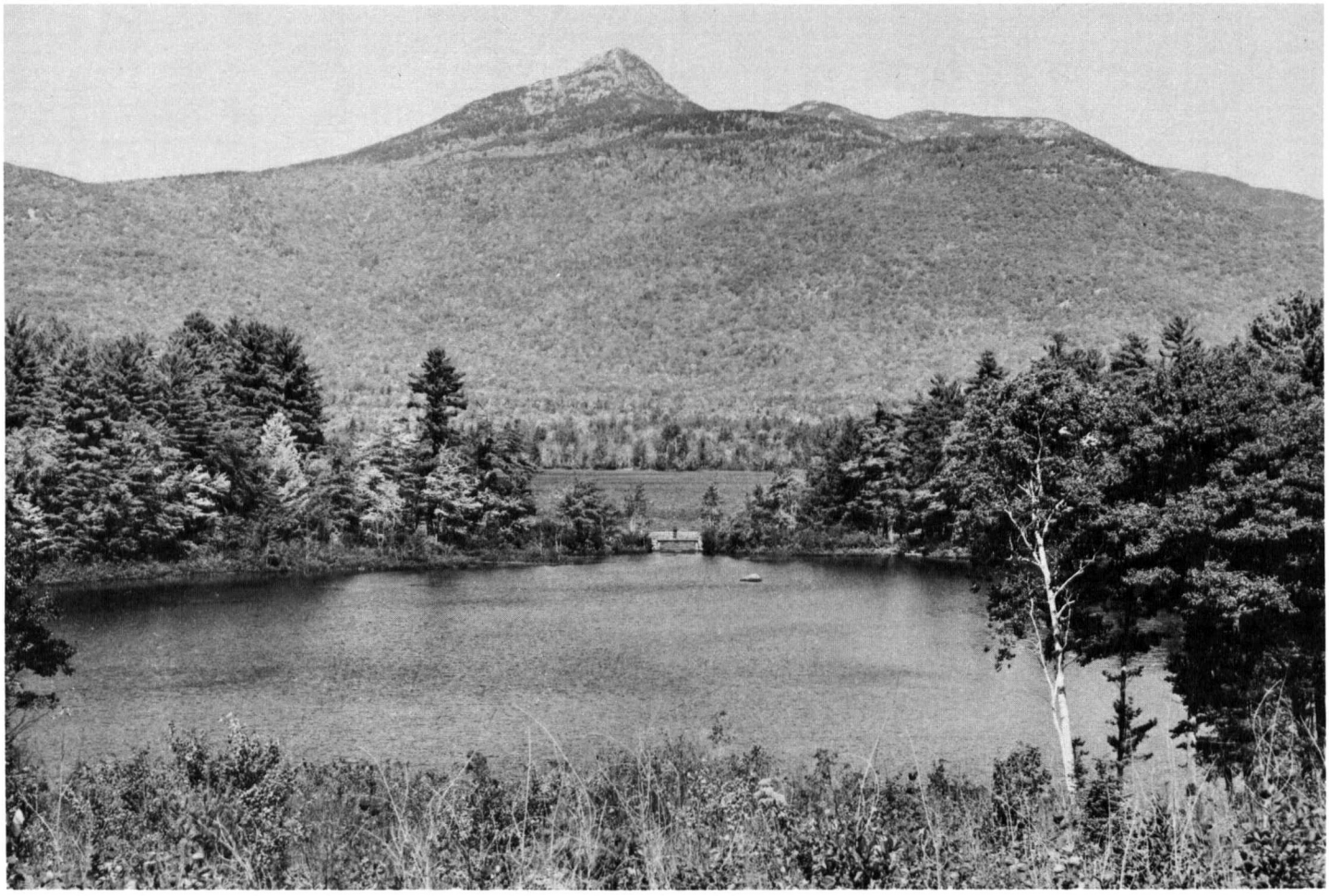
SOIL SURVEY OF

Carroll County, New Hampshire



United States Department of Agriculture
Soil Conservation Service and Forest Service
In cooperation with
New Hampshire Agricultural Experiment Station

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

Major fieldwork for this soil survey was completed in the period 1956–72. Soil names and descriptions were approved in 1973. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1972. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the New Hampshire Agricultural Experiment Station. It is part of the technical assistance furnished to the Carroll County Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Carroll County are shown in the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and identified by symbols. All areas marked with the same symbol are the same kind or kinds of soil. The soil symbol is inside the area if there is enough room; otherwise it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions.

Foresters and others can refer to the section "Woodland Management," where the soils of the county are rated according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife Management."

Community planners and others can read about soil properties that affect the choice of sites for dwellings and for recreation areas in the sections "Town and County Planning" and "Recreational Development."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation, Morphology, and Classification of the Soils."

Newcomers in Carroll County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given in the section "Environmental Factors Affecting Soil Use."

Cover: This forested area around Chocorua Lake has good potential for recreational uses. The Colton-Adams association surrounds the lake and the Lyman-Berkshire-Hermon association extends to Mt. Chocorua in the background.

Contents

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Index to Mapping Units

Summary of Tables

SOIL SURVEY OF CARROLL COUNTY, NEW HAMPSHIRE

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
AND FOREST SERVICE, IN COOPERATION WITH NEW HAMPSHIRE AGRICULTURAL EXPERIMENT STATION

CARROLL COUNTY is in the east-central part of New Hampshire (fig. 1). It is bounded on the east by the State of Maine, on the north and northwest by Coos and Grafton Counties, and on the south and southwest by Strafford and Belknap Counties. The county has a total area of 995.6 square miles, of which 57.7 square miles is water. About 92 percent of the land area is wooded, including about 147,000 acres of Federal land in the White Mountain National Forest.

The most striking landscape features of the county are the rolling hills and low mountains in the central and southern parts of the county and the steep mountains in the northern and western parts. The many lakes and ponds and their backdrop of mountains and hills provide Carroll County with some of the most scenic areas in the State.

Carroll County is essentially rural. Conway is the most populous town, and Ossipee is the county seat. The county's population of 19,293 in 1971 represents an increase of about 22 percent since 1960. During the peak of the tourist season, the population in the northern part of the county has been estimated to be about 50,000.

Those activities that serve the needs of the tourist trade are the mainspring of the county's economy, and industry is second in importance. Farming, once a major part of the economy, has decreased to the point that today only a few farms remain in the county, mainly in the Saco River Valley. Recently there has been a considerable increase in the development of land for campgrounds, picnic areas, ski areas, and vacation homes.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Carroll County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes; the size and speed of streams; the kinds of native plants or crops; the kinds of rock; and many facts

[1] Others participating in the fieldwork were RICHARD W. BOND, RICHARD R. DAVIS, NORMAN M. DAVIS, CARL E. DELLINGER, JAMES B. HERSEY, THEODORE L. KELSEY, RODNEY PETERS, ROY A. SHOOK, and GARNET J. WOOD.

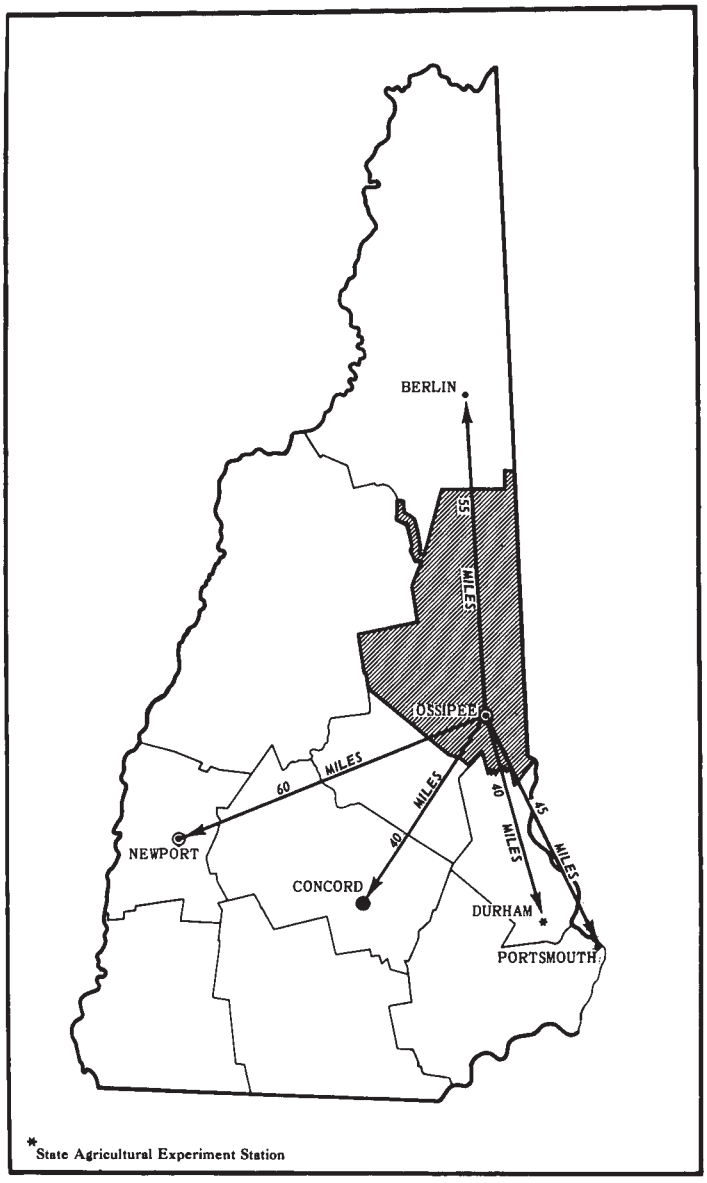

Figure 1.—Location of Carroll County in New Hampshire.

about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures (*16, 19*) [2]. The *soil series* is the category of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Colton and Berkshire, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Colton gravelly loamy fine sand, 0 to 3 percent slopes, is one of several phases within the Colton series.

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

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Carroll County: soil complexes and soil associations.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Lyman-Berkshire very rocky fine sandy loams, 3 to 8 percent slopes, is an example.

A soil association is made up of adjacent soils that occur as areas large enough to be shown individually on the soil map but that are shown as one unit because the time and effort of delineating them separately cannot be justified. There is a considerable degree of uniformity in pattern and relative extent of the dominant soils, but the soils may differ greatly one from another. The name of an association consists of the names of the dominant soils, joined by a hyphen. Rock outcrop-Lyman association, steep, is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Rock outcrop is a land type in Carroll County.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kind of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kind of soil. Yields under defined management are estimated for all the soils.

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or to its high water table. They see that streets, road pavements, and foundations for houses are cracked on a particular soil and they relate this failure to the high potential frost action. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

Soil Survey Intensities

Part of Carroll County is mapped at medium intensity and part at low intensity (fig. 2). The different intensities of field study are best described by the kind and composition of mapping units and the intensity of field procedures. A given confidence level for making soil behavior predictions is established by the different intensities of study.

In areas mapped at medium intensity, soils are examined at regular intervals and mapping units narrowly defined in terms of making predictions for

[2] Italic numbers in parentheses refer to Literature Cited, p. 158

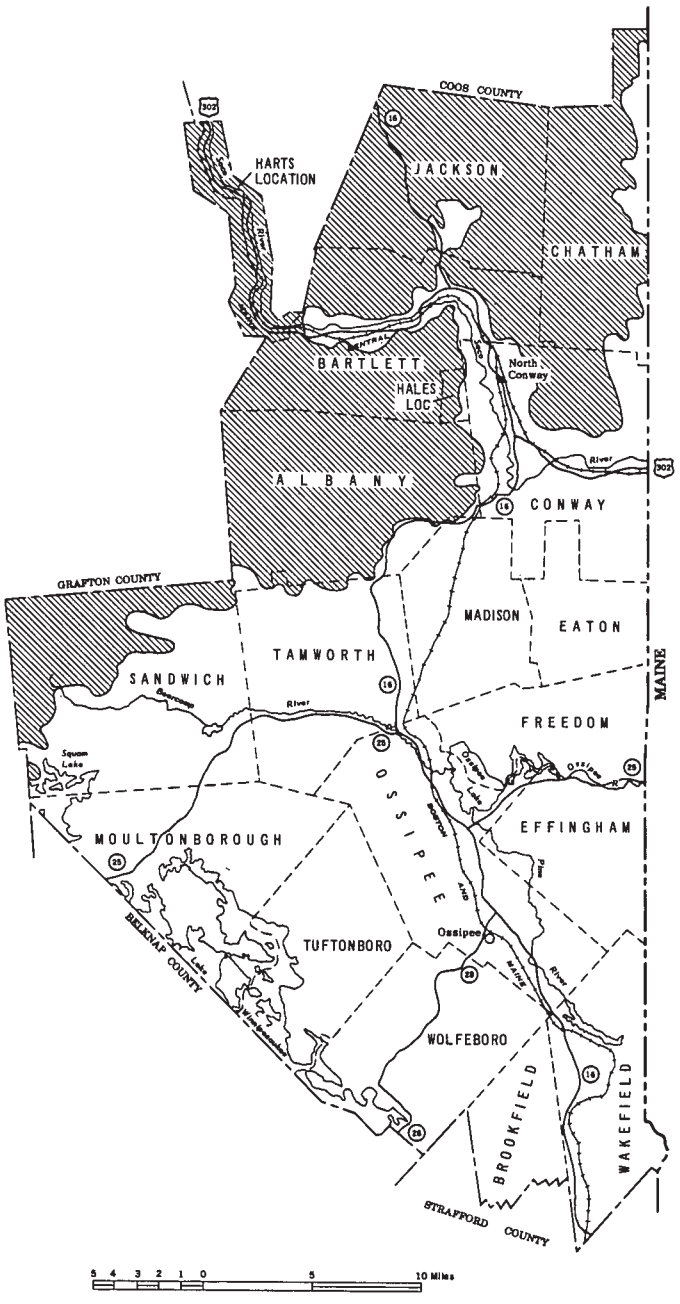

***Figure 2.*—Major areas of soil survey intensities in Carroll County. The shaded area indicates soils mapped mostly at low intensity and broadly defined. The unshaded area indicates soils mapped mostly at medium intensity and narrowly defined.**

intensive uses, such as septic tank sewage effluent disposal, dwellings, streets and parking lots, etc.

Soils mapped at low intensity are examined at wider intervals and mapping units broadly defined to fit the need of making predictions for broad uses, such as timber management. Although broadly defined mapping units are designed primarily for broad uses in Carroll County, predictions or interpretations for intensive uses are made by major components. Broadly defined mapping units have not been assigned to capability units because of the variability of the soils within mapped areas.

Broadly defined mapping units generally cover heavily wooded parts of the county that are not easily accessible and that require interpretations for broad uses. Most of the White Mountain National Forest in Carroll County is mapped using low intensity field procedures and broadly defined mapping units.

The kind of broadly defined mapping unit covering the greatest area in the county is a soil association. The associations are named for the major soil or soils in it; for example, Hermon very stony fine sandy loam association, steep.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Carroll County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in this survey have been grouped into three general kinds of landscapes for broad interpretive purposes. Each of the broad groups and their included soil associations are described in the following pages.

Soils That Formed in Water-Deposited Material

The soils that make up these associations are mainly in the Saco River Valley and on the Silver Lake, Ossipee Lake, and Pine River Valley plains. They formed in thick, water-deposited material on glacial outwash terraces, kames, and eskers; in intervales; and on flood plains along the larger streams. The soil material ranges in texture from sand to silt and is stratified in most places. Organic deposits are common in the wetter depressions. Slopes range from nearly level on the flood plains to very steep on kames and eskers. The main dairy farming area in the county is on the gently sloping flood plains and terraces of the Saco River Valley.

1. Colton-Adams association

Nearly level to very steep, excessively drained gravelly and sandy soils; on terraces, kames, and eskers

This soil association is on terraces in the Saco River

and Bearcamp River watersheds and in the plains adjacent to Ossipee Lake and Silver Lake. Other small areas of this soil are in former glacial drainageways and near lakes in the northern two-thirds of the county. The association makes up about 5 percent of the county. Colton soils make up about 75 percent of this association, Adams soils 15 percent, and minor soils 10 percent.

Colton soils are excessively drained. They formed in gravel and sand deposits. These soils are on all landscapes in the association.

Adams soils are excessively drained. They formed in thick sand deposits. These soils are commonly on terraces and lake plains, but they are also on steep kames and eskers.

Among the minor soils are scattered spots of moderately well drained Croghan and Duane soils. Both these soils are in shallow depressions and have a seasonal high water table.

The main limitation of soils in this association for community development is the potential pollution hazard to ground water from subsurface sewage disposal systems. Droughtiness and low natural fertility are the main limitations for farming. The soils in about one-third of the area are steep enough to have an additional moderate to severe hazard of erosion. Colton soils contain gravel and, in some places, cobbles that interfere with cultivation or landscaping operations.

Most of this association is wooded, but some is in idle fields or pasture. Many communities are built at least partly on soils in this association. New areas are being developed for residential and industrial uses because these soils have desirable characteristics for community development. The soils in this association have good potential as a source of sand and gravel, and there are sand and gravel pits throughout the association.

2. *Adams-Naumburg-Croghan association*

Dominantly nearly level to sloping, excessively drained to poorly drained sandy soils; on terraces and mountain intervales

This soil association is on low terraces along major streams and lake borders and in mountain intervales. It is in the northern two-thirds of the county. It makes up about 2 percent of the county. Adams soils make up about 40 percent of this association, Naumburg soils 36 percent, Croghan soils 12 percent, and minor soils 12 percent.

Adams soils are excessively drained. They formed in thick sand deposits. These soils are on the highest positions on the landscape.

Naumburg soils are somewhat poorly drained and poorly drained. They formed in sand deposits. These soils are in the lower depressions where the water table is at or near the surface for long periods.

Croghan soils are moderately well drained. They formed in sand deposits. These soils occupy the intermediate position on the landscape where the water table seasonally rises to near the surface.

Among the minor soils are the well-drained to somewhat excessively drained Hermon soils, the well-drained Salmon soils, and the moderately well drained Nicholville soils. Hermon soils are on positions that are transitional between uplands and mountain intervales or former glacial lake basins.

The main limitation of Adams soils for community development is the potential hazard of pollution of ground water by subsurface sewage disposal systems. Droughtiness and low natural fertility are the main limitations for farming. The seasonal high water table in Croghan soils and the high water table in Naumburg soils are the main limitations for most community development uses. Artificial drainage improves both Naumburg and Croghan soils for most farm and nonfarm uses.

Most of this association is wooded. A few areas are in idle fields or pasture adjacent to the dairy farming area along the Saco River. Some communities are built partly on the Adams soils in this association. These soils have characteristics favorable for most community development uses. If drained, Croghan soils have slight limitations for most uses. Naumburg soils have good potential for dugout ponds and for development of wetland wildlife habitat.

3. *Hinckley-Windsor-Deerfield association*

Nearly level to very steep, excessively drained and moderately well drained gravelly and sandy soils; on *terraces, kames, and eskers*

This soil association is on terraces, kames, and eskers mainly on the Pine River Valley plains south of Ossipee Lake. Other small areas are in former glacial drainageways and near lakes in the southern third of the county. The association makes up about 4 percent of the county. Hinckley soils make up about 45 percent of this association, Windsor soils 35 percent, Deerfield soils 10 percent, and minor soils 10 percent.

Hinckley soils are excessively drained. They formed in thick gravel and sand deposits. These soils are on all landscapes in this association.

Windsor soils are excessively drained. They formed in thick sand deposits. These soils are commonly on terraces, lake plains, and, in some places, steeper kames and eskers.

Deerfield soils are moderately well drained. They formed in sand deposits. These soils are in the shallow depressions where the water table rises to near the surface during wet seasons.

Among the minor soils are scattered spots of Gloucester and Naumburg soils.

The main limitation of soils in this association for most community development uses is the potential hazard of pollution of ground water by subsurface sewage disposal systems. Droughtiness and low natural fertility are the main limitations for farming. The soils in about one-third of the association are steep enough to have a moderate to severe hazard of erosion. Hinckley soils contain gravel and, in some places, cobbles that interfere with cultivation or landscaping operations.

Most of this association is wooded, but some is in idle fields or pasture. Many communities are built at least partly on soils in this association, and more areas are being developed because these soils have characteristics favorable for community development. The soils in this association have good potential as a source

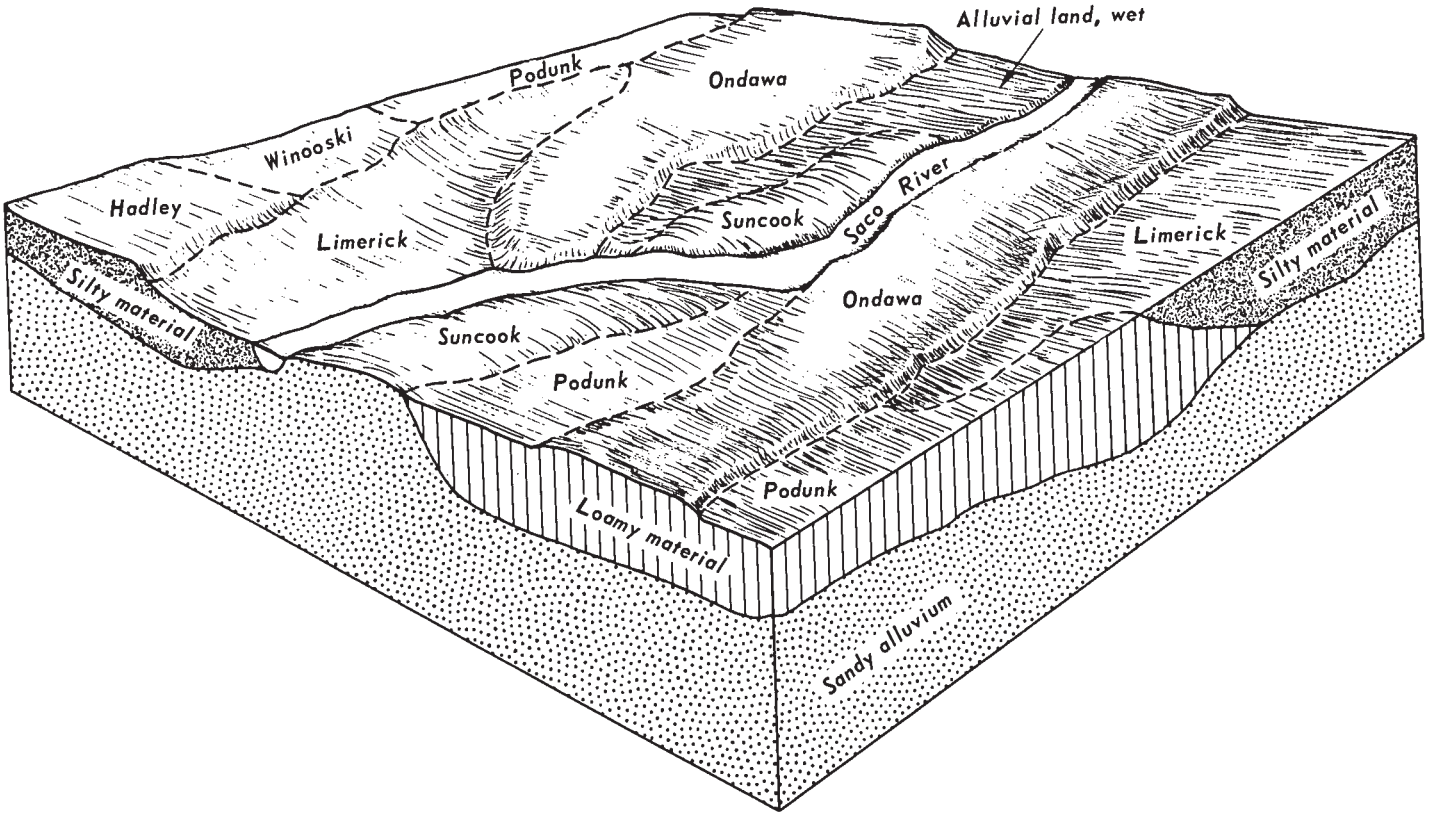

Figure 3.—**Typical pattern of soils and underlying material in the Ondawa-Limerick-Podunk association.**

of sand and gravel, and sand and gravel pits are common.

4. *Ondawa-Limerick-Podunk association*

Nearly level, well drained, poorly drained, and moderately well drained loamy soils; on flood plains

This soil association is on flood plains primarily along the Saco and Bearcamp Rivers (fig. 3). It makes up about 2 percent of the county. Ondawa soils make up about 38 percent of this association, Limerick soils 20 percent, Podunk soils 12 percent, and minor soils 30 percent.

Ondawa soils are nearly level to gently sloping and well drained. They formed in loamy deposits thicker than 20 inches over sand or gravel. These soils are on both the high and low bottom positions on the flood plains.

Limerick soils are nearly level and poorly drained. They formed in loamy deposits, high in silt, that are thicker than 20 inches over sand or gravel. These soils are in wet depressions and oxbows on the flood plains. They have a long-duration high water table.

Podunk soils are nearly level and moderately well drained. They formed in loamy deposits thicker than 20 inches over sand or gravel. These soils are in shallow depressions on both high and low bottom positions on the flood plains. They have a seasonal high water table.

Among the minor soils are excessively drained Suncook soils on natural river levees; Alluvial land, wet, and Greenwood soils in wet depressions; Hadley soils on high bottom positions; and moderately well drained Winooski soils in shallow depressions.

Flooding is a potential hazard for community development uses and certain recreational developments using permanent facilities. Other limitations for intensive uses are the seasonal high water table in Limerick soils. The well-drained soils make excellent farmland, especially those on high bottom positions that flood less frequently than those in lower positions. The high water table in Podunk and Limerick soils can generally be controlled by open ditch or tile drainage.

Much of this association in the Saco River Valley is used for corn and hay. A few areas remain idle. The Saco River valley is the main dairy farming area in the county.

5. *Greenwood-Chocorua-Naumburg association*

Nearly level, very poorly drained organic soils and somewhat poorly drained and poorly drained sandy soils; along broad drainageways and in depressions

This soil association is in broad, wet depressions and drainageways along major streams and adjacent to lakes. The association makes up about 1 percent of the county. Greenwood soils make up about 50 percent of this association, Chocorua soils 30 percent, Naumburg soils 15 percent, and minor soils 5 percent.

Greenwood and Chocorua soils are very poorly drained. They formed in mucky peat deposits that vary in thickness. Chocorua soils are 16 to 51 inches thick over sand or gravel, and Greenwood soils are

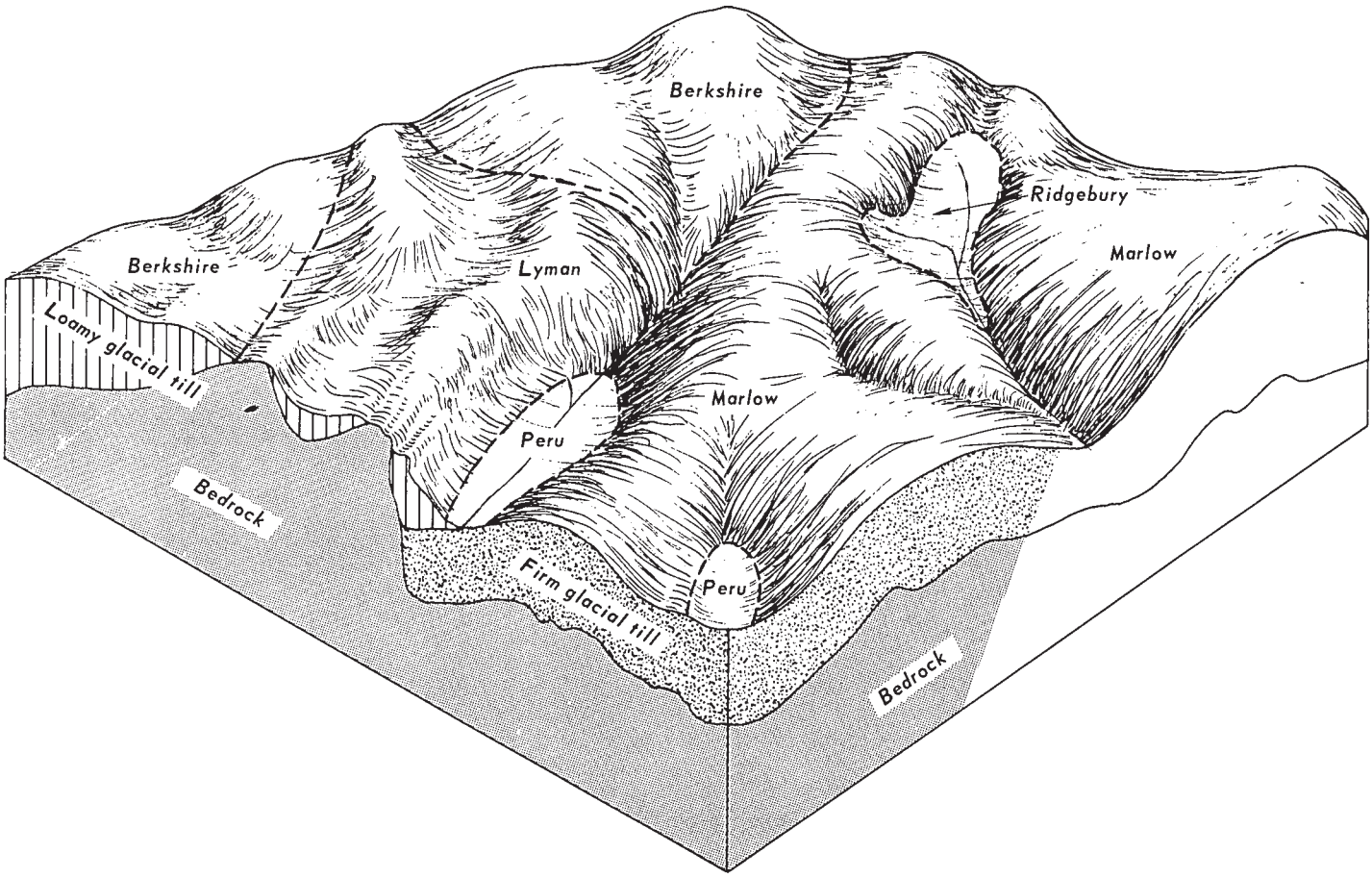

Figure 4.—**Typical pattern of soils and underlying material in the Marlow-Lyman-Berkshire association.**

more than 51 inches thick. These soils are in depressions where the water table is at or near the surface most of the time.

Naumburg soils are somewhat poorly drained and poorly drained. They formed in thick sand deposits. These soils are on slightly elevated positions adjacent to the wetter organic bogs on terraces and lake plains.

Among the minor soils are the wet Ossipee soils that formed in mucky peat deposits 16 to 51 inches thick over loams, Fresh water marsh, poorly drained Raynham variant soils, and sandy and loamy soils on small island rises and bog beaches.

The main limitation of soils in this association for most uses is the long-duration high water table. The poor stability and shear strength of organic material is an added limitation of the organic soils.

This association is in woods and open bogs. The excessive wetness and lack of adequate drainage outlets favor development for wetland wildlife habitat. Where areas are filled for roads, the organic material must be removed to reduce subsidence and improve stability.

Soils That Formed in Glacial Till on the White Mountains and Adjacent Uplands

The soils that make up these associations are in the northern two-thirds of the county. They formed mainly in glacial till that varies in thickness and is over bedrock. Areas that have bedrock exposed commonly are on ridgetops. The soils on the rolling or hilly lower landscapes, near streams, are generally without pan layers, while those at higher elevations and on smooth elliptical landforms dominantly have compact pan layers in the substratum. Most of the soils of these associations are wooded because they are too stony, rocky, or steep for farming.

6. Marlow-Lyman-Berkshire association

Gently sloping to very steep, well-drained stony loamy soils, most of which have a pan layer, and somewhat excessively drained soils that are shallow over bedrock; on mountains and uplands

This soil association is on the White Mountains and upland foot slopes in the extreme northern part of the county (fig. 4). It makes up about 14 percent of the county. Marlow soils make up about 50 percent of this association, Lyman soils 20 percent, Berkshire soils 18 percent, and minor soils 12 percent.

Marlow soils are gently sloping to very steep and well drained. They formed in loamy glacial till. These soils have a pan layer at a depth of 15 to 36 inches. They are on smooth mountainsides, valley walls, and foot slopes associated with the White Mountains. Surface stones are common.

Lyman soils are somewhat excessively drained. They formed in less than 20 inches of loamy glacial till overlying bedrock. These soils generally are on the high ridges and valley walls. Bedrock outcropping is common.

Berkshire soils are very closely associated with the Marlow soils in the landscape. They are gently sloping to very steep and well drained. These soils formed in loamy glacial till and generally have south-facing slopes. Surface stones are common.

Among the minor soils are moderately well drained Peru soils and poorly drained and somewhat poorly drained Ridgebury soils. The Peru soils are in lower areas where slopes are concave, and the Ridgebury soils are in depressions and along drainageways.

The main limitations of soils in this association for most farm and nonfarm uses are shallowness to bedrock, rockiness, presence of a pan layer, stoniness, and steepness of slope. Cleared areas are susceptible to erosion.

Most of this association is wooded and is in the White Mountain National Forest. Some areas are being developed as recreational homesites and ski areas. The limitations for intensive development are severe in more than 90 percent of the area. Very careful planning and extensive conservation structures and safeguards are needed to properly overcome soil limitations. Soils of this association have good potential for production of timber, skiing, hiking, hunting, and the development of scenic vistas.

7. *Lyman-Berkshire-Hermon association*

Dominantly moderately steep to very steep, shallow over bedrock, somewhat excessively drained soils and deep, well-drained to somewhat excessively drained stony loamy and stony sandy soils; on uplands and mountains

This soil association is on the high ridges on mountains and hills in the northern two-thirds of the county. It is characterized by moderately steep to very steep soils that have rock outcrops and stones on the surface. The association makes up about 22 percent of the county. Lyman soils make up about 45 percent of this association, Berkshire soils 35 percent, Hermon soils 12 percent, and minor soils 8 percent.

Lyman soils are somewhat excessively drained. They formed in less than 20 inches of loamy glacial till overlying bedrock. These soils are on the ridges on mountaintops, hilltops, and valley walls.

Berkshire soils are well drained. They formed in loamy glacial till. Generally these soils are on high valley walls and ridgetops and are common on south-facing slopes. In most places stones are on the surface.

Hermon soils are well drained to somewhat excessively drained. They formed in sandy glacial till. These soils are common to the irregular lower valley slopes. In most places there are many stones on the surface.

Among the minor soils are moderately well drained Peru and Waumbek soils on lower concave slopes and rock outcrops on mountaintops and sheer valley walls.

The main limitations of the major soils in this association for most uses are shallowness to bedrock, rockiness, stoniness, steep slopes, and susceptibility to erosion.

Most of this association is wooded, and at least half is in the White Mountain National Forest. A few areas are being developed as recreational homesites and ski areas. Soils of this association have poor potential for most farm and community development uses. Very careful planning and expensive conservation structures and safeguards are required to properly overcome inherent hazards. This association has good potential for production of timber, skiing, hiking, and the development of woodland wildlife habitat and scenic vistas.

8. *Marlow-Peru association*

Gently sloping to steep, well drained and moderately well drained stony loamy soils that have a pan layer; on uplands

This soil association is on the gently sloping to steep mountain foot slopes and smooth glacial uplands adjacent to the White Mountains in the northern two-thirds of the county, mostly in the town of Sandwich. It makes up about 3 percent of the county. Marlow soils make up about 65 percent of this association, Peru soils 25 percent, and minor soils 10 percent.

Marlow soils are well drained. They formed in loamy glacial till. These soils have a pan layer at a depth of 15 to 36 inches. They are commonly in the convex upper landscape positions on smooth uplands.

Peru soils are moderately well drained. They formed in loamy glacial till. A pan layer is at a depth of 12 to 36 inches. These soils are commonly in shallow depressions and lower concave slopes.

Among the minor soils are moderately well drained Waumbek soils along drainageways and on lower upland slopes and well-drained Berkshire soils that are closely associated with Marlow soils in upper landscape positions.

The main limitations of the soils in this association for most farm and nonfarm uses are the pan layer, a seasonal high water table, and stoniness. If cleared, most of these soils have a moderate or severe hazard of erosion.

Most of this association has been reforested, but some acreage remains in pasture and is being used as hobby farms. Soils of this association have good potential for production of timber and for selected recreational uses. Some gently sloping to sloping stone-free soils have good potential for farm uses.

9. *Becket-Hermon-Skerry association*

Gently sloping to steep, well drained, somewhat excessively drained, and moderately well drained stony soils, most of which have a sandy pan layer; on uplands

This soil association is on the rolling and hilly, dissected uplands in the northern two-thirds of the county. It makes up about 12 percent of the county. Becket soils make up about 38 percent of this association, Hermon soils 30 percent, Skerry soils 20 percent, and minor soils 12 percent.

Becket soils are well drained. They formed in glacial till. These soils have a loamy cap 18 to 36 inches thick over a firm sandy pan. They are commonly on convex, smooth and dissected hillsides.

Hermon soils are well drained to somewhat excessively drained. They formed in sandy glacial till. These

soils are in choppy, irregular areas. In most places, stones are on the surface.

Skerry soils are moderately well drained. They formed in glacial till. These soils have a loamy cap 18 to 30 inches thick over a sandy pan layer. They are commonly on concave lower hillsides.

Among the minor soils are well-drained Marlow soils on the smooth north-facing slopes, moderately well drained Peru and Waumbek soils on lower foot slopes, and poorly drained and somewhat poorly drained Ridgebury soils along drainageways.

The main limitations of the soils in this association for most farm and nonfarm uses are the pan layer, a seasonal high water table, stoniness, and in some places, slope. If cleared, most of these soils are susceptible to erosion.

Much of this association is wooded. Some previously farmed areas have reverted to woodland. A few small hobby farms remain. Most soils of this association have poor potential for intensive uses, such as those associated with community and recreational development. Very careful planning and proper design or operation are needed to overcome limitations.

10. Hermon-Berkshire-Waumbek association

Gently sloping to very steep, somewhat excessively drained to moderately well drained stony sandy and stony loamy soils; on uplands

This association is on the more irregular lower mountain side slopes, upland hills, and rolling terrace borders in the northern two-thirds of the county. It makes up about 12 percent of the county. Hermon soils make up about 52 percent of this association, Berkshire soils 20 percent, Waumbek soils 12 percent, and minor soils 16 percent.

Hermon soils are well drained to somewhat excessively drained. They formed in stony glacial till. These soils are on the steeper or convex landscape positions.

Berkshire soils are well drained. They formed in loamy glacial till. These soils are on smooth upper slopes and generally have stones on the surface.

Waumbek soils are moderately well drained. They formed in stony sandy glacial till. These soils are on the more gently sloping, lower concave positions.

Among the minor soils are Lyman soils, which are shallow over bedrock and well-drained Becket soils on smooth upper slopes and hilltops, somewhat poorly drained and poorly drained Leicester soils in drainageways and shallow depressions, and very poorly drained Greenwood soils in the deeper enclosed depressions.

The main limitations of the soils in this association for most farm and nonfarm uses are steepness of slope, stoniness, and a seasonal high water table. Most of the soils, if cleared, have a moderate or severe hazard of erosion.

Most of this association is wooded, but a few areas are being developed for recreational second homes. The gentler landscapes at the lower elevations have potential for residential development, but most of this association is better suited to production of timber and to other uses of wooded areas.

11. Canaan-Redstone association

Sloping to very steep, somewhat excessively drained rocky and stony soils that are shallow to deep over bedrock; on uplands

This soil association is on the irregular hills and mountaintops mostly on the eastern slopes of the White Mountains within the Saco River watershed. Rock outcrop and stones are common on the surface. This association makes up about 2 percent of the county. Canaan soils make up about 48 percent of this association, Redstone soils 32 percent, and minor soils 20 percent.

Canaan soils are somewhat excessively drained. They formed in gravelly glacial till less than 20 inches over bedrock. These soils are mostly on knolls and ridges.

Redstone soils are somewhat excessively drained. They formed in glacial deposits of dominantly weathered, gravel-sized granite fragments. These soils are mostly on foothills and mountainsides.

Among the minor soils are well-drained Berkshire and Becket soils on smooth foot slopes and rolling uplands and moderately well drained Skerry soils on the lower concave landscape positions. Rock outcrop is in areas of Canaan soils.

The main limitations of the soils in this association for most farm and nonfarm uses are shallowness to bedrock, rockiness, stoniness, and steepness of slope.

Most of this association is wooded, but some areas are being developed as residential homesites. Pockets of loose, gravel-sized fragments of Conway granite are important local sources of gravel.

Soils That Formed in Glacial Till on Uplands in the Southern Part of the County

The soils that make up these associations are in the southern third of the county. They formed mainly in glacial till and are, in most places, very stony. Bedrock exposures are commonly on ridgetops. The soils on the rolling or hilly lower landscapes near streams are generally without pan layers, while those on smooth elliptical landforms have compact pan layers in the substratum. Most of the soils of these associations are wooded. A few scattered small farms are still in operation where trees and stones have been cleared.

12. Paxton-Woodbridge-Ridgebury association

Nearly level to moderately steep, well drained, moderately well drained, poorly drained, and somewhat poorly drained loamy soils that have a pan layer; on uplands

This soil association is on the smooth, oval glacial uplands in the southern third of the county (fig. 5). It makes up about 3 percent of the county. Paxton soils make up about 52 percent of this association, Woodbridge soils 28 percent, Ridgebury soils 10 percent, and minor soils 10 percent.

Paxton soils are gently sloping to moderately steep and well drained. They formed in loamy glacial till. These soils have a loamy pan layer at a depth of 16 to 36 inches. They are commonly in the convex upper positions on the landscape. Stones are common on and below the surface.

Woodbridge soils are gently sloping to sloping and moderately well drained. They formed in loamy glacial

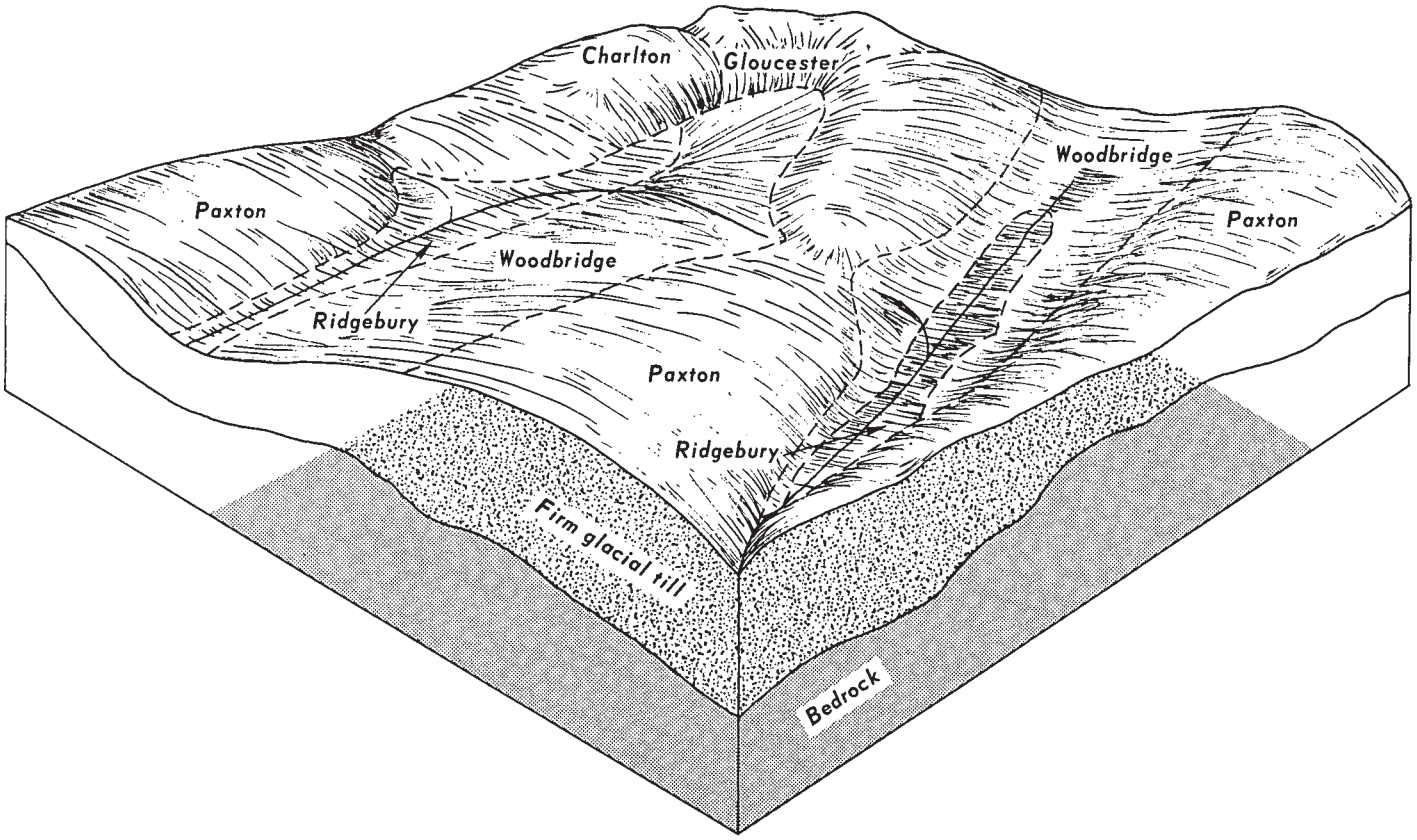

Figure 5.—**Typical pattern of soils and underlying material in the Paxton-Woodbridge-Ridgebury association.**

till and have a pan layer at a depth of 18 to 36 inches. These soils are on the lower concave slopes. Stones are common on the surface.

Ridgebury soils are nearly level to gently sloping and poorly drained and somewhat poorly drained. They formed in loamy glacial till and have a pan layer at a depth of 10 to 25 inches. These soils are in depressions and drainageways.

Among the minor soils are the somewhat excessively drained Gloucester soils, the well-drained Charlton soils on landscapes closely associated with Paxton soils, and the very poorly drained Whitman soils along drainageways and in depressions.

The major limitations of soils in this association for most farm and nonfarm uses are a seasonal high water table, the pan layer, and stoniness. If cleared of protective cover, most soils of this association have a moderate to severe hazard of erosion.

Much of this association was once farmed but now is reverting to woodland. There are still a few scattered small areas of open fields or idle farmland. The well-drained soils or those with improved drainage have good potential for growing apples.

13. Millis-Scituate-Ridgebury association

Nearly level to moderately steep, well drained and moderately well drained soils that have a sandy pan layer, and poorly drained and somewhat poorly drained soils that have a loamy pan layer; on uplands

This soil association is on the smoothly dissected, oval glacial uplands in the southern third of the county. In most places stones cover the surface. The association makes up about 6 percent of the county. Millis soils make up about 52 percent of the association, Scituate soils 23 percent, Ridgebury soils 10 percent, and minor soils 15 percent.

Millis soils are gently sloping to moderately steep and well drained. They formed in loamy glacial till and have a sandy pan layer at a depth of 18 to 36 inches. These soils commonly are in convex upper landscape positions.

Scituate soils are gently sloping to sloping and moderately well drained. They formed in loamy glacial till and have a sandy pan layer at a depth of 18 to 30 inches. These soils are in the concave intermediate landscape positions between well-drained Millis soils and poorly drained and somewhat poorly drained Ridgebury soils.

Ridgebury soils are nearly level to gently sloping and poorly drained and somewhat poorly drained. They formed in glacial till and have a loamy pan layer at a depth of 10 to 25 inches. These soils are in the low depressions and drainageways on uplands.

Among the minor soils are the somewhat excessively drained Gloucester soils and the Hollis soils, which are shallow over bedrock, on the more irregular landforms and ridgetops. The well-drained Paxton soils are adjacent to Millis soils in upper landscape positions, and the very poorly drained Whitman soils are in depressions and along broad drainageways.

The major limitations of soils in this association affecting most farm and nonfarm uses are a seasonal high water table, the pan layer, and stoniness. Cleared areas are susceptible to erosion.

Much of this association was once farmed but now is reverting to woodland. There are some areas still in open fields or idle farmland. Most active farmland is used for specialized crops or for part-time hobby usage. More and more of the area is being used for residential and recreational development, especially near lakes or other centers of attraction. The well-drained soils have good potential for growing apples.

14. Gloucester-Acton-Leicester association

Nearly level to steep, somewhat excessively drained and moderately well drained sandy soils, and somewhat poorly drained and poorly drained loamy soils; on uplands

This soil association is on the irregular, undulating to hilly glacial uplands in the southern third of the county. Soils in this association are generally very stony to extremely stony. The association makes up about 5 percent of the county. Gloucester soils make up about 55 percent of the association, Acton soils 20 percent, Leicester soils 15 percent, and minor soils 10 percent.

Gloucester soils are gently sloping to steep and somewhat excessively drained. They formed in stony glacial till. These soils are in the convex upper positions on the landscape.

Acton soils are gently sloping to sloping and moderately well drained. They formed in stony glacial till. These soils are in the concave intermediate landscape positions between somewhat excessively drained Gloucester soils and somewhat poorly drained and poorly drained Leicester soils.

Leicester soils are somewhat poorly drained and poorly drained. They formed in loamy glacial till. These soils are in low depressions and drainageways.

Among the minor soils are well-drained Millis soils on the smooth landforms, Hollis soils, which are shallow over bedrock on the irregular ridges and knobs, well-drained Charlton soils in the deep pockets, and areas of Muck and Peat in flat depressions.

The major limitations of soils in this association for most farm and nonfarm uses are a seasonal high water table, steepness of slope, and stoniness.

Most of this association is wooded, but scattered small tracts are in pasture. More and more of the area is being used for residential and recreational development, especially near lakes or other centers of interest. The less steep areas have good potential for community development.

15. Hollis-Gloucester-Charlton association

Gently sloping to very steep, somewhat excessively drained to well-drained loamy and sandy soils that are shallow to deep over bedrock; on uplands and mountains

This soil association is on ridges, low mountains, and humpy landscapes in the southern third of the county. In most places, rock outcrops and stones cover the surface. The association makes up about 7 percent of the county. Hollis soils make up about 40 percent of this association, Gloucester soils 35 percent, Charlton soils 15 percent, and minor soils 10 percent.

Hollis soils are gently sloping to very steep and somewhat excessively drained. They formed in loamy glacial till less than 20 inches thick over bedrock.

Gloucester soils are gently sloping to very steep and somewhat excessively drained. They formed in stony glacial till. These soils are on hills and mountainsides below high ridges.

Charlton soils are gently sloping to moderately steep and well drained. They formed in loamy glacial till. These soils are on the smoother landforms and in deep soil areas closely associated with the Hollis soils.

Among the minor soils are the moderately well drained Acton and Sutton soils on the lower concave positions, well-drained Millis soils on smooth hills, and somewhat poorly drained and poorly drained Leicester and Walpole soils in depressions and along drainageways.

The main limitations of soils in this association for most farm and nonfarm uses are shallowness to bedrock, rockiness, steepness of slope, and stoniness. Most of this association is wooded, but a few small tracts are in pasture or are idle. Some areas near lakes have been developed for recreational and residential uses, but most soils of this association are better suited to woodland or extensive recreational uses.

Descriptions of the Soils

This section describes the soil series and mapping units in Carroll County. Each soil series is described in detail, and then, briefly, each mapping unit in that series is described. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile; that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. Color terms are for moist soil unless otherwise stated. The profile described in the series is representative for mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are differences that are apparent in the name of the mapping unit.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Alluvial land, wet, and Rock outcrop, for example, do not belong to a soil series, but they are listed in alphabetic order along with the soil series.

Preceding the name of each mapping unit is the symbol that identifies the mapping unit on the detailed soil map. Listed at the end of each description of a narrowly defined mapping unit is the capability unit in which the mapping unit has been placed. The

TABLE 1.—*Approximate acreage and proportionate extent of narrowly defined mapping units*

Soil	Acres	Percent
Acton fine sandy loam, 0 to 8 percent slopes	360	0.1
Acton very stony fine sandy loam, 0 to 8 percent slopes	5,000	.8
Acton very stony fine sandy loam, 8 to 15 percent slopes	900	.2
Adams loamy sand, 0 to 3 percent slopes	4,700	.8
Adams loamy sand, 3 to 8 percent slopes	3,600	.6
Adams loamy sand, 8 to 15 percent slopes	850	.1
Adams loamy sand, 15 to 60 percent slopes	400	.1
Becket very stony fine sandy loam, 3 to 8 percent slopes	3,000	.5
Becket very stony fine sandy loam, 8 to 15 percent slopes	8,500	1.4
Becket very stony fine sandy loam, 15 to 25 percent slopes	8,800	1.5
Becket very stony fine sandy loam, 25 to 35 percent slopes	4,600	.8
Berkshire very stony fine sandy loam, 3 to 8 percent slopes	500	.1
Berkshire very stony fine sandy loam, 8 to 15 percent slopes	1,400	.2
Berkshire very stony fine sandy loam, 15 to 25 percent slopes	1,100	.2
Berkshire very stony fine sandy loam, 25 to 35 percent slopes	300	(1)
Berkshire extremely stony fine sandy loam, 8 to 25 percent slopes	1,700	.3
Charlton fine sandy loam, 3 to 8 percent slopes	250	(1)
Charlton very stony fine sandy loam, 3 to 8 percent slopes	460	.1
Charlton very stony fine sandy loam, 8 to 15 percent slopes	1,500	.3
Charlton very stony fine sandy loam, 15 to 25 percent slopes	2,100	.3
Colton gravelly loamy fine sand, 0 to 3 percent slopes	5,700	1.0
Colton gravelly loamy fine sand, 3 to 8 percent slopes	8,000	1.3
Colton gravelly loamy fine sand, 8 to 15 percent slopes	4,500	.8
Colton gravelly loamy fine sand, 15 to 60 percent slopes	4,400	.7
Croghan loamy fine sand, 0 to 3 percent slopes	1,200	.2
Croghan loamy fine sand, 3 to 8 percent slopes	770	.1
Deerfield loamy fine sand, 0 to 3 percent slopes	1,000	.2
Deerfield loamy fine sand, 3 to 8 percent slopes	2,000	.3
Duane fine sandy loam, 0 to 3 percent slopes	1,200	.2
Duane fine sandy loam, 3 to 8 percent slopes	2,100	.3
Gloucester fine sandy loam, 3 to 8 percent slopes	1,200	.2
Gloucester fine sandy loam, 8 to 15 percent slopes	516	.1
Gloucester very stony fine sandy loam, 3 to 8 percent slopes	5,500	.9
Gloucester very stony fine sandy loam, 8 to 15 percent slopes	17,500	2.9
Gloucester very stony fine sandy loam, 15 to 25 percent slopes	6,500	1.1
Gloucester extremely stony fine sandy loam, 8 to 25 percent slopes	4,500	.8
Gloucester extremely stony fine sandy loam, 25 to 60 percent slopes	1,200	.2
Hadley very fine sandy loam, high bottom	350	.1
Hermon fine sandy loam, 3 to 8 percent slopes	800	.1
Hermon fine sandy loam, 8 to 15 percent slopes	1,100	.2
Hermon very stony fine sandy loam, 3 to 8 percent slopes	6,500	1.1
Hermon very stony fine sandy loam, 8 to 15 percent slopes	17,000	2.8
Hermon very stony fine sandy loam, 15 to 25 percent slopes	8,000	1.3
Hermon very stony fine sandy loam, 25 to 60 percent slopes	1,850	.3
Hermon extremely stony fine sandy loam, 8 to 25 percent slopes	3,000	.5
Hermon extremely stony fine sandy loam, 25 to 60 percent slopes	1,600	.3
Hinckley gravelly loamy sand, 0 to 3 percent slopes	950	.2
Hinckley gravelly loamy sand, 3 to 8 percent slopes	3,700	.6
Hinckley gravelly loamy sand, 8 to 15 percent slopes	3,100	.5
Hinckley gravelly loamy sand, 15 to 60 percent slopes	3,400	.6
Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	300	(1)
Hollis-Charlton fine sandy loams, 8 to 15 percent slopes	300	(1)
Hollis-Charlton fine sandy loams, 15 to 25 percent slopes	250	(1)
Hollis-Charlton very rocky fine sandy loams, 3 to 8 percent slopes	1,500	.3
Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes	5,500	.9
Hollis-Charlton very rocky fine sandy loams, 15 to 25 percent slopes	4,000	.7
Hollis-Charlton very rocky fine sandy loams, 25 to 35 percent slopes	2,000	.3
Hollis-Charlton-Rock outcrop complex, 8 to 25 percent slopes	3,000	.5
Hollis-Charlton-Rock outcrop complex, 25 to 60 percent slopes	2,800	.5
Leicester-Walpole very stony fine sandy loams, 0 to 3 percent slopes	2,000	.3
Leicester-Walpole very stony fine sandy loams, 3 to 8 percent slopes	4,500	.8
Limerick silt loam	1,350	.2
Limerick very fine sandy loam, sandy subsoil variant	450	.1
Lyman-Berkshire very rocky fine sandy loams, 3 to 8 percent slopes	1,000	.2
Lyman-Berkshire very rocky fine sandy loams, 8 to 15 percent slopes	5,500	.9
Lyman-Berkshire very rocky fine sandy loams, 15 to 25 percent slopes	7,500	1.3
Lyman-Berkshire very rocky fine sandy loams, 25 to 35 percent slopes	5,500	.9
Lyman-Berkshire-Rock outcrop complex, 8 to 25 percent slopes	7,500	1.3
Lyman-Berkshire-Rock outcrop complex, 25 to 60 percent slopes	23,000	3.8
Marlow fine sandy loam, 3 to 8 percent slopes	500	.1
Marlow fine sandy loam, 8 to 15 percent slopes	600	.1
Marlow very stony fine sandy loam, 3 to 8 percent slopes	1,200	.2
Marlow very stony fine sandy loam, 8 to 15 percent slopes	4,500	.8
Marlow very stony fine sandy loam, 15 to 25 percent slopes	4,000	.7
Marlow very stony fine sandy loam, 25 to 60 percent slopes	4,500	.8
Millis fine sandy loam, 3 to 8 percent slopes	1,500	.3
Millis fine sandy loam, 8 to 15 percent slopes	800	.1
Millis very stony fine sandy loam, 3 to 8 percent slopes	3,200	.5

(1) Less than 0.1 percent.

TABLE 1.—*Approximate acreage and proportionate extent of narrowly defined mapping units*—Continued

Soil	Acres	Percent	Soil	Acres	Percent
Millis very stony fine sandy loam, 8 to 15 percent slopes	8,000	1.3	Salmon very fine sandy loam, sandy subsoil variant, 0 to 3 percent slopes	250	(1)
Millis very stony fine sandy loam, 15 to 25 percent slopes	4,800	.8	Salmon very fine sandy loam, sandy subsoil variant, 3 to 8 percent slopes	850	.1
Naumburg loamy sand, 0 to 8 percent slopes	7,500	1.3	Scituate very stony fine sandy loam, 3 to 8 percent slopes	5,500	.9
Nicholville silt loam, sandy subsoil variant, 0 to 3 percent slopes	350	.1	Scituate very stony fine sandy loam, 8 to 15 percent slopes	2,500	.4
Nicholville silt loam, sandy subsoil variant, 3 to 8 percent slopes	700	.1	Skerry very stony fine sandy loam, 3 to 8 percent slopes	5,800	1.0
Ondawa fine sandy loam	1,200	.2	Skerry very stony fine sandy loam, 8 to 15 percent slopes	6,800	1.1
Ondawa fine sandy loam, high bottom	1,400	.2	Suncook loamy fine sand	1,100	.2
Ondawa very fine sandy loam, sandy subsoil variant	1,300	.2	Sutton fine sandy loam, 0 to 8 percent slopes	200	(1)
Paxton fine sandy loam, 3 to 8 percent slopes	1,600	.3	Sutton very stony fine sandy loam, 0 to 8 percent slopes	300	(1)
Paxton fine sandy loam, 8 to 15 percent slopes	900	.2	Waumbek very stony fine sandy loam, 3 to 8 percent slopes	5,000	.8
Paxton very stony fine sandy loam, 3 to 8 percent slopes	1,500	.3	Waumbek very stony fine sandy loam, 8 to 15 percent slopes	2,500	.4
Paxton very stony fine sandy loam, 8 to 15 percent slopes	6,000	1.0	Whitman very stony loam	1,200	.2
Paxton very stony fine sandy loam, 15 to 25 percent slopes	2,000	.3	Windsor loamy sand, 0 to 3 percent slopes	1,300	.2
Peru very stony fine sandy loam, 3 to 8 percent slopes	7,500	1.2	Windsor loamy sand, 3 to 8 percent slopes	3,500	.6
Peru very stony fine sandy loam, 8 to 15 percent slopes	4,500	.8	Windsor loamy sand, 8 to 15 percent slopes	2,100	.3
Podunk fine sandy loam	600	.1	Windsor loamy sand, 15 to 60 percent slopes	2,200	.4
Podunk fine sandy loam, sandy subsoil variant	850	.1	Winooski very fine sandy loam	250	(1)
Raynham silt loam, sandy subsoil variant	750	.1	Woodbridge fine sandy loam, 3 to 8 percent slopes	1,100	.2
Ridgebury fine sandy loam, 0 to 8 percent slopes	350	.1	Woodbridge very stony fine sandy loam, 3 to 8 percent slopes	3,000	.5
Ridgebury very stony fine sandy loam, 0 to 3 percent slopes	2,100	.3	Woodbridge very stony fine sandy loam, 8 to 15 percent slopes	1,200	.2
Ridgebury very stony fine sandy loam, 3 to 8 percent slopes	8,000	1.3	Subtotal	376,456	62.7
			Water [2]	2,050	.3
			Total	378,506	63.0

[1] Less than .1 percent.

[2] Less than 40 acres in size and less than ⅛ mile in width.

broadly defined mapping units have not been assigned to capability units because of the variability of soils in mapped areas. The page for the description of each mapping unit can be found by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in tables 1 and 2. Many of the terms used in describing soils can be found in the Glossary at the end of this survey, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*16*).

Acton Series

The Acton series consists of moderately well drained soils that formed in deposits of stony sandy glacial till. These soils are on rolling uplands in the southern part of the county. They have concave slopes bordering depressions and drainageways or are on hillside foot slopes. Seepage from higher slopes causes these soils to be seasonally wet.

In a representative profile of an Acton soil in a reforested plowed area, a layer of fresh and partly decayed leaves and needles 3 inches thick is on the surface. The surface layer below this is dark-brown fine sandy loam 3 inches thick. The subsoil, extending to a depth of about 18 inches, is dark-brown fine sandy loam in the upper 2 inches; brownish-yellow fine sandy loam in the middle 7 inches; and mottled, light yellowish-brown gravelly loamy fine sand in the lower 6 inches. The underlying material to a depth of 50 inches is mottled pale-olive gravelly sand.

Permeability is moderately rapid. Available water capacity is low. Depth to seasonal high water generally ranges from 18 to 30 inches. Woodcrop productivity is fair. The seasonal high water table limits the use of these soils for community development.

Representative profile of Acton fine sandy loam in an area of Acton very stony fine sandy loam, 0 to 8 percent slopes, in a wooded area in the town of Wolfeboro; about six-tenths mile northwest of junction of North Line Road and New Hampshire Route 28, 450 feet north of North Line Road:

O1—3 inches to 1 inch, recent accumulation of leaves, twigs, and pine needles.

O2—1 inch to 0, decomposed organic material.

Ap—0 to 3 inches, dark-brown (10YR 3/3) fine sandy loam; weak, fine, granular structure; friable; many roots; 10 to 12 percent coarse fragments; strongly acid; abrupt, broken boundary.

B21—3 to 5 inches, dark-brown (7.5YR 4/4) fine sandy loam; weak, fine, granular structure; friable;

TABLE 2.—*Approximate acreage and proportionate extent of broadly defined mapping units*

Soil	Acres	Percent	Soil	Acres	Percent
Alluvial land, wet	4,500	0.7	Leicester-Ridgebury very stony fine sandy loams association, gently sloping	550	.1
Becket very stony fine sandy loam association, steep	800	.1	Lyman-Berkshire very rocky fine sandy loams association, sloping	1,000	.2
Becket-Skerry very stony fine sandy loams association, sloping	500	.1	Lyman-Berkshire very rocky fine sandy loams association, steep	8,500	1.4
Berkshire very stony fine sandy loam association, sloping	2,800	.5	Lyman-Berkshire very rocky fine sandy loams association, very steep	37,000	6.2
Berkshire very stony fine sandy loam association, steep	13,500	2.3	Lyman-Rock outcrop-Berkshire association, steep	3,500	.6
Berkshire very stony fine sandy loam association, very steep	20,000	3.3	Lyman-Rock outcrop-Berkshire association, very steep	17,000	2.8
Canaan-Redstone very rocky gravelly fine sandy loams association, sloping	1,100	.2	Marlow very stony fine sandy loam association, steep	23,000	3.8
Canaan-Redstone very rocky gravelly fine sandy loams association, steep	5,700	1.0	Marlow very stony fine sandy loam association, very steep	14,000	2.3
Canaan-Redstone-Rock outcrop association, steep	1,100	.2	Marlow-Peru very stony fine sandy loams association, sloping	5,500	.9
Canaan-Redstone-Rock outcrop association, very steep	1,300	.2	Muck and Peat	2,500	.4
Chocorua mucky peat	3,500	.6	Ossipee mucky peat	750	.1
Fresh water marsh	3,700	.6	Peru very stony fine sandy loam association, sloping	3,500	.6
Greenwood mucky peat	5,500	.9	Rock outcrop	450	.1
Hermon very stony fine sandy loam association, sloping	5,500	.9	Rock outcrop-Lyman association, steep	1,000	.2
Hermon very stony fine sandy loam association, steep	20,000	3.3	Rock outcrop-Lyman association, very steep	5,500	.9
Hermon very stony fine sandy loam association, very steep	4,500	.8	Waumbek-Skerry very stony fine sandy loams association, sloping	4,000	.7
			Total	221,750	37.0

many roots; 10 percent coarse fragments; strongly acid; abrupt, broken boundary.

B22—5 to 12 inches, brownish-yellow (10YR 6/6) fine sandy loam; weak, fine, granular structure; very friable; common roots; 15 percent coarse fragments; strongly acid; clear, smooth boundary.

B23—12 to 18 inches, light yellowish-brown (10YR 6/4) gravelly loamy fine sand; few, medium, distinct, strong-brown (7.5YR 5/6) and pale-olive (5Y 6/3) mottles; massive; very friable; common roots; 20 percent coarse fragments; strongly acid; clear, wavy boundary.

C—18 to 50 inches, pale-olive (5Y 6/3) gravelly sand; common, medium, distinct, yellowish-brown (10YR 5/6) mottles and few, medium, faint, light olive-gray (5Y 6/2) mottles; single grained; loose; few fine roots in upper part; 45 percent coarse fragments; strongly acid.

In the Ap horizon hue is 10YR, value is 3 or 4, and chroma is 2 or 3. The A2 horizon, where present in undisturbed areas, has a hue of 10YR, a value of 4 to 6, and a chroma of 1 or 2. The B horizon ranges from loamy sand to fine sandy loam and includes gravelly analogs. The B21 horizon has a hue of 7.5YR or 10YR and a value and chroma of 4 to 6. The B22 horizon has a hue of 10YR, a value of 5 or 6, and a chroma of 4 to 6. The B23 horizon has a hue of 10YR or 2.5Y, a value of 5 or 6, and a chroma of 4 to 6. The C horizon ranges from loamy fine sand to sand and includes gravelly analogs. The C horizon commonly has a hue of 2.5Y or 5Y, but it ranges to 10YR. Consistence is generally friable or loose but, in some places, thin, firm bands are present. The weighted average of all coarse fragments in the profile, including stones, is more than 35 percent, by volume.

Acton soils are near Gloucester, Hollis, and Leicester soils. These soils formed in material similar to that in which the somewhat excessively drained Gloucester soils formed, but they have mottling in the lower part of the B horizon. Acton soils are deeper to bedrock than Hollis soils, and they have more coarse fragments throughout the profile. The Acton soils formed in material similar to that in which Leicester soils formed, but they are better drained than those soils.

AcB—Acton fine sandy loam, 0 to 8 percent slopes. This soil is on concave foot slopes between the upper hill slopes and wet depressions near drainageways. It has a profile similar to the one described as representative of the series, but the mineral surface layer is generally thicker.

Included with this soil in mapping are small areas of Gloucester, Scituate, Leicester, and Ridgebury soils. Also included are areas of soils that have less than 35 percent coarse fragments, by volume; small areas of soils that have slopes greater than 8 percent; and scattered spots of very stony Acton soils.

Seasonal wetness is a major limitation to the use of Acton soils, but artificial drainage generally improves the soil for most farm and nonfarm uses. The hazard of erosion is slight where the soil has been disturbed by cultivation or during construction work.

This soil is suited to corn, small grain, grasses, and legumes. The gently sloping areas of this soil can be cropped continuously if they are drained and protected from erosion. The use of field ditches, tile drains, and diversions help control excess water. This allows for earlier tillage, increased choice of crops, and also more intensive nonfarm uses.

Most areas of this soil, once farmed, are now wooded. Some idle hayfields still remain. Near lakes and on hills and low mountains, areas of this soil are being developed for residential and recreational uses as part of large subdivisions. This soil has a fair potential for the development of open-land wildlife habitat. Capability unit IIw–52.

AdB—Acton very stony fine sandy loam, 0 to 8 percent slopes. This soil is on concave foot slopes between the upper hill slopes and wet depressions near drainageways. The profile described as representative of the series is in an area of this mapping unit. Stones on the surface are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Gloucester, Millis, Scituate, Leicester, and Ridgebury soils. Also included are areas of soils that have less than 35 percent coarse fragments, by volume; small areas of soils that have slopes greater than 8 percent; and extremely stony and bouldery spots.

Seasonal wetness and stoniness are major limitations to most uses of this soil. The hazard of erosion is slight if protective cover is removed and the soil is disturbed during construction work.

This soil is not suited to hay or row crops because of surface stoniness. The removal of surface stones and the use of drainage practices to control excess water improve the soil for most farm and nonfarm uses.

Most areas of the soil are wooded, but some small tracts are open pasture. Some areas of this soil, near lakes and on hills and low mountains, are being developed for residential and recreational uses as part of large subdivisions. In its natural condition, this soil is better suited to timber production and woodland wildlife habitat than to other uses. Capability unit VIs–72.

AdC—Acton very stony fine sandy loam, 8 to 15 percent slopes. This soil is on the concave lower hillsides between the upper hill slopes and wet depressions. It has a profile similar to the one described as representative of the series, but mottling is generally lower in the profile. Stones on the surface are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Gloucester, Millis, and Scituate soils. Also included are areas of soils that have less than 35 percent coarse fragments, by volume; small areas of soils that have slopes more than 15 percent; poorly drained spots, and extremely stony and bouldery spots.

Seasonal wetness, slope, and stoniness are major limitations to most uses of this soil. The hazard of erosion is moderate where areas of this soil lack vegetative cover. This soil has a severe limitation for the construction of paved streets and parking lots because of the steepness of slope.

This soil is not suited to hay or row crops because of surface stoniness. The removal of surface stones and the use of erosion-control and drainage practices improve this soil for most uses. Diversions and tile drains help control seasonal wetness caused by seepage from upper slopes.

Most areas of this soil are wooded, but some small tracts are open pasture. Near lakes and on hills and low mountains, a few spots are being used for residential and recreational developments. In its natural condition, this soil is well suited to timber production and woodland wildlife habitat. Capability unit VIs–72.

Adams Series

The Adams series consists of excessively drained soils that formed in deposits of water-laid sands. These soils are on glacial outwash terraces, kames, and eskers near streams and lakes or former glacial drainageways in the northern part of the county.

In a representative profile of an Adams soil in a wooded area, a covering of fresh and partly decayed leaves and needles 2 inches thick is on the surface. The surface layer, below this, is gray loamy sand about 3 inches thick. The subsoil, extending to a depth of about 18 inches, is yellowish-red loamy sand in the upper 7 inches and yellowish- brown loamy sand in the lower 8 inches. The underlying material to a depth of 50 inches is brown sand in the upper 14 inches and grayish-brown coarse sand in the lower part.

Permeability is rapid. Available water capacity is very low. These soils are a good source of sand for construction. There is a pollution potential of ground water sources from septic tank sewage disposal systems.

Representative profile of Adams loamy sand, 0 to 3 percent slopes, in Echo Lake State Park, three-fourths mile south of Echo Lake and one-half mile west of West Side Road in the town of Conway:

O11—2 to 1½ inches, recent accumulation of pine needles and twigs.
O12—1½ inches to ½ inch, partly decomposed needles and twigs.
O2—½ inch to 0, decomposed organic matter.
A2—0 to 3 inches, gray (10YR 5/1) loamy sand; weak, fine, granular structure; very friable; many roots; very strongly acid; abrupt, smooth boundary.
B21ir—3 to 10 inches, yellowish-red (5YR 5/6) loamy sand; weak, fine, granular structure; very friable; common roots; strongly acid; clear, smooth boundary.
B22—10 to 18 inches, yellowish-brown (10YR 5/6) loamy sand; weak, fine, granular structure; very friable; few roots; strongly acid; clear, smooth boundary.
C1—18 to 32 inches, brown (10YR 5/3) sand; single grained; loose; few roots; medium acid; clear, smooth boundary.
C2—32 to 50 inches, grayish-brown (10YR 5/2) coarse sand; single grained; loose; no roots; 2 to 3 percent coarse fragments up to ½ inch in size; medium acid.

In the A2 horizon hue is 10YR or 7.5YR, value is 5 to 7, and chroma is 1 or 2. The Ap horizon, if present, has a hue of 10YR, a value of 3 to 5, and a chroma of 2. The B horizon ranges from loamy fine sand to sand. The B21ir horizon has a hue of 2.5YR to 7.5YR, a value of 3 to 5, and a chroma of 4 to 6. The B21h horizon, where present below the A2 horizon, has a value ranging to 2 and a chroma ranging to 1. The hue in the lower part of the B horizon is 7.5YR or 10YR, the value is 5 or 6, and the chroma is 4 to 6. The C horizon ranges from fine sand to coarse sand. It has a hue of 10YR and 2.5Y, a value of 4 to 6, and a chroma of 2 to 4. Coarse fragments are generally less than 5 percent.

Adams soils are near Croghan and Colton soils. They formed in materials similar to those in which the moderately well drained Croghan soils formed, but they are better drained and have no mottling in the lower part of the B horizon. Adams soils are sandy and do not have the gravel and cobblestones common to Colton soils.

AmA—Adams loamy sand, 0 to 3 percent slopes. This soil is on outwash plains and terraces. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Croghan and Colton soils. Also included are small areas of soils that have slopes of more than 3 percent and areas of soils that have a thin layer of silt or loam below a depth of about 30 inches.

Droughtiness and low natural fertility are major

limitations to the use of these soils for crops. This soil warms early in spring and is generally easily tilled. Unprotected areas are subject to soil blowing. There are no serious limitations to most nonfarm uses.

This soil has limited suitability for row crops, hay, or pasture. Irrigation and heavy fertilization are needed for optimum growth of most crops. Cropping systems generally include cover crops, grasses, and legumes in the rotation. Adding manure and returning crop residue to the soil help to maintain the organic-matter content of the soil.

Supplemental irrigation is generally needed to establish and maintain grass cover, especially in areas receiving heavy foot traffic.

Most areas of this soil are wooded, but some areas are being used for residential and small industrial developments. This soil is most desirable for community development uses. Capability unit IIIs–26.

AmB—Adams loamy sand, 3 to 8 percent slopes. This undulating soil is on outwash plains and terraces.

Included with this soil in mapping are small areas of Colton and Croghan soils. Also included are small areas of soils that have slopes of more than 8 percent, areas of soils that have thin layers of silt or loam below a depth of 30 inches, and scattered spots that have stones on the surface.

Droughtiness and low natural fertility are limitations to most farm uses. Slope is a moderate limitation to some intensive nonfarm uses. Unprotected areas are susceptible to soil blowing and water erosion.

This soil is poorly suited to row crops, hay, or pasture. Irrigation and large amounts of fertilizer are required for optimum growth of most crops. Cropping systems generally include cover crops, grasses, and legumes in the rotation. Adding manure and returning crop residue help to maintain organic-matter content of the soil. Supplemental irrigation is generally needed to establish and maintain grass cover, especially in areas receiving heavy foot traffic.

Most areas of this soil are wooded, but some areas are being developed for residential and small industrial uses. Because of slope, this soil is less desirable for community development and recreational uses than the nearly level Adams soil. Capability unit IIIs–26.

AmC—Adams loamy sand, 8 to 15 percent slopes. This rolling soil is on outwash plains, short slope breaks, and terraces. It has a profile similar to the one described as representative of the series, but the mineral surface layer is generally thinner.

Included with this soil in mapping are small areas of Colton, Croghan, and Duane soils. Also included are small areas of soils that have slopes of more than 15 percent; scattered very stony spots; and small areas of soils, commonly in intervales or near lakes, that have thin layers of silt or loam below a depth of about 24 inches.

Droughtiness is a severe limitation to the use of this soil for crops. Areas under cultivation and areas disturbed in construction are subject to gullying and soil blowing. Slope is an important limitation to consider for uses involving excavations to establish level grades.

This soil is better suited to drought-resistant grasses and legumes than to row crops. Irrigation is required for optimum growth of most crops and for the establishment and maintenance of grass cover, especially in residential and recreational areas receiving heavy foot traffic.

Soil losses can be held to a minimum by the use of cover crops, grasses, and legumes supported by erosion-control practices, such as stripcropping, diversions, and grassed waterways. Adding manure and returning crop residue help to maintain organic-matter content in the soil.

Most areas of this soil are wooded, but a few areas are being used for residential and recreational developments. This soil is less favorable for intensive nonfarm uses than the less sloping Adams soils. Timber production and extensive recreational uses are generally the most favorable uses. Capability unit IVs–26.

AmE—Adams loamy sand, 15 to 60 percent slopes. This soil is on long, narrow eskers, kame knolls, and escarpments on outwash plains and outwash upland borders. It has a profile similar to the one described as representative of the series, but the thickness of soil layers is more variable.

Included with this soil in mapping are small areas of Colton soils. Also included are scattered spots of soils that have stones on the surface.

Moderately steep to very steep slopes and droughtiness are major limitations to most uses of this soil. The hazard of erosion is severe if vegetation is removed or excavations are made.

The soil is not suitable for row crops or hay crops. It is mainly wooded, but timber management is difficult because of the short, steep slopes. A good cover of sod or forest vegetation is needed to control erosion. This soil has good potential as a source of sand. Capability unit VIIs–26.

Alluvial Land, Wet

AW—Alluvial land, wet. This land type consists of various kinds of soil material on the bottom lands of streams and rivers. The soil material ranges in texture from silt loam to sand and gravel. This land type is poorly drained to very poorly drained and is frequently flooded.

Included with this soil in mapping are small areas of moderately well drained soils that formed in alluvial deposits, spots of Chocorua mucky peat, and spots of Ossipee mucky peat. A high water table and frequent flooding are major limitations to most uses of this soil. Artificial drainage generally is not feasible, and extreme measures are needed for protection from frequent flooding.

This land type is mainly in bushy woods of poor quality or in shrub vegetation. It has a good potential for the development of wetland wildlife habitat. Not assigned to a capability unit.

Becket Series

The Becket series consists of well-drained loamy soils. These soils formed in deposits of sandy glacial till that have a loamy cap 18 to 36 inches thick over a very firm sandy pan. These soils are on oval hills and mountainsides in the northern part of the county. Stones are common on the surface.

In a representative profile of a Becket soil in a wooded area, a layer of fresh and partly decomposed

leaves and needles 3 inches thick is on the surface. The surface layer, below this, is light brownish-gray fine sandy loam about 3 inches thick. The subsoil, extending to a depth of 24 inches, is dark reddish-brown fine sandy loam in the upper 6 inches, brownish-yellow fine sandy loam in the next 9 inches, and light olive-brown fine sandy loam in the lower 6 inches. Below this to a depth of 42 inches is a pan layer of very firm, grayish-brown gravelly loamy sand.

Permeability is moderate above the pan layer and moderately slow in the pan layer. Available water capacity is moderate. Depth to seasonal high water is generally more than 30 inches. Woodcrop production is fair. Septic tank filter fields do not function well on these soils because of the moderately slow permeability of the pan layer.

Representative profile of Becket fine sandy loam in an area of Becket very stony fine sandy loam, 8 to 15 percent slopes, in a wooded area eight-tenths of a mile north of junction of Gulf Road and Brownfield Road, one-half mile northeast of Birch Hill, 1,200 feet south of Greely Road in the town of Conway:

O2—3 inches to 0, partly decomposed and well decomposed forest litter.

A2—0 to 3 inches, light brownish-gray (10YR 6/2) fine sandy loam; weak, fine, granular structure; very friable; many fine and medium roots; very strongly acid; abrupt, broken boundary.

B21h—3 to 5 inches, dark reddish-brown (5YR 2/2) fine sandy loam; weak, medium, granular structure; friable; common fine and medium roots; 10 percent gravel; very strongly acid; abrupt, broken boundary.

B22ir—5 to 9 inches, dark reddish-brown (2.5YR 2/4) fine sandy loam; weak, fine, granular structure; friable; common fine roots; 10 percent gravel; strongly acid; clear, smooth boundary.

B23—9 to 18 inches, brownish-yellow (10YR 6/6) fine sandy loam; weak, fine, granular structure; friable; few fine roots; 10 percent gravel; strongly acid; clear, smooth boundary.

B3—18 to 24 inches, light olive-brown (2.5Y 5/4) fine sandy loam; weak, fine, granular structure; friable; few fine roots; 15 percent gravel; strongly acid; abrupt, smooth boundary.

IICx—24 to 42 inches, grayish-brown (2.5Y 5/2) gravelly loamy sand; weak, thin, platy structure; very firm; 20 percent gravel; segregated medium and fine sand lenses in horizontal orientation on bottoms of coarse fragments and between "plates" throughout horizon; common, medium, distinct, strong-brown (7.5YR 5/6) mottles along interface of sand lenses and fine sandy loam plates; many fine pores; strongly acid.

In the A2 horizon hue is 10YR or 7.5YR, value is 4 to 6, and chroma is 1 to 2. The Ap horizon, where present, has hue of 10YR, value of 2 to 4, and chroma of 2 or 3. The B horizon is mainly fine sandy loam or sandy loam. The B21h and B22ir horizons dominantly have hue of 5YR and 2.5YR, value of 2 to 4, and chroma of 2 to 6; in places hue is 7.5YR, and value and chroma are 3 or 4. In the B23 and B3 horizons, hue ranges from 7.5YR to 2.5Y. The weighted average texture of the C horizon is loamy fine sand or loamy sand and the gravelly analogs of these textures. Firm or very firm plates of fine sandy loam make up as much as 40 percent of the fragipan. In the C horizon hue is dominantly 2.5Y, value is 5 to 6, and chroma is 2 to 4. Value of the firm layers is lower in contrast to value of the friable or loose layers. The Cx horizon is firm or very firm. Depth to the pan layer ranges from 18 to 36 inches.

Becket soils are near Skerry, Hermon, and Marlow soils. Becket soils formed in material similar to that in which the moderately well drained Skerry soils formed, but they are better drained and do not have mottling in the lower part of the B horizon. Becket soils are similar to Hermon soils but have a fragipan. They have a coarser textured pan layer than Marlow soils and have alternating firm layers, while Marlow soils have a more uniform, massive pan layer.

BcB—Becket very stony fine sandy loam, 3 to 8 percent slopes. This soil is on convex hillcrests. It has a profile similar to that described as representative of the series, but the subsoil layers are thicker and faint mottles are just above the pan layer. Stones are generally 5 to 30 feet apart on the surface.

Included with this soil in mapping are some areas of Marlow, Hermon, Skerry, and Ridgebury soils, small areas of Lyman soils, and a few outcrops of bedrock. Also included are small areas of soils that have slopes of more than 8 percent and extremely stony and bouldery spots.

The pan layer and stoniness are major limitations to use of this soil, especially those uses involving level grades, landscaping, seedbed preparation, and excavations. The hazard of erosion is slight where the protective cover is removed and the soil is disturbed.

This soil is not suited to hay or row crops because of surface stoniness. Stone removal and the application of certain drainage measures permit most farm uses and more intensive nonfarm uses.

Most areas of this soil are wooded, and some are in unimproved pasture. A few areas of this soil are being used as part of large residential subdivisions. This soil is well suited to timber production. It has fair potential for the development of woodland wildlife habitat. Capability unit VIs–7.

BcC—Becket very stony fine sandy loam, 8 to 15 percent slopes. This soil is on convex hilltops and low oval hills. The profile described as representative of the series is in an area of this mapping unit. Stones are generally 5 to 30 feet apart on the surface.

Included with this soil in mapping are some areas of Marlow and Hermon soils, Lyman soils, and a few of Lyman soils, and a few outcrops of bedrock. Also included are small areas of soils that have slopes of more than 15 percent, extremely stony and bouldery spots, and scattered wet spots.

The pan layer is the major limitation to the use of this soil for many intensive purposes. It restricts internal drainage, causing water to seep laterally above the pan layer. Slope and stoniness are additional limitations for farm uses and for nonfarm uses requiring level grades, seedbed preparation, and excavations. The hazard of erosion is moderate where protective vegetation is removed. The steepness of these slopes is a severe limitation to the construction of paved streets and parking lots.

This soil is not suited to row crops or hay crops because of surface stones. Stone removal and drainage permit most farm uses and more intensive nonfarm uses.

Most areas of this soil are in woodland, and some are in unimproved pasture. Scattered spots are being used for residential development. The soil is better suited to timber production than to other uses, and it has fair potential for the development of woodland wildlife habitat. Capability unit VIs–7.

BcD—Becket very stony fine sandy loam, 15 to 25 percent slopes. This soil is on mountain valley walls and

hillsides. It has a profile similar to the one described as representative of the series, but subsoil layers and pan layers are thinner. Stones are generally 5 to 30 feet apart on the surface.

Included with this soil in mapping are some areas of Marlow and Hermon soils, Lyman soils, and a few outcrops of bedrock. Also included are small areas of soils that have slopes of more than 25 percent, extremely stony and bouldery spots, and seep spots and narrow drainageways.

The pan layer and moderately steep slopes are the main limitations to the use of this soil for certain intensive purposes. Stoniness hinders the establishment of level grades, excavation, and seedbed preparation. The hazard of erosion is severe where vegetation is removed.

This soil is not suited to row crops or hay crops because of surface stoniness.

Almost all of this soil is wooded. A few spots are being used as recreational dwelling sites. Some areas of this soil have been developed as ski slopes. Carefully planning slope layout and using conservation practices are required to prevent serious erosion. Areas of this soil are better suited to timber production than to other uses, but fair potential exists for the development of woodland wildlife habitat. Capability unit VIs–7.

BcE—Becket very stony fine sandy loam, 25 to 35 percent slopes. This soil is on mountain valley walls and hillsides. It has a profile similar to the one described as representative of the series, but generally subsoil layers, and in some places the pan layer, are thinner. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Marlow and Hermon soils, Lyman soils, and a few outcrops of bedrock. Also included are areas of soils steeper than 35 percent and areas of soils that are extremely stony or bouldery.

Steep slopes, the pan layer, and stoniness are the major limitations to the use of this soil for most intensive purposes. The erosion hazard is severe where protective vegetation is removed.

Nearly all areas of this soil are wooded, and the soil is well suited to trees. Machine logging operations, however, are difficult on the steeper slopes. A few areas have been developed for skiing. When cleared for skiing, natural drainageways ought not be disturbed and bare slopes ought to be protected with mulch and cover crops until permanent vegetation is established. Diversions help to control runoff over open slopes. Capability unit VIIs–7.

BEE—Becket very stony fine sandy loam association, steep. This association is on side slopes and lower valley walls of glaciated hills and mountains mainly in the White Mountain National Forest. Stones cover as much as 15 percent of the surface. The areas of this association follow the contour of the landscape and are generally 30 to 175 acres in size. Slope ranges from 15 to 35 percent. The Becket soil has a profile similar to the one described as representative of the series, but commonly there are more stones throughout the profile.

Becket very stony fine sandy loam makes up about 50 to 75 percent of this association. It is on the convex, smooth parts of the landscape.

Hermon, Lyman, and Skerry soils make up the remaining 25 to 50 percent of the association. Hermon soils are interspersed with the Becket soils but are commonly on the irregular, dissected slopes. Lyman soils and a few areas of rock outcrop are on the knobby ridges, and Skerry soils are in concave swales and drainageway borders.

Steepness of slope and stoniness are major limitations to the use of these soils for most farm and nonfarm purposes. The hazard of erosion is severe where the soil is bare of vegetation. Pan layers restrict downward water movement, causing water to seep laterally above the pan. In places, seasonal wetness and shallow depth to bedrock are limitations.

Most soils in this association are used for timber production and the management of woodland wildlife habitat, and they are fairly well suited to these uses. Steepness of slope is the primary hindrance to logging operations throughout most of the area. There is potential for recreational uses, such as the development of paths and trails and ski slopes. Careful planning and uses of conservation practices, however, are needed to prevent serious erosion, especially for ski slopes. Not assigned to a capability unit.

BKC—Becket-Skerry very stony fine sandy loams association, sloping. This association is on hilltops and lower side slopes of glaciated hills, mostly in the White Mountain National Forest. Stones cover as much as 15 percent of the surface. The areas are generally oblong and 25 to 100 acres in size. Slope ranges from 0 to 15 percent. The Becket and Skerry soils in this association have profiles similar to those described as representative of their respective series, but commonly there are more stones throughout the profile.

Becket very stony fine sandy loam makes up about 40 to 55 percent of this association; and Skerry very stony fine sandy loam, about 20 to 35 percent. Becket soils are on the smooth, convex parts of the landscape; Skerry soils are on smooth, concave parts.

Making up the remaining 10 to 40 percent of the association are areas of Hermon and Lyman soils. Hermon soils are interspersed with the Becket soils but are commonly on the irregular, dissected slopes; Lyman soils and a few rock outcrops are on knobby hilltops.

Stoniness and seasonal wetness are major limitations to most uses of these soils. The hazard of erosion is moderate where the soils are most sloping and bare of vegetation. Pan layers are major factors to consider for some uses. In places, shallow depth to bedrock is also a limitation.

Most soils of this association are used for timber production and the management of woodland wildlife habitat, and they are fairly well suited to these uses. Seasonal wetness and seep spots along the lower parts of side slopes in areas of Skerry soils hinder the construction and maintenance of logging roads and landings. These soils have limited potential for recreational uses, such as hiking trails, but any intensive use requires careful planning and choice of sites. Not assigned to a capability unit.

Berkshire Series

The Berkshire series consists of well-drained soils that formed in deposits of loamy glacial till. These

soils are on hillsides and mountainsides in the northern part of the county. Stones are common on the surface.

In a representative profile of a Berkshire soil in a wooded area, a covering of fresh and partly decayed leaves and needles 3 inches thick is on the surface. The surface layer, below this, is light brownish-gray fine sandy loam about 2 inches thick. A 1-inch intermittent layer of black fine sandy loam is just below the surface layer. The subsoil, extending to a depth of about 24 inches, is dark-red fine sandy loam in the upper 3 inches, strong-brown fine sandy loam in the next 3 inches, and yellowish-brown grading to light yellowish brown fine sandy loam in the lower 15 inches. The underlying material to a depth of 48 inches is light brownish-gray and light yellowish-brown gravelly fine sandy loam.

Permeability and available water capacity are moderate. Woodcrop productivity is good for white pine.

Representative profile of Berkshire fine sandy loam in an area of Berkshire very stony fine sandy loam, 8 to 15 percent slopes, in the Bartlett Experimental Forest, compartment 18, one-sixteenth mile south of Haystack Road on Shannon Trail. The pit is located on the west side of the trail:

O1—3 to 2½ inches, loose leaf litter, mostly yellow birch and beech leaves.

O2—2½ inches to 0, black (10YR 2/1) humus; abrupt, wavy boundary.

A2—0 to 2 inches, light brownish-gray (10YR 6/2) fine sandy loam; weak, fine, granular structure; very friable; many roots; extremely acid; abrupt, broken boundary.

B21h—2 to 3 inches, black (5YR 2/1) fine sandy loam; weak, fine, granular structure; friable; many roots; extremely acid; abrupt, broken boundary .

B22ir—3 to 6 inches, dark-red (2.5YR 3/6) fine sandy loam; weak, fine, granular structure; friable; 5 percent coarse fragments; few, small, cemented pellets; many roots; very strongly acid; abrupt, broken boundary.

B23—6 to 9 inches, strong-brown (7.5YR 5/6) fine sandy loam; weak, fine, granular structure; friable; 5 percent coarse fragments; common roots; very strongly acid; clear, wavy boundary.

B24—9 to 13 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, fine, granular structure; friable; 5 percent coarse fragments; common roots; strongly acid; clear, wavy boundary.

B3—13 to 24 inches, light yellowish-brown (2.5Y 6/4) fine sandy loam; weak, fine, granular structure; friable; 10 percent coarse fragments; few roots; strongly acid; clear, wavy boundary.

C1—24 to 44 inches, light brownish-gray (2.5Y 6/2) and light yellowish-brown (2.5Y 6/4) gravelly fine sandy loam; massive; slightly firm in place, friable removed; 25 percent coarse fragments; few Conway granite stones more than 14 inches in diameter; few roots; strongly acid; wavy boundary.

C2—44 to 48 inches, light brownish-gray (2.5Y 6/2) gravelly fine sandy loam; massive; friable; 25 percent coarse fragments; strongly acid.

In the A2 horizon hue is 10YR or 7.5YR, value is 5 or 6, and chroma is 1 or 2. The B horizon ranges from sandy loam to loam. In the B21h horizon hue is 2.5YR and 5YR, value is 2, and chroma is 1. The B22ir horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 4 to 6. The C horizon is sandy loam or fine sandy loam and gravelly analogs. It has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4.

Berkshire soils are near Hermon, Becket, Peru, and Lyman soils. Berkshire soils are finer textured below a depth of 30 inches than Hermon and Becket soils and lack the very firm layers present in Becket soils. Berkshire soils are better drained than Peru soils and lack the pan layer. Berkshire soils formed in materials similar to those in which Lyman soils formed, but they are thicker over bedrock.

BsB—Berkshire very stony fine sandy loam, 3 to 8 percent slopes. This soil commonly is on hillcrests. Areas are less than 20 acres in size. It has a profile similar to the one described as representative of the series, but subsoil layers are thicker in places. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Marlow, Becket, Hermon, and Peru soils, spots of Lyman soils, and a few outcrops of bedrock. Also included are small areas of soils that have slopes of more than 8 percent, extremely stony and bouldery spots, and scattered wet spots.

Stoniness is the primary limitation of this soil for intensive uses, such as septic tank filter fields or filter beds, shallow excavations, and seedbed preparation for landscaping or gardening. The gentle slopes are a moderate limitation where level grades are needed for such uses as roads and parking areas. The hazard of erosion is slight on the steeper slopes where vegetation is removed.

This soil is not suitable for farm uses because of surface stoniness. The removal of surface stones improves the soil for most farm and nonfarm uses.

Most areas of this soil are wooded, but some are in pasture. A rapidly increasing number of areas of this soil are being used as part of residential subdivisions. This soil has fair potential for the development of woodland wildlife habitat. Capability unit VIs–7.

BsC—Berkshire very stony fine sandy loam, 8 to 15 percent slopes. This soil is on hilltops and foot slopes. The profile described as representative of the series is in an area of this mapping unit. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Marlow, Becket, Hermon, and Peru soils, spots of Lyman soils, and a few outcrops of bedrock. Also included are small areas of soils that have slopes of more than 15 percent and extremely stony and bouldery spots.

Slope and stoniness are important limitations to the use of this soil for certain intensive purposes. Slope is a severe limitation where excavations and fill are needed to establish level grades, as in roads, parking lots, filter beds, and sewage lagoons. The presence of stones is a hindrance to seedbed preparation and landscaping. The hazard of erosion is moderate in cleared areas.

Stoniness makes this soil unsuited to hay and row crops. Stone removal improves the soil for most uses.

Most areas of this soil are wooded, but some small tracts are in pasture. An increasing number of areas are being developed as part of residential subdivisions. This soil has fair potential for the development of woodland wildlife habitat. Capability unit VIs–7.

BsD—Berkshire very stony fine sandy loam, 15 to 25 percent slopes. This soil is on valley walls and hills or mountainsides. It has a profile similar to the one described as representative of the series, but subsoil layers are thinner in places. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of

Marlow, Becket, and Hermon soils, some spots of Lyman soils, and a few outcrops of bedrock. Also included are small areas of soils that have slopes of more than 25 percent and extremely stony and bouldery spots.

Slope is a severe limitation to intensive usage of this soil. Level grades generally require major excavation and fill. Erosion is a serious problem where cuts are made or vegetation is removed. Stoniness is a limitation to specific uses where seedbed preparation and landscaping are needed.

Almost all areas of this soil are wooded. A few areas are being developed as part of residential subdivisions and some as part of ski slope developments. Ski slope layout requires very careful planning and establishment of conservation practices to prevent serious erosion. Recreational dwellings are sometimes built on pilings to allow for a minimum of excavation and fill.

This soil is well suited to production of timber, but machine logging operations are very difficult on the steeper slopes. This soil has some potential for the development of woodland wildlife habitat. Capability unit VIs–7.

BsE—Berkshire very stony fine sandy loam, 25 to 35 percent slopes. This soil is on valley walls and hills or mountainsides. It has a profile similar to the one described as representative of the series, but subsoil layers are thinner. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are some areas of Marlow, Becket, and Hermon soils, spots of Lyman soils, and a few outcrops of bedrock. Also included are local areas of soils that have slopes of more than 35 percent and extremely stony and bouldery spots.

Steep slopes are a severe limitation for most intensive uses of this soil. Machinery operation is very difficult, and level grades require major excavation and fill. Stoniness is a hindrance to seedbed preparation and excavations. Unprotected slopes are susceptible to severe erosion.

This soil has potential for the development of ski slopes. Careful planning and usage of conservation practices, however, is required to prevent serious erosion. Natural drainageways should not be disturbed, and bare slopes should be protected with mulch and cover crops until permanent vegetation is established. Diversions help control runoff.

Almost all areas of this soil are wooded except for a few open ski slopes. The soil is better suited to timber production than to other uses, but steep slopes make machine logging operations difficult. Fair potential exists for the development of woodland wildlife habitat. Capability unit VIIs–7.

BtD—Berkshire extremely stony fine sandy loam, 8 to 25 percent slopes. This soil is on valley walls, hilltops, and foot slopes. It has a profile similar to the one described as representative of the series, but in most places, there are more stones and boulders throughout the profile. Surface stones and boulders are generally less than 5 feet apart.

Included with this soil in mapping are small areas of Marlow, Becket, Hermon, and Peru soils, Lyman soils, and spots of bedrock outcrops. Also included are small areas of soils that have slopes of more than 25 percent, small pockets of poorly drained soils, and narrow drainageways.

Stoniness and, in some places, slope are severe limitations to most uses of this soil. Excavations are difficult, and level grades are hard to establish. Landscaping and seedbed preparation are also severely hindered. The hazard of erosion is severe where this soil is cleared. Diversions and grassed waterways are useful in controlling runoff and erosion. Grass is relatively easy to establish, but extreme stoniness hinders operations.

Almost all areas of this soil are wooded, but a few scattered spots are being used as recreational homesites. The cover of stones and boulders is often incorporated into the landscape pattern. The soil is better suited to timber production than to other uses, but surface stones and boulders hinder logging operations. This soil has some potential for the development of woodland wildlife habitat. Capability unit VIIs–58.

BVC—Berkshire very stony fine sandy loam association, sloping. This association is on crests of glaciated hills mostly in the White Mountain National Forest. The areas are commonly oblong and 20 to 100 acres in size. Slope ranges from 0 to 15 percent. The Berkshire soil has a profile similar to the one described as representative of the series, but generally there are more stones throughout the profile. Surface stones make up as much as 15 percent of the area.

Berkshire very stony fine sandy loam makes up about 55 to 75 percent of this association. It is on convex, smoother parts of the landscape.

The remaining 25 to 45 percent of the association is Marlow, Peru, and Lyman soils. Marlow soils are interspersed with Berkshire soils but are commonly on north-facing slopes; Peru soils are on concave lower slopes and in shallow depressions; and Lyman soils and a few rock outcrops are on the knobby hilltops.

Stoniness is a major limitation to most uses of this soil. The hazard of erosion is moderate where the soils are most sloping and have no vegetation. In places, seasonal wetness and shallow depth to bedrock is a limitation.

Most of the soils in this association are used for timber production and the development of woodland wildlife habitat, and they are fairly well suited to these uses. These soils have potential for the development of picnic areas. Not assigned to a capability unit.

BVE—Berkshire very stony fine sandy loam association, steep. This association is on side slopes of glaciated hills and mountains mostly in the White Mountain National Forest. The areas commonly follow the contour of the landscape, and are generally 30 to 175 acres in size. Slope ranges from 15 to 35 percent. The Berkshire soil has a profile similar to the one described as representative of the series, but generally there are more stones throughout the profile. Surface stones make up as much as 15 percent of the area.

Berkshire very stony fine sandy loam makes up about 50 to 75 percent of this association. It is on the convex, smooth part of the landscape. The remaining 25 to 50 percent of the association is Marlow, Lyman, and Peru soils. Marlow soils are interspersed with Berkshire soils but are commonly on north-facing slopes; Lyman soils and a few rock outcrops are on

knobby ridges; and Peru soils are in shallow depressions and drainageway borders.

Steepness of slope and stoniness are the major limitations to most uses of these soils. The hazard of erosion is severe where the soils are without vegetation. In places, seasonal wetness and shallow depth to bedrock is also a limitation.

Most of the soils in this association are used for timber production and the development of woodland wildlife habitat, and they are fairly well suited to these uses. Slope is a limitation to logging operations, however, especially in the steeper areas. These soils have potential for the development of ski slopes. Not assigned to a capability unit.

BVF—Berkshire very stony fine sandy loam association, very steep. This association is on side slopes and valley walls of glaciated hills and mountains, mostly in the White Mountain National Forest. The areas commonly follow the contour of the landscape and are generally 50 to 200 acres in size. Slope ranges from 25 to 60 percent. The Berkshire soil has a profile similar to the one described as representative of the series, but generally the subsoil layers are thinner and more stones and boulders are throughout the profile. Surface stones make up as much as 15 percent of the area.

Berkshire very stony fine sandy loam makes up about 45 to 70 percent of this association. It is on the smoother parts of the landscape. The remaining 30 to 55 percent of the association is Marlow and Lyman soils. Marlow soils are interspersed with Berkshire soils but commonly have north-facing slopes. Lyman soils and bedrock outcrops are on knobby ridgetops and sheer valley walls.

The very steep slopes and stoniness are major limitations to most uses of these soils. The hazard of erosion is very serious in areas where protective vegetation is removed. In places, shallow depth to bedrock is also a limitation.

Most of the soils in this association are wooded, but use for timber production is limited. The slopes are generally too steep for machine logging operations. There is potential for ski slopes; however, the layout, construction, and maintenance of ski slopes requires careful planning and the use of appropriate conservation practices as a safeguard against severe erosion. Not assigned to a capability unit.

Canaan Series

The Canaan series consists of somewhat excessively drained soils that are shallow to bedrock. These soils formed in a mantle of gravelly glacial till 10 to 20 inches thick over bedrock. They are on irregular hilltops, mountaintops, knolls, and ridges in the northern part of the county, in areas bordering the Saco River valley. Rock outcrops and stones are common on the surface.

In a representative profile of a Canaan soil in a wooded area, a layer of fresh and partly decayed leaves and needles about 3 inches thick is on the surface. The surface layer, below this, is light brownish-gray gravelly fine sandy loam about 3 inches thick. The subsoil, extending to solid granite bedrock at a depth of 17 inches, is reddish-brown gravelly fine sandy loam in the upper 6 inches and dark-brown very gravelly fine sandy loam in the lower 8 inches.

Permeability is moderately rapid above the bedrock. Available water capacity is low. Restriction of downward movement of ground water by bedrock causes the water to collect as wet spots and seeps. Shallow depth to bedrock and rock outcroppings are limitations to many uses.

Representative profile of Canaan gravelly fine sandy loam in a wooded area of Canaan-Redstone very rocky gravelly fine sandy loams association, steep, in the town of Conway, about 2 miles east of Kearsarge on Hurricane Mountain Road, seven-tenths mile west of height of land, about 60 feet north of road:

O1—3 to 2 inches, loose litter of leaves and twigs, mostly beech, white birch, and hemlock.
O2—2 inches to 0, partly decomposed litter.
A2—0 to 3 inches, light brownish-gray (10YR 6/2) gravelly fine sandy loam; weak, fine, granular structure; very friable; many fine and medium roots; 45 percent coarse fragments; very strongly acid; abrupt, broken boundary.
B21ir—3 to 9 inches, reddish-brown (5YR 4/4) gravelly fine sandy loam; weak, fine, granular structure; very friable; many fine roots; 40 percent coarse fragments; very strongly acid; abrupt, smooth boundary.
B22ir—9 to 17 inches, dark-brown (7.5YR 4/4) very gravelly fine sandy loam; weak, fine, granular structure; very friable; common fine roots; 65 percent coarse fragments; very strongly acid; abrupt smooth boundary.
IIR—17 inches, granite bedrock.

In the A2 horizon hue is generally 10YR, value is 5 or 6, and chroma is 1 or 2. The B horizon is mainly gravelly or very gravelly analogs of fine sandy loam or sandy loam. Coarse fragments commonly range from 40 to 80 percent, by volume, of the B horizon. The upper part of the B horizon has hue of 5YR, value of 3 and 4, and chroma of 4, 6, and 8; in some places hue is 2.5YR, value is 2 or 3, and chroma is 2, 4, or 6. The lower part of the B horizon has hue of 7.5YR, value of 4 or 5, and chroma of 4 or 6; in some places, hue is 5YR, value is 4, and chroma is 3, 4, or 6.

Canaan soils are near Redstone, Becket, and Skerry soils. Canaan soils formed in material similar to that in which Redstone soils formed, but they have a thinner mantle over bedrock. They are not thick enough, generally, to have the firm pan layer that Becket and Skerry soils have in their C horizon. Canaan soils are better drained than Skerry soils.

CDC—Canaan-Redstone very rocky gravelly fine sandy loams association, sloping. This association is on mountaintops, saddles, and low foothills mostly on the eastern slopes of the White Mountains adjacent to the Saco River valley. The areas are generally oblong and 10 to 50 acres in size. Slope ranges from 0 to 15 percent. The Canaan soil has a profile similar to the one described as representative of the series, but subsoil layers are thicker. The Redstone soil has the profile described as representative of the Redstone series. As much as 15 percent of the surface area is exposures of bedrock, some of which is weathered and rippable. Stones and boulders are common on the surface.

Canaan very rocky gravelly fine sandy loam makes up about 40 to 50 percent of the association, and Redstone very stony sandy loam, about 30 to 40 percent. Canaan soils are on the knobby hilltops; Redstone soils are on the smoother parts of the landscape. The remaining 10 to 30 percent of the association is Marlow and Peru soils. Marlow soils are interspersed with the Redstone soils but commonly have north-facing slopes.

Peru soils are in the concave swales and on drainageway borders.

Shallowness to bedrock and some outcropping of bedrock is the major limitation to most uses of the Canaan soils in this association. The shallowness to bedrock hinders excavations, limits tree growth, and presents a windthrow hazard. The hazard of erosion is moderate on steeper soils that have no vegetation. Hardness and rippability of the Conway granite bedrock is variable.

Most of the soils in this association are wooded, and a few tracts are used as ski slopes. Rock outcrops in areas of Canaan soils and seasonal wetness in spots hinder logging operations, especially the construction of logging roads and landings. Pockets of loose, gravel-sized fragments of granite are important local sources of gravel. Not assigned to a capability unit.

CDE—Canaan-Redstone very rocky gravelly fine sandy loams association, steep. This association is on side slopes and ridges on mountains and foothills on the eastern slopes of the White Mountains adjacent to the Saco River valley. The areas generally extend laterally along landscape contours and are 30 to 150 acres in size. Slope ranges from 15 to 35 percent. The Canaan soil has the profile described as representative of the Canaan series. The Redstone soil has a profile similar to the one described as representative of the Redstone series, but subsoil layers are generally thinner. As much as 15 percent of the surface area is exposures of bedrock, some of which is weathered and rippable. Stones and boulders are common on the surface.

Canaan very rocky gravelly fine sandy loam makes up about 40 to 55 percent of the association, and Redstone very stony sandy loam about 30 to 40 percent. Canaan soils are on the irregular, ridgy, side slopes, and Redstone soils are on the smoother parts of the landscape.

The remaining 15 to 25 percent of the association is Marlow and Berkshire soils. These soils are interspersed with the Redstone soils, but Marlow soils commonly have north-facing slopes.

Shallowness to bedrock, rockiness, stoniness, and steepness of slope are major limitations to most uses of these soils. The shallowness to bedrock hinders excavations, limits tree growth, and presents a windthrow hazard. Cleared areas are susceptible to severe erosion. Hardness and rippability of the Conway granite bedrock is variable.

Most of the soils in this association are in woods, but a few tracts are used as ski slopes. Machine logging operations are difficult and hazardous because of the steep slopes, rock outcrops, and boulders. In constructing ski slopes, careful planning of the layout and the use of appropriate conservation practices are required to control erosion. Pockets of loose, gravel-sized fragments of Conway granite are an important local source of gravel. Not assigned to a capability unit.

CEE—Canaan-Redstone-Rock outcrop association, steep. This association is on mountaintops and foothill ridges on the eastern slopes of the White Mountains adjacent to the Saco River valley. The areas are irregular in shape and are generally 40 to 150 acres in size. In most places, slope ranges from 15 to 35 percent. About 15 to 50 percent of the surface area is exposures of bedrock, some of which is weathered and rippable.

Canaan soils make up about 30 to 50 percent of this association, and Redstone soils, about 20 to 30 percent. The Canaan soils, interspersed with rock outcrops, are on irregular knobs, and the Redstone soils are on the smoother parts of the landscape. The remaining 15 to 25 percent of the association is Marlow and Peru soils. Marlow soils are interspersed with Redstone soils but commonly have north-facing slopes. Peru soils are in the concave swales and on drainageway borders.

Shallowness to bedrock, rock outcrops, stoniness, and steepness of slope are the major limitations to the use of soils in this association. The shallowness to bedrock hinders excavations, limits tree growth, and presents a windthrow hazard. Bare areas are susceptible to severe erosion. Hardness and rippability of the Conway granite bedrock is variable.

Most of the soils in this association are in woods, but a few spots are used as ski slopes. Areas of rock outcrops scattered over the area and seasonal wetness in places severely hinder logging operations. The steeper slopes also make machine operation difficult. In constructing ski slopes, careful planning of layout and the use of appropriate conservation practices are needed to control erosion. Pockets of loose, gravel-sized fragments of Conway granite are an important local source of gravel. Not assigned to a capability unit.

CEF—Canaan-Redstone-Rock outcrop association, very steep. This association is on mountainsides, hillsides, and ridges on the eastern slopes of the White Mountains adjacent to the Saco River valley. The areas extend laterally along landscape contours and are generally 25 to 100 acres in size. Slope ranges from 35 to 60 percent. About 15 to 50 percent of the surface area has exposed bedrock, of which some is weathered and rippable.

Canaan soils make up about 30 to 55 percent of the association, and Redstone soils, about 20 to 30 percent. Canaan soils, interspersed with Rock outcrop, are on the irregular ridges, and Redstone soils are on the smoother parts of the landscape. The remaining 15 to 20 percent of the association is Marlow and Berkshire soils. Marlow and Berkshire soils are interspersed with Redstone soils, but Marlow soils commonly have north-facing slopes.

Shallowness to bedrock, rock outcrops, stoniness, and very steep slopes are major limitations to most uses of these soils. The shallowness to bedrock hinders excavations, limits tree growth, and presents windthrow and landslide hazards. Areas without vegetation are susceptible to very severe erosion.

Most of the soils in this association are in woods, but a few spots are used as ski slopes. The very steep slopes, coupled with the numerous rock outcrops, present serious limitations to logging operations. The very steep slopes also restrict the removal of weathered Conway granite for use as gravel. In constructing ski slopes, very careful planning of layout and the use of appropriate conservation measures are needed to avoid serious erosion. Not assigned to a capability unit.

Charlton Series

The Charlton series consists of well-drained soils that formed in deposits of loamy glacial till. These

soils are on hillsides and ridges of uplands in the southern part of the county.

In a representative profile of a Charlton soil in a wooded area, a covering of partly decayed leaves 3 inches thick is on the surface. The surface layer, below this, is dark yellowish-brown fine sandy loam about 7 inches thick. The subsoil, extending to a depth of 26 inches, is yellowish-brown fine sandy loam in the upper 13 inches and pale-brown gravelly fine sandy loam in the lower 6 inches. The underlying material to a depth of 42 inches is light yellowish-brown fine sandy loam in the upper 10 inches and light brownish-gray gravelly loamy fine sand in the lower 6 inches.

Permeability and available water capacity are moderate. Woodcrop productivity is fair.

Representative profile of Charlton fine sandy loam in an area of Charlton very stony fine sandy loam, 15 to 25 percent slopes, in a wooded area in the town of Effingham about one-half mile north of the junction of Elm Street and Champion Road, about four-tenths mile east of Mountain Road:

O1—3 to 2 inches, loose hardwood leaves and pine needle litter.

O2—2 inches to 0, partly decayed organic matter.

Ap—0 to 7 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular structure; friable; common fine and medium roots; 15 percent coarse fragments; strongly acid; clear, smooth boundary.

B21—7 to 14 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, fine, granular structure; friable; common fine and medium roots; 15 percent coarse fragments; strongly acid; gradual, smooth boundary.

B22—14 to 20 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; friable; few fine and medium roots; 15 percent coarse fragments; strongly acid; gradual, smooth boundary.

B3—20 to 26 inches, pale-brown (10YR 6/3) gravelly fine sandy loam; massive; friable; few fine and medium roots; 25 percent coarse fragments; medium acid; clear, smooth boundary.

C1—26 to 36 inches, light yellowish-brown (2.5Y 6/4) fine sandy loam; moderate, thin to medium, platy structure; 30 to 40 percent slightly firm to firm strata ¼ to ½ inch thick; 60 to 70 percent friable; 15 percent coarse fragments; medium acid; gradual, smooth boundary.

C2—36 to 42 inches, light brownish-gray (2.5Y 6/2) gravelly loamy fine sand; weak, thin, platy structure; friable; 20 percent coarse fragments; medium acid.

In the Ap horizon hue is 10YR, value is 3 or 4, and chroma is 2 to 4. The B horizon is commonly fine sandy loam but ranges to sandy loam. The B21 horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. The B22 and B3 horizons have a hue of 10YR grading to 2.5Y in transition to the C horizon, value of 5 or 6, and chroma of 3 to 6. The C horizon is fine sandy loam or sandy loam ranging to loamy fine sand at depths below 36 inches. The C horizon is generally massive but ranges to weak or moderate, platy in structure. Consistence is commonly friable, but thin firm layers are common.

Charlton soils are near Hollis, Sutton, and Gloucester soils. They formed in material similar to that in which Hollis soils formed but thay have a thicker mantle over bedrock. Charlton soils are better drained than the similar moderately well drained Sutton soils. They are finer textured below a depth of 30 inches than Gloucester soils, and they have fewer coarse fragments throughout.

CfB—Charlton fine sandy loam, 3 to 8 percent slopes. This soil is on hillcrests and has had most of the surface stones removed for farming. It has a profile similar to the one described as representative of the series, but the mineral surface layer is thicker and darker in most places.

Included with this soil in mapping are some small areas of Paxton, Millis, Sutton, and Woodbridge soils, and spots of Hollis soils. Also included are small areas of soils that have slopes of more than 8 percent, very stony spots, and scattered wet spots.

Crops respond well to the application of fertilizer. A few cobblestones and stones interfere with tillage and excavation operations. The hazard of erosion is slight where the soils have been cultivated or disturbed in construction.

This soil is well suited to silage corn, grasses, and legumes. It can be used for row crops continuously if it is tilled on the contour or stripcropped. These practices are needed to control erosion, and they are also used in cropping systems that include row crops, cover crops, grasses, and legumes.

This soil, once farmed, is now mostly wooded. Some areas are being used for hay and pasture. An increasing number of areas of this soil is being used for residential development. This soil has good potential for the development of open-land and woodland wildlife habitat. Capability unit IIe–5.

ClB—Charlton very stony fine sandy loam, 3 to 8 percent slopes. This soil is on hillcrests. It has a profile similar to the one described as representative of the series, but commonly the mineral surface layer is darker. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are some small areas of Paxton, Millis, Sutton, and Woodbridge soils and spots of Hollis soils. Also included are small areas of soils that have slopes of more than 8 percent, scattered wet spots, and bouldery and extremely stony spots.

Stoniness and gentle slopes are important limitations for certain intensive uses, such as level grades for roads and parking areas or for septic tank filter fields or beds and seedbed preparation for landscaping, farming, or gardening. The hazard of erosion is slight where vegetation has been removed.

This soil is not suitable for most farm uses because of surface stones. If the stones are removed, it is suited to row crops and hay crops.

Most areas of this soil are wooded, but some are in pasture. An increasing number of areas of this soil is being used as part of residential subdivisions. This soil has good potential for the development of woodland wildlife habitat. Capability unit VIs–7.

ClC—Charlton very stony fine sandy loam, 8 to 15 percent slopes. This soil is on hilltops and foot slopes. It has a profile similar to the one described as representative of the series, but in places the surface mineral layer is thinner. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Paxton, Millis, Sutton, and Woodbridge soils and spots of Hollis soils. Also included are small areas of soils that have slopes of more than 15 percent and bouldery and extremely stony spots.

Slope and stoniness are the major limitations to certain intensive uses of this soil. Slope is a severe limitation where excavation and fill are needed to establish level grades, as in roads, parking lots, septic tank filter

fields or beds, and sewage lagoons. Stones hinder seedbed preparation and landscaping. Unprotected slopes are susceptible to moderate erosion.

This soil is not suitable for most farm uses because of surface stones. The removal of surface stones improves this soil for most farm and nonfarm uses.

Most areas of this soil are wooded, but some small tracts are in pasture. A few areas of this soil are being used as part of residential subdivisions. This soil has good potential for the development of woodland wildlife habitat. Capability unit VIs–7.

ClD—Charlton very stony fine sandy loam, 15 to 25 percent slopes. This soil is on hillsides. The profile described as representative of the series is in an area of this mapping unit. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Paxton and Millis soils, spots of Hollis soils, and a few bedrock outcrops. Also included are small areas of soils that have slopes of more than 25 percent and extremely stony and bouldery spots.

Slope is a severe limitation to intensive use of this soil. Level grades generally require major excavation and fill. Erosion is a serious concern where cuts are made or vegetation is removed. Stoniness is a hindrance to specific uses, especially where level grades, seedbeds, or excavations are needed.

Almost all of this soil is wooded. Some areas of this soil are being used as part of ski developments.

This soil is well suited to timber production, but logging operations are difficult because of the moderately steep slopes. This soil has good potential for the development of woodland wildlife habitat. Capability unit VIs–7.

Chocorua Series

The Chocorua series consists of very poorly drained soils that formed in organic deposits 16 to 50 inches thick overlying sand or gravel. These soils are in broad drainageway depressions or in bogs bordering lakes.

In a representative profile of a Chocorua soil in a wooded drainageway bog, the surface layer is dark reddish-brown mucky peat 6 inches thick. This layer is about 50 percent fiber that breaks down to about 25 percent fiber when rubbed. The remaining organic layers, extending to the sandy material at a depth of 31 inches, are mostly dark reddish-brown mucky peat that is more than 50 percent fiber that breaks down to 20 to 30 percent fiber when rubbed. The layer between depths of 19 to 23 inches is dark-brown mucky peat that is about 20 percent silt. The underlying mineral material to a depth of 42 inches is olive-gray, loose coarse sand.

Runoff and internal drainage are very slow, and ponding often occurs during wet periods. Permeability is moderate. A high water table and poor stability of the organic materials are the major limitations to most uses of these soils. The organic materials subside somewhat in drained areas. The underlying sandy deposits are often quick if excavated.

Representative profile of Chocorua mucky peat in a wooded drainageway bog in the town of Ossipee, about 1,000 feet southeast of the junction of Tuftonboro Road and Archer's Pond Road, about 200 feet south of Archer's Pond Road:

Oe1—0 to 6 inches, dark reddish-brown (5YR 3/2) on broken faces, hemic material (mucky peat), dark reddish-brown (5YR 2/2) when rubbed; about 50 percent fiber, about 25 percent when rubbed; weak, medium, granular structure; friable; sodium pyrophosphate extract (10YR 6/3); about 50 percent woody and 50 percent herbaceous fibers; many fine to medium roots; very strongly acid; clear, smooth boundary.

Oe2—6 to 19 inches, dark reddish-brown (5YR 3/2) on broken faces and when rubbed, hemic material (mucky peat); about 70 percent fiber, about 20 percent when rubbed; weak, medium, granular structure; nonsticky; sodium pyrophosphate extract (10YR 6/3); about 50 percent woody and 50 percent herbaceous fibers; many fine and medium roots; very strongly acid; clear, smooth boundary.

Oe3—19 to 23 inches, dark-brown (7.5YR 3/2) hemic material (mucky peat) on broken faces and when rubbed; about 50 percent fibers, about 25 percent when rubbed; massive; nonsticky; sodium pyrophosphate extract (10YR 6/3); primarily herbaceous and sedge fibers and some woody fibers and about 20 percent silt; few fine and medium roots; very strongly acid; clear, smooth boundary.

Oe4—23 to 31 inches, dark reddish-brown (5YR 2/2) on broken faces; hemic material (mucky peat) dark reddish-brown (5YR 3/2) when rubbed; about 55 percent fibers, about 30 percent when rubbed; massive; nonsticky; sodium pyrophosphate extract (10YR 7/3); primarily herbaceous fibers and some woody fibers; few fine and medium roots; very strongly acid; abrupt, smooth boundary.

IIC—31 to 42 inches, olive-gray (5Y 5/2) coarse sand; single grained; loose; strongly acid.

The thickness of the organic material over sand or loamy sand ranges from 16 to 50 inches. Resistant woody fragments make up less than 15 percent of the volume. A surface layer of sphagnum moss peat may be as thick as 18 inches if it makes up less than 50 percent of the organic material volume and fibric material is not dominant. The underlying mineral material is loamy fine sand or coarser and includes gravelly analogs. Reaction in the organic and mineral layers ranges from extremely acid to strongly acid. The soluble organic color of the hemic materials in pyrophosphate solutions are 10YR 5/1, 10YR 6/2, or 10YR 7/3 but range to include 10YR 5/2 and 10YR 6/3. Rubbed color hue is dominantly 2.5YR to 7.5YR, value is 2 or 3, and chroma is 1 to 3.

Chocorua soils are near Ossipee and Greenwood soils. Chocorua and Ossipee soils formed in similar organic materials, but Chocorua soils are underlain by sand or gravel rather than by loamy material. Chocorua soils formed in organic deposits 16 to 50 inches thick, while Greenwood soils formed in deposits 16 to more than 50 inches thick.

CM—Chocorua mucky peat. This nearly level soil is in drainageways, small depressions, and lake or marsh borders. It consists of shallow organic deposits of either partly decayed or well decayed herbaceous and woody material.

Included with this soil in mapping are small areas of Greenwood mucky peat, Naumburg soils, and Raynham soils.

The water table is at or above the surface for much of the year, and it seldom drops below a depth of 12 inches beneath the surface.

Wetness and poor stability are the major limitations of this soil. Organic materials are generally removed or displaced when an area is earthfilled, such as

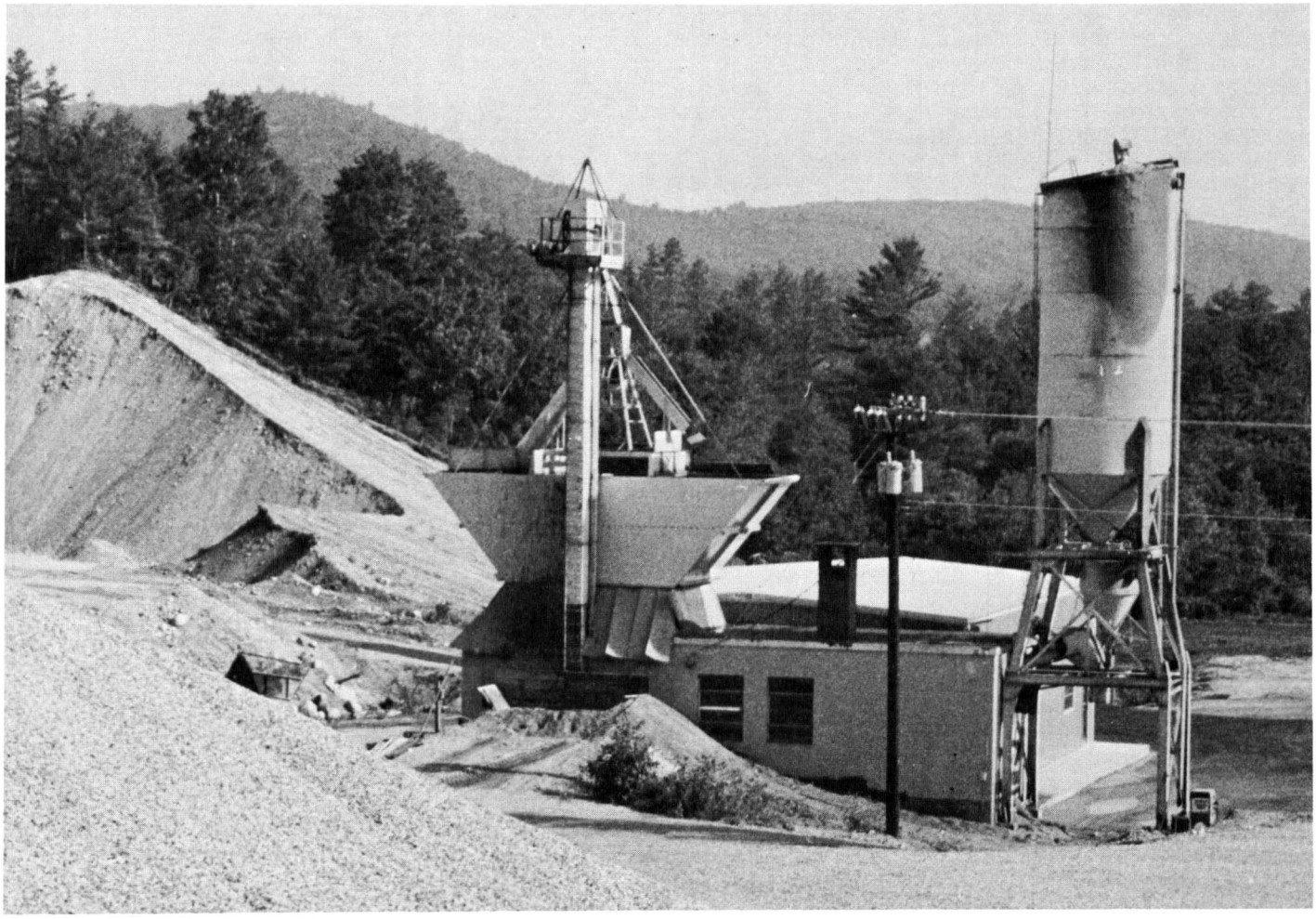

Figure 6.—**Gravel pit operation on Colton soils.**

for roads. Outlet grades are difficult to establish for drainage.

Most areas of this soil are in open bog or are wooded. This soil has good potential for the development of wetland wildlife habitat. Not assigned to a capability unit.

Colton Series

The Colton series consists of excessively drained soils that formed in deposits of water-laid sand and gravel. These soils are on glacial outwash plains, terraces, kames, and eskers near streams and lakes or former glacial drainageways in the northern part of the county. Cobblestones are common in these soils, especially on kames.

In a representative profile of a Colton soil in a wooded area, a layer of partly decomposed leaves and needles 1 inch thick is on the surface. The surface layer, below this, is light brownish-gray gravelly loamy fine sand 7 inches thick. The subsoil, extending to a depth of about 24 inches, is dark reddish-brown gravelly loamy coarse sand in the upper 9 inches and dark reddish-brown gravelly coarse sand in the lower 8 inches. The underlying material to a depth of 50 inches is yellowish-brown very gravelly coarse sand.

Permeability is rapid, and available water capacity is very low. Woodcrop productivity is fair for white pine and northern hardwoods. The main limitation to the use of these soils for community development is potential pollution of ground water by effluent from septic tank sewage disposal systems. These soils are a good source of sand and gravel (fig. 6).

Representative profile of Colton gravelly loamy fine sand, 3 to 8 percent slopes, in the town of Albany, White Mountain National Forest, about 15.1 miles west of Conway village on the Kancamagus Highway, across the highway from Passaconaway Campground:

O1—1 inch to 0, partly decomposed leaves and needles.

A2—0 to 7 inches, light brownish-gray (10YR 6/2) gravelly loamy fine sand; weak, fine, granular structure; very friable; many fine and medium roots; 30 to 35 percent gravel; very strongly acid; abrupt, broken boundary.

B21h—7 to 8 inches, black (5YR 2/1) and very dusky red (2.5YR 2/2) gravelly loamy fine sand; moderate, medium, granular structure; friable; many fine and medium roots; 30 to 35 percent gravel; very strongly acid; abrupt, broken boundary.

B22ir—8 to 16 inches, dark reddish-brown (5YR 3/4 and

2.5YR 3/4) gravelly loamy coarse sand; moderate, fine, granular structure; 60 percent friable, 40 percent firm; common fine roots; 35 to 40 percent gravel, 5 percent cobblestones; strongly acid; clear, irregular boundary.

B23—16 to 24 inches, dark reddish-brown (5YR 3/3 and 3/4) gravelly coarse sand; single grained; 40 percent firm, 60 percent loose; few fine roots; 35 to 40 percent gravel, 5 percent cobblestones; strongly acid; clear, smooth boundary.

C—24 to 50 inches, yellowish-brown (10YR 5/4 and 5/6) very gravelly coarse sand; single grained; loose; very few fine roots; 60 to 70 percent gravel, 15 percent cobblestones; strongly acid.

In the A2 horizon hue is 10YR or 7.5YR, value is 5 to 7, and chroma is 1 or 2. The B21h and B22ir horizons range from gravelly loamy coarse sand to gravelly fine sandy loam. The B23 horizon ranges from gravelly loamy sand to very gravelly coarse sand. The B21h and B21ir horizons have hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma 4 to 6. Where there is an accumulation of humus below the A2 horizon, value of the B21h horizon ranges to 2 and chroma ranges to 1. In the B23 horizon hue is 5YR to 10YR, value is 3 to 5, and chroma is 4 to 6. The C horizon is mostly gravel and cobblestones, and sand is in the interstices. Hue is 10YR to 5Y.

Colton soils are near Duane and Adams soils. Colton and Duane soils formed in similar materials, but Colton soils are better drained. Colton soils have more coarse fragments throughout than sandy Adams soils.

CnA—Colton gravelly loamy fine sand, 0 to 3 percent slopes. This nearly level soil is on outwash plains and terraces. It has a profile similar to the one described as representative of the series, but in places, it is deeper to the underlying sand and gravel material.

Included with this soil in mapping are small areas of Salmon variant, Adams, and Duane soils. Also included are small areas of soils that have slopes of more than 3 percent and spots that have stones on the surface.

Droughtiness and low natural fertility are limitations to most farm uses and to lawns and landscaping. In some places, gravel and cobblestones in the surface layer interfere with cultivation or landscaping operations.

This soil has limited suitability for row crops, hay, or pasture. Irrigation and heavy applications of fertilizer are needed for most crops. Cropping systems generally include cover crops, grasses, and legumes in the rotation. Adding manure and returning crop residue to the soil help maintain the organic-matter content.

Most areas of this soil are wooded, but some are in idle fields or pasture. Some communities are built on this soil, and more and more areas are being used for residential, recreational, and light industrial development. Because of good accessibility, nearly level slopes, and rather easy workability, this soil is desirable for community development uses. Capability unit IIIs–26.

CnB—Colton gravelly loamy fine sand, 3 to 8 percent slopes. This undulating soil is on outwash plains and terraces. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Salmon variant, Adams, and Duane soils. Also included are small areas of soils that have slopes of more than 8 percent and spots that have stones on the surface.

Droughtiness and low natural fertility are limitations to farming and to lawns and landscaping. Locally, cobblestones or gravel in the surface layer interfere with seedbed preparation or cultivation and landscaping operations. The hazard of erosion is slight if the soil is disturbed in cultivation or during construction work. Where the soil is gently sloping and level grades are needed, limitations for such uses as roads and parking areas are moderate.

Irrigation is necessary if row crops are grown or if a good grass cover is to be established and maintained. Cropping systems generally include cover crops, grasses, and legumes in the rotation. Stripcropping helps to conserve moisture and to minimize soil losses. Adding manure and returning crop residue to the soil help to maintain organic-matter content.

Most areas of this soil are wooded, but some are idle fields and a few are used for limited pasture. More and more of this soil is being used for residential and recreational developments, especially near lakes or streams. These soils are desirable for community development uses because of their gentle slopes and good internal drainage. Capability unit IIIs–26.

CnC—Colton gravelly loamy fine sand, 8 to 15 percent slopes. This rolling soil is on outwash plains or short slope breaks on terraces. It has a profile similar to the one described as representative of the series, but the mineral surface layer is commonly thinner.

Included with this soil in mapping are small areas of Adams and Hermon soils and spots of Duane soils. Also included are small areas of soils that have slopes of more than 15 percent and local spots that have stones on the surface.

Slope and droughtiness are limitations to most farm uses and certain nonfarm uses. Slope is a severe limitation where level grades are needed, such as for roads and parking areas. In places, gravel and cobblestones in this soil interfere with landscaping operations. The hazard of erosion is moderate in areas where vegetation has been removed.

This soil is better suited to drought-resistant grasses and legumes than to row crops. Irrigation is needed for most crops and for the establishment and maintenance of a good grass cover. Where this soil is used for row crops, a cropping system that holds soil losses to a minimum should be selected. Stripcropping, diversions, cover crops, grasses, and legumes help control erosion.

Most areas of this soil are wooded, but some areas are idle or in pasture. The soil is not well suited to farm uses. Timber production is its most suitable use. Use for residential and recreational development has increased over the years, especially near lakes and streams. Capability unit IVs–26.

CnE—Colton gravelly loamy fine sand, 15 to 60 percent slopes. This soil is on long, narrow eskers, kame knolls, and escarpments on outwash plains and upland borders. It has a profile similar to the one described as representative of the series, but generally subsoil layers are thinner, and more cobblestones and pebbles are throughout the profile.

Included with this soil in mapping are small areas of Adams and Hermon soils. Also included are small areas of soils that have slopes of less than 15 percent and small areas that have stones on the surface.

Slope is the primary limitation affecting most uses, especially slopes greater than 25 percent. The hazard of erosion is severe in cleared areas.

Most of this soil is in woods. It is too steep for most farm and nonfarm uses. Timber production is the most

suitable use, but steep slopes are a limitation to logging operations. Capability unit VIIs–27.

Croghan Series

The Croghan series consists of moderately well drained soils that formed in deposits of water-laid sands and are on glacial outwash plains in the northern part of the county. These soils are near streams, lakes and bogs in slight depressions or other positions where the water table seasonally rises to near the surface.

In a representative profile of a Croghan loamy fine sand in a wooded area, a covering of partly decayed leaves and needles 3 inches thick is on the surface. The surface layer, below this, is light brownish-gray loamy fine sand about 3 inches thick. The subsoil, extending to a depth of 28 inches, is brown loamy fine sand in the upper 4 inches, yellowish-brown loamy fine sand in the middle 11 inches, and mottled light yellowish-brown loamy fine sand in the lower 10 inches. The underlying material to a depth of 50 inches is mottled light-gray loamy fine sand.

Permeability is rapid. Available water capacity is low. Woodcrop productivity is fair for most tree species. The main limitation to the use of these soils for community development is a seasonal high water table.

Representative profile of Croghan loamy fine sand, 0 to 3 percent slopes, in a woodlot about 1 mile north of Conway Village and about 1,500 feet east of New Hampshire Route 16, in the town of Conway:

O1—3 to 2 inches, partly decayed leaves and needles.
O2—2 inches to 0, black (N 2/0) decomposed forest litter.
A2—0 to 3 inches, light brownish-gray (10YR 6/2) loamy fine sand; weak, fine, granular structure; very friable; many fine roots; very strongly acid; abrupt, broken boundary.
B21ir—3 to 7 inches, brown (7.5YR 4/4) loamy fine sand; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.
B22—7 to 18 inches, yellowish-brown (10YR 5/6) loamy fine sand; weak, fine, granular structure; very friable; many roots; strongly acid; clear, smooth boundary.
B23—18 to 28 inches, light yellowish-brown (2.5Y 6/4) loamy fine sand; few, fine, distinct, light brownish-gray (2.5Y 6/2) and brownish-yellow (10YR 6/6) mottles; weak, fine, granular structure; very friable; few roots; strongly acid; abrupt, smooth boundary.
C1—28 to 50 inches, light-gray (2.5Y 7/2) loamy fine sand; many, medium, prominent, strong-brown (7.5YR 5/6 and 5/8) mottles; common, dark-brown (7.5YR 3/2) oxide stains; weak, fine, granular structure; friable; few fine roots; medium acid.

In the A2 horizon hue is 10YR or 7.5YR, and value is 5 to 7. An Ap horizon, if present, has a hue of 10YR, a value of 3 or 4, and a chroma of 2 or 3. The B2 horizon is mainly loamy sand or loamy fine sand and ranges to fine sand in the lower part. The B21ir horizon has hue ranging from 5YR to 7.5YR, value of 3 to 5, and chroma of 4 to 6. Where there is an accumulation of humus below the A2 horizon, value in the upper part of the B horizon ranges to 2 and chroma to 1. The C horizon is mainly loamy fine sand, sand, or coarse sand with varied degrees of stratification. Hue ranges from 10YR to 2.5Y.

Croghan soils are near Adams and Naumburg soils and formed in similar sandy materials. Croghan soils are similar to Adams soils but have mottles beginning at a depth of 1½ to 2 feet below the surface. Croghan soils are better drained than Naumburg soils.

CyA—Croghan loamy fine sand, 0 to 3 percent slopes. This nearly level soil is on the lower positions on outwash sand plains. It generally is between the higher terraces and low, wet depressions and drainageways. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Naumburg, Duane, and Nicholville variant soils. Also included are small rises that have slopes of more than 3 percent; areas of soils that have thin, loamy layers at depths below 30 inches; and spots that have stones on the surface.

Seasonal wetness is the major limitation to intensive use of this soil. Drainage improves the soil for most farm and nonfarm uses. Tile drainage systems are commonly used.

Unless the soils are drained, the choice of crops is restricted and cultivation is delayed in the spring. If legumes are grown, they should be the kind that can tolerate seasonal wetness. Drained areas can be used for row crops continuously if a winter cover crop is grown. Irrigation is sometimes necessary during dry periods to insure satisfactory growth of shallow-rooted plants.

This soil is mostly in woods, but because it is near lakes or streams in many places, more and more is being used as part of residential subdivisions. If drained, this soil has few or no limitations for most uses. Capability unit IIIw–22.

CyB—Croghan loamy fine sand, 3 to 8 percent slopes. This undulating soil is on lower positions on outwash sand plains. It is generally between the higher terraces and low, wet depressions and drainageways. The soil has a profile similar to the one described as representative of the series, but depth to mottling is more variable.

Included with this soil in mapping are small areas of Nicholville variant, Adams, Naumburg, and Duane soils. Also included are small areas of soils that have thin loamy layers at depths below 30 inches, and spots that have stones on the surface.

Seasonal wetness is the major limitation to intensive use of this soil. Deeper excavations and fill are needed to establish level grades on this soil than on the nearby level soils.

Drainage improves this soil for most farm and nonfarm uses. Outlets for drainage systems are generally easily obtained. If the soil is not drained, wetness restricts the choice of crops and delays cultivation in the spring. If legumes are grown, they should tolerate seasonal wetness.

Cover crops, grasses, and legumes help to minimize soil losses and add organic matter. Irrigation is sometimes needed during dry periods to insure satisfactory growth of shallow-rooted plants.

This soil is mostly in woods, but there is a trend towards using the soil as part of residential subdivisions. Capability unit IIIw–22.

Deerfield Series

The Deerfield series consists of moderately well drained soils that formed in deposits of water-laid sands. These soils are on glacial outwash plains in the southern part of the county. They are near streams,

lakes, and bogs in depressions or other positions where the water table seasonally rises to near the surface.

In a representative profile of a Deerfield soil in a wooded area, a layer of fresh and partly decayed leaves and needles 1 inch thick is on the surface. The surface layer, below this, is dark-brown loamy fine sand about 8 inches thick. The subsoil, extending to a depth of about 26 inches, is strong-brown sand in the upper 2 inches and mottled yellowish-brown sand in the lower 16 inches. The underlying material to a depth of 50 inches is light yellowish-brown loose sand and mottled gravelly sand.

Permeability is rapid. Available water capacity is low. Depth to seasonal high water is 18 to 24 inches. Woodcrop productivity is fair for most tree species. The major limitation to the use of these soils for community development is the seasonal high water table.

Represenative profile of Deerfield loamy fine sand, 0 to 3 percent slopes, in a wooded area in the town of Moultonboro, about 2 miles south of the junction of New Hampshire Routes 109 and 171, about 600 feet west of New Hampshire Route 109 near Ambrose Cove:

O1—1 inch to 0, pine needle litter.
Ap—0 to 8 inches, dark-brown (10YR 3/3) loamy fine sand; weak, fine, granular structure; very friable; common fine and medium roots; 1 to 2 percent coarse fragments less than ¼ inch in size; strongly acid; abrupt, smooth boundary.
B21ir—8 to 10 inches, strong-brown (7.5YR 5/8) sand; single grained; loose; few fine roots; 2 percent coarse fragments less than ½ inch in size; strongly acid; clear, smooth boundary.
B22—10 to 18 inches, yellowish-brown (10YR 5/6) sand; single grained; loose; few fine roots; 1 to 2 percent coarse fragments less than ¼ inch in size; strongly acid; gradual, smooth boundary.
B23—18 to 26 inches, yellowish-brown (10YR 5/6) sand; common, fine and medium, distinct, strong-brown (7.5YR 5/6) mottles; single grained; loose; 2 percent coarse fragments less than ¼ inch in size; strongly acid; gradual, smooth boundary.
C1—26 to 45 inches, light yellowish-brown (10YR 6/4) sand; common, medium, distinct, strong-brown (7.5YR 5/6) mottles; single grained; loose; 2 to 3 percent coarse fragments less than ¼ inch in size; strongly acid; abrupt, smooth boundary.
IIC2—45 to 50 inches, light yellowish-brown (2.5Y 6/4) gravelly sand; single grained; loose; 25 to 30 percent coarse fragments; medium acid.

The Ap horizon has a hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The B horizon ranges from loamy sand or loamy fine sand to sand. The B21ir horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. The B22 and B23 horizons commonly have hue of 10YR, value of 5 or 6, and chroma of 4 to 6. The C horizon is mainly loose fine, medium, or coarse sand ranging to gravelly sand with varied degrees of stratification. The C horizon ranges in hues from 10YR to 5Y.

Deerfield soils are near Windsor and Naumburg soils. They formed in sandy materials similar to the material in which those soils formed. Deerfield soils are similar to the Windsor soil, but they have mottles at a depth of 1¼ to 2 feet below the surface. Deerfield soils are better drained than Naumburg soils.

DeA—Deerfield loamy fine sand, 0 to 3 percent slopes. This nearly level soil is on the lower positions on outwash sand plains. It is generally between higher terraces and low, wet depressions and drainageways. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Naumburg, Nicholville variant, and Duane soils. Also included are areas of soils that are reddish-brown to yellowish-red in the upper part of the subsoil, small rises that have slopes of more than 3 percent, areas of soils that have thin, loamy layers at depths below 30 inches, and spots that have stones on the surface.

Seasonal wetness is a limitation to many uses of this soil, but drainage improves the soil for most farm and nonfarm uses.

In undrained areas, the choice of crops is restricted and cultivation is delayed in the spring. Drained areas can be used for row crops continuously, but irrigation is needed during dry periods to insure satisfactory growth of shallow-rooted plants. A good cropping system includes cover crops, grasses, and legumes in the rotation.

This soil is mostly wooded, but because many areas are near lakes or streams, they are in demand for use as part of residential subdivisions. Capability unit IIIw–22.

DeB—Deerfield loamy fine sand, 3 to 8 percent slopes. This undulating soil is on the lower parts of outwash sand plains. It is generally between higher terraces and low, wet depressions and drainageways. It has a profile similar to the one described as representative of the series, but depth to mottling is more variable.

Included with this soil in mapping are small areas of Nicholville variant, Windsor, Naumburg, and Duane soils. Also included are areas of soils that are reddish-brown to yellowish-red in the upper part of the subsoil, areas of soils that have thin loamy layers at depths below 30 inches, and spots that have stones on the surface.

Seasonal wetness is the major limitation to the use of this soil, but drainage improves the soil for most farm and nonfarm uses. If protective vegetation is removed, this soil is susceptible to erosion. Deeper excavations and fill are needed to establish level grades on this soil than on nearby nearly level soils. In drained areas irrigation is generally needed during dry periods to insure satisfactory growth of shallow-rooted plants. In undrained areas the choice of crops is restricted and cultivation is delayed in the spring. A good cropping system includes cover crops, grasses, and legumes in the rotation.

This soil is mostly wooded, but some areas are being used for residential development as part of subdivisions. Capability unit IIIw–22.

Duane Series

The Duane series consists of moderately well drained soils that formed in deposits of water-laid sand and gravel. These soils are in depressions on glacial outwash plains and terraces near streams, lakes, bogs, or former glacial drainageways.

In a representative profile of a Duane soil in a wooded area, a layer of fresh and partly decayed leaves, needles, and herbs 4 inches thick is on the surface. The surface layer, below this, is pinkish-gray fine sandy loam about 1 inch thick. The subsoil, extending to a depth of about 16 inches, is dark reddish-brown gravelly fine sandy loam in the upper 5 inches, reddish-brown gravelly fine sandy loam in the middle 4 inches,

and brown gravelly loamy sand that has faint mottles in the lower 6 inches. The underlying material to a depth of 50 inches is dark yellowish-brown medium, coarse, and very coarse sand and fine gravel that has distinct mottles.

Permeability is rapid. Available water capacity is low. Depth to seasonal high water is 18 to 24 inches. Tree growth is fair for most species. The seasonal high water table is a major factor to consider for most community development uses.

Representative profile of Duane fine sandy loam, 0 to 3 percent slopes, in a wooded area about one-fourth mile northwest of the junction of Pine Woods Road and New Hampshire Route 113, about 125 feet west of Pine Woods Road, in the town of Tamworth:

O1—4 to 3 inches, leaf litter from mixed hardwoods and pines.

O2—3 inches to 0, partly decomposed dark reddish-brown (5YR 2/2 and 2.5YR 2/4) and black (5YR 2/1) organic matter.

A2—0 to 1 inch, pinkish-gray (7.5YR 6/2) fine sandy loam; weak, medium, granular structure; very friable; many roots; very strongly acid; abrupt, broken boundary.

B21ir—1 to 6 inches, dark reddish-brown (5YR 3/4) gravelly fine sandy loam; weak, fine, granular structure; friable; common roots; ortstein development in lower part; 20 to 30 percent coarse fragments; strongly acid; clear, smooth boundary.

B22—6 to 10 inches, reddish-brown (5YR 4/4) gravelly fine sandy loam; weak, fine, granular structure; friable; common roots; 50 percent coarse fragments; strongly acid; clear, smooth boundary.

B23—10 to 16 inches, brown (7.5YR 4/4) gravelly loamy sand; common, fine, faint, strong-brown (7.5YR 5/6) mottles below a depth of 12 inches; weak, very fine granular structure; very friable; few roots; 50 percent coarse fragments; medium acid; gradual, smooth boundary.

C—16 to 50 inches, dark yellowish-brown (10YR 4/4) medium, coarse, and very coarse sand, and fine gravel; common, fine, distinct, brown (7.5YR 4/4) and strong-brown (7.5YR 5/6) mottles; single grained; loose; 60 to 70 percent coarse fragments; medium acid.

In the A2 horizon hue is 10YR or 7.5 YR, value is 5 to 7, and chroma is 1 or 2. The B21ir and B22 horizons range from loamy sand to fine sandy loam and their gravelly analogs. The B23 horizon is gravelly and very gravelly analogs of loamy sand, loamy fine sand, and sand. The B2 horizon commonly has hue of 5 YR and 7.5YR, value of 3 to 5, and chroma of 4 to 6. The B21h horizon, if present, has value and chroma ranging to 2. The C horizon is dominated by gravel and sand with varying degrees of stratification. The weighted average total content of coarse fragments exceeds 35 percent, by volume, of the soil between depths of 10 to 40 inches.

The solum of these soils is thinner and the ortstein is less well expressed than defined in the range for the series, but this difference does not alter the usefulness and behavior of the soils.

Duane soils are near Colton, Naumburg, and Raynham variant soils. Duane and Colton soils formed in similar materials, but Duane soils are not so well drained. Duane soils have more coarse fragments throughout and are better drained than Naumburg and Raynham variant soils.

DnA—Duane fine sandy loam, 0 to 3 percent slopes. This nearly level soil is on the lower parts of the landscape and in shallow depressions on outwash plains. It generally lies between better drained soils on upper terraces and wet depressions or drainageways. This soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Waumbek soils and the Nicholville and Raynham variant soils. Also included are small areas of soils that have slopes of more than 3 percent and spots that have stones on the surface.

Seasonal wetness is the primary limitation to most farm and nonfarm uses of this soil. Open ditch or tile drainage generally controls excess water, allowing more intensive uses of the soil. In places, cobblestones and gravel hinder seedbed preparation. In drained areas, supplemental irrigation is sometimes needed to establish and maintain good grass cover. In undrained areas, the choice of crops is restricted and cultivation is delayed in the spring. Drained areas can be used for row crops continuously. Cropping systems should include cover crops, grasses, and legumes in the rotation.

This soil is used mostly as woodland. Some areas of this soil are used for community development and for recreational uses. This soil has fair potential for the development of open-land wildlife habitat. Capability unit IIIw–22.

DnB—Duane fine sandy loam, 3 to 8 percent slopes. This undulating soil is on the lower parts of outwash plains. It generally lies between better drained soils on upper terraces and wet depressions or drainageways. This soil has a profile similar to the one described as representative of the series, but mottling is generally at a greater depth.

Included with this soil in mapping are small areas of Waumbek, Nicholville variant, and Colton soils. Also included are small areas of soil that have stones on the surface.

Seasonal wetness is the major limitation to most uses of this soil. Deeper excavations and fill are needed to establish level grades on this soil than on the nearby nearly level soils. The use of open ditches or tile drains generally controls excess water, allowing more intensive uses of the soil. Cobblestones and gravel hinder seedbed preparation. This soil is susceptible to erosion if protective vegetation is removed. In drained areas, supplemental irrigation is sometimes needed to establish and maintain good grass cover. In undrained areas the choice of crops is restricted and cultivation is delayed in the spring. Row crops can be grown continuously provided the soil is drained and erosion is controlled. A good cropping system includes cover crops, grasses, and legumes in the rotation.

This soil is mostly in woodland. A few areas have been developed for residential and recreational uses. Gravel pits sometimes extend into areas of this soil from areas of better drained soils. The seasonal high water table hinders gravel removal during wet periods. This soil has fair potential for the development of open-land wildlife habitat. Capability unit IIIw–22.

Fresh Water Marsh

FA—Fresh water marsh. This land type consists of areas covered by shallow water most of the time. It occurs around the edges of lakes and ponds and also in depressions that are ponded much of the year. Vegetation is mainly grasses, reeds, sedges, cattails, and rushes. This land type is too wet for timber production.

Fresh water marsh has no value for farming, but it does provide very important habitat for wetland wildlife. The habitat can be improved in some places by

controlling the water level. Not assigned to a capability unit.

Gloucester Series

The Gloucester series consists of somewhat excessively drained soils that formed in deposits of stony sand glacial till. These soils are most common on rolling and hilly uplands in the southern part of the county. Stones are common on the surface.

In a representative profile of a Gloucester soil in a wooded area, the surface layer is dark yellowish-brown fine sandy loam about 1 inch thick. The subsoil, extending to a depth of about 24 inches, is dark yellowish-brown fine sandy loam in the upper 7 inches, yellowish-brown fine sandy loam in the next 5 inches, yellowish-brown gravelly fine sandy loam in the next 4 inches, and brown to light olive-brown gravelly loamy fine sand in the lower part. The underlying material to a depth of 50 inches is grayish-brown very gravelly loamy sand.

Permeability is moderately rapid. Available water capacity is low.

Representative profile of Gloucester fine sandy loam in an area of Gloucester very stony fine sandy loam, 15 to 25 percent slopes, in a wooded area in the town of Ossipee, about 1 mile northwest of junction of New Hampshire Routes 16 and 28 and 350 feet southwest of New Hampshire Route 16:

O1—2 inches to 1 inch, loose leaf and pine needle litter.
O2—1 inch to 0, partly decayed organic matter.
A1—0 to 1 inch, dark yellowish-brown (10YR 3/4) fine sandy loam; weak, fine, granular structure; friable; many fine and medium roots; 10 to 15 percent coarse fragments; strongly acid; abrupt, smooth boundary.
B21—1 to 8 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular structure; friable; many fine and medium roots; 10 to 15 percent coarse fragments; strongly acid; clear, smooth boundary.
B22—8 to 13 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, fine, granular structure; friable; common fine and medium roots; 10 to 15 percent coarse fragments; strongly acid; clear, smooth boundary.
B23—13 to 17 inches; yellowish-brown (10YR 5/4) gravelly fine sandy loam; weak, fine to medium, granular structure; friable; few fine roots; 25 to 30 percent coarse fragments; strongly acid; clear, wavy boundary.
B3—17 to 24 inches, brown (10YR 5/3) to light olive-brown (2.5Y 5/4) gravelly loamy fine sand; massive; very friable; few fine roots; 45 to 55 percent coarse fragments; strongly acid, gradual, wavy boundary.
C—24 to 50 inches, grayish-brown (2.5Y 5/2) very gravelly loamy sand; massive; 75 percent very friable, 25 percent firm, horizontally oriented; 60 to 70 percent coarse fragments; strongly acid.

In the A1 horizon or, if present, the Ap horizon, hue is 10YR, value is 3 or 4, and chroma is 2 to 4. The B horizon has hue of 7.5YR or 10YR in the upper part and 10YR or 2.5Y in the lower part. Their value ranges from 4 to 6, and their chroma, from 3 to 8. The B horizon ranges from sandy loam to loamy coarse sand and their gravelly analogs. The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. Texture is loamy fine sand, loamy sand, or loamy coarse sand, and gravelly and very gravelly analogs. Consistence is dominantly loose, very friable, or friable, but thin, discontinuous firm lenses are in some places.

Gloucester soils are near Acton, Hollis, and Millis soils. Gloucester and Acton soils formed in similar material, but Gloucester soils are better drained. Gloucester soils are deeper to bedrock and typically have more coarse fragments throughout than Hollis soils. They are similar in texture but lack the fragipan characteristic of Millis soils.

GlB—Gloucester fine sandy loam, 3 to 8 percent slopes. This soil is in areas from which surface stones have been removed. It is on hillcrests or foot slopes. It has a profile similar to the one described as representative of the series, but the mineral surface layer is generally thicker.

Included with this soil in mapping are areas of Millis, Acton, Scituate, and Hollis soils.

In some places, stones and cobblestones in the profile interfere with tillage. The hazard of erosion is slight, even in the more sloping areas. This soil is suited to most commonly grown farm crops, but some crops require irrigation for optimum growth. In cultivated areas, diversions and stripcropping are needed to control erosion. A good cropping system includes cover crops, grasses, and legumes. Adding manure and returning crop residue to the soil help provide additional organic matter to conserve moisture and improve tilth.

Most of this soil is in pasture or woodland. Some areas are being used as part of residential and recreational developments. There are few limitations for most nonfarm uses. Capability unit IIs–55.

GlC—Gloucester fine sandy loam, 8 to 15 percent slopes. This soil is in areas from which surface stones have been removed. It is on side slopes and crests of hills. It has a profile similar to the one described as representative of the series, but the mineral surface layer is generally thicker and lighter colored.

Included with this soil in mapping are areas of Millis, Acton, Scituate, and Hollis soils. Also included are scattered spots of very stony Gloucester soils.

Slope is the main limitation to most farm and nonfarm uses of this soil. Steepness of slope is a severe limitation where level grades are required. The hazard of erosion is moderate if the soil is disturbed by plowing or during construction work. This soil is suited to most commonly grown farm crops, but because of the erosion hazard, its use for row crops is limited. A cropping system that includes grasses and legumes helps to keep soil losses to a minimum. Supporting erosion-control practices are contour farming, stripcropping, and diversions. Some crops require irrigation to insure optimum growth. Adding manure and returning crop residue to the soil provides additional organic matter to help maintain tilth and conserve moisture. A few stones and cobblestones in the soil interfere with tillage.

Most of this soil is in pasture or woodland. A few areas are being used as part of residential and recreational developments. Capability unit IIIe–55.

GsB—Gloucester very stony fine sandy loam, 3 to 8 percent slopes. This soil is on hillcrests. It has a profile similar to the one described as representative of the series, but in most places, the mineral surface layer is thicker. Surface stones and boulders are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Acton, Scituate, and Millis soils, and spots of Hollis soils that have outcrops of bedrock in places. Also in-

cluded are small areas of soils that have slopes of more than 8 percent and small bouldery or extremely stony areas that are commonly near lakes and drainageways.

Stoniness is the major limitation to such uses as level grades for roads and parking areas, septic tank filter fields, and seedbed preparation for landscaping and farming.

Most of this soil is in woodland, but a few spots are in pasture. Some areas are being used for residential and recreational developments. Capability unit VIs–7.

GsC—Gloucester very stony fine sandy loam, 8 to 15 percent slopes. This soil is on foot slopes and hilltops. It has a profile similar to the one described as representative of the series, but the mineral surface layer is thicker. Surface stones and boulders are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Millis, Acton, and Scituate soils, and Hollis soils that have bedrock outcrops in places. Also included are small areas of soils that have slopes of more than 15 percent and bouldery and extremely stony spots commonly near lakes and drainageways.

Slope and stoniness are major limitations to most uses of this soil, especially where excavation and fill are needed to establish level grades. Stoniness is a limitation in seedbed preparation for landscaping and farming. Unprotected areas are susceptible to moderate erosion.

Most of this soil is in woodland, but small tracts are in pasture. A few areas of this soil are being used for recreational development. Capability unit VIs–7.

GsD—Gloucester very stony fine sandy loam, 15 to 25 percent slopes. This soil is on side slopes and hillsides. The profile described as representative of the series is in an area of this mapping unit. Surface stones and boulders are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Millis and Hinckley soils, and Hollis soils that have bedrock outcrops in places. Also included are small areas of extremely stony or bouldery soils.

Slope and stoniness are major limitations to most uses of this soil. Level grades generally require major excavation and fill. Unprotected areas are susceptible to erosion.

Most of this soil is in woodland. A few areas are being used for recreational development in ski areas. In some places, buildings are constructed on pilings to minimize excavation and fill. Capability unit VIs–7.

GtD—Gloucester extremely stony fine sandy loam, 8 to 25 percent slopes. This soil is on irregular hillsides. It has a profile similar to the one described as representative of the series, but it has more stones and boulders throughout the profile. Surface stones and boulders are generally less than 5 feet apart.

Included with this soil in mapping are small areas of Millis, Scituate, and Charlton soils, and Hollis soils that have scattered bedrock outcrops. Also included are scattered wet spots.

Moderately steep slopes and extreme stoniness are major limitations to farm and most nonfarm uses of this soil. Level grades generally require major excavation and fill. Landscaping and seedbed preparation are severely hindered by stones and boulders. The hazard of erosion is severe in areas where vegetative cover has been removed. Moderately steep slopes and extreme stoniness make machine operation very difficult in logging or in the construction of ski slopes.

Most of this soil is wooded. A few scattered spots are being used for recreational housing developments, mainly in areas that have scenic views. Stone and boulder cover is often incorporated into the landscape pattern. Capability unit VIIs–58.

GtE—Gloucester extremely stony fine sandy loam, 25 to 60 percent slopes. This soil is on hillsides and mountainsides. It has a profile similar to the one described as representative of the series, but it has a thinner subsoil layer and more stones and boulders throughout the profile. Surface stones and boulders are generally less than 5 feet apart.

Included with this soil in mapping are areas of Charlton, Millis, Hinckley, and Hollis soils that have bedrock outcrop in places.

Steep to very steep slopes and extreme stoniness are the major limitations to most uses of this soil. The stones and boulders severely hinder excavations, grading, and seedbed preparation. The hazard of erosion is severe in areas without vegetation. In constructing ski slopes, natural drainageways should not be disturbed, and open slopes should be quickly revegetated and surface runoff controlled.

Almost all of this soil is wooded. The slopes are generally too steep for safe machinery use in logging operations, especially on the steeper parts. There is potential for development of ski areas, but this use requires very careful planning and usage of appropriate conservation practices to safeguard against severe erosion. Capability unit VIIs–58.

Greenwood Series

The Greenwood series consists of very poorly drained soils that formed in organic deposits more than 50 inches thick. These soils are in bogs bordering lakes, in broad drainageways, and in glacial upland depressions (fig. 7).

In a representative profile of a Greenwood soil in a wooded bog, the surface layer is very dark brown mucky peat 6 inches thick that is about 65 percent fibers. When rubbed, it becomes dark reddish brown and is about 25 percent fibers. The remaining layers to a depth of 70 inches are mostly dark reddish-brown mucky peat that is more than 50 percent fibers. This breaks down, when rubbed, to 25 to 30 percent fibers with little color change.

Runoff and internal drainage are very slow, and ponding often occurs during wet periods. Permeability is moderate. The high water table and the poor stability of mucky peat materials are the main limitations to most uses of these soils. The mucky peat subsides if the soil is drained.

Representative profile of Greenwood mucky peat in a wooded bog in the town of Ossipee, about nine-tenths mile northwest of junction of N.H. Routes 16 and 25, about 800 feet east of old N.H. Route 16:

Oe1—0 to 6 inches, very dark brown (7.5YR 2/2) on broken face, hemic material (mucky peat) dark reddish brown (5YR 2/2) when rubbed; about 65 percent fiber, about 25 percent when rubbed, and about 3 percent silt; weak, thick, platy structure; friable; sodium pyrophosphate extract (10YR

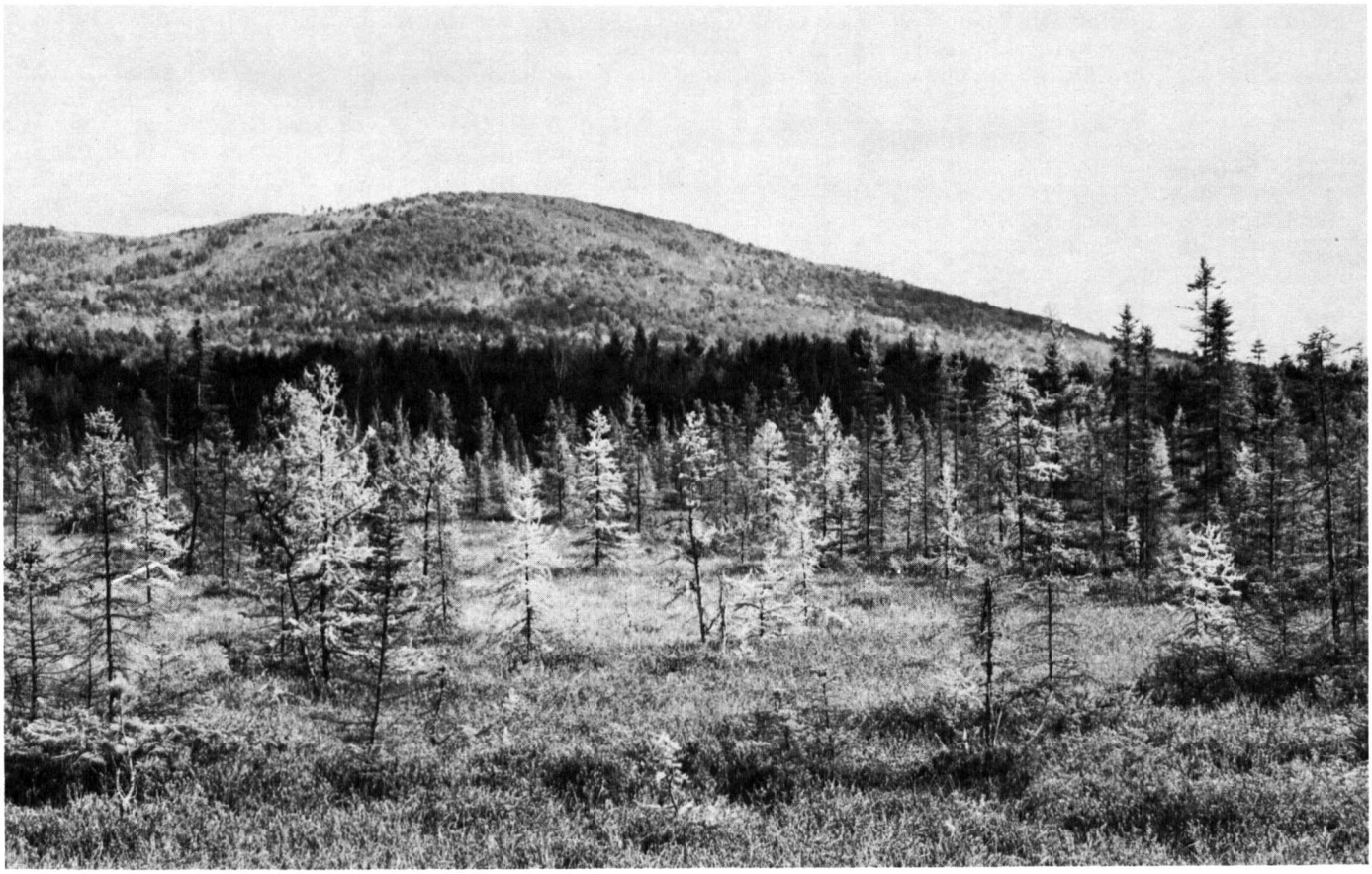

Figure 7.—**Typical area of Greenwood soils bordering Ossipee Lake.**

6/3); mainly herbaceous and sedge fibers; many fine and medium roots; very strongly acid; gradual, smooth boundary.

Oe2—6 to 28 inches, dark reddish brown (5YR 2/2) on broken face and when rubbed; hemic material (mucky peat) about 70 percent fiber, about 30 percent when rubbed; weak, medium to coarse, granular structure; nonsticky; sodium pyrophosphate extract (10YR 6/3); about 40 percent herbaceous and sedge fibers; few fine roots; very strongly acid; abrupt, smooth boundary.

Oe3—28 to 51 inches, black (5YR 2/1) and dark reddish brown (5YR 2/2) on broken face and when rubbed; hemic material (mucky peat) about 65 percent fiber, about 30 percent when rubbed; massive; nonsticky; sodium pyrophosphate extract (10YR 5/2); mainly sedge fibers; very strongly acid; abrupt, smooth boundary.

Oe4—51 to 70 inches, dark reddish brown (2.5YR 3/4) on broken face, hemic material (mucky peat) dark reddish brown (5YR 2/2) when rubbed; about 50 percent fiber, about 25 percent when rubbed; massive; nonsticky; sodium pyrophosphate extract (10YR 6/3); primarily sedge fibers; extremely acid.

The thickness of the organic materials exceeds 50 inches. The fibers are dominantly herbaceous and sedgy along with varied amounts of woody fibers. Resistant woody fragments, more than 2 millimeters in size, make up less than 15 percent of the volume. The surface layer of sphagnum moss peat is as thick as 21 inches where fibric materials make up less than 10 inches of the subsurface and bottom layers. Reaction in the surface and subsurface layers ranges from extremely acid to strongly acid. The soluble organic color of the hemic materials in sodium pyrophosphate solution are 10YR 5/1, 10YR 6/2, or 10YR 7/3, but they range to include 10YR 5/2 and 10YR 6/3. Rubbed color hue is dominantly 2.5YR through 7.5YR, values is 2 or 3, and chroma is 2 or 3.

Greenwood soils are near Chocorua and Ossipee soils, and they formed in similar organic materials. Greenwood soils consist of organic deposits that are more than 50 inches thick, while Chocorua and Ossipee soils consist of organic depoits 16 to 50 inches thick.

GW—Greenwood mucky peat. This nearly level soil is on wide drainageways or lake border bogs. These organic soils are made up of either partly decayed or well decayed herbaceous and woody material. Thickness of organic material ranges from 50 inches to well over 10 feet. Sand, gravel, silt, or loam underlies the organic materials.

Included with this soil in mapping are strips of Chocorua mucky peat and Ossipee mucky peat. Also included are small areas of Whitman, Naumburg, and Raynham variant soils and spots of Fresh water marsh.

The water table is at or above the surface for much of the year, and it seldom drops below a depth of 12 inches.

Wetness and poor stability are the major limitations to most uses of this soil. Organic materials are generally removed or displaced when an area is earth-filled for such uses as roads. Outlet grades are often difficult to establish for drainage.

Much of this soil is in open bog, but some is in woodland. There is good potential for the development of wetland wildlife habitat. Not assigned to a capability unit.

Hadley Series

The Hadley series consists of well-drained soils that formed in alluvial deposits of silt and very fine sand. These soils are on flood plains along major streams in the county and are subject to occasional flooding.

In a representative profile of a Hadley soil in a hayfield, the surface layer is dark-brown very fine sandy loam 12 inches thick. The subsoil, to a depth of 34 inches, is yellowish-brown very fine sandy loam in the upper 12 inches and dark yellowish-brown very fine sandy loam in the lower 10 inches. The underlying material to a depth of 50 inches is light olive-brown loamy very fine sand in the upper 4 inches and light olive-brown grading to yellowish-brown very fine sandy loam in the lower 12 inches.

Permeability is moderate. Available water capacity is high. The potential flood hazard is the main limitation to the use of these soils for community development. Timber production is good.

Representative profile of Hadley very fine sandy loam, high bottom, in a hayfield about 2.6 miles north of covered bridge over Swift River on Westside Road, 275 feet east of highway in the town of Conway:

Ap—0 to 12 inches, dark-brown (10YR 3/3) very fine sandy loam; weak, very fine to fine, granular structure; friable; common fine roots; some clods; slightly acid; abrupt, smooth boundary.

B21—12 to 24 inches, yellowish-brown (10YR 5/4) very fine sandy loam; weak, very fine, granular structure; friable; few fine roots, some subangular blocky clods ¼ inch to ¾ inch in diameter; medium acid; clear, smooth boundary.

B22—24 to 34 inches, dark yellowish-brown (10YR 4/4) very fine sandy loam; weak, very fine to fine, granular structure; friable; strongly acid; abrupt, smooth boundary.

IIC1—34 to 38 inches, light olive-brown (2.5Y 5/4) loamy very fine sand; weak, fine, granular structure; very friable; some thin bands of very fine sandy loam; strongly acid; abrupt, smooth boundary.

IIIC2—38 to 44 inches, light olive-brown (2.5Y 5/4) very fine sandy loam; massive; very friable; subangular blocky clods and very fine granules; strongly acid; gradual, smooth boundary.

IIIC3—44 to 50 inches, yellowish-brown (10YR 5/4)very fine sandy loam; massive; friable; strongly acid.

Thickness and number of horizons are variable, depending on alluvial deposition. Buried A horizons are common. In the Ap horizon, hue is 10 YR or 2.5 Y, value is 3 or 4, and chroma is 2 to 4. The C horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 2 to 4.

Hadley soils are near Winooski, Ondawa, and Podunk soils. Hadley and Winooski soils formed in similar material, but Hadley soils are better drained. Hadley soils formed in finer textured material than Ondawa or Podunk soils, and they are better drained than Podunk soils.

Ha—Hadley very fine sandy loam, high bottom. This nearly level soil is on high bottoms on flood plains along the larger rivers, especially the Saco River.

Included with this soil in mapping are small areas of Ondawa and Winooski soils. Also included are long, narrow strips of soils that have slopes of more than 3 percent along narrow flood plain drainageways, and spots of soils underlain by sand and gravel at a depth of less than 36 inches.

Occasional flooding is the main limitation to intensive use of this soil. This soil generally floods less frequently than once every 5 to 10 years or more.

This soil is suited to truck crops, field crops, hay, and pasture. There are few limitations for crops; however, special management is needed to maintain organic-matter content. A strip of sod along a streambank can be effective in controlling streambank erosion.

Most areas of this soil are in hay, pasture, or silage corn. A few areas of this soil have been developed for recreational and residential uses. This soil has good potential for open-land and woodland wildlife habitat. Capability unit I–1.

Hermon Series

The Hermon series consists of well-drained to somewhat excessively drained soils that formed in deposits of stony sand glacial till. These soils are on rolling to hilly uplands and mountains in the northern part of the county. Stones are prominent on the surface.

In a representative profile of a Hermon soil in a wooded area, a 5 inch layer of fresh and partly decayed leaves, needles, and herbs is on the surface. The surface layer, below this, is gray fine sandy loam about 3 inches thick. The subsoil, extending to a depth of about 19 inches, is dark reddish-brown fine sandy loam in the upper 1 inch, yellowish-red fine sandy loam in the next 7 inches, and yellowish-brown and some reddish-brown gravelly sandy loam in the lower 8 inches. The underlying material to a depth of 50 inches is light olive-brown gravelly loamy sand.

Permeability is moderately rapid. Available water capacity is low. Woodcrop production is fair for white pine and northern hardwoods.

Representative profile of Hermon fine sandy loam in a wooded area of Hermon very stony fine sandy loam association, steep, in the White Mountain National Forest in the town of Jackson, 1.7 miles south of junction of East Branch Saco River and Slippery Brook, 1,200 feet east of Slippery Brook Road:

O1—5 to 3 inches, matted layer of leaves and twigs.

O2—3 inches to 0, partly decomposed forest litter.

A2—0 to 3 inches, gray (10YR 6/1) fine sandy loam; weak, fine, granular structure; very friable, many fine and medium roots; very strongly acid; abrupt, wavy boundary.

B21h—3 to 4 inches, dark reddish-brown (2.5YR 3/4) fine sandy loam; moderate, fine, granular structure; 50 percent friable; 50 percent firm; many fine and medium roots; 5 percent coarse fragments as much as 3 inches in size; very strongly acid; abrupt broken boundary.

B22ir—4 to 11 inches, yellowish-red (5YR 4/6) fine sandy loam; weak, fine, granular structure; friable; many fine roots; 10 percent coarse fragments as much as 3 inches across; very strongly acid; clear, smooth boundary.

B23—11 to 19 inches, yellowish-brown (10YR 5/6) and reddish-brown (5YR 4/4) gravelly sandy loam; weak, fine, granular structure; friable; common fine roots; 30 percent coarse fragments as much as 3 inches across; very strongly acid; clear, smooth boundary.

C1—19 to 27 inches, light olive-brown (2.5Y 5/4) gravelly loamy sand; massive parting to weak, fine, granu-

lar structure; very friable; few fine roots; 35 percent coarse fragments as much as 3 inches across; strongly acid; clear, smooth boundary.

C2—27 to 50 inches, light olive-brown (2.5Y 5/4) gravelly loamy sand that has streaks of light yellowish brown (2.5Y 6/4); massive parting to weak, thick, platy structure; very friable; 25 percent coarse fragments as much as 3 inches in size; strongly acid.

In the A2 horizon hue is 10YR or 7.5YR, value is 5 to 7, and chroma is 2 or 1. The Ap horizon, where present, has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The B21h and B22ir horizons are sandy loam or fine sandy loam, including their gravelly analogs. The B23 horizon is gravelly or very gravelly sandy loam or loamy sand. The B21h and B22ir horizons have hue of 2.5YR to 7.5YR, value of 3 and 4, and chroma of 4 to 6. The C horizon is gravelly or very gravelly loamy sand, loamy coarse sand, or coarse sand. Hue ranges from 10YR to 5Y.

Hermon soils are near Waumbek, Lyman, and Becket soils. Hermon and Waumbek soils formed in similar material, but Hermon soils are better drained. Hermon soils are thicker over bedrock than Lyman soils and lack the firm pan layer present in Becket soils.

HfB—Hermon fine sandy loam, 3 to 8 percent slopes. This soil is in areas from which surface stones have been removed. It is in fields on hillcrests and undulating foot slopes. It has a profile similar to the one described as representative of the series, but the mineral surface layer is thicker and darker colored.

Included with this soil in mapping are areas of Waumbek, Skerry, and Becket soils. Also included are scattered spots of very stony Hermon soils, soils that have slopes of more than 8 percent, and wet spots.

This soil is suited to most commonly grown farm crops. Some crops require irrigation for optimum growth. In places where these soils are in row crops, diversions and stripcropping are needed to control erosion. These practices are also needed in cropping systems that include cover crops, grasses, and legumes. Adding manure and returning crop residue are helpful in maintaining tilth and conserving moisture. Stones and cobblestones in the profile interfere with tillage in some places.

Most areas of this soil are in woodland or pasture. A few areas are in hay. Some areas are being used for residential development. There are minor limitations for most nonfarm uses. Capability unit IIs–55.

HfC—Hermon fine sandy loam, 8 to 15 percent slopes. This soil is in areas from which surface stones have been removed. It is on side slopes and hillcrests. It has a profile similar to the one described as representative of the series, but the mineral surface layer is thicker and darker colored.

Included with this soil in mapping are small areas of Becket, Waumbek, Skerry, and Lyman soils. Also included are small areas of very stony Hermon soils and small areas of soil that have slopes of more than 15 percent.

Slope is a severe limitation for intensive uses where level grades are needed. The hazard of erosion is moderate if the soil is disturbed by plowing or during construction.

This soil is suited to most farm crops. Where these soils are in row crops, a cropping system that has grasses and legumes in the rotation helps keep soil losses to a minimum. Contour farming, stripcropping, and diversions also help control erosion. Some crops require irrigation for optimum growth. Adding manure and returning crop residue to the soil helps to maintain tilth and conserve moisture. Stones and cobblestones interfere with tillage in places.

Most areas of this soil are in woodland or pasture, but some small areas are in hay. A few areas are in residential use, and this use is increasing in some areas. Capability unit IIIe–55.

HmB—Hermon very stony fine sandy loam, 3 to 8 percent slopes. This soil is on hillcrests. It has a profile similar to the one described as representative of the series, but in places upper subsoil layers are thicker. Surface stones and boulders are generally 5 to 30 feet apart (fig. 8).

Included with this soil in mapping are areas of Waumbek, Skerry, and Becket soils and Lyman soils that have some bedrock outcrops. Redstone soils are commonly on uplands adjacent to the Saco River valley. Also included are extremely stony spots and scattered wet spots.

Stoniness is the main limitation to intensive uses, such as level grades for roads and parking areas, septic tank filter fields, and seedbed preparation for landscaping and farming.

Because of stoniness, this soil is unsuitable for cultivation. Removal of stones improves this soil for farm and nonfarm uses.

Most areas of this soil are in woodland, but some are in pasture or are idle. In a few places, this soil is being used for residential development. Capability unit VIs–7.

HmC—Hermon very stony fine sandy loam, 8 to 15 percent slopes. This soil is on foot slopes and hilltops. It has a profile similar to the one described as representative of the series, but in places subsoil layers are thicker. Surface stones and boulders are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Becket, Waumbek, Skerry, and Colton soils and areas of Lyman soils that have some bedrock outcrops. On uplands adjacent to the Saco River valley, Redstone soils are common. Also included are small areas that are extremely stony.

Slope and stoniness are major limitations to most intensive uses of this soil. Slope is a severe limitation where excavation and fill are needed to establish level grades. Stoniness hinders seedbed preparation for landscaping and farming. The hazard of erosion is moderate in unprotected areas. Stone removal improves this soil for most uses.

Most areas of this soil are in woodland, but small tracts are in pasture. A few areas of this soil are being used for residential and recreational development. Capability unit VIs–7.

HmD—Hermon very stony fine sandy loam, 15 to 25 percent slopes. This soil is on lower valley walls and hillsides. Surface stones and boulders are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Becket, Redstone, and Colton soils and areas of Lyman soils that have some bedrock outcrops. Also included are small areas that are extremely stony or bouldery.

Slope and stoniness are the main limitations to most uses of this soil. Level grades generally require major excavation and fill. The hazard of erosion is severe in unprotected areas. The moderately steep slopes are a

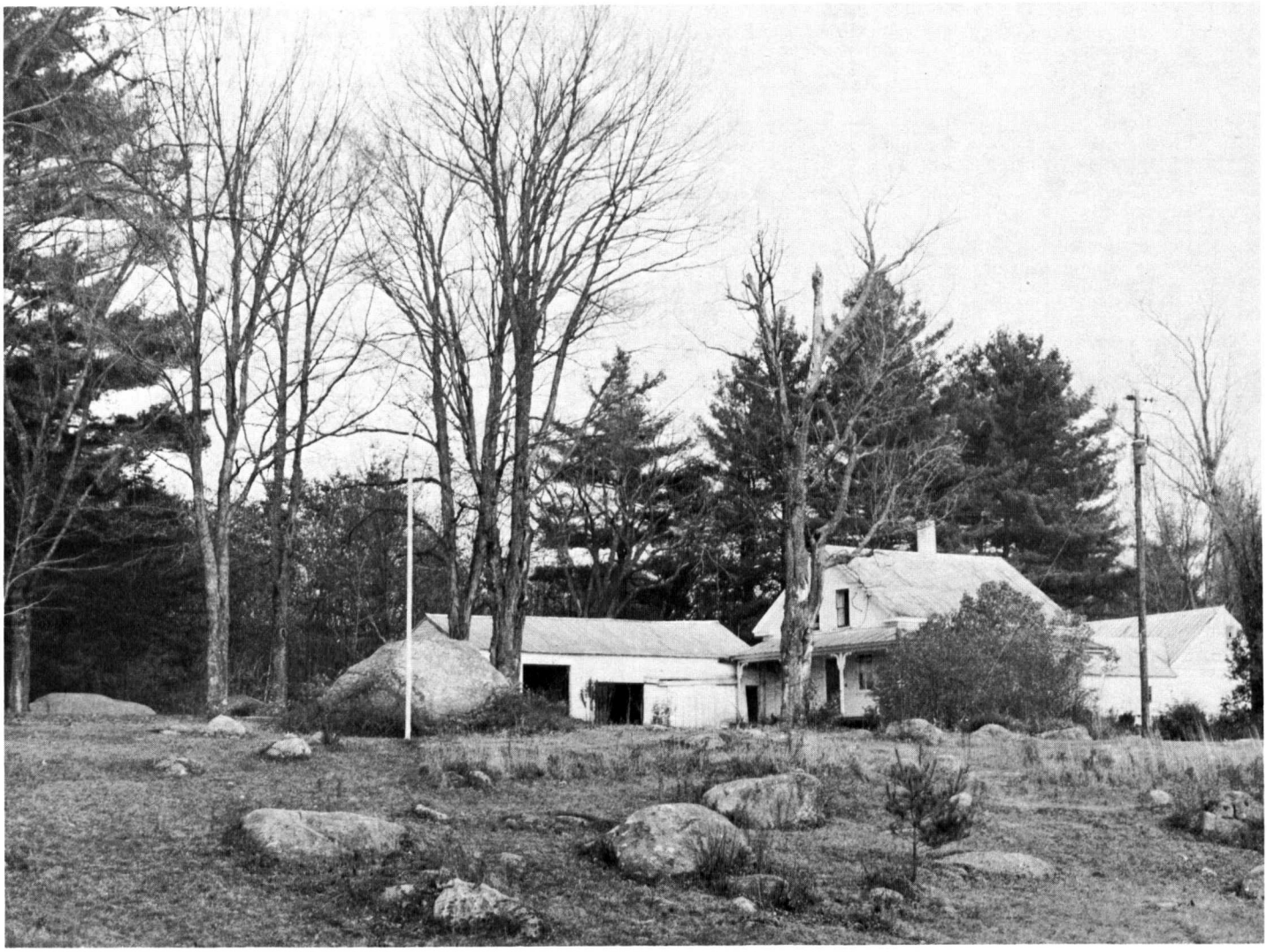

Figure 8.—**Area of Hermon very stony fine sandy loam, 3 to 8 percent slopes, with stones and boulders on the surface.**

severe limitation for community development. Stones and boulders hinder excavations and seedbed preparation.

Much of this soil is in woodland, but some areas are being used for recreational subdivisions and ski slopes. Where buildings are involved, pilings are generally used to minimize excavation and fill. The construction of ski slopes requires careful planning and usage of conservation practices to prevent serious erosion. Capability unit VIs–7.

HmE—Hermon very stony fine sandy loam, 25 to 60 percent slopes. This soil is on the sides of hills and mountains. It has a profile similar to the one described as representative of the series, but in places the mineral surface layer and subsoil are thinner. Surface stones and boulders are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Becket and Redstone soils and areas of Lyman soils that have some bedrock outcrops. Also included are extremely stony or bouldery spots.

The steep slopes severely limit most uses of this soil. Level grades require major excavation and fill. The hazard of erosion is severe in unprotected areas. On cleared ski slopes, runoff can be controlled by using diversions and grassed waterways. Natural drainageways should be left in vegetation, and bare slopes can be protected with mulch and cover crops until permanent vegetation is established. Stoniness is a hindrance to seedbed preparation and excavations.

Most areas of this soil are in woodland, but a few spots have been used for recreational developments, such as ski areas. The slopes are generally too steep for safe machinery use in logging operations, especially where they are greater than 35 percent. The construction of ski slopes requires very careful planning of erosion-control measures to prevent serious erosion. Capability unit VIIs–7.

HnD—Hermon extremely stony fine sandy loam, 8 to 25 percent slopes. This soil is on irregular lower valley walls and hillsides. Surface stones and boulders are generally less than 5 feet apart.

Included with this soil in mapping are areas of Bec-

ket, Berkshire, and Waumbek soils and areas of Lyman soils that have small areas of rock outcrops. Also included are scattered wet spots in areas of less sloping soils.

Moderately steep slopes and extreme stoniness are major limitations to farm and nonfarm uses. Level grades generally require major excavation and fill. Landscaping and seedbed preparation are severely limited by the stones and boulders. The hazard of erosion is severe after vegetative cover has been removed where slopes are greater than 15 percent. Moderately steep slopes and extreme stoniness make machine operation very difficult for logging or for the construction of ski slopes.

Most areas of this soil are wooded. Some areas are being used for residential and recreational developments, mainly places with scenic views. Stone and boulder cover is commonly incorporated into the landscape pattern. Capability unit VIIs–58.

HnE—Hermon extremely stony fine sandy loam, 25 to 60 percent slopes. This soil is on irregular hillsides and mountainsides. Surface stones and boulders are generally less than 5 feet apart.

Included with this soil in mapping are areas of Becket and Berkshire soils and areas of Lyman soils that have areas of rock outcrops.

Steep to very steep slopes and extreme stoniness severely limit most uses of this soil. The hazard of erosion is severe after vegetation has been removed. The stones and boulders hinder excavations, grading, and seedbed preparation. In constructing ski slopes, natural drainageways should not be disturbed; bare slopes should be quickly vegetated using mulch and cover crops; and diversions should be established to control runoff.

Most areas of this soil are in woodland, but a few spots have been developed for skiing. The slopes are generally too steep for safe machinery use in logging operations, especially where they are greater than 35 percent. There is potential for development of ski slopes, but this use requires very careful planning and layout of erosion control practices to safeguard against serious erosion. Capability unit VIIs–58.

HOC—Hermon very stony fine sandy loam association, sloping. This association is on crests of glaciated foothills, mostly in the White Mountain National Forest. The areas are commonly irregular in shape and are generally 25 to 100 acres in size. Slope ranges from 0 to 15 percent. The Hermon soil has a profile similar to the one described as representative of the series, but upper subsoil layers are thicker in places. Surface stones cover as much as 15 percent of the area.

Hermon very stony fine sandy loam makes up about 50 to 70 percent of this association. These soils are in irregular, rolling places on the landscape. The remaining 30 to 50 percent of this association is Becket, Waumbek, and Lyman soils. Becket soils are interspersed with Hermon soils but are commonly on the smooth, convex places on the landscape. Waumbek soils are in concave areas on lower slopes and in shallow depressions. Lyman soils and, in places, rock outcrops are on the knobby hilltops.

Stoniness is a serious limitation to most uses of this soil. The hazard of erosion is moderate where the soils are steeper and vegetation has been removed. In spots, seasonal wetness and shallow depth to bedrock are limitations to timber management.

Most soils in this association are used for timber production and the development of woodland wildlife habitat, and the soils are well suited to these uses. There is potential for selected recreational uses, such as the development of picnic areas and ski slopes. Not assigned to a capability unit.

HOE—Hermon very stony fine sandy loam association, steep. This association is on side slopes of glaciated foothills, mostly in the White Mountain National Forest. The areas are irregular in shape and are generally 50 to 225 acres in size. Slope ranges from 15 to 35 percent. The profile described as representative of the Hermon series is in an area of this association. Stones cover as much as 15 percent of the surface.

Hermon very stony fine sandy loam makes up about 50 to 70 percent of this association. This soil is on irregular, dissected places on the landscape. The remaining 30 to 50 percent of the association is Becket, Lyman and Skerry soils. Becket soils are interspersed with Hermon soils but are commonly on the smooth parts of the landscape. Lyman soils and a few rock outcrops are on the knobby ridges, and Skerry soils are in shallow depressions and drainageway borders.

Steepness of slope and stoniness are the main limitations to most uses of this soil. The hazard of erosion is severe where these slopes are bare of vegetation. In some spots, seasonal wetness and shallow depth to bedrock are limitations to timber management.

Most soils in this association are used for timber production, and they are well suited to this use. There is potential for the development of ski areas, but this use requires careful planning and layout of vegetative and structural measures to prevent serious erosion. Not assigned to a capability unit.

HOF—Hermon very stony fine sandy loam association, very steep. This association is on side slopes and lower valley walls of glaciated hills and mountains, mostly in the White Mountain National Forest. The areas commonly follow the contour of the landscape and are generally 60 to 250 acres in size. Slope ranges from 35 to 60 percent. The Hermon soil has a profile similar to the one described as representative of the series, but in places the mineral surface layer and subsoil are thinner. Stones make up as much as 15 percent of the surface.

Hermon very stony fine sandy loam makes up about 45 to 65 percent of this association. This soil is in irregular, dissected parts of the landscape. The remaining 35 to 55 percent of the association is Becket and Lyman soils. Becket soils are interspersed with Hermon soils but commonly are on the smoother parts of the landscape. Lyman soils and bedrock outcrops are on knobby ridgetops and sheer valley walls.

Very steep slopes and stoniness are serious limitations to most uses of these soils. The hazard of erosion is very severe in places where protective vegetation has been removed. In a few spots, shallowness to bedrock and rock outcrops are additional limitations.

Most soils in this association are wooded, and they are well suited to this use. Timber production is limited because slopes are generally too steep for machine logging operations. There is potential for ski slopes; however, the layout, construction, and maintenance of ski

slopes requires very careful planning and the use of appropriate conservation practices to safeguard against serious erosion. Not assigned to a capability unit.

Hinckley Series

The Hinckley series consists of excessively drained soils that formed in deposits of water-laid sand and gravel. These soils are on glacial outwash terraces, kames, and eskers near streams and lakes or former glacial drainageways in the southern part of the county. Cobblestones are common on these soils, especially on kames.

In a representative profile of a Hinckley soil in a wooded area, the surface layer is grayish-brown gravelly loamy sand about 1 inch thick. The subsoil, extending to a depth of about 19 inches, is dark-brown gravelly loamy sand in the upper 10 inches, yellowish-brown gravelly loamy sand in the next 3 inches, and yellowish-brown gravelly loamy sand in the lower 5 inches. The underlying material to a depth of 50 inches is light yellowish-brown and pale-brown stratified very gravelly sand and very gravelly coarse sand.

Permeability is rapid. Available water capacity is very low. Woodcrop productivity is poor for most tree species. There is danger of pollution of underground water sources from subsurface sewage disposal systems. Hinckley soils are a good potential source of sand and gravel.

Representative profile of Hinckley gravelly loamy sand, 15 to 60 percent slopes, in a wooded area in the town of Wakefield, six-tenths mile south of junction of New Hampshire Routes 153 and 110, 400 feet south of Sanborn Road, 170 feet west of the New Hampshire-Maine State line:

O1—2 inches to 1 inch, loose leaves and needle litter.
O2—1 inch to 0, partly decayed leaves and needles.
A2—0 to 1 inch, grayish-brown (10YR 5/2) gravelly loamy sand; weak, fine, granular structure; very friable; many fine and medium roots; 30 to 35 percent coarse fragments; strongly acid; abrupt, broken boundary.
B21ir—1 to 11 inches, dark-brown (7.5YR 4/4) gravelly loamy sand; weak, fine, granular structure; very friable; many fine to medium roots; 35 to 40 percent coarse fragments; strongly acid; clear, wavy boundary.
B22—11 to 14 inches, yellowish-brown (10YR 5/6) gravelly loamy sand; weak, fine granular structure; very friable; common fine and medium roots; 35 to 40 percent coarse fragments; strongly acid; gradual, wavy boundary.
B23—14 to 19 inches, yellowish-brown (10YR 5/4) very gravelly loamy sand; weak, very fine, granular structure; very friable; common fine and medium roots; 50 percent coarse fragments; strongly acid; clear, wavy boundary.
C1—19 to 32 inches, light yellowish-brown (10YR 6/4) very gravelly sand; single grained; loose; few fine and medium roots; 50 percent coarse fragments; strongly acid; abrupt, wavy boundary.
C2—32 to 50 inches, pale-brown (10YR 6/3) very gravelly coarse sand; single grained; loose; few fine roots; 60 percent coarse fragments; strongly acid.

In the A2 horizon hue is 10YR, value is 5 to 7, and chroma is 1 or 2. Where the Ap horizon is present, hue is 10YR, value is 3 or 4, and chroma is 2 or 3. The B21ir horizon ranges from gravelly loamy sand to gravelly fine sandy loam. The B22 and B23 horizons range from very gravelly loamy sand to very gravelly sand. The B21ir horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The B22 and B23 horizons have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 6. The C horizon is dominated by stratified sand, gravel, and cobblestones.

Hinckley soils are near Deerfield and Windsor soils. Hinckley soils have more coarse fragments throughout than the sandy Windsor and Deerfield soils. They are better drained than Deerfield soils.

HsA—Hinckley gravelly loamy sand, 0 to 3 percent slopes. This nearly level soil is on outwash plains and terraces. It has a profile similar to the one described as representative of the series, but it commonly has a darker and thicker mineral surface layer.

Included with this soil in mapping are small areas of Windsor, Gloucester, and Deerfield soils. Also included are small areas of soils that have slopes of more than 3 percent and local spots that have stones on the surface.

Droughtiness and low natural fertility are limitations to farming and to use for lawns and landscaping. Locally, cobblestones or gravel in the surface layer interfere with seedbed preparation or landscaping operations.

This soil is not well suited to row crops, hay, or pasture. Irrigation and heavy applications of fertilizer are needed for most crops. Cropping systems generally include cover crops, grasses, and legumes in the rotation. Adding manure and returning crop residue to the soil help maintain organic-matter content.

Much of this soil has been reforested, but some is in idle fields or pasture. Some communities are built on this soil, and more areas are being used for residential, recreational, and light, industrial uses. Because of good accessibility, nearly level slopes, and easy workability, this soil is desirable for community development uses. Capability unit IIIs–26.

HsB—Hinckley gravelly loamy sand, 3 to 8 percent slopes. This undulating soil is on outwash plains and terraces. It has a profile similar to the one described as representative of the series, but it commonly has a darker and thicker surface layer.

Included with this soil in mapping are small areas of Windsor, Gloucester, and Deerfield soils. Also included are spots that have stones on the surface.

Droughtiness and low natural fertility are limitations to farming and to use for lawns and landscaping. Gravel and, in some places, cobblestones interfere with seedbed preparation or landscaping operations. The hazard of erosion is slight, even where the more sloping areas have been cleared. Slope is a moderate limitation where level grades are needed, such as for roads and parking areas.

Irrigation is necessary for row crops or for the establishment and maintenance of good grass cover. Stripcropping helps to conserve moisture and to minimize soil losses. Cropping systems generally include cover crops, grasses, and legumes in the rotation. Adding manure and returning crop residue to the soil help to maintain organic-matter content.

Most areas of this soil have been reforested, but some areas remain idle or in pasture. More and more of this soil is being developed for residential and recreational uses, especially near lakes or streams. Because of good accessibility, gentle slopes, and easy workability, these soils are desirable for community development. Capability unit IIIs–26.

HsC—Hinckley gravelly loamy sand, 8 to 15 percent slopes. This rolling soil is on outwash plains or short slope breaks on terraces. It has a profile similar to the one described as representative of the series, but the mineral surface layer is darker and thicker.

Included with this soil in mapping are small areas of Windsor and Gloucester soils and spots of Deerfield soils. Also included are small areas of soils that have slopes of more than 15 percent and local spots that have stones on the surface.

Slope and droughtiness are limitations to most farm uses and certain intensive nonfarm uses. Slope is a severe limitation where level grades are needed, such as for roads and parking areas. Gravel and cobblestones interfere with landscaping operations. The hazard of erosion is moderate where vegetation has been removed.

This soil is better suited to drought-resistant grasses and legumes than to row crops. Irrigation is needed for most row crops and for the establishment and maintenance of good grass cover. A cropping system that includes cover crops, grasses, and legumes keeps soil losses to a minimum. Erosion-control practices include stripcropping, diversions, and cover crops.

Most of this soil is wooded, but some areas are idle or in pasture. Because this soil is generally near lakes or streams, more and more is being used for residential or recreational developments. Capability unit IVs–26.

HsE—Hinckley gravelly loamy sand, 15 to 60 percent slopes. This soil is on long, narrow eskers, kame knolls, and escarpments on outwash plains and upland borders. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Windsor and Gloucester soils and small areas that have stones on the surface.

Slope is the main limitation to most uses of this soil. Droughtiness is also an important limitation requiring supplemental water to establish and maintain vegetation. The hazard of erosion is severe in cleared areas.

Most areas of this soil are in woodland, and scattered spots are in borrow pits. The soil is too steep for most uses other than woodland. This soil has the best potential of all soils in the county as a source of gravel. Capability unit VIIs–27.

Hollis Series

The Hollis series consists of shallow, somewhat excessively drained soils that formed in a mantle of loamy glacial till 10 to 20 inches thick over bedrock. They are on rolling, hilly uplands in the southern part of the county. Rock outcrops, boulders, and stones are common on the surface.

In a representative profile of a Hollis soil in a plowed area, the surface layer is dark-brown fine sandy loam about 8 inches thick. The subsoil, extending to granite bedrock at a depth of about 16 inches, is strong-brown fine sandy loam.

Permeability is moderate above the bedrock. Available water capacity is low. Shallow depth to bedrock is a limitation to many uses of this soil. Woodcrop productivity is fair for northern hardwoods and red spruce.

Representative profile of Hollis fine sandy loam in a plowed area of Hollis-Charlton fine sandy loams, 3 to 8 percent slopes, about one-fourth mile north of junction of North Wolfeboro Road and Trask Mountain Road, 450 feet west of Trask Mountain Road in the town of Wolfeboro:

Ap—0 to 8 inches, dark-brown (10YR 3/3) fine sandy loam; weak, fine, granular structure; very friable; many very fine roots; 5 percent coarse fragments; strongly acid; abrupt, smooth boundary.

B2—8 to 16 inches, strong-brown (7.5YR 5/6) fine sandy loam; weak, fine, granular structure; very friable; common very fine roots; 5 to 8 percent coarse fragments; strongly acid; abrupt, wavy boundary.

R—16 inches, solid granite bedrock.

In the A horizon hue is 10YR, value is 2 or 3, and chroma is 2 or 3. The B horizon is fine sandy loam or sandy loam. This horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Consistence is friable or very friable.

Hollis soils are near Charlton and Gloucester soils. They have a thinner mantle over bedrock than both Charlton and Gloucester soils. Hollis and Charlton soils formed in similar material. Hollis soils have fewer coarse fragments throughout the profile than Gloucester soils.

HtB—Hollis-Charlton fine sandy loams, 3 to 8 percent slopes. This complex of undulating soils consists of Hollis soils, which are shallow to bedrock, and deeper Charlton soils. Hollis soils make up about 40 to 60 percent of the complex, and Charlton soils, about 30 to 40 percent. These soils are on hillcrests or foot slopes that have been cleared of surface stones. The profile described as representative of the Hollis series is in an area of this complex. The Charlton soil has a profile similar to the one described as representative of the Charlton series, but it generally has a darker mineral surface layer.

Included with this complex in mapping are areas of Paxton, Millis, Gloucester, and Woodbridge soils. Also included are soils that are 20 to 40 inches thick over bedrock, scattered wet spots, small areas of soils that have slopes of more than 8 percent, and some bedrock outcrops.

Shallow depth to bedrock is the major limitation to most intensive uses of the Hollis soils in this complex. The hazard of erosion is slight where these soils are cultivated or left bare of protective cover.

The Hollis soils in this complex are better suited to grasses and legumes than to corn and truck crops. Variations in available water capacity due to the variable depth to bedrock generally cause row crops to mature unevenly. Irrigation helps to even the maturity and increases growth of row and truck crops.

Diversions, stripcropping, and contour farming are needed to control erosion. A good cropping system includes cover crops, grasses, and legumes in the rotation.

Most of these soils have been reforested, but some small tracts are in hay and pasture or remain idle. Some spots, near lakes or mountains, have been developed for recreational homesites. Capability unit IIIe–56.

HtC—Hollis-Charlton fine sandy loams, 8 to 15 percent slopes. This complex of rolling soils consists of Hollis soils, which are shallow to bedrock, and deeper Charlton soils. Hollis soils make up about 40 to 60 percent of this complex, and Charlton soils, about 30 to 40 percent. These soils are on foot slopes that have been cleared of surface stones. The Hollis soil has a profile similar to the one described as representative of the

Hollis series, but it generally has a thinner surface layer. The Charlton soil has a profile similar to the one described as representative of the Charlton series, but it generally has a darker surface layer.

Included with this complex in mapping are areas of Paxton, Millis, Gloucester, and Woodbridge soils. Also included are soils that are 20 to 40 inches thick over bedrock, small areas of soils that have slopes of more than 15 percent, scattered wet spots, and some bedrock outcrops.

Shallow depth to bedrock of the Hollis soils and slope of both the Hollis and Charlton soils are the major limitations to most intensive uses. The hazard of erosion is moderate where these soils are cultivated or left bare of protective cover.

The Hollis soils in this complex are better suited to grasses and legumes than to row crops. Variations in available water capacity due to the variable depth to bedrock generally cause row crops to mature unevenly. Irrigation helps to even the maturity and increases growth of row crops and truck crops. The hazard of erosion can be lessened by shortening long slopes with diversions, and by controlling runoff with stripcropping or contour farming if row crops are grown.

Most of this soil has been reforested, but some small tracts are in hay and pasture or remain idle. Some spots near lakes, streams, or mountains have been used as recreational homesites. Capability unit IVe–56.

HtD—Hollis-Charlton fine sandy loams, 15 to 25 percent slopes. This complex consists of Hollis soils, which are shallow to bedrock soils and deeper Charlton soils. Hollis soils make up 45 to 65 percent of this complex, and Charlton soils, about 30 to 40 percent. These soils are on side slopes that have been cleared of surface stones. The Hollis soil has a profile similar to the one described as representative of the Hollis series, but generally the mineral surface layer is thinner. The Charlton soil has a profile similar to the one described as representative of the Charlton series, but there are fewer stones on the surface and throughout the profile.

Included with this complex in mapping are areas of Paxton, Millis, and Gloucester soils. Also included are soils that are 20 to 40 inches thick over bedrock and some bedrock outcrops.

Shallow depth to bedrock of the Hollis soils and slope of both the Hollis and Charlton soils are the major limitations to most uses. The hazard of erosion is severe where these soils are cultivated or disturbed. Permanent vegetation is required for protection.

These soils are not suited to cultivated crops and have limited suitability for hay and pasture. Diversions are needed to control runoff. Waterways should be left in vegetation.

Almost all soils of this complex are wooded. A few small tracts are pastured or remain idle. Capability unit VIe–56.

HvB—Hollis-Charlton very rocky fine sandy loams, 3 to 8 percent slopes. This complex of undulating soils consists of Hollis soils, which are shallow over bedrock, and deeper Charlton soils. These soils are on hillcrests and foot slopes. Hollis soils make up 40 to 60 percent of the complex, and Charlton soils, 30 to 40 percent. The Hollis and Charlton soils have profiles similar to those described as representative of their respective series, but they do not have a plow layer and their mineral surface layer is generally thinner. Bedrock outcrops are generally 30 to 100 feet apart, and they cover as much as 25 percent of the surface area. There are also some stones and boulders on the surface.

Included with this complex in mapping are areas of Paxton, Millis, Gloucester, and Woodbridge soils. Also included are areas of soils that are 20 to 40 inches thick over bedrock, scattered wet spots, small areas of soils that have slopes of more than 8 percent, and spots that have rock exposures less than 30 feet apart.

Shallow depth to bedrock of the Hollis soils and rockiness are the major limitations to most uses. The hazard of erosion is slight even where the vegetation has been removed. These soils are not suited to most farm uses. Rock outcrops are so numerous that cultivation is not practical.

Keeping waterways in vegetation generally prevents serious erosion. The variable depth to bedrock hinders diversion construction and generally causes deep-rooted plants to grow unevenly. Stones and boulders also hinder excavations.

Most of these soils are wooded. Some spots have been developed for recreational homesites, especially near lakes and streams. Septic tank filter fields or filter beds have generally been constructed where the soils are deeper. In places, fill has been used to raise the filter fields or beds above the bedrock. Rock outcrops and boulders commonly have been incorporated into the landscape pattern. Capability unit VIs–57.

HvC—Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes. This complex of rolling soils consists of Hollis soils, which are shallow over bedrock, and deeper Charlton soils. These soils are on foot slopes and ridgetops. Hollis soils make up 40 to 60 percent of this complex, and Charlton soils, 30 to 40 percent. The Hollis and Charlton soils have profiles similar to those described as representative of their respective series, but in most places they do not have a plow layer and their mineral surface layer is thinner. Outcrops of bedrocks are generally 30 to 100 feet apart and cover as much as 25 percent of the surface area. There are some stones and boulders throughout the profile and on the surface.

Included with this soil in mapping are areas of Paxton, Millis, Gloucester, and Woodbridge soils. Also included are soils that are 20 to 40 inches thick over bedrock, scattered wet spots, small areas of soils that have slopes of more than 15 percent, and spots where rock outcrops are less than 30 feet apart.

Shallowness to bedrock of the Hollis soils, bedrock outcrops and slope of both the Hollis and Charlton soils are major limitations to most uses. The hazard of erosion is moderate where vegetative cover has been removed and the surface disturbed. Keeping natural drainageways in vegetation and using protective mulch to help reestablish vegetation on bared slopes generally prevents serious erosion. Diversions help control runoff. Leveling excavations generally require cuts in the bedrock. Available water capacity is too variable for consistent and uniform growth of deep-rooted plants.

Most of these soils are wooded. Some spots have been developed for recreational homesites, especially near lakes and streams. Septic tank filter fields or filter beds generally have been constructed where the soils are deeper. In places, fill has been used to raise

the filter fields or beds above the bedrock. Dwellings commonly are built on pilings or fill to avoid cutting into the bedrock. Rock outcrops and boulders have commonly been incorporated into the landscape pattern. Capability unit VIs–57.

HvD—Hollis-Charlton very rocky fine sandy loams, 15 to 25 percent slopes. This complex consists of Hollis soils, which are shallow to bedrock, and deeper Charlton soils. Hollis soils make up about 45 to 65 percent of the complex, and Charlton soils, about 25 to 35 percent. These soils are on side slopes and ridges. The Hollis and Charlton soils have profiles similar to those described as representative of their respective series, but generally they do not have a plow layer and their mineral surface layer is thinner. Outcrops of bedrock are generally 30 to 100 feet apart and cover as much as 25 percent of the surface area. There are also some stones and boulders throughout the profile and on the surface.

Included with this complex in mapping are areas of Paxton, Millis, and Gloucester soils. Also included are soils that are 20 to 40 inches thick over bedrock and spots where rock outcrops are less than 30 feet apart.

Shallow depth to bedrock of the Hollis soils, rock outcrops, and slope of both the Hollis and Charlton soils are major limitations to most uses of these soils. The hazard of erosion is severe in places where vegetation has been removed. Waterways need to be kept in vegetation, and protective mulch needs to be used to reestablish vegetation to help prevent serious erosion on bare slopes. Leveling excavations generally require cutting into the bedrock. Available water capacity is too variable for consistent and uniform growth of deep-rooted plants.

Most of these soils are in woodland, to which they are well suited. A small tract is within the Moose Mountain ski area in the town of Brookfield. Rock outcrops, stones, and boulders on these moderately steep soils make the use of machinery difficult for logging operations and ski slope construction. Capability unit VIs–57.

HvE—Hollis-Charlton very rocky fine sandy loams, 25 to 35 percent slopes. This complex consists of Hollis soils, which are shallow to bedrock, and deeper Charlton soils. Hollis soils make up about 45 to 65 percent of the complex, and Charlton soils, about 25 to 35 percent. These soils are on side slopes and ridges. The Hollis and Charlton soils have profiles similar to those described as representative of their respective series, but they do not have a plow layer and they have a thinner mineral surface layer. Outcrops of bedrock are generally 30 to 100 feet apart and cover as much as 25 percent of the surface area. There are some stones and boulders throughout the soil and on the surface.

Included with this complex in mapping are areas of Millis and Gloucester soils. Also included are soils that are 20 to 40 inches thick over bedrock, small areas of soils that have slopes of more than 35 percent, and spots of soils in which rock outcrops are less than 30 feet apart.

Shallow depth to bedrock of the Hollis soils, rock outcrops and slope of both the Hollis and Charlton soils are major limitations to intensive uses. The hazard of erosion is severe where vegetation is removed. Waterways need to be kept in vegetation and protective mulch needs to be used to reestablish vegetation on bare slopes to help prevent serious erosion. Where feasible, surface water needs to be diverted to vegetated natural drainageways. Leveling excavations generally require cutting into the bedrock.

Almost all areas of this soil are in woodland, to which they are well suited. A small tract is in the town of Brookfield, within the Moose Mountain ski area. Using machinery on these steep, rocky, and stony soils is hazardous for logging operations and ski slope construction. Ski area development requires careful planning and usage of appropriate conservation practices to prevent serious erosion. Capability unit VIIs–57.

HxD—Hollis-Charlton-Rock outcrop complex, 8 to 25 percent slopes. This complex consists of Hollis soils, which are shallow to bedrock, and deeper Charlton soils. Hollis soils make up about 30 to 55 percent of the complex and Charlton soils, about 20 to 30 percent. These soils are on side slopes and ridgetops. The Hollis and Charlton soils have profiles similar to those described as representative of their respective series, but they do not have a plow layer and their mineral surface layer is thinner. Outcrops of bedrock are generally less than 30 feet apart and cover about 25 to 50 percent of the surface area. There are also stones and boulders throughout the soil and on the surface.

Included with this mapping are areas of Millis, Gloucester, and Scituate soils. Also included are soils that are 20 to 40 inches thick over bedrock, wet spots, and spots where rock outcrops make up more than 50 percent of the surface.

Shallow depth to bedrock of the Hollis soils and rock outcrops and slope of both the Hollis and Charlton soils are major limitations to most uses. The hazard of erosion is severe in cleared areas. Natural drainageways need to be kept in vegetation, and mulches and cover crops need to be used to quickly establish permanent vegetation to prevent serious erosion on bare slopes.

Bedrock is exposed in almost all excavations, and it must be removed where level grades are needed. Stones and large boulders also hinder excavations. Fill is necessary to establish level grades. Available water capacity is too variable for consistent and uniform growth of deep-rooted plants and trees.

Most soils of this complex are in woodland, to which they are well suited; however, rock outcrops are common, and they restrict logging operations. Capability unit VIIs–58.

HxE—Hollis-Charlton-Rock outcrop complex, 25 to 60 percent slopes. This complex consists of Hollis soils, which are shallow to bedrock, and deeper Charlton soils. Hollis soils make up about 25 to 55 percent of the complex, and Charlton soils, 15 to 30 percent. These soils are on hillsides and ridges. The Hollis and Charlton soils have profiles similar to those described as representative of their respective series, but they do not have a plow layer and they have a thinner mineral surface layer. Rock outcrops are generally less than 30 feet apart and cover about 25 to 50 percent of the surface.

Included with this complex in mapping are areas of Millis and Gloucester soils. Also included are soils that are 20 to 40 inches thick over bedrock and spots where rock outcrops make up more than 50 percent of the surface.

Shallow depth to bedrock of the Hollis soils, rock

outcrops and steep to very steep slopes of both the Hollis and Charlton soils are major limitations to most uses. The hazard of erosion is severe in cleared areas. In developing ski slopes, natural drainageways should not be disturbed and protective mulches and cover crops should be used to establish permanent vegetation on bare slopes.

Most of these soils are in woodland. Frequent rock outcrops, steep to very steep slopes, and, in places, boulders generally prohibit machinery use in logging operations, especially where the soils are very steep. The forests yield timber, protect watersheds, and provide wildlife habitat. Some areas have potential for development as scenic vistas but require very careful planning to avoid serious erosion. Capability unit VIIs–58.

Leicester Series

The Leicester series consists of somewhat poorly drained and poorly drained soils that formed in deposits of loamy glacial till. These soils are in upland depressions, in drainageways, or on seepy hillside foot slopes. Stones are common on the surface.

In a representative profile of a Leicester soil in a wooded area, a layer of partly decayed and decayed leaves 5 inches thick is on the surface. The surface layer, below this, is very dark grayish-brown fine sandy loam about 1 inch thick. The subsoil extends to a depth of about 25 inches. In the upper part it is grayish-brown fine sandy loam, and in the lower part it is light brownish-gray gravelly sandy loam that has distinct mottles. The underlying material to a depth of 42 inches is light brownish-gray gravelly sandy loam that has distinct mottles.

Permeability is moderate. Available water capacity is moderate. Depth to the seasonal high water table ranges from 0 to 12 inches. The water table, which is at or near the surface for 7 to 9 months of the year, is the main limitation for community development.

Representative profile of Leicester fine sandy loam in a wooded area of Leicester-Walpole very stony fine sandy loams, 3 to 8 percent slopes, in the town of Moultonboro, about three-tenths mile south of junction of Ossipee Mountain Road and New Hampshire Route 109, one-fourth mile southwest of New Hampshire Route 109:

O1—5 to 4 inches, loose leaf litter.

O21—4 to 3 inches, dark reddish-brown (5YR 3/2) partly decayed organic matter.

O22—3 inches to 0, black (5YR 2/1) well-decayed organic matter.

A1—0 to 1 inch, very dark grayish-brown (10YR 3/2) fine sandy loam; weak, fine, granular structure; very friable; many fine and medium roots; abrupt, smooth boundary.

B21g—1 to 7 inches, grayish-brown (2.5Y 5/2) fine sandy loam that has common, medium, distinct, dark reddish-brown (5YR 3/2) mottles and organic stains; weak, fine to medium, granular structure; friable; common fine and medium roots; 10 to 15 percent coarse fragments; strongly acid; clear, smooth boundary.

B22g—7 to 25 inches, light brownish-gray (2.5Y 6/2) gravelly sandy loam; common, fine, distinct, strong-brown (7.5YR 5/6), yellowish-red (5YR 5/6 and 4/6), and dark reddish-brown (2.5YR 2/4) oxide concretions; massive; 80 percent friable and 20 percent firm, horizontally oriented; few fine roots in the upper 4 inches; 20 percent coarse fragments; strongly acid; clear, smooth boundary.

C—25 to 42 inches, light brownish-gray (2.5Y 6/2) gravelly sandy loam; many, fine, distinct, strong-brown (7.5YR 5/6), yellowish-red (5YR 5/6), and light-gray (10YR 6/1) mottles; massive; 75 percent friable; 25 percent firm, horizontally oriented; 25 to 30 percent coarse fragments of gravel size; strongly acid.

In the A1 or Ap horizon hue is 10YR, value is 2 to 4, and chroma is 1 to 3. The B horizon ranges from sandy loam to loam, including gravelly analogs. It commonly has hue of 10YR or 2.5Y ranging to 5Y in the lower part, value of 5 or 6, and chroma of 2 or 3. The C horizon is commonly sandy loam or fine sandy loam and gravelly analogs. Consistence is generally friable or very friable, but firm strata are common. Thin lenses of segregated sands are in the C horizon in many places.

Leicester soils formed in material similar to the material in which Sutton, Peru, and Whitman soils formed. They are more poorly drained than Sutton and Peru soils and better drained than Whitman soils. Leicester soils do not have the pronounced pan layer in the underlying material as Peru and Whitman soils have.

LDB—Leicester-Ridgebury very stony fine sandy loams association, gently sloping. This association is in upland depressions, in drainageways, and on seepy foot slopes mostly in the White Mountain National Forest. Slope ranges from 0 to 8 percent. The Leicester and Ridgebury soils in this association have profiles similar to those described as representative of their respective series, but commonly there are more stones throughout the profile. Surface stones make up as much as 15 percent of the area.

Leicester very stony fine sandy loam makes up about 40 to 50 percent of the association, and Ridgebury very stony fine sandy loam, about 30 to 40 percent. These soils are in the lower parts of depressions. The remaining 10 to 30 percent of the association is Peru and Waumbek soils. These soils are in the slightly higher concave parts of the landscape.

Seasonal wetness and stoniness are major limitations to most uses of the soils in this association. Ridgebury soils also have pan layers that restrict downward movement of water.

Most soils in this association are used for timber production, but the wet conditions severely hinder logging operations. Diversions and open ditches drain and control excess water in areas used for the construction of logging roads and landings. This allows for more intensive logging operations. There is good potential for the development of wetland wildlife habitat and construction of dugout ponds. Not assigned to a capability unit.

LfA—Leicester-Walpole very stony fine sandy loams, 0 to 3 percent slopes. This complex consists of about 60 percent Leicester soils, 30 percent Walpole soils, and 10 percent other soils. These soils are mostly in depressions on uplands. The Leicester soil has a profile similar to the one described as representative of the series, but the mineral surface layer is generally slightly thicker. The profile described as representative of the Walpole series is in an area of the Walpole part of this complex. Stones are generally 5 to 30 feet apart on the surface.

Included with this soil in mapping are small areas of Ridgebury, Whitman, Sutton, Waumbek, and Acton soils. Also included are small areas of soils that have slopes of more than 3 percent, extremely stony or boul-

dery soils, and small tracts of soils from which stones have been removed.

Wetness caused by a high water table of long duration is the major limitation to most uses of these soils. Stoniness is a limitation for certain uses, especially for excavation, seedbed preparation, or construction of level grades.

Most areas of these soils are in woodland. Cleared areas can be drained by open ditches or tiles if outlet grade is sufficient. There is a good potential for dugout ponds and for the development of wetland wildlife habitat. Capability unit VIIs–73.

LfB—Leicester-Walpole very stony fine sandy loams, 3 to 8 percent slopes. This complex is about 55 percent Leicester soils, about 30 percent Walpole soils, and 15 percent other soils. These soils are on lower foot slopes and drainageways on uplands. The profile described as representative of the Leicester series is in an area of the Leicester part of this complex. The profile of the Walpole soils is similar to the one described as representative of its series, but there are more coarse fragments, including stones, on the surface and throughout the profile. Stones on the surface are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Ridgebury, Sutton, Waumbek, and Acton soils. Also included are small areas of soils that have slopes of more than 8 percent, spots of extremely stony or bouldery soils, and small tracts from which stones have been removed.

A high water table of long duration is the major limitation to most uses of these soils. Stoniness is a limitation for certain uses, especially for excavations, seedbed preparation, and level grades.

In cleared areas, tile and surface drainage systems and diversions are used to remove excess water. The hazard of erosion is slight in areas without vegetative cover. In cleared areas, grassed waterways help safely direct runoff to natural drainageways.

These soils are mostly in woodland. Some small tracts within subdivision boundaries have been develloped for recreation homesites. Fill has been used to raise the site above the water table. There is potential for the development of wetland habitat. Capability unit VIIs–73.

Limerick Series

The Limerick series consists of poorly drained soils that formed in alluvial deposits of silt and very fine sand. These soils are in depressions or floodwater drainageways on flood plains mostly along the major streams in the county. The water table is at or near the surface for long periods. These soils generally flood every year.

In a representative profile of a Limerick soil in an old hayfield, a layer of partly decayed fibrous roots 2 inches thick is on the surface. The surface layer, below this, is mixed very dark grayish-brown and very dark brown silt loam about 5 inches thick. The underlying material to a depth of 36 inches is dark grayish-brown silt loam in the upper 2 inches and grayish-brown silt loam that has distinct mottles in the next 29 inches. Between depths of 36 to 50 inches, it is light olive-brown loose sand and fine gravel.

Permeability is moderate. Available water capacity is high. The water table is at or near the ground surface for 7 to 9 months of the year. The flooding hazard and the high water table limit the use of these soils for most purposes.

Representative profile of Limerick silt loam in an old hayfield, about 1.5 miles southwest of junction of Sandwich Notch Road and Beebe River Road, seven-tenths mile east of the Grafton-Carroll county line:

O1—2 inches to 0, dark-brown (7.5YR 3/2) partly decayed fibrous roots.

Ap—0 to 5 inches, very dark grayish-brown (10YR 3/2) and very dark brown (10YR 2/2) silt loam; weak, fine to medium, granular structure; friable; common fine roots; strongly acid; clear, smooth boundary.

C1g—5 to 7 inches, dark grayish-brown (2.5Y 4/2) silt loam; weak, medium, granular structure; friable; few fine roots; strongly acid; clear, smooth boundary.

C2g—7 to 14 inches, grayish-brown (2.5Y 5/2) silt loam that has common, medium, prominent, reddish-brown (5YR 4/4) mottles in the lower part; weak, fine to medium, granular structure; friable; strongly acid; clear, smooth boundary.

C3g—14 to 36 inches, grayish-brown (2.5Y 5/2) silt loam that has few, fine, distinct, strong-brown (7.5YR 5/6) mottles; massive; friable; very strongly acid; abrupt, smooth boundary.

IIC4—36 to 50 inches, light olive-brown (2.5Y 5/4) sand and fine gravel; single grained; loose; strongly acid.

In the A1 or Ap horizon hue is commonly 10YR, value is 3 or 4, and chroma is 2 or 3. Where the thickness of the A1 or Ap horizon is 7 inches or more, dry color value is higher than 5.5. The C horizon has hue of 2.5Y or 5Y. Chroma is 1 or 2 to a depth of 30 inches, but it ranges to 4 below that depth.

Limerick soils are near Winooski and Podunk soils. Limerick soils formed in material similar to that in which Winooski soils formed, but they are more poorly drained. Limerick soils formed in finer textured material than Podunk soils and are poorer drained.

Lk—Limerick silt loam. This nearly level soil is in depressions on flood plains along the major rivers and in intervales.

Included with this soil in mapping are small areas of Winooski and Podunk soils. Also included are small areas underlain by sand or gravel at a depth of 20 to 36 inches.

A high water table of long duration and seasonal flooding are major limitations to most uses of this soil.

In its natural condition, this soil is better suited to hay and pasture than to cultivated crops. If it is adequately drained, it is suited to corn and late vegetables. Frequent flooding and the lack of suitable outlets, however, may prevent proper drainage. The drainage of this soil can be improved by the use of tile drains, surface field ditches, and land smoothing.

Most of this soil is in pasture or remains in woodland. This soil has good potential for development of wetland wildlife habitat. Capability unit IIIw–13.

Limerick Variant

The Limerick variant consists of poorly drained soils that formed in water-laid deposits of very fine sand and silt. These soils are 20 to 36 inches thick over sand. They are in depressions of floodwater drainageways on nearly level flood plains. The water table is at

or near the surface for long periods. These soils generally flood every year.

In a representative profile of a Limerick variant in a cornfield, the surface layer is very dark grayish-brown very fine sandy loam about 10 inches thick. The underlying material to a depth of 23 inches is mottled light brownish-gray silt loam in the upper 4 inches and mottled light brownish-gray loamy very fine sand grading to very fine sandy loam in the next 9 inches. The underlying material between depths of 23 and 50 inches is mottled pinkish-gray coarse sand in the upper 13 inches and pinkish-gray gravelly coarse sand in the lower 14 inches.

Permeability is moderate in the upper part of the soil and rapid in the loose underlying sand and gravel. Available water capacity is moderate. The water table is at or near the surface for 7 to 9 months of the year. The flooding hazard and the high water table limit the use of these soils for most purposes.

Representative profile of Limerick very fine sandy loam, sandy subsoil variant, in a cornfield in the town of Conway, about one-half mile west-northwest of junction of New Hampshire Routes 16 and 153, three-tenths mile northeast of junction of Kancamagus Highway and New Hampshire Route 16, and 400 feet west of railroad:

Ap—0 to 10 inches, very dark grayish-brown (10YR 3/2) very fine sandy loam, light brownish gray (10YR 6/2) when dry; few, fine, distinct, strong-brown (7.5YR 5/6) mottles; weak, fine, granular structure; friable; common fine roots; medium acid; abrupt, smooth boundary.

C1g—10 to 14 inches, light brownish-gray (2.5Y 6/2) silt loam; few, fine, distinct, strong-brown (7.5YR 5/6) mottles; massive; friable; medium acid; clear, smooth boundary.

C2g—14 to 16 inches, light brownish-gray (2.5Y 6/2) loamy very fine sand; common, medium, distinct, strong-brown (7.5YR 5/6) mottles; massive; very friable; medium acid; clear, smooth boundary.

C3g—16 to 23 inches, light brownish-gray (2.5Y 6/2) very fine sandy loam; few, fine, distinct, strong-brown (7.5YR 5/6) mottles; massive; friable; medium acid; abrupt, smooth boundary.

IIC4—23 to 36 inches, pinkish-gray (7.5YR 6/2) coarse sand; common, medium, distinct, yellowish-red (5YR 5/8) and red (2.5YR 4/8) mottles; single grained; loose; medium acid; clear, smooth boundary.

IIC5—36 to 50 inches, pinkish-gray (7.5YR 6/2) gravelly coarse sand; common, medium, distinct, yellowish-red (5YR 5/8) mottles; single grained; loose; 50 percent gravel; medium acid.

In the A1 or Ap horizon hue is commonly 10YR, value is 3 or 4, and chroma is 2 or 3. Where the thickness of the A1 or Ap horizon is 7 inches or more, dry color values are higher than 5.5. The C horizon in the loamy mantle has hue of 2.5Y or 5Y and chroma of 1 or 2.

Limerick variant soils are near Podunk variant and Winooski soils. They formed in a finer textured mantle than Podunk variant soils and are more poorly drained. Limerick variant soils are thinner over sand or gravel than Winooski soils and are more poorly drained.

Lm—Limerick very fine sandy loam, sandy subsoil variant. This nearly level soil is in depressions on flood plains along streams and in intervales.

Included with this soil in mapping are small areas of Winooski soils and Podunk variant soils. Also included are small areas of Alluvial land, wet, and soils that are coarser than loamy very fine sand.

In its natural condition, this soil is better suited to hay and pasture than to cultivated crops. If adequately drained, it is suited to corn and late vegetables. Frequent flooding and lack of suitable outlets, however, may prevent proper drainage. The drainage of this soil can be improved by the use of tile drains and surface field ditches. In most places, land smoothing and ditching expose the underlying loose sand or gravel.

Most areas of this soil are in pasture or woodland. This soil has good potential for development of wetland wildlife habitat. Capability unit IIIw–13.

Lyman Series

The Lyman series consists of somewhat excessively drained soils that formed in a thin mantle of loamy glacial till 10 to 20 inches thick over bedrock. They are on hilly uplands and mountains in the northern part of the county. Rock outcrops and stones are generally on the surface.

In a representative profile of a Lyman soil in a wooded area, a layer of fresh and partly decayed leaves and needles 3 inches thick is on the surface. The surface layer, below this, is gray fine sandy loam about 1 inch thick. The subsoil, extending to the granite bedrock at a depth of about 18 inches, is dark reddish-brown fine sandy loam in the upper 6 inches and dark-brown fine sandy loam grading to yellowish-brown fine sandy loam in the lower 11 inches.

Permeability is moderate above the bedrock. Available water capacity is low. The shallow depth to bedrock limits the use of these soils for many purposes. Woodcrop productivity is fair for northern hardwoods and red spruce.

Representative profile of Lyman fine sandy loam in a wooded area of Lyman-Berkshire-Rock outcrop complex, 8 to 25 percent slopes, in the town of Conway, about 1.5 miles southeast of Echo Lake and about 0.4 mile southwest of Westside Road on Birch Hill:

O1—3 to 2 inches, leaf litter and some pine needles.

O2—2 inches to 0, partly decayed organic matter.

A2—0 to 1 inch, gray (10YR 5/1) fine sandy loam; weak, fine, granular structure; friable; common fine and medium roots; strongly acid; abrupt, broken boundary.

B21h—1 to 3 inches, dark reddish-brown (2.5YR 2/4 and 5YR 3/4) fine sandy loam; weak, fine and medium, granular structure; friable; common fine and medium roots; 3 percent coarse fragments; strongly acid; clear, wavy boundary.

B22ir—3 to 7 inches, dark reddish-brown (5YR 3/4) fine sandy loam; weak, fine, granular structure; friable; common fine and medium roots; 3 percent coarse fragments; strongly acid; gradual smooth boundary.

B23—7 to 10 inches, dark-brown (7.5YR 4/4) fine sandy loam; weak, fine and medium, granular structure; friable; common fine roots; 3 to 5 percent coarse fragments; strongly acid; gradual, smooth boundary.

B3—10 to 18 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, medium and coarse, granular structure; friable; few fine roots; 5 percent coarse fragments; strongly acid; abrupt, smooth boundary.

R—18 inches, granite bedrock.

In the A2 horizon hue is 10YR or 7.5YR, value is 5 or 6 and chroma is 1 or 2. In plowed areas the Ap horizon has a hue of 10YR, a value of 3 to 5, and a chroma of 2 or 3. The B horizon is generally fine sandy loam, or sandy loam, but in places it is loam or gravelly analogs of fine sandy loam, sandy loam, or loam. The B21 and B22ir horizons commonly have a hue of 2.5YR to 7.5YR, a value of 3 or 4

and a chroma of 4 to 6. Where there is a B21h horizon, value ranges to 2 and chroma ranges to 1. The B23 and B3 horizons have a hue of 7.5YR or 10YR, a value of 4 or 5, and a chroma of 3 or 4.

Lyman soils are near Berkshire and Hermon soils. Lyman and Berkshire soils formed in similar material, but Lyman soils are shallower to bedrock. Typically, Lyman soils have fewer coarse fragments throughout and are shallower to bedrock than Hermon soils.

LnB—Lyman-Berkshire very rocky fine sandy loams, 3 to 8 percent slopes. This complex consists of Lyman soils, which are shallow to bedrock, intermingled with deeper Berkshire soils. Lyman soils make up 40 to 60 percent of the complex and Berkshire soils, about 30 to 40 percent. These soils are on undulating foot slopes and ridgetops. The Lyman and Berkshire soils have profiles similar to those described as representative of their respective series, but the mineral surface layer is thicker in most places. Outcrops of bedrock are generally 30 to 100 feet apart, and they cover as much as 25 percent of the surface area. Also, a few stones are throughout the profile and on the surface.

Included with this complex in mapping are areas of Marlow, Becket, Hermon, and Peru soils. Also included are small areas of soils that have slopes of more than 8 percent, areas of soils that are 20 to 40 inches thick over bedrock, scattered wet spots, small areas where rock outcrops are less than 30 feet apart, and a few areas where bedrock is rippable Conway granite.

Shallow depth to bedrock and rockiness are the major limitations to use of the Lyman soils, which are predominant in this complex. The hazard of erosion is slight on the steeper slopes of this complex. The soils are unsuitable for most farm uses. A good vegetative cover on waterways prevents serious erosion in wooded areas that are cleared for nonfarm uses.

The soils of this complex are mostly wooded, but in places small tracts are in pasture or are idle. Some spots, commonly those near lakes and streams, have been developed as recreational homesites. Capability unit VIs–57.

LnC—Lyman-Berkshire very rocky fine sandy loams, 8 to 15 percent slopes. This complex consists of Lyman soils, which are shallow to bedrock, intermingled with deeper Berkshire soils. Outcrops of bedrock are generally 30 to 100 feet apart. They cover as much as 25 percent of the surface area. A few stones are on the surface and throughout the profile of these soils. Lyman soils make up 40 to 60 percent of this complex, and Berkshire soils about 30 to 40 percent.

Included with this complex in mapping are areas of Marlow, Becket, Hermon, and Peru soils. Also included are small areas of a soil that has slopes of more than 15 percent, areas of soils that are 20 to 40 inches thick over bedrock, scattered wet spots, small areas where rock outcrops are less than 30 feet apart, and a few areas where bedrock is rippable Conway granite.

Lyman soils, the predominant ones in this complex, are limited for intensive uses by shallowness to bedrock, bedrock outcrops, and slope. The hazard of erosion is moderate where soils of this complex are disturbed during construction projects or are left bare. Keeping natural drainageways in vegetation and using mulch to establish vegetation on bare slopes generally prevents serious erosion.

Most of the soils in this complex are wooded, but a few small tracts are in pasture or are idle. Some spots near lakes and streams have been developed as recreational homesites where fill has been used to raise the site above the bedrock. Capability unit VIs–57.

LnD—Lyman-Berkshire very rocky fine sandy loams, 15 to 25 percent slopes. This complex consists of Lyman soils, which are shallow to bedrock, and deeper Berkshire soils. These soils are on valley walls and ridges. The Lyman soils in this complex have a profile similar to the one described as representative of the Lyman series. The Berkshire soils have a profile similar to the one described as representative of the Berkshire series, but in places more coarse fragments are in the underlying material. Outcrops of bedrock are generally 30 to 100 feet apart and cover as much as 25 percent of the surface area. Also, stones and boulders are on the surface in places. Lyman soils make up 45 to 65 percent of this complex, and Berkshire soils, 25 to 35 percent.

Included with this complex in mapping are areas of Marlow, Becket, Redstone, and Hermon soils. Also included are small areas of soils that have slopes of more than 25 percent, soils that are 20 to 40 inches thick over bedrock, small areas where rock outcrops are less than 30 feet apart, and a few spots whose bedrock is rippable Conway granite.

Shallow depth to bedrock of the Lyman soils and rockiness and slope of both the Lyman and Berkshire soils are serious limitations to most farm and nonfarm uses. The hazard of erosion is severe where these soils are disturbed in construction work. A mulch is needed for erosion control when reestablishing vegetation. Where feasible, runoff can be controlled by using diversions. Where wooded areas are cleared for construction, natural drainageways should be left in vegetation.

Almost all areas of this complex are wooded. A few small tracts are in pasture or are idle. These soils have some potential for the development of ski areas. Capability unit VIs–57.

LnE—Lyman-Berkshire very rocky fine sandy loams, 25 to 35 percent slopes. This complex consists of Lyman soils, which are shallow to bedrock, intermingled with deeper Berkshire soils. These soils are on hillsides, valley walls, and ridges on uplands. The Lyman soils have a profile similar to the one described as representative of the Lyman series. The Berkshire soils have a profile similar to the one described as representative of the Berkshire series, but the lower part of the subsoil is generally thinner and the underlying material contains more coarse fragments. Outcrops of bedrock are generally 30 to 100 feet apart and cover as much as 25 percent of the surface area. Also some stones and boulders are on the surface. Lyman soils make up 45 to 65 percent of this complex and Berkshire soils, 25 to 35 percent.

Included with this complex in mapping are areas of Marlow, Becket, Redstone, and Hermon soils. Also included are small areas of soils that have slopes of more than 35 percent, areas of soils that are 20 to 40 inches thick over bedrock, small areas of rock outcrop less than 30 feet apart, and spots where bedrock is rippable Conway granite.

Shallow depth to bedrock of the Lyman soils, rock outcrops and steep slopes of both the Lyman and Berkshire soils are major limitations to most uses. Cleared areas are susceptible to severe erosion.

The soils of this complex are generally too rocky and too steep for most uses other than timber production. These soils are largely wooded. Logging operations are very difficult because of the steep slopes and the rock outcrops. Capability unit VIIs–57.

LsD—Lyman-Berkshire-Rock outcrop complex, 8 to 25 percent slopes. This complex consists of Lyman soils, which are shallow to bedrock, and deeper Berkshire soils. The Lyman soils have the profile described as representative of the Lyman series. The Berkshire soils have a profile similar to the one described as representative of the Berkshire series, but in most places more coarse fragments are throughout the profile. Outcrops of bedrock are generally less than 30 feet apart and make up 25 to 50 percent of the surface area. Also, stones and boulders are on the surface. Lyman soils make up about 30 to 55 percent of this complex and Berkshire soils, 20 to 30 percent.

Included with this complex in mapping are areas of Becket, Hermon, and Skerry soils. Also included are small areas where soils have slopes of more than 25 percent, scattered wet spots, and areas where rock outcrops make up more than 50 percent of the surface area. In places the bedrock is rippable.

Shallow depth to bedrock of the Lyman soils and rockiness and slope of both Lyman and Berkshire soils are major limitations to most uses. The hazard of erosion is severe if these soils are disturbed or left bare. Natural drainageways need to be kept in vegetation, and mulches and cover crops need to be used to quickly establish permanent vegetation on bare slopes.

Most areas of the soils in this complex are wooded, but in places small tracts are in unimproved pasture or are idle. Numerous rock outcrops restrict logging operations. In a few spots that are near lakes, streams, or on low mountains, shallow soil areas above the bedrock have been filled, and the spots are being used as recreational homesites. These soils have some potential for the development of ski areas. Capability unit VIIs–58.

LsE—Lyman-Berkshire-Rock outcrop complex, 25 to 60 percent slopes. This complex consists of Lyman soils, which are shallow to bedrock, and deeper Berkshire soils. These soils are on mountains, hillsides, and ridges. The Lyman and Berkshire soils have profiles similar to those described as representative of their respective series, but in this complex they generally have more coarse fragments throughout their profile. Bedrock outcrops are generally less than 30 feet apart and cover 25 to 50 percent of the surface area. Also stones and boulders are on the surface. Lyman soils make up 25 to 55 percent of this complex and Berkshire soils, 15 to 30 percent.

Included with this complex in mapping are areas of Marlow, Becket, and Hermon soils. Also included are small areas where rock outcrops make up more than 50 percent of the surface area and spots where the bedrock is rippable Conway granite.

Shallowness to bedrock of the Lyman soils and rock outcrops and steep to very steep slopes of both the Lyman and Berkshire soils are major limitations to most uses. The hazard of erosion is severe in cleared areas. Natural drainageways need to be left undisturbed, and protective mulches and cover crops are essential in the establishment of permanent vegetation on bare slopes.

The soils in this complex are almost entirely wooded, and they are better suited to growing trees than to any other uses. Numerous rock outcrops, boulders in places, and steep to very steep slopes are serious limitations to logging operations. This is especially true in areas where slopes are very steep. The woods yield timber, and serve as wildlife habitat. Also, the trees protect the watersheds. Some areas have potential for the development of scenic vistas and ski slopes, but very careful layout and installation of appropriate conservation measures are needed to avoid serious erosion. Capability unit VIIs–58.

LVC—Lyman-Berkshire very rocky fine sandy loams association, sloping. This association is on mountaintops, saddles, and foothill ridges, mostly in the White Mountain National Forest. Lyman soils are on the irregular tops of the mountains and ridges, and Berkshire soils are in smoother parts of the landscape. Individual areas are generally irregular in shape and 30 to 80 acres in size. Slope ranges from 0 to 15 percent. Rock outcrops make up as much as 15 percent of the surface area. Also, stones and boulders are generally on the surface. Lyman very rocky fine sandy loam makes up about 40 to 55 percent of the association and Berkshire very stony fine sandy loam, about 25 to 40 percent.

Included with this association in mapping, and making up 15 to 30 percent of this association, are areas of Marlow and Peru soils. Marlow soils are interspersed with the Berkshire soils. They are commonly on the north-facing slopes. Peru soils are in concave swales and on borders of drainageways.

The Lyman soils in this association are limited for intensive uses by shallowness to bedrock, bedrock outcrop, and stoniness. The hazard of erosion is moderate on the steeper slopes from which vegetation has been removed. In places seasonal wetness is a limitation to use.

The soils in this association are mostly wooded, and they are used for production of timber. Rock outcrops and, in places, seasonal wetness hinder logging operations, however, especially the construction of logging roads and landings. Not assigned to a capability unit.

LVE—Lyman-Berkshire very rocky fine sandy loams association, steep. This association is on side slopes and ridges of mountains and hills, mostly in the White Mountain National Forest. Lyman soils are on the irregularly contoured knobby side slopes, and Berkshire soils are in smoother parts on the landscape. Individual areas are generally irregular in shape, extending laterally along the landscape contours. They are 50 to 200 acres in size. Slope ranges from 15 to 35 percent. Rock outcrops make up as much as 15 percent of the surface area. Stones and boulders are commonly on the surface. Lyman very rocky fine sandy loam makes up 40 to 60 percent of the association and Berkshire very stony fine sandy loam, 25 to 35 percent.

Included with this association in mapping, and making up 10 to 20 percent of the association, are areas of Marlow soils. Marlow soils are interspersed with the Berkshire soils, but they are commonly on the north-facing slopes.

The major limitations of these soils are shallowness to bedrock, rockiness, stoniness, and steepness of slope. Shallowness to bedrock hinders excavation, limits tree growth, and increases the hazard of windthrow. Cleared areas of soil are susceptible to severe erosion.

The soils in this association are mostly wooded. In a few places they are used for ski slopes. Logging operations are difficult because of the steepness of slopes and presence of rock outcrops and boulders. In constructing ski slopes, careful layout and installation of appropriate conservation measures are needed to avoid serious erosion. Not assigned to a capability unit.

LVF—Lyman-Berkshire very rocky fine sandy loams association, very steep. This association is on mountainsides and valley walls, mostly in the White Mountain National Forest. Lyman soils are on irregularly dissected side slopes, and Berkshire soils are in smoother parts of the landscape. Individual areas follow the contour of the landscape and are 75 to 300 acres in size. Slopes range from 35 to 60 percent. Both the Lyman and Berkshire soils in this association have profiles similar to those described as representative of their respective series, but in most places the lower part of the subsoil in Berkshire soil is thinner. Rock outcrops make up as much as 15 percent of the surface area. Stones and boulders are generally on the surface. Lyman very rocky fine sandy loam makes up 45 to 65 percent of this association and Berkshire very stony fine sandy loam, 25 to 35 percent.

Included in mapping, and making up 10 to 25 percent of the association, are areas of Marlow soils. Marlow soils are interspersed with the Berkshire soils, but they are generally on the north-facing slopes.

The major limitations to use of these soils are very steep slopes, shallowness to bedrock, and rockiness. Areas without vegetation are subject to very severe erosion. The shallowness to bedrock hinders excavation, limits tree growth, and is a windthrow and landslide hazard.

The soils in this association are mostly wooded. Ski slopes are present in a few places. The very steep slopes generally present serious limitations to logging operations. In constructing ski slopes, very careful layout and installation of appropriate conservation measures are needed to avoid serious erosion. Not assigned to a capability unit.

LYE—Lyman-Rock outcrop-Berkshire association, steep. This association is on mountaintops and foothill ridges mostly in the White Mountain National Forest. Lyman soils, interspersed with areas of rock outcrop, are on the irregular, knobby ridges. Berkshire soils are in the smoother parts of the landscape. Individual areas are irregular in shape and are generally 50 to 160 acres in size. In most places slope ranges from 15 to 35 percent. Lyman and Berkshire soils in this association have profiles similar to the ones described as representative for their respective series, but in most places more stones and boulders are on the surface. Bedrock is exposed in about 15 to 50 percent of the area. Lyman soils make up 30 to 50 percent of this association and Berkshire soils, 20 to 30 percent.

Included in mapping, and making up 10 to 25 percent of this association, are areas of Marlow and Peru soils. Marlow soils are interspersed with the Berkshire soils, but they are commonly on the north-facing slopes. Peru soils are on the concave swales and drainageway borders.

The major limitations of these soils for most uses are shallowness to bedrock, rock outcrops, and steepness of slope. Cleared areas are subject to severe erosion. The shallowness to bedrock hinders excavation, limits tree growth, and is a windthrow hazard. In some places, seasonal wetness is a limitation.

The soils in this association are mostly wooded. They are well suited to trees. Numerous rock outcrops and steep slopes, however, make timber management difficult. In constructing ski slopes, very careful layout and installation of appropriate conservation practices are needed to avoid serious erosion. Not assigned to a capability unit.

LYF—Lyman-Rock outcrop-Berkshire association, very steep. This association is on mountainsides, hillsides, and ridges that are mostly in the White Mountain National Forest. Lyman soils, interspersed with areas of rock outcrop, are in the irregular ridge positions, and Berkshire soils are on the smoother parts of the landscape. Individual areas extend laterally along landscape contours. They are generally 75 to 250 acres in size. Slope ranges from 35 to 60 percent. The Lyman and Berkshire soils in this association have profiles similar to those described as representative of their respective series, but in most places more stones and boulders are on the surface. Also, the lower part of the subsoil in these Berkshire soils is thinner. Rock outcrops make up 15 to 50 percent of the surface area. Lyman soils make up 30 to 50 percent of this association and Berkshire soils, 20 to 30 percent.

Included in mapping, and making up 15 to 25 percent of the association, are areas of Marlow and Hermon soils. Marlow and Hermon soils are interspersed with the Berkshire soils. Marlow soils are commonly on the north-facing slopes, and Hermon soils are commonly on the irregular, dissected parts of the lower side slopes.

The major limitations of these soils for intensive uses are very steep slopes, shallowness to bedrock, and rock outcrops. Soils in areas without vegetation are susceptible to very severe erosion. The shallowness to bedrock hinders excavation, limits tree growth, and causes a windthrow and landslide hazard.

The soils in this association are mostly wooded. Timber management is difficult because of the numerous rock outcrops and boulders on the surface. The wooded areas yield timber and serve as wildlife habitat. Also, the trees protect the watersheds. In constructing ski slopes, careful layout and installation of appropriate conservation measures are needed to avoid serious erosion. Not assigned to a capability unit.

Marlow Series

The Marlow series consists of well-drained soils that formed in deposits of loamy glacial till. These soils have a firm pan layer at a depth of 15 to 36 inches. They are on oval upland hills and mountainsides in the northern part of the county. Stones are common on the surface.

In a representative profile of a Marlow soil in a wooded area, a layer of fresh and partly decayed leaves and needles 2 inches thick is on the surface. The sur-

face layer, below this, is grayish-brown fine sandy loam about 2 inches thick. The subsoil, extending to a depth of about 20 inches, is dark-brown fine sandy loam in the upper 4 inches and dark-brown gravelly fine sandy loam in the lower 14 inches. The underlying material to a depth of 42 inches is a pan layer of olive fine sandy loam. Distinct mottles are at a depth of 27 inches.

Permeability is moderate above the pan but moderately slow in the pan. Available water capacity is moderate. The depth to seasonal high water is generally more than 30 inches. Woodcrop productivity is good for white pine and upland oaks. Septic tank filter fields or filter beds do not function well because of the moderately slow permeability of the pan layer.

Representative profile of Marlow fine sandy loam in a wooded area of Marlow very stony fine sandy loam association, steep, about one-fourth mile east of Jackson Road, about 1,000 feet north of Tyrol Ski Area road in the town of Jackson:

O1—2 inches to 1 inch, partly decomposed needles and twigs.
O2—1 inch to 0, decomposed organic material.
A2—0 to 2 inches, grayish-brown (10YR 5/2) fine sandy loam; weak, fine, granular structure; very friable; many fine rocks; 10 to 15 percent coarse fragments; very strongly acid; abrupt, smooth boundary.
B21ir—2 to 6 inches, dark-brown (7.5YR 4/4) fine sandy loam; weak, fine, granular structure; friable; many fine roots; 10 to 15 percent coarse fragments; very strongly acid; clear, wavy boundary.
B22—6 to 20 inches, dark-brown (10YR 4/3) gravelly fine sandy loam; weak, fine, granular structure; friable; common fine roots; 20 percent coarse fragments; strongly acid; clear, smooth boundary.
C1x—20 to 27 inches, olive (5Y 4/3) fine sandy loam; weak, thick, platy structure; firm; few fine roots; 10 percent coarse fragments; strongly acid; gradual, smooth boundary.
C2x—27 to 42 inches, olive (5Y 4/3) fine sandy loam; many, medium, distinct, dark yellowish-brown (10YR 4/4) and dark-brown (7.5YR 4/4) mottles; weak, thick, platy structure; 10 percent coarse fragments; firm; strongly acid.

In the A2 horizon hue is 10YR or 7.5YR, value is 5 to 7, and chroma is 1 or 2. The Ap horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The B horizon ranges from sandy loam to loam and gravelly analogs. The B21ir horizon has hue of 5YR and 7.5YR, value of 3 and 4, and chroma of 4 to 6. Where the B21h horizon is present, value ranges to 2 and chroma to 1. The lower part of the B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 5. The Cx horizon is dominantly fine sandy loam or sandy loam and gravelly analogs. The C horizon has hue of 2.5Y and 5Y, value of 4 or 5, and chroma of 2 to 4. Structure is generally moderate, medium, or thick platy ranging to massive. Consistence is firm or very firm. There is mottling just above or within the pan layer.

Marlow soils are near Peru, Lyman, and Berkshire soils. Marlow, Peru, Lyman, and Berkshire soils formed in similar materials, but Marlow soils are better drained than Peru soils. Marlow soils are thicker over bedrock than Lyman soils, and they have a firm or very firm pan layer that Berkshire soils do not have.

MaB—Marlow fine sandy loam, 3 to 8 percent slopes. This soil is in areas where surface stones have been removed. It is on crests of oval hills. It has a profile similar to the one described as representative of the series, but the mineral surface layer is darker and thicker.

Included with this soil in mapping are areas of Peru, Berkshire, and Becket soils. Also included are small areas of soils that have slopes of more than 8 percent, very stony spots, and wet spots.

A pan layer limits most nonfarm uses of this soil. Restricted internal drainage causes wetness in the spring and delays tillage and other earth-moving operations. The hazard of erosion is slight where the soil is bare or in row crops.

This soil is well suited to silage corn, grasses, and legumes. It can be used for row crops continuously if tilled on the contour or stripcropped. These practices are needed to control erosion, and they are also used in cropping systems that include cover crops, grasses, and legumes.

Grassed waterways are useful in controlling surface runoff. Seepage from upper slopes can be intercepted by diversions or by tile laid across the slope above the area to be used.

Most areas of this soil are in pasture or woodland. Some areas are being used for residential and recreational development. This soil has good potential for the development of open-land wildlife habitat. Capability unit IIe–6.

MaC—Marlow fine sandy loam, 8 to 15 percent slopes. This soil is in areas where surface stones have been removed. It is on convex hilltops and low oval hills. It has a profile similar to the one described as representative of the series, but the mineral surface layer is darker and thicker.

Included with this soil in mapping are areas of Peru, Berkshire, Becket, and Lyman soils. Also included are a few wet spots and narrow drainageways, small areas of soils that have slopes of more than 15 percent, and very stony spots.

A pan layer and slope are limitations to certain uses of this soil. The pan restricts downward movement of water and causes lateral movement above the pan. Slope is a consideration where excavation or fill is required for level grades. The hazard of erosion is moderate if the soil is disturbed by plowing or contruction work.

This soil is well suited to grasses and legumes. Row crops can be grown if erosion is controlled. Cropping systems that use grasses and legumes help reduce soil losses. Beneficial erosion control practices include contour farming, stripcropping, and diversions. Seepage from upper slopes can be intercepted with tile laid across the slope above the area to be used. Grassed waterways are useful in controlling runoff from cleared areas to natural drainageways.

Most areas of this soil are in pasture or woodland. Some areas are being used for residential and recreational development. This soil has good potential for the development of open-land wildlife habitat. Capability unit IIIe–6.

MdB—Marlow very stony fine sandy loam, 3 to 8 percent slopes. This soil is on crests of oval hills. Surface stones and boulders are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Peru, Becket, and Berkshire soils, and Lyman soils that have a few bedrock outcrops. Also included are scattered areas of soils that have slopes of more than 8 percent and a few wet spots.

The pan layer is the main limitation to certain intensive uses of this soil. Downward movement of water

is restricted, resulting in lateral seepage above the pan. Stoniness hinders the establishment of level grades, landscaping, seedbed preparation, and excavations.

This soil is unsuited to field crops or row crops because of surface stoniness. Some areas can be used for improved pasture. Stone removal and the application of water control practices permit more intensive usage.

Seepage can be controlled by installing tile or constructing diversions above the area to be used. In cleared areas, waterways help to channel surface drainage to natural drainageways.

Most of this soil is in woodland, but more of it is being used as part of residential developments. In these areas, the problem of septic tank sewage effluent disposal can be temporarily corrected by building up the filter field or filter bed above the pan layer. Capability unit VIs–7.

MdC—Marlow very stony fine sandy loam, 8 to 15 percent slopes. This soil is on convex hilltops and low oval hills. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Becket, Berkshire, and Peru soils, and Lyman soils that have a few bedrock outcrops. Also included are small areas of soils that have slopes of more than 15 percent, scattered wet spots and narrow drainageways, and extremely stony spots.

The pan layer, stoniness, and slope are the main limitations to most uses of this soil. Stoniness and slope are limitations for specific uses such as level grades, landscaping, seedbed preparation, and excavations. The hazard of erosion is moderate in disturbed areas. These sloping soils have a severe limitation for the construction of paved streets and parking lots.

This soil is unsuited to crops because of stones on the surface. The removal of stones improves this soil for most uses.

Seepage can be controlled by installing tile across the slope above the area to be used and also at the bases of excavations. In cleared areas, waterways help to channel surface drainage to natural drainageways.

Most of this soil is in woodland, but more of it is being used for residential developments. In these areas, the problem of septic tank sewage effluent absorption can be temporarily corrected by installing tile around the filter bed area or by building up the filter bed above the pan layer. Capability unit VIs–7.

MdD—Marlow very stony fine sandy loam, 15 to 25 percent slopes. This soil is on hillsides. It has a profile similar to the one described as representative of the series, but mottling is commonly absent in the pan layer. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Berkshire, Becket, and Peru soils, and Lyman soils that have a few rock outcrops. Also included are seep spots and narrow drainageways.

The pan layer, slope, and stoniness are the major limitations to most uses of this soil. The moderately steep slopes severely limit the use of this soil for community development. Extensive excavation and fill are needed to develop homesites and roads in this soil. Where level grades, landscaping, and seedbed preparation are needed, stoniness is a concern. The hazard of erosion is severe in areas where vegetation is removed.

In cleared areas, waterways help to channel surface drainage to natural drainageways. Seepage can be controlled to some extent by installing tile across the slope above the area to be used and also at the base of excavations.

Most of this soil is in woodland, a use to which it is well suited. A small area is being used for recreational development. This soil has potential for the construction of ski slopes; however, careful planning of slope layout and use of conservation practices are required to prevent serious erosion. Capability unit VIs–7.

MdE—Marlow very stony fine sandy loam, 25 to 60 percent slopes. This soil is on hillsides and valley walls. It has a profile similar to the one described as representative of the series, but mottling is absent in the pan layer and subsoil layers are generally thinner. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Berkshire and Becket soils, and Lyman soils that have a few rock outcrops. Also included are extremely stony spots, seep spots, and narrow drainageways.

The pan layer, slope, and stoniness are major limitations to most uses of this soil. Level grades generally require major excavation and fill. Erosion is a serious concern when cuts are made or vegetation is removed. Stoniness hinders uses where level grades, seedbeds, or excavations are needed.

Almost all of this soil is in woodland, to which it is well suited; however, slopes are generally too steep for safe machinery use in logging operations, especially where the soils are very steep. Some areas are being used as part of ski slope developments. In areas cleared for skiing, natural drainageways should not be disturbed, and slopes without vegetation should be protected with mulch and cover crops until permanent vegetation is established. Diversions can help to control runoff over open slopes. Capability unit VIIs–7.

MEE—Marlow very stony fine sandy loam association, steep. This association is on side slopes and lower valley walls of glaciated hills and mountains, mostly in the White Mountain National Forest. The areas follow the contour of the landscape and are generally 50 to 175 acres in size. Generally, slope ranges from 15 to 35 percent. The profile described as representative of the Marlow series is in an area of this association. Surface stones cover as much as 15 percent of the area.

Marlow very stony fine sandy loam makes up about 50 to 75 percent of the association. It is on convex smooth parts of the landscape.

The remaining 25 to 50 percent of the association is Berkshire, Lyman, and Peru soils. Berkshire soils are interspersed with the Marlow soils, but commonly have south-facing slopes. Lyman soils and a few rock outcrops are on the knobby ridges, and Peru soils are in concave swales and on drainageway borders.

Steepness of slope, the pan layer, and stoniness are major limitations to most uses of this soil. The hazard of erosion is severe in areas that are bare of vegetation. The pan layer restricts downward water movement, causing water to seep laterally above the pan. In a few places, seasonal wetness and shallow depth to bedrock is a limitation.

The soils in this association are used mostly for timber production and the development of woodland wildlife habitat, and they are fairly well suited to these uses. In logging operations, steepness of slope is

a limitation throughout most of the area. There is potential for recreational uses, such as paths and trails and ski slopes. For ski slopes, careful layout planning and use of conservation practices are needed to prevent serious erosion. Not assigned to a capability unit.

MEF—Marlow very stony fine sandy loam association, very steep. This association is on side slopes and valley walls of glaciated hills and mountains, mostly in the White Mountain National Forest. The areas commonly follow the contour of the landscape and are generally 75 to 200 acres in size. In most places, slopes range from 35 to 60 percent. The Marlow soil has a profile similar to the one described as representative of the series, but generally there are more stones and boulders throughout the profile. Surface stones cover as much as 15 percent of the area.

Marlow very stony fine sandy loam makes up about 45 to 70 percent of this association. It is in the smoother part of the landscape.

The remaining 30 to 55 percent of the association is Berkshire and Lyman soils. Berkshire soils are interspersed with Marlow soils but are common to the south-facing slopes. Lyman soils, including bedrock outcrops, are on knobby ridgetops and sheer valley walls.

The very steep slopes of soils in this association are the dominant limitation for all uses. The pan layer is a major limitation for most intensive uses, and stoniness hinders excavations. The hazard of erosion is very severe where slopes are bare of vegetation. In a few spots, shallowness to bedrock limits tree growth and presents a windthrow and landslide hazard.

The soils in this association are mostly in woodland and are used for limited timber production. The slopes are generally too steep for machine logging operations. There is potential for use as ski slopes; however, the layout, construction, and maintenance of ski slopes requires very careful planning and use of appropriate conservation practices to safeguard against serious erosion. Not assigned to a capability unit.

MFC—Marlow-Peru very stony fine sandy loams association, sloping. This association is on hilltops and lower side slopes of glaciated hills, mostly in the White Mountain National Forest. The areas are generally oblong and 30 to 100 acres in size. Slope ranges from 0 to 15 percent. The Marlow and Peru soils have profiles similar to those described as representative of their respective series, but commonly there are more stones throughout the profile. Surface stones cover as much as 15 percent of the area.

Marlow very stony fine sandy loam makes up about 40 to 55 percent of the association, and Peru very stony fine sandy loam, about 25 to 40 percent. Marlow soils are on the smooth, convex parts of the landscape, and Peru soils are in the concave parts.

The remaining 15 to 30 percent of the association is Berkshire and Lyman soils. Berkshire soils are interspersed with Marlow soils, but commonly have south-facing slopes. Lyman soils, including a few rock outcrops, are on the knobby hilltops.

The pan layer and stoniness in both Marlow and Peru soils and seasonal wetness in Peru soils are the major limitations to most uses of this soil. The hazard of erosion is moderate on the more steeply sloping soils from which vegetation has been removed. The pan layer restricts downward water movement, resulting in lateral seepage above the pan. In a few scattered spots, shallowness to bedrock limits tree growth and presents a hazard of windthrow.

Soils in this association are used mostly for timber production and the development of woodland wildlife habitat, and they are well suited to these uses. While over half of the area is favorable for logging operations, seasonal wetness and seep spots along the lower side slopes hinder the construction and maintenance of logging roads and landings. Machine operation on the Peru soils during wet periods can leave ruts, making the soil highly erodible. There is limited potential for recreational uses, such as paths and trails, but any intensive use requires careful planning and choice of sites. Not assigned to a capability unit.

Millis Series

The Millis series consists of well-drained soils that formed in deposits of glacial till. These soils have a loamy cap 18 to 36 inches thick over a firm sandy pan layer. They are on rounded hills in the southern part of the county.

In a representative profile of a Millis soil in a reforested area, the surface layer is brown fine sandy loam about 8 inches thick. The subsoil, extending to a depth of about 22 inches, is strong-brown fine sandy loam in the upper 5 inches and pale-brown fine sandy loam in the lower 9 inches. The underlying material to a depth of 46 inches is grayish-brown gravelly loamy coarse sand that has a very firm pan layer.

Permeability is moderate above the pan layer but moderately slow through the pan. Available water capacity is moderate. Woodcrop production is fair for white pine and northern hardwoods. Septic tank filter or leach fields do not function well because of the moderately slow permeability of the pan layer.

Representative profile of Millis fine sandy loam, 8 to 15 percent slopes, in an old field now reforested, about 1.5 miles southeast of North Wolfeboro, 150 feet southeast of junction of Cooper and Avery Roads, in the town of Wolfeboro:

Ap—0 to 8 inches, brown (10YR 4/3) fine sandy loam; fine and medium roots; 8 percent coarse fragments; very strongly acid; abrupt, smooth boundary.

B21—8 to 13 inches, strong-brown (7.5YR 5/6) fine sandy loam; weak, fine, granular structure; friable; common fine and medium roots; 8 percent coarse fragments; very strongly acid; clear, smooth boundary.

B22—13 to 22 inches, pale-brown (10YR 6/3) fine sandy loam; weak, very fine, granular structure; friable; common fine and medium roots; 10 percent coarse fragments; strongly acid; abrupt, smooth boundary.

IICx—22 to 46 inches, grayish-brown (2.5Y 5/2) gravelly loamy coarse sand; weak, thick, platy structure; very firm; few fine roots between plates in upper 10 inches; 15 to 20 percent coarse fragments; medium acid.

In the Ap horizon hue is 10YR, value is 2 to 4, and chroma is 2 or 3. The B horizon is mainly fine sandy loam or sandy loam. The B21 horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. The lower part of the B horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. The weighted average texture of the IIC horizon is loamy fine sand, loamy sand, loamy coarse sand, or gravelly analogs of these textures. Firm, horizontally oriented layers of fine sandy loam make up as much as 40

percent of the IIC horizon, by volume. This horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 2 or 3.

Millis soils are near Scituate, Gloucester, and Paxton soils. They formed in material similar to the material in which Scituate soils formed but are better drained. Millis soils are similar to Gloucester soils, but they have fewer coarse fragments throughout and a firm, sandy pan layer. Millis soils have a coarser C horizon than Paxton soils and have alternating firm layers, while Paxton soils have a more uniform, massive pan layer.

MlB—Millis fine sandy loam, 3 to 8 percent slopes. This soil is on convex hillcrests. It has a profile similar to the one described as representative of the series, but faint mottling is just above or within the pan layer.

Included with this soil in mapping are small areas of Paxton, Gloucester, Scituate, Woodbridge, and Hollis soils. Also included are small areas of soils that have slopes of more than 8 percent, scattered wet spots, and small spots that are very stony.

The pan layer is the main limitation to certain intensive uses of this soil. Internal drainage is restricted, causing some wetness in the spring. This soil can be improved for most intensive uses with drainage or water-control measures.

This soil is well suited to most farm crops. Diversions, contour farming, or stripcropping are used to control erosion on the steeper slopes in places that are used for cultivated crops. Cropping systems include cover crops, grasses, and legumes.

Much of this soil has been reforested, but some remains idle or in pasture. More and more is being used for residential and recreational development. This soil has good potential for the development of open-land wildlife habitat. Capability unit IIe–6.

MlC—Millis fine sandy loam, 8 to 15 percent slopes. This soil is on convex hilltops and low, oval hills. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Paxton, Gloucester, Scituate, Woodbridge, and Hollis soils. Also included are small areas of soils that have slopes of more than 15 percent and scattered wet spots and narrow drainageways.

Slope and a pan layer are limitations to certain intensive uses of this soil. The pan layer restricts downward movement of water, causing some wetness in the spring in the form of seep spots. This soil can be improved for intensive uses with drainage or water-control measures. Slope is an important consideration when planning uses that require level grades. The hazard of erosion is moderate where this soil is used for row crops.

This soil is suited to most commonly grown farm crops if erosion is controlled. Cropping systems that use grasses and legumes help to reduce soil losses. Beneficial erosion-control practices include contour farming, stripcropping, and diversions.

Most of this soil has been reforested, but small tracts are in pasture. An increasing number of areas of this soil are being developed for residential and recreational uses. This soil has good potential for the development of open-land wildlife habitat. Capability unit IIIe–6.

MsB—Millis very stony fine sandy loam, 3 to 8 percent slopes. This soil is on convex hillcrests. It has a profile similar to the one described as representative of the series, but in most places it has a thinner and darker mineral surface layer. Stones on the surface are generally 5 to 30 feet apart.

Included with this soil in mapping are some areas of Paxton, Gloucester, Scituate, and Woodbridge soils, and small areas of Hollis soils that have a few bedrock outcrops. Also included are small areas of soils that have slopes of more than 8 percent and extremely stony and bouldery spots.

The pan layer is the major limitation to most intensive uses of this soil. Internal drainage is restricted, causing some wetness in the spring. Stoniness is a limitation for specific uses, such as level grades, landscaping, seedbed preparation, and excavations. Drainage and stone removal improve the soil for farming and more intensive nonfarm uses.

Most of this soil is used as woodland, and some is in unimproved pasture. More and more of this soil is being developed as part of residential subdivisions. It has fair potential for the development of woodland wildlife habitat. Capability unit VIs–7.

MsC—Millis very stony fine sandy loam, 8 to 15 percent slopes. This soil is on convex hilltops and low, oval hills. It has a profile similar to the one described as representative of the series, but it generally has a thinner and darker mineral surface layer. Stones on the surface are generally 5 to 30 feet apart.

Included with this soil in mapping are some areas of Paxton, Gloucester, Scituate, and Woodbridge soils, and small areas of Hollis soils that have a few bedrock outcrops. Also included are small areas of soils that have slopes of more than 15 percent, extremely stony and bouldery spots, and scattered wet spots and narrow drainageways.

The pan layer is a major limitation to many intensive uses of this soil. It restricts internal drainage, causing water to seep laterally above the pan. Slope and stoniness are additional limitations to farm uses and nonfarm uses requiring level grades, seedbed preparation, and excavations. The hazard of erosion is moderate where protective vegetation has been removed. The steepness of these slopes is a severe limitation to the construction of paved streets and parking lots.

This soil is unsuited to row crops or hay crops because of surface stones. Stone removal and drainage permit more intensive farm and nonfarm uses.

Most of this soil is used as woodland, and a little is in unimproved pasture. More and more of this soil is being developed as part of residential subdivisions. Capability unit VIs–7.

MsD—Millis very stony fine sandy loam, 15 to 25 percent slopes. This soil is on hillsides. It has a profile similar to the one described as representative of the series, but generally the mineral surface layer is thinner and darker. Stones on the surface are generally 5 to 30 feet apart.

Included with this soil in mapping are some areas of Paxton and Gloucester soils and areas of Hollis soils that have a few bedrock outcrops. Also included are small areas of soils that have slopes of more than 25 percent, extremely stony and bouldery spots, and seep spots and narrow drainageways.

The pan layer and moderately steep slopes are the main limitations to certain intensive uses of this soil. Stoniness hinders the establishment of level grades,

excavations, and seedbed preparation. The moderately steep slopes are a severe limitation to most community development uses. The hazard of erosion is severe where vegetation has been removed. Natural drainageways need to be left undisturbed, and bare slopes need to be protected with mulch and cover crops until permanent vegetation is established.

Almost all of this soil is in woodland, to which it is well suited. A few scattered spots are being used as recreational dwelling sites. In places, dwellings are built on pilings to decrease needed excavations. A few areas of this soil are being developed as ski slopes. The use of this soil for ski slopes requires very careful layout planning and control of runoff to prevent serious erosion. There is fair potential for the development of woodland wildlife habitat. Capability unit VIs–7.

Muck and Peat

MU—Muck and Peat. This nearly level soil is in wet depressions. It consists of undifferentiated organic materials. This land type is in round glacial pits and oblong bogs bordering streams, marshes, lakes, and ponds. The areas range from about 2 acres to 50 acres in size.

Included with this land in mapping are small areas of Whitman, Naumburg, and Walpole soils and some small areas of Fresh water marsh.

The organic material is mostly partly decayed sedges, ferns, woody plants, and reeds. Sphagnum moss accumulates on the surface in many places. Thickness of organic materials ranges from about 1½ to more than 10 feet. Sand, gravel, silt, or loamy material underlies the organic deposit.

The high water table and poor stability are the major limitations to most uses of this land. The organic materials subside if the soil is drained. Organic materials are generally removed or displaced when an area is earthfilled for such uses as roads. Outlet grades are often difficult to establish for drainage.

Most of this soil is in woodland or open bog. There is good potential for the development of wetland wildlife habitat. Not assigned to a capability unit.

Naumburg Series

The Naumburg series consists of somewhat poorly drained and poorly drained sandy soils. These soils formed in deposits of water-laid sands. They are in depressions on glacial outwash plains and terraces. These soils are near streams, lakes, or bogs where the water table remains near the surface for long durations. In places, they have hard iron chunks between depths of 10 and 30 inches.

In a representative profile of a Naumburg soil in a wooded area, a layer of fresh and partly decayed leaves and herbs 2 inches thick is on the surface. The surface layer, below this, is pinkish-gray loamy sand about 6 inches thick. The subsoil, extending to a depth of about 20 inches, is dark reddish-brown loamy sand in the upper 2 inches and yellowish-red loamy sand that has distinct mottles in the lower 12 inches. The underlying material to a depth of 44 inches is pale-brown, loose sand that has distinct mottles.

Permeability is rapid. Available water capacity is low. The high water table is the main limitation to the use of these soils for community development.

Representative profile of Naumburg loamy sand, 0 to 8 percent slopes, in a wooded area in the town of Conway about six-tenths mile south-southwest of junction of U.S. Highway 302 and New Hampshire route 113, about 200 feet west of access road to Conway Lake:

O1—2 inches to 1 inch, fresh leaves and herb litter.
O2—1 inch to 0, partly decomposed forest litter.
A2—0 to 6 inches, pinkish-gray (7.5YR 7/2) loamy sand; weak, fine, granular structure; very friable; common, fine and medium roots; strongly acid; abrupt, irregular boundary.
B21hir—6 to 8 inches, dark reddish-brown (50 percent 5YR 3/4, 50 percent 5YR 2/2) loamy sand; massive; friable; common fine and medium roots; strongly acid; clear, irregular boundary.
B22ir—8 to 20 inches, yellowish-red (5YR 4/6) loamy sand; common, coarse, distinct strong-brown weak, fine, granular structure; very friable; (7.5YR 5/6) mottles; weak, fine, granular structure; very friable; common fine and medium roots; strongly acid; clear, wavy boundary.
C—20 to 44 inches, pale-brown (10YR 6/3) sand; common, coarse, distinct, strong-brown (7.5YR 5/6) mottles; single grained; loose; medium acid.

The A horizon is mainly loamy sand. An A1 or Ap horizon, if present, has hue of 10YR or 7.5YR , value of 2 to 4, and chroma of 1 or 2. The A2 horizon has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 1 or 2. The B horizon is mainly loamy sand or sand but in places it is loamy fine sand in the upper part. The B21hir horizon has hue of 5YR or 7.5YR and value and chroma of 2 to 4. The B22ir horizon has a hue of 5YR to 10YR and value and chroma of 4 to 6. The B22ir horizon has random indurated tongues of cemented chunks as much as 8 inches in diameter. These chunks make up less than 50 percent of the B21hir and B22ir horizons. The C horizon has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 2 to 4.

Naumburg soils formed in materials similar to the material in which the nearby Croghan and Deerfield soils formed, but Naumburg soils are more poorly drained. Naumburg soils are similar in drainage to the Raynham variant soils, but they do not have the very fine sandy loam or silt loam capping.

NaB—Naumburg loamy sand, 0 to 8 percent slopes. This nearly level to undulating soil is in depressions on outwash sand plains. It generally adjoins lakes, bogs, and streams.

Included with this soil in mapping are small areas of Croghan, Deerfield, Nicholville variant, and Raynham variant soils. Also included are small areas of soils that have continuous, very hard, cemented layers in the subsoil; rises that have slopes of more than 8 percent; spots that have stones on the surface; areas of soils that have gravel or loamy layers in the underlying sand, and very poorly drained sandy soils that do not have the iron humus layer in the subsoil.

The high water table that keeps the soil wet for 7 to 9 months of the year is the main limitation to most uses of this soil. Where the upper part of the subsoil is cemented, permeability is moderately slow. Some areas of this soil lack enough outlet grade to allow proper drainage because of the soil's nearness to bogs and ponds. Where outlet grades are established, the water table can generally be lowered by open ditches or tile drains.

This soil is not well suited to cultivated crops. It is poorly suited to hay and has limited value for pasture unless it is drained.

Most areas of this soil are wooded or idle. Some

areas are within residential developments and generally fill has been used to raise the dwellings and septic tank filter fields or filter beds above the high water table. Timber production is generally fair, but the soil favors shallow-rooted water-tolerant species. This soil has good potential for dugout ponds and for development of wetland wildlife habitat. Capability unit IVw–23.

Nicholville Variant

The Nicholville variant consists of moderately well drained soils that formed in slack-water deposits of silt and very fine sand overlying sands. These soils are on former glacial lake basins mainly in the northern half of the county.

In a representative profile of a Nicholville variant in a wooded area, a layer of fresh and partly decayed leaves and needles 3 inches thick is on the surface. The surface layer, below this, is dark-brown silt loam about 5 inches thick. Below this is a leached layer of gray and light brownish-gray silt loam 1 inch thick. The subsoil, extending to a depth of 27 inches, is yellowish-red silt loam in the upper 4 inches and yellowish-brown silt loam in the lower 17 inches. The lower 4 inches of the subsoil has distinct yellowish-red mottles. The underlying material to a depth of 35 inches is light olive-brown and light yellowish-brown silt loam that has distinct strong-brown mottles. Below this, a fine sand multicolored layer extends to a depth of 50 inches.

Permeability is moderate. Available water capacity is high. The depth to seasonal high water ranges from 18 to 24 inches.

Representative profile of Nicholville silt loam, sandy subsoil variant, 3 to 8 percent slopes, in a wooded area in the town of Conway, about 2.5 miles north of covered bridge over Swift River on Westside Road, about 1,000 feet west of Westside Road:

O1—3 to 2 inches, pine needles and leaf litter.
O2—2 inches to 0, partly decayed organic matter.
Ap—0 to 5 inches, dark-brown (10YR 3/3) silt loam; weak, fine, granular structure; friable; common fine and medium roots; strongly acid; abrupt, smooth boundary.
A2—5 to 6 inches, gray (10YR 6/1) and light brownish-gray (10YR 6/2) silt loam; moderate, medium platy structure; friable; common fine to medium roots; strongly acid; abrupt, broken boundary.
B21ir—6 to 10 inches, yellowish-red (5YR 4/8) silt loam; weak, fine, granular structure; friable; common fine and few medium roots; strongly acid; abrupt, wavy boundary.
B22—10 to 23 inches, yellowish-brown (10YR 5/6) silt loam; few, fine, faint, strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; few fine roots; strongly acid; clear, smooth boundary.
B23—23 to 27 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, distinct, yellowish-red (5YR 5/6 and 4/6) and pale-brown (10YR 6/3) mottles; moderate, medium to thick, platy structure; friable; few fine roots; strongly acid; abrupt, smooth boundary.
C1—27 to 35 inches, light olive-brown (2.5Y 5/4) and light yellowish-brown (2.5YR 6/4) silt loam; many, fine distinct, strong-brown (7.5YR 5/6) and light brownish-gray (10YR 6/2 and 2.5Y 6/2) mottles and dark reddish-brown (5YR 3/3) stains; moderate, thick, platy structure; firm, strongly acid; abrupt, smooth boundary.
IIC2—35 to 50 inches, multicolored light yellowish-brown (2.5Y 6/4), olive-yellow (2.5Y 6/6), light olive-brown (2.5Y 5/6), light brownish-gray (2.5Y 6/2), and yellowish-brown (10YR 5/6) fine sand; single grained; loose; strongly acid.

In the Ap horizon hue is 10YR, value is 3 or 4, and chroma is 2 to 4. The B horizon ranges from very fine sandy loam to silt loam. The B21ir horizon commonly has hue of 5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. The B22 and B23 horizons have hue of 7.5YR or 10YR, but in places hue is 2.5Y in transition to the C horizon. The IIC horizon is commonly fine sand or loamy fine sand that is as much as 15 percent gravel. Depth to the IIC horizon ranges from 20 to 36 inches.

The Nicholville variant soils formed in material similar to the material in which the nearby Salmon variant and Raynham variant soils formed, and they are similar in drainage to Croghan soils. They are not so well drained as Salmon variant soils, but they are better drained than Raynham variant soils. Nicholville variant soils have a finer textured B horizon than Croghan soils.

NcA—Nicholville silt loam, sandy subsoil variant, 0 to 3 percent slopes. This soil is in shallow depressions in areas of former glacial lake basins where slack water stood near lakes, the edge of wide flood plains, or in mountain intervales. It has a profile similar to the one described as representative of the series, but distinct mottles are evident closer to the surface.

Included with this soil in mapping are small areas of Raynham variant, Croghan, and Naumburg soils. Also included are small areas of moderately well drained soils that have 20 to 30 inches of fine sandy loam over sand, spots of soils that have slopes of more than 3 percent, areas of soils that have thin loamy layers at depths below 35 inches, and scattered spots that have surface stones.

Seasonal wetness is the major limitation to most intensive uses of this soil. Open ditches or tile will generally drain and control excess water, allowing more intensive uses.

This soil is well suited to hay and pasture crops. It is also suited to silage corn and truck crops if it is drained. In its natural condition, cultivation of this soil is delayed in the spring and the choice of crops is restricted. If legumes are grown, they should tolerate seasonal wetness. Drained areas can be used for row crops continuously if a winter cover crop is grown.

Much of this soil is in crops or limited pasture, or is idle. A few spots are being used as part of recreational developments near lakes and streams. On most homesites, fill has been used to build up septic tank sewage filter fields or filter beds above the water table. Capability unit IIw–32.

NcB—Nicholville silt loam, sandy subsoil variant, 3 to 8 percent slopes. This undulating soil is in shallow depressions in areas of former glacial lake basins where slack water stood near lakes, the edges of wide flood plains, or in mountain intervales. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Salmon variant and Croghan soils. Also included are moderately well drained soils that have 20 to 30 inches of fine sandy loam over sand, areas of soils that have thin loamy layers at depths below 35 inches, scattered wet spots, and spots that have surface stones.

Seasonal wetness is the main limitation to most intensive uses of this soil. Open ditches, tile drains, diversions, and grassed waterways control seasonal wetness.

This soil is well suited to hay and pasture crops. It is also suited to silage corn and truck crops if it is drained.

In undrained areas, wetness restricts the choice of crops and delays cultivation in the spring. If legumes are grown, they should tolerate seasonal wetness. In areas having long slopes, the hazard of erosion is slight, and erosion-control practices are needed to hold soil losses to a minimum. Stripcropping is used in cropping systems that include cover crops, grasses, and legumes.

Much of this soil is in crops or limited pasture, or is idle. A few areas are being used as part of recreational developments near lakes and streams. On most homesites, fill has been used to build up septic tank sewage filter fields or filter beds above the water table. Capability unit IIw–32.

Ondawa Series

The Ondawa series consists of well-drained soils that formed in alluvial deposits dominantly of fine sandy loam. These soils are on high bottoms and low bottoms on flood plains along the major streams of the county. The flood plains are generally dissected by narrow floodwater drainageways. The soils on high bottoms flood less frequently than the soils on low bottoms.

In a representative profile of an Ondawa soil in a hayfield, the surface layer is dark-brown fine sandy loam about 8 inches thick. The subsoil, extending to a depth of 18 inches, is dark yellowish-brown fine sandy loam. The underlying material to a depth of 42 inches is dominantly yellowish-brown fine sandy loam that has some layers of very fine sandy loam.

Permeability is moderately rapid. Available water capacity is moderate. Ondawa soils are good farming soils, and many of them are still being farmed. The potential flood hazard is the main limitation to the use of these soils for community development.

Representative profile of Ondawa fine sandy loam, high bottom, in a hayfield, about six-tenths mile northwest of junction of U.S. Highway 302 and New Hampshire Route 113, about 100 feet southwest of U.S. Highway 302, in the town of Conway:

Ap—0 to 8 inches, dark-brown (10YR 3/3) fine sandy loam; weak, fine, granular structure; friable; common fine roots; medium acid; abrupt, smooth boundary.

B2—8 to 18 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular structure; very friable; few fine roots; slightly acid; clear, smooth boundary.

C1—18 to 26 inches, yellowish-brown (10YR 5/4) fine sandy loam; massive; very friable; slightly acid; clear, smooth boundary.

C2—26 to 38 inches, yellowish-brown (10YR 5/4) fine sandy loam; massive; friable; medium acid; clear, smooth boundary.

C3—38 to 42 inches, dark yellowish-brown (10YR 4/4) very fine sandy loam; massive; friable; medium acid; clear, smooth boundary.

In the A horizon hue is 10YR, value is 3 or 4, and chroma is 2 or 3. The C horizon commonly has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. Thin bands or layers of loamy fine sand, fine sand, or very fine sandy loam are common.

Ondawa soils are near Podunk and Hadley soils. Ondawa and Podunk soils formed in similar material, but Ondawa soils are better drained. Ondawa soils are coarser in the solum than Hadley soils.

Of—Ondawa fine sandy loam. This nearly level soil is on the low bottoms on flood plains, mostly along the larger streams. It has a profile similar to the one described as representative of the series, but in most places, there are dark buried surface layers and thin layers of coarse material throughout the profile.

Included with this soil in mapping are small areas of Ondawa variant, Hadley, Podunk, Winooski, and Suncook soils. Also included are a few wet spots and narrow strips of soils that have slopes of more than 3 percent along narrow flood plain drainageways.

A flooding hazard presents serious limitations to most uses of this soil. Flooding generally occurs at least once every 5 years.

This soil is suited to field crops, hay, and pasture. Frequent flooding is a major management concern, especially where row crops are grown. This soil can be cropped continuously if protected from flooding. A good cropping system that includes cover crops, greenmanure crops, and the use of crop residue helps maintain optimum plant growth. Ponding, which occurs when the soil is frozen, can be eliminated by land smoothing. A strip of sod or trees along streambanks can be effective in controlling streambank erosion.

Most of this soil is in hay, pasture, or silage corn as part of dairy farm operations. A few areas have been developed for residential and recreational uses. This soil has good potential for the development of openland and woodland wildlife habitat. Capability unit IIw–10.

Oh—Ondawa fine sandy loam, high bottom. This nearly level soil is on high bottoms on flood plains along larger rivers and streams. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Hadley, Podunk, and Winooski soils, and spots of Ondawa variant. Also included are long, narrow strips of soils that have slopes of more than 3 percent along narrow flood plain drainageways.

A flooding hazard is the major feature affecting most intensive uses of this soil. This soil generally floods less frequently than once every 5 to 10 years.

This soil is suited to most farm crops and can be cultivated continuously provided good management practices are used to keep the soil productive. A strip of sod along a streambank can be effective in controlling streambank erosion.

This soil is in hay, pasture, or silage corn. A few areas have been developed for residential and recreational uses. The soil has good potential for the development of open-land and woodland wildlife habitat. Capability unit I–1.

Ondawa Variant

The Ondawa variant consists of somewhat excessively drained soils that formed in alluvial deposits dominantly of fine sandy loam, 20 to 36 inches thick, overlying sand or gravel. These soils are on flood plains along the major streams of the county. The flood plains are generally dissected by narrow floodwater drainageways.

In a representative profile of an Ondawa variant in a hayfield, the surface layer is dark-brown very fine sandy loam about 9 inches thick. The subsoil, extending

to a depth of 30 inches, is yellowish-brown fine sandy loam in the upper 8 inches, yellowish-brown very fine sandy loam in the middle 9 inches, and yellowish-brown fine sandy loam in the lower 4 inches. The underlying material to a depth of 50 inches is pale-brown sand.

Permeability is moderately rapid. Available water capacity is low. These soils are somewhat droughty, and generally most crops need supplemental water for optimum plant growth. The potential flooding hazard is the main limitation to the use of these soils for community development.

Representative profile of Ondawa very fine sandy loam, sandy subsoil variant, in a hayfield in the town of Conway, about 150 yards west of Redstone Covered Bridge and 150 feet southwest of U.S. Highway 302:

Ap—0 to 9 inches, dark-brown (10YR 4/3) very fine sandy loam; weak, fine, granular structure; friable; common fine roots; strongly acid; abrupt, wavy boundary.

B21—9 to 17 inches, yellowish-brown (10YR 5/6) fine fine sandy loam; weak, fine, granular structure; friable; few fine roots; medium acid; clear, wavy boundary.

B22—17 to 26 inches, yellowish-brown (10YR 5/8) very fine sandy loam that has a few ½-inch pockets of light yellowish-brown (10YR 6/4) sand; weak, fine, granular structure; friable; few fine roots; medium acid; clear, wavy boundary.

B23—26 to 30 inches, yellowish-brown (10YR 5/8) fine sandy loam; weak, fine, granular structure; friable; strongly acid; abrupt, wavy boundary.

IIC—30 to 50 inches, pale-brown (10YR 6/3) sand; single grained; loose; strongly acid.

In the A horizon hue is commonly 10YR, value is 3 or 4, and chroma is 2 or 3. The B horizon commonly has hue of 10YR, value of 4 or 5, and chroma of 4 to 8. The IIC horizon ranges from loamy sand to very coarse sand and gravelly or very gravelly analogs of these textures. Depth to the IIC horizon ranges from 20 to 36 inches.

Ondawa variant soils formed in material similar to the material in which the nearby Podunk variant soils formed, but they are better drained. Ondawa variant soils are similar in drainage to nearby Ondawa soils, but they are shallower to sand.

Os—Ondawa very fine sandy loam, sandy subsoil variant. This nearly level soil is on the high bottoms and the rises on low bottoms of flood plains, mostly along the larger streams.

Included with this soil in mapping are small areas of Podunk variant, Ondawa, and Suncook soils. Also included are small areas of soils that are dominantly silt loam above the sand or gravel layers.

The flooding hazard is the main limitation to intensive use of this soil. Flooding occurs less frequently than once every 5 to 10 years or more; however, some rises on the lower bottoms are flooded more frequently. Because of droughtiness, row crops mature unevenly during dry years. Relatively shallow excavations expose loose sand or gravel.

This soil is better suited to hay and pasture crops than to row crops. It does not retain enough water for optimum plant growth. Irrigation is needed for most crops. Using a good cropping system that includes cover crops, grasses, and legumes; adding manure; and returning crop residue to the soil help to maintain productivity.

Most of this soil is in crops or pasture, or is idle. Some spots have been developed for recreation or residential use. This soil has good potential for the development of open-land and woodland wildlife habitat. Capability unit IIs–15.

Ossipee Series

The Ossipee series consists of very poorly drained soils that formed in organic deposits 16 to 50 inches thick over loamy material. These soils are in shallow bogs adjacent to lakes and in wide drainageway depressions.

In a representative profile of an Ossipee soil in a wooded bog, the surface layer is very dusky red mucky peat 12 inches thick. This material is about 70 percent fiber that becomes dark reddish brown and about 35 percent fiber when rubbed. The remaining mucky peat layers, extending to a depth of 25 inches, are dark reddish brown in the upper 6 inches and dark brown in the lower 7 inches. They are more than 50 percent fiber that breaks down when rubbed to 25 to 30 percent fiber with little change in color. The underlying material to a depth of 43 inches is firm gray silt loam in the upper 11 inches grading to very fine sandy loam in the lower 7 inches.

Runoff and internal drainage are very slow, and ponding often occurs during wet periods. Permeability is moderate.

The high water table and poor stability of the mucky peat materials are the main limitations to most uses of these soils. The mucky peat subsides if the soil is drained.

Representative profile of Ossipee mucky peat in a wooded bog in the town of Conway, about 1.3 miles south of junction of U.S. Highway 302 and New Hampshire Route 113, 700 feet east of Morrill Conway Lake access road:

Oe1—0 to 12 inches, very dusky red (2.5YR 2/2) on broken faces, hemic material (mucky peat) dark reddish-brown (5YR 2/2) when rubbed; about 70 percent fiber, about 35 percent when rubbed; moderate, medium to coarse, granular structure; nonsticky; sodium pyrophosphate extract (10YR 7/3); primarily herbaceous and sedgy fibers and some woody fibers; common fine and medium roots; extremely acid; clear, smooth boundary.

Oe2—12 to 18 inches, dark reddish-brown (5YR 2/2) on broken faces and when rubbed, hemic material (mucky peat); about 60 percent fiber, about 30 percent when rubbed; moderate, very coarse, granular structure; nonsticky; sodium pyrophosphate extract (10YR 6/3); primarily herbaceous and sedgy fibers; few fine and medium roots; very strongly acid; clear, smooth boundary.

Oe3—18 to 25 inches, dark-brown (7.5YR 3/2) on broken faces and when rubbed, hemic material (mucky peat); about 50 percent fiber, about 25 percent when rubbed; massive; nonsticky; sodium pyrophosphate extract (10YR 6/3); primarily herbaceous and sedgy fibers; very strongly acid; abrupt, smooth boundary.

IIC1g—25 to 36 inches, gray (5Y 6/1) silt loam; massive; firm; strongly acid; clear, smooth boundary.

IIC2g—36 to 43 inches, gray (5Y 6/1) very fine sandy loam; massive; firm; strongly acid.

The thickness of organic materials over the loamy material ranges from 16 to 50 inches. The fibers are dominantly herbaceous and sedgy, with varied amounts of woody fibers. Resistant woody fragments, more than 2 mm in size, make up less than 15 percent of the volume. The surface layer, of sphagnum moss peat, is as thick as 18 inches if it makes up less than 50 percent, by volume, of the

organic material and if fibric materials are not dominant. Reaction in the organic and mineral layers ranges from extremely acid to strongly acid. The soluble organic color of the hemic materials in sodium pyrophosphate solution are dominantly 10YR 5/1, 10YR 6/2, or 10YR 7/3 but include 10YR 5/2 and 10YR 6/3. Rubbed color hue is dominantly 2.5YR to 7.5YR, value is 2 or 3, and chroma is 2 or 3.

Ossipee soils are near Chocorua and Greenwood soils. Ossipee soils formed in organic materials similar to the materials in which Chocorua soils formed, but they are underlain by loamy material rather than by sand or gravel. Ossipee soils formed in organic deposits 16 to 50 inches thick, while Greenwood soils formed in deposits thicker than 50 inches.

OT—Ossipee mucky peat. This nearly level soil is in upland depressions and on flood plains and lake borders. It consists of shallow organic deposits of either partly decayed or well-decayed herbaceous and woody material.

Included with this soil in mapping are small areas of Greenwood mucky peat and Whitman and Raynham variant soils.

The water table is at or above the surface for much of the year, and it seldom drops below a depth of 12 inches.

Wetness and poor stability are the major limitations to most uses of this soil. Organic materials are generally removed or displaced when an area is earth-filled, such as for roads. Outlet grade is often difficult to establish for drainage.

Most of this soil is in woodland or open bog. There is good potential for the development of wetland wildlife habitat. Not assigned to a capability unit.

Paxton Series

The Paxton series consists of well-drained soils that formed in deposits of loamy glacial till. These soils have a firm pan layer at a depth of 16 to 36 inches. These soils are on oval upland landscapes and hillsides in the southern part of the county.

In a representative profile of a Paxton soil in a reforested old field, a layer of fresh and partly decayed leaves and herbs 2 inches thick is on the surface. The surface layer, below this, is brown to dark-brown fine sandy loam about 5 inches thick. The subsoil, extending to a depth of about 18 inches, is strong-brown fine sandy loam in the upper 6 inches and yellowish-brown fine sandy loam in the lower 7 inches. The underlying pan layer to a depth of 50 inches is very firm grayish-brown fine sandy loam.

Permeability is moderate above the pan layer but moderately slow in the pan. Available water capacity is moderate. Woodcrop productivity is good for upland oaks and northern hardwoods. These are among the better soils on the uplands for farming and for timber production. Septic tank filter fields function poorly on these soils because of the moderately slow permeability of the pan layer.

Representative profile of Paxton fine sandy loam in an area of Paxton very stony fine sandy loam, 8 to 15 percent slopes, in an old field now reforested, about one-half mile southwest of North Wolfeboro Road, about 500 feet south of New Hampshire Route 28, in the town of Wolfeboro:

O2—2 inches to 0, partly decomposed leaves and twigs.
Ap—0 to 5 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many very fine and medium roots; 2 percent coarse fragments; very strongly acid; abrupt, smooth boundary.
B21—5 to 11 inches, strong-brown (7.5YR 5/6) fine sandy loam; weak, fine, granular structure; very friable; many very fine and medium roots; 2 percent coarse fragments; strongly acid; clear, smooth boundary.
B22—11 to 18 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; friable; common very fine and fine roots; 5 to 8 percent coarse fragments; strongly acid; clear, smooth boundary.
Cx—18 to 50 inches, grayish-brown (2.5Y 5/2) fine sandy loam, moderate, thick, platy structure; very firm; few roots in upper 3 to 4 inches; 8 to 10 percent coarse fragments; medium acid.

Coarse fragments of all sizes make up 5 to 25 percent, by volume, of the A and B horizons. The B21 horizon has hue of 7.5YR to 10YR, value of 3 to 5, and chroma of 4 to 8. The B22 horizon has hue of 10YR to 2.5Y, value of 3 to 5, and chroma of 4 to 6. The Cx horizon is fine sandy loam to sandy loam and contains 10 to 30 percent coarse fragments. A few faint mottles are in the fragipan or just above it.

Paxton soils formed in similar material to the material in which the nearby Hollis, Charlton, and Woodbridge soils formed. They are deeper to bedrock than Hollis soils and, unlike Charlton soils, have a strongly developed pan layer. Paxton soils are better drained than Woodbridge soils.

PaB—Paxton fine sandy loam, 3 to 8 percent slopes. This soil is in areas from which surface stones have been removed. It is on crests of oval hills. It has a profile similar to the one described as representative of the series, but the mineral surface layer is generally thicker.

Included with this soil in mapping are areas of Woodbridge, Charlton, and Millis soils. Also included are small areas of soils that have slopes of more than 8 percent, scattered wet spots, and very stony spots.

The pan layer is the main limitation to certain intensive uses. It restricts downward movement of water, causing some wetness in the spring. Artificial drainage helps improve this soil for intensive uses, especially during wet periods.

This soil is well suited to silage corn, grasses, and legumes. Diversions, contour farming, or stripcropping are needed to control erosion where the steeper slopes are used for cultivated crops. Cover crops, grasses, and legumes are included in the cropping system in areas where erosion control practices are used.

Most of this soil is in pasture or woodland, but some areas are used for hay. A few areas of this soil are used for residential and recreational development. This soil has good potential for the development of open-land wildlife habitat. Capability unit IIe–6.

PaC—Paxton fine sandy loam, 8 to 15 percent slopes. This soil is in areas from which surface stones have been removed. It is on convex hilltops and low oval hills. It has a profile similar to the one described as representative of the series, but it generally has a slightly thicker mineral surface layer.

Included with this soil in mapping are areas of Millis, Charlton, Woodbridge, and Hollis soils. Also included are small areas of soils that have slopes of more than 15 percent, wet spots and narrow drainageways, and very stony spots.

The pan layer and slope are limitations to certain intensive uses of this soil. The pan layer restricts downward movement of water, causing it to seep laterally

above the pan. Slope is a consideration where excavation or fill is required for level grades. The hazard of erosion is moderate if the soil is disturbed by plowing or in construction work.

This soil is well suited to silage corn, grasses, and legumes. A cropping system that includes grasses or legumes helps to reduce soil losses. Beneficial erosion-control practices include contour farming, stripcropping, and diversions.

Most of this soil is in pasture or woodland, but some small tracts are used for hay. A few areas of this soil are used for residential and recreational development. This soil has good potential for the development of open-land wildlife habitat. Capability unit IIIe–6.

PdB—Paxton very stony fine sandy loam, 3 to 8 percent slopes. This soil is on crests of oval hills. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Woodbridge, Charlton, and Millis soils. Also included are areas of soils that have slopes of more than 8 percent, scattered wet spots, and extremely stony spots.

The pan layer is the main limitation to specific intensive uses of this soil. Stoniness is a hindrance to uses such as level grades, landscaping, seedbed preparation, and excavations. The hazard of erosion is slight where the protective cover has been removed.

This soil is unsuited to hay or row crops because of the surface stones. Stone removal and spot drainage to control seepage improve this soil for most farm and nonfarm uses.

Most of this soil is in woodland, and some areas are in unimproved pasture. A few areas are being used as part of residential developments. This soil has fair potential for the development of woodland wildlife habitat. Capability unit VIs–7.

PdC—Paxton very stony fine sandy loam, 8 to 15 percent slopes. This soil is on convex hilltops and low oval hills. The profile described as representative of the series is in an area of this unit. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Charlton, Millis, and Woodbridge soils and areas of Hollis soils that have a few bedrock outcrops. Also included are small areas of soils that have slopes of more than 15 percent, seep spots and narrow drainageways, and extremely stony spots. The pan layer, stoniness, and slope are the main limitations to most intensive uses of this soil. The pan layer restricts downward movement of water, causing it to move laterally above the pan. The resulting seep spots can be controlled by tile drains. Stoniness and slopes are limitations for specific uses such as level grades, landscaping, seedbed preparation, and excavations. The hazard of erosion is moderate in cleared areas. The steepness of these slopes is a severe limitation to the construction of paved streets and parking lots.

Surface stones make this soil unsuitable for most farm uses. Stone removal and spot drainage improve the soil for more intensive uses.

Most of this soil is in woodland, but more of it is being used for residential developments. This soil has fair potential for the development of woodland wildlife habitat. Capability unit VIs–7.

PdD—Paxton very stony fine sandy loam, 15 to 25 percent slopes. This soil is on rounded hillsides on uplands. It has a profile similar to the one described as representative of the series, but the mineral surface layer is thinner in places. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Charlton, Millis, and Woodbridge soils and areas of Hollis soils that have a few rock outcrops. Also included are small areas of soils that have slopes of more than 25 percent, seep spots and narrow drainageways, and extremely stony spots.

The pan layer, slope, and stoniness are the main limitations to most uses of this soil. This soil has a severe limitation for community development. Extensive excavation and fill are needed to develop homesites and roads. Seepage can be controlled by tile drains. Stoniness hinders the establishment of level grades, excavations, and landscape seedbed preparation.

The hazard of erosion is severe when vegetation has been removed. When clearing protective vegetation, natural drainageways need to be left undisturbed and bare slopes protected with mulch and cover crops until permanent vegetation is established.

Grassed waterways help to channel surface drainage to natural drainageways. Seepage can be controlled to some extent by installing tile drains across the slope above the area to be used and also at the bases of excavations.

Most of this soil is in woodland, but more of it is being used for recreational development. Some areas have good potential for ski slopes. Developing this soil for ski slopes requires very careful planning, layout, and construction of runoff-control devices to prevent serious erosion. This soil has fair potential for the development of woodland wildlife habitat. Capability unit VIs–7.

Peru Series

The Peru series consists of moderately well drained soils that formed in deposits of loamy glacial till. These soils have a firm pan layer at a depth of 12 to 36 inches. These soils generally have concave slopes in upland depressions, at the heads of drainageways, or on foot slopes in the northern part of the county. Water moving down the slopes above the pan causes these soils to be seasonally wet. Stones are common on the surface.

In a representative profile of a Peru soil in a wooded area, a layer of fresh and partly decayed leaves, needles, and herbs 3 inches thick is on the surface. The surface layer, below this, is very dark brown fine sandy loam about 6 inches thick. The subsoil, extending to a depth of about 24 inches, is yellowish-brown and dark reddish-brown fine sandy loam in the upper 3 inches and dark yellowish-brown fine sandy loam and sandy loam in the lower 15 inches, and it has distinct mottles below a depth of 12 inches. The underlying pan layer to a depth of 50 inches is firm, light olive-brown gravelly fine sandy loam.

Permeability is moderate above the pan layer but moderately slow in the pan. Available water capacity is moderate. The depth to seasonal high water ranges from 12 to 30 inches. Woodcrop production is good for white pine and upland oaks. Septic tank filter fields or filter beds do not function well because of the seasonal

high water table and the moderately slow permeability of the pan layer.

Representative profile of Peru fine sandy loam in a wooded area of Peru very stony fine sandy loam association, sloping, about 2 miles south of Chatham Village on Robbins Hill Road, about 100 feet west of road in the White Mountain National Forest, in the town of Chatham:

O2—3 inches to 0, partly decayed leaves, needles, and twigs.
Ap—0 to 6 inches, very dark brown (10YR 2/2) fine sandy loam; weak, fine, granular structure; friable; many medium roots; 5 to 10 percent coarse fragments as much as 8 inches in diameter; strongly acid; abrupt, wavy boundary.
B21ir—6 to 9 inches, yellowish-red (5YR 4/6) and dark reddish-brown (5YR 3/4) fine sandy loam; weak, fine, granular structure; friable; common fine roots; 5 to 10 percent coarse fragments as much as 2 inches in diameter; strongly acid; clear, smooth boundary.
B22—9 to 18 inches, dark yellowish-brown (10YR 4/4) fine sandy loam that has few, medium, distinct dark reddish-brown (5YR 3/3) mottles below a depth of 12 inches; weak, fine, granular structure; friable; few fine roots; 8 to 12 percent coarse fragments as much as 6 inches in diameter; strongly acid; clear, smooth boundary.
B3—18 to 24 inches, dark yellowish-brown (10YR 4/4) sandy loam that has few, medium, distinct, dark-brown (7.5YR 3/2) mottles; weak, fine, granular structure; friable; few fine roots; 20 to 25 percent coarse fragments as much as 5 inches in diameter; strongly acid; abrupt, smooth boundary.
Cx—24 to 50 inches, light olive-brown (2.5Y 5/4) gravelly fine sandy loam that has few, fine, distinct reddish-brown (5YR 4/3) mottles; massive; firm; 25 to 30 percent coarse fragments as much as 8 inches in diameter; strongly acid.

In the Ap horizon hue is 10YR and value and chroma are 2 or 3. The A2 horizon, where present, has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 2 or 3. The B horizon ranges from sandy loam to loam. The B21ir horizon has hue of 2.5YR to 7.5YR, value of 3 to 6, and chroma of 4 to 6. Where the B21h horizon is present, values and chromas range to 2. The B22 and B3 horizons commonly have hue of 10YR, value of 4 to 6, and chroma of 3 to 6. An A'2 horizon, if present, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2. The Cx horizon is fine sandy loam or sandy loam and gravelly analogs of these textures. Hue commonly is 2.5Y or 5Y, value is 4 or 5, and chroma is 2 to 4. The Cx horizon generally has moderate, medium or thick, platy structure but ranges to massive. Consistence of the Cx horizon is firm or very firm.

Peru soils are near Marlow, Ridgebury, and Berkshire soils. Peru, Marlow, Ridgebury, and Berkshire soils formed in similar materials, but Peru soils are not so well drained as the Marlow soils and are better drained than Ridgebury soils. Peru soils have a pan layer that the better drained Berkshire soils do not have.

PeB—Peru very stony fine sandy loam, 3 to 8 percent slopes. This soil is on concave lower foot slopes and at the heads of drainageways. It has a profile similar to the one described as representative of the series, but commonly it has fewer cobblestones throughout the profile. Stones are generally 5 to 30 feet apart on the surface.

Included with this soil in mapping are small areas of Ridgebury, Skerry, Marlow, and Berkshire soils. Also included are small areas of soils that have slopes of more than 8 percent, spots that have bedrock within 3 feet of the surface, and extremely stony and bouldery spots.

Seasonal wetness, stoniness, and a pan layer are the main limitations to intensive uses of this soil. The pan layer restricts downward movement of water, causing it to collect and move laterally above the pan. Excess water in this soil can generally be controlled by intercepting the seepage above the pan with diversions or tile drains. In cleared areas, grassed waterways can help safely direct runoff to natural drainageways.

Stoniness is an important consideration for specific uses, especially those requiring level grades or seedbed preparation for landscaping or gardening. Erosion is a hazard where the soil is bare of vegetative cover.

Most of this soil is in woodland, but some small tracts are in pasture. Seasonal wetness hinders construction of logging roads and landings and softens the soil above the pan. There are a few sites near lakes, streams, and mountains that are being used as part of residential subdivisions. Fill has generally been used to raise septic tank filter fields or filter beds above the pan layer and the water table. This soil has some potential for woodland wildlife habitat development. Capability unit VIs–72.

PeC—Peru very stony fine sandy loam, 8 to 15 percent slopes. This soil is on concave lower side slopes. It has a profile similar to the one described as representative of the series, but commonly there are fewer cobblestones throughout the profile.

Included with this soil in mapping are small areas of Skerry, Marlow, Berkshire, and Ridgebury soils. Also included are small areas of soils that have slopes of more than 15 percent, spots that have bedrock within 3 feet of the surface, extremely stony and bouldery spots, and narrow drainageways.

Seasonal wetness, stoniness, slope, and a pan layer are the main limitations to intensive uses of this soil. The pan layer restricts downward water movement, causing it to move laterally above the pan. Excess water in the soil can generally be controlled by intercepting the seepage with diversions or tile drains. In cleared areas, grassed waterways can help safely channel runoff to natural drainageways.

Slope is a severe limitation for the construction of paved roads and parking lots. Leveling excavations generally expose the dense pan material. Stoniness interferes with excavations and seedbed preparation in landscaping. The hazard of erosion is severe in places that lack vegetative cover.

Most of this soil is in woodland, but some small tracts are in pasture. Seasonal wetness hinders construction and maintenance of logging roads and landings. A few sites near lakes, streams, and mountains are being used for residential development. Fill has generally been used to raise septic tank filter fields or filter beds above the pan layer and the water table. This soil has some potential for woodland wildlife habitat development. Capability unit VIs–72.

PLC—Peru very stony fine sandy loam association, sloping. This association is on concave lower side slopes and heads of drainageways on glaciated hills and mountains, mostly in the White Mountain National Forest. The areas are generally oblong and about 25 to 100 acres in size. Slope ranges from 0 to 15 percent. The profile described as representative of the Peru series is in an area of this association. Surface stones cover as much as 15 percent of the area.

Peru very stony fine sandy loam makes up about 55 to 75 percent of the association. It is in concave parts of

the landscape. The remaining 20 to 35 percent of the association is Marlow, Ridgebury, and Lyman soils. Marlow soils are on the smooth convex rises on the landscape and Ridgebury soils are in depressions and drainageways. Lyman soils and a few rock outcrops are on irregular and knobby rises on the landscape.

Seasonal wetness, the pan layer, and stoniness are the main limitations to intensive uses of the Peru soils in this association. The pan layer restricts downward movement of water, causing it to seep laterally above the pan. Stones hinder excavations and seedbed preparation. The hazard of erosion is moderate to severe where the soils are steeper and bare of vegetation. In a few spots, shallowness to bedrock is a limitation to shallow excavations and tree growth, and it presents a windthrow hazard.

The soils in this association are used mostly for timber production and woodland wildlife habitat. Seasonal wetness and seep spots hinder the construction and maintenance of logging roads and landings. Machine operation during wet periods can leave ruts that make the soil highly erodible. All intensive uses require very careful planning and use of surface water control practices and structures, along with considerations of the restrictive pan layer. Not assigned to a capability unit.

Podunk Series

The Podunk series consists of moderately well drained soils that formed in alluvial deposits dominantly of a fine sandy loam texture. These soils are on flood plains along major streams of the county. They are on lower flood plain levels where the water table rises seasonally to near the surface. These soils generally flood annually.

In a representative profile of a Podunk soil in a hayfield, the surface layer is dark-brown fine sandy loam about 11 inches thick. The subsoil, extending to a depth of 21 inches, is dark yellowish-brown fine sandy loam. The underlying material to a depth of 50 inches is dark-brown fine sandy loam that has distinct mottles in the upper 13 inches, and olive-brown fine sandy loam in the lower 16 inches.

Permeability is moderate. Available water capacity is moderately rapid. The depth to seasonal high water ranges from 1 to 2 feet. Woodcrop production is good for most tree species.

Representative profile of Podunk fine sandy loam in a hayfield about one-fourth mile southwest of junction of New Hampshire Routes 16 and 16A on the Bartlett-Conway town line:

Ap—0 to 11 inches, dark-brown (10YR 3/3) fine sandy loam; weak, medium, granular structure; friable; many fine roots; strongly acid; abrupt, smooth boundary.

B2—11 to 21 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, medium, granular structure; very friable; few fine roots; strongly acid; clear, smooth boundary.

C1—21 to 28 inches, dark-brown (10YR 4/3) fine sandy loam that has few, fine, distinct, grayish-brown (10YR 5/2) and yellowish-brown (10YR 5/6) mottles; massive; friable; strongly acid; gradual, smooth boundary.

C2—28 to 34 inches, dark-brown (10YR 4/3) fine sandy loam that has common, fine, distinct, yellowish-brown (10YR 5/6), brown (10YR 5/3), and grayish-brown (10YR 5/2) mottles; massive; friable; strongly acid; clear, smooth boundary.

C3—34 to 50 inches, olive-brown (2.5Y 4/4) fine sandy loam that has many, fine and medium, distinct, yellowish-brown (10YR 5/6), brown (10YR 5/3), dark-brown (7.5YR 4/4), and strong-brown (7.5YR 5/6) mottles; massive; friable; strongly acid; abrupt, smooth boundary.

In the A horizon hue is commonly 10YR, value is 3 or 4, and chroma is 2 or 3. The B2 horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. The C horizons commonly have hue of 10YR to 5Y, value of 4 or 5, and chroma of 2 to 4. There are common thin strata of loamy fine sand, fine sand, or very fine sandy loam. Depth to low-chroma mottling ranges from 12 to 24 inches.

Podunk soils are near Ondawa, Limerick, and Winooski soils. Podunk and Ondawa soils formed in similar materials, but Podunk soils are not so well drained as Ondawa soils. Podunk soils are coarser textured within a depth of about 3 feet than Winooski and Limerick soils, and they are better drained than Limerick soils.

Po—Podunk fine sandy loam. This nearly level soil occupies the lower bottoms on flood plains along rivers and large brooks.

Included with this soil in mapping are small areas of Limerick, Ondawa, Suncook, and Winooski soils, and spots of Podunk variant soils. Also included on small rises are soils that have slopes of more than 3 percent.

Flooding and a seasonal high water table are major limitations to most farm and nonfarm uses. Flooding generally occurs at least once in 1 or 2 years and sometimes more often. This soil can be cropped continuously if it is drained and protected from flooding. In its natural condition, it is better suited to hay and pasture crops than to row crops. If legumes are grown, they should be the varieties that can withstand wetness and winterkill.

Depressions in this soil can generally be eliminated by land smoothing. A permanent strip of sod or trees along streams reduces the hazard of streambank erosion.

Much of this soil is idle or in pasture, and some areas are in crops or are reverting to forest. A few spots are being developed for recreational uses. This soil has fair potential for the development of open-land and woodland wildlife habitat. Capability unit IIw–12.

Podunk Variant

The Podunk variant consists of moderately well drained soils that formed in alluvial deposits dominantly of fine sandy loam. These soils are 20 to 36 inches thick over sand or gravel. They are on lower flood plain levels where the water table rises to near the surface seasonally. These soils generally flood annually.

In a representative profile of a Podunk variant in a hayfield, the surface layer is dark-brown fine sandy loam about 9 inches thick. The subsoil, extending to a depth of 23 inches, is yellowish-brown very fine sandy loam that has faint mottles in the upper 8 inches and dark yellowish-brown fine sandy loam that has distinct mottles in the lower 6 inches. The underlying material to a depth of 50 inches is light olive-gray sand that has distinct mottles in the upper 13 inches and mottled yellowish-brown very gravelly coarse sand in the lower 14 inches.

Permeability is moderately rapid. Available water capacity is low. Woodcrop production is good for most tree species.

Representative profile of Podunk fine sandy loam, sandy subsoil variant, in a hayfield in the town of Conway, about 2.6 miles northwest of New Hampshire Route 113 where it crosses into Maine, 300 feet east of Weeks Brook:

Ap—0 to 9 inches, dark-brown (10YR 3/3) and streaks of very dark grayish-brown (10YR 3/2) fine sandy loam; weak, fine, granular structure; friable; many fine and medium roots; strongly acid; abrupt, smooth boundary.

B21—9 to 17 inches, yellowish-brown (10YR 5/4) very fine sandy loam; few, fine, faint, grayish-brown (2.5Y 5/2) mottles; weak, fine, granular structure; friable; few fine roots; strongly acid; clear, smooth boundary.

B22—17 to 23 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; common, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak, fine, granular structure; friable; strongly acid; abrupt, smooth boundary.

IIC1—23 to 36 inches, light olive-gray (5Y 6/2) sand that has streaks of fine gravel; common, fine, distinct, yellowish-red (5YR 5/6) mottles; single grained; loose; strongly acid; abrupt, smooth boundary.

IIC2—36 to 50 inches, yellowish-brown (10YR 5/4) and streaks of light yellowish-brown (10YR 6/4) very gravelly coarse sand that is 65 percent gravel; common, medium, distinct, yellowish-red (5YR 5/6) mottles; single grained; loose; strongly acid; abrupt, smooth boundary.

In the A horizon hue is commonly 10YR, value is 3 or 4, and chroma is 2 or 3. The B2 horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. The IIC horizon ranges from loamy sand to very coarse sand and gravelly or very gravelly analogs of these textures. Depth to the IIC horizon ranges from 20 to 36 inches. Depth to low chroma mottling ranges from 12 to 14 inches.

Podunk variant soils are near Winooski soils and Limerick variant soils. Podunk variant soils are coarser textured and thinner over sand or gravel than Winooski soils. Podunk variant soils are coarser textured and better drained than Limerick variant soils.

Ps—Podunk fine sandy loam, sandy subsoil variant. This nearly level soil is on the lower bottoms of flood plains along rivers and large brooks.

Included with this soil in mapping are small areas of Limerick variant, Ondawa variant, and Suncook soils. Also included are small areas of Limerick, Podunk, and Ondawa soils, and spots overwashed with as much as 6 inches of sand or loamy sand.

Flooding and the seasonal high water table are major limitations to most uses of this soil. Flooding generally occurs at least once in 1 or 2 years and sometimes more often. Shallow excavations generally expose loose sand or gravel.

If drained and protected from flooding, this soil can be cropped continuously. However, potential crop yields are slightly lower on this soil than they are on the Podunk soils. In its natural condition, this soil is better suited to hay and pasture crops than to row crops. If legumes are grown, they should be the varieties that withstand wetness and winterkill.

Much of this soil is idle or in pasture, and some is in crops. A few spots are reverting to woods. A permanent strip of sod along streams reduces the hazard of streambank erosion. Capability unit IIw–12.

Raynham Variant

Raynham variant consists of poorly drained to somewhat poorly drained soils that formed in loamy deposits about 20 to 36 inches thick over sand. These soils are near streams, lakes, and bogs on outwash plains and lake basins. They are in depressions where the water table is at or near the surface for long durations, especially between fall and late spring.

In a representative profile of a Raynham variant in a wooded area, a layer of fresh and partly decayed sphagnum moss, leaves, needles, and herbs 5 inches thick is on the surface. The surface layer, below this, is gray and grayish-brown silt loam about 7 inches thick. The subsoil, extending to a depth of about 21 inches, is light olive-gray and grayish-brown silt loam that has prominent mottles in the upper 7 inches, and light brownish-gray silt loam that has prominent mottles in the lower 7 inches. The underlying material to a depth of 50 inches is brown grading to dark yellowish-brown loose sand that has faint mottles.

Permeability is moderately slow in the upper part and rapid in the loose underlying sand. Available water capacity is moderate. The water table is at or near the surface for 7 to 9 months of the year. Woodcrop production is generally fair for most tree species.

Representative profile of Raynham silt loam, sandy subsoil variant, in a wooded area about 1.3 miles northwest of junction of New Hampshire Routes 16 and 25, 750 feet east of old New Hampshire Route 16 in the town of Ossipee:

O1—5 to 3 inches, raw sphagnum moss debris and leaf litter.

O2—3 inches to 0, black (5YR 2/1) decomposed sphagnum moss debris.

A2—0 to 7 inches, gray (10YR 5/1) and grayish-brown (10YR 5/2) silt loam; weak, very thin to thin, platy structure and somewhat massive in place; friable; many roots; very strongly acid; clear, smooth boundary.

B2g—7 to 14 inches, light olive-gray (5Y 6/2) and grayish-brown (2.5Y 5/2) silt loam that has many, fine and medium, prominent, brown (7.5YR 5/4), strong-brown (7.5YR 5/6), and reddish-brown (5YR 5/4) mottles; weak, medium, subangular blocky structure; friable; common roots; 50 to 70 percent low chroma; dark reddish brown (2.5YR 3/4) along root channels; strongly acid; clear, smooth boundary.

B3g—14 to 21 inches, light brownish-gray (2.5Y 6/2) silt loam that has many, fine, prominent, strong-brown (7.5YR 5/6), yellowish-brown (10YR 5/6), and gray (10YR 6/1) mottles; weak, medium, platy structure; friable; few roots; strongly acid; abrupt, smooth boundary.

IIC1—21 to 32 inches, brown (10YR 5/3) sand that has common, fine, faint, light brownish-gray (10YR 6/2), yellowish-brown (10YR 5/6), and strong-brown (7.5YR 5/6) mottles; single grained; loose; strongly acid; gradual, smooth boundary.

IIC2—32 to 50 inches, dark yellowish-brown (10YR 4/4) sand that has few, fine, faint, yellowish-brown (10YR 5/6) mottles; single grained; loose; strongly acid.

In the A1 or Ap horizon, if present, hue is 10YR, value is 2 or 3, and chroma is 1 or 2. The A2 horizon commonly has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The B horizon is generally very fine sandy loam or silt loam. It has hue of 10YR to 5Y, value of 5 or 6, and chroma of 2 or 3. The IIC horizon is dominated by loose fine to coarse sand but ranges to include gravelly analogs of fine to coarse sand and thin strata of very fine sandy loam. The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 or 4.

Raynham variant soils are near Nicholville variant and Naumburg soils. They formed in material similar to the

material in which the Nicholville variant soils formed, but are not so well drained. Raynham variant soils have finer texture in the upper part of the profile than Naumburg soils and do not have cemented chunks in the B horizon.

Ra—Raynham silt loam, sandy subsoil variant. This nearly level soil is in depressions on outwash plains and lake basins.

Included with this soil in mapping are small areas of Naumburg, Ridgebury, and Limerick soils, and Nicholville variant soils. Also included are small areas of soils that have slopes of more than 3 percent, spots that have loamy materials to depths more than 36 inches, and very stony spots.

A high water table of long duration is the main limitation to intensive use of this soil. Because these soils are generally close to lakes or bogs, outlet grade is sometimes difficult to establish. Where outlet grade is sufficient, the water table can generally be lowered and controlled with an open ditch or tile drainage system. Bedding and land smoothing help to remove surface water and improve drainage, but it commonly exposes spots of loose underlying sand or gravel.

The soil is unsuited to row crops unless it is drained. Where undrained, this soil is suited to hay and pasture crops, but management is difficult because of wetness and moderately slow permeability.

This soil is not extensive. Most of it is in woodland, but some small tracts are in crops or pasture, and a few spots have been filled for use as recreation homesites. The high water table restricts logging operations to dry seasons or winter. This soil has good potential for the development of wetland wildlife habitat. Capability unit IIIw–33.

Redstone Series

The Redstone series consists of somewhat excessively drained soils that formed in glacial till deposits dominated by weathered, fragmented Conway granite. These soils are on foothills and mountainsides on the eastern slopes of the White Mountains, mostly adjacent to the Saco River valley.

In a representative profile of a Redstone soil in a wooded area, a layer of fresh and partly decayed leaves and needles 2 inches thick is on the surface. The surface layer, below this, is gray sandy loam about 3 inches thick. The subsoil, extending to a depth of about 17 inches, is very dusky red fine sandy loam in the upper 2 inches, dark-red and strong-brown gravelly fine sandy loam in the middle 7 inches, and yellowish-brown gravelly loamy sand in the lower 5 inches. The underlying material to a depth of 60 inches is dark-brown and dark yellowish-brown, loose very gravelly sand.

Permeability is moderately rapid. Available water capacity is low. These soils have deep pockets of gravel-sized fragments of Conway granite. These pockets are locally an important source of gravel for road construction.

In Carroll County, Redstone soils are mapped only in association with Canaan soils.

Representative profile of Redstone sandy loam in a wooded area of Canaan-Redstone very rocky gravelly fine sandy loams association, sloping, in the town of Conway along Hurricane Mountain Road, 220 feet west and 100 feet south of parking area at the height of land on Conway State Forest:

O2—2 inches to 0, decomposed forest litter.
A2—0 to 3 inches, gray (10YR 6/1) sandy loam; weak, fine, granular structure; friable; few roots; 10 percent coarse fragments as much as 1 inch across; strongly acid; abrupt, broken boundary.
B21h—3 to 5 inches, very dusky red (2.5YR 2/2) fine sandy loam; moderate, medium, granular structure; friable; few roots; 10 percent coarse fragments as much as 1 inch across; strongly acid; abrupt, broken boundary.
B22ir—5 to 8 inches, dark-red (2.5YR 3/6) gravelly fine sandy loam; moderate, fine, granular structure; 80 percent friable; 20 percent weakly cemented (ortstein); few roots; 20 percent coarse fragments as much as 1 inch across; strongly acid; abrupt, smooth boundary.
B23ir—8 to 12 inches, strong-brown (7.5YR 5/6) gravelly fine sandy loam; weak, fine, granular structure; friable; few roots; 45 percent coarse fragments as much as 1 inch across; strongly acid; abrupt, smooth boundary.
B3—12 to 17 inches, yellowish-brown (10YR 5/6) gravelly loamy sand; weak, fine, granular structure; friable; few roots; 25 percent coarse fragments as much as 1 inch across; strongly acid; abrupt, smooth boundary.
C—17 to 60 inches, dark-brown (10YR 3/3) and dark yellowish-brown (10YR 4/4) very gravelly sand; single grained; loose; 70 percent coarse fragments as much as 1 inch across; strongly acid.

Coarse fragments dominantly less than 1 inch across make up 40 to 80 percent, by volume, of the B and C horizons.

The B21 and B22 horizons dominantly have hue of 2.5YR, value of 2 or 3, and chroma of 2 to 6. In places, hue is 5YR, value is 2 to 4, and chroma is 2 to 6. The B23 and B3 horizons commonly have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 or 6. The B2 and B3 horizons range from fine sandy loam to loamy sand and gravelly analogs. The C horizon commonly has hue of 10YR or 2.5Y. It is commonly very gravelly sand but ranges to gravelly sand.

Redstone soils are near Canaan, Berkshire, and Marlow soils. They are deeper over bedrock than the shallow Canaan soils. Redstone soils have a coarser textured C horizon than Berkshire or Marlow soils, and they do not have a fragipan, as Marlow soils have.

Ridgebury Series

The Ridgebury series consists of poorly drained and somewhat poorly drained soils that formed in deposits of loamy glacial till. These soils have a firm pan layer at a depth of 10 to 25 inches. These soils are in upland depressions, in drainageways, or on seepy hillside foot slopes. Seepage water collects above the pan layer and causes the water table to be at or near the surface for long periods.

In a representative profile of a Ridgebury soil in a wooded area, the surface layer is dark-gray fine sandy loam about 6 inches thick. The subsoil, extending to a depth of about 20 inches, is grayish-brown sandy loam in the upper 10 inches and light brownish-gray fine sandy loam in the lower 4 inches. Distinct mottles are present throughout. The underlying material to a depth of 50 inches is a light olive-brown and light brownish-gray fine sandy loam and gravelly fine sandy loam firm pan layer that has distinct mottles.

Permeability is moderate above the pan layer but moderately slow in the pan. Available water capacity is moderate. Woodcrop production is fair for white pine and red spruce.

Representative profile of Ridgebury fine sandy loam in an area of Ridgebury very stony fine sandy loam, 3 to 8 percent slopes, in a wooded area in the town of Ossipee, about one-half mile southwest of junction of New Hampshire Routes 16 and 25, 750 feet east of Tuftonboro Road:

O1—1 inch to 0, loose leaf litter.
Ap—0 to 6 inches, dark-gray (10YR 4/1) fine sandy loam; weak, fine and medium, granular structure; friable; many fine and medium roots; 10 to 15 percent coarse fragments; strongly acid; abrupt, smooth boundary.
B2g—6 to 16 inches, grayish-brown (2.5Y 5/2) sandy loam; common, medium, distinct, brown (10YR 5/3), yellowish-brown (10YR 5/4) and dark yellowish-brown (10YR 4/4) mottles; massive; friable; common fine roots; 10 to 15 percent coarse fragments; strongly acid; clear, smooth boundary.
B3g—16 to 20 inches, light brownish-gray (2.5Y 6/2) fine sandy loam; common, fine and medium, distinct, yellowish-brown (10YR 5/4 and 5/6) and olive yellow (2.5Y 6/6) mottles; massive; friable; few fine roots; 10 to 15 percent coarse fragments; strongly acid; clear, smooth boundary.
C1x—20 to 27 inches, light olive-brown (2.5Y 5/4) fine sandy loam; many, fine, distinct, yellowish-brown (10YR 5/6), strong-brown (7.5YR 5/6), and olive-yellow (2.5Y 6/6) mottles; massive; firm; 10 to 15 percent coarse fragments; strongly acid; clear, smooth boundary.
C2x—27 to 50 inches, light brownish-gray (2.5Y 6/2) gravelly fine sandy loam; few fine, distinct, yellowish-brown (10YR 5/6) mottles; massive (including few thin segregated horizontal sand seams); firm; 15 to 20 percent coarse fragments; medium acid.

In the A1 or Ap horizons hue is 10YR, value is 2 to 4, and chroma is 1 or 2. The B horizon ranges from sandy loam to loam, including gravelly analogs. It mostly has hue of 10YR or 2.5Y, but in places it is 5Y in the lower part. Value ranges from 4 to 6, and chroma is 1 or 2. The Cx horizon is fine sandy loam or sandy loam and gravelly analogs of these textures. The Cx horizon commonly has hue of 2.5Y, value of 4 to 6, and chroma of 1 to 4. Structure is generally moderate, medium, or thick platy ranging to massive, and consistence is firm or very firm.

Ridgebury soils are near Woodbridge, Peru, and Whitman soils. Ridgebury soils formed in materials similar to the materials in which Woodbridge, Peru, and Whitman soils formed, but they are not so well drained as Woodbridge and Peru soils. Ridgebury soils are better drained than Whitman soils.

RgB—Ridgebury fine sandy loam, 0 to 8 percent slopes. This soil generally is in long, narrow depressions on drumlins and other upland hills. It has a profile similar to the one described as representative of the series, but in most places there are fewer stones on the surface and throughout the profile.

Included with this soil in mapping are small areas of Leicester, Peru, Woodbridge, Whitman, and Raynham variant soils. Also included are small areas of soils that are coarser over the pan layer.

Wetness is the major management concern for most farm and nonfarm uses. Unless drained, this soil is suitable only for hay and pasture. Drained areas can be used for selected row crops. Drainage of this soil can be improved by ditches, tile drains, or diversions.

Most of this soil is used for hay and pasture or is idle. Some areas are wooded. This soil has good potential for dugout ponds and for the development of wetland wildlife habitat. Capability unit IIIw–63.

RlA—Ridgebury very stony fine sandy loam, 0 to 3 percent slopes. This soil is in depressions on uplands. It has a profile similar to the one described as representative of the series, but the pan layer is generally closer to the surface. Stones are generally 5 to 30 feet apart on the surface.

Included with this soil in mapping are small areas of Leicester, Peru, Woodbridge, Whitman, and Raynham variant soils. Also included are small areas of soils that have slopes of more than 3 percent, very poorly drained organic soils, and extremely stony or bouldery spots.

A high water table, stoniness, and a pan layer are the main limitations to intensive uses of this soil. This soil can generally be drained of excess water by open ditches or tile drains. Stones hinder excavation.

This soil is not suitable for farming. Removing surface stones and draining this soil is generally not economically feasible for hay or pasture plants.

Most of this soil is in woodland. Woodland management and logging operations are limited by wetness. This soil has good potential for dugout ponds and for the development of wetland wildlife habitat. Capability unit VIIs–73.

RlB—Ridgebury very stony fine sandy loam, 3 to 8 percent slopes. This soil is on lower foot slopes and drainageways on uplands. The profile described as representative of the series is in an area of this mapping unit. Stones are generally 5 to 30 feet apart on the surface.

Included with this soil in mapping are small areas of Leicester, Peru, and Woodbridge soils. Also included are small areas of soils that have slopes of more than 8 percent, spots of soils that are coarser in the upper part of the profile, and extremely stony or bouldery spots.

A high water table, stoniness, and a pan layer are the main limitations to intensive use of this soil. Wetness can be controlled by using tile drains or diversions to intercept excess water that moves above the pan. Open ditches or tile drains can be used to safely direct the water to natural drainageways or impoundments. The materials above the pan are highly erodible in places bare of vegetation.

Most of this soil is used for woodland, to which it is well suited. Some small plots lying within subdivision boundaries have been used for recreation homesites after fill has been used to raise the site above the water table.

Logging operations are restricted by the high water table. This soil has some potential for the development of woodland wildlife habitat. Capability unit VIIs–73.

Rock Outcrop

RO—Rock outcrop. Rock outcrop consists of areas of nearly level bare bedrock. It is on mountains, hilltops, and steep cliffs throughout the county. Bedrock exposure generally makes up more than 90 percent of the area. Vegetation is very sparse and consists mostly of mosses, lichens, and small scrubby trees. Some of these areas have vista or scenic value. Not assigned to a capability unit.

RPE—Rock outcrop-Lyman association, steep. This association is on mountaintops and foothills, mainly in the White Mountain National Forest. The areas are oblong or irregular in shape and are 25 to 150 acres in size. Slope ranges from 0 to 35 percent.

Rock outcrop covers 50 to 90 percent of the surface. Lyman soils make up about 30 to 40 percent of the association. These soils are interspersed between the rock outcrops. The remaining 10 to 20 percent of the association is well drained and moderately well drained loamy soils that are more than 20 inches thick over bedrock and that are interspersed with the Lyman soils.

Shallow depth to bedrock, rockiness, and slope are major limitations to most uses of these soils. The hazard of erosion is severe where the soils are steeper. Shallowness to bedrock hinders excavations, limits tree growth, and presents a windthrow hazard. Water collects above the bedrock in places to form wet spots and seeps.

Most of this association is wooded; however, timber management and harvest are very difficult. The forests yield limited timber, protect watersheds, and serve as wildlife habitat. Some areas have potential for hiking and development of scenic vistas. However, overuse of these areas for recreation can cause deterioration and serious erosion. Not assigned to a capability unit.

RPF—Rock outcrop-Lyman association, very steep. This association is on sheer valley walls and mountainsides, mainly in the White Mountain National Forest. The areas follow the contour of the landscape and generally are 35 to 200 acres in size. Slope ranges from 35 to 80 percent.

Rock outcrop covers 50 to 90 percent of the surface. Lyman soils make up about 25 to 40 percent of the association. These soils are interspersed between the rock outcrops. The remaining 15 to 25 percent of the association is loamy soils that are more than 20 inches thick over bedrock and that are interspersed with the Lyman soils.

Rockiness, very steep slopes, and shallowness to bedrock are major limitations to most uses of this soil.The hazard of erosion is severe where protective vegetation has been removed. Shallowness to bedrock limits tree growth and is a windthrow and landslide hazard.

Most of this association is wooded. The slopes are too steep for machine logging operations. The forests yield timber, protect watersheds, and serve as wildlife habitat. Some areas have potential for the development of scenic vistas. There is also potential for hiking trails where the soils are less steep. However, overuse of these areas for recreation can cause deterioration and serious erosion. Not assigned to a capability unit.

Salmon Variant

The Salmon variant consists of well-drained soils that formed in loamy deposits 26 to 36 inches thick over sand and some gravel. It is in areas where slack water stood near lakes or in intervales at the edge of wide flood plains.

In a representative profile of a Salmon variant in a wooded area, a layer of fresh and partly decayed leaves and needles 3 inches thick is on the surface. The surface layer, below this, is dark yellowish-brown very fine sandy loam 8 inches thick. Below this is a subsurface layer of gray silt loam 2 inches thick. The subsoil, extending to a depth of 24 inches, is strong-brown silt loam in the upper 3 inches and yellowish-brown silt loam in the lower 11 inches. The underlying material to a depth of 35 inches is yellowish-brown very fine sandy loam. Yellowish-brown gravelly sand is below a depth of 35 inches and extends to a depth of 50 inches or more.

Permeability is moderate. Available water capacity is high. Woodland productivity is good. These are good farming soils.

Representative profile of Salmon very fine sandy loam, sandy subsoil variant, 0 to 3 percent slopes, in a wooded area in the town of Albany, about 2.6 miles west of junction of Westside Road and Passaconaway Road, one-tenth mile north of Passoconaway Road and 25 feet west of South Moat Trail:

O1—3 to 2 inches, pine needles and twigs.
O2—2 inches to 0, very dusky red partly decomposed needles and twigs.
Ap—0 to 8 inches, dark yellowish-brown (10YR 4/4) very fine sandy loam; weak, fine, granular structure; friable; many medium and coarse roots; strongly acid; abrupt, smooth boundary.
A2—8 to 10 inches, gray (10YR 6/1) silt loam; weak, fine, granular structure; friable; common medium and coarse roots; strongly acid; abrupt, broken boundary.
B21ir—10 to 13 inches, strong-brown (7.5YR 5/8) silt loam; weak, fine, granular structure; friable; common medium and coarse roots; strongly acid; clear, smooth boundary.
B22—13 to 16 inches, yellowish-brown (10YR 5/6) silt loam; weak, fine, granular structure; friable; common medium and coarse roots; medium acid; clear, smooth boundary.
B23—16 to 24 inches, yellowish-brown (10YR 5/4 and 5/6) silt loam; weak, fine, granular structure; friable; common medium and coarse roots; medium acid; gradual, smooth boundary.
C1—24 to 35 inches, yellowish-brown (10YR 5/4) very fine sandy loam; weak, medium, granular structure; friable; few fine and medium roots; 3 percent coarse fragments; strongly acid; abrupt, smooth boundary.
IIC2—35 to 50 inches, yellowish-brown (10YR 5/4) gravelly sand; single grained; loose; 25 percent coarse fragments; medium acid.

In the Ap horizon hue is 10YR, value is 3 or 4, and chroma is 2 to 4. The B2 horizon is very fine sandy loam or silt loam. The B21ir horizon commonly has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. Depth to the coarse-textured IIC horizon commonly ranges from 26 to 36 inches. The C horizon commonly has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4.

Salmon variant soils formed in material similar to the material in which the nearby Nicholville variant and Hadley soils formed. They are better drained than the moderately well drained Nicholville variant soils, and they do not have mottling in the lower part of the B horizon. They have brighter colors in the upper part of the B horizon than Hadley soils.

SaA—Salmon very fine sandy loam, sandy subsoil variant, 0 to 3 percent slopes. This soil is on terraces and plains near lakes and large streams. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Nicholville variant, Adams, and Colton soils. Also included are small areas of soils that have slopes of more than 3 percent.

This soil is well suited to truck crops, field crops, hay, and pasture. Using cover crops and green-manure crops in a good system of crop rotation helps maintain fertility.

Much of this soil is in the Saco River valley and is in crops. A few areas are wooded or are idle fields. Some areas are being used for community development. Be-

cause of good accessibility, nearly level slopes, and easy workability, this soil makes desirable residential and small industrial sites. Capability unit I–2.

SaB—Salmon very fine sandy loam, sandy subsoil variant, 3 to 8 percent slopes. This soil is on terraces and plains near lakes and large streams. It has a profile similar to the one described as representative of the series, but the surface mineral layer is commonly thinner.

Included with this soil in mapping are areas of Nicholville variant, Adams, and Colton soils. Also included are small areas of soils that are sandier in the upper part, and some soils that have thin loamy layers below a depth of 36 inches.

Gentle slopes are the main limitation to most intensive uses of this soil. Slope must be considered where level grades are needed. The hazard of erosion is slight in cultivated areas and in areas disturbed in construction.

This soil is well suited to truck crops, field crops, hay, and pasture. Where this soil is used extensively for cultivated crops, diversions or stripcropping are needed to control erosion. These practices are often used in cropping systems that include cover crops, grasses and legumes.

Much of this soil is in the Saco River valley and is in crops. Some areas are wooded, and some are in idle fields. More and more acreage is being intensively developed as communities expand and subdivisions arise. Because of good accessibility, gentle slopes, and easy workability, this soil generally makes desirable residential and small industrial sites. Capability unit IIe–2.

Scituate Series

The Scituate series consists of moderately well drained soils that formed in deposits of glacial till. These soils have a loamy cap 18 to 30 inches thick overlying a sandy pan layer. They are generally in upland depressions, at the heads of drainageways, or on concave foot slopes in the southern part of the county. Seepage causes these soils to be seasonally wet. Stones are common on the surface.

In a representative profile of a Scituate soil in a wooded area, a layer of partly decayed leaves, needles, and herbs 2 inches thick is on the surface. The surface layer, below this, is dark-brown fine sandy loam about 6 inches thick. The subsoil, extending to a depth of about 29 inches, is yellowish-brown fine sandy loam in the upper 9 inches, light yellowish-brown sandy loam that has distinct mottles in the next 7 inches, and light brownish-gray sandy loam in the lower 7 inches. The underlying material to a depth of 50 inches is firm, light olive-gray gravelly loamy sand.

Permeability is moderate above the pan layer but moderately slow in the pan. Available water capacity is moderate. The depth to seasonal high water ranges from 12 to 30 inches. Woodcrop production is fair.

Representative profile of Scituate fine sandy loam in a wooded area of Scituate very stony fine sandy loam, 3 to 8 percent slopes, about 2 miles southeast of Wolfeboro Center, one-fourth mile south of New Hampshire Route 109, and about 150 feet northwest of Tutle Island Road in the town of Wolfeboro:

O1—2 inches to 1 inch, pine needles and twigs.
O2—1 inch to 0, decomposed organic matter.
Ap—0 to 6 inches, dark-brown (10YR 3/3) fine sandy loam; weak, fine, granular structure; very friable; many roots; very strongly acid; abrupt, smooth boundary.
B21—6 to 15 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, fine, granular structure; friable; common roots; 5 percent coarse fragments; medium acid; clear, wavy boundary.
B22—15 to 22 inches, light yellowish-brown (2.5Y 6/4) sandy loam; common, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, fine, granular structure; friable; few roots; 10 percent coarse fragments; medium acid; clear, wavy boundary.
B3—22 to 29 inches, light brownish-gray (2.5Y 6/2) sandy loam; many, medium, distinct, brownish-yellow (10YR 6/6) and reddish-yellow (7.5YR 6/8) mottles; weak, fine, granular structure; friable; 15 percent coarse fragments; medium acid; clear, wavy boundary.
IICx—29 to 50 inches, light olive-gray (5Y 6/2) gravelly loamy sand; weak, medium, platy structure; firm and brittle; 20 percent coarse fragments; medium acid.

In the A horizon hue is 10YR and value and chroma are 2 or 3. The B horizons commonly are fine sandy loam or sandy loam and gravelly analogs. The B21 horizon has hue of 10YR or 7.5YR, and value and chroma of 4 to 6. The B22 and B3 horizons have matrix hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. Weighted average texture of the Cx horizon is commonly gravelly loamy sand. Firm, horizontally oriented layers of fine sandy loam commonly make up to 35 percent of the Cx horizon, by volume. There are segregated sand lenses as thick as a few inches and having a horizontal orientation throughout the Cx horizon. These lenses are characteristic of the fragipan. In the C horizon, hue commonly is 2.5Y or 5Y, value is 5 or 6, and chroma is 2 to 4.

Scituate soils are near Millis, Woodbridge, and Ridgebury soils. Scituate and Millis soils formed in similar material, but Scituate soils are not so well drained. Scituate soils are coarser in the pan layer than Woodbridge and Ridgebury soils, and they are better drained than Ridgebury soils.

SdB—Scituate very stony fine sandy loam, 3 to 8 percent slopes. This soil is on concave foot slopes of upland hills. The profile described as representative of the series is in an area of this soil. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Woodbridge, Acton, Millis, and Ridgebury soils. Also included are small areas of soils that have slopes of more than 8 percent, spots that have bedrock within 3 feet of the surface, and small areas of soils that are extremely stony and bouldery.

A seasonal high water table, stoniness, and a pan layer are the main limitations to intensive use of this soil. The pan layer restricts downward movement of water, causing it to collect and move laterally above the pan, resulting in seep spots downslope.

Excess water in the upper part of the subsoil can generally be controlled by intercepting seepage with diversions or tile laid across the slope. Excess surface water can be channeled to natural drainageways using grassed waterways.

Stoniness is a limitation to those uses requiring level grades or seedbed preparation, as in landscaping or farming. The soil material above the pan is moderately erodible in places where vegetative cover has been removed.

Most of this soil is in woodland, but some small tracts are in pasture. A few spots are being used for home-

sites. This soil has some potential for the development of woodland wildlife habitat. Capability unit VIs–72.

SdC—Scituate very stony fine sandy loam, 8 to 15 percent slopes. This soil is on concave lower side slopes of hills in the uplands. It has a profile similar to the one described as representative of the series, but it commonly does not have a dark plow layer. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Woodbridge, Acton, and Millis soils. Also included are small areas of soils that have slopes of more than 15 percent, small areas of soils that have bedrock within 3 feet of the surface, small areas of soils that are extremely stony and bouldery, and wet spots and narrow drainageways.

A seasonal high water table, stoniness, slope, and the pan layer are the main limitations to intensive uses of this soil. The pan layer restricts downward movement of water, causing it to collect and move laterally above the pan, resulting in seep spots downslope. Diversions or tile drains laid across the slope above areas to be used control seepage. In cleared areas, grassed waterways can safely direct runoff to natural drainageways. Stoniness and slope must be considered for specific uses that require level grades, excavations, or seedbed preparation, as for roads and parking areas, septic tank sewage filter fields or filter beds, and landscaping. The soil material above the pan is very erodible if the soil is not protected by vegetative cover.

Most of this soil is in woodland, but small tracts are in pasture. A few tracts have been developed for residential use as part of subdivisions. This soil has some potential for the development of woodland wildlife habitat. Capability unit VIs–72.

Skerry Series

The Skerry series consists of moderately well drained soils that formed in deposits of glacial till. These soils have a loamy cap 18 to 30 inches thick overlying a sandy pan layer. They are generally in upland depressions, at the heads of drainageways, or on concave foot slopes in the northern part of the county. Seepage causes these soils to be seasonally wet. Stones are common on the surface.

In a representative profile of a Skerry soil in a wooded area, a layer of decayed leaves and needles 3 inches thick is on the surface. The surface layer, below this, is light-gray fine sandy loam about 2 inches thick. The subsoil, extending to a depth of about 23 inches, is reddish-brown fine sandy loam in the upper 17 inches and yellowish-brown, mottled gravelly fine sandy loam in the lower 4 inches. The underlying material to a depth of 45 inches is brown, grayish-brown, and light olive-brown gravelly loamy sand.

Permeability is moderate above the pan layer but moderately low in the pan itself. Available water capacity is moderate. The depth to seasonal high water ranges from 12 to 30 inches. Woodcrop productivity is good for white pine and upland oaks.

Representative profile of Skerry fine sandy loam in an area of Skerry very stony fine sandy loam, 8 to 15 percent slopes, in a wooded area in the town of Conway, about one-half mile north of junction of Greely and Potter Roads, 90 feet east of Potter Road:

O1—3 to 2 inches, leaf and pine needle litter.
O2—2 inches to 0, partly decomposed and well decomposed forest litter.
A2—0 to 2 inches, light-gray (10YR 6/1) fine sandy loam; weak, fine, granular structure; friable; common fine to medium roots; strongly acid; abrupt, broken boundary.
B21h—2 to 3 inches, dark reddish-brown (5YR 2/2) fine sandy loam; weak, fine, granular structure; friable; common fine to medium roots; strongly acid; abrupt, broken boundary.
B22ir—3 to 19 inches, reddish-brown (5YR 4/4) fine sandy loam; moderate, medium granular structure; 50 percent weakly cemented (ortstein) and 50 percent friable; few fine roots; 15 percent coarse fragments; strongly acid; clear, wavy boundary.
B23ir—19 to 23 inches, yellowish-brown (10YR 5/4) gravelly fine sandy loam that has common, fine, distinct, strong-brown (7.5YR 5/6) and grayish-brown (10YR 5/2) mottles; massive; weakly cemented (ortstein); 20 percent coarse fragments; strongly acid; clear, smooth boundary.
C1x—23 to 32 inches, brown (10YR 5/3) and light olive-brown (2.5Y 5/4) gravelly loamy sand that has common, fine, distinct, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/6) mottles; 60 percent massive and firm, and 40 percent single grained and loose; 25 percent coarse fragments; loose segregated sand layers as thick as 2 inches and having a horizontal orientation occur alternately with the massive layers of brown (10YR 5/3) fine sandy loam; strongly acid; gradual, smooth boundary.
C2x—32 to 45 inches, grayish-brown (2.5Y 5/2) and light olive-brown (2.5Y 5/4) gravelly loamy sand; 40 percent massive and firm, and 60 percent single grained and loose; 25 percent coarse fragments; loose segregated sand layers as thick as 2 inches and having horizontal orientation occur alternately with the layers of massive grayish-brown (2.5Y 5/2) fine sandy loam; strongly acid.

In the Ap horizon, where present, hue is 10YR, value is 3 or 4, and chroma is 2 to 4. The B horizon has textures of fine sandy loam or sandy loam and gravelly analogs. The B21 and B22 horizons have hue of 2.5YR or 5YR, value of 2 to 4, and chroma of 2 to 6. The B23 horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. The C horizon is dominantly gravelly loamy sand or gravelly loamy fine sand. Layers of fine sandy loam commonly make up as much as 35 percent, by volume, of the Cx horizon. The C horizon commonly has hue of 2.5Y, although hue ranges from 10YR to 5Y, value is 5 or 6, and chroma is 2 to 4.

Skerry soils are near Becket, Peru, and Ridgebury soils. Skerry and Becket soils formed in similar material, but Skerry soils are not so well drained. Skerry soils have a coarser textured fragipan than Peru and Ridgebury soils, and they are better drained than Ridgebury soils.

SeB—Skerry very stony fine sandy loam, 3 to 8 percent slopes. This soil is on concave foot slopes of hills in the uplands. It has a profile similar to the one described as representative of the series, but in most places, mottling is closer to the surface. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Waumbek, Becket, and Ridgebury soils. Also included are small areas of soils that have slopes of more than 8 percent, spots that have bedrock within 3 feet of the surface, and small areas of soils that are extremely stony and bouldery.

A seasonal high water table, stoniness, and a pan layer are the major limitations to intensive use of this soil. The pan layer restricts downward movement of water, causing it to collect and move laterally above the pan, resulting in some seep spots downslope.

Excess water in the subsoil can generally be con-

trolled by intercepting seepage with diversions or tile drains. Excess surface water can be channeled to natural drainageways with open ditches or, in cleared areas, with grassed waterways. Stoniness is a limitation to certain uses, especially those requiring level grades or seedbed preparation, as in landscaping or farming. The soil material above the pan is moderately erodible where it lacks vegetative cover.

Most of this soil is in woodland, but some small tracts are in pasture. An increasing acreage is being used for homesites. This soil has some potential for the development of woodland wildlife habitat. Capability unit VIs–72.

SeC—Skerry very stony fine sandy loam, 8 to 15 percent slopes. This soil is on concave lower side slopes on upland hills. It has the profile described as representative of the series. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Waumbek and Becket soils. Also included are small areas of soils that have slopes of more than 15 percent, small areas of soils that have bedrock within 3 feet of the surface, small areas of soils that are extremely stony and bouldery, and wet spots and narrow drainageways.

A seasonal high water table, slope, stoniness, and the pan layer are the main limitations to intensive use of this soil. The pan layer restricts downward movement of water, causing it to collect and move laterally above the pan, resulting in seep spots. Diversions or tile drains control seepage above the pan. In cleared areas, grassed waterways can safely direct surface runoff to natural drainageways. Stoniness and slope are limitations to specific uses that require level grades, excavations, and seedbed preparation. Such uses include roads and parking areas, septic tank sewage filter fields or filter beds, and landscaping. This soil is highly erodible where it does not have vegetative cover.

Most of this soil is in woodland, but small tracts are in pasture. A few areas have been developed for residential use as part of subdivisions. This soil has some potential for the development of woodland wildlife habitat. Capability unit VIs–72.

Suncook Series

The Suncook series consists of excessively drained soils that formed in sandy alluvial deposits. These soils are on flood plains and commonly are in places close to stream channels. In most places, the flood plain is dissected by narrow floodwater drainageways. These soils generally flood at least once a year.

In a representative profile of a Suncook soil in an old hayfield, the surface layer is dark-brown loamy fine sand about 10 inches thick. The underlying material to a depth of 56 inches is yellowish-brown fine, medium, and coarse sand.

Permeability is rapid. Available water capacity is very low. Depth to the seasonal high water table is generally more than 3 feet and depth to bedrock is more than 6 feet. Flooding is the main limitation to the use of these soils for community development. Woodcrop productivity is good.

Representative profile of Suncook loamy fine sand in an old hayfield in the town of Conway, about 1 mile southeast of Echo Lake, 550 feet east of Westside Road:

Ap—0 to 10 inches, dark-brown (10YR 3/3) loamy fine sand, weak, medium, granular structure; very friable; few fine roots; slightly acid; abrupt, smooth boundary.

C1—10 to 26 inches, yellowish-brown (10YR 5/4) fine sand; single grained; loose; medium acid; clear, smooth boundary.

C2—26 to 56 inches, yellowish-brown (10YR 5/4) medium and coarse sand; single grained; loose; medium acid; clear, smooth boundary.

In the A1 or Ap horizon hue commonly is 10YR, value is 3 or 4, and chroma is 2 or 3. The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chromas of 3 to 6. In places below a depth of 20 inches, gravel makes up as much as 20 percent, by volume, of the soil material.

Suncook soils are near Ondawa and Podunk soils, but they have a coarser texture than both soils and are better drained than Podunk soils.

Sf—Suncook loamy fine sand. This nearly level soil is on the low bottoms on flood plains along the larger streams, mostly the Saco River.

Included with this soil in mapping are Ondawa and Podunk soils. Also included are areas of soils of windblown sand, water-sorted sand, sand bars, and areas of soils that have thin silt bands throughout the profile.

Frequent flooding and droughtiness are major limitations to farm and most nonfarm uses. Cultivated areas are susceptible to soil blowing.

Because of droughtiness, this soil is not well suited to cultivated crops or to hay or pasture. Irrigation and large quantities of lime and fertilizer are needed for all crops. Adding manure and returning crop residue to the soil helps to maintain the organic-matter content.

This soil has a poor potential for farm uses unless it is irrigated and protected from flooding. Most areas are in pasture, are idle, or are in woodland. Capability unit IIIs–16.

Sutton Series

The Sutton series consists of moderately well drained soils that formed in deposits of loamy glacial till. These soils are generally on concave foot slopes in upland depressions or at the heads of drainageways in the southern part of the county. Seepage from higher slopes causes these soils to be seasonally wet. Stones are common on the surface.

In a representative profile of a Sutton soil in a white pine plantation, a layer of fresh and partly decayed leaves, needles, and herbs 3 inches thick is on the surface. The surface layer, below this, is dark yellowish-brown fine sandy loam about 7 inches thick. The subsoil, extending to a depth of about 27 inches, is dark-brown and yellowish-brown fine sandy loam in the upper 9 inches and light yellowish-brown fine sandy loam that has distinct mottles in the lower 11 inches. The underlying material to a depth of 42 inches is pale-olive fine sandy loam that has distinct mottles.

Permeability is moderate. Available water capacity is moderate. The depth to seasonal high water ranges from 13 to 30 inches. Woodcrop production is fair.

Representative profile of Sutton fine sandy loam, 0 to 8 percent slopes, in a white pine plantation, one-

fourth mile west-northwest of junction of Federal Corner Road and North Line Road, about 100 feet northeast of North Line Road, in the town of Tuftonboro:

O1—3 inches to 1 inch, loose needles and twigs.
O2—1 inch to 0, partly decomposed needles and twigs.
Ap—0 to 7 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, fine, granular structure; friable; many fine and medium roots; 5 percent coarse fragments; strongly acid; abrupt, smooth boundary.
B21—7 to 8 inches, dark-brown (7.5YR 4/4) fine sandy loam, weak, fine, granular structure; friable; common fine and medium roots; 5 percent coarse fragments; strongly acid; abrupt, broken boundary.
B22—8 to 16 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, fine, granular structure; friable; common fine and medium roots; 5 percent coarse fragments; strongly acid; clear, wavy boundary.
B23—16 to 27 inches, light yellowish-brown (2.5Y 6/4) fine sandy loam that has common, fine, distinct, olive-gray (5Y 5/2) mottles; massive; friable; common fine and medium roots; 5 percent coarse fragments, medium acid; abrupt, smooth boundary.
C1—27 to 38 inches, pale-olive (5Y 6/3) fine sandy loam that has common, fine, distinct, light yellowish-brown, (2.5Y 6/4) and brownish-yellow (10YR 6/6) mottles; weak; thick, platy structure; friable; few medium roots; 3 to 5 percent coarse fragments; medium acid; abrupt, smooth boundary.
C2—38 to 42 inches, pale-olive (5Y 6/3) fine sandy loam that has common, fine, distinct, light yellowish-brown (2.5Y 6/4) and brownish-yellow (10YR 6/6) mottles; weak, thick, platy structure; friable; few medium roots; 10 percent coarse fragments; medium acid.

In the A1 or Ap horizon hue is 10YR, value is 3 or 4, and chroma is 2 to 4. The B horizon ranges from sandy loam to loam and includes gravelly analogs in the lower part. The B21 horizon commonly has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The B22 and B23 horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. The C horizon is commonly fine sandy loam or sandy loam and gravelly analogs. Thin lenses of loamy fine sand or loamy sand are common below a depth of 36 inches. The C horizon commonly has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 2 to 4.

Sutton soils formed in material similar to the material in which the nearby Charlton, Leicester, and Woodbridge soils formed. Sutton soils are not so well drained as Leicester soils. Sutton soils do not have a pan layer as Woodbridge soils have.

SnB—Sutton fine sandy loam, 0 to 8 percent slopes. This soil is on concave upland foot slopes in fields from which surface stones have been removed. It has the profile described as representative of the series.

Included with this soil in mapping are areas of Woodbridge, Scituate, Ridgebury, and Charlton soils. Also included are small areas of soils that have slopes of more than 8 percent and very stony spots.

A seasonal high water table is the main limitation to intensive use of this soil. In places that lack vegetative cover, this soil is moderately erodible. This soil is suited to silage corn, grasses, and legumes. The long slopes in the steeper areas can be cropped continuously if this soil is drained and protected from erosion by the use of diversions and stripcropping.

Excess water can be controlled by the use of open ditches or tile drains. Where the surface is bare of vegetation, grassed waterways are helpful in directing runoff to natural drainageways.

Most of this soil is wooded, but some is in idle fields. A few small tracts are in pasture or crops. Some areas near lakes and mountains are being developed for residential or recreational uses. Fill has generally been used to raise septic tank filter fields or filter beds above the water table. This soil has good potential for the development of open-land and woodland wildlife habitat. Pasture plants grow well on this soil. Capability unit IIw–52.

SuB—Sutton very stony fine sandy loam, 0 to 8 percent slopes. This soil is on concave foot slopes on the uplands. It has a profile similar to the one described as representative of the series, but the surface mineral layer is commonly thinner and darker. Surface stones and boulders are generally 5 to 30 feet apart.

Included with this soil in mapping are areas of Woodbridge, Paxton, Ridgebury, and Charlton soils. Also included are small areas of soils that have slopes of more than 8 percent, extremely stony spots, and narrow drainageways.

A seasonal high water table and stoniness are limitations to most uses of this soil. Stones are a problem in landscaping, seedbed preparation, leveling grades, and excavations. The hazard of erosion is moderate in areas that lack protective vegetation.

Drainage by open ditches or tile drains and interception of seepage water from upper slopes by diversions help control excess water. Grassed waterways are helpful in safely directing runoff to natural drainageways in areas where the surface is bare of vegetation.

Most of this soil is in woodland, but some small tracts are in open pasture. Near lakes and mountains, a few areas of this soil are being developed for recreational or residential use. Fill has generally been used to raise septic tank filter fields or filter beds above the water table. This soil has good potential for the development of woodland wildlife habitat. Capability unit VIs–72.

Walpole Series

The Walpole series consists of somewhat poorly drained and poorly drained sandy soils. These soils formed in loamy water-laid deposits 18 to 28 inches thick over sandy or sandy and gravelly material. These soils occupy drainageways of the uplands. The water table is at or near the surface for long durations, especially between fall and late in spring.

In a representative profile of a Walpole soil in a wooded area, a layer of fresh and decayed organic materials 6 inches thick is on the surface. The surface layer, below this, is very dark grayish-brown fine sandy loam about 6 inches thick. The subsoil, extending to a depth of about 20 inches, is grayish-brown sandy loam that has distinct mottles. The underlying material to a depth of 44 inches is dark grayish-brown gravelly loamy sand in the upper 4 inches and olive gravelly loamy sand that has distinct mottles in the lower 20 inches.

Permeability is moderate in the upper part and rapid in the loose underlying sands. Available water capacity is moderate. The water table is at or near the surface for 7 to 9 months of the year. The high water table is the main limitation to the use of these soils for community development.

In Carroll County, Walpole soils are mapped only in complex with Leicester soils.

Representative profile of Walpole fine sandy loam in a wooded area of Leicester-Walpole very stony fine sandy loams, 0 to 3 percent slopes, in the town of Moultonboro, about four-tenths mile southwest of junction of New Hampshire Routes 109 and 171, about two-tenths mile west of New Hampshire Route 109:

O1—6 to 5 inches, loose leaf litter.
O2—5 inches to 0, dark reddish-brown (5YR 2/2) well-decayed organic matter.
A1—0 to 6 inches, very dark grayish-brown (2.5Y 3/2) fine sandy loam; weak, fine, granular structure; friable; few fine and medium roots; strongly acid; abrupt, smooth boundary.
B2—6 to 20 inches, grayish-brown (2.5Y 5/2) sandy loam; common, fine, distinct, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/4 and 5/6) mottles; massive; friable; few fine roots; strongly acid; abrupt, smooth boundary.
IIC1—20 to 24 inches, dark grayish-brown (2.5Y 4/2) gravelly loamy sand; few, fine, distinct, yellowish-brown (10YR 5/6) mottles: massive; very friable; 25 to 30 percent coarse fragments; strongly acid; clear, smooth boundary.
IIC2—24 to 44 inches, olive (5Y 5/3) gravelly loamy sand; common, fine, distinct, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/6) mottles; massive; very friable; 35 to 40 percent coarse fragments; strongly acid.

In the A1 or Ap horizon, where present, hue is 10YR or 2.5Y, value is 2 or 3, and chroma is 1 or 2. The B horizon is generally fine sandy loam but ranges to sandy loam. The B horizon has hue of 10YR to 5Y and value of 5 or 6. The IIC horizon is dominated by loamy sand or sand and gravelly analogs. In the C horizon hue is commonly 2.5Y or 5Y, and value is 4 to 6.

Walpole soils are similar in drainage to Naumburg soils and Raynham variant soils. Walpole soils have a loamy cap, and Naumburg soils are sandy throughout. Walpole soils resemble Raynham variant soils, but they have a coarser textured solum.

Waumbek Series

The Waumbek series consists of moderately well drained soils that formed in deposits of stony sandy glacial till. These soils are generally in upland depressions, at the heads of drainageways, or on concave mountain foot slopes in the northern part of the county. Seepage from higher slopes causes these soils to be seasonally wet. Stones are common on the surface.

In a representative profile of a Waumbek soil in a reforested area, a layer of fresh and decayed leaves, needles, and herbs 2 inches thick is on the surface. The surface layer, below this, is 10 inches thick. It is very dark grayish-brown fine sandy loam in the upper 7 inches and gray loamy fine sand in the lower 3 inches. The subsoil, extending to a depth of about 26 inches, is black fine sandy loam in the upper 3 inches, dark-red fine sandy loam in the middle 6 inches, and yellowish-red gravelly loamy fine sand that has distinct mottles in the lower 7 inches. The underlying material to a depth of 46 inches is light yellowish-brown gravelly loamy sand that has distinct mottles in the upper 14 inches and light brownish-gray gravelly loamy sand in the lower 6 inches.

Permeability is moderately rapid. Available water capacity is moderate. Depth to the seasonal high water table ranges from 18 to 30 inches. Woodcrop productivity is fair.

Representative profile of Waumbek fine sandy loam in a reforested old pasture, in an area of Waumbek-Skerry very stony fine sandy loams association, sloping, about 1.7 miles west-southwest of Chatham Village, 500 feet west of junction of Burnt Knoll Trail and Province Brook Trail in the White Mountain National Forest, in the town of Chatham:

O1—2 inches to 1 inch, matted layer of leaves and twigs.
O2—1 inch to 0, partly decomposed forest litter.
Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; weak, fine, granular structure; friable; many fine and medium roots; very strongly acid; 5 percent coarse fragments ½ inch to 6 inches in diameter; abrupt, smooth boundary.
A2—7 to 10 inches, gray (10YR 5/1) loamy fine sand, weak, fine, granular structure; friable; common fine and medium roots; 5 percent coarse fragments ½ inch to 6 inches in diameter; very strongly acid; abrupt, broken boundary.
B21h—10 to 13 inches, black (5YR 2/1) fine sandy loam; moderate, medium, granular structure; friable; common fine and medium roots; 7 percent coarse fragments ½ inch to 6 inches in diameter; very strongly acid; abrupt, broken boundary.
B22ir—13 to 19 inches, dark-red (2.5YR 3/6) fine sandy loam; moderate, medium, granular structure; 60 percent friable and 40 percent firm (ortstein); common fine roots; 10 percent coarse fragments ½ inch to 3 inches in diameter, 15 percent larger than 3 inches in diameter; very strongly acid; abrupt, smooth boundary.
B23—19 to 26 inches, yellowish-red (5YR 5/8) gravelly loamy fine sand; common, medium, distinct, light-gray (10YR 6/1) mottles; weak, fine, granular structure; friable; few fine roots; 15 percent coarse fragments ½ inch to 3 inches in diameter, 25 percent larger than 3 inches in diameter; very strongly acid; clear, broken boundary.
C1—26 to 40 inches, light yellowish-brown (10YR 6/4) gravelly loamy sand; common, medium, distinct, red (2.5YR 5/8) mottles; massive; friable; 20 percent coarse fragments as much as 6 inches in diameter, 25 percent larger than 6 inches in diameter; strongly acid; clear, smooth boundary.
C2—40 to 46 inches, light brownish-gray (2.5Y 6/2) gravelly loamy sand; massive; friable; 25 percent coarse fragments as much as 6 inches in diameter, 25 percent larger than 6 inches in diameter; strongly acid.

In the Ap horizon hue is commonly 10YR, value is 3 or 4 and chroma is 2 or 3. Textures of fine sandy loam and sandy loam, including gravelly analogs, are common in the B21 and B22 horizons. The B23 horizon ranges from sandy loam to loamy sand and includes gravelly analogs. The B21 horizon has hue of 2.5YR or 5YR, value of 2 to 4, and chroma of 1 to 6. The B22 and B23 horizons have matrix hue of 5YR, 7.5YR, or 10YR and chroma of 4 to 8. The C horizon is generally gravelly loamy sand, gravelly loamy fine sand, or gravelly sand.

Waumbek soils are near Hermon, Leicester, and Skerry soils. Waumbek, Hermon, and Leicester soils formed in similar material, but Waumbek soils are not so well drained as Hermon soils and are better drained and coarser textured in the C horizon than Leicester soils. Waumbek soils do not have a pan layer, as Skerry soils have.

WaB—Waumbek very stony fine sandy loam, 3 to 8 percent slopes. This soil is on concave foot slopes and heads of drainageways between the better drained hillsides and wet depressions or drainageways. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Skerry, Hermon, and Ridgebury soils and areas of Lyman soils that have a few rock outcrops. Also included are small areas of soils that have slopes of more than 8 percent and extremely stony and bouldery spots.

A seasonal high water table and stoniness are limitations to intensive uses of this soil. Stones are a problem in landscaping, seedbed preparation, leveling grades, and excavations. In places that lack vegetative cover, this soil is moderately erodible.

Drainage by open ditches or tile drains and interception of seepage water from upper slopes by diversions help control excess water. These practices allow more intensive use of this soil for development. Grassed waterways are helpful in safely directing surface runoff to natural drainageways where the surface is bare of vegetation.

Most of this soil is in woodland, but some small tracts are in pasture. An increasing acreage of this soil is being used for residential or recreational development. Fill has generally been used to raise septic tank filter fields or filter beds above the water table. This soil has fair potential for the development of woodland wildlife habitat. Capability unit VIs–72.

WaC—Waumbek very stony fine sandy loam, 8 to 15 percent slopes. This soil is on concave lower hillsides and mountainsides between the better drained soils above and the foot slopes and wet depressions below. It has a profile similar to the one described as representative of the series, but the mineral surface layer and subsoil are thinner in most places. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Skerry, Becket, and Hermon soils and areas of Lyman soils that have a few rock outcrops. Also included are small areas of soils that have slopes of more than 15 percent, wet spots and narrow drainageways, and extremely stony and bouldery spots.

A seasonal high water table, slope, and stoniness are limitations to intensive use of this soil. In places that lack vegetative cover, this soil has a severe hazard of erosion. Stones and slope are limitations to landscaping, seedbed preparation, leveling grades, and excavations. Steepness of slope is a serious limitation to the construction of paved roads and parking lots.

Diversions or tile drains laid out across the slope above the area to be used help control the seasonal high water table. These practices, along with erosion-control measures, allow more intensive use of this soil. Open ditches and grassed waterways help safely direct runoff to natural drainageways.

Most of this soil is in woodland, but some small tracts are in pasture. A few areas, especially near lakes and mountains, are being used for residential or recreational developments. Fill has generally been used to raise septic tank filter fields or filter beds above the water table. This soil has fair potential for the development of woodland wildlife habitat. Capability unit VIs–72.

WBC—Waumbek-Skerry very stony fine sandy loams association, sloping. This association is on concave lower side slopes and at the heads of drainageways, mainly in the White Mountain Forest. The areas are generally oblong and 10 to 100 acres in size. Slope generally ranges from 0 to 15 percent. The profile described as representative of the Waumbek series is in the Waumbek part of this association. The Skerry soil has a profile similar to the one described as representative of its series, but in most places, there are more stones throughout the profile. Stones cover as much as 15 percent of the surface.

Waumbek very stony fine sandy loam makes up about 40 to 50 percent of the association, and Skerry very stony fine sandy loam, about 30 to 40 percent. Both soils are interspersed on the concave lower parts of slopes on the landscape.

The remaining 10 to 30 percent of the association is Hermon, Becket, Ridgebury, and Lyman soils. Hermon and Becket soils are in the irregular convex rises on the landscape, and Ridgebury soils are in depressions and drainageways. Lyman soils and a few outcrops are on knobby rises.

A seasonal high water table and stoniness are the main limitations to intensive uses of these soils. Skerry soils also have a pan layer that restricts downward movement of water, causing it to seep laterally above the pan. The steeper slopes have a severe hazard of erosion in places that are bare of vegetation. In some places, shallow depth to bedrock limits tree growth and presents a windthrow hazard.

The soils in this association are used mostly for timber production and woodland wildlife habitat, to which they are well suited. Seasonal wetness and seep spots hinder the construction and maintenance of logging roads and landings. Machine operations during wet periods can leave ruts that make the soil highly erodible. All intensive uses require very careful planning and use of surface water control practices and structures. Not assigned to a capability unit.

Whitman Series

The Whitman series consists of very poorly drained soils that formed in deposits of loamy glacial till. A pan layer is 10 to 25 inches below the surface. These soils are in upland depressions and broad drainageways, and are near lakes, streams, and bogs. The water table is at or above the surface most of the time.

In a representative profile of a Whitman soil in a wooded area, a mat of organic materials about 3 inches thick is on the surface. The mineral surface layer is very dark gray loam 5 inches thick. Below this layer, to a depth of about 13 inches, is gray fine sandy loam that has yellowish-brown and light olive-brown mottles. The next layer, about 3 inches thick, is light brownish-gray loamy sand that has yellowish-brown and gray mottles. Below this is a firm pan layer that is light brownish-gray and gray fine sandy loam in the upper 10 inches and light brownish-gray gravelly sandy loam in the lower 16 inches. Prominent strong brown and yellowish-brown mottles are in the lower part of the pan layer.

Permeability is moderate above the pan layer but moderately slow in the pan. Available water capacity is moderate. The water table is at or above the surface for much of the year. Wetness is a major limitation to most uses of these soils.

Representative profile of Whitman very stony loam in a wooded area in the town of Ossipee, about four-tenths mile southwest of junction of New Hampshire Routes 16 and 25, two-tenths mile east of Tuftonboro Road, 550 feet south of Center Ossipee Village road:

O1—3 to 2 inches, loose leaf and pine needle litter.
O2—2 inches to 0, partly decayed leaves and needles.

A1—0 to 5 inches, very dark gray (10YR 3/1) loam; weak, fine to medium, granular structure; friable; many fine and medium roots; 10 to 15 percent coarse fragments; strongly acid; abrupt, smooth boundary.

C1g—5 to 13 inches, gray (10YR 6/1) fine sandy loam; few, fine, distinct, yellowish-brown (10YR 5/6) and light olive-brown (2.5Y 5/6) mottles; massive; friable; 10 percent coarse fragments; strongly acid; abrupt, smooth boundary.

A'2—13 to 16 inches, light brownish-gray (2.5Y 6/2) loamy sand; common, medium, distinct, yellowish-brown (10YR 5/6) and gray (10YR 6/1) mottles; massive; very friable; 15 percent coarse fragments; medium acid; abrupt, smooth boundary.

C2x—16 to 26 inches, light brownish-gray (2.5Y 6/2) and gray (10YR 6/1) fine sandy loam; few, fine, distinct, yellowish-brown (10YR 5/4 and 5/6) mottles; massive; firm; 15 percent coarse fragments; medium acid; clear, smooth boundary.

C3x—26 to 42 inches, light brownish-gray (2.5Y 6/2) gravelly sandy loam; common, medium, prominent, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/4 and 5/6) mottles, horizontally oriented; massive; common horizontally segregated sand seams as thick as ½ inch; firm; 20 percent coarse fragments; medium acid.

The A1 horizon is black (10YR 2/1) or very dark gray 10YR 3/1). The C1g horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 0 or 1. It is fine sandy loam or sandy loam. The Cx horizon has hue of 2.5Y and 5Y, value of 4 to 6, and chroma of 0 to 2. The Cx horizon ranges from sandy loam to fine sandy loam and gravelly analogs. Structure of the Cx horizon is moderate, medium, or thick platy ranging to massive. Consistence ranges from firm to very firm.

Whitman soils formed in materials similar to the materials in which Ridgebury and Leicester soils formed. Whitman soils have a darker A horizon and are more poorly drained than Ridgebury and Leicester soils. Whitman soils have a pan layer, and Leicester soils do not.

Wc—Whitman very stony loam. This nearly level soil is in depressions and drainageways on the uplands near lakes, streams, and bogs. Surface stones are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Ridgebury, Walpole, Naumburg, and Ossipee soils. Also included are very poorly drained soils that have laminated silt layers at depths below 24 inches and extremely stony and bouldery spots.

A high water table, stoniness, and a pan layer are the major limitations to most uses of this soil. Outlet grades are generally difficult to establish.

This soil is mostly in woodland or shrub-sedge cover. It is favorable for dugout ponds and the development of wetland wildlife habitat. Wetness restricts logging operations to winter. Capability unit VIIs–74.

Windsor Series

The Windsor series consists of excessively drained soils that formed in deposits of water-laid sands. These soils are on terraces, kames, and eskers near streams and lakes or former glacial drainageways in the southern part of the county.

In a representative profile of a Windsor soil in a wooded area, a layer of fresh and partly decayed leaves, needles, and herbs 2 inches thick is on the surface. The surface layer, below this, is very dark grayish-brown loamy sand about 1 inch thick. The subsoil, extending to a depth of about 23 inches, is dark-brown loamy sand in the upper 4 inches, yellowish-brown loamy sand in the middle 6 inches, and yellowish-brown, loose fine sand and sand in the lower 12 inches. The underlying material to a depth of 50 inches is light yellowish-brown, loose sand.

Permeability is rapid. Available water capacity is very low. There is a pollution hazard to ground water sources from septic-tank sewage disposal systems because of rapid permeability. These soils are a potential source of sand for construction work.

Representative profile of Windsor loamy sand, 3 to 8 percent slopes, in a wooded area about 1.9 miles east of New Hampshire Route 16, 400 feet southwest of junction of Plains Road and Elm Street, in the town of Effingham:

O2—2 inches to 0, partly decomposed pine needles and twigs.

A1—0 to 1 inch, very dark grayish-brown (10YR 3/2) loamy sand; weak, fine, granular structure; very friable; many roots; very strongly acid; abrupt, broken boundary.

B21—1 inch to 5 inches, dark-brown (7.5YR 4/4) loamy sand; weak, fine, granular structure; very friable; many roots; 3 to 4 percent coarse fragments; strongly acid; abrupt, smooth boundary.

B22—5 to 11 inches, yellowish-brown (10YR 5/4) loamy sand; weak, fine, granular structure; very friable; common roots; 4 to 5 percent coarse fragments; medium acid; clear, smooth boundary.

B23—11 to 23 inches, yellowish-brown (10YR 5/6) fine sand and sand; single grained; loose; few roots; 4 to 5 percent coarse fragments; medium acid; gradual, smooth boundary.

C—23 to 50 inches, light yellowish-brown (2.5Y 6/4) sand; single grained; loose; no roots; 4 to 5 percent coarse fragments; medium acid.

In the A1 or Ap horizon hue is 10YR, value is 3 or 4, and chroma is 2 to 4. The B21 and B22 horizons are loamy sand or loamy fine sand, and the B23 horizon is loamy fine sand ranging to sand. The B21 horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. The B22 and B23 horizons have hue of 10YR grading to 2.5Y in transition to the C horizon. The C horizon is generally fine sand or sand. The amount of gravel-sized fragments in the C horizon is as much as 10 percent, by volume. The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 2 to 4.

Windsor soils are near Deerfield and Hinckley soils. Windsor and Deerfield soils formed in similar material, but Windsor soils are better drained. Windsor soils have much less gravel and fewer cobblestones throughout than Hinckley soils.

WdA—Windsor loamy sand, 0 to 3 percent slopes. This nearly level soil is on outwash plains and terraces. It has a profile similar to the one described as representative of the series, but it commonly has a dark plow layer.

Included with this soil in mapping are small areas of Deerfield and Hinckley soils. Also included are small areas of soils that have slopes of more than 3 percent, and areas of soils that have thin layers of silt or loam below a depth of about 30 inches.

Droughtiness and low natural fertility are the major limitations to the use of this soil for crops. This soil warms early in spring and is easily tilled. There are generally no serious limitations to intensive nonfarm uses.

This soil has limited suitability for row crops, hay, and pasture. Irrigation and heavy fertilization are needed for optimum growth of most crops. Cropping systems generally include cover crops, grasses, and legumes. Adding manure and returning crop residue to the soil help maintain organic-matter content.

Supplemental irrigation is generally needed to establish and maintain grass cover, especially in areas receiving heavy foot traffic.

Most of this soil is wooded. Some areas are being used for residential and small industrial developments. This soil is most desirable for community development uses. Capability unit IIIs–26.

WdB—Windsor loamy sand, 3 to 8 percent slopes. This undulating soil is on outwash plains and terraces. It has the profile described as representative of the series.

Included with this soil in mapping are small areas of Hinckley and Deerfield soils. Also included are small areas of soils that have slopes of more than 8 percent, spots that have surface stones, and areas that have thin layers of silt or loam below a depth of about 30 inches.

Droughtiness and low natural fertility are limitations to most farm uses of this soil. Slope is a limitation to some intensive nonfarm uses. Unprotected areas are susceptible to soil blowing and a slight hazard of water erosion.

This soil is poorly suited to most farm crops. Irrigation and large amounts of fertilizer are required for optimum growth of most crops. Cropping systems generally include cover crops, grasses, and legumes. Stripcropping helps to conserve moisture and reduce soil losses. Adding manure and returning crop residue help to maintain organic-matter content of the soil.

Supplemental irrigation is generally needed to establish and maintain grass cover in areas receiving heavy foot traffic.

This soil is used mostly for timber production, but some areas are being used for residential and small industrial developments. Because of slope, this soil is less desirable for residential and recreational uses than the nearly level Windsor soils. Capability unit IIIs–26.

WdC—Windsor loamy sand, 8 to 15 percent slopes. This rolling soil is on outwash plains, short slope breaks, or terraces. It has a profile similar to the one described as representative of the series, but it has a dark surface plow layer in places.

Included with this soil in mapping are small areas of Hinckley and Deerfield soils. Also included are small areas of soils that have slopes of more than 15 percent, spots that have surface stones, and local areas of soils that have thin layers of silt or loam below a depth of about 24 inches, especially near lakes.

Droughtiness is a severe limitation to the use of this soil for crops. Areas under cultivation and areas disturbed in construction are susceptible to gullying and soil blowing. Slope is a serious limitation to uses involving excavations to establish level grades, such as streets and parking lots.

This soil is better suited to drought-resistant grasses and legumes than to row crops. Irrigation is required for optimum growth of most crops and for the establishment and maintenance of grass cover, especially in residential and recreational areas receiving heavy foot traffic.

Most areas of this soil are wooded, but a few areas are being developed for residential and recreational uses. This soil is less favorable for intensive nonfarm uses than the less sloping Windsor soils. Timber production and extensive recreational uses are generally the most favorable. Capability unit IVs–26.

WdE—Windsor loamy sand, 15 to 60 percent slopes. This soil is on long narrow eskers, kame knolls, and escarpments on outwash plains and outwash-upland borders. It has a profile similar to the one described as representative of the series, but upper subsoil layers are thinner in most places.

Included with this soil in mapping are small areas of Hinckley and Gloucester soils. Also included are local spots that have surface stones.

Moderately steep to very steep slopes and droughtiness are major limitations to most uses of this soil. The hazard of water erosion is very severe where vegetation has been removed or excavations are made.

This soil is not suitable for row crops or hay crops. It is mainly wooded, but timber management is very difficult because of the short, steep slopes. This soil is best kept in a good sod or forest cover. Capability unit VIIs–26.

Winooski Series

The Winooski series consists of moderately well drained soils that formed in alluvial deposits of silt and very fine sand. These soils are along major streams on lower flood plain levels where the water table rises to near the surface seasonally. These soils generally flood annually.

In a representative profile of a Winooski soil in a wooded area, the surface layer is very fine sandy loam about 14 inches thick. It is dark brown in the upper 6 inches and very dark brown in the lower 8 inches. The subsoil, extending to a depth of 30 inches, is light olive-brown and olive-brown very fine sandy loam that has distinct mottles beginning at a depth of 20 inches. The underlying material to a depth of 40 inches is olive-brown very fine sandy loam. Below this to a depth of 50 inches, it is yellowish-brown stratified loose sand, coarse sand, and very coarse sand.

Permeability is moderate. Available water capacity is high. The depth to seasonal high water ranges from 18 to 30 inches below the surface. Woodcrop production is good.

Representative profile of Winooski very fine sandy loam in a wooded area, about one-third mile east of the intersection of the Kancamagus Highway and Bear Mountain Road (Albany Intervale) in the White Mountain National Forest, in the town of Albany:

Ap1—0 to 6 inches, dark-brown (10YR 3/3) very fine sandy loam; weak, fine, granular structure; very friable; many roots; strongly acid; clear, smooth boundary.

Ap2—6 to 14 inches, very dark brown (10YR 2/2) very fine sandy loam; weak, fine, granular structure; very friable; few roots; strongly acid; abrupt, smooth boundary.

B2—14 to 30 inches, light olive-brown (2.5Y 5/4) and olive-brown (2.5Y 4/4) very fine sandy loam; common, fine, distinct, yellowish-red (5YR 5/6) and light brownish-gray (2.5Y 6/2) mottles starting at a depth of 20 inches; weak, fine, granular structure; friable; strongly acid; clear, smooth boundary.

C1—30 to 40 inches, olive-brown (2.5Y 4/4) very fine sandy loam; common, fine, distinct, yellowish-red (5YR 5/6) mottles; weak, fine, granular structure; friable; strongly acid; abrupt, smooth boundary.

IIC2—40 to 50 inches, yellowish-brown (10YR 5/4) stratified sand, coarse sand, and very coarse sand; single grained; loose; strongly acid.

In the A1 or Ap horizon hue is 10YR or 2.5Y, and value is 2 to 4. The B2 horizon has hue of 10YR and 2.5Y, value of 3 to 5, and chroma of 2 to 6. Texture ranges from very fine sandy loam to silt loam. The C horizon has hue of 2.5Y, or 5Y, but hue ranges to 10YR in coarse materials. The C horizon is dominantly very fine sandy loam or silt loam, but layers of sand or gravelly sand are common in the underlying material.

Winooski soils are near Hadley, Limerick, and Podunk soils. Winooski, Hadley, and Limerick soils formed in similar materials, but Winooski soils are not so well drained as Hadley soils and they are better drained than Limerick soils. Winooski soils have finer textures to a depth of 40 inches than Podunk soils.

Wn—Winooski very fine sandy loam. This nearly level soil is on the low bottoms on flood plains along the major rivers, mostly the Saco River.

Included with this soil in mapping are small areas of Limerick, Hadley, and Podunk soils.

The flood hazard is the major limitation to intensive uses of this soil. Flooding generally occurs at least once in 1 or 2 years and sometimes more often. A seasonal high water table also limits intensive use.

This soil can be cropped continuously if it is drained and protected from flooding. Undrained areas are better suited to hay and pasture crops than to row crops. Depressions in this soil can generally be eliminated by land smoothing. A permanent strip of sod along streams reduces the hazard of streambank erosion.

Much of this soil is idle or in pasture, and some is in crops. A few areas are reverting to woods. Some spots are being developed for recreational uses. The potential is good for the development of woodland wildlife habitat. Capability unit IIw–12.

Woodbridge Series

The Woodbridge series consists of moderately well drained soils that formed in deposits of loamy glacial till. A firm pan layer is 18 to 36 inches beneath the surface. These soils are generally on concave slopes in upland depressions, at the heads of drainageways, or on foot slopes in the southern part of the county. Seepage moving down the slopes above the pan layer causes these soils to be seasonally wet.

In a representative profile of a Woodbridge soil in a reforested area, a layer of partly decayed leaves and needles 1 inch thick is on the surface. The surface layer, below this, is dark-brown fine sandy loam about 7 inches thick. The subsoil, extending to a depth of about 27 inches, is fine sandy loam that is yellowish-brown in the upper 13 inches and light olive-brown and distinctly mottled in the lower 7 inches. The underlying material to a depth of 46 inches is olive-gray firm fine sandy loam that has prominent mottles.

Permeability is moderate above the pan layer but moderately slow in the pan. Available water capacity is moderate. The depth to a seasonal high water table is 12 to 30 inches. Septic tank filter fields do not function well in these soils because of moderately slow permeability in the pan layer. Woodcrop productivity is good.

Representative profile of Woodbridge fine sandy loam in a reforested area of Woodbridge very stony fine sandy loam, 3 to 8 percent slopes, in the town of Moultonboro, about 1 mile south of the northern tip of Long Island, 250 feet east of road:

O2—1 inch to 0, partly decayed leaves and needles.

Ap—0 to 7 inches, dark-brown (10YR 3/3) fine sandy loam; weak, fine, granular structure; friable; many roots; 5 percent coarse fragments; strongly acid; abrupt, smooth boundary.

B21—7 to 12 inches, yellowish-brown (10YR 5/6) fine sandy loam; weak, fine, granular structure; friable; common roots; 5 percent coarse fragments; strongly acid; gradual, smooth boundary.

B22—12 to 20 inches, yellowish-brown (10YR 5/4) fine sandy loam; weak, fine, granular structure; friable; few roots; 5 percent coarse fragments; strongly acid; clear, smooth boundary.

B23—20 to 27 inches, light olive-brown (2.5Y 5/4) fine sandy loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, thin and medium, platy structure; friable; 7 percent coarse fragments; strongly acid; abrupt, smooth boundary.

Cx—27 to 46 inches, olive-gray (5Y 5/2) fine sandy loam; many, medium and coarse, prominent, yellowish-brown (10YR 5/6) mottles; moderate, thin and medium, platy structure; firm; 5 percent coarse fragments; strongly acid.

In the Ap horizon hue is 10YR, value is 3 or 4, and chroma is 2 to 4. The B horizon ranges from sandy loam to loam. The B21 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The B22 and B23 horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. The Cx horizon is fine sandy loam or sandy loam and gravelly analogs. Hue is 2.5Y or 5Y, value is 4 to 6, and chroma is 2 to 4. Structure is generally platy ranging to massive. Consistence of the Cx horizon is firm or very firm.

Woodbridge soils formed in material similar to the material in which the nearby Paxton, Ridgebury, and Sutton soils formed, but Woodbridge soils are not so well drained as Paxton soils. They are better drained than Ridgebury soils; they have a pan layer, and Sutton soils do not.

WoB—Woodbridge fine sandy loam, 3 to 8 percent slopes. This soil is on concave foot slopes and hill crests on uplands. Most of the surface stones have been removed.

Included with this soil in mapping are small areas of Ridgebury, Scituate, Sutton, and Paxton soils. Also included are small areas of soils that have slopes of more than 8 percent, spots that have bedrock within 3 feet of the surface, and scattered spots that have stones on the surface.

A seasonal high water table and the pan layer are the main limitations to intensive uses of this soil. The pan restricts downward movement of water, causing it to collect and move laterally above the pan. The hazard of erosion is slight in cultivated areas.

This soil is suited to cultivated crops and is well suited to grasses and legumes. If drained and used intensively for row crops, diversions and stripcropping are needed to control erosion. These practices are often used in cropping systems that include cover crops, grasses, and legumes. Excess water can generally be controlled by field ditches, tile drains, or diversions. This allows for earlier tillage, increased choice of crops, and also more intensive nonfarm uses. In open or cultivated areas, grassed waterways can help safely direct runoff to natural drainageways.

Much of this soil is wooded. Some remains in pasture or hay, and a small acreage is in orchards. Some of this soil, mainly near lakes, is being used for recreational homesites. Fill has generally been used to raise

septic tank filter fields or filter beds above the pan layer and water table. This soil has good potential for open-land and woodland wildlife habitat. Capability unit IIw–62.

WvB—Woodbridge very stony fine sandy loam, 3 to 8 percent slopes. This soil is on concave foot slopes and hillcrests on uplands. The profile described as representative of the series is in an area of this soil. Stones on the surface are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Ridgebury, Paxton, Sutton, and Scituate soils. Also included are small areas of soils that have slopes of more than 8 percent, spots that have bedrock within 3 feet of the surface, and extremely stony and bouldery spots.

Seasonal wetness, stoniness, and the pan layer are major limitations to most uses of this soil. The pan layer restricts downward movement of water, causing it to collect and move laterally above the pan. Excess water can generally be controlled by field ditches, tile drains, or diversions. In cleared areas, grassed waterways can help safely direct surface runoff to natural drainageways. Stoniness is an important consideration for specific uses requiring level grades, excavations, and seedbed preparation in landscaping or farming. The hazard of erosion is moderate in cleared areas.

Most of this soil is in woodland, but some small tracts are in pasture. Some sites near lakes, streams, or mountains are being developed as part of recreational or residential subdivisions. Fill has generally been used to raise septic tank filter fields or filter beds above the pan layer and the water table. The potential for the development of woodland wildlife habitat is good. Capability unit VIs–72.

WvC—Woodbridge very stony fine sandy loam, 8 to 15 percent slopes. This soil is on concave lower side slopes on uplands. It has a profile similar to the one described as representative of the series, but it commonly does not have a dark plow layer. Stones on the surface are generally 5 to 30 feet apart.

Included with this soil in mapping are small areas of Paxton, Sutton, and Scituate soils. Also included are small areas of soils that have slopes of more than 15 percent, spots that have bedrock within 3 feet of the surface, extremely stony and bouldery spots, and wet spots and narrow drainageways.

A seasonal high water table, stoniness, and a pan layer are the main limitations to intensive uses of this soil. The pan restricts downward water movement, causing it to move laterally above the pan. Excess water can generally be controlled by the use of tile drains or diversions. In cleared areas, grassed waterways can help safely channel runoff to natural drainageways. Slope and stoniness are important limitations to certain specific uses where level grades are required for roads, parking lots, and septic tank filter fields or filter beds. Stoniness interferes with seedbed preparation in landscaping or farming. The hazard of erosion is severe in cleared areas.

Most of this soil is in woodland, and some small tracts are in pasture. Many sites near lakes, streams, or mountains are being developed for residential uses as part of subdivisions. Fill has generally been used to raise septic tank filter fields or filter beds above the pan layer and water table. This soil has a good potential for woodland wildlife habitat. Capability unit VIs–72.

Use and Management of the Soils

In this section the use and management of soils for farming, woodland, wildlife, engineering, recreation, and town and country planning are discussed. Additional suggestions for the use and management of each soil are given in the section "Descriptions of the Soils."

For more detailed information, consult the local office of the Carroll County Agricultural Extension Service or Soil Conservation Service, or inquire at the New Hampshire Experiment Station at Durham, New Hampshire.

Crops and Pasture

The soils of Carroll County vary widely in their suitability for plants and in the kind of management needed. Surface texture ranges from silt loam to gravelly loamy sand. Some of the soils are well supplied with organic matter; some are not. Some need artificial drainage if they are used for cultivated crops. Most of them need lime and fertilizer but in different amounts.

The tilth of the surface soil and the supply of plant nutrients are very important. The subsoil also must furnish some nutrients and a great deal of water. The sandy and gravelly subsoil of droughty Colton soils and the sandy subsoil of droughty Adams soils can supply only a small amount of nutrients and water for plant growth. In contrast, the loamy subsoil of Berkshire and Marlow soils can supply adequate amounts of nutrients and water for most crops.

Many soil properties affect crop growth. Recognizing these specific characteristics and qualities is important in planning soil use and management. Some soil properties can be changed. For example, acid soils can be limed so that alfalfa can be grown. Some naturally wet soils, such as Naumburg loamy sand, can be drained to improve aeration and permit early preparation of seedbeds. Soils that are naturally low in organic-matter content can be improved by application of manure. Irrigation can correct moisture deficiencies in such soils as Adams loamy sand.

Other soil properties, such as slope and the physical character of the subsoil, are not so easily changed. Erosion and excess runoff can be controlled and tilth can be improved by terracing the slopes, keeping waterways in sod, and using suitable cropping systems.

It is important to know the problems of managing each soil because no single cropping system, fertilizer treatment, or erosion-control plan is good for all the soils in the county. Practices that are good on one farm may not be good on an adjoining farm. There are many differences among soils, and different management plans are needed to get the best yields.

Capability grouping

The capability classification is a grouping that shows, in a general way, the suitability of soils for

most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when these soils are used, and the way they respond to treatment.

In this classification system, all the narrowly defined soils of Carroll County are grouped at three levels: capability class, subclass, and unit. The broadly defined mapping units have not been assigned to capability units because of the variability of soils in mapped areas. The eight *capability classes* in the broadest grouping are designated by Roman numerals I through VIII. In Class I, the soils have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. Soils and landforms in Class VIII are so rough, shallow, or otherwise limited that they do not produce worthwhile amounts of crops, forage, or wood products.

The *subclasses* indicate major kinds of limitations within the classes. Within most of the classes there can be as many as four subclasses. The subclass is indicated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* means that water in or on the soil interferes with plant growth or cultivation (in some soils, the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; *c* is used in some parts of the country, but not in Carroll County; it indicates that the chief limitation is climate that is too cold or too dry.

Class I has no subclasses because the soils of this class have few or no limitations. Class V can have, at the most, only subclasses *w, s,* and *c,* because the soils in it are subject to little or no erosion. This class has other limitations, however, that restrict use largely to pasture, woodland, or wildlife.

Capability units within the subclasses are soil groups that are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are identified by an Arabic numeral added to the subclass designator, for example, IIe–5 or IIIe–6. The capability unit numbers are usually assigned locally but are part of a statewide system.

Soils are placed in capability classes, subclasses, and units according to the type and degree of their permanent limitations, but without consideration of possible but unlikely major reclamation projects, or major and generally expensive landforming that would change the slope, depth, or other characteristics of the soil.

Use and management of soils are described in the section "Descriptions of the Soils," and not in this section.

The eight classes in the capability system and the subclasses and capability units in this county are described in the list that follows. Because the capability classification of soils in Carroll County is part of a statewide system, all of the capability units in the system do not occur in this county. Consequently, capability unit numbers in the list are not consecutive.

Class I. Soils that have few limitations that restrict their use.

- Capability unit I–1.—Deep, well-drained, nearly level, very fine sandy loams on flood plains that are seldom flooded.
- Capability unit I–2.—Deep, well-drained, nearly level soils that formed in loamy deposits 26 to 36 inches thick over sands with some gravel. These soils occupy intervales at the edges of wide flood plains.

Class II. Soils that have some limitations that reduce the choice of plants or require conservation practices.

Subclass IIe.—Soils that are subject to moderate erosion if they are not protected.

- Capability unit IIe–2.—Deep, well-drained, gently sloping soils that formed in loamy deposits 26 to 36 inches thick over sands with some gravel. These soils occupy intervales at the edges of wide flood plains.
- Capability unit IIe–5.—Deep, well-drained, gently sloping soils that formed in loamy glacial till on uplands.
- Capability unit IIe–6.—Deep, well-drained, gently sloping soils that formed in loamy glacial till or loamy over sandy glacial till. These soils have a pan layer and are mostly on oval hills on uplands.

Subclass IIw.—Soils that have moderate limitations because of excess water.

- Capability unit IIw–10.—Deep, well-drained, nearly level, very fine sandy loams on flood plains that are frequently flooded.
- Capability unit IIw–12.—Deep, moderately well-drained, nearly level, very fine sandy loam and fine sandy loams on flood plains. These soils are subject to flooding.
- Capability unit IIw–32.—Deep, moderately well-drained, nearly level and gently sloping soils that formed in slack-water deposits of very fine sand and silt.
- Capability unit IIw–52.—Deep, moderately well-drained, nearly level to gently sloping soils that formed in sandy and loamy glacial till on uplands.
- Capability unit IIw–62.—Deep, moderately well-drained, gently sloping soils that formed in loamy glacial till. These soils have a pan layer and are on uplands.

Subclass IIs.—Soils that have moderate limitations because of available water capacity.

- Capability unit IIs–15.—Deep, somewhat excessively drained, nearly level soils that formed in dominantly fine sandy loam 20 to 36 inches thick over sand or gravel. These soils are on flood plains that are seldom flooded.
- Capability unit IIs–55.—Deep, well-drained to somewhat excessively drained, gently sloping soils that formed in sandy glacial till on uplands.

Class III. Soils that have severe limitations that re-

duce the choice of plants or require special conservation practices, or both.

Subclass IIIe.—Soils subject to severe erosion if they are cultivated and not protected.

Capability unit IIIe–6.—Deep, well-drained, sloping soils that formed in loamy glacial till or loamy over sandy glacial till. These soils have a pan layer and are mostly on rounded hills on uplands.

Capability unit IIIe–55.—Deep, somewhat excessively drained, sloping soils that formed in sandy glacial till on uplands.

Capability unit IIIe–56.—Shallow, somewhat excessively drained, gently sloping soils intermingled with pockets of deeper, well-drained soils on uplands. The shallow soils that predominate formed in a thin mantle of glacial till underlain by bedrock at a depth of about 20 inches.

Subclass IIIw.—Soils that have severe limitations because of excess water.

Capability unit IIIw–13.—Deep, poorly drained, nearly level soils on flood plains. These soils are subject to frequent flooding.

Capability unit IIIw–22.—Deep, moderately well drained, nearly level and gently sloping soils that formed in sands and gravel. These soils are on outwash plains and terraces.

Capability unit IIIw–33.—Deep, somewhat poorly drained to poorly drained, nearly level soils that formed in loamy over sandy deposits. They are on outwash plains in intervales and lake basins.

Capability unit IIIw–63.—Deep, somewhat poorly and poorly drained, nearly level to gently sloping soils that formed in loamy glacial till. These soils occupy upland depressions.

Subclass IIIs.—Soils that have severe limitations because of available water capacity.

Capability unit IIIs–16.—Deep, excessively drained, nearly level soils on flood plains. These soils are subject to frequent flooding.

Capability unit IIIs–26.—Deep, excessively drained, nearly level and gently sloping soils that formed in sands and gravel. These soils are on outwash plains and terraces.

Class IV. Soils that have very severe limitations that restrict the choice of plants, require very careful management, or both.

Subclass IVe.—Soils subject to very severe erosion if they are cultivated and not protected.

Capability unit IVe–56.—Shallow, somewhat excessively drained, sloping soils intermingled with pockets of deeper, well-drained soils on uplands. The shallow soils predominate. These soils formed in a thin mantle of glacial till underlain by bedrock at a depth of about 20 inches.

Subclass IVw.—Soils that have very severe limitations because of excess water.

Capability unit IVw–23.—Deep, somewhat poorly drained and poorly drained, nearly level to gently sloping soils that formed in sand deposits. These soils occupy depressional areas on outwash plains.

Subclass IVs.—Soils that have very severe limitations because of low available water capacity.

Capability unit IVs–26.—Deep, excessively drained, sloping soils that formed in sand and gravel. These soils are on outwash plains and terraces.

Class VI. Soils that have severe limitations that make them generally unsuitable for cultivation and that limit their use largely to pasture, woodland, or wildlife habitat.

Subclass VIe.—Soils severely limited, chiefly by risk of erosion, if protective cover is not maintained.

Capability unit VIe–56.—Shallow, somewhat excessively drained, moderately steep soils intermingled with pockets of deeper, well-drained soils on uplands. The shallow soils predominate. These soils formed in a thin mantle of glacial till underlain by bedrock at a depth of about 20 inches.

Subclass VIs.—Soils generally unsuitable for cultivation and limited for other uses by stones and outcrops of bedrock.

Capability unit VIs–7.—Deep, well-drained and somewhat excessively drained, gently sloping to moderately steep, very stony soils that formed in glacial till on uplands.

Capability unit VIs–57.—Shallow, very rocky, gently sloping to moderately steep soils intermingled with pockets of deeper, well-drained soils on uplands. The shallow soils predominate. These soils formed in a thin mantle of glacial till underlain by bedrock at a depth of about 20 inches.

Capability unit VIs–72.—Deep, moderately well drained, nearly level to sloping, very stony soils that formed in glacial till on uplands.

Class VII. Soils that have very severe limitations that make them unsuitable for cultivation without major reclamation, and that restrict their use largely to grazing, woodland, or wildlife.

Subclass VIIs.—Soils very severely limited by low available water capacity, stones, or outcrops of bedrock.

Capability unit VIIs–7.—Deep, well-drained and somewhat excessively drained, steep to very steep, very stony soils that formed in glacial till on uplands.

Capability unit VIIs–26.—Deep, excessively drained, moderately steep to very steep soils that formed in sand deposits. These soils occupy terrace breaks, kames, and eskers.

Capability unit VIIs–27.—Deep, excessively drained, moderately steep to very steep soils that formed in sand and gravel deposits. These soils are on terrace breaks, kames, and eskers.

TABLE 3.—*Predicted average yields per acre of*

[Yields in columns A are those obtained under ordinary management; those in columns B can be expected under improved man- justify the level of management specified. Very steep, stony, or rocky soils, extremely wet soils, and miscellaneous land types have 2 tons for hay, no yield estimates are given under the B level of management]

Soil	Corn for silage[1]		Potatoes	
	A	B	A	B
	Tons	*Tons*	*Bu*	*Bu*
Acton fine sandy loam, 0 to 8 percent slopes		18		
Adams loamy sand, 0 to 3 percent slopes		12		
Adams loamy sand, 3 to 8 percent slopes		12		
Adams loamy sand, 8 to 15 percent slopes				
Charlton fine sandy loam, 3 to 8 percent slopes	14	22	350	550
Colton gravelly loamy fine sand, 0 to 3 percent slopes		12		
Colton gravelly loamy fine sand, 3 to 8 percent slopes		12		
Croghan loamy fine sand, 0 to 3 percent slopes		16		
Croghan loamy fine sand, 3 to 8 percent slopes		16		
Deerfield loamy fine sand, 0 to 3 percent slopes		16		
Deerfield loamy fine sand, 3 to 8 percent slopes		16		
Duane fine sandy loam, 0 to 3 percent slopes		16		400
Duane fine sandy loam, 3 to 8 percent slopes		16		400
Gloucester fine sandy loam, 3 to 8 percent slopes		16		400
Gloucester fine sandy loam, 8 to 15 percent slopes		14		350
Hadley very fine sandy loam, high bottom	20	28	400	600
Hermon fine sandy loam, 3 to 8 percent slopes		16		450
Hermon fine sandy loam, 8 to 15 percent slopes		14		400
Hinckley gravelly loamy sand, 0 to 3 percent slopes		12		
Hinckley gravelly loamy sand, 3 to 8 percent slopes		12		
Hollis-Charlton fine sandy loams, 3 to 8 percent slopes		15		
Hollis-Charlton fine sandy loams, 8 to 15 percent slopes		14		
Hollis-Charlton fine sandy loams, 15 to 25 percent slopes				
Limerick silt loam		20		
Limerick very fine sandy loam, sandy subsoil variant		18		
Marlow fine sandy loam, 3 to 8 percent slopes	14	22	350	550
Marlow fine sandy loam, 8 to 15 percent slopes	14	20	350	500
Millis fine sandy loam, 3 to 8 percent slopes	14	20	350	550
Millis fine sandy loam, 8 to 15 percent slopes	12	18	300	500
Naumburg loamy sand, 0 to 8 percent slopes		16		
Nicholville silt loam, sandy subsoil variant, 0 to 3 percent slopes	14	22		450
Nicholville silt loam, sandy subsoil variant, 3 to 8 percent slopes	14	22		450
Ondawa fine sandy loam	14	22	300	500
Ondawa fine sandy loam, high bottom	18	26	350	550
Ondawa very fine sandy loam, sandy subsoil variant	14	20	300	500
Paxton fine sandy loam, 3 to 8 percent slopes	14	22	350	550
Paxton fine sandy loam, 8 to 15 percent slopes	14	20	350	500
Podunk fine sandy loam	16	24	350	500
Podunk fine sandy loam, sandy subsoil variant	14	22	300	450
Raynham silt loam, sandy subsoil variant		18		
Ridgebury fine sandy loam, 0 to 8 percent slopes		16		
Salmon very fine sandy loam, sandy subsoil variant, 0 to 3 percent slopes	16	24	350	550
Salmon very fine sandy loam, sandy subsoil variant, 3 to 8 percent slopes	16	24	350	550
Suncook loamy fine sand		12		
Sutton fine sandy loam, 0 to 8 percent slopes	14	22		450
Windsor loamy sand, 0 to 3 percent slopes		14		
Windsor loamy sand, 3 to 8 percent slopes		14		
Windsor loamy sand, 8 to 15 percent slopes		12		
Winooski very fine sandy loam	18	26	350	550
Woodbridge fine sandy loam, 3 to 8 percent slopes	14	24		450

[1] Estimates are for green weight.

[2] Based on alfalfa-timothy mixture, the most commonly used.

[3] Based on red clover-timothy mixture, the most commonly used.

principal crops under two levels of management

agement. Absence of a yield figure indicates the crop is not commonly grown or is not well suited to the soil, or yields do not not been included in the table. When yields are rated below the minimums of 12 tons for corn silage, 300 bushels for potatoes, and

Hay				Pasture			
Alfalfa-grass [2]		Clover-grass [3]		Permanent bluegrass		Tall grass-legume	
A	B	A	B	A	B	A	B
Tons	*Tons*	*Tons*	*Tons*	*Cow-acre days* [4]	*Cow-acre days* [4]	*Cow-acre days* [4]	*Cow-acre days* [4]
2.0	4.0	2.0	4.0	90	145	115	230
1.5	3.0	1.0	2.5	35	115	85	170
1.5	3.0	1.0	2.5	35	115	85	170
1.0	2.5	1.0	2.0	35	100	55	145
2.5	4.5	2.0	4.0	85	150	115	255
1.5	2.5	1.0	2.0	---	---	55	145
1.5	2.5	1.0	2.0	---	---	55	145
1.5	3.5	1.5	3.0	80	145	85	200
2.0	3.5	1.5	3.0	80	145	85	200
1.5	3.5	1.5	3.0	80	145	85	200
2.0	3.5	1.5	3.0	80	145	85	200
1.5	3.5	1.5	3.0	80	145	85	200
2.0	3.5	1.5	3.0	80	145	85	200
2.0	4.0	1.5	3.0	75	115	85	230
2.0	4.0	1.5	3.0	75	115	85	230
3.0	5.0	2.5	4.5	85	145	145	285
2.5	4.0	1.5	3.0	75	115	85	230
2.5	4.0	1.5	3.0	75	115	85	230
1.5	2.5	1.0	2.0	---	---	55	145
1.5	2.5	1.0	2.0	---	---	55	145
2.0	3.5	1.5	3.0	75	145	85	200
2.0	3.5	1.5	3.0	75	145	85	200
1.5	3.0	1.5	2.5	50	115	85	170
---	---	1.0	3.5	55	115	55	200
---	---	1.0	3.0	75	145	55	170
2.5	4.5	2.0	4.0	95	150	115	255
2.5	4.5	2.0	4.0	95	150	115	255
2.0	4.0	2.0	3.5	95	150	115	230
2.0	4.0	2.0	3.5	95	150	115	230
1.0	3.0	1.0	2.5	45	100	55	170
2.0	4.5	2.0	3.5	80	145	115	255
2.0	4.5	2.0	3.5	80	145	115	255
2.0	4.0	2.0	3.5	75	145	115	230
2.5	4.5	2.0	4.0	75	145	115	255
2.0	4.0	2.0	4.0	75	145	115	230
2.5	4.5	2.0	4.0	95	150	115	255
2.5	4.5	2.0	4.0	95	150	115	255
2.0	4.0	2.5	4.5	75	115	115	255
2.0	3.5	2.0	4.0	75	115	115	230
---	---	1.5	3.5	75	145	85	200
---	---	1.5	3.5	75	145	85	200
2.5	4.5	2.0	4.0	95	150	115	255
2.5	4.5	2.0	4.0	95	150	115	255
1.0	2.5	1.0	2.0	35	100	55	145
2.0	4.0	2.0	4.0	80	150	115	230
1.5	3.0	1.0	2.5	35	115	85	170
1.5	3.0	1.0	2.5	35	115	85	170
1.0	2.5	1.0	2.0	35	100	55	145
3.0	4.5	2.5	4.0	85	145	145	255
2.0	4.0	2.0	4.0	90	150	115	230

[4] Cow-acre days is a term used to express the number of days one acre will support one animal unit (one cow, steer, or horse; five hogs; or seven sheep or goats) without injury to pasture.

Capability unit VIIs–57.—Shallow, very rocky, steep soils intermingled with pockets of deeper, well-drained soils on uplands. The shallow soils predominate. These soils formed in a thin mantle of glacial till underlain by bedrock at a depth of about 20 inches.

Capability unit VIIs–58.—Deep and shallow, well-drained and somewhat excessively drained, sloping to very steep, very stony, extremely stony, and very rocky soils that formed in glacial till. These soils are on uplands.

Capability unit VIIs–73.—Deep, somewhat poorly drained and poorly drained, nearly level and gently sloping, very stony soils that formed in glacial till on uplands.

Capability unit VIIs–74.—Deep, very poorly drained, nearly level, very stony soils that formed in loamy glacial till. These soils have a pan layer and occupy upland depressions.

Estimated yields

The estimated yields of the main crops in Carroll County are shown in table 3. Yields are estimated for two levels of management and are listed under columns A and B. Those in column A are estimates for the prevailing or ordinary management now being used by farmers in the county. Yields in column B are those expected under improved management practices. Soils not shown in the table are considered too steep, too stony, too rocky, or too wet to produce economical yields for the crops listed. In addition, miscellaneous land types are not shown because their use is limited to nonfarm purposes or their properties are too variable for reliable estimates.

The yields shown are averages that can be expected over a period of several years. In any one year, yields may be affected by several factors, such as favorable or unfavorable weather, plant diseases, or insects.

The estimates in column A and column B are based largely on observations made by soil scientists during the survey and by members of the New Hampshire Agricultural Experiment Station; records of farmers; and records of other farm workers involved in obtaining yields throughout the county. For most soils, however, records on specific crop yields were not available.

Under prevailing or ordinary management, insufficient amounts of lime, fertilizer, and manure are used, and on some farms erosion control, drainage, and irrigation are inadequate. Improved varieties, certified seed, and proper seedbed preparation are not always used; and insects, plant diseases, and weeds are not well controlled. Estimated yields under this level of management are shown in column A of the table.

Improved management needed to obtain the yields listed in column B includes liming to the pH required for the crop; fertilizing according to need or desired yields as determined by soil tests; using good cropping systems; controlling runoff, erosion, weeds, brush, insects, and plant diseases; preparing seedbeds adequately; selecting suitable crops and varieties; and adjusting plant populations and seeding rates to the kind of soil and to the yields that may be expected (in estimating silage corn yields, plant populations of 20,000 to 24,000 per acre were assumed). Improved management for pasture includes liming, fertilizing, brush and weed control, seeding desirable forage plants, and regulating grazing.

Woodland Management

This section includes facts about forest resources in Carroll County and information about potential productivity, suitable trees and their limitations, and hazards of soils for growing trees.

Forest resources

The following subsections contain two discussions of the forest resources in Carroll County. The first discussion deals with private, State, and town forests, and the other, with the White Mountain National Forest.

Private, state, and town.[3]—Forest resources have had a significant economic impact in Carroll County since man first settled in the area. First, the forest provided masts for England's Navy; next the high-quality pine, spruce, and hemlock trees provided lumber for building towns and cities in the Northeast; then came the woodbox era that consumed billions of board feet of old-field white pine timber.

During the height of farm development, Carroll County was about 70 percent wooded. Today, it is about 92 percent wooded. Of this forest land, about 70 percent is privately controlled, 26 percent Federal (White Mountain National Forest), and about 4 percent State and town controlled.

The forest area is about 55 percent hardwood types, primarily paper birch, yellow birch, sugar maple, oak, white ash, beech, and red maple. The remaining acreage supports white pine, hemlock, spruce, balsam fir, and some red pine. Pitch pine and scrub oak, although not extensive or commercially important, are dominant on the sand barrens of the Ossipee Plains, partly because of their ability to regenerate after fires.

In the southern part of the county, soils on uplands support transitional hardwoods such as paper birch, white ash, and oak. With an increase in elevation and latitude, the stands on upland soils become pure northern hardwoods, such as sugar maple, yellow birch, and beech. At still higher elevations, spruce-fir stands prevail. White pine is the most productive forest type on sandy and gravelly soils of outwash plains and terraces.

The Carroll County Cooperative Extension Service carries on a forestry educational program which includes assistance in the field. These forestry programs are encouraged by the Agricultural Stabilization and Conservation Service, Carroll County Conservation District, and the Tree Farm Committee. Many woodland owners are active participants in forestry programs. Their objectives are to improve composition and quality of forest stands through a multiple-use forest-land management system. Most of these stands are 15 to 40 years old. These younger stands require silvicultural treatment to increase volume per acre production. Less than one-fifth of the timber growing today will pro-

[3] By PETER W. POHL, county forester, Carroll County Cooperative Extension Service.

duce the higher quality forest products that command the better prices.

Forest products produced in Carroll County include lumber, boltwood for turning dowels, pegs, and furniture. Within the county there are six sawmills, three boltmills, and two furniture factories. The total production of the sawmills and boltmills is approximately 33 million board feet, or 66,000 cords of softwood and hardwood. The forest products industry in the county employs, either directly or indirectly, about 1,000 persons on a full-time basis, or about 17 percent of the total labor force. Winter logging employs another 15 to 20 percent. Thus the forest products industry provides some employment for about 32 to 37 percent of the county labor force.

Within the last 10 years the importance of recreational activity on forest lands and the esthetic values of the county's forest has become more and more apparent. There is continuing pressure on forest lands for recreational uses such as camping, hiking, skiing, and picnicking. The forested mountains and abundant water resources insure a steady influx of visitors. Abandoned roads, powerlines, and rights-of-way attract snowmobile enthusiasts and cross-country skiers.

Soaring tax rates have forced the division of forest lands into smaller and smaller tracts. It becomes increasingly difficult to practice economical forestry on these small acreages. The recent passage of a current-use assessment bill will allow landowners in the county to retain forest land for the purpose of growing timber and providing recreation. Manageable tracts will insure the viability of the forest products industry.

White Mountain National Forest.[4]—The White Mountain National Forest was established in 1911. It is located in parts of Carroll, Coos, and Grafton Counties, New Hampshire, and parts of Oxford County, Maine. About 20 percent, or 147,000 acres, of the Forest is in Carroll County.

The Forest, since its inception, has been managed to provide planned use of its natural resources. These uses include timber production, outdoor recreation, fish and wildlife production, and water management. Under this multiple-use system of management, the management of the timber resources has been an objective of the Forest Service since the first stumpage was sold in 1916.

The objective of timber management is to produce a sustained yield of high-quality sawlogs, veneer logs, and cordwood products. The principal timber species in Carroll County are yellow birch, paper birch, sugar maple, white ash, red maple, beech, and hemlock. There are four major timber types in the White Mountain National Forest part of Carroll County. The largest is the beech-maple-birch type. The other three are spruce-fir, spruce-hardwood, and white birch. The minor types include white pine, aspen, and hemlock.

Trees in Carroll County are harvested at all levels of productivity. However, about 70 percent of the White Mountain National Forest lands are of medium or low productivity, because most of the forest land is on mountain slopes at relatively high elevations. The forest is very well stocked; however, there is an overabundance of old-growth sawtimber stands in comparison to young stands. The quality is low because of the beech bark disease and birch dieback and the fact that many stands are overmature.

The impacts of timber harvesting on other resources and uses are evaluated by a multidisciplinary team for each timber sale. The coordination between resources is very important. The Forest is managed under an even-aged system using clear-cutting, seed tree, and shelterwood cutting methods. This will reproduce stands with a good representation of intolerant species such as paper birch, yellow birch, and white ash as well as tolerant species such as maple, beech, and hemlock. The overall effect will be a continued improvement in the quality of the Forest for timber production as well as other uses.

Recreational use in the White Mountain National Forest continues to increase. In 1972 there were 627,000 recreation visitor-days to the facilities in Carroll County. The Forest Service maintains campsite units, trailer sites, shelters, and cabins for public use. They also maintain about 150 miles of trails in Carroll County.

The Forest provides suitable habitat for a wide variety of wildlife. Hunters, fishermen, camera buffs, and bird watchers are some of the kinds of visitors who enjoy forest wildlife.

Activities on the Forest, such as timber harvesting or road building, are closely coordinated with wildlife needs on a project-by-project basis. Management plans are designed to aid various species through critical periods in their lives. An example of this is the long-range plan designed to improve wintering areas for white-tailed deer through programed timber harvesting. The Forest is also concerned with the protection of, and management for, endangered or threatened species. Studies are being carried out to evaluate habitat needs, and various reintroduction attempts are being considered on the Forest.

Streams and ponds within the Forest are of high value for many uses including municipal water supplies, cold water fisheries, and recreational enjoyment. Forestwide guidelines are provided to minimize the impacts of resource use on water resources. Erosion control on roads, trails, and ski slopes is a critical aspect of watershed management. Waste disposal from recreational facilities is becoming more of a problem, especially at remote sites.

Woodland interpretations

Woodland soil interpretations are made to help landowners plan the management of their soils for woodland. In table 4 yields for selected tree species are given, and in table 5 each soil in the county is rated according to its estimated tree-producing potential. The hazards and limitations that affect the suitability of soils for woodland are also indicated.

Soils differ in their ability to produce trees just as they do in their ability to produce farm crops. Soil properties affect tree growth, species adaptation, and forest management practices. The depth of the soil, texture, structure, moisture content, and availability of nutrients are factors that are important to tree growth. For example, trees grow faster in deep soils

[4] By the Forest Service Staff, White Mountain National Forest, Laconia, New Hampshire.

TABLE 4.—*Timber yields of selected tree species*

Forest species and productivity ratings	Site index	Average yield per acre at age 50
	Feet	*Board feet*
White pine: [1]		
Good	70–80	50,000
Fair	60–70	36,500
Poor	50–60	24,000
Upland oaks: [2]		
Good	65–75	9,750
Fair	55–65	6,300
Poor	45–55	3,250
Northern hardwoods: [3]		
Good	59–66	9,000
Fair	52–59	7,000
Poor	45–52	6,000
Red spruce: [4]		
Good	50–60	12,500
Fair	40–50	8,150
Poor	30–40	4,050

[1] For trees with breast-height diameter of 5 inches or more.

[2] For trees with a top diameter of 5 inches inside bark (International rule, ⅛-inch saw kerf).

[3] For trees with breast-height diameter of more than 4 inches, including total tree height.

[4] For trees with breast-height diameter of 7 inches or more (International rule, ¼-inch saw kerf).

that are high in available water capacity, such as those of the Hadley series, than they do in gravelly and droughty soils, such as those of the Colton series. Other factors that affect tree growth are climate and topography.

A standard measure of productivity is *site index*. Site index is the average height of the dominant and codominant trees in a fully stocked stand at the age of 50 years. In table 5 an estimated *productivity rating* (*good, fair,* or *poor*) is assigned to each mapping unit to show suitability for white pine (fig. 9), upland oaks, northern hardwoods (fig. 10), and red spruce. These ratings are based on site index measurements. Only a few of the measurements were made in Carroll County. The ratings shown in table 5 are based mostly on site index measurements made on the same or similar soils in nearby counties. The degree to which soil-related factors affect woodland management is also shown in table 5.

Seedling mortality refers to mortality of naturally occurring or planted tree seedlings, as influenced by kinds of soil or topographic conditions when plant competition is assumed not to be a factor. *Slight* means a loss of 0 to 25 percent; *moderate* means a loss of 25 to 50 percent; and *severe* means a loss of more than 50 percent of the seedlings. It is assumed that seed supplies are adequate.

Plant competition refers to the degree of competition from other plants and the rate that undesirable species invade different soils when openings are made in the canopy. Competition is *slight* if unwanted plants are no special concern. It is *moderate* if the invaders delay but do not prevent the establishment of normal, fully stocked stands of desirable trees. Competition is *severe* if desirable trees cannot regenerate naturally or artificially without intensive site preparation and maintenance such as weeding. Plant competition in table 5 is subdivided into competition for hardwoods and for conifers.

Use of equipment is rated according to the degree that soil characteristics restrict or prohibit the use of equipment commonly used in woodland management or in tree harvesting. Natural wetness, steepness of slope, and number of stones and boulders are the principal limiting factors considered. Limitations are *slight* if slopes are less than 15 percent and there are no special problems in the use of equipment throughout the year. A rating of *moderate* indicates that the use of heavy equipment is restricted by wetness in spring and wet seasons, or that slopes range from 15 to 35 percent. A rating of *severe* indicates that use of some kinds of equipment are limited because the soils are very poorly drained or are extremely stony or extremely rocky; because of steep slopes (greater than 35 percent); or because the soils are too wet for more than 3 months during the year.

Woodland roads are based on soil characteristics that restrict or prohibit construction or use of access roads. Natural drainage, rockiness, number of stones and boulders, erosion hazard, and gradient are examples of these factors. A rating of *slight* indicates that no special problems are recognized. A rating of *moderate* indicates that the soil is limited for the construction or use of roads for less than 3 months per year. Seasonal wetness is common. A *severe* rating indicates that normal use is restricted for more than 3 months per year because of wetness, or that the number of boulders or rock outcrops limits road construction.

Windthrow hazard depends on the development of roots and on the ability of soils to hold trees firmly. A rating of *slight* indicates that roots develop normally and windthrow is not common. A rating of *moderate* indicates that trees will remain standing unless wind velocity is high and soils are unusually wet. A rating of *severe* indicates that the soil does not allow adequate rooting for stability. Windthrow may be common because of high water table, a pan layer, or because bedrock limits the depth of roots to about 10 inches.

Suitable species are those in natural stands and the ones generally preferred for planting as timber and Christmas trees. The species named are best for the soils listed, and they are not listed in order of priority. They are also considered to have a higher relative value than those not named. Hardwoods are not listed for new plantings because they are more difficult to establish and normally are less successful than conifers.

With the yield data listed in table 4 and the productivity ratings shown in table 5, average yield per acre can be estimated for unmanaged stands of white pine, upland oaks, northern hardwoods, and red spruce in each mapping unit.

The yield data in table 4 are from the following sources: white pine—USDA Bulletin 13 (*7*); upland oaks—USDA Technical Bulletin 560 (*10*); northern hardwoods—Proceedings of the First North American Forest Soils Conference, 1958 (*5*) and site index data

Figure 9.—Natural stand of white pine on Marlow soils. Estimated productivity is good.

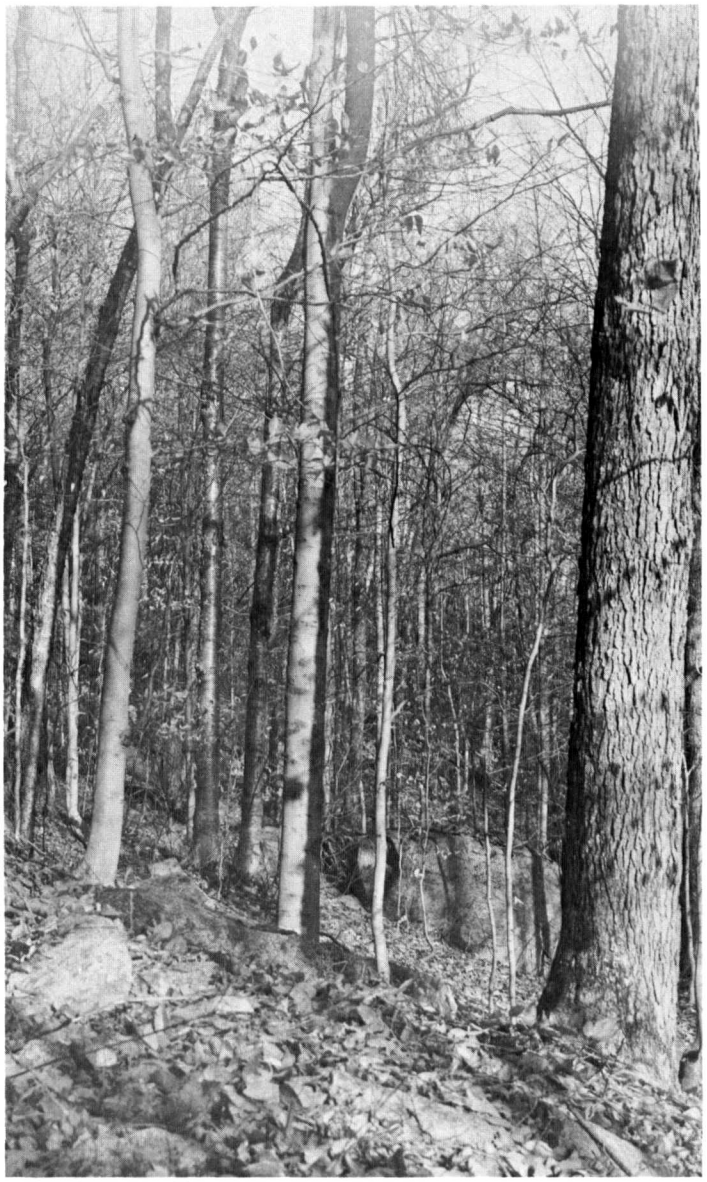

Figure 10.—Typical stand of northern hardwoods on Berkshire soils. Estimated productivity is fair.

from Forest Service Lake States Forest Experiment Station Technical Note 485 (*17*) ; and red spruce—volume yield from USDA Technical Bulletin 142 (*9*) and site index data from an unpublished site index curve prepared by the Soil Conservation Service and the Vermont Forest Service in 1962.

Wildlife Management[5]

Carroll County has a good population of fish and wildlife. Major game species are deer, bear, grouse, and snowshoe hare, but bobcat, raccoon, and other small game are also found. Such furbearers as beaver, muskrat, and fisher are common. Waterfowl are present, but not in great numbers.

Warm-water fish such as smallmouth bass, perch, pickerel, and horned pout are common. Salmonoid species include landlocked salmon, smelt, lake trout, brook trout, and brown trout.

Osprey and golden eagle might be nesting in the National Forest.

Successful management of wildlife on any tract of land requires that a suitable combination of food, cover, and water be available. If any one of these elements is lacking or unfavorably distributed, certain desirable wildlife species may be absent or limited in number. Soils information provides a valuable tool in creating, improving, or maintaining suitable food, cover, and water for wildlife.

[5] By DAVID N. ALLAN, field biologist, Soil Conservation Service.

TABLE 5.—*Estimated productivity, limitations,*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The instructions for referring to other series that

Soil series and map symbols	Estimated productivity for—				Limitations
	White pine	Upland oaks	Northern hardwoods	Red spruce	Seedling mortality
Acton: AcB, AdB, AdC	Fair	Fair	Fair	Fair	Slight
Adams: AmA, AmB, AmC	Fair	Poor	Fair	Poor	Moderate
AmE	Fair	Poor	Fair	Poor	Moderate
Alluvial land, wet: AW. Too variable to be rated.					
*Becket: BcB, BcC	Fair	Fair	Fair	Fair	Slight
BcD, BKC	Fair	Fair	Fair	Fair	Slight
For the Skerry part of BKC, see Skerry series.					
BcE, BEE	Fair	Fair	Fair	Fair	Slight
Berkshire: BsB, BsC, BVC	Good	Fair	Fair	Fair	Slight
BsD	Good	Fair	Fair	Fair	Slight
BsE, BtD, BVE	Good	Fair	Fair	Fair	Slight
BVF	Good	Fair	Fair	Fair	Slight
*Canaan: CDC, CDE: Canaan part	Poor	Poor	Fair	Fair	Severe

and suitability of the soils for woodland

soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the appear in the first column of this table]

Limitations—Continued					Suitable species—	
Plant competition		Use of equipment	Woodland roads	Windthrow hazard	For planting (timber and Christmas trees)	To retain in natural stands
Hardwoods	Conifers					
Slight	Moderate	Slight	Moderate	Slight	White pine, red pine, white spruce, balsam fir, and Douglas-fir.	White pine, red oak, sugar maple, white spruce, and paper birch.
Slight	Slight	Slight	Slight	Slight	White pine, red pine, and Scotch pine.	White pine and red pine.
Slight	Slight	Severe	Slight	Slight	White pine, red pine, and Scotch pine.	White pine and red pine.
Slight	Moderate	Slight	Slight [1]	Slight	White pine, white spruce, and balsam fir.	Sugar maple, paper birch, yellow birch, white spruce, red spruce, and balsam fir.
Slight	Moderate	Moderate	Slight [1]	Slight	White pine, white spruce, and balsam fir.	Sugar maple, paper birch, yellow birch, white spruce, red spruce, and balsam fir.
Slight	Moderate	Moderate	Moderate	Slight	White pine, white spruce, and balsam fir.	Sugar maple, paper birch, yellow birch, white spruce, red spruce, and balsam fir.
Slight	Moderate	Slight	Slight	Slight	White pine, red pine, white spruce, and balsam fir.	Sugar maple, paper birch, yellow birch, white pine, white spruce, red spruce, and hemlock.
Slight	Moderate	Moderate	Slight	Slight	White pine, red pine, white spruce, and balsam fir.	Sugar maple, paper birch, yellow birch, white pine, white spruce, red spruce, and hemlock.
Slight	Moderate	Moderate	Moderate	Slight	White pine, red pine, white spruce, and balsam fir.	Sugar maple, paper birch, yellow birch, white pine, white spruce, red spruce, and hemlock.
Slight	Moderate	Severe	Severe	Slight	White pine, red pine, white spruce, and balsam fir.	Sugar maple, paper birch, yellow birch, white pine, white spruce, red spruce, and hemlock.
Slight	Slight	Moderate	Moderate	Moderate	White pine, white spruce, and Scotch pine.	White spruce, red spruce, paper birch, and hemlock.

TABLE 5.—*Estimated productivity, limitations,*

Soil series and map symbols	Estimated productivity for—				Limitations
	White pine	Upland oaks	Northern hardwoods	Red spruce	Seedling mortality
Canaan: CDC, CDE, continued					
Redstone part	Fair	Poor	Fair	Poor	Moderate
CEE, CEF:					
Canaan part	Poor	Poor	Fair	Fair	Severe
Redstone part	Fair	Poor	Fair	Poor	Moderate
Rock outcrop parts of CEE and CEF are too variable to be rated.					
Charlton:					
CfB, CIB, CIC	Fair	Fair	Fair	Fair	Slight
CID	Fair	Fair	Fair	Fair	Slight
Chocorua: CM. Unsuited to commercial production of timber.					
Colton:					
CnA, CnB, CnC	Fair	Poor	Fair	Poor	Moderate
CnE	Fair	Poor	Fair	Poor	Moderate
Croghan: CyA, CyB	Fair	Fair	Fair	Fair	Slight
Deerfield: DeA, DeB	Fair	Fair	Fair	Fair	Slight
Duane: DnA, DnB	Fair	Fair	Fair	Fair	Slight
Fresh water marsh: FA. Unsuited to commercial production of timber.					
Gloucester:					
GIB, GIC, GsB, GsC	Fair	Poor	Fair	Poor	Moderate
GsD	Fair	Poor	Fair	Poor	Moderate
GtD, GtE	Fair	Poor	Fair	Poor	Moderate

and suitability of the soils for woodland—Continued

Limitations—Continued					Suitable species—	
Plant competition		Use of equipment	Woodland roads	Windthrow hazard	For planting (timber and Christmas trees)	To retain in natural stands
Hardwoods	Conifers					
Slight	Slight	Slight. Moderate for 15 to 35 percent slopes.	Slight. Moderate for 15 to 35 percent slopes.	Slight	White pine, white spruce, and Scotch pine.	White spruce, red spruce, paper birch, and hemlock.
Slight	Slight	Severe	Severe	Severe	White pine, white spruce, and Scotch pine.	White spruce, red spruce, paper birch, and hemlock.
Slight	Slight	Moderate. Severe for slopes greater than 35 percent.	Moderate. Severe for slopes greater than 35 percent.	Slight	White pine, white spruce, and Scotch pine.	White spruce, red spruce, paper birch, and hemlock.
Slight	Moderate	Slight	Slight	Slight	White pine, red pine, white spruce, Douglas-fir, and Scotch pine.	White pine, sugar maple, yellow birch, red oak, paper birch, and hemlock.
Slight	Moderate	Moderate	Slight	Slight	White pine, red pine, white spruce, Douglas-fir, and Scotch pine.	White pine, sugar maple, yellow birch, red oak, paper birch, and hemlock.
Slight	Slight	Slight	Slight	Slight	Red pine, white pine, and Scotch pine.	Red pine and white pine.
Slight	Slight	Moderate	Slight	Slight	Red pine, white pine, and Scotch pine.	Red pine and white pine.
Slight	Moderate	Slight	Moderate	Slight	White pine, red pine, balsam fir, white spruce, and Douglas-fir.	White pine, balsam fir, white spruce, and red spruce.
Slight	Moderate	Slight	Moderate	Slight	White pine, red pine, white spruce, and Douglas-fir.	White pine, red pine, and red oak.
Slight	Moderate	Slight	Moderate	Slight	White pine, red pine, balsam fir, and white spruce.	White pine, balsam fir, white spruce, and red spruce.
Slight	Slight	Slight	Slight	Slight	White pine, red pine, and Scotch pine.	White pine, red pine, red oak, and hemlock.
Slight	Slight	Moderate	Slight	Slight	White pine, red pine, and Scotch pine.	White pine, red pine, red oak, and hemlock.
Slight	Slight	Moderate. Severe for 35 to 60 percent slopes.	Severe	Slight	White pine, red pine, and Scotch pine.	White pine, red pine, red oak, and hemlock.

TABLE 5.—*Estimated productivity, limitations,*

Soil series and map symbols	Estimated productivity for—				Limitations
	White pine	Upland oaks	Northern hardwoods	Red spruce	Seedling mortality
Greenwood: GW. Unsuited to commercial production of timber.					
Hadley: Ha	Good	Good	Good		Slight
Hermon:					
HfB, HfC, HmB, HmC	Fair	Poor	Fair	Poor	Moderate
HmD, HmE	Fair	Poor	Fair	Poor	Moderate
HnD, HnE, HOF	Fair	Poor	Fair	Poor	Moderate
HOC, HOE	Fair	Poor	Fair	Poor	Moderate
Hinckley:					
HsA, HsB, HsC	Poor	Poor	Poor		Severe
HsE	Poor	Poor	Poor		Severe
*Hollis:					
HtB, HtC	Poor	Poor	Fair	Fair	Severe
HtD, HvB, HvC, HvD, HvE	Poor	Poor	Fair	Fair	Severe
HxD, HxE. For the Charlton parts, see Charlton series. Rock outcrop parts of HxD and HxE are too variable to be rated.	Poor	Poor	Fair	Fair	Severe
*Leicester: LDB, LfA, LfB. For the Ridgebury part of LDB, see Ridgebury series. Interpretations are for both the Leicester and Walpole parts of LfA and LfB.	Fair	Poor	Poor	Fair	Severe
Limerick: Lk	Fair	Poor	Poor	Fair	Severe

and suitability of the soils for woodland—Continued

Limitations—Continued					Suitable species—	
Plant competition		Use of equipment	Woodland roads	Windthrow hazard	For planting (timber and Christmas trees)	To retain in natural stands
Hardwoods	Conifers					
Slight	Moderate	Slight	Slight	Slight	White pine, red pine, white spruce, and Douglas-fir.	White pine, yellow birch, sugar maple, and white ash.
Slight	Slight	Slight	Slight	Slight	White pine, red pine, and Scotch pine.	White pine, red spruce, balsam fir, paper birch, and hemlock.
Slight	Slight	Moderate. Severe for slopes greater than 35 percent.	Slight	Slight	White pine, red pine, and Scotch pine.	White pine, red spruce, balsam fir, paper birch, and hemlock.
Slight	Slight	Moderate. Severe for slopes greater than 35 percent.	Severe	Slight	White pine, red pine, and Scotch pine.	White pine, red spruce, balsam fir, paper birch, and hemlock.
Slight	Slight	Moderate	Moderate	Slight	White pine, red pine, and Scotch pine.	White pine, red spruce, balsam fir, paper birch, and hemlock.
Slight	Slight	Slight	Slight	Slight	White pine, red pine, and Scotch pine.	White pine and red pine.
Slight	Slight	Moderate. Severe for slopes greater than 35 percent.	Slight	Slight	White pine, red pine, and Scotch pine.	White pine and red pine.
Slight	Slight	Slight	Slight	Moderate	White pine, red spruce, and Scotch pine.	White pine, sugar maple, yellow birch, red spruce, paper birch, and hemlock.
Slight	Slight	Moderate	Moderate	Moderate	White pine, red spruce, and Scotch pine.	White pine, sugar maple, yellow birch, red spruce, paper birch, and hemlock.
Slight	Slight	Severe	Severe	Moderate	White pine, red spruce, and Scotch pine.	White pine, sugar maple, yellow birch, red spruce, paper birch, and hemlock.
Moderate	Moderate	Severe	Severe	Severe	White pine and white spruce.	White pine, red spruce, and red maple.
Severe	Severe	Severe	Severe	Severe	White pine and white spruce.	White pine, white spruce, and red maple.

TABLE 5.—*Estimated productivity, limitations,*

Soil series and map symbols	Estimated productivity for—				Limitations
	White pine	Upland oaks	Northern hardwoods	Red spruce	Seedling mortality
Limerick variant: Lm	Fair	Poor	Poor	Fair	Severe
*Lyman: LnB, LnC, LnD, LnE	Poor	Poor	Fair	Fair	Severe
LsD, LsE, LVC, LVE, LVF, LYE, LYF. For the Berkshire parts, see Berkshire series. Rock outcrop parts of LsD, LsE, LYE, and LYF are too variable to be rated.	Poor	Poor	Fair	Fair	Severe
*Marlow: MaB, MaC, MdB, MdC	Good	Good	Fair	Fair	Slight
MdD, MdE	Good	Good	Fair	Fair	Slight
MEE, MFC. For the Peru part of MFC, see Peru series.	Good	Good	Fair	Fair	Slight
MEF	Good	Good	Fair	Fair	Slight
Millis: MlB, MlC, MsB, MsC	Fair	Poor	Fair	Poor	Moderate
MsD	Fair	Poor	Fair	Poor	Moderate
Muck and Peat: MU. Unsuited to commercial production of timber.					
Naumburg: NaB	Fair	Poor	Fair	Fair	Severe
Nicholville variant: NcA, NcB	Good	Good	Good	Good	Slight
Ondawa: Of, Oh	Fair	Fair	Fair	Fair	Slight

and suitability of the soils for woodland—Continued

Limitations—Continued					Suitable species—	
Plant competition		Use of equipment	Woodland roads	Windthrow hazard	For planting (timber and Christmas trees)	To retain in natural stands
Hardwoods	Conifers					
Severe	Severe	Severe	Severe	Severe	White pine and white spruce.	White pine, white spruce, and red maple.
Slight	Slight	Moderate	Moderate	Moderate	White pine, balsam fir, and white spruce.	White pine, balsam fir, sugar maple, yellow birch, white spruce, red spruce, and paper birch.
Slight	Slight	Severe	Severe	Moderate	White pine, balsam fir, and white spruce.	White pine, balsam fir, sugar maple, yellow birch, white spruce, red spruce, and paper birch.
Slight	Moderate	Slight	Slight [1]	Slight	White pine, white spruce, and balsam fir.	White pine, sugar maple, yellow birch, white spruce, white ash, and paper birch.
Slight	Moderate	Moderate. Severe for slopes greater than 35 percent.	Slight [1]	Slight	White pine, white spruce, and balsam fir.	White pine, sugar maple, yellow birch, white spruce, white ash, and paper birch.
Slight	Moderate	Moderate	Severe	Slight	White pine, white spruce, and balsam fir.	White pine, sugar maple, yellow birch, white spruce, white ash, and paper birch.
Slight	Moderate	Severe	Severe	Slight	White pine, white spruce, and balsam fir.	White pine, sugar maple, yellow birch, white spruce, white ash, and paper birch.
Slight	Slight	Slight	Slight [1]	Slight	White pine and red pine.	White pine, red pine, red oak, and paper birch.
Slight	Slight	Moderate	Slight [1]	Slight	White pine and red pine.	White pine, red pine, red oak, and paper birch.
Moderate	Moderate	Severe	Severe	Severe	White pine, white spruce, and balsam fir.	White pine, balsam fir, and red maple.
Slight	Moderate	Slight	Moderate	Slight	White pine, white spruce, balsam fir, and Douglas-fir.	White pine, yellow birch, sugar maple, white spruce, balsam fir, red spruce, and white ash.
Slight	Moderate	Slight	Slight	Slight	White pine, white spruce, balsam fir, and Douglas-fir.	White pine, yellow birch, sugar maple, and red oak.

TABLE 5.—*Estimated productivity, limitations,*

Soil series and map symbols	Estimated productivity for—				Limitations
	White pine	Upland oaks	Northern hardwoods	Red spruce	Seedling mortality
Ondawa variant: Os	Fair	Fair	Fair	Fair	Slight
Ossipee: OT. Unsuited to commercial production of timber.					
Paxton:					
PaB, PaC, PdB, PdC	Fair	Good	Good	Fair	Slight
PdD	Fair	Good	Good	Fair	Slight
Peru:					
PeB, PeC	Good	Good	Fair	Fair	Slight
PLC	Good	Good	Fair	Fair	Slight
Podunk: Po	Good	Good	Good	Fair	Slight
Podunk variant: Ps	Good	Good	Good	Fair	Slight
Raynham variant: Ra	Fair	Poor	Fair	Fair	Severe
Redstone. Mapped only in complexes with Canaan soils.					
Ridgebury: RgB, RlA, RlB	Fair	Poor	Poor	Fair	Severe
*Rock outcrop: RO, RPE, RPF. Rock outcrop is unsuited to commercial production of timber. For the Lyman parts of RPE and RPF, see Lyman series.					
Salmon variant: SaA, SaB	Good	Good	Good	Good	Slight
Scituate: SdB, SdC	Fair	Fair	Fair	Fair	Slight

and suitability of the soils for woodland—Continued

Limitations—Continued					Suitable species—	
Plant competition		Use of equipment	Woodland roads	Windthrow hazard	For planting (timber and Christmas trees)	To retain in natural stands
Hardwoods	Conifers					
Slight	Moderate	Slight	Slight	Slight	White pine, white spruce, balsam fir, and Douglas-fir.	White pine, yellow birch, sugar maple, and red oak.
Slight	Moderate	Slight	Slight [1]	Slight	White pine and white spruce.	White pine, sugar maple, yellow birch, white spruce, red oak, white ash, and hemlock.
Slight	Moderate	Moderate	Slight [1]	Slight	White pine and white spruce.	White pine, sugar maple, yellow birch, white spruce, red oak, white ash, and hemlock.
Slight	Moderate	Slight	Moderate	Slight	White pine, white spruce, balsam fir, and Douglas-fir.	White pine, sugar maple, yellow birch, white spruce, red oak, white ash, and hemlock.
Slight	Moderate	Moderate	Severe	Slight	White pine, white spruce, balsam fir, and Douglas-fir.	White pine, sugar maple, yellow birch, white spruce, red oak, white ash, and hemlock.
Slight	Moderate	Slight	Moderate	Slight	White pine and white spruce.	White pine, yellow birch, sugar maple, and red oak.
Slight	Moderate	Slight	Moderate	Slight	White pine and white spruce.	White pine, yellow birch, sugar maple, and red oak.
Moderate	Moderate	Severe	Severe	Severe	White pine and white spruce.	White pine, white spruce, and red maple.
Moderate	Moderate	Severe	Severe	Severe	White pine and white spruce.	White pine, white spruce, and red maple.
Slight	Slight	Slight	Slight	Slight	White pine, red pine, balsam fir, and white spruce.	White pine, balsam fir, white spruce, and red spruce.
Slight	Moderate	Slight	Moderate	Slight	White pine, white spruce, and Douglas-fir.	White pine, sugar maple, red oak, and hemlock.

TABLE 5.—*Estimated productivity, limitations,*

Soil series and map symbols	Estimated productivity for—				Limitations
	White pine	Upland oaks	Northern hardwoods	Red spruce	Seedling mortality
Skerry: SeB, SeC	Good	Good	Fair	Fair	Slight
Suncook: Sf	Poor	Poor	Poor	Poor	Severe
Sutton: SnB, SuB	Fair	Fair	Fair	Fair	Slight
Walpole. Mapped only in complexes with Leicester soils.					
*Waumbek: WaB, WaC	Fair	Fair	Fair	Fair	Slight
WBC. For the Skerry part of WBC, see Skerry series.	Fair	Fair	Fair	Fair	Slight
Whitman: Wc	Poor	Poor	Poor	Poor	Severe
Windsor: WdA, WdB, WdC	Poor	Poor	Fair	Poor	Severe
WdE	Poor	Poor	Fair	Poor	Severe
Winooski: Wn	Good	Good	Good	Good	Slight
Woodbridge: WoB, WvB, WvC	Good	Good	Good	Good	Slight

[1] Excessive seepage may be a limitation during wet periods.

Wildlife habitat is normally managed by manipulating existing vegetation to increase or improve desired plants, by encouraging natural establishment, by planting, or by combinations of such measures. In addition, water areas can be created or natural areas can be improved as wildlife habitat. Information on soil is useful for these purposes.

Soil interpretations for wildlife habitat serve a variety of purposes. They are guides for selecting the more suitable sites for various kinds of habitat management. They indicate the level of management needed to achieve satisfactory results. They also show why it may not be generally feasible to manage a particular area for a given kind of wildlife.

These interpretations also may serve in broad-scale planning of wildlife management areas, parks, and

and suitability of the soils for woodland—Continued

Limitations—Continued					Suitable species—	
Plant competition		Use of equipment	Woodland roads	Windthrow hazard	For planting (timber and Christmas trees)	To retain in natural stands
Hardwoods	Conifers					
Slight	Moderate	Slight	Moderate	Slight	White pine, white spruce, balsam fir, and Douglas-fir.	White pine, sugar maple, yellow birch, red oak, white spruce, balsam fir, and hemlock.
Slight	Slight	Slight	Slight	Slight	White pine, red pine, and Scotch pine.	White pine and red pine.
Slight	Moderate	Slight	Moderate	Slight	White pine, white spruce, balsam fir, and Douglas-fir.	White pine, red oak, sugar maple, yellow birch, white ash, and hemlock.
Slight	Moderate	Slight	Moderate	Slight	White pine, balsam fir, white spruce, and Douglas-fir.	White pine, balsam fir, yellow birch, sugar maple, white spruce, red spruce, and paper birch.
Slight	Moderate	Moderate	Moderate	Slight	White pine, balsam fir, white spruce, and Douglas-fir.	White pine, balsam fir, yellow birch, sugar maple, white spruce, red spruce, and paper birch.
Moderate	Moderate	Severe	Severe	Severe	White pine and white spruce.	Red maple.
Slight	Slight	Slight	Slight	Slight	White pine, red pine, and Scotch pine.	White pine and red pine.
Slight	Slight	Severe	Slight	Slight	White pine, red pine, and Scotch pine.	White pine and red pine.
Slight	Moderate	Slight	Moderate	Slight	White pine, red pine, white spruce, balsam fir, and Douglas-fir.	White pine, yellow birch, sugar maple, and red oak.
Slight	Moderate	Slight	Moderate	Slight	White pine, white spruce, and Douglas-fir.	White pine, red oak, sugar maple, yellow birch, and white ash.

nature areas, or for acquiring wildlife lands. The suitability or grouping of individual habitat elements may be considered by using a map overlay.

The soil areas shown on the soil survey maps are rated without regard to their position relative to adjoining delineated areas, present land use, or the mobility of wildlife. The size, shape, or location of the outlined areas does not affect the rating. Certain influences on habitats, such as elevation and aspect, must be appraised at the site. For specific detail on a given limitation, the section "Descriptions of the Soils" should be consulted.

In table 6, the soils of Carroll County are rated for their suitability for the creation, improvement, or maintenance of seven wildlife habitat elements (*1*).

Habitat suitability ratings are defined as follows:

TABLE 6.—*Suitability of the soils for elements*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The the instructions for referring to other series

Soil series and map symbols	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees
Acton:				
AcB	Poor	Fair	Fair	Poor
AdB, AdC	Very poor	Poor	Fair	Poor
Adams:				
AmA, AmB, AmC	Very poor	Poor	Poor	Very poor
AmE	Very poor	Very poor	Poor	Very poor
Alluvial land, wet: AW. Too variable to be rated.				
*Becket:				
BcB, BcC, BcD, BcE	Very poor	Poor	Good	Fair
BEE, BKC	Very poor	Very poor	Good	Fair
For the Skerry part of BKC, see Skerry series.				
Berkshire:				
BsB, BsC, BsD, BsE	Very poor	Poor	Good	Good
BtD, BVC, BVE, BVF	Very poor	Very poor	Good	Good
*Canaan:				
CDC, CDE, CEE, CEF	Very poor	Poor	Fair	Poor
Interpretations are for both the Canaan and Redstone parts. For the Rock outcrop part of CEE and CEF, see Rock outcrop.				
Charlton:				
CfB, CIC	Fair	Good	Good	Good
CIB, CID	Very poor	Poor	Good	Good
Chocorua: CM	Very poor	Poor	Very poor	Poor
Colton:				
CnA, CnB, CnC	Very poor	Poor	Poor	Very poor
CnE	Very poor	Very poor	Poor	Very poor
Croghan:				
CyA	Poor	Fair	Fair	Poor
CyB	Poor	Fair	Fair	Poor
Deerfield:				
DeA	Poor	Fair	Fair	Poor
DeB	Poor	Fair	Fair	Poor
Duane:				
DnA	Poor	Fair	Fair	Poor
DnB	Poor	Fair	Fair	Poor
Fresh water marsh: FA	Very poor	Poor	Very poor	Very poor
Gloucester:				
GlB, GlC	Poor	Fair	Fair	Poor
GsB, GsC, GsD	Very poor	Poor	Fair	Poor
GtD, GtE	Very poor	Very poor	Fair	Poor
Greenwood: GW	Very poor	Poor	Very poor	Poor
Hadley: Ha	Good	Good	Good	Good
Hermon:				
HfB, HfC	Poor	Fair	Fair	Poor
HmB, HmC, HmD, HmE	Very poor	Poor	Fair	Poor
HnD, HnE, HOC, HOE, HOF	Very poor	Very poor	Fair	Poor

of wildlife habitat and for kinds of wildlife

soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully that appear in the first column of this table]

Elements of wildlife habitat—Continued			Kinds of wildlife		
Coniferous plants	Wetland plants	Shallow-water areas	Openland	Woodland	Wetland
Poor	Very poor [1]	Very poor [1]	Fair	Poor	Very poor.[1]
Poor	Unsuited	Unsuited	Poor	Poor	Very poor.[1]
Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Fair	Very poor [2]	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Good	Very poor [2]	Very poor	Poor	Good	Very poor.
Good	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Good	Very poor [2]	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Poor	Good	Very poor.
Poor	Good	Good	Very poor	Poor	Good.
Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Poor	Poor	Poor	Fair	Poor	Poor.
Poor	Poor	Very poor	Fair	Poor	Very poor.
Poor	Poor	Poor	Fair	Poor	Poor.
Poor	Poor	Very poor	Fair	Poor	Very poor.
Poor	Poor	Poor	Fair	Poor	Poor.
Poor	Poor	Very poor	Fair	Poor	Very poor.
Very poor	Good	Good	Very poor	Very poor	Good.
Poor	Very poor	Very poor	Fair	Poor	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Poor	Good	Good	Very poor	Poor	Good.
Good	Poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Fair	Poor	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.

TABLE 6.—*Suitability of the soils for elements*

Soil series and map symbols	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees
Hinckley:				
HsA, HsB, HsC	Very poor	Poor	Poor	Very poor
HsE	Very poor	Very poor	Poor	Very poor
*Hollis:				
HtB, HtC, HtD	Poor	Poor	Fair	Poor
HvB, HvC, HvD, HvE, HxD, HxE	Very poor	Poor	Fair	Poor
For the Charlton parts, see Charlton series. For the Rock outcrop parts of HxD and HxE, see Rock outcrop.				
*Leicester:				
LDB	Very poor	Poor	Fair	Fair
For the Ridgebury part, see Ridgebury series.				
LfA	Very poor	Poor	Fair	Fair
Interpretations are for both the Leicester and Walpole parts.				
LfB	Very poor	Poor	Fair	Fair
Interpretations are for both the Leicester and Walpole parts.				
Limerick: Lk	Poor	Fair	Fair	Fair
Limerick variant: Lm	Poor	Fair	Fair	Fair
*Lyman:				
LnB, LnC, LnD, LsD, LVC	Poor	Poor	Fair	Poor
LnE, LsE, LVE, LVF, LYE, LYF	Very poor	Poor	Fair	Poor
For the Berkshire parts, see Berkshire series. For the Rock outcrop parts of LsD, LsE, LYE, and LYF, see Rock outcrop.				
*Marlow:				
MaB, MaC	Fair	Good	Good	Fair
MdB, MdC, MdD	Very poor	Poor	Good	Fair
MdE, MEE, MEF, MFC	Very poor	Very poor	Good	Fair
For the Peru part of MFC, see Peru series.				
Millis:				
MlB, MlC	Fair	Good	Good	Fair
MsB, MsC, MsD	Very poor	Poor	Good	Fair
Muck and Peat: MU	Very poor	Poor	Very poor	Poor
Naumburg: NaB	Poor	Fair	Fair	Poor
Nicholville variant:				
NcA	Fair	Good	Good	Good
NcB	Fair	Good	Good	Good
Ondawa:				
Of	Poor	Fair	Fair	Fair
Oh	Fair	Good	Good	Fair
Ondawa variant: Os	Fair	Good	Good	Fair
Ossipee: OT	Very poor	Poor	Very poor	Poor
Paxton:				
PaB, PaC	Fair	Good	Good	Fair
PdB, PdC, PdD	Very poor	Poor	Good	Fair
Peru:				
PeB, PeC	Very poor	Poor	Good	Fair
PLC	Very poor	Very poor	Good	Fair

of wildlife habitat and for kinds of wildlife—Continued

Elements of wildlife habitat—Continued			Kinds of wildlife		
Coniferous plants	Wetland plants	Shallow-water areas	Openland	Woodland	Wetland
Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Fair	Poor [3]	Very poor [3]	Poor	Fair	Very poor.[3]
Fair	Good	Good	Poor	Fair	Good.
Fair	Poor	Very poor	Poor	Fair	Very poor.
Fair	Good	Good	Fair	Fair	Good.
Fair	Good	Good	Fair	Fair	Good.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Fair	Very poor [2]	Very poor	Good	Fair	Very poor.
Fair	Very poor [2]	Very poor	Poor	Fair	Very poor.
Fair	Very poor	Very poor	Poor	Fair	Very poor.
Fair	Very poor [2]	Very poor	Good	Fair	Very poor.
Fair	Very poor [2]	Very poor	Poor	Fair	Very poor.
Poor	Good	Good	Very poor	Very poor	Good.
Poor	Poor [3]	Very poor [3]	Fair	Poor	Very poor.[3]
Good	Poor	Poor	Good	Good	Poor.
Good	Poor	Very poor	Good	Good	Very poor.
Fair	Poor	Very poor	Fair	Fair	Very poor.
Fair	Poor	Very poor	Good	Fair	Very poor.
Fair	Poor	Very poor	Good	Fair	Very poor.
Poor	Good	Good	Very poor	Poor	Good.
Fair	Very poor [2]	Very poor	Good	Fair	Very poor.
Fair	Very poor [2]	Very poor	Poor	Fair	Very poor.
Fair	Very poor [2]	Very poor	Poor	Fair	Very poor.
Fair	Very poor [1]	Very poor [1]	Poor	Fair	Very poor.

TABLE 6.—*Suitability of the soils for elements*

Soil series and map symbols	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees
Podunk: Po	Poor	Fair	Fair	Fair
Podunk variant: Ps	Poor	Fair	Fair	Fair
Raynham variant: Ra	Poor	Fair	Fair	Fair
Redstone. Mapped only in complexes with Canaan soils.				
Ridgebury:				
RgB	Poor	Fair	Fair	Fair
RlA	Very poor	Poor	Fair	Fair
RlB	Very poor	Poor	Fair	Fair
*Rock outcrop: RO, RPE, RPF	Very poor	Very poor	Very poor	Very poor
For the Lyman part of RPE and RPF, see Lyman series.				
Salmon variant:				
SaA	Good	Good	Good	Good
SaB	Fair	Good	Good	Good
Scituate: SdB, SdC	Very poor	Poor	Good	Fair
Skerry: SeB, SeC	Very poor	Poor	Good	Fair
Suncook: Sf	Very poor	Poor	Poor	Very poor
Sutton:				
SnB	Good	Good	Good	Good
SuB	Very poor	Poor	Good	Good
Walpole. Mapped only in complexes with Leicester soils.				
*Waumbek:				
WaB, WaC	Very poor	Poor	Fair	Fair
WBC	Very poor	Very poor	Fair	Fair
For the Skerry part of WBC, see Skerry series.				
Whitman: Wc	Very poor	Poor	Poor	Poor
Windsor:				
WdA, WdB, WdC	Very poor	Poor	Poor	Very poor
WdE	Very poor	Very poor	Poor	Very poor
Winooski: Wn	Poor	Fair	Fair	Good
Woodbridge:				
WoB	Fair	Good	Good	Good
WvB, WvC	Very poor	Poor	Good	Good

[1] Rating is poor where slopes are less than 3 percent.
[2] Rating is poor where slopes are less than 8 percent.

Good.—Soil limitations do not significantly affect management of the designated habitat element. Generally, the intensity of management required for the creation, improvement, or maintenance of the habitat element is low, and satisfactory results are reasonably assured.

Fair.—Soil limitations moderately affect the management of the designated habitat element. Moderately intensive effort and fairly frequent attention is required to achieve satisfactory results.

Poor.—Soil limitations are severe. Successful creation, improvement, or maintenance of the designated habitat element will generally be expensive and require intensive effort.

Unsuited.—Soil limitations are so extreme that management efforts are not practical.

of wildlife habitat and for kinds of wildlife—Continued

Elements of wildlife habitat—Continued			Kinds of wildlife		
Coniferous plants	Wetland plants	Shallow-water areas	Openland	Woodland	Wetland
Fair	Poor	Poor	Fair	Fair	Poor.
Fair	Poor	Poor	Fair	Fair	Poor.
Fair	Good	Good	Fair	Fair	Good.
Fair	Poor [3]	Very poor [3]	Fair	Fair	Very poor.[3]
Fair	Good	Good	Poor	Fair	Good.
Fair	Poor	Very poor	Poor	Fair	Very poor.
Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Poor	Very poor	Good	Good	Very poor.
Fair	Very poor [2]	Very poor	Poor	Fair	Very poor.
Fair	Very poor [2]	Very poor	Poor	Fair	Very poor.
Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
Good	Poor	Very poor [1]	Good	Good	Very poor.[1]
Good	Poor	Very poor [1]	Poor	Good	Very poor.[1]
Fair	Very poor [2]	Very poor	Poor	Fair	Very poor.
Fair	Very poor [2]	Very poor [3]	Poor	Fair	Very poor.[3]
Poor	Good	Good	Poor	Poor	Good.
Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
Very poor	Very poor	Very poor	Very poor	Very poor	Very poor.
Good	Poor	Poor	Fair	Good	Poor.
Good	Poor	Very poor	Good	Good	Very poor.
Good	Very poor [2]	Very poor	Poor	Good	Very poor.

[3] Rating is good where slopes are less than 3 percent.

The seven wildlife habitat elements rated in table 6 are as follows:

Grain and seed crops.—Farm grains or seed-producing annuals planted to produce food for wildlife. Examples are corn, rye, wheat, oats, millet, buckwheat, and sunflowers.

Grasses and legumes.—Domestic perennial grasses and herbaceous legumes that are established by planting and that furnish wildlife food and cover. Examples are fescue, bromegrass, bluegrass, timothy, redtop, orchardgrass, reed canarygrass, clover, trefoil, alfalfa, crownvetch, and panicgrass (switchgrass).

Wild herbaceous plants.—Native or introduced perennial grasses and forbs (weeds) that provide food and cover principally to upland forms of wildlife, and that are established mainly through natural processes.

Examples are bluestems, indiangrass, wheatgrass, quackgrass, wild ryegrass, oatgrass, bunchberry, pokeweed, strawberries, lespedeza, beggarweed, wild beans, nightshade, goldenrod, and dandelions.

Hardwood trees.—Nonconiferous trees and associated woody understory plants that provide wildlife cover or that produce fruits, nuts, buds, catkins, twigs (browse), or foliage used extensively as food by wildlife. Commonly, they are established through natural processes, but they may also be planted. Examples are oak, beech, cherry, hawthorn, dogwood, viburnum, maple, birch, poplar, grape, honeysuckle, blueberry, brier, autumn-olive, and multiflora rose.

Coniferous plants.—Cone-bearing trees, shrubs, or groundcover that furnish wildlife cover or supply food in the form of browse, seeds, or fruitlike cones. Plants commonly are established through natural processes, but they may also be planted or transplanted. On soils well suited to conifer production, the length of availability of good habitat is limited by the rapidity of canopy closure. If trees quickly form a dense canopy that shuts out light, the lower branches and understory food plants die. This generally takes place in 10 to 15 years unless trees are more widely spaced. It is important that branches be maintained close to the ground so that food and cover are readily available to deer, rabbits, and other small mammals. On soils poorly suited to coniferous tree production, wildlife habitat will be maintained over a longer period of time because of slower tree growth. Widely spaced conifers may quickly but only temporarily produce desired growth. Careful management is needed to produce the desired wildlife habitat. Unless properly controlled, hardwoods may rapidly invade and overtop conifers. Examples of conifers are spruce, pine, whitecedar, hemlock, balsam, fir, juniper, and yew.

Wetland plants.—Annual and perennial wild herbaceous plants in moist to wet sites, exclusive of submerged or floating aquatics, that produce food or cover primarily for wetland forms of wildlife. Examples are smartweed, wild millet, bulrush, spike sedge, rush, sedge, burreed, wild rice, rice cutgrass, mannagrass, and cattail.

Shallow-water areas.—Impounded or excavated areas where water generally does not exceed 6 feet in depth. Examples are low dikes and levees, shallow dugouts, level ditches, and devices for control of water level in marshy drainageways or channels.

The suitability ratings in table 6 apply to the following three major kinds of wildlife:

Openland wildlife.—Birds and mammals that normally frequent croplands, pastures, meadows, lawns, and areas overgrown with grasses, forbs, and shrubs. Examples are pheasant (on a limited scale), mourning dove, meadowlark, field sparrow, redwing blackbird, red fox, and woodchuck. Openland is also used by woodland wildlife such as deer, grouse, and woodcock. Openland wildlife ratings are based on suitability of soils for grain and seed crops, grasses, and legumes, wild herbaceous plants, and hardwoods.

Woodland wildlife.—Birds and mammals that normally frequent wooded areas of coniferous and hardwood trees and shrubs, or mixtures of such plants. Examples are ruffed grouse, woodcock, thrush, vireo, scarlet tanager, white-tailed deer, moose, bear, bobcat, porcupine, fisher, raccoon, New England cottontail rabbit, snowshoe hare, gray squirrel, and red squirrel. Woodland wildlife ratings are based on soil suitabilities for hardwood trees, coniferous plants, wild herbaceous plants, and grasses and legumes.

Wetland wildlife.—Birds and mammals that normally frequent wet areas such as ponds, marshes, and swamps. Examples are black duck, woodcock, heron, shore birds, beaver, mink, otter, muskrat, turtle, and frog. Wetland wildlife ratings are based upon suitability for wetland plants and shallow-water areas.

Engineering Uses of the Soils[6]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, available water capacity, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and soil slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, and other suitable construction materials.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 7, 8, and 9, which show, respectively, several estimated soil properties significant in engineering; interpretations for various engineering uses; and results of engineering laboratory tests on soil samples.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in table 8, and it also can be used to make other useful maps.

[6] DAVID E. KEATES, engineering specialist, Soil Conservation Service, helped prepare this section.

This information, however, does not eliminate the need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 4 feet. Also, inspection of sites, especially small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists but are not commonly used by all engineers. The Glossary defines many of these terms as used in soil science.

Engineering classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*3*) used by the SCS engineers. Department of Defense, and others, and the AASHTO system adopted by the American Association of State Highway and Transportation Officials (*2*).

In the Unified system soils are classified according to particle size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, CL–ML.

The AASHTO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as folows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHTO classification for tested soils, with group index numbers in parentheses, is shown in table 9; the estimated classification, without group index numbers, is given in table 7 for all soils mapped in the survey area.

USDA texture is determined by the relative proportions of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Sand," "silt," "clay," and some of the other terms used in the USDA textural classification are defined in the Glossary.

Estimated soil properties significant in engineering

Several estimated soil properties significant in engineering are given in table 7. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 7.

Depth to bedrock is distance from the surface of the soil to the upper surface of the rock layer.

Depth to seasonal high-water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Potential frost action was estimated for the soils as they occur in place. Frost action is the heaving caused by ice lenses forming in the soil and the subsequent loss of strength as a result of excess moisture during thawing periods. Soils that have a high percentage of silt and very fine sand are highly susceptible to frost action.

Soil texture is described in table 7 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains 15 to 20 percent or more gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

Permeability as used in table 7 relates only to movement of water downward through undisturbed and uncompacted soils. It does not include lateral seepage or upward movement under artesian pressure. The estimates are based mainly on structure and porosity in the soil and on tests of undisturbed cores of similar soils.

Available water capacity is the approximate amount of capillary water in the soil available for plant growth after all free water has been drained away.

Reaction, expressed as pH value, is not shown in table 7. Most of the soils in Carroll County generally range from pH 5.0 to 7.0.

Engineering interpretations

In table 8, soils in the county are rated as sources of construction material—topsoil, sand, gravel, and road fill. The table also lists certain typical engineering activities and indicates the soil features that are particularly significant to each type of engineering work. The ratings and other interpretations in the table are based on estimated engineering properties of the soils in table 7; on available test data, including those in table 9; and on field experience.

The suitability of soils as a source of topsoil is based on productivity; texture; thickness of suitable layers; presence of gravel, stones, or cobbles; and difficulty in obtaining the material (wetness, for example). Topsoil refers to soil material used as topdressing for lawns, gardens, ditchbanks, roadbanks, and the like. Normally, only the surface layer is removed for topsoil. Wet, shallow to bedrock, sandy or gravelly soils are poor or unsuitable sources.

Sand and gravel ratings are based on the probabil-

TABLE 7.—*Estimated soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. the instructions for referring to other series that appear in the first column of this table.

Soil series and map symbols	Depth to bedrock	Depth to seasonal high water table	Potential frost action	Depth from surface	USDA texture
	Feet	*Feet*		*Inches*	
Acton: AcB, AdB, AdC	>4	1½–2½	Moderate.	0–12	Fine sandy loam
				12–18	Gravelly loamy fine sand
				18–50	Gravelly sand
Adams: AmA, AmB, AmC, AmE.	>8	>5	Low.	0–18	Loamy sand
				18–32	Sand
				32–50	Coarse sand
Alluvial land, wet: AW. Subject to frequent flooding. No valid estimates can be made. Material too variable.					
*Becket: BcB, BcC, BcD, BcE, BEE, BKC. For Skeery part of BKC, see Skerry series.	>4	>2½	Moderate.	0–18	Fine sandy loam
				18–24	Fine sandy loam
				24–42	Gravelly loamy sand (fragipan)
Berkshire: BsB, BsC, BsD, BsE, BtD, BVC, BVE, BVF.	>4	>4	Moderate.	0–13	Fine sandy loam
				13–24	Fine sandy loam
				24–48	Gravelly fine sandy loam
*Canaan: CDC, CDE, CEE, CEF. For the Redstone parts, see Redstone series. For the Rock outcrop parts of CEE and CEF, see Rock outcrop.	1–2	(2)	Moderate.	0–17	Gravelly and very gravelly fine sandy loam
Charlton: CfB, ClB, ClC, ClD.	>4	>4	Moderate.	0–20	Fine sandy loam
				20–36	Gravelly fine sandy loam and fine sandy loam
				36–42	Gravelly loamy fine sand
Chocorua: CM	>8	0	High.	0–31	Organic material
				31–42	Coarse sand
Colton: CnA, CnB, CnC, CnE.	>8	>5	Low.	0–8	Gravelly loamy fine sand
				8–16	Gravelly loamy coarse sand
				16–50	Gravelly and very gravelly coarse sand
Croghan: CyA, CyB	>8	1½–2	Moderate.	0–28	Loamy fine sand
				28–50	Loamy fine sand
Deerfield: DeA, DeB	>8	1½–2	Moderate.	0–8	Loamy fine sand
				8–45	Sand
				45–50	Gravelly sand
Duane: DnA, DnB	>6	1½–2	Moderate.	0–6	Fine sandy loam and gravelly fine sandy loam.
				6–10	Gravelly fine sandy loam
				10–16	Gravelly loamy sand
				16–50	Sand, coarse sand, very coarse sand, and fine gravel.
Fresh water marsh: FA. Subject to flooding or ponding. No valid estimates can be made.					

significant in engineering

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully
The symbol > means greater than. Dashes in columns indicate estimates could not be made]

Classification		Percentage passing sieve [1]—				Permeability	Available water capacity
Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
						Inches per hour	*Inches per inch of soil*
SM	A–2 or A–4	85–95	80–90	55–75	30–40	2.0–6.0	0.08–0.18
SM	A–2	80–90	65–75	45–60	20–30	2.0–6.0	0.05–0.11
SM, SP–SM, GM, or GP–GM	A–1	55–65	50–60	30–45	5–15	>6.0	0.03–0.05
SM	A–2	95–100	95–100	45–75	15–30	>6.0	0.08–0.15
SP–SM or SM	A–2 or A–3	95–100	95–100	45–70	5–15	>6.0	0.02–0.08
SP or SP–SM	A–1 or A–3	90–100	85–100	30–60	0–10	>6.0	0.01–0.06
SM	A–2 or A–4	85–95	80–90	55–75	30–45	0.6–2.0	0.13–0.21
SM	A–2 or A–4	80–90	75–85	40–60	30–40	0.6–2.0	0.08–0.16
SM or SP–SM	A–1 or A–2	80–90	70–80	35–55	10–30	0.2–0.6	0.03–0.08
SM	A–4	85–95	80–90	60–80	35–50	0.6–2.0	0.13–0.21
SM	A–2 or A–4	80–90	75–85	55–75	30–45	0.6–2.0	0.11–0.18
SM	A–2 or A–4	70–80	65–75	50–70	25–40	0.6–2.0	0.07–0.13
SM or GM	A–2	50–65	30–45	20–40	15–25	2.0–6.0	0.02–0.11
SM	A–4	85–95	80–90	60–75	35–45	0.6–2.0	0.11–0.21
SM	A–2 or A–4	65–75	60–70	40–60	25–40	0.6–2.0	0.06–0.13
SM	A–2	75–85	65–75	45–65	20–30	2.0–6.0	0.04–0.10
Pt	A–8	100	100	100	100	0.6–2.0	----------
SP or SP–SM	A–1 or A–3	100	95–100	35–55	0–10	>6.0	0.01–0.06
SM or SP–SM	A–2	70–80	55–65	35–50	10–25	>6.0	0.04–0.11
SP, GP, SP–SM, or GP–GM	A–1	45–60	35–45	5–35	0–10	>6.0	0.01–0.08
SP or GP	A–1	35–50	25–40	0–30	0–5	>6.0	0.01–0.04
SM	A–2	95–100	95–100	65–85	25–35	>6.0	0.07–0.13
SM or SP–SM	A–2 or A–3	95–100	85–100	60–80	5–15	>6.0	0.02–0.08
SM	A–2	95–100	95–100	65–85	20–35	>6.0	0.08–0.13
SM or SP–SM	A–2 or A–3	95–100	90–100	45–70	5–15	>6.0	0.02–0.08
SP–SM	A–1, A–2 or A–3	80–90	60–70	30–50	0–10	>6.0	0.01–0.07
SM	A–2 or A–4	70–80	65–75	50–65	25–40	2.0–6.0	0.08–0.18
SM	A–1 or A–2	55–75	35–45	25–40	15–25	>6.0	0.03–0.13
SM, SP–SM, GM, or GP–GM	A–1	55–75	35–45	15–35	5–15	>6.0	0.01–0.08
SP or GP	A–1	35–55	25–35	0–25	0–5	>6.0	0.01–0.05

TABLE 7.—*Estimated soil properties*

Soil series and map symbols	Depth to bedrock	Depth to seasonal high water table	Potential frost action	Depth from surface	USDA texture
	Feet	*Feet*		*Inches*	
Gloucester: GlB, GlC, GsB, GsC, GsD, GtD, GtE.	>4	>4	Low.	0–13 13–17 17–24 24–50	Fine sandy loam Gravelly fine sandy loam Gravelly loamy fine sand Very gravelly loamy sand
Greenwood: GW	>8	0	High.	0–70	Organic material
Hadley: Ha	>8	>4	High.	0–34 34–38 38–50	Very fine sandy loam Loamy very fine sand Very fine sandy loam
Hermon: HfB, HfC, HmB, HmC, HmD, HmE, HnD, HnE, HOC, HOE, HOF.	>4	>4	Low.	0–4 4–19 19–50	Fine sandy loam Fine sandy loam and gravelly sandy loam Gravelly loamy sand
Hinckley: HsA, HsB, HsC, HsE.	>8	>5	Low.	0–14 14–19 19–50	Gravelly loamy sand Very gravelly loamy sand Very gravelly sand and very gravelly coarse sand.
*Hollis: HtB, HtC, HtD, HvB, HvC, HvD, HvE, HxD, HxE. For the Charlton parts, see Charlton series. For Rock outcrop parts of HxD and HxE, see Rock outcrop.	1–2	(2)	Moderate.	0–16	Fine sandy loam
*Leicester: LDB, LfA, LfB For the Ridgebury part of LDB, see Ridgebury series. For the Walpole parts of LfA and LfB, see Walpole series.	>4	0–1	High.	0–7 7–42	Fine sandy loam Gravelly sandy loam
Limerick: Lk	>8	0–1	High.	0–36 36–50	Silt loam Sand and fine gravel
Limerick variant: Lm	>8	0–1	High.	0–14 14–23 23–50	Very fine sandy loam and silt loam Very fine sandy loam and loamy very fine sand. Coarse sand and gravelly coarse sand
*Lyman: LnB, LnC, LnD, LnE, LsD, LsE, LVC, LVE, LVF, LYE, LYF. For the Berkshire parts, see Berkshire series. For the Rock outcrop parts of LsD, LsE, LYE, and LYF, see Rock outcrop.	1–2	(2)	Moderate.	0–7 7–18	Fine sandy loam Fine sandy loam
*Marlow: MaB, MaC, MdB, MdC, MdD, MdE, MEE, MEF, MFC. For the Peru part of MFC, see Peru series.	>4	>2½	Moderate.	0–6 6–20 20–42	Fine sandy loam Gravelly fine sandy loam Fine sandy loam (fragipan)
Millis: MlB, MlC, MsB, MsC, MsD.	>4	>2½	Moderate.	0–8 8–22 22–46	Fine sandy loam Fine sandy loam Gravelly loamy coarse sand (fragipan)
Muck and Peat: MU. Subject to flooding or ponding. No valid estimates can be made.					

significant in engineering—Continued

Classification		Percentage passing sieve [1]—				Permeability	Available water capacity
Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
						Inches per hour	*Inches per inch of soil*
SM	A–2 or A–4	85–95	70–80	50–70	30–45	2.0–6.0	0.08–0.15
SM	A–2	55–75	55–65	40–55	20–35	2.0–6.0	0.06–0.13
SM	A–1 or A–2	55–65	45–55	30–40	15–25	2.0–6.0	0.02–0.09
SM, SP–SM, GM, or GP–GM	A–1 or A–2	45–55	35–45	20–35	5–15	>6.0	0.01–0.08
Pt	A–8	100	100	100	100	0.6–2.0	--------
ML	A–4	100	100	85–95	55–65	0.6–2.0	0.15–0.23
SM or ML	A–4	100	100	90–95	40–60	0.6–2.0	0.08–0.15
ML	A–4	100	100	85–95	55–65	0.6–2.0	0.14–0.20
SM	A–2 or A–4	80–90	75–85	55–70	30–40	2.0–6.0	0.11–0.20
SM	A–2	65–80	60–75	35–55	15–35	2.0–6.0	0.05–0.15
SM, SP–SM, GM, or GP–GM	A–1 or A–2	55–90	50–70	25–50	10–20	>6.0	0.02–0.12
SM	A–1 or A–2	55–65	45–55	25–40	15–25	>6.0	0.03–0.09
SM or SP–SM	A–1	50–60	35–45	20–35	5–15	>6.0	0.02–0.08
SP or GP	A–1	45–55	30–40	10–30	0–5	>6.0	0.01–0.05
SM	A–4	85–95	80–90	60–75	35–50	0.6–2.0	0.10–0.23
SM	A–4	80–90	75–85	50–70	35–45	0.6–2.0	0.09–0.16
SM	A–2	70–80	60–70	35–50	20–35	0.6–2.0	0.05–0.12
ML	A–4	100	100	90–100	70–85	0.6–2.0	0.18–0.26
SM or SP–SM	A–1 or A–3	95–100	85–100	10–60	5–15	>6.0	0.01–0.08
ML	A–4	100	100	85–100	55–85	0.6–2.0	0.15–0.26
ML	A–4	100	100	85–95	50–65	0.6–2.0	0.08–0.23
SP, SM, GP, or GM	A–1 or A–3	55–90	40–85	20–55	0–15	>6.0	0.01–0.07
SM	A–2 or A–4	85–95	80–90	65–75	30–45	0.6–2.0	0.10–0.16
SM	A–2 or A–4	80–90	75–85	55–80	20–40	0.6–2.0	0.09–0.16
SM	A–4	85–95	75–85	60–70	35–50	0.6–2.0	0.11–0.20
SM	A–2 or A–4	70–80	65–75	50–65	30–40	0.6–2.0	0.07–0.14
SM	A–2 or A–4	80–90	75–85	60–70	30–45	0.2–0.6	0.06–0.10
SM	A–2 or A–4	85–95	80–90	65–75	30–45	0.6–2.0	0.10–0.16
SM	A–2 or A–4	80–90	75–85	60–70	30–45	0.6–2.0	0.08–0.14
SM or SP–SM	A–1 or A–2	70–80	65–75	30–50	10–20	0.2–0.6	0.02–0.06

TABLE 7.—*Estimated soil properties*

Soil series and map symbols	Depth to bedrock	Depth to seasonal high water table	Potential frost action	Depth from surface	USDA texture
	Feet	*Feet*			
Naumburg: NaB	>6	0–1	Moderate.	0–20 20–44	Loamy sand Sand
Nicholville variant: NcA, NcB.	>8	1½–2	High.	0–35 35–50	Silt loam Fine sand
Ondawa: Of, Oh	>8	>4	Moderate.	0–8 8–38 38–42	Fine sandy loam Fine sandy loam Very fine sandy loam
Ondawa variant: Os	>8	>4	Moderate.	0–9 9–30 30–50	Very fine sandy loam Fine sandy loam and very fine sandy loam Sand
Ossipee: OT	>6	0	High.	0–25 25–43	Organic materials Silt loam and very fine sandy loam
Paxton: PaB, PaC, PdB, PdC, PdD.	>4	>2½	Moderate.	0–11 11–18 18–50	Fine sandy loam Fine sandy loam Fine sandy loam (fragipan)
Peru: PeB, PeC, PLC	>4	1–2½	High.	0–18 18–24 24–50	Fine sandy loam Sandy loam Gravelly fine sandy loam (fragipan)
Podunk: Po	>8	[3] 1–2	High.	0–11 11–50	Fine sandy loam Fine sandy loam
Podunk variant: Ps	>8	[3] 1–2	High.	0–23 23–36 36–50	Fine sandy loam and very fine sandy loam Sand Very gravelly coarse sand
Raynham variant: Ra	>8	0–1	High.	0–21 21–50	Silt loam Sand
Redstone Mapped only in complexes with Canaan soils.	>4	>4	Low.	0–5 5–12 12–17 17–60	Sandy loam and fine sandy loam Gravelly fine sandy loam Gravelly loamy sand Very gravelly sand
Ridgebury: RgB, RlA, RlB	>4	0–1	High.	0–6 6–20 20–50	Fine sandy loam Fine sandy loam and sandy loam Fine sandy loam and gravelly fine sandy loam (fragipan).
*Rock outcrop: RO, RPE, RPF. For the Lyman parts of RPE and RPF, see Lyman series.	0				Exposed granite or schist bedrock.
Salmon variant: SaA, SaB	>8	>5	High.	0–24 24–35 35–50	Very fine sandy loam and silt loam Very fine sandy loam Gravelly sand
Scituate: SdB, SdC	>4	1–2½	High.	0–15 15–29 29–50	Fine sandy loam Sandy loam Gravelly loamy sand (fragipan)
Skerry: SeB, SeC	>4	1–2½	High.	0–19 19–23 23–45	Fine sandy loam Gravelly fine sandy loam Gravelly loamy sand (fragipan)
Suncook: Sf	>6	[3] >3	Low.	0–10 10–26 26–56	Loamy fine sand Fine sand Coarse sand and sand

significant in engineering—Continued

Classification		Percentage passing sieve [1]—				Permeability	Available water capacity
Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
						Inches per hour	*Inches per inch of soil*
SM	A–2	100	95–100	50–75	15–30	2.0–6.0	0.08–0.13
SM or SP–SM	A–2 or A–3	95–100	90–100	45–70	5–15	>6.0	0.02–0.06
ML	A–4	100	100	90–100	70–85	0.6–2.0	0.17–0.26
SM	A–2	100	100	65–80	20–35	2.0–6.0	0.02–0.08
SM or ML	A–4	95–100	95–100	70–85	40–55	2.0–6.0	0.13–0.20
SM or ML	A–4	95–100	90–100	65–85	35–55	2.0–6.0	0.06–0.18
SM	A–4	90–100	85–100	75–95	40–50	2.0–6.0	0.11–0.21
ML	A–4	95–100	95–100	80–95	50–60	2.0–6.0	0.13–0.20
SM or ML	A–4	95–100	90–100	65–95	35–55	2.0–6.0	0.11–0.20
SM or SP–SM	A–3	90–100	85–95	45–65	5–15	>6.0	0.01–0.08
Pt	A–8	100	100	100	100	0.6–2.0	--------
ML	A–4	100	95–100	80–100	50–85	0.6–2.0	0.14–0.26
SM	A–4	90–100	85–95	65–80	35–50	0.6–2.0	0.12–0.22
SM	A–2 or A–4	85–95	80–90	60–75	30–45	0.6–2.0	0.10–0.16
SM	A–2 or A–4	80–90	75–85	60–70	30–40	0.2–0.6	0.05–0.08
SM	A–4	85–95	80–90	60–75	35–50	0.6–2.0	0.11–0.21
SM	A–2	75–85	70–80	45–55	20–30	0.6–2.0	0.06–0.13
SM	A–2	65–75	55–65	40–55	20–35	0.2–0.6	0.05–0.08
SM or ML	A–4	95–100	90–100	65–85	35–55	2.0–6.0	0.13–0.23
SM	A–2 or A–4	95–100	90–100	65–85	30–45	2.0–6.0	0.06–0.18
SM or ML	A–4	95–100	90–100	65–95	35–60	2.0–6.0	0.11–0.20
SM or SP–SM	A–3	90–100	80–100	45–70	5–15	>6.0	0.02–0.08
SP–SM or GP–GM	A–1	45–55	30–40	15–30	0–5	>6.0	0.01–0.05
ML	A–4	100	100	90–100	70–80	0.2–0.6	0.16–0.26
SM or SP–SM	A–3	95–100	95–100	50–70	5–15	>6.0	0.02–0.08
SM	A–2 or A–4	75–90	70–85	45–65	25–45	0.6–2.0	0.10–0.17
SM or GM	A–1 or A–2	55–65	45–55	35–45	20–30	2.0–6.0	0.04–0.11
SM, SW–SM, or SP–SM	A–1 or A–2	65–90	55–70	30–50	5–20	2.0–6.0	0.03–0.10
SW or GW	A–1	40–55	20–40	10–25	0–5	>6.0	0.01–0.04
SM	A–2 or A–4	85–95	80–90	60–75	30–50	0.6–2.0	0.13–0.24
SM	A–2 or A–4	80–90	75–85	50–70	25–45	0.6–2.0	0.09–0.18
SM	A–2	75–85	65–75	50–60	25–35	0.2–0.6	0.04–0.09
ML	A–4	100	100	100	60–80	0.6–2.0	0.17–0.30
ML	A–4	100	95–100	85–95	55–65	0.6–2.0	0.14–0.23
SP–SM	A–1	90–100	55–65	30–45	5–10	>6.0	0.06–0.13
SM	A–2 or A–4	85–95	80–90	60–75	30–50	0.6–2.0	0.11–0.21
SM	A–2	80–90	75–85	45–55	20–30	0.6–2.0	0.05–0.14
SM	A–1 or A–2	75–85	65–75	35–55	15–25	0.2–0.6	0.03–0.08
SM	A–2 or A–4	85–95	80–90	60–75	30–50	0.6–2.0	0.11–0.21
SM	A–2	65–75	50–65	35–55	15–35	0.6–2.0	0.05–0.15
SM or SP–SM	A–1 or A–2	65–75	60–70	35–50	10–20	0.2–0.6	0.02–0.07
SM	A–2	95–100	95–100	65–85	25–35	>6.0	0.08–0.15
SM	A–2	95–100	95–100	65–80	20–30	>6.0	0.02–0.08
SP or SP–SM	A–1 or A–3	90–100	90–100	35–65	0–10	>6.0	0.01–0.07

TABLE 7.—*Estimated soil properties*

Soil series and map symbols	Depth to bedrock	Depth to seasonal high water table	Potential frost action	Depth from surface	USDA texture
	Feet	*Feet*		*Inches*	
Sutton: SnB, SuB	>4	1–2½	High.	0–8	Fine sandy loam
				8–38	Fine sandy loam
				38–42	Fine sandy loam
Walpole Mapped only in complexes with Leicester soils.	>8	0–1	Moderate.	0–6	Fine sandy loam
				6–20	Sandy loam
				20–44	Gravelly loamy sand
*Waumbek: WaB, WaC, WBC. For the Skerry part of WBC, see Skerry series.	>4	1½–2½	Moderate.	0–7	Fine sandy loam
				7–19	Fine sandy loam and loamy fine sand
				19–46	Gravelly loamy fine sand and gravelly loamy sand.
Whitman: Wc	>4	0	High.	0–5	Loam
				5–13	Fine sandy loam
				13–16	Loamy sand
				16–42	Fine sandy loam and gravelly sandy loam (fragipan).
Windsor: WdA, WdB, WdC, WdE.	>8	>5	Low.	0–11	Loamy sand
				11–50	Fine sand and sand
Winooski: Wn	>8	[2] 1½–2½	High.	0–40	Very fine sandy loam
				40–50	Sand, coarse sand, and very coarse sand
Woodbridge: WoB, WvB, WvC.	>4	1–2½	High.	0–7	Fine sandy loam
				7–27	Fine sandy loam
				27–46	Fine sandy loam (fragipan)

[1] Estimates based to total material excluding coarse fraction greater than 3 inches.

[2] Seasonal high water table above bedrock.

ity that delineated areas of the soil contain deposits of sand or gravel. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, and neither do they indicate quality or size of the deposit. Soils in AASHTO classification A-1 or A-3 are suitable sources of sand, and those classified as A-1 are suitable sources of gravel. In Carroll County, Colton and Hinckley soils are good sources of sand and gravel.

Road fill is soil material used in embankments for roads. The suitability ratings reflect the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage. Also reflected is the relative ease of excavating the material at borrow areas.

Highway location is influenced by features of the undisturbed soil that affect construction and maintenance of highways. Some of the factors affecting use are compressibility, the hazards of flooding and seepage, stability of slopes, susceptibility to frost action, and depth to water table and to bedrock. In soils that are moderately well drained to very poorly drained, a seasonal high water table makes earthwork difficult, and may limit working time to July and August. If highway cuts are to be located where the water table is high, interceptor drains or underdrains may be required. Roadways in most areas that are subject to flooding need embankments. Seepage along the slopes of cuts may cause slumping or sliding of the underlying material. Highway routes that avoid deep cuts in bedrock may help reduce construction costs. When highways are located in areas of highly compressible organic materials such as muck and peat, these materials must be removed and replaced with more desirable backfill.

In the construction of ponds, a particular soil feature may be a problem in the reservoir but not in the embankment. Permeability, stability, shrink-swell potential, resistance to piping, depth to water table, and depth to bedrock are some of the major factors considered. The same factors are also important in the construction of dikes, levees, lagoons, and sedimentation pools.

The installation and performance of surface and subsurface drainage systems are affected by such soil features as depth to water table, seepage, permeability, flooding, sloughing, and depth to bedrock.

Features that affect the design of an irrigation system are soil depth, available water capacity, water

significant in engineering—Continued

Classification		Percentage passing sieve [1]—				Permeability	Available water capacity
Unified	AASHTO	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)		
						Inches per hour	*Inches per inch of soil*
SM	A–2 or A–4	85–95	80–90	60–75	30–50	0.6–2.0	0.11–0.21
SM	A–2 or A–4	80–90	75–85	55–70	30–45	0.6–2.0	0.06–0.16
SM	A–2 or A–4	80–90	70–85	50–70	30–45	0.6–2.0	0.06–0.14
SM	A–4	90–100	85–95	60–75	35–45	0.6–2.0	0.11–0.17
SM	A–2	85–95	80–90	50–60	25–35	0.6–2.0	0.07–0.15
SM or SP–SM	A–1 or A–2	70–80	50–65	25–45	10–20	>6.0	0.02–0.10
SM	A–2 or A–4	85–90	75–85	55–65	30–45	2.0–6.0	0.11–0.20
SM	A–2	75–90	70–80	50–70	25–35	2.0–6.0	0.06–0.12
SM or SP–SM	A–1 or A–2	60–80	55–70	35–50	10–25	>6.0	0.03–0.10
ML	A–4	85–95	80–90	70–80	55–65	0.6–2.0	0.13–0.23
SM	A–2 or A–4	85–95	80–90	60–75	30–50	0.6–2.0	0.11–0.21
SM or SP–SM	A–2	80–90	75–85	45–60	10–25	0.6–2.0	0.09–0.16
SM	A–2 or A–4	70–80	65–75	40–60	20–40	0.2–0.6	0.04–0.07
SM	A–2	95–100	90–100	50–75	15–30	>6.0	0.08–0.15
SP or SP–SM	A–1 or A–3	90–100	85–95	45–70	0–20	>6.0	0.01–0.08
ML	A–4	100	100	85–95	55–65	0.6–2.0	0.15–0.30
SP or SP–SM	A–1	95–100	95–100	10–50	0–10	>6.0	0.01–0.06
SM	A–4	85–95	80–90	60–75	35–50	0.6–2.0	0.11–0.21
SM	A–2 or A–4	80–90	75–85	55–65	30–45	0.6–2.0	0.09–0.16
SM	A–2 or A–4	80–90	75–85	55–70	30–45	0.2–6.0	0.05–0.08

[3] Periodically flooded.

intake rate, need for drainage, and presence of layers limiting water movement. In Carroll County only sprinkler irrigation was considered.

Some of the features that influence the construction and maintenance of diversions, terraces, and waterways are erodibility, seepage, depth to bedrock or to pan layers, presence of stones or rock outcrops, and difficulty in obtaining good vegetative cover.

Additional features affecting engineering uses

On the Cold River valley, soils of the Nicholville and Colton series are underlain with saturated clay, silt, or sand that has a low bearing capacity in places. These materials are at a greater depth in soils of the Colton series than in those of the Nicholville series. A thorough investigation and testing is needed as part of the engineering of large structures such as highways, buildings, bridges, and dams.

Seep spots are common in sloping to steep soils with a pan layer, such as those of the Marlow and Peru series. Investigations are needed to determine suitable locations for drainage practices to control runoff and reduce erosion. Drainage measures are needed to intercept seep spots on ski slopes in order to reduce icy conditions.

Soils of the Redstone and Canaan series formed in glacial till deposits that are underlain with weathered Conway granite. Because of the weathered condition of the bedrock, this material can be excavated without blasting and locally is used as subgrade and subbase material in road construction.

Soils of the Peru, Ridgebury, and Woodbridge series are highly susceptible to frost heaving. Engineering design of structures and highways on these soils should include features to protect against damage from frost heaving.

The soils of Carroll County are generally coarse, moderately coarse, or medium textured. The volume change in moisture is very low because the soils contain relatively little clay and the clay present has low shrink-swell potential.

More detailed information about each soil is contained in the section "Descriptions of the Soils."

Engineering test data

Table 9 contains the results of engineering tests performed by the New Hampshire Department of Public Works and Highways, Materials and Research Division on some of the major soil series in Carroll County. These tests were made to help evaluate the soils for

TABLE 8.—*Interpretations of*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The instructions for referring to other series

Soil series and map symbols	Suitability as source of—			
	Topsoil [1]	Sand	Gravel	Road fill [2]
Acton: AcB, AdB, AdC	Fair: coarse fragments.	Poor: excess fines.	Poor: excess fines.	Good
Adams: AmA, AmB, AmC, AmE	Poor: sandy	Good	Poor: excess fines [4]	Good
Alluvial land, wet: AW	Poor: high water table.	Generally unsuitable: variable.	Generally unsuitable: variable.	Poor: wetness
*Becket: BcB, BcC, BcD, BcE, BEE, BKC For the Skerry part of BKC, see Skerry series.	Poor: stoniness	Poor: excess fines.	Poor: excess fines.	Good. Fair for BcD: slope. Poor for BcE, BEE and BEF: slope.
Berkshire: BsB, BsC, BsD, BsE, BtD, BVC, BVE, BVF.	Poor: stoniness	Unsuited: excess fines.	Poor: excess fines.	Good. Fair for BsD: slope. Fair for BVC: stoniness. Poor for BsE, BtD, BVE, and BVF: slope and in places stoniness.
*Canaan: CDC, CDE, CEE, CEF For the Redstone parts, see Redstone series. For the Rock outcrop parts of CEE and CEF, see Rock outcrop.	Poor: coarse fragments.	Poor: bedrock within 20 inches of surface.	Poor: bedrock within 20 inches of surface	Poor: bedrock within 20 inches of surface.
Charlton: CfB, ClB, ClC, ClD	Fair: coarse fragments.	Unsuited: excess fines.	Poor: excess fines.	Good. Fair for ClD: slope.
Chocorua: CM	Poor: excess wetness.	Good below a depth of about 3 feet.	Unsuited: no gravel.	Unsuited: organic deposits.
Colton: CnA, CnB, CnC, CnE	Poor: coarse fragments.	Good: sand, gravel, cobblestones mixed.	Good: sand, gravel, cobblestones mixed.	Good. Fair to poor for CnE: slope.
Croghan: CyA, CyB	Poor: sandy	Fair: excess fines.	Poor: excess fines.	Good
Deerfield: DeA, DeB	Poor: sandy	Good	Poor: excess fines.	Good
Duane: DnA, DnB	Poor: coarse fragments.	Good: sand, gravel, cobblestones mixed.	Good: sand, gravel, cobblestones mixed.	Good

engineering properties of the soils

soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the that appear in the first column of this table]

Soil features affecting—					
Highway location	Ponds		Drainage	Irrigation	Diversions, terraces, and waterways
	Reservoir areas	Embankments [3]			
High water table; seepage; stoniness.	High water table; moderately rapid permeability.	Moderate permeability; fair stability; stoniness.	High water table; seepage; stoniness.	High water table; low available water capacity.	Seepage; erodible; stoniness.
Unstable cut slopes; very low available water capacity; erodible.	Rapid permeability	Rapid permeability; susceptible to piping; erodible.	(5)	Very low available water capacity; rapid intake rate.	Erodible; very low available water capacity.
High water table; subject to flooding; high frost action.	Variable permeability; subject to flooding.	Variable material	High water table; subject to flooding; variable permeability.	(5)	(5)
Moderate potential frost action; seepage spots in cuts; stoniness.	Moderately slow permeability; stoniness.	Slow permeability; stoniness.	Seepage along top of compact layer; stoniness.	Moderate available water capacity; intake rate.	Seepage along top of compact layer; stoniness; erodible.
Stoniness	Moderate permeability; stoniness.	Moderately slow permeability; stoniness.	(5)	Moderate available water capacity; intake rate.	Stoniness; erodible.
Bedrock within 20 inches of surface; seepage over bedrock; moderate potential frost action.	Bedrock within 20 inches of surface.	Bedrock within 20 inches of surface; moderately rapid permeability above bedrock.	(5)	Low available water capacity within 20 inches of surface.	Bedrock within 20 inches of surface.
Stoniness	Moderate permeability; stoniness.	Moderately slow permeability; stoniness.	(5)	Moderate available water capacity and intake rate.	Stoniness; erodible.
High water table; poor stability; high compressibility.	High water table; organic deposits.	(5)	High water table; poor stability; high compressibility; outlet limitations.	(5)	(5)
Unstable cut slopes; very low available water capacity.	Rapid permeability	Rapid permeability	(5)	Very low available water capacity; rapid intake rate.	Sand and gravel layer below a depth of 16 inches; very low available water capacity.
High water table; unstable cut slopes.	High water table; rapid permeability.	Rapid permeability; susceptible to piping.	High water table; rapid permeability.	High water table; low available water capacity.	High water table; low available water capacity; erodible.
High water table; unstable cut slopes.	High water table; rapid permeability.	Rapid permeability; susceptible to piping.	High water table; rapid permeability.	High water table; low available water capacity.	High water table low available water capacity; erodible.
High water table; unstable cut slopes.	High water table; rapid permeability.	Rapid permeability	High water table; rapid permeability.	High water table; low available water capacity.	High water table; low available water capacity.

TABLE 8.—*Interpretations of engineering*

Soil series and map symbols	Suitability as source of—			
	Topsoil [1]	Sand	Gravel	Road fill [2]
Fresh water marsh: FA	Unsuited: ponded.	Unsuited: ponded.	Unsuited: ponded	Unsuited: ponded; high in organic-matter content.
Gloucester: GlB, GlC, GsB, GsC, GsD, GtD, GtE.	Poor: coarse fragments.	Poor: excess fines.	Poor: excess fines.	Good
Greenwood: GW	Poor: excess wetness.	Unsuited: no sand.	Unsuited: no gravel.	Unsuited: organic deposits.
Hadley: Ha	Good	Poor: excess fines.	Unsuited: excess fines.	Fair: high in fines.
Hermon: HfB, HfC, HmB, HmC, HmD, HmE, HnD, HnE, HOC, HOE, HOF.	Poor: coarse fragments.	Poor: excess fines.	Poor: excess fines.	Good. Fair for HmD, HOC: slope or stoniness. Poor for HmE, HnD, HnE, HOE and HOF: slope and stoniness in places.
Hinckley: HsA, HsB, HsC, HsE	Poor: coarse fragments.	Good: sand, gravel, and cobblestones mixed.	Good: sand, gravel, and cobblestones mixed.	Good. Fair to poor for HsE: slope.
*Hollis: HtB, HtC, HtD, HvB, HvC, HvD, HvE, HxD, HxE. For the Charlton parts, see Charlton series. For the Rock outcrop parts of HxD and HxE, see Rock outcrop.	Fair: coarse fragments.	Unsuited: excess fines.	Poor: excess fines.	Poor: bedrock within 20 inches of surface.
*Leicester: LDB, LfA, LfB For the Ridgebury part of LDB, see Ridgebury series. For the Walpole parts of LfA and LfB, see Walpole series.	Poor: high water table; stoniness.	Poor: excess fines.	Poor: excess fines.	Poor: wetness
Limerick: Lk	Poor: high water table.	Poor: excess fines.[3]	Poor: excess fines [3]	Poor: wetness
Limerick variant: Lm	Poor: high water table.	Good below a depth of about 2 feet.	Poor: excess fines [3]	Poor: wetness
*Lyman: LnB, LnC, LnD, LnE, LsD, LsE, LVC, LVE, LVF, LYE, LYF. For the Berkshire parts, see Berkshire series. For the Rock outcrop parts of LsD, LsE, LYE, and LYF, see Rock outcrop.	Fair: coarse fragments.	Unsuited: excess fines.	Poor: excess fines.	Poor: bedrock within 20 inches of surface.

properties of the soils—Continued

Soil features affecting—					
Highway location	Ponds		Drainage	Irrigation	Diversions, terraces, and waterways
	Reservoir areas	Embankments [3]			
Ponded most of the year; high compressibility.	Ponded most of the year.	([5])	([5])	([5])	([5])
Stoniness	Moderately rapid permeability; stoniness.	Moderate permeability; stoniness.	([5])	Low available water capacity; rapid intake rate.	Stoniness; erodible.
High water table; poor stability; high compressibility.	High water table; organic deposits.	([5])	High water table; poor stability; high compressibility; outlet limitations.	([5])	([5])
Subject to flooding; high potential frost action.	Subject to flooding; moderate permeability.	Moderately slow permeability; susceptible to piping; erodible.	Subject to flooding	High available water capacity; moderate intake rate.	Erodible.
Stoniness	Moderately rapid permeability; stoniness.	Moderate permeability; stoniness.	([5])	Low available water capacity; rapid intake rate.	Stoniness; erodible.
Unstable cut slopes; very low available water capacity.	Rapid permeability	Rapid permeability	([5])	Very low available water capacity; rapid intake rate.	Sand and gravel layers below a depth of 19 inches; very low available water capacity.
Bedrock within 20 inches of surface; seepage over bedrock; moderate susceptibility to frost action.	Bedrock within 20 inches of surface.	Moderate permeability; bedrock within 20 inches of surface.	([5])	Low available water capacity; bedrock within 20 inches of surface.	Bedrock within 20 inches of surface.
High water table; high potential frost action; stoniness.	High water table; moderate permeability; seepage; stoniness.	High water table; moderate permeability; stoniness.	High water table; stoniness.	([5])	High water table; stoniness; eordible.
High water table; subject to flooding; high potential frost action.	High water table; subject to flooding; moderate permeability.	High water table; moderately slow permeability; susceptible to piping.	High water table; subject to flooding; moderate permeability.	High water table	([5])
High water table; subject to flooding; high potential frost action.	High water table; subject to flooding; rapid permeability in substratum.	High water table; moderately slow permeability; susceptible to piping.	High water table; subject to flooding; rapid permeability in substratum.	High water table	([5])
Bedrock within 20 inches of surface; seepage over bedrock; moderate potential frost action.	Bedrock within 20 inches of surface.	Moderate permeability; bedrock within 20 inches of surface	([5])	Low available water capacity; bedrock within 20 inches of surface.	Bedrock within 20 inches of surface.

TABLE 8.—*Interpretations of engineering*

Soil series and map symbols	Suitability as source of—			
	Topsoil [1]	Sand	Gravel	Road fill [2]
*Marlow: MaB, MaC, MdB, MdC, MdD, MdE, MEE, MEF, MFC. For the Peru part of MFC, see Peru series.	Fair: coarse fragments.	Unsuited: excess fines.	Poor: excess fines.	Good. Fair for MdD and MFC: slope or stoniness. Poor for MdE, MEE and MEF: slope.
Millis: MlB, MlC, MsB, MsC, MsD	Fair: coarse fragments.	Poor: excess fines.	Poor: excess fines.	Good. Fair for MsD: slope.
Muck and Peat: MU	Poor: excess wetness.	Unsuited: no sand.	Unsuited: no gravel.	Unsuited: organic-matter content.
Naumburg: NaB	Poor: high water table.	Good below a depth of about 18 inches.	Poor: excess fines.	Poor: wetness
Nicholville variant: NcA, NcB	Good	Good below a depth of about 3 feet.	Poor: excess fines.	Fair: high in fines.
Ondawa: Of, Oh	Good	Poor: excess fines.[4]	Poor: excess fines.[4]	Good
Ondawa variant: Os	Good	Good below a depth of about 30 inches.	Poor: excess fines.[3]	Good
Ossipee: OT	Poor: excess wetness.	Unsuited: no sand.	Unsuited: no gravel.	Unsuited: organic deposits.
Paxton: PaB, PaC, PdB, PdC, PdD	Fair: coarse fragments.	Unsuited: excess fines.	Poor: excess fines.	Good. Fair for PdD: slope.
Peru: PeB, PeC, PLC	Poor: stoniness	Unsuited: excess fines.	Poor: excess fines.	Good. Fair for PLC: stoniness.
Podunk: Po	Good	Poor: excess fines.[4]	Poor: excess fines.[4]	Good
Podunk variant: Ps	Good	Good below a depth of about 2 feet.	Poor: excess fines.[4]	Good
Raynham variant: Ra	Poor: excess wetness.	Good below a depth of about 2 feet.	Poor: excess fines.[4]	Poor: wetness

properties of the soils—Continued

Soil features affecting—					
Highway location	Ponds		Drainage	Irrigation	Diversions, terraces, and waterways
	Reservoir areas	Embankments [3]			
Moderate potential frost action; seepage spots in cuts; stoniness.	Moderately slow permeability; stoniness.	Slow permeability; stoniness.	Seepage along top of compact layer; stoniness.	Moderate available water capacity and intake rate.	Seepage along top of compact layer; stoniness.
Moderate potential frost action.	Moderately slow permeability.	Slow permeability	Seepage along top of compact layer; stoniness.	Moderate available water capacity.	Seepage along top of compact layer; stoniness; erodible.
High water table; poor stability; high compressibility.	High water table; organic deposits.	[5]	High water table; poor stability; high compressibility; outlet limitations.	[5]	[5]
High water table; unstable cut slopes; moderate potential frost action.	High water table; rapid permeability.	High water table; rapid permeability; susceptible to piping.	High water table; rapid permeability; unstable trench walls.	High water table; low available water capacity.	High water table; erodible.
High water table; high potential frost action; cut slopes; erodible.	High water table; rapid permeability in substratum.	Moderately slow permeability; susceptible to piping; erodible.	High water table; rapid permeability in substratum.	High water table; high available water capacity.	Seepage spots; erodible.
Subject to flooding	Moderately rapid permeability; subject to flooding.	Moderate permeability; susceptible to piping; erodible.	Subject to flooding	Moderate available water capacity and intake rate.	Erodible.
Subject to flooding	Moderately rapid permeability; subject to flooding.	Moderate permeability; susceptible to piping; erodible.	Subject to flooding	Low available water capacity; moderate intake rate.	Erodible.
High water table; poor stability; high compressibility.	High water table; organic deposits.	[5]	High water table; poor stability; high compressibility; outlet limitations.	[5]	[5]
Moderate potential frost action; seepage spots in cuts; stoniness.	Moderately slow permeability; stoniness.	Slow permeability; stoniness.	Seepage along top of of compact layer; stoniness.	Moderate available water capacity and intake rate.	Seepage along top of compact layer; stoniness; erodible.
High water table; high potential frost action; seepage spots in cuts; stoniness.	High water table; moderately slow permeability; stoniness.	Slow permeability; stoniness.	High water table; seepage along top of compact layer; of stoniness.	High water table; moderate available water capacity and intake rate.	High water table; seepage along top of compact layer; erodible; stoniness.
High water table; subject to flooding; high potential frost action.	High water table; subject to flooding; moderately rapid permeability.	Moderate permeability; susceptible to piping.	High water table; subject to flooding.	High water table; moderate available water capacity and intake rate.	High water table; subject to flooding; erodible.
High water table; subject to flooding; high potential frost action.	High water table; subject to flooding; moderately rapid permeability.	Moderate permeability; susceptible to piping.	High water table; subject to flooding.	High water table; low available water capacity and intake rate.	High water table; subject to flooding; erodible.
High water table; high potential frost action.	High water table; rapid permeability in substratum.	High water table; moderately slow permeability; susceptible to piping.	High water table; rapid permeability in substratum.	High water table	[5]

TABLE 8.—*Interpretations of engineering*

Soil series and map symbols	Suitability as source of—			
	Topsoil [1]	Sand	Gravel	Road fill [2]
Redstone Mapped only in complexes with Canaan soils.	Poor: coarse fragments.	Poor: excess fines.	Good	Good. Fair for slopes 15 to 25 percent. Poor for slopes greater than 25 percent.
Ridgebury: RgB, RlA, RlB	Poor: excess wetness.	Unsuited: excess fines.	Poor: excess fines.	Poor: wetness
*Rock outcrop: RO, RPE, RPF For the Lyman parts of RPE and RPF, see Lyman series.	Unsuited: rock outcrops.	Unsuited: rock outcrops.	Unsuited: rock outcrops.	Unsuited: rock outcrops.
Salmon variant: SaA, SaB	Good	Good below a depth of about 3 feet.	Poor: excess fines [4]	Fair: high in fines.
Scituate: SdB, SdC	Poor: stoniness	Poor: excess fines.	Poor: excess fines.	Good
Skerry: SeB, SeC	Poor: stoniness	Poor: excess fines.	Poor: excess fines.	Good
Suncook: Sf	Poor: sandy	Good below a depth of about 2 feet.	Poor: excess fines.	Good
Sutton: SnB, SuB	Fair: coarse fragments.	Unsuited: excess fines.	Poor: excess fines.	Good
Walpole Mapped only in complexes with Leicester soils.	Poor: excess wetness.	Fair below a depth of about 18 inches.	Fair below a depth of about 18 inches.	Poor: wetness
*Waumbek: WaB, WaC, WBC For the Skerry part of WBC, see Skerry series.	Poor: stoniness	Poor: excess fines.	Poor: excess fines.	Good. Fair for WBC: stoniness.
Whitman: Wc	Poor: excess wetness; stoniness.	Unsuited: excess fines.	Poor: excess fines.	Poor: wetness
Windsor: WdA, WdB, WdC, WdE	Poor: sandy	Good	Poor: excess fines [4]	Good. Fair to poor for WdE: slope.

properties of the soils—Continued

Soil features affecting—					
Highway location	Ponds		Drainage	Irrigation	Diversions, terraces, and waterways
	Reservoir areas	Embankments [3]			
Stoniness	Moderately rapid permeability; stoniness.	Moderate permeability; stoniness.	([5])	Low available water capacity; rapid intake rate.	Stoniness; erodible.
High water table; high potential frost action; stoniness.	High water table; moderately slow permeability; stoniness.	High water table; moderately slow permeability.	High water table; moderately slow permeability; stoniness.	High water table	High water table; seepage along top of compact layer; erodible; stoniness.
Rock outcrops	([5])	([5])	([5])	([5])	([5])
High potential frost action; erodible.	Moderate permeability.	Moderately slow permeability; susceptible to piping; erodible.	([5])	High available water capacity.	Erodible; sand below a depth of about 35 inches.
High water table; high potential frost action; seepage spots in cut slopes; stoniness.	High water table; moderately slow permeability; stoniness.	Slow permeability; stoniness.	High water table; seepage along top of compact layer; stoniness.	High water table; moderate available water capacity and intake rate.	High water table; seepage along top of compact layer; erodible; stoniness.
High water table; high potential frost action; seepage in cut slopes; stoniness.	High water table; moderately slow permeability; stoniness.	Slow permeability; stoniness.	High water table; seepage along top of compact layer; stoniness.	High water table; moderate available water capacity and intake rate.	High water table; seepage along top of compact layer; erodible; stoniness.
Subject to flooding; cut slopes unstable.	Subject to flooding; rapid permeability.	Rapid permeability; susceptible to piping.	Subject to flooding	Very low available water capacity; rapid intake rate.	([5])
High water table; high potential frost action; stoniness.	High water table; moderate permeability; stoniness.	Moderately slow permeability; stoniness.	High water table; seepage; stoniness.	High water table; moderate available water capacity.	High water table; erodible; stoniness.
High water table; moderate potential frost action.	High water table; rapid permeability below a depth of 20 inches.	High water table; moderately rapid permeability.	High water table; rapid permeability below a depth of 20 inches; unstable trench walls.	High water table; moderate available water capacity.	High water table; rapid permeability below a depth of 20 inches.
High water table; moderate potential frost action; stoniness.	High water table; moderately rapid permeability; stoniness.	Moderate permeability; stoniness.	High water table; seepage; stoniness.	High water table; moderate available water capacity.	High water table; moderately rapid permeability; stoniness.
High water table; high potential frost action; stoniness.	High water table; moderately slow permeability; stoniness.	High water table; slow permeability; stoniness.	High water table; seepage over compact layer; stoniness.	([5])	([5])
Unstable cut slopes; erodible; very low available water capacity.	Rapid permeability	Rapid permeability; susceptible to piping; erodible.	([5])	Very low available water capacity and rapid intake rate.	Erodible; very low available water capacity.

TABLE 8.—*Interpretations of engineering*

Soil series and map symbols	Suitability as source of—			
	Topsoil [1]	Sand	Gravel	Road fill [2]
Winooski: Wn	Good	Good below a depth of about 42 inches.	Poor: excess fines	Fair: high in fines.
Woodbridge: WoB, WvB, WvC	Fair: coarse fragments.	Unsuited: excess fines.	Poor: excess fines	Good

[1] Rating does not include the stony or rocky phases of the respective series where a nonstony or nonrocky phase exists.

[2] Susceptibility to frost action was not considered in the ratings because predictions made of disturbed soil material are not very reliable, especially when information concerning water sources is not available.

[3] Permeability for embankment refers to the soil material when compacted.

engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. All samples in table 9 were obtained at specific depths as indicated in the table; therefore, the test data should not be used as a basis for estimating the properties of layers below the sampled layer.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from semisolid to plastic. The liquid limit is the moisture content at which the material changes from plastic to liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. Since all tested soils in Carroll County are nonplastic, the columns showing the results of tests for liquid limit and plasticity index have not been included in table 9.

The AASHTO and Unified classifications have been explained previously.

Recreational Development

This section contains information about the suitability of the soils for outdoor recreational use. The information does not preclude more detailed onsite investigations. Specific recommendations for the use of the soils are not given. The sections "General Soil Map," "Descriptions of the Soils," and "Engineering Uses of the Soils" contain additional information useful in planning the use and development of outdoor recreation sites.

Soils that support construction of facilities such as dwellings, sanitary facilities, campsites, play areas, roads, and parking areas are required for most recreational enterprises in Carroll County.

In table 10, some of the installations or component facilities that are common to most recreational developments in the county are listed. In the table, ratings of *slight, moderate,* or *severe* are given to indicate the degree to which the suitability of a soil for a given use may be affected by limitations. Where the effect of a specific limitation is estimated to be either *moderate* or *severe,* the specific limitation is named in the table.

A rating of *slight* includes the range from none to slight, since very few soils have no limitations to use. Soils with a rating of *moderate* have one or more limitations that generally can be overcome by moderate expenditures of money, effort, or both. A rating of *severe* indicates one or more limitations that are not easily controlled or eliminated. The rating does not imply, however, that a soil cannot be put to the specific use.

The ratings of the mapping units in the table indicate what can be expected for areas delineated on the soil map. Local variations within these delineated mapping units require onsite examination to determine the nature and extent of the variations. Some of these variations, or mapping inclusions, are described under the mapping unit description in the section "Descriptions of the Soils."

The recreational uses for which soils are rated in table 10 are discussed in the following paragraphs.

Low buildings without basements include cottages, summer homes, lodges, and recreational service buildings. It is assumed that construction will be on concrete, wood, or steel columns, or on a slab. Sewage disposal, water supply, access roads, and stabilizing or maintaining vegetative cover are not considered.

The main soil features affecting use for low buildings without basements are depth to water table, natu-

properties of the soils—Continued

Soil features affecting—					
Highway location	Ponds		Drainage	Irrigation	Diversions, terraces, and waterways
	Reservoir areas	Embankments [3]			
High water table; subject to flooding; high potential frost action.	High water table; subject to flooding; moderate permeability.	Moderately slow permeability; susceptible to piping.	High water table; subject to flooding.	High water table; high available water capacity; moderate intake rate.	High water table; subject to flooding; erodible.
High water table; high potential frost action; stoniness.	High water table; moderately slow permeability.	Slow permeability; stoniness.	High water table; seepage along top of compact layer; stoniness.	High water table; moderate available water capacity and intake rate.	High water table; seepage along top of compact layer; erodible; stoniness.

[4] Locally, sand or gravel may be below a depth of 4 to 5 feet.

[5] Soil features are not given because the engineering use or practice generally is not needed or not applicable, the soils are not suited, or the properties of the mapping unit range so widely that it is not practical to list them.

ral drainage, steepness of slope, depth to bedrock, potential frost action, stoniness, rockiness, hazard of flooding, and those properties affecting foundation support.

Playgrounds are those areas to be developed for intensive play activities such as baseball, football, badminton, and all other similar organized games. These areas are subject to intensive foot traffic. Importation of material or topsoil is not considered. Limitation of soils for growing and maintaining grass cover is also not considered, but it is an important item to consider in final evaluation of a site.

The main soil features affecting use for playgrounds are wetness, flooding, permeability, slope, surface soil texture, depth to bedrock, coarse fragments on the surface, stoniness, and rockiness.

Campsites include trailer and tent sites. These areas provide picnic tables, fireplaces, and an unsurfaced parking area at each site to accommodate large groups of people (fig. 11). More nearly level areas are generally required for trailer sites than tent sites because of the larger types of vehicles involved. Sewage disposal, water supply, access roads, and growing and maintaining grass cover are not considered in this interpretation; however, these items are important considerations in the final evaluation of a site.

Major soil features affecting use for campsites are wetness, flooding, permeability, slope, surface soil texture, coarse fragments on the surface, stoniness, and rockiness.

Picnic areas are for intensive use. Such areas include park-type picnic areas with provisions for tables and fireplaces. It is assumed that most vehicular traffic will be confined to access roads. Growing and maintaining grass cover is an important consideration in the final evaluation of a site but was not used in this interpretation.

Major soil features affecting use for picnic areas are wetness, flooding, slope, surface soil texture, coarse fragments on the surface, stoniness, and rockiness.

Paths and trails apply to areas to be used for local and cross-country footpaths and trails and for bridle paths. It is assumed that these areas will be used as they occur in nature and that little or no soil will be moved. In making the ratings, special emphasis was given to those soil features affecting trafficability, dust, design, and maintenance of trafficways.

Major soil features affecting use for paths and trails are wetness, flooding, slope, surface soil texture, coarse fragments on the surface, rockiness, and stoniness.

Access roads (unpaved) are for light-duty seasonal roads that have been graded, sanded, or graveled but not paved. These roads are used to provide access to recreational areas. Estimated limitations for paved streets and parking lots are given in the section "Town and Country Planning."

Major soil features affecting use for access roads (unpaved) are depth to water table, depth to bedrock, slope, potential frost action, flooding, stoniness, and rockiness.

Ski slopes (constructed) are for the construction and maintenance of ski slopes. It is assumed that these slopes will be for skiers of various skills, from beginners through experts (fig. 12).

The ratings are based on soil features influencing site preparation, construction, and maintenance of ski slopes such as length and gradient of slopes, natural drainage or wetness, the presence of a pan layer, the amount of stones, boulders and rock outcrops, and the erodibility of the soil. Although of major importance in final evaluation of a site, slope aspect and the growing and maintaining of short grass cover was not a consideration.

Vegetative cover (grass) is for the establishment and maintenance of grass cover only. It is assumed that vegetative cover is for erosion control. For information about trees, see the section "Woodland Management."

TABLE 9.—*Engineering*

[Tests performed by the New Hampshire Department of Public Works and Highways Materials and Research Division in accordance

Soil name and location	Parent material	Report No.	Depth from surface	Percentage larger than 3 inches discarded in field sampling (estimated by weight)[1]
		S71NH-		
Becket very stony fine sandy loam:				
Town of Madison, 2 miles east of New Hampshire Route 16, south of Whitton Pond, ½ mile southeast of Salter Hill. (Shallower over fragipan and coarser-textured solum than modal.)	Glacial till.	2–16–2	19–40	
Town of Conway, 0.8 mile north of junction of Gulf and Brownfield Roads, ½ mile northeast of Birch Hill, 1,200 feet south of Greely Road. (Modal)	Glacial till.	2–19–1	9–18	5
		2–19–2	24–42	
		S68NH-		
Colton gravelly loamy fine sand:				
Town of Albany, White Mountain National Forest, 15.1 miles west of Conway Village on Kancamagus Highway, across highway from Passaconaway Campground. (Modal)	Water-sorted sand and gravel.	2–4–1	8–16	5
		2–4–3	24–50	15
Hermon very stony fine sandy loam:				
Town of Conway, ½ mile southeast of Labrador Pond, ¾ mile west of Gulf Road, 1,200 feet northeast of Willey Brook. (Fewer coarse fragments than modal.)	Glacial till.	2–1–2	11–21	
		2–1–3	21–42	15
Town of Jackson, White Mountain National Forest, 1.7 miles south of junction of East Branch Saco River and Slippery Brook, 1,200 feet east of Slippery Brook Road. (Modal)	Glacial till.	2–3–1	11–19	5
		2–3–3	27–50	10
		S71NH-		
Redstone sandy loam:				
Town of Bartlett, 1.5 miles north of Glen, ½ mile northwest of Goodrich Falls, 0.6 mile west of Ellis River. (Less coarse fragments in the solum than modal. Highly weathered gravel size fragments partially disintegrated in the process of testing, mostly in the 9- to 16-inch layer.)	Glacial till.	2–20–1	9–16	
		2–20–2	16–34	

[1] Based on samples as received in laboratory. Laboratory test data not corrected for amount discarded in field sampling.

[2] Mechanical analyses according to the AASHTO Designation T 88(2). Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-sized fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-sized fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

The major soil features considered in the rating of soils for vegetative cover (grass) are surface stoniness and rockiness, slope, depth to seasonal high water table, erodibility of the soil, and the amount of water in the soil available for plant growth.

Town and Country Planning

Residential, commercial, and industrial development in Carroll County has expanded into farming areas. The problems that have resulted show the need for careful planning and a thorough understanding of the physical and economic ramifications involved with changes in land use.

Planning officials, developers, builders, and homeowners will find useful information on the soil maps in the back of this survey and in the table and text in this section. Additional information can be obtained from the sections "Engineering Uses of the Soils" and "Descriptions of the Soils."

In table 11 the estimated limitations of the soils for specified uses in town and country planning are rated as *slight, moderate,* and *severe.* If a given soil is rated

test data

with standard procedures of the American Association of State Highway and Transportation Officials (AASHTO). All soils are nonplastic]

Mechanical analysis [2]											Classification	
Percentage passing sieve—							Percentage smaller than—					
3-in	¾-in	⅜-in	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm	AASHTO [3]	Unified [4]
100	97	91	83	72	42	21	18	12	5	2	A–1–b	SM
100	95	91	85	80	58	31	26	16	3	1	A–2–4	SM
--------	96	92	87	79	54	26	22	14	5	2	A–2–4	SM
100	66	56	45	35	7	3	2	2	--------	--------	A–1–a	GP
100	66	54	41	30	3	1	1	1	--------	--------	A–1–a	GP
--------	90	85	76	69	43	16	10	5	1	1	A–1–b	SM
100	95	92	89	83	56	17	9	4	1	1	A–2	SM
100	79	73	65	59	35	10	9	5	2	1	A–1–b	SP–SM
100	91	86	78	72	52	17	12	8	3	2	A–2	SM
--------	99	95	90	71	26	9	6	4	1	1	A–1–b	SW–SM
--------	99	90	55	31	8	3	2	1	--------	--------	A–1–a	SW

[3] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 8): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHTO Designation M 145–49 (*2*).

[4] Based on the Unified Soil Classification System (*3*).

moderate or *severe* for a given use, the limiting soil features are named in the table.

A rating of *slight* indicates that the soil has few to no limitations and is considered desirable for the use named. Soils with a rating of *moderate* have one or more limitations that generally can be overcome or corrected. A rating of *severe* implies that the limitation presents difficult problems; however, this does not mean that the soil cannot be used for the stated purpose.

The ratings of the limitations in the table indicate what can be expected for mapping units delineated on the soil map. Local variations within these delineated mapping units require onsite examination to determine the nature and extent of the variations. Some of these variations or mapping inclusions are described under the mapping unit description in the section "Descriptions of the Soils."

The town and country planning aspects in table 11 are discussed in the following paragraphs.

Dwellings (with basements) are for undisturbed soils on which single-family dwellings or other structures with similar foundation requirements can be built. The buildings are three stories or less and have

Figure 11.—Campsites on Adams loamy sand, 0 to 3 percent slopes. Soil limitations are moderate, and the main concerns in management are the potential problems of trafficability and dust.

basements that extend to a depth of at least 5 feet. Sewage disposal, water supply, access roads, or stabilizing and maintaining vegetative cover are not considered in the rating.

The major soil features affecting use for dwellings (with basements) are natural drainage, depth to seasonal high water table, depth to bedrock, flooding, slope, stoniness, and those soil properties influencing foundation support.

Septic tank effluent disposal refers to the disposal of effluent from a septic tank system by means of a filter or leach field. The successful operation of this system depends on the absorptive quality of the soil and the level of the water table during wet seasons. Specific locations of filter fields require onsite investigations.

If the effluent is not absorbed rapidly enough, it may back up or rise to the surface and be carried off into ditches and drainageways and eventually into streams and lakes as a pollutant. If the effluent drains through the soil too rapidly, it may travel unfiltered into and contaminate ground water supplies. The filtering action through the soil is thus essential to the proper operation of the system.

The major soil features affecting use for septic tank effluent disposal are permeability of the soil, depth to water table, depth to bedrock or pan layer, slope, stoniness, rockiness, and hazard of flooding.

Sewage lagoons are shallow ponds built to dispose of sewage through oxidation. Sewage lagoons require consideration of the soils for two functions: as a floor for the impounded area, and as soil material for the enclosing embankment. The soil must be capable of holding water with little or no seepage in order to minimize pollution of ground and surface waters. It is assumed that soil material at the site will be used for the embankment. Location of specific sites for sewage lagoons requires onsite investigations.

Major soil features considered in rating the soils for sewage lagoons are permeability, depth to water table, depth to bedrock, slope, amount and size of coarse fragments on and below the surface, organic-matter content, and hazard of flooding.

Use for *lawns and landscaping* is based on soil characteristics that limit the establishment and maintenance of lawns and shrubs. Ratings are for the natural soil, in place. It is assumed that the lawns will be

Figure 12.—Ski slope on Becket very stony fine sandy loam, 15 to 25 percent slopes, where moderately steep slopes are a moderate limitation to site preparation, construction, and maintenance.

subject to moderate foot traffic and that fill or topsoil will not be brought in.

Major soil factors considered in the ratings are texture of the surface soil and subsoil, depth to water table, depth to bedrock, slope, stoniness, rockiness, and hazard of flooding.

Streets and parking lots (paved) apply to the use of soil for the construction and maintenance of hard surfaced (commonly asphalt) streets and parking lots such as those used in community subdivisions. High-speed interstate highways were not considered in the ratings. The actual layout of streets and parking lots will require onsite investigations.

The major soil features affecting use for streets and parking lots are natural drainage, flooding, slope, depth to bedrock, potential frost action, stoniness, rockiness, and those properties related to use of the soil as subgrade material.

Shallow excavations are for excavating or trenching to a depth of 5 or 6 feet. Additional soil features must be considered in evaluating soils for such uses requiring excavations and trenching as dwellings with basements, cemeteries, pipelines, and cables.

The major soil features considered in rating soils for shallow excavations are natural drainage, flooding, slope, texture of soil to the depth to be excavated, depth to bedrock, stoniness, and rockiness.

Formation, Morphology, and Classification of the Soils

This section is in three parts. In the first part, factors of soil formation are discussed as they relate to the formation of soils in Carroll County. In the second part the morphology of the soils in the county is discussed. In the third part, the soil series of Carroll County are placed in their respective family, subgroup, and order of the current system of soil classification.

Formation of the Soils

Soils are the result of the interaction of five major factors: climate; parent material; plant and animal life; topography; and time. The relative importance of

TABLE 10.—*Limitations of the soils*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The instructions for referring to other series

Soil series and map symbols	Degree and kind of limitations for—			
	Low buildings without basements	Playgrounds	Campsites	
			Trailer	Tent
Acton:				
AcB	Moderate: moderate potential frost action.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table.
AdB	Moderate: moderate potential frost action; stoniness.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table; stoniness.
AdC	Moderate: moderate potential frost action; stoniness; slope.	Severe: slope	Severe: slope	Moderate: seasonal high water table; stoniness; slope.
Adams:				
AmA	Slight	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.
AmB	Slight	Moderate: sandy surface layer; slope.	Moderate: sandy surface layer; slope.	Moderate: sandy surface layer.
AmC	Moderate: slope	Severe: slope	Severe: slope	Moderate: sandy surface layer; slope.
AmE	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Alluvial land, wet: AW	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.
*Becket:				
BcB	Moderate: moderate potential frost action; stoniness.	Moderate: moderately slow permeability; slope; stoniness.	Moderate: moderately slow permeability; slope; stoniness.	Moderate: moderately slow permeability; stoniness.
BcC	Moderate: moderate potential frost action; stoniness; slope.	Severe: slope	Severe: slope	Moderate: moderately slow permeability; stoniness; slope.
BcD	Severe: slope	Severe: slope	Severe: slope	Severe: slope
BcE	Severe: slope	Severe: slope	Severe: slope	Severe: slope
BEE	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.
BKC For the Skerry part of BKC, see Skerry series.	Severe: stoniness	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness
Berkshire:				
BsB	Moderate: stoniness	Moderate: slope; stoniness.	Moderate: slope; stoniness.	Moderate: stoniness
BsC	Moderate: stoniness; slope.	Severe: slope	Severe: slope	Moderate: stoniness; slope.
BsD	Severe: slope	Severe: slope	Severe: slope	Severe: slope

for recreational development

soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the that appear in the first column of this table]

Degree and kind of limitations for—Continued				
Picnic areas	Paths and trails	Access roads (unpaved)	Ski slopes (constructed)	Vegetative cover (grass)
Slight	Slight	Moderate: seasonal high water table.	Slight	Slight.
Slight	Moderate: stoniness	Moderate: seasonal high water table.	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: seasonal high water table; slope.	Moderate: slope	Moderate: stoniness.
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Slight	Severe: lack of slope	Severe: droughty.
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Slight	Moderate: erodible	Severe: droughty.
Moderate: sandy surface layer; slope.	Moderate: sandy surface layer.	Moderate: slope	Moderate: erodible; slope.	Severe: droughty.
Severe: slope	Moderate: sandy surface layer; slope. Severe for slopes greater than 25 percent.	Severe: slope	Severe: short slopes; erodible.	Severe: droughty.
Severe: high water table; frequent flooding.	Severe: high water table.	Severe: high water table; frequent flooding.	Severe: wetness; lack of slope.	Severe: high water table; frequent flooding.
Slight	Moderate: stoniness	Slight	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: slope	Moderate: slope; pan layer.	Moderate: stoniness.
Severe: slope	Moderate: stoniness; slope.	Severe: slope	Moderate: slope; seep spots; pan layer.	Moderate: stoniness; slope.
Severe: slope	Severe: slope	Severe: slope	Moderate: seep spots; pan layer.	Severe: slope.
Severe: slope	Severe: stoniness; slope (where greater than 25 percent).	Severe: slope	Moderate: seep spots; pan layer.	Severe: stoniness; slope.
Moderate: stoniness	Severe: stoniness	Moderate: stoniness; slope.	Moderate: seep spots; pan layer.	Severe: stoniness.
Slight	Moderate: stoniness	Slight	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: slope	Moderate: slope	Moderate: stoniness.
Severe: slope	Moderate: stoniness; slope.	Severe: slope	Moderate: slope	Moderate: stoniness; slope.

TABLE 10.—*Limitations of the soils*

Soil series and map symbols	Degree and kind of limitations for—			
	Low buildings without basements	Playgrounds	Campsites	
			Trailer	Tent
Berkshire (continued)				
BsE	Severe: slope	Severe: slope	Severe: slope	Severe: slope
BtD	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.
BVC	Severe: stoniness	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness
BVE, BVF	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.
*Canaan:				
CDC:				
Canaan part	Severe: bedrock outcrops.	Severe: bedrock outcrops; slope (where greater than 8 percent).	Severe: bedrock outcrops; slope (where greater than 8 percent).	Severe: bedrock outcrops.
Redstone part	Severe: stoniness	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness
CDE, CEE, CEF:				
Canaan part	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.
Redstone part	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.
For the Rock outcrop parts of CEE and CEF, see Rock outcrop.				
Charlton:				
CfB	Slight	Moderate: slope	Moderate: slope	Slight
ClB	Moderate: stoniness	Moderate: slope; stoniness.	Moderate: slope; stoniness.	Moderate: stoniness
ClC	Moderate: stoniness; slope.	Severe: slope	Severe: slope	Moderate: stoniness; slope.
ClD	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Chocorua: CM	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.
Colton:				
CnA	Slight	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.
CnB	Slight	Moderate: sandy surface layer; slope.	Moderate: sandy surface layer; slope.	Moderate: sandy surface layer.
CnC	Moderate: slope	Severe: slope	Severe: slope	Moderate: sandy surface layer; slope.
CnE	Severe: slope	Severe: slope	Severe: slope	Severe: slope

for recreational development—Continued

Degree and kind of limitations for—Continued				
Picnic areas	Paths and trails	Access roads (unpaved)	Ski slopes (constructed)	Vegetative cover (grass)
Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope.
Severe: stoniness; slope.	Severe: stoniness	Severe: stoniness; slope.	Moderate: slope	Severe: stoniness; slope.
Moderate: stoniness	Severe: stoniness	Moderate: stoniness	Moderate: slope	Severe: stoniness.
Severe: slope	Severe: stoniness; slope (where greater than 25 percent).	Severe: slope	Moderate: slope. Severe: slope (where greater than 35 percent).	Severe: stoniness; slope.
Severe: bedrock outcrops.	Severe: bedrock outcrops.	Severe: bedrock outcrops.	Severe: bedrock outcrops; seepage over bedrock.	Severe: bedrock outcrops.
Moderate: slope (where greater than 8 percent).	Severe: stoniness	Moderate: stoniness; slope (where greater than 8 percent).	Moderate: slope	Severe: stoniness.
Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope (where greater than 25 percent).	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; seepage over bedrock; slope (where greater than 35 percent).	Severe: bedrock outcrops.
Severe: stoniness; slope.	Severe: stoniness; slope (where greater than 25 percent).	Severe: stoniness; slope.	Moderate: slope. Severe: slope (where greater than 35 percent).	Severe: stoniness; slope.
Slight	Slight	Slight	Slight	Slight.
Slight	Moderate: stoniness	Slight	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: slope	Moderate: slope	Moderate: stoniness.
Severe: slope	Moderate: stoniness; slope.	Severe: slope	Moderate: slope	Moderate: stoniness; slope.
Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: wetness; lack of slope.	Severe: water table at surface; high in organic-matter content.
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Slight	Severe: lack of slope	Severe: droughty.
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Slight	Slight	Severe: droughty.
Moderate: sandy surface layer; slope.	Moderate: sandy surface layer.	Moderate: slope	Moderate: slope	Severe: droughty.
Severe: slope	Moderate: sandy surface layer; slope. Severe: slope (where greater than 25 percent).	Severe: slope	Severe: short slopes	Severe: droughty; slope.

TABLE 10.—*Limitations of the soils*

Soil series and map symbols	Degree and kind of limitations for—			
	Low buildings without basements	Playgrounds	Campsites	
			Trailer	Tent
Croghan:				
CyA	Moderate: moderate potential frost action.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.
CyB	Moderate: moderate potential frost action.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table.
Deerfield:				
DeA	Moderate: moderate potential frost action.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.
DeB	Moderate: moderate potential frost action.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table.
Duane:				
DnA	Moderate: moderate potential frost action.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.
DnB	Moderate: moderate potential frost action.	Moderate: seasonal high water table.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table.
Fresh water marsh: FA	Severe: ponded	Severe: ponded	Severe: ponded	Severe: ponded
Gloucester:				
GlB	Slight	Moderate: slope	Moderate: slope	Slight
GlC	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope
GsB	Moderate: stoniness	Moderate: slope; stoniness.	Moderate: slope; stoniness.	Moderate: stoniness
GsC	Moderate: stoniness; slope.	Severe: slope	Severe: slope	Moderate: stoniness; slope.
GsD	Severe: slope	Severe: slope	Severe: slope	Severe: slope
GtD, GtE	Severe: stoniness; slope (where greater than 15 percent).	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope (where greater than 15 percent).
Greenwood: GW	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.
Hadley: Ha	Severe: occasional flooding.	Moderate: occasional flooding.	Moderate: occasional flooding.	Moderate: occasional flooding.
Hermon:				
HfB	Slight	Moderate: slope	Moderate: slope	Slight
HfC	Moderate: slope	Severe: slope	Severe: slope	Moderate: slope
HmB	Moderate: stoniness	Moderate: slope; stoniness.	Moderate: slope; stoniness.	Moderate: stoniness
HmC	Moderate: stoniness; slope.	Severe: slope	Severe: slope	Moderate: stoniness; slope.

for recreational development—Continued

Degree and kind of limitations for—Continued				
Picnic areas	Paths and trails	Access roads (unpaved)	Ski slopes (constructed)	Vegetative cover (grass)
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: seasonal high water table.	Severe: lack of slope	Slight.
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: seasonal high water table.	Slight	Slight.
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: seasonal high water table.	Severe: lack of slope	Slight.
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: seasonal high water table.	Slight	Slight.
Slight	Slight	Moderate: seasonal high water table.	Severe: lack of slope	Slight.
Slight	Slight	Moderate: seasonal high water table.	Slight	Slight.
Severe: ponded	Severe: ponded	Severe: ponded	Severe: ponded	Severe: ponded.
Slight	Slight	Slight	Slight	Moderate: somewhat droughty.
Moderate: slope	Slight	Moderate: slope	Moderate: slope	Moderate: somewhat droughty.
Slight	Moderate: stoniness	Slight	Slight	Moderate: somewhat droughty; stoniness.
Moderate: slope	Moderate: stoniness	Moderate: slope	Moderate: slope	Moderate: somewhat droughty; stoniness.
Severe: slope	Moderate: stoniness; slope.	Severe: slope	Moderate: slope	Moderate: somewhat droughty; stoniness; slope.
Severe: stoniness; slope (where greater than 15 percent).	Severe: stoniness; slope (where greater than 25 percent).	Severe: stoniness; slope (where greater than 15 percent).	Moderate: slope. Severe: slope (where greater than 35 percent).	Severe: stoniness; slope (where greater than 25 percent).
Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: wetness; lack of slope.	Severe: water table at surface; high in organic-matter content.
Slight	Slight	Moderate: occasional flooding.	Severe: lack of slope	Slight.
Slight	Slight	Slight	Slight	Moderate: somewhat droughty.
Moderate: slope	Slight	Moderate: slope	Moderate: slope	Moderate: somewhat droughty.
Slight	Moderate: stoniness	Slight	Slight	Moderate: somewhat droughty; stoniness.
Moderate: slope	Moderate: stoniness	Moderate: slope	Moderate: slope	Moderate: somewhat droughty; stoniness.

TABLE 10.—*Limitations of the soils*

Soil series and map symbols	Degree and kind of limitations for—			
	Low buildings without basements	Playgrounds	Campsites	
			Trailer	Tent
Hermon (continued)				
HmD	Severe: slope	Severe: slope	Severe: slope	Severe: slope
HmE	Severe: slope	Severe: slope	Severe: slope	Severe: slope
HnD, HnE, HOE	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.
HOC	Severe: stoniness	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness
HOF	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.
Hinckley:				
HsA	Slight	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.
HsB	Slight	Moderate: sandy surface layer; slope.	Moderate: sandy surface layer; slope.	Moderate: sandy surface layer.
HsC	Moderate: slope	Severe: slope	Severe: slope	Moderate: sandy surface layer; slope.
HsE	Severe: slope	Severe: slope	Severe: slope	Severe: slope
*Hollis:				
HtB	Severe: bedrock at a depth of 20 inches or less.	Severe: bedrock at a depth of 20 inches or less.	Moderate: slope	Slight
HtC	Severe: bedrock at a depth of 20 inches or less.	Severe: bedrock at a depth of 20 inches or less; slope.	Severe: slope	Moderate: slope
HtD	Severe: slope	Severe: bedrock at a depth of 20 inches or less; slope.	Severe: slope	Severe: slope
HvB	Severe: bedrock outcrops.	Severe: bedrock outcrops.	Moderate: bedrock outcrops; slope.	Moderate: bedrock outcrops.
HvC	Severe: bedrock outcrops.	Severe: bedrock outcrops; slope.	Severe: slope	Moderate: bedrock outcrops; slope.
HvD	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: slope	Severe: slope
HvE	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: slope	Severe: slope

for recreational development—Continued

Degree and kind of limitations for—Continued				
Picnic areas	Paths and trails	Access roads (unpaved)	Ski slopes (constructed)	Vegetative cover (grass)
Severe: slope	Moderate: stoniness; slope.	Severe: slope	Moderate: slope	Moderate: somewhat droughty; stoniness; slope.
Severe: slope	Severe: slope	Severe: slope	Moderate: slope. Severe: slope (where greater than 35 percent).	Severe: slope.
Severe: stoniness; slope.	Severe: stoniness; slope (where greater than 25 percent).	Severe: stoniness; slope.	Moderate: slope. Severe: slope (where greater than 35 percent).	Severe: stoniness; slope.
Moderate: stoniness	Severe: stoniness	Moderate: stoniness	Moderate: slope	Severe: stoniness.
Severe: slope	Severe: stoniness; slope (where greater than 25 percent).	Severe: slope	Severe: slope	Severe: stoniness; slope.
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Slight	Severe: lack of slope	Severe: droughty.
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Slight	Slight	Severe: droughty.
Moderate: sandy surface layer; slope.	Moderate: sandy surface layer.	Moderate: slope	Moderate: slope	Severe: droughty.
Severe: slope	Moderate: sandy surface layer; slope. Severe: slope (where greater than 25 percent).	Severe: slope	Severe: short slopes	Severe: droughty; slope.
Slight	Slight	Moderate: bedrock at a depth of 20 inches or less; slope.	Slight	Slight.
Moderate: slope	Slight	Moderate: bedrock at a depth of 20 inches or less; slope.	Moderate: slope	Slight.
Severe: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope.
Moderate: bedrock outcrops.	Moderate: bedrock outcrops.	Severe: bedrock outcrops.	Moderate: bedrock outcrops.	Moderate: bedrock outcrops.
Moderate: bedrock outcrops; slope.	Moderate: bedrock outcrops.	Severe: bedrock outcrops.	Moderate: bedrock outcrops; slope; seepage over bedrock.	Moderate: bedrock outcrops.
Severe: slope	Moderate: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Moderate: bedrock outcrops; slope; seepage over bedrock.	Moderate: bedrock outcrops.
Severe: slope	Severe: slope	Severe: bedrock outcrops; slope.	Moderate: bedrock outcrops; slope; seepage over bedrock.	Severe: slope.

TABLE 10.—*Limitations of the soils*

Soil series and map symbols	Degree and kind of limitations for—			
	Low buildings without basements	Playgrounds	Campsites	
			Trailer	Tent
Hollis (continued) HxD, HxE For the Charlton parts, see Charlton series. For the Rock outcrop parts of HxD and HxE, see Rock outcrop.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.
*Leicester: LDB For the Ridgebury part, see Ridgebury series.	Severe: high water table; stoniness.	Severe: high water table; stoniness.	Severe: high water table; stoniness.	Severe: high water table; stoniness.
LfA, LfB Interpretations are for both Leicester and Walpole parts.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.
Limerick: Lk	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.
Limerick variant: Lm	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.
*Lyman: LnB	Severe: bedrock outcrops.	Severe: bedrock outcrops.	Moderate: bedrock outcrops; slope.	Moderate: bedrock outcrops.
LnC	Severe: bedrock outcrops.	Severe: bedrock outcrops; slope.	Severe: slope	Moderate: bedrock outcrops; slope.
LnD	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: slope	Severe: slope
LnE	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: slope	Severe: slope
LsD, LsE, LVE, LVF, LYE, LYF.	Severe: bedrock outcrops; slope (where greater than 15 percent).	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope (where greater than 15 percent).
LVC For the Berkshire parts, see Berkshire series. For the Rock outcrop parts of LsD, LsE, LYE, and LYF, see Rock outcrop.	Severe: bedrock outcrops.	Severe: bedrock outcrops; slope (where greater than 8 percent).	Severe: bedrock outcrops; slope (where greater than 8 percent).	Severe: bedrock outcrops.
*Marlow: MaB	Moderate: moderate potential frost action.	Moderate: moderately slow permeability; slope.	Moderate: moderately slow permeability; slope.	Moderate: moderately slow permeability.
MaC	Moderate: moderate potential frost action; slope.	Severe: slope	Severe: slope	Moderate: moderately slow permeability; slope.

for recreational development—Continued

Degree and kind of limitations for—Continued				
Picnic areas	Paths and trails	Access roads (unpaved)	Ski slopes (constructed)	Vegetative cover (grass)
Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope (where greater than 25 percent).	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; seepage over bedrock; slope (where greater than 35 percent).	Severe: bedrock outcrops; slope.
Severe: high water table.	Severe: high water table; stoniness.	Severe: high water table.	Severe: wetness	Severe: stoniness.
Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: wetness	Moderate: high water table; stoniness.
Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: wetness; lack of slope.	Moderate: high water table.
Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: wetness; lack of slope.	Moderate: high water table.
Moderate: bedrock outcrops.	Moderate: bedrock outcrops.	Severe: bedrock outcrops.	Moderate: bedrock outcrops.	Moderate: bedrock outcrops.
Moderate: bedrock outcrops; slope.	Moderate: bedrock outcrops.	Severe: bedrock outcrops.	Moderate: bedrock outcrops; slope; seepage over bedrock.	Moderate: bedrock outcrops.
Severe: slope	Moderate: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Moderate: bedrock outcrops; slope; seepage over bedrock.	Moderate: bedrock outcrops; slope.
Severe: slope	Severe: slope	Severe: bedrock outcrops; slope.	Moderate: bedrock outcrops; slope; seepage over bedrock.	Severe: slope.
Severe: bedrock outcrops; slope (where greater than 15 percent).	Severe: bedrock outcrops; slope (where greater than 15 percent).	Severe: bedrock outcrops; slope (where greater than 15 percent).	Severe: bedrock outcrops; seepage over bedrock; slope (where greater than 35 percent).	Severe: bedrock outcrops; slope (where greater than 25 percent).
Severe: bedrock outcrops.	Severe: bedrock outcrops.	Severe: bedrock outcrops.	Severe: bedrock outcrops; seepage over bedrock.	Severe: bedrock outcrops.
Slight	Slight	Slight	Slight	Slight.
Moderate: slope	Slight	Moderate: slope	Moderate: slope; pan layer; seep spots.	Slight.

TABLE 10.—*Limitations of the soils*

Soil series and map symbols	Degree and kind of limitations for—			
	Low buildings without basements	Playgrounds	Campsites	
			Trailer	Tent
Marlow (continued)				
MdB	Moderate: moderate potential frost action; stoniness.	Moderate: moderately slow permeability; slope; stoniness.	Moderate: moderately slow permeability; slope; stoniness.	Moderate: moderately slow permeability; stoniness.
MdC	Moderate: moderate potential frost action; stoniness; slope.	Severe: slope	Severe: slope	Moderate: moderately slow permeability; slope; stoniness.
MdD	Severe: slope	Severe: slope	Severe: slope	Severe: slope
MdE	Severe: slope	Severe: slope	Severe: slope	Severe: slope
MEE	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.
MEF	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.	Severe: stoniness; slope.
MFC For the Peru part of MFC, see Peru series.	Severe: stoniness	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness
Millis:				
MlB	Moderate: moderate potential frost action.	Moderate: moderately slow permeability; slope.	Moderate: moderately slow permeability; slope.	Moderate: moderately slow permeability.
MlC	Moderate: moderate potential frost action; slope.	Severe: slope	Severe: slope	Moderate: moderately slow permeability; slope.
MsB	Moderate: moderate potential frost action; stoniness.	Moderate: moderately slow permeability; slope; stoniness.	Moderate: moderately slow permeability; slope; stoniness.	Moderate: moderately slow permeability; stoniness.
McC	Moderate: moderate potential frost action; stoniness; slope.	Severe: slope	Severe: slope	Moderate: moderately slow permeability; slope.
MsD	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Muck and Peat: MU	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.
Naumburg: NaB	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.
Nicholville variant:				
NcA	Severe: high potential frost action.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.
NcB	Severe: high potential frost action.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table.

for recreational development—Continued

Degree and kind of limitations for—Continued				
Picnic areas	Paths and trails	Access roads (unpaved)	Ski slopes (constructed)	Vegetative cover (grass)
Slight	Moderate: stoniness	Slight	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: slope	Moderate: slope; pan layer; seep spots.	Moderate: stoniness.
Severe: slope	Moderate: stoniness; slope.	Severe: slope	Moderate: slope; pan layer; seep spots.	Moderate: stoniness; slope.
Severe: slope	Severe: slope	Severe: slope	Moderate: slope; pan layer; seep spots. Severe: slope (where greater than 35 percent).	Severe: slope.
Severe: slope	Severe: stoniness; slope (where greater than 25 percent).	Severe: slope	Moderate: slope; pan layer; seep spots.	Severe: stoniness; slope.
Severe: slope	Severe: stoniness; slope.	Severe: slope	Severe: slope	Severe: stoniness; slope.
Moderate: stoniness	Severe: stoniness	Moderate: stoniness	Moderate: slope; pan layer; seep spots.	Severe: stoniness.
Slight	Slight	Slight	Slight	Slight.
Moderate: slope	Slight	Moderate: slope	Moderate: slope; pan layer.	Slight.
Slight	Moderate: stoniness	Slight	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: slope	Moderate: slope; pan layer.	Moderate: stoniness.
Severe: slope	Moderate: stoniness; slope.	Severe: slope	Moderate: slope; seep spots; pan layer.	Moderate: stoniness; slope.
Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: wetness; lack of slope.	Severe: water table at surface; high in organic-matter content.
Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: wetness; lack of slope.	Moderate: high water table.
Slight	Slight	Moderate: seasonal high water table.	Severe: lack of slope	Slight.
Slight	Slight	Moderate: seasonal high water table.	Moderate: erodible	Slight.

TABLE 10.—*Limitations of the soils*

Soil series and map symbols	Degree and kind of limitations for—			
	Low buildings without basements	Playgrounds	Campsites	
			Trailer	Tent
Ondawa: Of	Severe: frequent flooding.	Severe: frequent flooding.	Severe: frequent flooding.	Severe: frequent flooding.
Oh	Severe: occasional flooding.	Moderate: occasional flooding.	Moderate: occasional flooding.	Moderate: occasional flooding.
Ondawa variant: Os	Severe: occasional flooding.	Moderate: occasional flooding.	Moderate: occasional flooding.	Moderate: occasional flooding.
Ossipee: OT	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.
Paxton: PaB	Moderate: moderate potential frost action.	Moderate: moderately slow permeability; slope.	Moderate: moderately slow permeability; slope.	Moderate: moderately slow permeability.
PaC	Moderate: moderate potential frost action.	Severe: slope	Severe: slope	Moderate: moderately slow permeability; slope.
PdB	Moderate: moderate potential frost action; stoniness.	Moderate: moderately slow permeability; slope; stoniness.	Moderate: moderately slow permeability; slope; stoniness.	Moderate: moderately slow permeability; stoniness.
PdC	Moderate: moderate potential frost action; stoniness; slope.	Severe: slope	Severe: slope	Moderate: moderately slow permeability; slope; stoniness.
PdD	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Peru: PeB	Severe: high potential frost action.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table; stoniness.
PeC	Severe: high potential frost action.	Severe: slope	Severe: slope	Moderate: seasonal high water table; stoniness; slope.
PLC	Severe: high potential frost action; stoniness.	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness
Podunk: Po	Severe: frequent flooding.	Severe: frequent flooding.	Severe: frequent flooding.	Severe: frequent flooding.
Podunk variant: Ps	Severe: frequent flooding.	Severe: frequent flooding.	Severe: frequent flooding.	Severe: frequent flooding.
Raynham variant: Ra	Severe: high water table; high potential frost action.	Severe: high water table.	Severe: high water table.	Severe: high water table.
Redstone. Mapped only in complexes with Canaan soils.				
Ridgebury: RgB	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.

for recreational development—Continued

Degree and kind of limitations for—Continued				
Picnic areas	Paths and trails	Access roads (unpaved)	Ski slopes (constructed)	Vegetative cover (grass)
Moderate: flooding	Moderate: flooding	Severe: frequent flooding.	Severe: lack of slope	Slight.
Slight	Slight	Moderate: occasional flooding.	Severe: lack of slope	Slight.
Slight	Slight	Moderate: occasional flooding.	Severe: lack of slope	Slight.
Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: high water table; high in organic-matter content.	Severe: wetness; lack of slope.	Severe: water table at surface; high in organic-matter content.
Slight	Slight	Slight	Slight	Slight.
Moderate: slope	Slight	Moderate: slope	Moderate: slope; pan layer.	Slight.
Slight	Moderate: stoniness	Slight	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: slope	Moderate: slope; pan layer.	Moderate: stoniness.
Severe: slope	Moderate: stoniness; slope.	Severe: slope	Moderate: slope; seep spots; pan layer.	Moderate: stoniness; slope.
Slight	Moderate: stoniness	Moderate: seasonal high water table.	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: seasonal high water table; slope.	Moderate: slope; seep spots; pan layer.	Moderate: stoniness.
Moderate: stoniness	Severe: stoniness	Moderate: seasonal high water table; stoniness; slope (where greater than 8 percent).	Moderate: slope; seep spots; pan layer.	Severe: stoniness.
Moderate: flooding	Moderate: flooding	Severe: frequent flooding.	Severe: lack of slope	Slight.
Moderate: flooding	Moderate: flooding	Severe: frequent flooding.	Severe: lack of slope	Slight.
Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: wetness; lack of slope.	Moderate: high water table.
Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: wetness	Moderate: high water table.

TABLE 10.—*Limitations of the soils*

Soil series and map symbols	Degree and kind of limitations for—			
	Low buildings without basements	Playgrounds	Campsites	
			Trailer	Tent
Ridgebury (continued) RIA, RIB	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.
*Rock outcrop: RO, RPE, RPF. For the Lyman parts of RPE and RPF, see Lyman series.	Severe: rock outcrops.	Severe: rock outcrops.	Severe: rock outcrops.	Severe: rock outcrops.
Salmon: SaA	Slight	Slight	Slight	Slight
SaB	Slight	Moderate: slope	Moderate: slope	Slight
Scituate: SdB	Severe: high potential frost action.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table; stoniness.
SdC	Severe: high potential frost action.	Severe: slope	Severe: slope	Moderate: seasonal high water table; stoniness; slope.
Skerry: SeB	Severe: high potential frost action.	Moderate: seasonal high water table; stoniness; slope.	Moderate: seasonal high water table; stoniness; slope.	Moderate: seasonal high water table; stoniness.
SeC	Severe: high potential frost action.	Severe: slope	Severe: slope	Moderate: seasonal high water table; stoniness; slope.
Suncook: Sf	Severe: frequent flooding.	Severe: frequent flooding.	Severe: frequent flooding.	Severe: frequent flooding.
Sutton: SnB	Severe: high potential frost action.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table.
SuB	Severe: high potential frost action; stoniness.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table.
Walpole. Mapped only in complexes with Leicester soils.				
*Waumbek: WaB	Moderate: moderate potential frost action; stoniness.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table; slope; stoniness.	Moderate: stoniness
WaC	Moderate: moderate potential frost action; stoniness; slope.	Severe: slope	Severe: slope	Moderate: stoniness; slope.
WBC For the Skerry part of WBC, see Skerry series.	Severe: stoniness	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness
Whitman: Wc	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.

for recreational development—Continued

Degree and kind of limitations for—Continued				
Picnic areas	Paths and trails	Access roads (unpaved)	Ski slopes (constructed)	Vegetative cover (grass)
Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: wetness	Moderate: high water table; stoniness.
Severe: rock outcrops	Severe: rock outcrops	Severe: rock outcrops	Severe: rock outcrops	Severe: rock outcrops.
Slight	Slight	Slight	Severe: lack of slope	Slight.
Slight	Slight	Slight	Moderate: erodible	Slight.
Slight	Moderate: stoniness	Moderate: seasonal high water table.	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: seasonal high water table; slope.	Moderate: slope; pan layer.	Moderate: stoniness.
Slight	Moderate: stoniness	Moderate: seasonal high water table.	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: seasonal high water table; slope.	Moderate: slope; pan layer.	Moderate: stoniness.
Moderate: flooding	Moderate: flooding	Severe: frequent flooding.	Severe: lack of slope	Severe: droughty.
Slight	Slight	Moderate: seasonal high water table.	Slight	Slight.
Slight	Moderate: stoniness	Moderate: seasonal high water table.	Slight	Moderate: stoniness.
Slight	Moderate: stoniness	Moderate: seasonal high water table.	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: seasonal high water table; slope.	Moderate: slope	Moderate: stoniness.
Moderate: stoniness	Severe: stoniness	Moderate: seasonal high water table; stoniness; slope (where greater than 8 percent).	Moderate: slope	Severe: stoniness.
Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: wetness; lack of slope.	Severe: water table at surface.

TABLE 10.—*Limitations of the soils*

Soil series and map symbols	Degree and kind of limitations for—			
	Low buildings without basements	Playgrounds	Campsites	
			Trailer	Tent
Windsor:				
WdA	Slight	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.
WdB	Slight	Moderate: sandy surface layer; slope.	Moderate: sandy surface layer; slope.	Moderate: sandy surface layer.
WdC	Moderate: slope	Severe: slope	Severe: slope	Moderate: sandy surface layer; slope.
WdE	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Winooski: Wn	Severe: frequent flooding.	Severe: frequent flooding.	Severe: frequent flooding.	Severe: frequent flooding.
Woodbridge:				
WoB	Severe: high potential frost action.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table; slope.	Moderate: seasonal high water table.
WvB	Severe: high potential frost action.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table; slope; stoniness.	Moderate: seasonal high water table; stoniness.
WvC	Severe: high potential frost action.	Severe: slope	Severe: slope	Moderate: seasonal high water table; slope; stoniness.

each factor differs from place to place. Normally, a combination of all five factors determines the kind of soil that develops in any given place. In Carroll County, parent material, physiography, and drainage (depth to seasonal water table) account for most of the differences among the named soils. (See also the section "Classification of the Soils" and its accompanying table.)

Climate

The climate of Carroll County is predominantly continental. Average annual temperature is about 43° F in the northern part and 47° F in the southern part. Annual average rainfall is about 46 inches. Rainfall during the growing season is fairly uniform, generally 3 inches or more each month. Local variations result mainly from differences in elevations. More detailed information about the climate of the county is given in the section "Climate" near the end of this survey.

Temperature and rainfall govern the rates of physical and chemical weathering of the soils (*18*). The excessively drained to moderately well drained soils in the county have been leached of readily soluble bases and are acid in reaction. Chemical weathering proceeds at a very slow rate during the winter (*15*); physical weathering continues in the form of alternate freezing and thawing. This promotes the granulation of soil material and the breaking of rock fragments into smaller units.

Parent material

The present landscape features and parent material are largely the remains of the last ice advance and retreat during the late Wisconsin stage of glaciation (*6*). The majority of the soils in Carroll County formed in glacial till and glaciofluvial deposits.

The coarse-textured glacial till of the upland hills and mountains throughout the county reflects the nature of the coarse-grained parent rock. The Gloucester and Acton soils in the south and the Hermon and Waumbek soils in the north formed in this kind of till. Some of the till is friable to firm, is moderately coarse textured, and is derived largely from fine-grained schist parent rock. The Charlton and Sutton soils in the south and the Berkshire soils in the north formed in this type of glacial till. The Paxton and Woodbridge soils in the south and the Marlow and Peru soils in the north also formed in moderately coarse textured till; however, the till is firm to very firm and has accumulated through the process of lodging or plastering on, rather than dumping (*6*). Rounded hill, or drumlin, landscape features result from this type of glacial till deposition. Broad areas of rolling upland ground moraines are common south and east of the White Moun-

for recreational development—Continued

Degree and kind of limitations for—Continued				
Picnic areas	Paths and trails	Access roads (unpaved)	Ski slopes (constructed)	Vegetative cover (grass)
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Slight	Severe: lack of slope	Severe: droughty.
Moderate: sandy surface layer.	Moderate: sandy surface layer.	Slight	Moderate: erodible	Severe: droughty.
Moderate: sandy surface layer; slope.	Moderate: sandy surface layer.	Moderate: slope	Moderate: erodible; slope.	Severe: droughty.
Severe: slope	Moderate: sandy surface layer. Severe: where slope is greater than 25 percent.	Severe: slope	Severe: short slopes	Severe: droughty; slope.
Moderate: flooding	Moderate: flooding	Severe: frequent flooding.	Severe: lack of slope	Slight.
Slight	Slight	Moderate: seasonal high water table.	Slight	Slight.
Slight	Moderate: stoniness	Moderate: seasonal high water table.	Slight	Moderate: stoniness.
Moderate: slope	Moderate: stoniness	Moderate: seasonal high water table; slope.	Moderate: slope; pan layer.	Moderate: stoniness.

tains. Much of this coarse glacial till material has had its finer textured material reoriented into stratified fragipan-like lamellae or bands. The Becket and Skerry soils in the north and the Millis and Scituate soils in the south formed in this layered glacial till. An area on the eastern slopes of the White Mountains adjacent to the Saco River valley has glacial till material dominated by loose, fragmented, Conway granite. Redstone soils and shallow to bedrock Canaan soils formed in this gravelly till.

Glaciofluvial deposits accumulated when water from the melting ice picked up the smaller particles and sorted the material according to grain size. Outwash plains and terraces formed on bedded sands and gravel. There are a few glaciofluvial deposits of extremely variable grain size in the form of kames and eskers. The Hinckley and Colton soils formed in bedded sands and gravel on outwash plains, terraces, kames, and eskers. The Windsor, Adams, Croghan, Deerfield, and Naumburg soils formed in sands on plains and terraces.

There are a few glacial lake basins on the sand plains near the larger lakes or in mountain intervales. The Nicholvillle variant soils formed in these slack-water deposits of mostly silt and very fine sand. Locally, silt deposits underlie the sandy glaciofluvial deposits. A few soils in the county are forming in alluvial sediments deposited by active streams. Soils of the Suncook, Ondawa, Hadley, Podunk, Winooski, and Limerick series are forming in this alluvium.

Because much of the glacial material was transported only a short distance, the underlying rock formations play an important part in the distribution of the parent material in which the soils formed. Granite, quartz monzonite, granodiorite, quartzite, and coarse-grained mica schist underlie about 75 percent of the county.

The relatively complex geologic pattern with further mixing of these materials by overdrag from glacial movements gives a complex pattern of soil parent material.

Organic soils are forming in deposits of muck and peat in areas that formerly were ponded depressions where plant remains have accumulated over a long period. Organic deposits in Carroll County are in the Chocorua, Greenwood, or Ossipee series, or in the land type Muck and Peat.

Plant and animal life

Plants and animal life are active in the soil-forming process. In Carroll County, however, climate, topography, and parent material have had a greater influence on soil formation. The major influence of plants is through the addition of organic matter.

Carroll County was originally 90 to 95 percent

TABLE 11.—*Limitations of the soils for*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The instructions for referring to other series

Soil series and map symbols	Degree and kind of limitation for—	
	Dwellings (with basements)	Septic tank effluent disposal
Acton:		
AcB	Severe: seasonal high water table	Severe: seasonal high water table
AdB	Severe: seasonal high water table	Severe: seasonal high water table
AdC	Severe: seasonal high water table	Severe: seasonal high water table
Adams:		
AmA	Slight	Slight[1]
AmB	Slight	Slight[1]
AmC	Moderate: slope	Moderate:[1] slope
AmE	Severe: slope	Severe:[1] slope
Alluvial land, wet: AW	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.
*Becket:		
BcB	Moderate: perched water table; stoniness.	Severe: moderately slow permeability.
BcC	Moderate: perched water table; stoniness; slope.	Severe: moderately slow permeability.
BcD, BcE	Severe: slope	Severe: moderately slow permeability; slope.
BEE	Severe: stoniness; slope	Severe: moderately slow permeability; stoniness; slope.
BKC For the Skerry part, see Skerry series.	Severe: stoniness	Severe: moderately slow permeability; stoniness.
Berkshire:		
BsB	Moderate: stoniness	Moderate: stoniness
BsC	Moderate: stoniness; slope	Moderate: stoniness; slope
BsD, BsE	Severe: slope	Severe: slope
BtD, BVE, BVF	Severe: stoniness; slope	Severe: stoniness; slope
BVC	Severe: stoniness	Severe: stoniness
*Canaan:		
CDC:		
Canaan part	Severe: bedrock outcrops	Severe: bedrock outcrops
Redstone part	Severe: stoniness	Severe: stoniness
CDE, CEE, CEF:		
Canaan part	Severe: bedrock outcrops; slope	Severe: bedrock outcrops; slope

use in town and country planning

soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the that appear in the first column of this table]

Degree and kind of limitation for—Continued			
Sewage lagoons	Lawns and landscaping	Streets and parking lots (paved)	Shallow excavations
Severe: moderately rapid permeability.	Slight	Moderate: moderate potential frost action; slope.	Severe: seasonal high water table.
Severe: moderately rapid permeability.	Moderate: stoniness	Moderate: moderate potential frost action; slope.	Severe: seasonal high water water table; stoniness.
Severe: moderately rapid permeability; slope.	Moderate: stoniness; slope	Severe: slope	Severe: seasonal high water table.
Severe: rapid permeability	Severe: droughty	Slight	Severe: poor sidewall stability.
Severe: rapid permeability	Severe: droughty	Moderate: slope	Severe: poor sidewall stability.
Severe: rapid permeability; slope.	Severe: droughty	Severe: slope	Severe: poor sidewall stability.
Severe: rapid permeability; slope.	Severe: droughty; slope	Severe: slope	Severe: poor sidewall stability; slope.
Severe: frequent flooding	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.
Moderate: leakage in floor of lagoon; slope.	Moderate: stoniness	Moderate: moderate potential frost action; slope.	Moderate: pan layer; stoniness.
Severe: slope	Moderate: stoniness; slope	Severe: slope	Moderate: pan layer; stoniness; slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: slope	Severe: stoniness; slope	Severe: slope	Severe: stoniness; slope.
Moderate: stoniness. Severe for slopes greater than 8 percent.	Severe: stoniness	Moderate: stoniness. Severe for slopes greater than 8 percent.	Severe: stoniness.
Moderate: moderate permeability; slope.	Moderate: stoniness	Moderate: moderate potential frost action; slope.	Moderate: stoniness.
Severe: slope	Moderate: stoniness; slope	Severe: slope	Moderate: stoniness; slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: slope	Severe: stoniness; slope	Severe: slope	Severe: stoniness; slope.
Moderate: stoniness. Severe for slopes greater than 8 percent.	Severe: stoniness	Moderate: stoniness. Severe for slopes greater than 8 percent.	Severe: stoniness.
Severe: bedrock at depth of 20 inches or less.	Severe: bedrock outcrops	Severe: bedrock outcrops	Severe: bedrock outcrops.
Severe: moderately rapid permeability.	Severe: stoniness	Moderate: stoniness. Severe for slopes greater than 8 percent.	Severe: stoniness.
Severe: bedrock at a depth of 20 inches or less; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.

TABLE 11.—*Limitations of the soils for use*

Soil series and map symbols	Degree and kind of limitation for—	
	Dwellings (with basements)	Septic tank effluent disposal
Canaan (continued)		
Redstone part	Severe: stoniness; slope	Severe: stoniness; slope
For the Rock outcrop parts of CEE and CEF, see Rock outcrop.		
Charlton:		
CfB	Slight	Slight
ClB	Moderate: stoniness	Moderate: stoniness
ClC	Moderate: stoniness; slope	Moderate: stoniness; slope
ClD	Severe: slope	Severe: slope
Chocorua: CM	Severe: high water table; poor stability.	Severe: high water table
Colton:		
CnA	Slight	Slight [1]
CnB	Slight	Slight [1]
CnC	Moderate: slope	Moderate: [1] slope
CnE	Severe: slope	Severe: [1] slope
Croghan:		
CyA	Severe: seasonal high water table	Severe: [1] seasonal high water table
CyB	Severe: seasonal high water table	Severe: [1] seasonal high water table
Deerfield:		
DeA	Severe: seasonal high water table	Severe: [1] seasonal high water table
DeB	Severe: seasonal high water table	Severe: [1] seasonal high water table
Duane:		
DnA	Severe: seasonal high water table	Severe: [1] seasonal high water table
DnB	Severe: seasonal high water table	Severe: [1] seasonal high water table
Fresh water marsh: FA	Severe: ponded	Severe: ponded
Gloucester:		
GlB	Slight	Slight
GlC	Moderate: slope	Moderate: slope
GsB	Moderate: stoniness	Moderate: stoniness
GsC	Moderate: stoniness; slope	Moderate: stoniness; slope
GsD	Severe: slope	Severe: slope

in town and country planning—Continued

Degree and kind of limitation for—Continued			
Sewage lagoons	Lawns and landscaping	Streets and parking lots (paved)	Shallow excavations
Severe: stoniness; moderately rapid permeability; slope.	Severe: stoniness; slope	Severe: slope	Severe: stoniness; slope.
Moderate: moderate permeability; slope.	Slight	Moderate: moderate potential frost action; slope.	Slight.
Moderate: moderate permeability; slope.	Moderate: stoniness	Moderate: moderate potential frost action; slope.	Moderate: stoniness.
Severe: slope	Moderate: stoniness; slope	Severe: slope	Moderate: stoniness; slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: high in organic-matter content; poor stability.	Severe: high water table; high in organic-matter content.	Severe: high water table; poor stability.	Severe: high water table; poor stability.
Severe: rapid permeability	Severe: droughty	Slight	Severe: poor sidewall stability.
Severe: rapid permeability	Severe: droughty	Moderate: slope	Severe: poor sidewall stability.
Severe: rapid permeability; slope.	Severe: droughty	Severe: slope	Severe: poor sidewall stability.
Severe: rapid permeability; slope.	Severe: droughty; slope	Severe: slope	Severe: poor sidewall stability; slope.
Severe: rapid permeability	Severe: sandy surface layer	Moderate: moderate potential frost action.	Severe: seasonal high water table; poor sidewall stability.
Severe: rapid permeability	Severe: sandy surface layer	Moderate: moderate potential frost action; slope.	Severe: seasonal high water table; poor sidewall stability.
Severe: rapid permeability	Severe: sandy surface layer	Moderate: moderate potential frost action.	Severe: seasonal high water table; poor sidewall stability.
Severe: rapid permeability	Severe: sandy surface layer	Moderate: moderate potential frost action; slope.	Severe: seasonal high water table; poor sidewall stability.
Severe: rapid permeability	Severe: low available water capacity.	Moderate: moderate potential frost action.	Severe: seasonal high water table; poor sidewall stability.
Severe: rapid permeability	Severe: low available water capacity.	Moderate: moderate potential frost action; slope.	Severe: seasonal high water table; poor sidewall stability.
Severe: ponded; high in organic-matter content.	Severe: ponded	Severe: ponded	Severe: ponded.
Severe: moderately rapid permeability.	Moderate: somewhat droughty.	Moderate: slope	Slight.
Severe: moderately rapid permeability; slope.	Moderate: somewhat droughty; slope.	Severe: slope	Moderate: slope.
Severe: moderately rapid permeability.	Moderate: somewhat droughty; stoniness.	Moderate: slope	Moderate: stoniness.
Severe: moderately rapid permeability; slope.	Moderate: somewhat droughty; stoniness; slope.	Severe: slope	Moderate: stoniness; slope.
Severe: moderately rapid permeability; slope.	Severe: slope	Severe: slope	Severe: slope.

TABLE 11.—*Limitations of the soils for use*

Soil series and map symbols	Degree and kind of limitation for—	
	Dwellings (with basements)	Septic tank effluent disposal
Gloucester (continued)		
GtD, GtE	Severe: stoniness; slope	Severe: stoniness; slope
Greenwood: GW	Severe: high water table; poor stability.	Severe: high water table
Hadley: Ha	Severe: occasional flooding	Severe: occasional flooding
Hermon:		
HfB	Slight	Slight
HfC	Moderate: slope	Moderate: slope
HmB	Moderate: stoniness	Moderate: stoniness
HmC	Moderate: stoniness; slope	Moderate: stoniness; slope
HmD, HmE	Severe: slope	Severe: slope
HnD, HnE, HOE, HOF	Severe: stoniness; slope	Severe: stoniness; slope
HOC	Severe: stoniness	Severe: stoniness
Hinckley:		
HsA	Slight	Slight[1]
HsB	Slight	Slight[1]
HsC	Moderate: slope	Moderate:[1] slope
HsE	Severe: slope	Severe:[1] slope
*Hollis:		
HtB	Severe: bedrock at a depth of 20 inches or less.	Severe: bedrock at a depth of 20 inches or less.
HtC	Severe: bedrock at a depth of 20 inches or less.	Severe: bedrock at a depth of 20 inches or less.
HtD	Severe: bedrock at a depth of 20 inches or less; slope.	Severe: bedrock at a depth of 20 inches or less; slope.
HvB	Severe: bedrock outcrops	Severe: bedrock outcrops
HvC	Severe: bedrock outcrops	Severe: bedrock outcrops
HvD, HvE, HxD, HxE For the Charlton parts, see Charlton series. For the Rock outcrop parts of HxD and HxE, see Rock outcrop.	Severe: bedrock outcrops; slope	Severe: bedrock outcrops; slope
*Leicester:		
LDB For the Ridgebury part, see Ridgebury series.	Severe: high water table; stoniness	Severe: high water table; stoniness

in town and country planning—Continued

Degree and kind of limitation for—Continued			
Sewage lagoons	Lawns and landscaping	Streets and parking lots (paved)	Shallow excavations
Severe: moderately rapid permeability; slope; stoniness.	Severe: stoniness; slope	Severe: stoniness; slope	Severe: stoniness; slope.
Severe: high in organic-matter content; poor stability.	Severe: high water table; high in organic-matter content.	Severe: high water table; poor stability.	Severe: high water table; poor stability.
Severe: occasional flooding	Severe: occasional flooding	Moderate: occasional flooding	Severe: occasional flooding.
Severe: moderately rapid permeability.	Moderate: somewhat droughty.	Moderate: slope	Slight.
Severe: moderately rapid permeability; slope.	Moderate: somewhat droughty; slope.	Severe: slope	Moderate: slope.
Severe: moderately rapid permeability.	Moderate: somewhat droughty; stoniness.	Moderate: slope	Moderate: stoniness.
Severe: moderately rapid permeability; slope.	Moderate: somewhat droughty; stoniness; slope.	Severe: slope	Moderate: stoniness; slope.
Severe: moderately rapid permeability; slope.	Severe: slope	Severe: slope	Severe: slope.
Severe: moderately rapid permeability; slope.	Severe: stoniness; slope	Severe: slope	Severe: stoniness; slope.
Severe: moderately rapid permeability; slope.	Severe: stoniness	Moderate: stoniness. Severe for slopes greater than 8 percent.	Severe: stoniness.
Severe: rapid permeability	Severe: droughty	Slight	Severe: poor sidewall stability.
Severe: rapid permeability	Severe: droughty	Moderate: slope	Severe: poor sidewall stability.
Severe: rapid permeability; slope.	Severe: droughty	Severe: slope	Severe: poor sidewall stability.
Severe: rapid permeability; slope.	Severe: droughty; slope	Severe: slope	Severe: poor sidewall stability; slope.
Severe: bedrock at a depth of 20 inches or less.	Moderate: bedrock at a depth of 20 inches or less.	Severe: bedrock at a depth of 20 inches or less.	Severe: bedrock at a depth of 20 inches or less.
Severe: bedrock at a depth of 20 inches or less; slope.	Moderate: bedrock at a depth of 20 inches or less; slope.	Severe: bedrock at a depth of 20 inches or less; slope.	Severe: bedrock at a depth of 20 inches or less.
Severe: bedrock at a depth of 20 inches or less; slope.	Severe: slope	Severe: bedrock at a depth of 20 inches or less; slope.	Severe: bedrock at a depth of 20 inches or less; slope.
Severe: bedrock outcrops	Severe: bedrock outcrops	Severe: bedrock outcrops	Severe: bedrock outcrops.
Severe: bedrock outcrops; slope.	Severe: bedrock outcrops	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops.
Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.
Severe: high water table	Severe: high water table; stoniness.	Severe: high water table; high potential frost action.	Severe: high water table; stoniness.

TABLE 11.—*Limitations of the soils for use*

Soil series and map symbols	Degree and kind of limitation for—	
	Dwellings (with basements)	Septic tank effluent disposal
Leicester (continued)		
LfA, LfB:		
Leicester part	Severe: high water table	Severe: high water table
Walpole part	Severe: high water table	Severe: high water table
Limerick: Lk	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.
Limerick variant: Lm	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.
*Lyman:		
LnB, LnC, LVC	Severe: bedrock outcrops	Severe: bedrock outcrops
LnD, LnE, LsD, LsE, LVE, LVF, LYE, LYF	Severe: bedrock outcrops; slope	Severe: bedrock outcrops; slope
For the Berkshire parts, see Berkshire series. For the Rock outcrop parts of LsD, LsE, LYE, and LYF, see Rock outcrop.		
*Marlow:		
MaB	Moderate: perched water table	Severe: moderately slow permeability.
MaC	Moderate: perched water table; slope.	Severe: moderately slow permeability.
MdB	Moderate: perched water table; stoniness.	Severe: moderately slow permeability.
MdC	Moderate: perched water table; stoniness; slope.	Severe: moderately slow permeability.
MdD, MdE	Severe: slope	Severe: moderately slow permeability; slope.
MEE, MEF	Severe: stoniness; slope	Severe: moderately slow permeability; stoniness; slope.
MFC	Severe: stoniness	Severe: moderately slow permeability; stoniness.
For the Peru part of MFC, see Peru series.		
Millis:		
MlB	Moderate: perched water table	Severe: moderately slow permeability.
MlC	Moderate: perched water table; slope.	Severe: moderately slow permeability.
MsB	Moderate: perched water table; stoniness.	Severe: moderately slow permeability.
MsC	Moderate: perched water table; stoniness; slope.	Severe: moderately slow permeability.
MsD	Severe: slope	Severe: moderately slow permeability; slope.
Muck and Peat: MU	Severe: high water table; poor stability.	Severe: high water table
Naumburg: NaB	Severe: high water table	Severe: high water table

in town and country planning—Continued

Degree and kind of limitation for—Continued			
Sewage lagoons	Lawns and landscaping	Streets and parking lots (paved)	Shallow excavations
Severe: high water table	Severe: high water table	Severe: high water table; high potential frost action.	Severe: high water table.
Severe: high water table	Severe: high water table	Severe: high water table	Severe: high water table.
Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.
Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.	Severe: high water table; frequent flooding.
Severe: bedrock outcrops; slope (where greater than 8 percent).	Severe: bedrock outcrops	Severe: bedrock outcrops; slope (where greater than 8 percent).	Severe: bedrock outcrops.
Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.
Moderate: leakage in floor of lagoon; slope.	Slight	Moderate: moderate potential frost action; slope.	Moderate: pan layer.
Severe: slope	Moderate: slope	Severe: slope	Moderate: pan layer; slope.
Moderate: leakage in floor of lagoon; slope.	Moderate: stoniness	Moderate: moderate potential frost action; slope.	Moderate: pan layer; stoniness.
Severe: slope	Moderate: stoniness; slope	Severe: slope	Moderate: pan layer; stoniness; slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: stoniness; slope	Severe: stoniness; slope	Severe: slope	Severe: stoniness; slope.
Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness	Moderate: stoniness. Severe for slopes greater than 8 percent.	Severe: stoniness.
Moderate: leakage in floor of lagoon; slope.	Slight	Moderate: moderate potential frost action; slope.	Moderate: pan layer.
Severe: slope	Moderate: slope	Severe: slope	Moderate: pan layer; slope.
Moderate: leakage in floor of lagoon; slope.	Moderate: stoniness	Moderate: moderate potential frost action; slope.	Moderate: pan layer; stoniness.
Severe: slope	Moderate: stoniness; slope	Severe: slope	Moderate: pan layer; stoniness; slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: high in organic-matter content; poor stability.	Severe: high water table; high in organic-matter content.	Severe: high water table; poor stability.	Severe: high water table; poor stability.
Severe: rapid permeability; high water table.	Severe: high water table	Severe: high water table	Severe: high water table.

TABLE 11.—*Limitations of the soils for use*

Soil series and map symbols	Degree and kind of limitation for—	
	Dwellings (with basements)	Septic tank effluent disposal
Nicholville variant:		
NcA	Severe: seasonal high water table	Severe: seasonal high water table
NcB	Severe: seasonal high water table	Severe: seasonal high water table
Ondawa:		
Of	Severe: frequent flooding	Severe: frequent flooding
Oh	Severe: occasional flooding	Severe: occasional flooding
Ondawa variant: Os	Severe: occasional flooding	Severe: occasional flooding
Ossipee: OT	Severe: high water table; poor stability.	Severe: high water table
Paxton:		
PaB	Moderate: perched water table	Severe: moderately slow permeability.
PaC	Moderate: perched water table; slope.	Severe: moderately slow permeability.
PdB	Moderate: perched water table; stoniness.	Severe: moderately slow permeability.
PdC	Moderate: perched water table; stoniness; slope.	Severe: moderately slow permeability.
PdD	Severe: slope	Severe: moderately slow permeability; slope.
Peru:		
PeB	Severe: seasonal high water table	Severe: seasonal high water table; moderately slow permeability.
PeC	Severe: seasonal high water table	Severe: seasonal high water table; moderately slow permeability.
PLC	Severe: seasonal high water table; stoniness.	Severe: seasonal high water table; moderately slow permeability; stoniness.
Podunk: Po	Severe: frequent flooding	Severe: seasonal high water table; frequent flooding.
Podunk variant: Ps	Severe: frequent flooding	Severe: seasonal high water table; frequent flooding.
Raynham variant: Ra	Severe: high water table	Severe: high water table; moderately slow permeability.
Redstone. Mapped only in complex with Canaan soils.		
Ridgebury: RgB, RlA, RlB	Severe: high water table	Severe: high water table; moderately slow permeability.
*Rock outcrop: RO, RPE, RPF. For the Lyman parts of RPE and RPF, see Lyman series.	Severe: bedrock outcrops; slope	Severe: bedrock outcrops; slope
Salmon variant: SaA, SaB	Slight	Slight

in town and country planning—Continued

Degree and kind of limitation for—Continued			
Sewage lagoons	Lawns and landscaping	Streets and parking lots (paved)	Shallow excavations
Moderate: leakage in floor of lagoon.	Slight	Severe: high potential frost action.	Severe: seasonal high water table.
Moderate: leakage in floor of lagoon; slope.	Slight	Severe: high potential frost action.	Severe: seasonal high water table.
Severe: frequent flooding	Severe: frequent flooding	Severe: frequent flooding	Severe: frequent flooding.
Severe: occasional flooding	Moderate: occasional flooding	Moderate: occasional flooding	Severe: occasional flooding.
Severe: occasional flooding	Moderate: occasional flooding	Moderate: occasional flooding	Severe: occasional flooding.
Severe: high in organic-matter content; poor stability.	Severe: high water table; high in organic-matter content.	Severe: high water table; poor stability.	Severe: high water table; poor stability.
Moderate: leakage in floor of lagoon; slope.	Slight	Moderate: moderate potential frost action; slope.	Moderate: pan layer.
Severe: slope	Moderate: slope	Severe: slope	Moderate: pan layer; slope.
Moderate: leakage in floor of lagoon; slope.	Moderate: stoniness	Moderate: moderate potential frost action; slope.	Moderate: pan layer; stoniness.
Severe: slope	Moderate: stoniness; slope	Severe: slope	Moderate: pan layer; stoniness; slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Moderate: leakage in floor of lagoon; slope.	Moderate: stoniness	Severe: high potential frost action.	Severe: seasonal high water table.
Severe: slope	Moderate: stoniness; slope	Severe: high potential frost action; slope.	Severe: seasonal high water table; slope.
Severe: stoniness; slope (where greater than 8 percent).	Severe: stoniness	Severe: high potential frost action; slope (where greater than 8 percent).	Severe: stoniness.
Severe: moderately rapid permeability; frequent flooding.	Severe: frequent flooding	Severe: frequent flooding	Severe: frequent flooding.
Severe: moderately rapid permeability; frequent flooding.	Severe: frequent flooding	Severe: frequent flooding	Severe: frequent flooding.
Moderate: leakage in floor of lagoon.	Severe: high water table	Severe: high water table; high potential frost action.	Severe: high water table.
Moderate: leakage in floor of lagoon.	Severe: high water table	Severe: high water table	Severe: high water table.
Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.	Severe: bedrock outcrops; slope.
Moderate: moderate permeability.	Slight	Severe: high potential frost action.	Slight.

TABLE 11.—*Limitations of the soils for use*

Soil series and map symbols	Degree and kind of limitation for—	
	Dwellings (with basements)	Septic tank effluent disposal
Scituate:		
SdB	Severe: seasonal high water table	Severe: seasonal high water table; moderately slow permeability.
SdC	Severe: seasonal high water table	Severe: seasonal high water table; moderately slow permeability.
Skerry:		
SeB	Severe: seasonal high water table	Severe: seasonal high water table; moderately slow permeability.
SeC	Severe: seasonal high water table	Severe: seasonal high water table; moderately slow permeability.
Suncook: Sf	Severe: frequent flooding	Severe: frequent flooding
Sutton:		
SnB	Severe: seasonal high water table	Severe: seasonal high water table
SuB	Severe: seasonal high water table	Severe: seasonal high water table
Walpole. Mapped only in complexes with Leicester soils.		
*Waumbek:		
WaB	Severe: seasonal high water table	Severe: seasonal high water table
WaC	Severe: seasonal high water table	Severe: seasonal high water table
WBC. For the Skerry part of WBC, see Skerry series.	Severe: seasonal high water table; stoniness.	Severe: seasonal high water table; stoniness.
Whitman: Wc	Severe: high water table	Severe: high water table
Windsor:		
WdA	Slight	Slight[1]
WdB	Slight	Slight[1]
WdC	Moderate: slope	Moderate:[1] slope
WdE	Severe: slope	Severe:[1] slope
Winooski: Wn	Severe: frequent flooding	Severe: seasonal high water table; frequent flooding.
Woodbridge:		
WoB	Severe: seasonal high water table	Severe: seasonal high water table; moderately slow permeability.
WvB	Severe: seasonal high water table	Severe: seasonal high water table; moderately slow permeability.
WvC	Severe: seasonal high water table	Severe: seasonal high water table; moderately slow permeability.

[1] Possible pollution hazard to nearby lakes, streams, springs, or wells.

in town and country planning—Continued

Degree and kind of limitation for—Continued			
Sewage lagoons	Lawns and landscaping	Streets and parking lots (paved)	Shallow excavations
Moderate: leakage in floor of lagoon; slope.	Moderate: stoniness	Severe: high potential frost action.	Severe: seasonal high water table.
Severe: slope	Moderate: stoniness; slope	Severe: high potential frost action; slope.	Severe: seasonal high water table.
Moderate: leakage in floor of lagoon; slope.	Moderate: stoniness	Severe: high potential frost action.	Severe: seasonal high water table.
Severe: slope	Moderate: stoniness; slope	Severe: high potential frost action; slope.	Severe: seasonal high water table.
Severe: frequent flooding; rapid permeability.	Severe: frequent flooding	Severe: frequent flooding	Severe: frequent flooding.
Moderate: moderate permeability; slope.	Slight	Severe: high potential frost action.	Severe: seasonal high water table.
Moderate: moderate permeability; slope.	Moderate: stoniness	Severe: high potential frost action.	Severe: seasonal high water table.
Severe: moderately rapid permeability.	Moderate: stoniness	Moderate: moderate potential frost action; slope.	Severe: seasonal high water table.
Severe: moderately rapid permeability; slope.	Moderate: stoniness; slope	Severe: slope	Severe: seasonal high water table.
Severe: moderately rapid permeability; slope.	Severe: stoniness	Moderate: moderate potential frost action; stoniness. Severe for slopes greater than 8 percent.	Severe: stoniness.
Moderate: leakage in floor of lagoon.	Severe: high water table	Severe: high water table	Severe: high water table.
Severe: rapid permeability	Severe: droughty	Slight	Severe: poor sidewall stability.
Severe: rapid permeability	Severe: droughty	Moderate: slope	Severe: poor sidewall stability.
Severe: rapid permeability; slope.	Severe: droughty	Severe: slope	Severe: poor sidewall stability.
Severe: rapid permeability; slope.	Severe: droughty; slope	Severe: slope	Severe: poor sidewall stability; slope.
Severe: frequent flooding	Severe: frequent flooding	Severe: frequent flooding	Severe: frequent flooding.
Moderate: leakage in floor of lagoon; slope.	Slight	Severe: high potential frost action.	Severe: seasonal high water table.
Moderate: leakage in floor of lagoon; slope.	Moderate: stoniness	Severe: high potential frost action.	Severe: seasonal high water table.
Severe: slope	Moderate: stoniness; slope	Severe: high potential frost action; slope.	Severe: seasonal high water table.

wooded. White pine was dominant; red and white oak, beech, sugar maple, red spruce, and hemlock were also common. Hardwoods use much of the bases in the soil, but these bases are returned to the soil in the fallen leaves (*13*). Since the natural fertility of most soils in Carroll County is low, few bases are returned, and the soils remain acid even under hardwood vegetation. The acid nature of pine litter helps to lower the base status of the soil.

The nature of the vegetation influences the number and kind of micro-organisms in the soils. Fungi are generally present in much greater numbers in soil developed under forest than in soil developed under grass vegetation. Bacteria, fungi, and other micro-organisms decompose the fresh organic matter and change it to the more resistant humus. Earthworms, rodents, and other animals that live in the soil help mix the soil layers. They aid aeration and the decomposition of organic matter.

The activities of man have brought about significant changes in soil development. Clearing the forests, constructing buildings and roads, cultivating, liming, fertilizing, and irrigating are a few of these activities that have mixed the upper soil horizons, accelerated the rate of erosion, or otherwise changed the nature of the soils.

Topography

Topography affects surface drainage and has considerable influence on soil formation. The county is dominated in its northern and northwestern parts by the White Mountains. Most peaks are at about 2,000 feet elevation; the highest point, about 3,000 feet, is near Mt. Webster in Crawford Notch. The Ossipee Mountains and Red Hill in the western part of the county range from about 1,500 to 2,900 feet in elevation. Other dominant hills and low mountains are scattered throughout the rest of the county. Rolling ground moraines with lakes, ponds, and bogs dominate the landscape between the hills. Splitting the county down the center is an extinct glacial drainageway reflected by gently sloping outwash plains and rolling, choppy eskers and kames interspersed with low rolling uplands. The lowest elevation, about 400 feet, is along the Ossipee River near Loon Lake in the east-central part of the county. The Saco River valley, which has diverted eastward to Maine, dominates the northern segment of this extinct drainageway.

The influence of topography on the soils is evident from a comparison of the profiles of soils that formed in the same parent material and under the same climatic conditions, but which were different in topography and drainage conditions. Paxton, Woodbridge, Ridgebury, and Whitman soils formed in firm, compact, platy glacial till. Paxton soils are well drained, have a fragipan at a depth of about 2 feet, and are mostly sloping. The slope is not steep enough to encourage excessive erosion and not level enough to prevent runoff. The Woodbridge soils are moderately well drained and have a fragipan in the subsoil. They are mostly gently sloping, runoff is medium to slow, and more surface water enters the soil. The nearly level to gently sloping Ridgebury soils occupy depressions and are somewhat poorly drained and poorly drained with a fragipan in the subsoil. The Whitman soils are very poorly drained. They receive runoff from adjoining slopes, but produce little runoff because they are nearly level. In table 12 the soil series are arranged to show relationship between parent material, topographic position, and drainage classification.

Time

Time is an important soil-forming factor. The degree of profile development reflects all the major soil-forming factors, including time. Generally, the soils in Carroll County have been forming since the last ice sheet receded about 14,000 years ago (*8*). Whether or not a distinct profile forms in a soil in this length of time is determined by all the major soil-forming factors. If the soil is steep and the geologic erosion rate is rapid, the soil generally has indistinct horizons. Some soils formed in alluvium such as those of the Suncook series that have indistinct horizons because of the continual accumulation of sediments.

The Gloucester and Hermon soils have been in place long enough to have distinct horizons. The rate of weathering, or soil formation, exceeds the rate of geologic erosion. The Ondawa soils are forming in alluvial sediment on flood plains. They have indistinct horizons because the deposition of fresh alluvium prevents the formation of distinct horizons.

Morphology of the Soils

Most soils in Carroll County exhibit distinct horizon development. Soils such as Suncook, Ondawa, Podunk, and Limerick, which are forming in alluvium, are the exceptions.

Distinct soil horizons are the result of soil profile development in the cool, humid northeastern United States. The reasons for differences in these horizons are many. In Carroll County the principal reasons are addition of organic matter, transformation and transfer of organic matter and iron and aluminum oxides, chemical weathering of primary minerals or rocks and parent material into silicate clays, and chemical change and transfer of iron. One or more of these processes have acted on most of the soils in the county, but the degree of activity varies from soil to soil.

Organic matter has accumulated in all the soils in Carroll County to form an A1 or Ap horizon. Plowing and cultivation have changed the A1 horizon to an Ap horizon and, in some places, part or all of the A horizon has been removed by erosion. The amount of organic matter added to the surface of soils varies with vegetation, aspect, temperature, moisture, and drainage conditions. The Suncook and Adams soils have very small amounts of organic matter in the A horizon, while Whitman and Walpole soils have an A horizon higher in organic-matter content.

The process most important in the formation of horizons in the soils of Carroll County involves the movement of organic matter and iron and aluminum oxides out of the A horizon and into the B horizon. Under acid conditions the decomposition of organic matter in the A horizon dissolves sesquioxides (iron and aluminum oxides), reduces iron, and forms soluble metal-organic complexes (*12*). These complexes move out of the A horizon and into the B horizon, where they are precipitated under oxidizing conditions. The intensity

TABLE 12.—*Soil series arranged to show relationship between position, parent material, and drainage*

Parent material and landscape position	Excessively drained	Somewhat excessively drained	Well drained	Moderately well drained	Poorly drained	Very poorly drained
Coarse textured and moderately coarse textured alluvial sediment of mixed mineralogy; on bottom lands.	Suncook		Ondawa Ondawa (variant).	Podunk. Podunk (variant).		
Medium-textured alluvial sediment of mixed mineralogy; on bottom lands.			Hadley	Winooski	Limerick. Limerick (variant).	
Stratified sand and gravel deposits, mainly from granite, gneiss, and schist; on outwash plains and terraces.	Hinckley Colton			Duane.	Walpole.[1] [2]	
Sand deposits with little or no gravel, mainly from granite, gneiss, and schist; on outwash plains and terraces.	Adams Windsor			Croghan Deerfield.	Naumburg.[3]	
Silty material over sand deposits; on lacustrine terraces.			Salmon variant.	Nicholville variant.	Raynham variant.[2]	
Coarse-textured glacial till mainly from coarse-grained rock; on uplands.		Hermon Gloucester Redstone. Canaan.[4]		Waumbek. Acton.		
Coarse-textured compact glacial till derived from coarse-grained rock; on uplands.			Becket Millis	Skerry. Scituate.		
Moderately coarse textured glacial till mainly from medium and fine-grained rock; on uplands.		Hollis[4] Lyman[4]	Charlton Berkshire.	Sutton	Leicester.[2]	
Moderately coarse textured compact glacial till mainly from medium and fine-grained rock; on uplands.			Marlow Paxton	Peru. Woodbridge	Ridgebury.[2]	Whitman.
Shallow mucky peat over sand or gravel (on all positions).						Chocorua.
Shallow mucky peat over loamy material (on all positions).						Ossipee.
Deep mucky peat (on all positions).						Greenwood.

[1] 18 to 28 inches of moderately coarse textured material over loamy sand, sands, or gravelly analogs of these materials.
[2] Extends into the lower range of the somewhat poorly drained class.
[3] Extends into the upper range of the somewhat poorly drained class.
[4] Shallow to bedrock.

of this soil-forming process determines the degree of development of a spodic horizon (*19*). A light grayish, leached A2 horizon may form over an accumulation of humus and sesquioxides in the B horizon. In places there is no A2 horizon. Soils of the Acton, Charlton, Deerfield, Gloucester, Hinckley, Hollis, Paxton, Sutton, Windsor, and Woodbridge series common to southern Carroll County all show evidence of the development of a spodic horizon. The spodic horizon is more strongly expressed in soils of northern Carroll County, such as the Adams, Becket, Berkshire, Colton, Croghan, Duane, Hermon, Marlow, Lyman, and Peru soils. The spodic horizon is strongly expressed in soils of the Naumburg series, but the movement of organic matter and iron and aluminum oxides is associated with a fluctuating water table.

In soils that are not well drained, the reduction of ferric iron to the ferrous form results in a change in soil color. An example would be a soil color change from yellowish brown to various shades of gray. This process has been called gleization (*15*). In some cases, the reduced iron is removed entirely from the profile; in others, the iron moves to a different horizon and is partly reoxidized. Mottles in the soil result from this reoxidation. Gray layers are common in the somewhat poorly drained to very poorly drained soils, such as Leicester, Ridgebury, Walpole, and Whitman soils.

Some soils, such as Marlow and Paxton soils, have a distinct fragipan. Certain investigators believe the the pan did not form during the current cycle of soil development but that it formed through the process of

lodgement or plastering (*6*). The eluvial-illuvial sequence is not apparent or is weakly expressed.

Classification of the Soils

Soils are placed in narrowly defined classes so that we can identify them and apply knowledge of them to the management of small areas, such as farms, towns, and counties. They are placed in broadly defined categories so that large areas, such as countries or continents, can be studied and compared. Further explanations concerning narrowly defined classes of soils are in the section "How This Survey Was Made."

The soil classification system described in this section is the current system; it was adopted for general use by the National Cooperative Soil Survey in 1965 (*19*). The previous system, adopted in 1938 (*15*) and later revised (*14*), was incomplete and did not properly emphasize the observable and measurable characteristics of the soil. The new system is an improvement, and modifications are being made to it as new knowledge is gained (*11*).

Under the current system of classification, all soils are placed in six categories. These are, beginning with the most inclusive category, order, suborder, great group, subgroup, family, and series. Table 13 shows the soil series of Carroll County classified in the current system by order, subgroup, and family. A description of each soil series in the county, including a profile representative of the series, is in the section "Descriptions of the Soils." A brief description of each of the six classification categories in the current system is given in the following paragraphs.

ORDER.—Ten soil orders are recognized. They are

TABLE 13.—*Classification of soils according to the current system*

Series	Family	Subgroup	Order
Acton	Sandy-skeletal, mixed, mesic	Aquentic Haplorthods	Spodosols.
Adams	Sandy, mixed, frigid	Typic Haplorthods	Spodosols.
Becket	Coarse-loamy, mixed, frigid	Typic Fragiorthods	Spodosols.
Berkshire	Coarse-loamy, mixed, frigid	Typic Haplorthods	Spodosols.
Canaan	Loamy-skeletal, mixed, frigid	Lithic Haplorthods	Spodosols.
Charlton	Coarse-loamy, mixed, mesic	Entic Haplorthods	Spodosols.
Chocorua	Sandy, mixed, dysic	Terric Borohemists	Histosols.
Colton	Sandy-skeletal, mixed, frigid	Typic Haplorthods	Spodosols.
Croghan	Sandy, mixed, frigid	Aquic Haplorthods	Spodosols.
Deerfield	Sandy, mixed, mesic	Aquentic Haplorthods	Spodosols.
Duane[1]	Sandy-skeletal, mixed, frigid, ortstein	Typic Haplorthods	Spodosols.
Gloucester	Sandy-skeletal, mixed, mesic	Entic Haplorthods	Spodosols.
Greenwood	Dysic	Typic Borohemists	Histosols.
Hadley	Coarse-silty, mixed, mesic	Fluventic Dystrochrepts	Inceptisols.
Hermon	Sandy-skeletal, mixed, frigid	Typic Haplorthods	Spodosols.
Hinckley	Sandy-skeletal, mixed, mesic	Entic Haplorthods	Spodosols.
Hollis	Loamy, mixed, mesic	Entic Lithic Haplorthods	Spodosols.
Leicester	Coarse-loamy, mixed, acid, mesic	Typic Haplaquepts	Inceptisols.
Limerick	Coarse-silty, mixed, nonacid, mesic	Typic Fluvaquents	Entisols.
Limerick variant	Coarse-silty over sandy or sandy-skeletal, mixed, nonacid, mesic.	Typic Fluvaquents	Entisols.
Lyman	Loamy, mixed, frigid	Lithic Haplorthods	Spodosols.
Marlow	Coarse-loamy, mixed, frigid	Typic Fragiorthods	Spodosols.
Millis	Coarse-loamy, mixed, mesic	Entic Fragiorthods	Spodosols.
Naumburg	Sandy, mixed, frigid	Aeric Haplaquods	Spodosols.
Nicholville variant	Coarse-silty over sandy or sandy-skeletal, mixed, frigid	Aquic Haplorthods	Spodosols.
Ondawa	Coarse-loamy, mixed, mesic	Fluventic Dystrochrepts	Inceptisols.
Ondawa variant	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic	Fluventic Dystrochrepts	Inceptisols.
Ossipee	Loamy, mixed, dysic	Terric Borohemists	Histosols.
Paxton	Coarse-loamy, mixed, mesic	Entic Fragiorthods	Spodosols.
Peru	Coarse-loamy, mixed, frigid	Aquic Fragiorthods	Spodosols.
Podunk	Coarse-loamy, mixed, mesic	Fluventic Dystrochrepts	Inceptisols.
Podunk variant	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic	Fluventic Dystrochrepts	Inceptisols.
Raynham variant	Coarse-silty over sandy or sandy-skeletal, mixed, nonacid, mesic.	Aeric Haplaquepts	Inceptisols.
Redstone	Fragmental, mixed, frigid	Typic Haplorthods	Spodosols.
Ridgebury	Coarse-loamy, mixed, mesic	Aeric Fragiaquepts	Inceptisols.
Salmon variant	Coarse-silty over sandy or sandy-skeletal, mixed, frigid	Typic Haplorthods	Spodosols.
Scituate	Coarse-loamy, mixed, mesic	Aquentic Fragiorthods	Spodosols.
Skerry	Coarse-loamy, mixed, frigid	Aquic Fragiorthods	Spodosols.
Suncook	Mixed, mesic	Typic Udipsamments	Entisols.
Sutton	Coarse-loamy, mixed, mesic	Aquentic Haplorthods	Spodosols.
Walpole	Sandy, mixed, mesic	Aeric Haplaquepts	Inceptisols.
Waumbek	Sandy-skeletal, mixed, frigid	Aquic Haplorthods	Spodosols.
Whitman	Coarse-loamy, mixed, mesic	Typic Fragiaquepts	Inceptisols.
Windsor	Sandy, mixed, mesic	Entic Haplorthods	Spodosols.
Winooski	Coarse-silty, mixed, mesic	Fluvaquentic Dystrochrepts	Inceptisols.
Woodbridge	Coarse-loamy, mixed, mesic	Aquentic Fragiorthods	Spodosols.

[1] The Duane soils in Carroll County are taxadjuncts to the series because they have a thinner solum and less well expressed ortstein than defined in the range for the series.

Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate soil orders are those that tend to give broad climatic groupings of soils. The exceptions to this are the Entisols, the Histosols, and, to some extent, the Inceptisols. These three orders occur in many different climates.

Table 13 shows the four soil orders in Carroll County: Entisols, Inceptisols, Spodosols, and Histolsols. Entisols are "recent" soils. They do not have genetic horizons, or they have only the beginnings of such horizons. In Carroll County, the Suncook series is an example of this order.

Inceptisols are soils that have begun to develop characteristic properties in the various horizons. The Leicester series is an example of this order.

Spodosols are soils that have a distinctive horizon called a spodic horizon. In the Spodosols of Carroll County, this diagnostic subsurface horizon consists of an illuvial accumulation of free sesquioxides and organic carbon. The Berkshire and Hermon series are representative of this order in Carroll County.

Histosols are soils that are dominantly organic. They are mostly soils that are commonly called bogs, or moors, or peats and mucks. This order is represented by soils of the Chocorua, Greenwood, and Ossipee series.

SUBORDER.—Each order is divided into suborders, primarily on the basis of those soil characteristics that seem to produce classes with the greatest genetic similarity. Suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders mainly reflect the presence or absence of waterlogging or the soil differences resulting from the climate or vegetation. Suborders are not shown in table 13.

GREAT GROUP.—Suborders are separated into great groups on the basis of uniformity in the kinds and sequences of major soil horizons and features. The horizons on which the divisions are based are those in which clay, iron, and humus have accumulated. The features used are the self-mulching properties of clays, soil temperatures, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), and the like. Great groups in the current system are not shown in table 13.

SUBGROUP.—Great groups are divided into subgroups. One subgroup of the great group represents the central (typic) segment of the group; the others, called intergrades, have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside the range of any other great group, suborder, or order. The more strongly developed soils in northern Carroll County are Typic Haplorthods, while the lesser developed soils in the southern part are Entic Haplorthods.

FAMILY.—Families are separated within a subgroup primarily on the basis of properties important to the growth of plants or behavior of soil when manipulated by man. Among the properties considered in Carroll County are texture, mineralogy, reaction, and soil temperature.

SERIES.—The series is a group of soils that have major horizons that are similar in important characteristics and in arrangement in the profile, except for texture of the surface layer. They are given the name of a geographic location near the place where that series was first observed and described. An example is the Berkshire series.

Environmental Factors Affecting Soil Use

In this section, the chief natural and cultural factors that affect the use and management of the soils in Carroll County are highlighted.

Climate[7]

Moderate summers, fairly cold winters, and ample rainfall are characteristic of Carroll County. The waters of the Atlantic, only 30 to 70 miles to the southeast, cause increased precipitation in fall and winter, but otherwise the county has a continental climate maintained by the predominant westerly winds. The many lakes, ponds, and marshes tend to moderate the temperature somewhat. Carroll County lies mostly from 500 to 1,500 feet above the sea, but some peaks rise to 3,000 feet and higher. Change in elevation has an effect upon climate, with temperature tending to drop about 1° F for each extra 300 feet. Precipitation increases with elevation. Even small-scale terrain features and soil types affect the climate near the ground. For example, low spots, especially peaty soils in swamplands, are more frostprone on clear nights. Temperatures are subject to change frequently because Carroll County is near the path of weather systems that alternately bring in warmer and colder air.

Climate data are given in tables 14, 15, and 16 for Conway. These are typical of a mostly rural setting at the lower end of the county's range in elevation. These data are, therefore, reasonably typical of county areas where most residents, farming, and industry are located, though rural and urban differences, local topography, and varying distance from the ocean prevent strict application of the data everywhere.

Temperature.—July, the warmest month, averages in the upper 60's, or near 70° F in the warmer locations. The number of summer days reaching 90° F or higher averages 5 to 15, but can vary from none to 25 or so in a summer. Most nights are cool even in the warmest summers. January, generally the coldest month, averages mostly in the upper teens but in the lower 20's in the more protected urban areas. Tables 15 and 16 contain monthly and annual temperature data. Included in table 15 are degree-day statistics for both home heating and crop growing. The heating units are accumulations of daily deficits from a 65° F base. They correlate well with fuel use. The growing units are accumulated excesses over selected base daily mean temperatures. A 40° F base is generally used for cool-weather crops, peas, for example; the 50° F base, for warmer weather crops, such as corn.

[7] By ROBERT E. LAUTZENHEISER, climatologist for New Hampshire, National Weather Service, U.S. Department of Commerce.

TABLE 14.—*Probabilities of occurrence of specified freezing temperatures in spring and in fall*

[Data from Conway]

Probability	Dates for given probability and temperature				
	32° F or lower	28° F or lower	24° F or lower	20° F or lower	16° F or lower
Spring:					
1 year in 10, later than	June 9	May 27	May 17	April 29	April 19
2 years in 10, later than	June 5	May 22	May 12	April 24	April 14
5 years in 10, later than	May 29	May 14	May 4	April 16	April 6
8 years in 10, later than	May 21	May 6	April 26	April 8	March 29
Fall:					
1 year in 10, earlier than	August 31	September 6	September 23	October 6	October 21
2 years in 10, earlier than	September 4	September 11	September 28	October 11	October 26
5 years in 10, earlier than	September 14	September 21	October 8	October 21	November 5
8 years in 10, earlier than	September 24	October 1	October 18	October 31	November 15

They are useful in planning planting and harvesting dates.

A substantial number of growing-degree-days in a month does not necessarily mean that a crop may be safely planted. A damaging freeze may occur. Table 14 gives probabilities for various freeze severities after certain spring dates and before certain fall dates. For example, there remains at Conway one chance in 10 that the temperature will drop to 32° F or lower on or after June 9. The 50-50 chance date is May 29. At more protected or urban locations, the dates are earlier. For much of Carroll County, the average length of the freeze-free season ranges from 105 to 130 days but extends to 140 days or longer at the most favored spots. The season may be much shorter in local "frost pockets," or low boggy areas, where frost may be a threat in an occasional cold summer.

Storms.—Thunderstorms are the main cause of damage to crops from wind and hail. These average 20 to 25 per year. Though possible in any month, most occur during the crop season. Most do little damage but bring needed rain. Some bring very heavy rain, eroding soil and injuring plants. Hail may fall once or twice a year at a given location, but only seldom are the stones large or numerous enough to do extensive damage. Winds or heavy rains of damaging nature are brought to the county by hurricanes about once in 10 years. Coastal storms, or "northeasters," bring wind and heavy precipitation much more frequently, but usually do not cause serious damage. Carroll County is not immune to tornadoes, but these most violent storms are rare and usually extremely small, presenting a very small threat to any given location. Nevertheless, they warrant a watchful eye whenever conditions favoring tornadoes are forecast.

Precipitation.—The precipitation data from Conway in table 15 are generally representative of the county, though annual normals may range to near 42 inches in the Lake Winnipesaukee area to over 50 inches at the highest elevations. These figures include the water equivalent of snowfall. There are no "rainy" or "dry" seasons. The relatively large annual total provides water for many purposes, including irrigation during the usually short but fairly common dry spells in summer.

Snowfall varies from about 75 to 125 inches in an average season over much of the county but is higher in some elevations. Snowfall varies markedly from season to season, but seldom is less than 50 percent or more than 150 percent of the average. The ground is normally covered with snow most of the time from early December until sometime in April. Even in the mildest winter, the ground is rarely bare in January, February, and March. At Conway the average seasonal maximum depth of snow is 3 feet, and this occurs late in February on the average. For Conway, the seasonal occurrences of snowfall of specified amounts in one day have been calculated as follows:

Amount (inches)	Frequency (days per season) Average	Extremes
1 or more	29	22–39
2 or more	20	14–28
4 or more	11	6–15
8 or more	3	0–6
12 or more	1	0–3

Other snowfall data appear in table 16.

Geology

The soils of the White Mountains and the Sandwich Range are underlain mostly with Conway Granite and Mount Osceola granite of the White Mountain Plutonic-Volcanic series. Soils of the central part of the county are underlain with the Littleton Formation of Devonian age. Soils of the southern part are underlain mostly with binary granite and quartz diorite. A stock of Conway Granite occupies the center of the Ossipee Mountains, Red Hill, and Green Hills. Red Hill is unique among the mountains of New Hampshire in that it is composed in part of a rare rock called nephelite-sodalite syenite (*4*).

The existing landforms evolved as the result of the action of short mountain glaciers and a great ice sheet that gathered in Canada and grew southward, overwhelming the mountain glaciers. This great mass of ice —possibly a mile in thickness—scraped the surface of

TABLE 15.—*Frequencies of occurrence of selected temperature levels and average number of heating- and growing-degree-days*

[Data from Conway]

Month	Mean number of days with—				Accumulated heat units		
	Maximum temperature of—		Minimum temperature of—		Heating-degree-days	Growing-degree-days	
	90° F or higher	32° F or lower	32° F or lower	0° F or lower	Base 65° F	Base 40° F	Base 50° F
January	0	17	31	13	1,481	0	0
February	0	13	28	11	1,296	0	0
March	0	5	28	2	1,077	12	0
April	(1)	(1)	21	(1)	700	123	20
May	(1)	0	8	0	351	435	165
June	2	0	(1)	0	109	706	406
July	4	0	0	0	38	860	550
August	2	0	(1)	0	71	795	485
September	1	0	5	0	246	541	254
October	0	(1)	14	0	539	250	48
November	0	2	24	0	883	50	2
December	0	15	30	7	1,322	0	0
Year	9	52	189	33	8,113	3,772	1,930

[1] Less than one-half day.

TABLE 16.—*Temperature and precipitation*

[Data from Conway, elevation 475 feet]

Month	Temperature					Precipitation						
	Average daily—			Average extreme—		Average monthly total	One year in 10 will have—		Average snowfall	Number of days with—		
	Maximum	Minimum	Mean	Maximum	Minimum		Less than—	More than—		Snowfall of 1 inch or more	Snow cover of 1 inch or more	Precipitation of 0.10 inch or more
	°F	°F	°F	°F	°F	Inches	Inches	Inches	Inches			
January	29.7	4.3	17.0	47	−23	3.00	1.0	4.9	22.0	6	31	6
February	32.3	5.5	18.9	49	−20	4.06	1.6	6.5	28.8	7	28	7
March	41.2	18.8	30.0	60	−4	3.42	1.1	5.0	19.6	5	31	7
April	54.2	28.6	41.4	75	12	3.58	1.5	5.4	6.5	2	10	6
May	68.2	39.4	53.8	87	24	3.44	.6	6.5	0.5	(1)	(1)	7
June	77.4	49.1	63.3	92	33	3.59	1.4	5.1	0	0	0	7
July	81.4	53.6	67.5	93	39	3.79	1.7	6.0	0	0	0	7
August	79.0	51.8	65.4	91	35	3.34	1.3	5.4	0	0	0	7
September	71.2	44.4	57.8	88	26	3.68	1.3	6.2	0	0	0	6
October	60.3	34.4	47.4	80	18	4.04	1.5	7.5	1.1	(1)	(1)	6
November	45.1	25.6	35.4	63	9	5.64	3.0	7.9	8.8	3	5	9
December	32.7	11.5	22.1	52	−14	4.43	2.3	7.3	26.0	6	26	7
Year	56.1	30.6	43.3	[2] 96	[3] −26	46.01	37.0	55.4	113.3	29	131	82

[1] Less than one-half day.

[2] Average annual highest temperature.

[3] Average annual lowest temperature.

the ground; picked up stones, boulders, and other soil material; and crushed and mixed them while slowly moving to the south. In many places the scouring action of the glaciers rounded the hills and mountains. As the climate became warmer, the ice melted and dropped the debris it had been carrying. This material, called glacial drift, now forms an irregular blanket over the bedrock of the county. In some places the bedrock is exposed. Melt water from the glaciers picked up sand, gravel, and other smaller particles and carried them on into temporary lakes where they were deposited as beds of sand and gravel. Postglacial and present-day streams formed river bottoms, dropping material in some places and eroding it away in others.

About 14,000 years ago (*8*) the last of the ice melted away, and there has been little change in the landforms since that time.

Relief

The central and southern parts of the county occupy the New England Hill Province or plateau region. It is characterized by a rolling type of topography broken by the low, wide valleys of the Saco and Bearcamp Rivers. The northern and western parts of the county are hilly to mountainous with high, rugged peaks separated by narrow, steep valleys. Elevation ranges from about 400 feet to about 3,800 feet in Crawford Notch near Mount Webster.

Water

Streams and lakes are well scattered over the area. There also appear to be abundant subterranean water supplies. This is particularly true under sand and gravel deposits. Small and large streams are subject to severe flooding. Water-retarding structures on the headwaters to control flooding appear to be feasible on many streams because there are many suitable impoundment sites.

Municipal water is of some concern in areas of rapid growth, such as North Conway. The private shallow wells are, for the most part, inadequate in these areas. The problem here is not one of locating adequate water but of financing the construction of suitable reservoirs and laying the necessary waterlines in the towns.

The Pine River of Ossipee contains a substantial volume of water for industrial growth. Stream pollution in the Saco and Bearcamp Rivers is a matter of some concern.

Manufacturing, Transportation, and Schools

The manufacture of furniture and the milling of lumber and other wood products are the main industries in the county. Other industry includes machinery manufacturing, communications, utilities, and real estate.

The county has a network of State highways that adequately serve the entire area. A large number of town and country roads are maintained for year-round use. Railroad service is limited to freight. The county has five private airports: Conway, Moultonboro, Ossipee, Tuftonboro, and Wolfeboro. One major bus line serves the county.

Brewster Academy prep school in Wolfeboro is the only school in the county to offer education beyond high school. Elementary and high schools adequately serve the county except in a few areas where they are starting to become overcrowded.

Trends in Soil Use

Early history and development of Carroll County was tied to farming and lumbering. Maximum farm development peaked around 1875, when 80 percent of some townships consisted of cleared land. This is in contrast to the 92 percent of the county that today is classed as woodland.

In recent years there has been a large decrease in the number of farms. Many of the small hill farms are occupied by full time or part-time residents, and the tilling of the soil is either in a secondary position or entirely neglected.

Recreational activity has progressed on a steady basis in the county. Because of this, a large acreage of woodland has been converted to recreational enterprises and year-round housing developments. The Mountain and Lake Regions have become the playground of the Northeast.

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Glossary

Acidity. See Reaction, soil.
Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; but that in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.
Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.
Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.
Association, soil. A group of soils geographically associated in a characteristic repeating pattern.
Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.
Bedding. Plowing, grading, or otherwise elevating the surface of a flat field into a series of broad beds, or "lands," in order to leave shallow surface drains between the beds.
Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.
Boulder (USDA classification). A stone more than 24 inches in diameter.
Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.
Cobblestone. A rounded or partly rounded stone 3 to 10 inches in diameter.
Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—
Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard and brittle; little affected by moistening.
Contour farming. Plowing, cultivating, planting, and harvesting in rows that are at right angles to the natural direction of the slope or that are parallel to terrace grade.
Cover crop. A close-growing crop grown primarily to improve and to protect the soil between periods of regular crop production; or a crop grown between trees and vines in orchards and vineyards.
Delta. An alluvial deposit, formed largely beneath the water, where a stream or river drops its load of sediment on entering a body of more quiet water. Commonly triangular in shape.
Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.
Drumlin (geology). A smooth, elongated hill of glacial drift, normally compact and unstratified. A drumlin is commonly asymmetric in shape, having a blunt nose pointing in the direction from which the vanished glacier advanced, and a more gentle, longer slope pointing in the opposite direction.
Eluviation. The movement of material from one place to another within the soil, in either true solution or colloidal suspension. Soil horizons that have lost material through eluviation are said to be eluvial; those that have received material are illuvial.
Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.
Esker (geology). A winding, steep-walled ridge of stratified sand and gravel showing evidence of deposition by water. Eskers are only a few feet wide, but range from a fraction of a mile to more than 100 miles long. An esker is commonly 10 to 50 feet high, but a few are as much as 100 feet high.
Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.
Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.
Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.
Glacial drift (geology). Rock material transported by glacial ice and then deposited; also includes the assorted and unassorted materials deposited by streams flowing from glaciers.
Glacial lake. A lake that forms, after the ice has melted, in the bedrock basin from which a mountain glacier flows. Also called a *tarn.*
Glacial till (geology). Unassorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.
Glacial outwash. Stratified sand and gravel deposited by glacial melt water streams. Commonly the deposits occupy valley positions on landforms known as valley trains or outwash terraces, eskers, kames, kame terraces, and outwash fans or deltas.
Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice; the deposits are stratified and occur in the form of kames, eskers, deltas, and outwash plains.
Glaciolacustrine deposits. Material moved by glaciers, deposited in lake water, and exposed by lowering of the water level or by elevation of the land.
Gleization. The reduction, translocation, and segregation of soil compounds, notably of iron, usually in the lower horizons, as a result of waterlogging with poor aeration and drainage; expressed in the soil by mottled colors dominated by gray. The soil-forming processes leading to the development of a gley soil.
Grassed waterway. A natural or constructed waterway, typically broad and shallow, and covered by grass for protection against erosion; used to conduct surface water away from cropland.
Gravel (USDA classification). Rounded or subrounded fragments of rock up to 3 inches in diameter.
Green manure (agronomy). A crop grown for the purpose of being turned under in an early stage of maturity or soon after maturity for soil improvement.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Internal drainage. The downward movement of water through the soil profile. The rate of movement is determined by the texture, structure, and other characteristics of the soil profile and underlying layers, and by height of the water table, either permanent or perched. Relative terms for expressing internal drainage are *none, very slow, slow, medium, rapid,* and *very rapid.*

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Leached layer. A layer from which the soluble materials have been dissolved and washed away by percolating water.

Leached soil. A soil from which most of the soluble materials have been removed from the entire profile or have been removed from one part of the profile and have accumulated in another part.

Medium-textured soil. Soil of very fine sandy loam, loam, silt loam, or silt texture.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and their thickness and arrangement in the soil profile.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Organic soil material, Histosols. *Fibric material* is the least decomposed of all the organic material. It contains a large amount of fiber that is well preserved and of readily identifiable botanical origin. It has the lowest bulk density of all the organic material and the highest water content at saturation. *Hemic material* is intermediate in degree of decomposition. It is more highly decomposed than fibric material, but less decomposed than sapric material. It is also intermediate in bulk density, fiber content, and water content at saturation. *Sapric material* is the most highly decomposed of the organic material. It also has the highest bulk density, the lowest fiber content, and the lowest water content at saturation.

Orterde. The aggregated, friable, noncemented B or subsurface horizon of Podzol soils. The accumulation of organic matter or organic matter and iron sesquioxides imparts the usual dark-brown or yellowish coloring.

Pan layer. See fragipan.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *slow, moderately slow, moderate, moderately rapid,* and *rapid.*

Productivity (of soil). The present capability of a soil for producing a specified plant or sequence of plants under a specified system of management. It is measured in terms of output, or harvest, in relation to input of production for the specific kind of soil under a specified system of management.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rippable bedrock. Bedrock that can be broken or dislodged to be handled like soil in earth-moving operations.

Runoff (hydrolics). The part of the precipitation upon a drainage area that is discharged from the area in stream channels. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand (USDA classification). Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Sand plains. Deposits of glacial outwash consisting mostly of sand-sized material.

Series, soil. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silt (USDA classification). Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stone (USDA classification). A rock fragment greater than 10 inches in diameter if rounded, or greater than 15 inches along the longer axis if flat.

Stripcropping. Growing crops in a systematic arrangement of

strips, or bands, to serve as vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles) adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tier. An arbitrary division of the control section in Histosols. Classification at the suborder level is based on the kind of material in the subsurface tier. Classification at the subgroup level is based on the kind of material in the *bottom tier*. Classification at the series or phase level is based on the *surface tier*.

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Upland (geology). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

Varves. Distinctly marked seasonal deposits of sediment, regardless of its origin, that usually consist of two layers.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In many places an upper or perched water table is separated from a lower one by a dry zone. A seasonal high water table refers to the highest level at which the water stands for a significant period of time during wet seasons.

Weathering. All physical and chemical changes produced in rocks at or near the earth's surface by atmospheric agents. These changes result in more or less complete disintegration and decomposition of the rock.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. Map symbols consisting of all capital letters are used to identify mapping units that are broadly defined. Symbols chosen to identify mapping units that are narrowly defined have a lower case letter as the second letter in the symbol. The suitability of the soils for use as cropland is discussed in the soil descriptions. The capability classification is discussed on pages 71 through 76.

Map symbol	Mapping unit	Page	Capability unit Symbol
HmC	Hermon very stony fine sandy loam, 8 to 15 percent slopes	33	VIs-7
HmD	Hermon very stony fine sandy loam, 15 to 25 percent slopes	33	VIs-7
HmE	Hermon very stony fine sandy loam, 25 to 60 percent slopes	34	VIIs-7
HnD	Hermon extremely stony fine sandy loam, 8 to 25 percent slopes	34	VIIs-58
HnE	Hermon extremely stony fine sandy loam, 25 to 60 percent slopes	35	VIIs-58
HOC	Hermon very stony fine sandy loam association, sloping	35	-------
HOE	Hermon very stony fine sandy loam association, steep	35	-------
HOF	Hermon very stony fine sandy loam association, very steep	35	-------
HsA	Hinckley gravelly loamy sand, 0 to 3 percent slopes	36	IIIs-26
HsB	Hinckley gravelly loamy sand, 3 to 8 percent slopes	36	IIIs-26
HsC	Hinckley gravelly loamy sand, 8 to 15 percent slopes	37	IVs-26
HsE	Hinckley gravelly loamy sand, 15 to 60 percent slopes	37	VIIs-27
HtB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	37	IIIe-56
HtC	Hollis-Charlton fine sandy loams, 8 to 15 percent slopes	37	IVe-56
HtD	Hollis-Charlton fine sandy loams, 15 to 25 percent slopes	38	VIe-56
HvB	Hollis-Charlton very rocky fine sandy loams, 3 to 8 percent slopes	38	VIs-57
HvC	Hollis-Charlton very rocky fine sandy loams, 8 to 15 percent slopes	38	VIs-57
HvD	Hollis-Charlton very rocky fine sandy loams, 15 to 25 percent slopes	39	VIs-57
HvE	Hollis-Charlton very rocky fine sandy loams, 25 to 35 percent slopes	39	VIIs-57
HxD	Hollis-Charlton-Rock outcrop complex, 8 to 25 percent slopes	39	VIIs-58
HxE	Hollis-Charlton-Rock outcrop complex, 25 to 60 percent slopes	39	VIIs-58
LDB	Leicester-Ridgebury very stony fine sandy loams association, gently sloping	40	-------
LfA	Leicester-Walpole very stony fine sandy loams, 0 to 3 percent slopes	40	VIIs-73
LfB	Leicester-Walpole very stony fine sandy loams, 3 to 8 percent slopes	41	VIIs-73
Lk	Limerick silt loam	41	IIIw-13
Lm	Limerick very fine sandy loam, sandy subsoil variant	42	IIIw-13
LnB	Lyman-Berkshire very rocky fine sandy loams, 3 to 8 percent slopes	43	VIs-57
LnC	Lyman-Berkshire very rocky fine sandy loams, 8 to 15 percent slopes	43	VIs-57
LnD	Lyman-Berkshire very rocky fine sandy loams, 15 to 25 percent slopes	43	VIs-57
LnE	Lyman-Berkshire very rocky fine sandy loams, 25 to 35 percent slopes	43	VIIs-57
LsD	Lyman-Berkshire-Rock outcrop complex, 8 to 25 percent slopes	44	VIIs-58
LsE	Lyman-Berkshire-Rock outcrop complex, 25 to 60 percent slopes	44	VIIs-58
LVC	Lyman-Berkshire very rocky fine sandy loams association, sloping	44	-------
LVE	Lyman-Berkshire very rocky fine sandy loams association, steep	44	-------
LVF	Lyman-Berkshire very rocky fine sandy loams association, very steep	45	-------
LYE	Lyman-Rock outcrop-Berkshire association, steep	45	-------
LYF	Lyman-Rock outcrop-Berkshire association, very steep	45	-------
MaB	Marlow fine sandy loam, 3 to 8 percent slopes	46	IIe-6
MaC	Marlow fine sandy loam, 8 to 15 percent slopes	46	IIIe-6
MdB	Marlow very stony fine sandy loam, 3 to 8 percent slopes	46	VIs-7
MdC	Marlow very stony fine sandy loam, 8 to 15 percent slopes	47	VIs-7
MdD	Marlow very stony fine sandy loam, 15 to 25 percent slopes	47	VIs-7
MdE	Marlow very stony fine sandy loam, 25 to 60 percent slopes	47	VIIs-7
MEE	Marlow very stony fine sandy loam association, steep	47	-------
MEF	Marlow very stony fine sandy loam association, very steep	48	-------
MFC	Marlow-Peru very stony fine sandy loams association, sloping	48	-------
MlB	Millis fine sandy loam, 3 to 8 percent slopes	49	IIe-6
MlC	Millis fine sandy loam, 8 to 15 percent slopes	49	IIIe-6
MsB	Millis very stony fine sandy loam, 3 to 8 percent slopes	49	VIs-7
MsC	Millis very stony fine sandy loam, 8 to 15 percent slopes	49	VIs-7
MsD	Millis very stony fine sandy loam, 15 to 25 percent slopes	49	VIs-7
MU	Muck and Peat	50	-------
NaB	Naumburg loamy sand, 0 to 8 percent slopes	50	IVw-23
NcA	Nicholville silt loam, sandy subsoil variant, 0 to 3 percent slopes	51	IIw-32
NcB	Nicholville silt loam, sandy subsoil variant, 3 to 8 percent slopes	51	IIw-32
Of	Ondawa fine sandy loam	52	IIw-10
Oh	Ondawa fine sandy loam, high bottom	52	I-1
Os	Ondawa very fine sandy loam, sandy subsoil variant	53	IIs-15
OT	Ossipee mucky peat	54	-------
PaB	Paxton fine sandy loam, 3 to 8 percent slopes	54	IIe-6

Map symbol	Mapping unit	Page	Capability unit Symbol
PaC	Paxton fine sandy loam, 8 to 15 percent slopes	54	IIIe-6
PdB	Paxton very stony fine sandy loam, 3 to 8 percent slopes	55	VIs-7
PdC	Paxton very stony fine sandy loam, 8 to 15 percent slopes	55	VIs-7
PdD	Paxton very stony fine sandy loam, 15 to 25 percent slopes	55	VIs-7
PeB	Peru very stony fine sandy loam, 3 to 8 percent slopes	56	VIs-72
PeC	Peru very stony fine sandy loam, 8 to 15 percent slopes	56	VIs-72
PLC	Peru very stony fine sandy loam association, sloping	56	-------
Po	Podunk fine sandy loam	57	IIw-12
Ps	Podunk fine sandy loam, sandy subsoil variant	58	IIw-12
Ra	Raynham silt loam, sandy subsoil variant	59	IIIw-33
RgB	Ridgebury fine sandy loam, 0 to 8 percent slopes	60	IIIw-63
R1A	Ridgebury very stony fine sandy loam, 0 to 3 percent slopes	60	VIIs-73
R1B	Ridgebury very stony fine sandy loam, 3 to 8 percent slopes	60	VIIs-73
RO	Rock outcrop	60	-------
RPE	Rock outcrop-Lyman association, steep	60	-------
RPF	Rock outcrop-Lyman association, very steep	61	-------
SaA	Salmon very fine sandy loam, sandy subsoil variant, 0 to 3 percent slopes	61	I-2
SaB	Salmon very fine sandy loam, sandy subsoil variant, 3 to 8 percent slopes	62	IIe-2
SdB	Scituate very stony fine sandy loam, 3 to 8 percent slopes	62	VIs-72
SdC	Scituate very stony fine sandy loam, 8 to 15 percent slopes	63	VIs-72
SeB	Skerry very stony fine sandy loam, 3 to 8 percent slopes	63	VIs-72
SeC	Skerry very stony fine sandy loam, 8 to 15 percent slopes	64	VIs-72
Sf	Suncook loamy fine sand	64	IIIs-16
SnB	Sutton fine sandy loam, 0 to 8 percent slopes	65	IIw-52
SuB	Sutton very stony fine sandy loam, 0 to 8 percent slopes	65	VIs-72
WaB	Waumbek very stony fine sandy loam, 3 to 8 percent slopes	66	VIs-72
WaC	Waumbek very stony fine sandy loam, 8 to 15 percent slopes	67	VIs-72
WBC	Waumbek-Skerry very stony fine sandy loams association, sloping	67	-------
Wc	Whitman very stony loam	68	VIIs-74
WdA	Windsor loamy sand, 0 to 3 percent slopes	68	IIIs-26
WdB	Windsor loamy sand, 3 to 8 percent slopes	69	IIIs-26
WdC	Windsor loamy sand, 8 to 15 percent slopes	69	IVs-26
WdE	Windsor loamy sand, 15 to 60 percent slopes	69	VIIs-26
Wn	Winooski very fine sandy loam	70	IIw-12
WoB	Woodbridge fine sandy loam, 3 to 8 percent slopes	70	IIw-62
WvB	Woodbridge very stony fine sandy loam, 3 to 8 percent slopes	71	VIs-72
WvC	Woodbridge very stony fine sandy loam, 8 to 15 percent slopes	71	VIs-72

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