OIL SURVEY

Susitna Valley Area Alaska

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF ALASKA INSTITUTE OF AGRICULTURAL SCIENCES
Issued December 1973

Major fieldwork for this soil survey was done in the period 1961–68. Soil names and descriptions were approved in 1968. Unless otherwise indicated, statements in the publication refer to conditions in the Area in 1968. This survey was made cooperatively by the Soil Conservation Service and the University of Alaska Institute of Agricultural Sciences. It is part of the technical assistance furnished to the Montana Soil Conservation Subdistrict of Alaska and the Wasilla Soil Conservation Subdistrict of Alaska.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

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

Locating Soils

All the soils of the Susitna Valley Area are shown on 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 are identified by symbols. All areas marked with the same symbol are the same kind 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 Area in alphabetic order by map symbol and gives the management group of each. It also shows the page where each soil is described and the page for the management group in which the soil has been placed.

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 a 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 and from the discussion of the management groups.

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

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

Community planners and others can read about soil properties that affect the choice of sites for nonindustrial buildings and for recreation areas in the section "Recreation."

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 and Classification of Soils."

Newcomers in the Susitna Valley Area will be especially interested in the section "General Soil Map," where broad patterns of soils are described. They will also be interested in the information about the Area given at the beginning of the publication and in the section "General Nature of the Area" at the end of this survey.

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SOIL SURVEY OF SUSITNA VALLEY AREA, ALASKA 1973

BY DALE B. SCHOEPHORSTER AND ROBERT B. HINTON[1]

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH UNIVERSITY OF ALASKA INSTITUTE OF AGRICULTURAL SCIENCES

THE SUSITNA VALLEY AREA occupies about 730,390 acres, of which 28,890 acres are lakes and streams, excluding the Susitna River. This Area is in the Cook Inlet-Susitna Lowland of south-central Alaska (fig. 1).

The Susitna Area is about 85 miles in length from north to south and ranges from 8 to 18 miles in width. It is almost parallel to the lower course of the Susitna River and extends from a point about 10 miles north of Talkeetna southward to the tidal waters of Cook Inlet. The northern half of the Area includes strips of land on both sides of the Susitna River and makes up most of the Montana Soil Conservation Subdistrict. The southern half, which includes the western part of the Wasilla Soil Conservation Subdistrict, is bounded on the west by the Susitna River and on the east by the adjoining Matanuska Valley Soil Survey Area.

Most of the Area is sparsely populated, and large tracts are uninhabited. According to the U.S. Census, the village of Talkeetna, the largest community, had a population of 76 in 1960. Most of the rural settlement is concentrated along the Alaska Railroad and along a new major highway that almost parallels the Susitna River in the northern half of the Area. Cabins near many of the lakes and streams are used mainly for recreation.

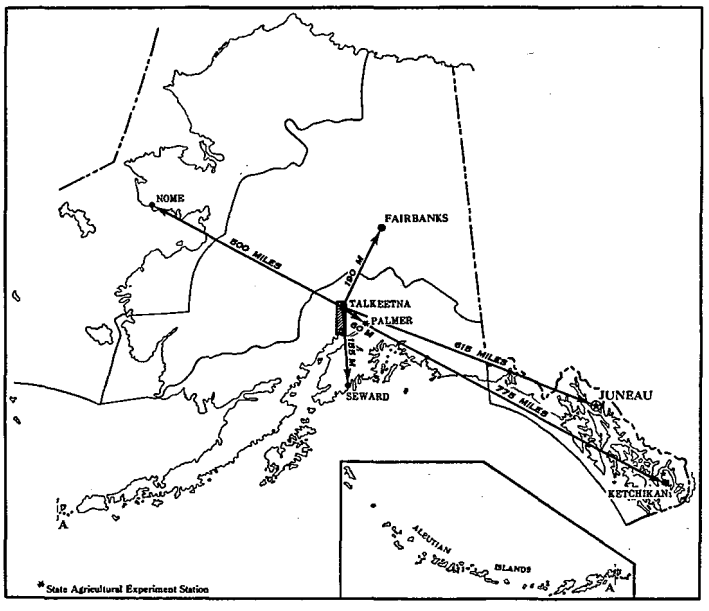

Figure 1.—Location of Susitna Valley Area in Alaska.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in the Susitna Valley Area, where they are located, and how they can be used. The soil scientists went into the Area 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 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 areas nearby and in places more distant. They classified and named the soils according to nationwide uniform procedures. The *soil series* and the *soil phase* are the categories 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. Nancy and Rabideux, 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 soil and in slope, stoniness, or some other characteristic

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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, Nancy silt loam, undulating, is one of several phases within the Nancy 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 in the back of this publication was prepared from the 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 other 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 the Susitna Valley Area: soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intermingled 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. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Dinglishna-Moose River complex is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and." Susitna and Niklason fine sandy loams, overflow, is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be 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. Gravelly alluvial land is a land type in the Susitna Valley Area.

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

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others, 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 present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in the Susitna Valley Area. 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 an area, who want to compare different parts of an area, 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 similiar 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 the Susitna Valley Area are discussed in the following pages. The terms for texture used in the title for several of the associations apply to the surface layer. For example, in the title for association 1, the words silt loams refer to texture of the surface layer.

1. Rabideux-Salamatof Association

Dominantly nearly level to steep, well-drained silt loams that are shallow and moderately deep over sand or gravelly sand and are on uplands; and nearly level, very poorly drained, fibrous peats in muskegs

This association is in two large areas in the northern part of the survey area. It consists of nearly level and undulating soils on terraces and of nearly level and rolling to steep soils on moraines and in muskegs. The vegetation is mainly paper birch and white spruce, but in the muskegs it is sphagnum moss, sedges, low shrubs, and a few black spruce. Elevation ranges from 250 to 1,300 feet.

This association occupies about 25 percent of the survey area. Rabideux soils make up about 50 percent of the association, Salamatof soils about 20 percent, and minor soils about 30 percent.

Rabideux soils are on terraces and moraines. They formed in 15 to 30 inches of silt loam underlain by very gravelly sand or fine sand. These soils are well drained and are very strongly acid and strongly acid.

Salamatof soils are in muskegs, where drainage is very poor and the water table is seasonally high. These soils were derived chiefly from sphagnum moss and are extremely acid.

Among the minor soils are Chulitna and Nancy soils on terraces and Moose River, Killey, and Kalifonsky soils in depressions and on bottom lands along streams.

Most of the acreage in this association is wooded and is used mainly as wildlife habitat. A few paper birch, however, are harvested for logs and fuel. Also, homesteaders along the roads have cleared a few areas of Rabideux, Chulitna, and Nancy soils for crops. The principal crops are perennial grasses, barley, oats, potatoes, and hardy vegetables. Areas near many of the lakes and streams are used for recreational buildings and for campsites. In addition, sand and gravel can be obtained from the substratum of the well-drained soils.

2. Nancy-Kashwitna Association

Dominantly nearly level to steep, well-drained silt loams that are moderately deep and shallow over sand or gravelly sand; on uplands

This association is in the central part of the survey area. It consists of nearly level and undulating soils on terraces and of rolling to steep soils on moraines. The vegetation is mainly paper birch and white spruce. Elevation ranges from 150 to 800 feet.

This association makes up about 20 percent of the survey area. Nancy soils make up about 30 percent of the association, Kashwitna soils about 20 percent, and other less extensive soils about 50 percent.

Nancy soils are on terraces and on moraines. These soils formed in 15 to 30 inches of silt loam underlain by very gravelly sand. Kashwitna soils are mainly on terraces. They formed in silt loam 10 to 18 inches thick over gravelly sand. Both of these soils are well drained, and they are strongly acid to very strongly acid.

Salamatof soils make up 10 percent of the acreage of the minor soils in this association, and Whitsol, Flat Horn, Lucile, Caswell, and Moose River soils make up the remaining 40 percent. Salamatof soils are in depressional areas in muskegs. They are nearly level and are very poorly drained.

Most of this association is wooded and is used as wildlife habitat, but a few tracts have been cleared and are used as cropland. The principal crops are perennial grasses, barley, oats, potatoes, and hardy vegetables. Many areas near the lakes and streams are used for recreational buildings and for campsites. In addition, road fill, sand, and gravel are obtained from many areas of the Kashwitna and Nancy soils.

3. Nancy-Delyndia Association

Dominantly nearly level to steep, well-drained and somewhat excessively drained silt loams that are moderately deep and shallow over sand or gravelly sand; on uplands

This association is in the southern part of the survey area on broad terraces. Most of the acreage is nearly level and undulating, but a few areas are rolling to moderately steep. These soils are well drained and somewhat excessively drained. The vegetation is dominantly paper birch, white spruce, and quaking aspen. Elevation ranges from 25 to 30 feet.

This association makes up about 12 percent of the survey area. Nancy soils make up about 25 percent of the association, Delyndia soils about 20 percent, and other less extensive soils about 55 percent.

Nancy soils are well drained. They formed in 15 to 30 inches of silt loam underlain by fine sand. Delyndia soils are somewhat excessively drained. They formed in sandy material that had a capping of silt loam 7 to 12 inches thick. Both of these soils are strongly acid to very strongly acid.

Salamatof soils make up about 15 percent of the acreage of the minor soils in this association, and Flat Horn, Moose River, Caswell, and Jacobsen soils make up the remaining 40 percent. Salamatof soils are nearly level and very poorly drained and are in muskegs.

Most of this association is wooded. The areas are used mainly as wildlife habitat, though a few trees are harvested for fuel and for logs. In addition, homesteaders near Flat Horn Lake and the settlement of Susitna have cleared a few areas for growing garden vegetables.

4. Kashwitna-Homestead Association

Dominantly nearly level to steep, well-drained silt loams that are shallow and very shallow over gravelly sand or gravelly sandy loam; on uplands

This association is in the southern part of the survey area along its eastern boundary. Some of the soils in this association are nearly level and are on broad outwash plains south of the Susitna River. Others are rolling to steep and are on moraines north of the river. The soils in this association are well drained and moderately well drained. The vegetation is dominantly paper birch, white spruce, and quaking aspen. Elevation ranges from 100 to 600 feet.

This association makes up about 5 percent of the survey area. Kashwitna soils make up about 35 percent of the association, Homestead soils about 15 percent, and other less extensive soils about 50 percent.

Kashwitna soils are nearly level and undulating and are on outwash plains. They formed in 10 to 18 inches of silt loam underlain by very gravelly sand. These soils are well drained and are strongly acid to very strongly acid.

Homestead soils are dominantly rolling to steep, but a few areas are nearly level. They formed in 5 to 10 inches of silt loam underlain by gravelly material. They are strongly acid to very strongly acid.

Less extensive soils in this association are in the Jacobsen, Lucile, Nancy, and Salamatof series. The Jacobsen and Salamatof soils are nearly level and poorly drained and occupy most of the muskegs scattered throughout the association.

Most of this association is wooded. The areas are used mostly as wildlife habitat, but a few trees are harvested for logs and fuel. Also, a few areas along the lakes and streams are used for recreational purposes.

5. Susitna-Schrock Association

Dominantly nearly level, well-drained, stratified fine sandy loams and silt loams that are deep over sand or gravelly sand; on alluvial plains

This association is in the northern part of the survey area. It consists of nearly level soils on alluvial plains. Some of these soils are along the major streams of the Area, and others are on large islands near the Susitna River. Many of the areas are dissected by secondary stream channels and oxbow sloughs. The vegetation is mainly cottonwood, paper birch, and white spruce. Elevation ranges from 10 to 500 feet.

This association makes up about 10 percent of the survey area. Susitna soils make up about 50 percent of the association, Schrock soils about 10 percent, and less extensive soils about 40 percent.

Susitna soils occupy slightly lower positions closer to the rivers and streams than Schrock soils. Both formed in stratified silty and sandy water-laid sediment, about 40 to 60 inches thick, underlain by very gravelly material. Both are well drained and strongly acid. Susitna soils generally have a dark-gray surface layer, and Schrock soils have a dark-brown surface layer.

Among the less extensive soils are Niklason soils near Susitna soils; Moose River and Wasilla soils in depressions; and Gravelly alluvial land in frequently flooded areas next to the rivers and streams.

Most of the acreage in this association is wooded and is used mainly as wildlife habitat. A few cottonwoods, white spruce, and paper birch are harvested for logs and fuel. In addition, homesteaders have cleared a few areas along the roads for use as cropland. The principal crops are barley, bromegrass, potatoes, oats and peas for silage, and hardy vegetables.

6. Clunie-Tidal Marsh Association

Dominantly nearly level, very poorly drained, fibrous peats and poorly drained, clayey sediment; on tidal plains

This association is in the southernmost part of the survey area. It consists of nearly level, slightly acid to neutral soils in depressions on broad tidal plains that border Cook Inlet. On the poorly drained soils in this association, the vegetation consists of sedges, grasses, and other plants that commonly grow in coastal meadows. On the very poorly drained soils in slightly depressional areas, the vegetation is mainly moss, sedges, and low shrubs. Elevation ranges from a few feet above the average level of high tides to 25 feet.

This association makes up about 4 percent of the survey area. Clunie peats make up about 35 percent of the association, Tidal marsh about 30 percent, and less extensive soils about 35 percent.

Clunie soils are in large muskegs, generally between areas of Tidal marsh and uplands. They consist of very poorly drained, brownish, fibrous peat, about 30 to 40 inches thick, underlain by clayey sediment.

Tidal marsh is on broad coastal areas slightly above the level of high tides. It consists of blue to greenish-gray, poorly drained, clayey tidal sediment that is occasionally flooded.

Among the less extensive soils are small tracts of Tidal flats, which are next to tidal waters and are almost bare of vegetation.

Most of this association is used as wildlife habitat, especially for migratory waterfowl.

7. Salamatof-Jacobsen Association

Dominantly nearly level, very poorly drained, fibrous peats in muskegs; and nearly level, very poorly drained, very stony silt loams along the edges of muskegs

This association is in many parts of the survey area. It consists of nearly level, very poorly drained and poorly drained soils in broad irregular areas. The vegetation is dominantly sphagnum moss, sedges, and low shrubs, but black spruce grows in a few areas. Elevation ranges from 25 to 500 feet.

This association makes up about 24 percent of the survey area. Salmatof soils make up about 75 percent of the association, Jacobsen soils about 10 percent, and minor soils about 15 percent.

Salamatof soils are in muskegs. These soils are very poorly drained. They consist of deep, coarse peats derived mainly from sphagnum moss. Jacobsen soils are near the outside edges of muskegs and in tracts along small streams. These soils are poorly drained. They consist of dark grayish-brown, very stony silt loam that is overlain by a thick mat of moss and decomposing organic material. Both soils are strongly acid to extremely acid and have a seasonally high water table.

The minor soils consist of well drained and moderately well drained soils on islands within muskegs and in areas next to muskegs.

The soils in this association are used mainly as wildlife habitat.

Descriptions of the Soils

This section provides detailed information about the soils in the Susitna Valley Area. It describes each soil series, and then each soil, or mapping unit. The soils are described in alphabetical order.

The description of a soil series mentions features that apply to all of the soils of that series. Differences among the soils of one series are pointed out in the descriptions of the individual soils or are apparent in the name.

A representative profile of each series is described in detail in the first mapping unit. This profile is for use by scientists, engineers, and others who need to make highly technical soil interpretations. The layers, or horizons, are designated by symbols such as A1, B21, and C1. These symbols have special meaning for soil scientists. Many readers, however, need only remember that symbols beginning with "A" are for surface soil; those with "B" are for subsoil; and those with "C" are for substratum, or parent material.

The color of each horizon is described in words, such as yellowish brown, and is also indicated by symbols for hue, value, and chroma, such as 10YR 3/2. These symbols, which are called Munsell color notations, are used by soil scientists to evaluate the color of the soil precisely (*20*)[2].

[2] Italic numbers in parentheses refer to Literature Cited, p. 69.

Unless otherwise stated, the color terms in the survey are for moist soils.

The texture of the soil refers to the content of sand, silt, and clay. It is determined by the way the soil feels when rubbed between the fingers, and it is checked by laboratory analyses. Each mapping unit is identified by a textural class name, such as "fine sandy loam." This name refers to the texture of the surface layer or A horizon.

The structure is indicated by the way the individual soil particles are arranged in larger grains or aggregates, and the amount of pore space between grains. The structure of the soil is described by terms that denote strength or grade, size, and shape of the aggregates. For example, a layer may consist of soil materials that have weak, fine, blocky structure.

Boundaries between the horizons are described so as to indicate their thickness and shape. The terms for thickness are *abrupt*, *clear*, *gradual*, and *diffuse*. The shape of the boundary is described as *smooth*, *wavy*, *irregular*, or *broken*.

Other terms used for describing the soils are defined in the Glossary. For more general information about the soils, the reader can refer to the section "General Soil Map," in which the broad patterns of soils are described. The approximate acreage and proportionate extent of the soils are given in table 1, and their location and extent are shown on the detailed soil map at the back of this survey.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the soil or land type on the detailed map at the back of this survey. Shown at the end of each description of each mapping unit are the management group and the capability classification in which the mapping unit has been placed. The page on which each management group is described is listed in the "Guide to Mapping Units." The locations of the soils in the Area are shown on the detailed map at the back of this survey, and the acreage and proportionate extent of the mapping units are shown in table 1.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent	Soil	Acres	Percent
Bernice sandy loam, steep	6, 790	0. 9	Nancy silt loam, sandy substratum, undulating	3, 830	. 5
Caswell silt loam	11, 270	1. 5	Nancy silt loam, sandy substratum, rolling	1, 490	. 2
Chena fine sandy loam	460	. 1	Nancy silt loam, sandy substratum, hilly	1, 920	. 3
Chulitna silt loam, nearly level	3, 990	. 5	Nancy silt loam, sandy substratum, moderately steep	250	(1)
Chulitna silt loam, undulating	6, 350	. 9	Niklason fine sandy loam	4, 700	. 6
Chulitna silt loam, rolling	680	. 1	Rabideux silt loam, nearly level	25, 360	3. 5
Clunie peat	10, 280	1. 4	Rabideux silt loam, undulating	27, 400	3. 8
Coal Creek silt loam	1, 420	. 2	Rabideux silt loam, rolling	10, 380	1. 4
Delyndia silt loam, nearly level	9, 960	1. 4	Rabideux silt loam, hilly	8, 330	1. 1
Delyndia silt loam, undulating	7, 020	1. 0	Rabideux silt loam, moderately steep	13, 910	2. 0
Delyndia silt loam, rolling	1, 320	. 2	Rabideux silt loam, steep	5, 280	. 7
Delyndia silt loam, hilly	370	(1)	Rabideux silt loam, shallow, nearly level	4, 760	. 7
Delyndia-Salamatof complex	1, 160	. 2	Rabideux silt loam, shallow, undulating	5, 790	. 8
Dinglishna sandy loam	1, 680	. 2	Rabideux silt loam, shallow, rolling	360	(1)
Dinglishna-Moose River complex	3, 340	. 5	Rabideux silt loam, shallow, hilly	230	(1)
Flat Horn silt loam, nearly level	14, 150	2. 0	Rabideux silt loam, shallow, moderately steep	1, 230	. 2
Flat Horn silt loam, undulating	3, 890	. 5	Rabideux silt loam, sandy substratum, nearly level	770	. 1
Gravelly alluvial land	3, 400	. 5	Rabideux silt loam, sandy substratum, undulating	830	. 1
Gravel pits	100	(1)	Rabideux silt loam, sandy substratum, rolling	220	(1)
Homestead silt loam, nearly level	1, 990	. 3	Rabideux silt loam, sandy substratum, hilly	200	(1)
Homestead silt loam, undulating	1, 610	. 2	Rabideux silt loam, sandy substratum, moderately steep	60	(1)
Homestead silt loam, rolling	500	. 1	Salamatof peat	244, 090	33. 4
Homestead silt loam, hilly	750	. 1	Schrock silt loam, nearly level	7, 590	1. 0
Homestead silt loam, moderately steep	670	. 1	Slikok mucky silt loam	3, 900	. 5
Jacobsen very stony silt loam	13, 830	2. 0	Susitna fine sandy loam	39, 110	5. 3
Kalifonsky silt loam	4, 850	. 7	Susitna and Niklason fine sandy loams, overflow	6, 150	. 8
Kashwitna silt loam, nearly level	23, 140	3. 1	Terrace escarpments	700	. 1
Kashwitna silt loam, undulating	7, 690	1. 1	Tidal flats	5, 610	. 8
Kashwitna silt loam, rolling	2, 760	. 4	Tidal marsh	8, 120	1. 1
Kashwitna silt loam, hilly	3, 270	. 5	Wasilla silt loam	2, 670	. 4
Kashwitna silt loam, moderately steep	1, 450	. 2	Whitsol silt loam, nearly level	7, 700	1. 0
Kashwitna silt loam, steep	90	(1)	Whitsol silt loam, undulating	3, 330	. 5
Killey-Moose River complex	15, 620	2. 1	Whitsol silt loam, rolling	2, 080	. 3
Lucile silt loam	11, 140	1. 5	Whitsol silt loam, hilly	760	. 1
Mixed alluvial land	2, 160	. 3	Whitsol silt loam, moderately steep	60	(1)
Moose River silt loam	20, 720	2. 8	Lakes and streams (excluding Susitna River)	28, 890	4. 0
Nancy silt loam, nearly level	11, 100	1. 6	Total	730, 390	100. 0
Nancy silt loam, undulating	6, 470	. 9			
Nancy silt loam, rolling	4, 100	. 6			
Nancy silt loam, hilly	6, 960	1. 0			
Nancy silt loam, moderately steep	6, 940	1. 0			
Nancy silt loam, steep	260	(1)			
Nancy silt loam, sandy substratum, nearly level	16, 630	2. 3			

[1] Less than 0.05 percent.

Bernice Series

The Bernice series consists of strongly sloping to steep, excessively drained, coarse-textured soils on narrow terrace escarpments. The vegetation is paper birch, white spruce, and quaking aspen. Elevation ranges from 100 to 800 feet. Bernice soils generally are near the edges of large areas of Nancy, Kashwitna, and Rabideux soils.

In a representative profile a mat of decomposing organic material and fine roots overlies a surface layer of dark-gray silt loam about 1 inch thick. The subsoil, about 4 inches thick, is dark reddish brown to yellowish brown. It generally is silt loam or fine sandy loam in the upper part and sandy loam or gravelly sandy loam below. The underlying material is olive-brown gravelly sandy loam and olive very gravelly coarse sand.

Most areas of Bernice soils are wooded and are used mainly as wildlife habitat. A few small areas, however, are a source of gravel and road fill.

Bernice sandy loam, steep (12 to 45 percent slopes) (BeF).—This is the only Bernice soil mapped in the survey area. It is on narrow escarpments between terraces of different levels and between terraces and flood plains. The areas generally are between 100 and 300 feet in length.

Representative profile (SW¼NW¼ sec. 32, T. 22 N., R. 4 W.):

O1—1½ inches to 0, dark reddish-brown mat of decomposing organic material; many roots; abrupt, wavy boundary.
A2—0 to 1 inch, dark-gray (10YR 4/1) silt loam; weak, thin, platy structure; friable; many roots; very strongly acid; abrupt, wavy boundary.
B21—1 to 1½ inches, dark reddish-brown (5YR 3/3) silt loam; weak, fine, granular structure; friable; many roots; a few small pebbles; very strongly acid; clear, wavy boundary.
B22—1½ to 3½ inches, brown (7.5YR 4/4) fine sandy loam; very weak, fine, subangular blocky structure; very friable; common roots; a few pebbles; very strongly acid; clear, wavy boundary.
B3—3½ to 5 inches, yellowish-brown (10YR 5/4) sandy loam; single grain; loose; common roots; many pebbles and pockets of coarse sand; very strongly acid; clear, wavy boundary.
C1—5 to 9 inches, olive-brown (2.5Y 4/4) gravelly sandy loam; single grain; loose; common roots; many pockets of coarse sand; very strongly acid; clear, wavy boundary.
IIC2—9 to 30 inches, olive (5Y 4/3) very gravelly coarse sand; single grain; loose; a few roots; very strongly acid.

The A2 horizon and the B horizon range from sandy loam to silt loam within a distance of a few feet. The mantle of silty and sandy material ranges from 4 to 12 inches thick over the very gravelly material in the C horizon. In places the horizons are discontinuous and distorted because of frost action and soil creep. A few strata and pockets of medium-textured and coarse-textured material are in the C horizon.

Permeability is rapid in this Bernice soil, and available moisture capacity is low. Plant roots can penetrate to a depth of 20 inches. Runoff is rapid, and the hazard of water erosion is very severe. Fertility is low.

Included with this soil in mapping are a few small areas of soils that formed in 10 to 15 inches of silt loam underlain by sand or gravel. Also included are spots of deep sandy soils.

This soil is used mainly as woodland and as wildlife habitat. A few areas, however, are a good source of gravel and road fill. Management group 26 (VIIe–2).

Caswell Series

In the Caswell series are nearly level, moderately well drained soils that formed in roughly stratified sandy and silty sediment. These soils are in broad shallow depressions along drainageways on terraces and in tracts next to lakes and muskegs. The vegetation is dominantly black spruce, scattered paper birch, and willow. Elevation ranges from 50 to 500 feet. Caswell soils generally are near well-drained Delyndia and Nancy soils on terraces.

In a representative profile a fairly thick mat of roots, moss, and decomposing organic matter overlies a layer of grayish silt loam about 1½ inches thick. The subsoil, about 12 inches thick, is mottled. It generally is dark reddish-brown silt loam in the uppermost 2 or 3 inches and light olive-brown sand and olive loamy sand below. The underlying material is roughly stratified olive and light olive-brown silty and sandy sediment over very gravelly sand at a depth of about 32 inches.

Caswell soils are wooded and are used as wildlife habitat.

Caswell silt loam (0 to 3 percent slopes) (Ca).—This is the only Caswell soil mapped in the survey area. It is in broad depressions and along drainageways, large lakes, muskegs, and flood plains.

Representative profile (1,200 feet north and 100 feet east of the northwest corner of sec. 35, T. 16 N., R. 5 W.):

O1—3 to 1 inch, dark reddish-brown (5YR 2/2) mat of coarse partly decomposed forest litter and moss; many fine roots; extremely acid; abrupt, wavy boundary.
O2—1 inch to 0, black (5YR 2/1) finely divided organic matter; many fine roots; mycelia; many charcoal fragments; extremely acid; abrupt, wavy boundary.
A2—0 to 1½ inches, gray (10YR 5/1) silt loam; common, medium, prominent mottles of dark brown (7.5YR 3/2); weak, thin, platy structure; very friable; common roots; a few small pockets of sand; very strongly acid; abrupt, irregular boundary.
B21—1½ to 4 inches, dark reddish-brown (5YR 3/3 silt loam; common, coarse, distinct mottles of dark yellowish brown (10YR 4/4); weak, medium, subangular blocky structure that breaks to weak, fine, granular; very friable; common roots; a few, fine, hard concretions; very strongly acid; clear, wavy boundary.
B22—4 to 9 inches, light olive-brown (2.5Y 5/4) sand; common, coarse, distinct mottles of dark yellowish brown (10YR 3/4); single grain; loose; about 30 percent of mass consists of large convoluted pockets or patches of dark-brown, olive-brown, and grayish-brown silt loam; massive; very friable; slightly smeary when rubbed between the fingers; common roots; very strongly acid; clear, wavy boundary.
B3—9 to 14 inches, olive (5Y 4/3) loamy sand; single grain; loose; weakly cemented convoluted streaks of dark brown (5YR 3/3) and brown (7.5YR 4/4) make up about 40 percent of the horizon; a few roots; a few pebbles; very strongly acid; abrupt, wavy boundary.
C1—14 to 20 inches, olive (5Y 4/3) very fine sandy loam; common, medium, prominent mottles of brown (7.5YR 4/4); weak, medium, platy structure; a few roots; strongly acid; clear, smooth boundary.
C2—20 to 23 inches, light olive-brown (2.5Y 5/6) sand; common, medium, distinct mottles of brown (7.5YR 4/4); single grain; loose; a few roots; strongly acid; abrupt, smooth boundary.
C3—23 to 32 inches, olive (5Y 5/3) silt loam; common, fine, prominent mottles of reddish brown (5YR 4/4) around old root channels; moderate, thin, platy structure; friable; a few roots; a few, thin, roughly horizontal strata of fine sand; a few rounded pebbles; strongly acid; clear, smooth boundary.

IIC4—32 to 40 inches, olive (5Y 4/3) very gravelly sand; single grain; loose; a few weakly cemented streaks of brown (7.5YR 4/4); large compact pockets of iron-coated gravel; strongly acid.

The roughly stratified silty and sandy sediment range from 30 to 40 inches thick over very gravelly sand. The silty and sandy strata vary in number, thickness, and arrangement. In places a layer of moderately firm silt loam as much as several inches thick overlies the very gravelly substratum. In places rounded pebbles and gravel make up as much as 15 percent of the mass in the lower part of the stratified sediment. The very gravelly substratum is closely packed and contains many cobblestones and iron stains.

Permeability and available moisture capacity are moderate in this Caswell soil. Plant roots can penetrate to a depth of about 30 inches. Runoff is slow. The water table generally is at a depth of more than 30 inches, but it rises to within a few inches of the surface for short periods.

Included with this soil in mapping are small spots of poorly drained soils of the Coal Creek, Killey, and Moose River series. Also included are small areas of soils that are shallow to very gravelly material.

Most of this Caswell soil is wooded and is used as wildlife habitat. The trees, dominantly black spruce, grow slowly and have little commercial value. If cleared, areas of this soil would be suitable for growing oats, barley, perennial grasses, potatoes, and other hardy vegetables. Management group 5 (IIw–1).

Chena Series

In the Chena series are nearly level, excessively drained soils on alluvial plains along the edges of major streams of the survey area. These soils formed in a very thin mantle of silty and fine sandy sediment laid down by water over thick deposits of very gravelly sand. The vegetation is mainly paper birch, white spruce, cottonwood, willow, and alder. Elevation ranges from 50 to 400 feet. Chena soils generally are near Niklason and Susitna soils.

In a representative profile a mat of decomposing organic matter about 2 inches thick overlies a thin layer of very dark grayish-brown silt loam. Below is about 10 inches of dark grayish-brown fine sandy loam and olive-gray loamy sand. The underlying material is loose very gravelly sand that extends to a depth of more than 40 inches.

The acreage of these Chena soils is wooded and is used as wildlife habitat, as woodland, and for recreational purposes.

Chena fine sandy loam (0 to 3 percent slopes) (Ch).—This is the only Chena soil mapped in the survey area. It occupies a few scattered tracts on or along the edges of flood plains of the major streams.

Representative profile (about 500 feet south and 500 feet east of the northeast corner of sec. 7, T. 23 N., R. 4 W.):

O1—2 inches to 0, very dark brown (10YR 2/2) mat of decomposing organic matter; many roots; very strongly acid; abrupt, wavy boundary.

A1—0 to 1½ inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; many roots; strongly acid; clear, wavy boundary.

C1—1½ to 6 inches, dark grayish-brown (2.5Y 4/2) fine sandy loam; weak, fine, granular structure; very friable; common roots; medium acid; clear, wavy boundary.

C2—6 to 11 inches, olive-gray (5Y 4/2) loamy sand; single grain; loose; common roots; medium acid; gradual boundary.

IIC3—11 to 40 inches, olive-gray (5Y 4/2) very gravelly sand; single grain; loose; many rounded stones and cobblestones; medium acid.

The mantle of loamy and sandy sediment ranges from about 5 to 12 inches thick over very gravelly sand. The surface layer ranges from silt loam to very fine sandy loam in texture. In places rounded stones and cobblestones are on or near the surface.

Permeability is rapid in this soil, and available moisture capacity is low. The water table generally is at a depth of more than 4 feet, but small areas are flooded occasionally for short periods. Runoff is slow, and the hazard of erosion is slight.

Included with this soil in mapping are patches of Niklason and Susitna soils. Also included are a few small areas of Mixed alluvial land that are flooded occasionally.

Most of this Chena soil is wooded and is used as wildlife habitat, but a few areas support stands of cottonwood and white spruce that are suitable for logging. A few small areas next to streams and roads are used for such recreational activities as overnight camping, picnicking, and hiking. In places the hazard of occasional flooding is a moderate limitation for intensive recreational activities. If cleared, this soil is well suited to perennial grasses for hay or pasture. It is too shallow and droughty for good growth of row crops. Management group 22 (VIs–1).

Chulitna Series

The Chulitna series consists of nearly level and undulating to rolling, well-drained silt loams. Some of these soils are on high terraces, and others are on low moraines. The vegetation is mainly paper birch and white spruce. Elevation ranges from 300 to 1,000 feet. Generally, these soils are near soils of the Rabideux series.

In a representative profile a mat of decomposing organic material and roots overlies a surface layer of gray silt loam about 1 to 2 inches thick. The subsoil is dark reddish-brown to olive-brown silt loam to a depth of about 21 inches. The underlying material is olive silt loam to a depth of about 37 inches and loose, coarse, olive-gray very gravelly sand below.

Most of the acreage of these soils is wooded and is used mainly as wildlife habitat. In a few places, however, white spruce and paper birch are harvested to provide fuel and logs for local use (fig. 2). Also, several small areas have been cleared for use as cropland.

Chulitna silt loam, undulating (3 to 7 percent slopes) (ClB).—This soil has the profile described as representative of the series. It is on high terraces and moraines. Slopes are short.

Representative profile (NW¼SW¼ sec. 10, T. 24 N., R. 5 W.):

O1—3 inches to 0, dark reddish-brown (5YR 2/2) mat of partly decomposed forest litter; many fine roots; mycelia; extremely acid; abrupt, wavy boundary.

A2—0 to 2 inches, gray (10YR 5/1) silt loam; weak, thin, platy structure; friable; many roots; a few streaks of very dark grayish brown (10YR 3/2); very strongly acid; abrupt, irregular boundary.

B21—2 to 4 inches, dark reddish-brown (2.5YR 2/4) silt loam; moderate, fine, granular structure; very friable; many roots; many, very fine, hard concretions; a few weakly cemented fragments in the uppermost one-half inch; very strongly acid; clear, wavy boundary.

Figure 2.—A homesteader's cabin on a Chulitna silt loam.

B22—4 to 9 inches, reddish-brown (5YR 4/4) silt loam; streaks and patches of strong brown (7.4YR 5/6) and dark yellowish brown (10YR 4/4); weak, medium, subangular blocky structure, very friable; common roots; very strongly acid; abrupt, wavy boundary.

A2b—9 to 10½ inches, grayish-brown (2.5Y 5/2) silt loam; a few streaks of very dark gray (10YR 3/1); weak, thin, platy structure; friable; thin discontinuous bands of very dark gray (10YR 3/1) at surface of horizon; common roots; very strongly acid; abrupt, wavy boundary.

B2b—10½ to 16 inches, dark-brown (7.5YR 3/4) silt loam; a few patches of dark yellowish brown (10YR 4/4); a few isolated pockets of material from the A2b horizon; weak, fine, subangular blocky structure; friable; a few roots; strongly acid; clear, wavy boundary.

B3b—16 to 21 inches, olive-brown (2.5Y 4/4) silt loam; patches of yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4); a few, fine, distinct mottles of dark brown (7.5YR 4/4) around old root channels; weak, fine, subangular blocky structure; friable; a few roots; strongly acid; gradual boundary.

C1—21 to 37 inches, olive (5Y 4/3) silt loam; massive; friable; a few patches of dark grayish brown (2.5Y 4/2); a few, fine pores; a few charcoal fragments; discontinuous lenses of fine sand at base of horizon; a few roots; strongly acid; clear, smooth boundary.

IIC2—37 to 44 inches, olive-gray (5Y 4/2) very gravelly sand; single grain; loose; many rounded stones and cobblestones; strongly acid.

The combined thickness of the two sequences ranges from about 18 to 25 inches. These sequences generally formed entirely in silt loam, but in places the lower part formed in very fine sandy loam. The mantle of silt loam ranges from 30 to 40 inches in thickness and is underlain by loose very gravelly sand or sand. In places in the northwestern part of the survey area this mantle is underlain by very gravelly glacial till that is moderately compact.

Permeability is moderate in this soil, and available moisture capacity is moderate to high. Plant roots can penetrate to a depth of about 30 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate.

Included with this soil in mapping are small tracts of Rabideux soils. Also included are a few poorly drained spots.

Most of this Chulitna soil is wooded. It is suitable for growing paper birch and white spruce for commercial uses and also for growing oats, barley, perennial grasses, potatoes, and hardy vegetables. It is also suitable for use as wildlife habitat and for intensive recreational areas, such as picnic grounds, campsites, and playgrounds. Management group 4 (IIe–2).

Chulitna silt loam, nearly level (0 to 3 percent slopes) (ClA).—This soil is on high terraces in the southern third of the survey area.

Permeability and available moisture capacity are moderate in this soil, and runoff is slow. Roots can penetrate to a depth of 30 inches.

Included with this soil in mapping are small areas of Rabideux soils that are moderately deep over sand or very gravelly sand. Also included, in the northwestern part of the survey area, are many spots of somewhat poorly drained Kalifonsky soils. In addition, several large areas of a deep, moderately well drained soil north of Talkeetna are included. This soil contains a few strata of fine sand and has a firm substratum that contains many rounded pebbles.

Most of this Chulitna soil is wooded, but a few areas have been cleared for cultivation. The principal crops are bromegrass, timothy, oats, barley, potatoes, and hardy garden vegetables. The wooded areas are suitable for use as wildlife habitat. The better stands of paper birch and white spruce have some commercial value. Much of the paper birch is average, however, and the white spruce trees generally are scattered. This soil is also suitable for such intensive recreational use as campsites, picnic grounds, and playgrounds. Management group 2 (IIc–2).

Chulitna silt loam, rolling (7 to 12 percent slopes) (ClC).—This soil is on low moraines. Included in mapping are a few areas of a hilly soil, a few small wet depressions, and small tracts of Rabideux soils that are moderately deep over very gravelly material.

Permeability is moderate in this Chulitna soil, and available moisture capacity is moderate to high. Plant roots can penetrate to a depth of 30 inches. Runoff is medium, and the hazard of water erosion is moderate.

Most of this Chulitna soil is wooded, but a few areas have been cleared for cultivation. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. Commercial stands of paper birch and white spruce can be grown on this soil. The vegetation provides suitable habitat for wildlife. Management group 7 (IIIe–2).

Clunie Series

In the Clunie series are nearly level, very poorly drained peats that are underlain by moderately fine textured tidal sediment. These soils are in broad depressions on tidal plains. The vegetation is mainly sedges, rushes, mosses, and low-growing shrubs that commonly grow in muskeg areas. Elevation ranges from 0 to 25 feet. Clunie soils generally are bordered by large tracts of Tidal marsh.

In a representative profile a Clunie soil consists of very dark gray to dark-brown, coarse peat to a depth of about 37 inches. Below is gray silty clay loam tidal sediment.

Most of the acreage of these soils is used as wildlife habitat.

Clunie peat (0 to 3 percent slopes) (Cn).—This is the only Clunie soil mapped in the survey area. It is in shallow depressions on tidal plains.

Representative profile (NW¼NW¼ sec. 6, T. 14 N., R. 6 W.):

Oi1—0 to 18 inches, very dark gray (10YR 3/1) to grayish-brown (10YR 5/2, squeezed dry) mat of live sphagnum moss and very coarse peat made up of slightly decomposed moss, sedge leaves, and woody particles; many roots; contains a few patches of peat that have thin, grayish silt coatings; medium acid; gradual, smooth boundary.

Oi2—18 to 37 inches, dark-brown (7.5YR 3/2) to brown (10YR 4/3, squeezed dry) coarse sedge peat interlayered with moss peat; a few woody particles; several thin strata of grayish silty clay loam; slightly acid; abrupt, smooth boundary.

C—37 to 50 inches, dark greenish-gray (5BG 4/1) silty clay loam; massive; slightly sticky, slightly plastic; neutral.

The peat ranges from 30 to 40 inches in thickness. More than 50 percent of the peat below a depth of 10 inches was derived from sedges. The peat is commonly coated with grayish silt and contains thin strata of silt loam or silty clay loam, but in places the mineral coatings and strata are absent. Reaction ranges from strongly acid to medium acid near the surface, and from slightly acid to neutral below a depth of 10 to 15 inches.

Runoff is very slow on Clunie peat, and a few areas are subject to occasional flooding. The water table is always near the surface. The roots of plants can penetrate to a depth of 15 to 20 inches.

Included with this soil in mapping are a few small ponds. Also included are patches of peat that are more than 40 inches thick, small tracts of Salamatof peat, and a few small areas of greenish-gray tidal sediment.

Clunie peat is used mainly as wildlife habitat, especially for migratory waterfowl. Management group 27 (VIIw–1).

Coal Creek Series

The Coal Creek series consists of nearly level, poorly drained soils that formed in deep silty material washed in from surrounding areas. These soils are on the edges of muskegs and in shallow depressions on terraces and uplands. The vegetation is dominantly tall grasses and scattered sedge tussocks, but black spruce, alder, and willow grow in a few places. Elevation ranges from 50 to 800 feet. These soils generally are near well-drained Chulitna, Nancy, and Rabideux soils and very poorly drained Salamatof soils.

In a representative profile a mat of partly decomposed organic matter about 5 inches thick overlies very dark brown and dark-brown silt loam about 9 inches thick. Below is dark grayish-brown and olive-gray mottled silt loam to more than 45 inches.

Most areas of Coal Creek soils are under natural vegetation and are used as wildlife habitat.

Coal Creek silt loam (0 to 3 percent slopes) (Co).—This is the only Coal Creek soil mapped in the survey area. It is in depressions and along the edges of muskegs.

Representative profile (NE¼SE¼ sec. 13, T. 20 N., R. 5 W.):

O1—5 to 2 inches, very dark brown (10YR 2/2) mat of partly decomposed organic matter; many fine roots; strongly acid; clear, wavy boundary.

O2—2 to 0 inches, black (10YR 2/1) finely divided organic matter; many roots; a few pockets of grayish silt; strongly acid; clear, wavy boundary.

A11—0 to 2 inches, very dark brown (10YR 2/2) silt loam; weak, fine, granular structure; very friable; a few black streaks; many roots; strongly acid; clear, smooth boundary.

A12—2 to 9 inches, dark-brown (10YR 4/3) silt loam; common, medium, distinct, dark reddish-brown mottles; a few streaks of dark grayish brown (2.5Y 4/2); weak, fine, granular structure; very friable, smeary when rubbed between the fingers; common roots; strongly acid; clear, wavy boundary.

C1—9 to 20 inches, dark grayish-brown (2.5Y 4/2) silt loam; patches of olive gray (5Y 5/2); common, medium, prominent, brown (7.5YR 4/4) mottles; weak, medium, platy structure; nonsticky, nonplastic; a few roots; common fine pores; strongly acid; gradual boundary.

C2—20 to 45 inches, olive-gray (5Y 4/2) silt loam; a few streaks of olive brown (2.5Y 4/4); a few, medium, prominent, strong-brown (7.5YR 5/6) mottles; massive; friable, nonplastic; a few rounded pebbles; strongly acid.

The A horizon generally is silt loam, but in places it is mucky silt loam. Under vegetation that is dominantly grasses, the A horizon generally is between 6 to 12 inches thick, but under black spruce it is as little as 3 inches thick. The C horizon is dominantly silt loam, but it is likely to contain thin lenses or a few pockets of fine sand, very fine sand, and silty clay loam. The silt loam is friable to firm below a depth of 20 inches. Common brown to reddish-brown mottles are throughout the profile. In a few places rounded stones occur at shallow or moderate depths.

Permeability is moderate in this soil. The water table generally is below a depth of 30 inches, but it is likely to rise to a depth of less than 12 inches early in spring or after periods of heavy rain. Roots can penetrate to a depth of 20 to 30 inches. Runoff is very slow.

Included with this soil in mapping are a few shallow soils and stony spots. Also included are small tracts of Dinglishna and Lucile soils.

All of Coal Creek silt loam is in natural vegetation and is used as wildlife habitat. Management group 19 (IVw–2).

Delyndia Series

In the Delyndia series are nearly level to hilly, somewhat excessively drained soils on stabilized dunes and high terraces. These soils formed in deep fine sand that had a mantle of silt loam. The vegetation is paper birch, white spruce, and quaking aspen. Elevation ranges from about 25 to 250 feet. Delyndia soils generally are near Kashwitna and Nancy soils.

In a representative profile a thin mat of forest litter overlies a layer of light-gray silt loam, about 1½ inches thick, which rests abruptly on a layer of reddish-brown to strong-brown silt loam about 9 inches thick. Below is dark yellowish-brown loamy fine sand that extends to a depth of about 17 inches. The underlying material is olive-brown fine sand.

Most of the acreage of these soils is wooded, but a few small areas are cleared and are used for crops. The principal crops are hardy vegetables, hay, pasture, oats, and barley. The wooded areas are used as wildlife habitat.

Delyndia silt loam, nearly level (0 to 3 percent slopes) (DeA).—This soil has the profile described as representative of the series. It is on high terraces in the southern part of the Area.

Representative profile (NE¼NW¼ sec. 34, T. 16 N., R. 5 W.):

O1—2 inches to 0, dark reddish-brown (5YR 2/2) mat of partly decomposed forest litter; many roots; very strongly acid; abrupt, wavy boundary.

A2—0 to 1½ inches, light-gray (10YR 6/1) silt loam; weak, very fine, granular structure; very friable; many roots; very strongly acid; abrupt, wavy boundary.

B21—1½ to 3 inches, reddish-brown (5YR 4/4) silt loam; a few patches of dark reddish brown (5YR 3/3); moderate, fine, granular structure; very friable; a few fine concretions; many roots; very strongly acid; clear, wavy boundary.

B22—3 to 7 inches, strong-brown (7.5YR 5/6) silt loam; streaks and patches of brown (10YR 4/3); weak, fine, granular structure; very friable; common roots; very strongly acid; abrupt, wavy boundary.

A2b—7 to 8½ inches, grayish-brown (10YR 5/2) silt loam; weak, thin, platy structure; very friable; common roots; very strongly acid; abrupt, wavy boundary.

B2b—8½ to 11 inches, brown (7.5YR 4/4) very fine sandy loam; weak, fine, granular structure; very friable; common roots; very strongly acid; clear, wavy boundary.

IIB3b—11 to 17 inches, dark yellowish-brown (10YR 4/4) loamy fine sand; a few very weakly cemented streaks and patches of brown (10YR 4/3); single grain; loose when disturbed; a few roots; strongly acid; gradual boundary.

IIC—17 to 40 inches, olive-brown (2.5Y 4/4) fine sand; a few streaks of brown (10YR 4/3) to a depth of 30 inches; single grain; loose; a few strata of medium and coarse sand below a depth of 30 inches; a few rounded pebbles; strongly acid.

The mantle of silt loam ranges from about 7 to 12 inches thick under the leached gray A horizon. The B horizon ranges from dark yellowish brown to brown in color. In places this horizon contains a few weakly cemented fragments of dark reddish brown. In places the substratum contains a few strata of silt, rounded pebbles, pockets of coarse sand, and very weakly cemented brownish streaks.

Permeability is rapid in this soil, and available moisture capacity is low. Plant roots can penetrate to a depth of 30 inches. Runoff is slow. Fertility is low.

Included with this soil in mapping are patches of Kashwitna and Nancy soils. Also included are small areas of moderately well drained Caswell soils, a few areas of undulating Delyndia soils, and scattered wet spots.

Most of this Delyndia soil is wooded, but a few small areas are cleared and are used for crops. The principal crops are garden vegetables, perennial grasses, hay, pasture, oats, and barley. The wooded areas are used mainly as wildlife habitat, but in a few places trees are harvested to provide logs and fuel for local use. Management group 11 (IIIs–3).

Delyndia silt loam, undulating (3 to 7 percent slopes) (DeB).—This soil is on high terraces and low scattered dunes in the southern part of the survey area. Slopes are short.

Permeability is rapid, and available moisture capacity is low. Plant roots can penetrate to a depth of 30 inches. Runoff is slow. Fertility is low.

Included with this soil in mapping are patches of Caswell, Homestead, Kashwitna, and Nancy soils. Also included are a few wet spots and a few areas where slopes are short and as steep as 12 percent.

Most of this Delyndia soil is wooded and is used principally as wildlife habitat. In a few places, however, trees are harvested to provide logs and fuel for local use. A few cabins and homesteads have been built in widely scattered areas. Management group 8 (IIIe–3).

Delyndia silt loam, rolling (7 to 12 percent slopes) (DeC).—This soil occupies a few low knolls and ridges on terraces and also a few low stabilized dunes.

Permeability is rapid, and available moisture capacity is low. Plant roots can penetrate to a depth of 30 inches. Runoff is slow to moderate, and the hazard of water erosion is moderate. Fertility is low.

Included with this soil in mapping are a few very sandy spots and small undulating tracts. Also included are small areas of Homestead, Kashwitna, and Nancy soils.

All of this Delyndia soil is wooded and is used mainly as wildlife habitat. Management group 8 (IIIe–3).

Delyndia silt loam, hilly (12 to 20 percent slopes) (DeD).—This soil is in a few small tracts on terraces and low stabilized dunes.

Permeability is rapid, and available moisture capacity is low. Plant roots can penetrate to a depth of 30 inches. Runoff is medium, and the hazard of water erosion is severe. Fertility is low.

Included with this soil in mapping are a few very sandy spots and a few areas where slopes are short and as steep as 20 to 30 percent. Also included are a few small tracts of Kashwitna and Nancy soils.

Most of this Delyndia soil is wooded and is used as wildlife habitat. Management group 17 (IVe–4).

Delyndia-Salamatof complex (0 to 3 percent slopes) (Dm).—The soils of this complex are near the edges of several large muskegs in the southern part of the survey area. About 40 to 50 percent of this unit generally is Delyndia soils, and about 30 to 40 percent is Salamatof soils. Making up the remaining percentage are patches of Caswell, Dinglishna, and Moose River soils. The Delyndia and Salamatof soils each has the profile described as representative of its respective series.

Delyndia soils are on low knolls that generally range from 1 to 2 acres in size. The knolls are separated by a network of narrow tracts of Salamatof peats. The Caswell, Dinglishna, and Moose River soils are in narrow areas between areas of Delyndia and Salamatof soils.

Delyndia soils are wooded, and the vegetation is dominantly paper birch and white spruce. Salamatof peats are covered by moss, low shrubs, and scattered patches of stunted black spruce. The soils in this unit are used mainly as wildlife habitat. Management group 27 (VIIw–1).

Dinglishna Series

In the Dinglishna series are nearly level, poorly drained soils on or near the edges of large muskegs. These soils formed in sandy sediment that contains a few strata and pockets of silty material. The vegetation is dominantly moss, sedges, low shrubs, and scattered black spruce. Elevation ranges from 25 to 200 feet. These soils generally are near Delyndia, Moose River, and Salamatof soils.

In a representative profile a mat of partly decomposed moss and organic material about 4 to 10 inches thick is on the surface. The upper mineral layer is gray sandy loam, about 6 inches thick, that rests abruptly on a layer of very dusky red loamy sand about 8 inches thick. The material below is very dusky red strongly cemented sand.

All areas of Dinglishna soils are covered by native vegetation and are used as wildlife habitat.

Dinglishna sandy loam (0 to 3 percent slopes) (Dn).—This is the only Dinglishna soil mapped in the survey area. It is near the edges of large muskegs.

Representative profile (1,300 feet south and 600 feet east of northwest corner of sec. 33, T. 16 N., R. 5 W.):

O1—6 inches to 0, black (10YR 2/1) mat of partly decomposed moss, leaves, twigs, and other plant parts; many roots; very strongly acid; abrupt, wavy boundary.

A2—0 to 6 inches, gray (10YR 5/1) sandy loam; massive; friable; a few roots; a few pockets of silt loam; very strongly acid; abrupt, wavy boundary.

B21—6 to 14 inches, very dusky red (2.5YR 2/2) loamy sand; single grain; loose; many, fine and medium, hard concretions; very strongly acid; abrupt, wavy boundary.

B22—14 to 20 inches, very dusky red (2.5YR 2/2) sand; strongly cemented; very strongly acid; a few thin black bands and streaks.

The profile is dominantly sandy throughout, but the uppermost part contains common pockets and strata of silty material. In places a layer of dark silt loam or mucky silt loam about 3 inches thick underies the mat of organic material. The A horizon and the uppermost part of the B horizon generally are churned by frost action. The strongly cemented B22 horizon generally is more than 6 inches thick and is likely to contain lenses of loose, gray fine sand.

The strongly cemented material in the lower part of the subsoil is very slowly permeable. Penetration of plant roots generally is restricted to the organic mat on the surface, but a few roots can penetrate to a depth of about 12 inches. The water table is near the surface during most of the growing season, but at times it drops to a depth of about 12 or 24 inches for short periods. Runoff is very slow, and occasional ponding occurs in a few places.

Included with this soil in mapping are many patches of Moose River and Salamatof soils. Also included are a few small tracts of Caswell and Delyndia soils.

This Dinglishna soil supports vegetation that is used as wildlife habitat. Management group 24 (VIw–2).

Dinglishna-Moose River complex (0 to 3 percent slopes) (Dr).—The soils in this complex occupy irregular patches near the edges of large muskegs. About 30 to 40 percent of this unit generally is Dinglishna soils, and about 20 to 30 percent is Moose River soils. Making up the remaining percentage are Salamatof, Caswell, and Delyndia soils. The Dinglishna and Moose River soils each has the profile described as representative of its respective series.

Dinglishna soils occupy positions on knolls that are elevated about a foot above areas of Moose River soils. The knolls are between areas of Moose River soils in small depressions. Patches of Salamatof peats are in narrow depressions, and irregular tracts of Caswell soils are in slightly elevated positions. A few spots of Delyndia soils are on knolls and very narrow ridges.

The soils in this unit are almost treeless, but scattered black spruce grows in places. These soils generally have a thick ground cover of moss, low shrubs, sedges, rushes, and scattered patches of willow and alder brush. The vegetation is used mainly as wildlife habitat. Management group 24 (VIw–2).

Flat Horn Series

The Flat Horn series consists of nearly level to undulating, well-drained soils on terraces. These soils formed in stratified silty and fine sandy sediment capped by a mantle of silt loam. The vegetation is dominantly paper birch and white spruce. Elevation ranges from 50 to 400 feet. These soils generally are near soils of the Nancy and Delyndia series.

In a representative profile a mat of decomposing forest litter overlies a surface layer of gray silt loam, about 2 inches thick, over reddish-brown to strong-brown silt loam about 6 inches thick. Below is dark yellowish-brown fine sandy loam and olive-brown, stratified fine sand and silt that extend to a depth of about 21 inches. The underlying material is olive, stratified fine sand and silt.

Most areas of Flat Horn soils are wooded and are used as wildlife habitat and for recreation. A few small areas have been cleared for cultivation, and the principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables.

Flat Horn silt loam, nearly level (0 to 3 percent slopes) (FhA).—This soil has the profile described as representative of the series. It occupies fairly large tracts on terraces next to major streams in the survey area.

Representative profile (NW¼SW¼ sec. 22, T. 20 N., R. 6 W.):

O1—3 inches to 0, dark reddish-brown (5YR 2/2) mat of partly decomposed forest litter and moss; many fine roots; very strongly acid; abrupt, wavy boundary.

A2—0 to 2 inches, gray (10YR 5/1) silt loam; weak, thin, platy structure; very friable; many roots; very strongly acid; abrupt, wavy boundary.

B21—2 to 3½ inches, reddish-brown (5YR 4/4) silt loam; weak, fine, granular structure; very friable; many fine roots; a few fine concretions; very strongly acid; clear, wavy boundary.

B22—3½ to 8 inches, brown (7.5YR 4/4) and strong-brown (7.5YR 5/6) silt loam; a few small patches of yellowish brown; weak, fine, subangular blocky structure; very friable; common roots; strongly acid; abrupt, wavy boundary.

A2b—8 to 9 inches, grayish-brown (2.5Y 5/2) silt loam; weak, fine, subangular blocky structure; friable; common roots; strongly acid; abrupt, broken boundary.

IIB2b—9 to 15 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; patches of brown (7.5YR 4/4) and yellowish brown (10YR 5/4); weak, medium, subangular blocky structure; friable; common roots; strongly acid; clear, smooth boundary.

IIB3b—15 to 21 inches, olive-brown (2.5YR 4/4), stratified fine sand and silt; strata are well sorted and range from ¼ inch to 2 inches in thickness; fine sand is single grain, loose; silt is weak, medium, subangular blocky and is friable; a few roots; strongly acid; gradual boundary.

IIC—21 to 40 inches, olive (5Y 4/3), stratified fine sand and silt; strata are well sorted and range from ½ inch to 4 inches in thickness; fine sand is single grain, loose; silt is massive, friable; a few weakly cemented streaks of dark yellowish brown (10YR 4/4) in fine sand; a few roots to a depth of 30 inches; strongly acid.

The capping of silt loam ranges from 8 to 15 inches in thickness and overlies stratified silty and sandy sediment. In places a few pebbles and pockets of coarse sand occur below a depth of 25 inches.

Permeability and available moisture capacity are moderate in this Flat Horn soil. Roots can penetrate to a depth of 30 inches. Runoff is slow.

Included with this soil in mapping are patches of Nancy, Caswell, Delyndia, and Schrock soils.

Most of this Flat Horn soil is wooded and is used as wildlife habitat. Small areas, however, are cleared and used as cropland and pasture. The principal crops are bromegrass, oats, barley, potatoes, and hardy garden vegetables. Management group 1 (IIc–1).

Flat Horn silt loam, undulating (3 to 7 percent slopes) (FhB).—This soil is on broad terraces along the edges of major streams in the survey area.

Permeability and available moisture capacity are moderate in this soil. Plant roots can penetrate to a depth of 30 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate.

Included with this soil in mapping are patches of Nancy, Delyndia, Caswell, and Moose River soils. Also included are a few wet spots and a few soils that have slopes that range to 12 percent.

Most of this Flat Horn soil is wooded, but several small tracts are cleared and used as cropland and pasture. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. The wooded areas are used mainly as wildlife habitat, though in a few places paper birch and white spruce are harvested to provide logs and fuel for local use. In addition, a few areas are suitable for limited recreational uses as sites for camps, cabins, and trails. Management group 3 (IIe–1).

Gravelly Alluvial Land

Gravelly alluvial land (Ga) consists mainly of loose, coarse, very gravelly and stony, water-laid sediment. It is on flood plains and low-lying islands along the major rivers and streams of the survey area. In places the sediment is covered by recent deposits of grayish silty and fine sandy material. The areas are dissected by many secondary stream channels and sloughs and generally are flooded several times a year. Included in mapping are small areas of Chena and Niklason soils.

Part of Gravelly alluvial land is barren of vegetation, but willow brush, alder thickets, patches of grass, and scattered cottonwoods grow in many places. This land type is used chiefly as wildlife habitat. The willows provide excellent browse for moose, which frequent the areas in winter. Management group 32 (VIIIw–1).

Gravel Pits

Gravel pits (Gv) consist of excavations that are more than 3 acres in size. These pits generally are well drained, but a few are intermittently ponded.

Most areas of Gravel pits are barren of vegetation, though a few areas support sparse stands of shrubs and seedling trees. Gravel pits near rivers and streams are often used as temporary campsites. Areas of Gravel pits that are less than 3 acres in size are shown on the detailed map by the conventional symbol for gravel pits. Management group 31 (VIIIs–1).

Homestead Series

In the Homestead series are nearly level to moderately steep, well drained and moderately well drained soils that formed in a thin mantle of silt loam over very gravelly glacial drift. These soils are on outwash plains and moraines. The vegetation is dominantly paper birch, white spruce, and quaking aspen. In a few shallow depressions where the soils are moderately well drained, the vegetation consists of black spruce and a ground cover of moss. Elevation ranges from 100 to 600 feet. These soils generally are near soils of the Lucile, Kashwitna, and Jacobsen series.

In a representative profile a mat of decomposing organic material, about 2 inches thick, overlies a surface layer of gray silt loam about 1 inch thick. This horizon rests abruptly on patchy strong-brown and yellowish-brown silt loam about 6 inches thick. Below is yellowish-brown to olive-brown gravelly and very gravelly sand.

Most areas of Homestead soils are wooded, but a few areas are cleared and are used chiefly for hay and pasture. The wooded areas are used mainly as wildlife habitat, though in places paper birch and white spruce are harvested to provide logs and fuel. Also, a few areas are used for recreation and as a source of sand, gravel, and road fill.

Homestead silt loam, nearly level (0 to 3 percent slopes) (HoA).—This soil has the profile described as representative of the series. It occupies a few tracts on outwash plains.

Representative profile (SW¼NW¼ sec. 27, T. 20 N., R. 4 W.):

O1—2 inches to 0, dark reddish-brown (5YR 2/2) mat of decomposing organic material; many fine roots; very strongly acid; abrupt, wavy boundary.

A2—0 to 1 inch, gray (10YR 5/1) silt loam; weak, thin, platy structure; very friable; common roots; very strongly acid; abrupt, wavy boundary.

B21—1 to 3½ inches, strong-brown (7.5YR 5/6) silt loam; many large patches of dark yellowish brown (10YR 4/4); weak, fine, granular structure; very friable; a few, fine, dark concretions; common roots; very strongly acid; clear, wavy boundary.

B22—3½ to 7 inches, yellowish-brown (10YR 5/4) silt loam; a few patches of dark yellowish brown; very weak, fine, granular structure; very friable; a few rounded pebbles; a few small pockets of volcanic ash; common roots; strongly acid; clear, smooth boundary.

IIB3—7 to 11 inches, yellowish-brown (10YR 5/6) gravelly coarse sand; single grain; loose; common roots; a few cobblestones; strongly acid; gradual boundary.

IIC—11 to 28 inches, olive-brown (2.5Y 4/4) very gravelly sand; single grain; loose; many cobblestones; strongly acid.

The A2 horizon is gray or light gray in color and ranges from 1 to 2 inches in thickness. The B2 horizon is dark yellowish brown to strong brown in color and ranges from 5 to 9 inches in thickness. In places the B2 horizon is reddish brown. Mottles occur throughout the profile. The mantle of silt loam ranges from 5 to 10 inches in thickness. In places a layer of waterworked sand as much as 15 inches thick is between the silt loam and the underlying gravelly sand. The underlying material generally is loose, but in places it is compact and contains a small amount of finer material.

Permeability is moderate in the silt loam and rapid in the very gravelly material in the substratum. Available moisture capacity is low. Plant roots can penetrate to a depth of 15 inches. Runoff is slow.

Included with this soil in mapping are small tracts of soils of the Coal Creek, Jacobsen, Kashwitna, Lucile, and Salamatof series.

Most of this Homestead soil is wooded, but a few areas are cleared and are seeded to perennial grasses for hay and pasture. The wooded areas are used chiefly as wildlife habitat. A few paper birch and white spruce, however, are harvested for logs. This soil provides recreational sites for camps, cabins, and trailers. It also is a source of gravel, sand, and road fill. Management group 16 (IVe–3).

Homestead silt loam, undulating (3 to 7 percent slopes) (HoB).—A few scattered areas of this soil are on outwash plains and on low moraines.

Permeability is moderate in the surface layer of this soil, and it is rapid in the substratum. Available moisture capacity is low. Plant roots can penetrate to a depth of 15 inches. Runoff is slow, and the hazard of water erosion is slight.

Included with this soil in mapping are a few small areas of Coal Creek, Lucile, Jacobsen, and Kashwitna soils.

Most of this Homestead soil is wooded, but small areas are cleared and are used mainly for hay and pasture. The wooded areas are used chiefly as wildlife habitat. In places, however, a few trees are harvested to provide logs and fuel. Recreational use of this soil is limited to a few cabins, several temporary campsites, and trails. In addition, areas of this soil are a source of gravel, sand, and road fill. Management group 16 (IVe–3).

Homestead silt loam, rolling (7 to 12 percent slopes) (HoC).—This soil is on moraines. Slopes are short and irregular.

Permeability is moderate in the surface layer and rapid in the substratum. Available moisture capacity is low. Plant roots can penetrate to a depth of 15 inches. Runoff is medium, and the hazard of erosion is moderate.

Included with this soil in mapping are a few small depressions where drainage is poor. Also included are a few small tracts of Kashwitna soils.

Most of this Homestead soil is wooded, though a few small areas are cleared and are seeded to perennial grasses for hay and pasture. The wooded areas are used mainly as wildlife habitat, but in a few places paper birch and white spruce are harvested to provide logs and fuel. Recreational use of this soil is limited to a few cabins, small campsites, and trails. In several places the gravelly material in the substratum is a source of gravel, sand, and road fill. Management group 16 (IVe–3).

Homestead silt loam, hilly (12 to 20 percent slopes) (HoD).—This soil is on a few moraines. Slopes are short and choppy.

Permeability is moderate in the thin capping of silty material and rapid in the very gravelly substratum. Available moisture capacity is low. Plant roots can penetrate to a depth of 15 inches. Runoff is moderate to rapid, and the hazard of water erosion is severe.

Included with this soil in mapping are a few moderately steep slopes and wet spots. Also included are small tracts of soils of the Kashwitna series.

Most of this Homestead soil is wooded. Several small tracts, however, are cleared and are used for hay and pasture. The wooded areas are used mainly as wildlife habitat, but in a few places paper birch and white spruce are harvested to provide logs. Areas of this soil near lakes are used for recreational cabins and a few campsites. In addition, the very gravelly material in the substratum is a source of sand, gravel, and road fill. Management group 21 (VIe–2).

Homestead silt loam, moderately steep (20 to 30 percent slopes) (HoE).—This soil is on a few moraines. Slopes are short and choppy.

Permeability is moderate in the thin mantle of silty material and rapid in the very gravelly substratum. Available moisture capacity is low. Plant roots can penetrate to a depth of 15 inches. Runoff is rapid, and the hazard of erosion is severe.

Included with this soil in mapping are a few short steep slopes. Also included are a few small wet depressions.

Most of this Homestead soil is wooded and is used mainly as wildlife habitat. In a few places, however, the very gravelly material in the substratum is a source of sand, gravel, and road fill. Management group 21 (VIe–2).

Jacobsen Series

In the Jacobsen series are nearly level, poorly drained soils that formed in very stony silt loam alluvium and colluvium. These soils are in depressions and in areas along streams, lakes, and muskegs. The vegetation is dominantly moss, low shrubs, and scattered clumps of willow, alder, and black spruce. Elevation ranges from 100 to 1,000 feet. These soils generally are near soils of the Kalifonsky, Salamatof, and Slikok series.

In a representative profile, under a black mat of moss, roots, and other decomposing organic material, a Jacobsen soil consists of dark grayish-brown to dark olive-gray very stony silt loam that extends to a depth of 27 inches or more.

Most areas of Jacobsen soils are under vegetation and are used as wildlife habitat.

Jacobsen very stony silt loam (0 to 3 percent slopes) (Ja).—This is the only Jacobsen soil mapped in the survey area. It is in small scattered depressions and in areas along small streams, muskegs, and lakes.

Representative profile (SE¼NE¼ sec. 6, T. 24 N., R. 4 W.):

O1—9 inches to 0, black (10YR 2/1) mat of decomposing moss, twigs, and leaves; many roots; very strongly acid; clear, smooth boundary.

C1g—0 to 8 inches, dark grayish-brown (2.5Y 4/2) very stony silt loam; massive; slightly sticky, nonplastic; stones and cobblestones make up 50 to 70 percent of the soil mass; common roots; very strongly acid; gradual boundary.

C2g—8 to 27 inches, dark olive-gray (5Y 3/2) very stony silt loam; patches of yellowish brown (10YR 4/4); massive; slightly sticky, slightly plastic; stones and cobblestones make up 50 to 80 percent of the soil mass; a few roots to a depth of 18 inches; a few pockets of gravel and sand; very strongly acid.

The stones in the silty material are rounded. In places the texture is very stony loam.

Permeability is moderate in this soil. The water table generally is at a depth of less than 2 feet, and the soil is moist throughout the growing season. Plant roots can penetrate to a depth of 18 inches. Runoff is very slow.

All of this soil is in native vegetation and is used mainly as wildlife habitat. Management group 28 (VIIw–2).

Kalifonsky Series

The Kalifonsky series consists of nearly level, poorly drained soils that formed in silty material underlain by very gravelly sand at a depth of 15 to 30 inches. These soils are in depressions and in areas between well-drained soils on uplands and very poorly drained muskegs. The vegetation is dominantly paper birch, black spruce, and alder. Elevation ranges from 200 to 1,000 feet. These soils generally are near soils of the Chulitna and Rabideux series.

In a representative profile a mat of decomposing organic material, about 4 inches thick, overlies a surface layer of dark-brown silt loam about 2 inches thick. Below is olive to olive-gray silt loam that extends to a depth of about 22

inches. It contains brown and olive-brown patches and mottles. The underlying material is olive very gravelly sand.

The acreage of Kalifonsky soils is wooded and is used as wildlife habitat.

Kalifonsky silt loam (0 to 3 percent slopes) (Ka).—This is the only Kalifonsky soil mapped in the survey area. It is in the northern part of the Area in scattered depressions and along the edges of muskegs.

Representative profile (SW¼SW¼ sec. 17, T. 26 N., R. 6 W.):

O1—4 inches to 0, dark reddish-brown (5YR 2/2) mat of decomposing organic material; many roots; very strongly acid; abrupt, smooth boundary.
A1—0 to 2 inches, dark-brown (7.5YR 3/2) silt loam; weak, very fine, granular structure; very friable; common roots; a few, fine, black concretions; strongly acid; abrupt, wavy boundary.
C1—2 to 9 inches, olive (5Y 4/3) silt loam; common, medium distinct, brown (10YR 4/3) mottles; massive; very friable; nonsticky, nonplastic; a few roots; strongly acid; clear, wavy boundary.
C2—9 to 22 inches, olive-gray (5Y 5/2) silt loam; common, medium, distinct, brown (7.5YR 4/4) mottles; a few streaks and patches of olive brown; massive; nonsticky, nonplastic; a few roots; strongly acid; clear, smooth boundary.
IIC3—22 to 40 inches, olive (5YR 4/3) very gravelly sand; single grain; loose; a few subrounded stones; strongly acid.

The silty material ranges from 15 to 30 inches in thickness over very gravelly sand or gravelly loamy sand. In places a few rounded stones occur in the lower part of the silty material.

Permeability is moderate in this soil. Plant roots can penetrate to a depth of about 25 inches. Runoff is slow. The water table generally is at a depth between 6 and 40 inches, and the soil is nearly saturated throughout the growing season. Fertility is low.

Included with this soil in mapping are patches of soils of the Chulitna, Lucile, Rabideux, Salamatof, and Slikok series.

This soil is wooded and is used as wildlife habitat. Management group 12 (IIIw–1).

Kashwitna Series

In the Kashwitna series are nearly level to steep, well-drained soils that formed in a thin mantle of silt loam over very gravelly glacial drift. Some of these soils are on terraces, and others are on gravelly moraines. The vegetation is dominantly paper birch, white spruce, and quaking aspen. Elevation ranges from 150 to 600 feet. These soils generally are near soils of the Lucile, Homestead, and Nancy series.

In a representative profile a mat of decomposing forest litter and other organic material overlies a surface layer of gray silt loam about 2 inches thick. The subsoil is dark reddish-brown to strong-brown silt loam about 7 inches thick. Below is dark-brown silt loam and dark yellowish-brown gravelly sandy loam that extend to a depth of about 20 inches. The underlying material is olive very gravelly sand.

Most of the acreage of Kashwitna soils is wooded, but a few areas have been cleared for use as cropland. The principal crops are bromegrass, oats, barley, and hardy vegetables. The wooded areas are used as wildlife habitat. Recreational uses are limited to a few campsites and buildings along roadsides. The material in the substratum is a source of sand, gravel, and road fill.

Kashwitna silt loam, nearly level (0 to 3 percent slopes) (KsA).—This soil has the profile described as representative of the series. It occupies broad tracts on outwash plains and high terraces.

Representative profile (NE¼NW¼ sec. 20, T. 22 N., R. 4 W.):

O1—3 inches to 0, dark reddish-brown (5YR 2/2) mat of decomposing forest litter, moss, mycelia, and fine roots; very strongly acid; abrupt, wavy boundary.
A2—0 to 2 inches, gray (10YR 5/1) silt loam; weak, fine, granular structure; very friable; many roots; very strongly acid; abrupt, wavy boundary.
B21—2 to 4 inches, dark reddish-brown (5YR 3/4) silt loam; weak, fine, granular structure; very friable; slightly smeary when rubbed between the fingers; a few fine concretions; many roots; very strongly acid; clear, wavy boundary.
B22—4 to 9 inches, strong-brown (7.5YR 5/6) silt loam; a few patches of brown (7.5YR 4/4); weak, fine, subangular blocky structure; friable; common roots; very strongly acid; abrupt, smooth boundary.
A2b—9 to 10 inches, dark grayish-brown (2.5Y 4/2) silt loam; weak, thin, platy structure; friable; common roots; very strongly acid; abrupt, broken boundary.
B21b—10 to 14 inches, dark-brown (7.5YR 3/4) silt loam; weak, thin, platy structure; friable; common roots; a few rounded pebbles; very strongly acid; clear, smooth boundary.
IIB22b—14 to 20 inches, dark yellowish-brown (10YR 4/4) gravelly sandy loam; massive; friable; a few roots; strongly acid; gradual boundary.
IIC—20 to 30 inches, olive (5Y 4/3) very gravelly sand; single grain; loose; a few pockets of brown, weakly cemented sand; a few roots to a depth of 24 inches; strongly acid.

The mantle of silt loam ranges from 10 to 18 inches in thickness over very gravelly drift.

In the southeastern part of the survey area, along the boundary of the Matanuska Valley Area, Kashwitna soils have characteristics that approach those of soils of the Homestead series. In the Matanuska Valley Area, Kashwitna soils are classified as Homestead silt loam. As a result, the names of some adjoining mapping units in the two areas do not correspond.

Permeability is moderate in the mantle of silt loam and rapid in the very gravelly substratum. Available moisture capacity is low. Plant roots can penetrate to a depth of 24 inches. Runoff and fertility are low.

Included with this soil in mapping are patches of soils of the Caswell, Delyndia, Homestead, Lucile, and Nancy series. Also included are a few areas of undulating Kashwitna soils.

Most of this Kashwitna soil is wooded, but a few tracts are cleared and used as cropland. The principal crops are bromegrass, oats, barley, and hardy vegetables. The wooded areas are used mainly as wildlife habitat, though in places a few paper birch and white spruce are harvested for local use. Recreational uses include sites for a few cabins and temporary camps. The very gravelly material in the substratum is a source of sand, gravel, and road fill. Management group 9 (IIIs–1).

Kashwitna silt loam, undulating (3 to 7 percent slopes) (KsB).—This soil is on broad terraces.

Permeability is moderate in the mantle of silty material and rapid in the substratum. Available moisture capacity and fertility are low. Plant roots can penetrate to a depth of about 24 inches. Runoff is slow to medium, and the hazard of erosion is slight to moderate.

Included with this soil in mapping are patches of

Delyndia, Lucile, and Nancy soils. Also included are a few wet spots and patches of shallow soils.

Most of this Kashwitna soil is wooded, but a few areas are cleared and used as cropland. The chief crops are bromegrass, oats, barley, and hardy vegetables. The wooded areas are used as wildlife habitat. Recreational use is limited to sites for a few small camps and cabins. The very gravelly material in the substratum is a source of gravel, sand, and road fill. Management group 6 (IIIe–1).

Kashwitna silt loam, rolling (17 to 12 percent slopes) (KsC).—This soil is on moraines and terraces. Slopes generally are short and choppy.

Permeability is moderate in the mantle of silty material and rapid in the very gravelly substratum. Available moisture capacity and fertility are low. Plant roots can penetrate to a depth of about 24 inches. Runoff is medium, and the hazard of water erosion is moderate.

Included with this soil in mapping are small areas of Homestead, Lucile, and Nancy soils.

Most of this Kashwitna soil is wooded, but a few areas are cleared and used as cropland. The principal crops are bromegrass, oats, barley, and a few hardy vegetables. The wooded areas are used as wildlife habitat. Recreational use is limited to sites for a few cabins, for summer homes along the shores of streams and lakes, and for several small camps along roadsides. The material in the substratum is a source of sand and gravel. Management group 6 (IIIe–1).

Kashwitna silt loam, hilly (12 to 20 percent slopes) (KsD).—This soil is on a few hilly moraines. Slopes are short and irregular.

Permeability is moderate in the mantle of silty material and rapid in the gravelly substratum. Available moisture capacity is low. Plant roots can penetrate to a depth of about 24 inches. Runoff is rapid, and the hazard of water erosion is severe.

Included with this soil in mapping are small areas of Homestead and Nancy soils. Also included are a few moderately steep slopes.

Most of this Kashwitna soil is wooded and is used as wildlife habitat. In places, however, a few trees are harvested for local use. Use of the areas for recreational purposes is limited to a few cabins along streams and lakeshores and to several campsites along roads. The gravelly material in the substratum is a source of sand, gravel, and road fill. Management group 15 (IVe–2).

Kashwitna silt loam, moderately steep (20 to 30 percent slopes) (KsE).—This soil is on moraines. Slopes are short and irregular.

Permeability is moderate in the mantle of silty material and rapid in the very gravelly substratum. Available moisture capacity is low. Plant roots can penetrate to a depth of about 24 inches. Runoff is rapid, and the hazard of erosion is very severe.

Included with this soil in mapping are a few steep slopes and patches of Homestead and Nancy soils.

Most of this Kashwitna soil is wooded and is used as wildlife habitat. In places the material in the substratum is a source of sand, gravel, and road fill. Management group 20 (VIe–1).

Kashwitna silt loam, steep (30 to 45 percent slopes) (KsF).—Small areas of this soil are on moraines and on terrace escarpments. Slopes are short and steep.

Permeability is moderate in the mantle of silty material and rapid in the very gravelly substratum. Available moisture capacity is low. Plant roots can penetrate to a depth of about 24 inches. Runoff is rapid, and the hazard of water erosion is very severe.

Included with this soil in mapping are patches of Bernice, Homestead, and Nancy soils.

Most of this Kashwitna soil is wooded and is used as wildlife habitat. Management group 25 (VIIe–1).

Killey Series

In the Killey series are nearly level, moderately well drained to somewhat poorly drained soils on flood plains along streams. These soils formed in stratified silty and sandy, water-laid sediment about 30 to 40 inches thick over very gravelly coarse sand. The vegetation generally is sparse stands of white spruce and cottonwood that have an undergrowth of willow, alder, and bluejoint grass. Elevation ranges from 50 to 400 feet. These soils generally are near poorly drained Moose River soils and small patches of other soils on flood plains.

In a representative profile a dark mat of decomposing organic material, about 2 inches thick, overlies a dark-brown surface layer of silt loam about 3 inches thick. The underlying material is mottled olive-brown silt loam and fine sandy loam that extend to a depth of about 26 inches and dark grayish-brown fine sand that contains a few strata of silt. At a depth of about 36 inches is olive-gray gravelly coarse sand or sand that is free of gravel. All areas of these soils are wooded and are used as wildlife habitat.

Killey-Moose River complex (0 to 3 percent slopes) (Kr).—This mapping unit contains the only Killey soil mapped in the Area. It consists of soils on flood plains. About 40 to 50 percent of this unit generally is Killey soils, and about 30 to 40 percent is Moose River soils in shallow depressions. Making up most of the remaining percentage are small tracts of Coal Creek, Jacobsen, Slikok, Susitna, and Wasilla soils. Also included are a few patches of Mixed alluvial land and many abandoned stream channels, as much as 40 feet wide and several feet deep, that frequently contain excess water from main stream channels.

The Killey and Moose River soils each has the profile described as representative of its respective series.

Representative profile of a Killey soil in an area of Killey-Moose River complex (SW¼SW¼ sec. 32, T. 26 N., R. 6 W.):

O1—2 inches to 0, dark reddish-brown (5YR 2/2) mat of decomposing organic material; many fine roots; very strongly acid; abrupt, wavy boundary.

A1—0 to 3 inches, dark-brown (7.5YR 3/2) silt loam; a few, medium, faint, dark grayish-brown (10YR 4/2) mottles; weak, fine, granular structure; very friable; many roots; very strongly acid; abrupt, wavy boundary.

C1—3 to 10 inches, olive-brown (2.5Y 4/4) silt loam; common, medium, faint, dark grayish-brown (10YR 4/2) mottles and common, fine, distinct, brown (7.5YR 4/4) mottles; weak, fine, subangular blocky structure; very friable; a few thin strata of fine sand; common roots; very strongly acid; gradual boundary.

C2—10 to 26 inches, olive-brown (2.5Y 4/4) fine sandy loam; patches of dark grayish brown (2.5Y 4/2) make up about 50 percent of the horizon; common, medium, distinct, brown (7.5YR 4/4) mottles; weak, fine, subangu-

lar blocky structure; very friable; a few roots; very strongly acid; clear, smooth boundary.
C3—26 to 36 inches, dark grayish-brown (2.5Y 4/2) fine sand; a few thin strata of silt; single grain; loose; very strongly acid; clear, smooth boundary.
IIC4—36 to 44 inches, olive-gray (5Y 4/2) gravelly coarse sand; single grain; loose.

In places the A horizon is sandy loam. Brownish and reddish-brown mottles and streaks commonly occur below the A horizon. The strata of silty and sandy water-laid sediment vary in arrangement, number, and thickness. The sediment generally ranges from 30 to 40 inches in thickness over very gravelly sand or sand.

Permeability is moderate in the soils of this unit. The water table is at a depth between 2 and 3 feet during most of the growing season, and the soils generally are saturated throughout the growing season. In places these soils are flooded occasionally for short periods. Plant roots can penetrate to a depth of about 2 feet. Runoff is slow.

The plant cover on these soils varies. Many of the somewhat poorly drained soils have a cover of tall bluejoint grasses interspersed by clumps of willow and alder. The moderately well drained soils support cottonwoods, white spruce, and a few paper birch, and the small areas of poorly drained included soils generally have a thick cover of moss and low shrubs. These soils are used mainly as wildlife habitat. Management group 18 (IVw–1).

Lucile Series

The Lucile series consists of nearly level, moderately well drained soils in scattered depressions on terraces and moraines. These soils formed in a mantle of silt loam 15 to 30 inches thick over very gravelly sand. The vegetation is dominantly black spruce. Elevation ranges from 50 to 1,000 feet. These soils generally are near soils of the Homestead, Kashwitna, and Nancy series.

In a representative profile a mat of decomposing moss and forest litter overlies a layer of dark-gray, mottled silt loam about 2½ inches thick. Below is mottled dark reddish-brown to dark-brown silt loam about 13 inches thick. The material in the substratum is very gravelly sand.

Most areas of these soils are wooded, but a few areas are cleared and used as cropland. The principal crops are bromegrass, oats, barley, and hardy vegetables. The wooded areas are used as wildlife habitat.

Lucile silt loam (0 to 3 percent slopes) (lu).—This is the only Lucile soil mapped in the Area. It is in shallow depressional areas scattered throughout terraces and moraines.

Representative profile (1,100 feet east and 350 feet south of northwest corner of sec. 30, T. 21 N., R. 4 W.):

O1—4 inches to 0, black (10YR 2/1) mat of decomposing moss and forest litter; many roots; many coarse charcoal fragments; extremely acid; clear, wavy boundary.
A2—0 to 2½ inches, dark-gray (10YR 4/1) silt loam; common, medium, distinct mottles of dark yellowish brown (10YR 4/4); weak, thin, platy structure; friable; many roots; very strongly acid; abrupt, irregular boundary.
B21—2½ to 3½ inches, dark reddish-brown (5YR 3/4) silt loam; many mottles of brown (7.5YR 4/4) and very dark grayish brown (10YR 3/2); weak, fine, granular structure; very friable; common roots; many fine concretions; very strongly acid; abrupt, broken boundary.
B22—3½ to 12 inches, brown (7.5YR 4/4) silt loam; common, medium, distinct mottles of yellowish red (5YR 4/6) and a few large patches of brown (10YR 5/3); weak, medium, subangular blocky structure; friable; smeary when rubbed between the fingers; common roots; very strongly acid; abrupt, wavy boundary.
A2b—12 to 13 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, subangular blocky structure; friable; small patches of dark yellowish brown (10YR 4/4) and dark gray (10YR 4/1); many charcoal fragments; a few roots; very strongly acid; abrupt, broken boundary.
B2b—13 to 16 inches, dark-brown (7.5YR 4/4) silt loam; weak, fine, granular structure; very friable; smeary when rubbed between the fingers; many fine concretions the size of sand; a few pebbles; a few roots; very strongly acid; clear, smooth boundary.
IIC—16 to 30 inches, olive-brown (2.5Y 4/4) very gravelly sand; single grain; compact when in place, loose when disturbed; gravel in uppermost 10 inches is coated with iron; a few discontinuous strata of weakly cemented sand; strongly acid.

A few streaks and pockets of volcanic ash commonly occur in the silty material. Horizons generally are convoluted and contain streaks and patches of material from adjoining horizons. In places the evidence of a bisequal profile has been destroyed, probably as a result of frost action.

Permeability is moderate in this soil, and available moisture capacity is low to moderate. The cover of moss keeps this soil moist during most of the growing season. Plant roots can penetrate to a depth of about 24 inches. Runoff is slow. Fertility is very low.

Included with this soil in mapping are a few undulating areas and patches of Homestead, Nancy, and Rabideux soils.

Most of this soil is wooded, but a few tracts are cleared and used as cropland. The principal crops are bromegrass, oats, barley, and hardy vegetables. The wooded areas are used as wildlife habitat. Management group 9 (IIIs–1).

Mixed Alluvial Land

Mixed alluvial land (Me) is on flood plains along secondary streams. It consists of grayish, medium-textured to coarse-textured, water-laid sediment that is a few inches to several feet thick over boulders, stones, and cobblestones. The areas are nearly level, and in many places they are dissected by sloughs and small stream channels. In most places Mixed alluvial land is flooded at least once each year. The vegetation is dominantly dense thickets of alder and willow brush, but patches of grass, scattered stands of cottonwood, and a few paper birch grow in places.

Included with this land type in mapping are many small areas of Chena, Moose River, Niklason, and Susitna soils.

Mixed alluvial land is used chiefly as wildlife habitat. Management group 29 (VIIw–3).

Moose River Series

In the Moose River series are nearly level, poorly drained soils that formed in stratified sandy and silty sediment on flood plains along secondary streams. The vegetation consists of mosses, sedges, low shrubs, scattered patches of grass, and clumps of alder, willow, and black spruce. Elevation ranges from 50 to 700 feet. These soils generally are near soils of the Dinglishna, Killey, and Slikok series.

In a representative profile a mat of decomposing organic matter, about 3 inches thick, overlies a surface layer of dark grayish-brown silt loam about 3 inches thick. Below

is dark-gray silt loam and dark greenish-gray, stratified fine sand and silt. The material generally is gravelly below a depth of more than 40 inches.

These soils have a cover of plants and are used mainly as wildlife habitat.

Moose River silt loam (0 to 3 percent slopes) (Mr).—This is the only Moose River soil mapped in the survey area. It generally is on flood plains along secondary streams, but a few areas are on the edges of muskegs.

Representative profile (SW¼NW¼ sec. 32, T. 26 N., R. 6 W.):

O1—3 inches to 0, black (5YR 2/1) decomposing organic matter; many roots; strongly acid; clear, wavy boundary.
A1—0 to 3 inches, dark grayish-brown (2.5Y 4/2) silt loam; weak, thin, platy structure; very friable when moist, nonsticky and nonplastic when wet; many roots; strongly acid; clear, smooth boundary.
C1g—3 to 6 inches, dark-gray (5Y 4/1) silt loam; moderate, thin, platy structure; very friable; a few roots; strongly acid; clear, smooth boundary.
C2g—6 to 42 inches, dark greenish-gray (5GY 4/1) stratified fine sand and silt; massive; very friable; a few roots in uppermost part; a few thin strata of coarse sand and a few pebbles in lower part; strongly acid.

The A1 horizon is dominantly silt loam, but it ranges to fine sandy loam, and the texture commonly varies within short distances. The strata of silt and fine sand vary in thickness, number, and arrangement. In places as much as 35 percent of the material below a depth of 20 inches is coarse sand and gravel. The C horizon ranges from gray to dark greenish gray or bluish gray in color. Very gravelly sand commonly occurs below a depth of 40 to 50 inches.

Permeability is moderate in this soil. The water table generally is near the surface. Plant roots can penetrate to a depth of about 15 inches. Runoff is very slow, and in places shallow ponding and flooding occur several times each year.

Included with this soil in mapping are patches of Dinglishna, Jacobsen, Killey, Salamatof, and Slikok soils. Also included are a few small ponds and many secondary stream channels and sloughs that carry intermittent flows of water. In addition, a few small very stony and gravelly areas are included.

Moose River silt loam has a cover of plants and is used as wildlife habitat. Management group 24 (VIw–2).

Nancy Series

In the Nancy series are nearly level to steep, well-drained soils on high terraces and moraines. These soils formed in 15 to 30 inches of silt loam over very gravelly glacial drift or fine sand. The vegetation generally is paper birch and white spruce. Elevation ranges from 100 to 1,000 feet. These soils generally are near soils of the Lucile, Kashwitna, and Rabideux series.

In a representative profile a mat of decomposing forest litter and moss overlies a layer of dark reddish-brown, yellowish-brown, and dark yellowish-brown silt loam about 14 inches thick. Below is olive-brown silt loam, about 8 inches thick, over olive-gray sand or very gravelly sand that extends to a depth of 40 inches or more.

Most of the acreage of Nancy soils is wooded, but a few areas have been cleared and used for crops and for hay and pasture. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. The wooded areas are used mainly as wildlife habitat, but in a few places paper birch and white spruce are harvested for local use. Recreational use is limited to cabins and summer homes along streams and lakeshores and to a few campsites and trails. The substratum is a source of sand, gravel, and road fill.

Nancy silt loam, nearly level (0 to 3 percent slopes) (NaA).—This soil has the profile described as representative of the series. It occupies broad tracts on high terraces.

Representative profile (400 feet east and 150 feet south of northwest corner of sec. 20, T. 23 N., R. 4 W.):

O1—1½ inches to 0, dark reddish-brown (5YR 2/2) mat of decomposing forest litter and moss; many roots; very strongly acid; abrupt, wavy boundary.
A2—0 to 1½ inches, gray (10YR 5/1) silt loam; streaks and patches of dark yellowish brown (10YR 4/4); weak, thin, platy structure; very friable; common roots; many charcoal fragments; abrupt, irregular boundary.
B21—1½ to 3½ inches, dark reddish-brown (5 YR 3/4) silt loam; many streaks and patches of brown (7.5YR 4/4); weak, fine, granular structure; very friable; a few very fine concretions; common roots; very strongly acid; clear, wavy boundary.
B22—3½ to 9 inches, yellowish-brown (10YR 5/6) silt loam; massive; very friable; smeary when rubbed between the fingers; admixture of material from the A2 and B21 horizons; common roots; very strongly acid; abrupt, wavy boundary.
A2b—9 to 10½ inches, brown (10YR 5/3) silt loam; weak, thin, platy structure; very friable; common roots; very strongly acid; abrupt, broken boundary.
B2b—10½ to 16 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, thin, platy structure; very friable; a few streaks of dark brown (7.5YR 4/4) and a few pockets of material from the A2b horizon; common roots; strongly acid; gradual boundary.
C1—16 to 24 inches, olive-brown (2.5Y 4/4) silt loam; weak, thin, platy structure; friable; a few roots; fine pores; strongly acid; clear, smooth boundary.
IIC2—24 to 40 inches, olive-gray (5Y 4/2) very gravelly sand; single grain; loose; a few pockets of olive-brown silty material; many cobblestones; strongly acid.

In most places the horizons are churned and convoluted, and the color patterns are streaked and patchy. In places a few pockets of volcanic ash occur in the silty material. Within short distances the mantle of silty material ranges from 15 to 30 inches in thickness over loose very gravelly sand.

Permeability is moderate in the silty material, and it is rapid in the very gravelly material in the substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is slow. Fertility is low.

Included with this soil in mapping are patches of Coal Creek, Kashwitna, Lucile, and Rabideux soils. Also included are a few small undulating areas where slopes are very short.

Most of this Nancy soil is wooded, but a few areas are cleared and used as cropland. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. The wooded areas are used as wildlife habitat. Recreational use is limited to a few campsites, trails, and summer cabins along lakes and streams. The material in the substratum is a source of sand, gravel, and road fill. Management group 2 (IIc–2).

Nancy silt loam, undulating (3 to 7 percent slopes) (NaB).—This soil is on high terraces and moraines. Slopes are short and irregular.

Permeability is moderate in the mantle of silt loam and rapid in the substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of 30 inches.

Runoff is slow to medium, and the hazard of water erosion is slight to moderate. Fertility is low.

Included with this soil in mapping are a few small areas of Nancy silt loam, rolling. Also included are patches of Kashwitna, Lucile, and Rabideux soils.

Most areas of this Nancy soil are wooded, though a few areas are cleared for use as cropland. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. The wooded areas are used mainly as wildlife habitat, but in a few places the mature trees are harvested to provide logs and fuel. Recreational uses are limited mainly to summer cabins, a few trails, and a few campsites. The material in the substratum is a source of sand, gravel, and road fill. Management group 4 (IIe–2).

Nancy silt loam, rolling (7 to 12 percent slopes) (NaC).—This soil is on low moraines. Slopes are short and irregular.

Permeability is moderate in the mantle of silt loam and rapid in the very gravelly substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of about 30 inches. Runoff is medium, and the hazard of water erosion is moderate. Fertility is low.

Included with this soil in mapping are a few small areas of Nancy silt loam, hilly. Also included are patches of Kashwitna and Rabideux soils and a few small poorly drained depressions.

Most areas of this Nancy soil are wooded, though a few areas are cleared and used as cropland. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. The wooded areas are used mainly as wildlife habitat, but in places a few trees are harvested to provide logs and fuel. A few areas provide sites for summer cabins, trails, and camps. The material in the substratum is a source of sand, gravel, and road fill. Management group 7 (IIIe–2).

Nancy silt loam, hilly (12 to 20 percent slopes) (NaD).—This soil is on moraines. Slopes are short and choppy.

Permeability is moderate in the silt loam and rapid in the substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of about 30 inches. Runoff is rapid, and the hazard of water erosion is severe on areas that have been cleared. Fertility is low.

Included with this soil in mapping are a few areas of Nancy soils that are moderately steep. Also included are patches of Kashwitna and Rabideux soils and small scattered depressions where drainage is poor.

Most areas of this Nancy soil are wooded, but a few areas are cleared and used as cropland. The wooded areas are used mainly as wildlife habitat, and the cleared areas are seeded to grass and are used for hay or pasture. Recreational use is limited to a few cabins, trails, and campsites near lakes and streams. The gravelly material in the substratum is used for building roads. Management group 14 (IVe–1).

Nancy silt loam, moderately steep (20 to 30 percent slopes) (NaE).—This soil is on moraines and terrace escarpments. Slopes are irregular and generally are less than 200 feet long.

Permeability is moderate in the silt loam and rapid in the substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of about 30 inches. Runoff is rapid, and the hazard of water erosion is very severe in cleared areas.

Included with this soil in mapping are a few areas of Nancy silt loam, hilly, and scattered depressions where drainage is poor. Also included are patches of Kashwitna and Rabideux soils.

Except for a few small areas that have been cleared for cabin sites, this Nancy soil is wooded and used as wildlife habitat. The gravelly material in the substratum is a source of sand, gravel, and road fill. Management group 20 (VIe–1).

Nancy silt loam, steep (30 to 45 percent slopes) (NaF).—This soil is on moraines and terrace escarpments. Slopes are irregular and generally are less than 300 feet long.

Permeability is moderate in the mantle of silt loam and rapid in the substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of about 30 inches. Runoff is rapid, and the hazard of erosion is very severe. Fertility is low.

Included with this soil in mapping are a few areas of Nancy silt loam, moderately steep. Also included are small tracts of soils of the Bernice and Kashwitna series.

This Nancy soil is wooded and is used as wildlife habitat. Management group 25 (VIIe–1).

Nancy silt loam, sandy substratum, nearly level (0 to 3 percent slopes) (NcA).—This soil is on large tracts on terraces along the edges of the major streams of the survey area. The substratum is deep fine sand, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the mantle of silt loam and rapid in the substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of about 30 inches. Runoff is slow. Fertility is low.

Included with this soil in mapping are patches of Caswell, Delyndia, and Rabideux soils.

Most areas of this Nancy soil are wooded, but several tracts are cleared and are used for crops, hay, and pasture. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. The wooded areas are used mainly as wildlife habitat, but in places a few trees are harvested to provide logs and fuel. Recreational use is limited to a few cabin sites, campsites, and trails. The material in the substratum is a source of road fill. Management group 2 (IIc–2).

Nancy silt loam, sandy substratum, undulating (3 to 7 percent slopes) (NcB).—This soil is on broad tracts on high terraces on the edges of major streams of the survey area. The substratum is deep fine sand, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the mantle of silt loam and rapid in the sandy substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. Fertility is low.

Included with this soil in mapping are small tracts of the Caswell, Delyndia, Flat Horn, and Rabideux soils. Also included are a few wet spots.

Most areas of this Nancy soil are wooded, though a few tracts have been cleared and are used as cropland. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. The wooded areas are used mainly as wildlife habitat, but in a few places paper birch and white spruce are harvested to provide logs and fuel. Recreational use includes scattered cabin sites, trails, and one or two

camping sites. The sandy substratum is a source of road fill. Management group 4 (IIe–2).

Nancy silt loam, sandy substratum, rolling (7 to 12 percent slopes) (NcC).—This soil occupies scattered areas on high terraces. Slopes are short and irregular. The substratum is deep fine sand, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the mantle of silt loam and rapid in the sandy substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is medium, and the hazard of water erosion is moderate. Fertility is low.

Included with this soil in mapping are small areas of the Caswell, Delyndia, Flat Horn, and Rabideux soils. Also included are a few short, moderately steep terrace escarpments.

Most areas of this Nancy soil are wooded, though a few small areas are cleared and used as cropland. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. The wooded areas are used as wildlife habitat. Recreational use includes campsites, cabins, and trails. In a few places the sandy substratum is used as road fill. Management group 7 (IIIe–2).

Nancy silt loam, sandy substratum, hilly (12 to 20 percent slopes) (NcD).—This soil occupies scattered dissected areas on high terraces near major streams of the survey area. Except that the substratum is fine sand, the profile is like that described as representative of the series.

Permeability is moderate in the mantle of silt loam and rapid in the sandy substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is rapid, and the hazard of water erosion is severe in cleared areas. Fertility is low.

Included with this soil in mapping are small areas of Bernice, Delyndia, Flat Horn, and Rabideux soils.

Most of this Nancy soil is wooded and is used mainly as wildlife habitat. Many of the areas are used for such recreational purposes as cabins, trails, and campsites. Management group 14 (IVe–1).

Nancy silt loam, sandy substratum, moderately steep (20 to 30 percent slopes) (NcE).—This soil is on scattered escarpments, dissected areas, and low sharp ridges on terraces along the edges of major streams of the survey area. The substratum is fine sand, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the mantle of silt loam and rapid in the sandy substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is rapid, and the hazard of water erosion is severe in areas that lack a cover of vegetation. Fertility is low.

Included with this soil in mapping are patches of Bernice, Delyndia, and Rabideux soils. Also included are a few wet seepage spots.

This Nancy soil is wooded and is used mainly as wildlife habitat. Management group 20 (VIe–1).

Niklason Series

In the Niklason series are nearly level, well-drained soils that formed in silty and sandy, stratified, water-laid sediment. These soils overlie loose gravelly material at a depth of 10 to 30 inches. They are on alluvial plains along major streams of the survey area. The vegetation is dominantly large cottonwoods, alders, willows, and scattered paper birch and white spruce. Elevation ranges from 25 to 500 feet. These soils are near soils of the Susitna series.

In a representative profile a thin mat of decomposing organic matter overlies a layer of dark yellowish-brown silt loam about 2 inches thick. Below is dark grayish-brown and olive-gray, stratified fine sandy loam, loamy fine sand, and silt. The stratified material is about 17 inches thick over loose very gravelly sand.

Most of the acreage of Niklason soils is wooded and is used as wildlife habitat.

Niklason fine sandy loam (0 to 3 percent slopes) (Nk).—This is the only Niklason soil mapped in the survey area. Some areas are on alluvial plains along major streams of the Area, and others are on low-lying islands in the Susitna River.

Representative profile (500 feet northwest of southeast corner of sec. 10, T. 21 N. R. 5 W.) :

O1—1½ inches to 0, very dark brown (10YR 2/2) mat of partly decomposed forest litter; many roots; very strongly acid; abrupt, wavy boundary.

A1—0 to 2 inches, dark yellowish-brown (10YR 3/4) silt loam; weak, fine, granular structure; very friable; many roots; strongly acid; clear, smooth boundary.

C1—2 to 12 inches, dark grayish-brown (2.5Y 4/2) fine sandy loam; single grain; loose; a few thin strata of silt; common roots; strongly acid; clear, smooth boundary.

C2—12 to 17 inches, olive-gray (5Y 4/2) loamy fine sand; single grain; loose; a few thin strata of gray silt; common roots; strongly acid; clear, smooth boundary.

IIC3—17 to 40 inches, olive-gray (5Y 4/2) very gravelly sand; single grain; loose; many strata of closely packed cobblestones and coarse gravel; a few stones; strongly acid.

The A1 horizon ranges from silt loam to sandy loam in texture within short distances. In places the A1 horizon is absent. The strata in the C horizon vary in number, and they range from less than an inch to several inches in thickness. The material commonly contains streaks and patches of dark buried organic material. Depth to the very gravelly substratum ranges from 10 to 30 inches within short distances.

Permeability is moderate in the silty sediment and rapid in the underlying material. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of 20 to 30 inches. Runoff is slow. Floods are rare, but in places they occur for short periods. Erosion is a hazard near the banks of streams.

Included with this soil in mapping are patches of Wasilla and Susitna soils. Also included are a few small tracts of Gravelly alluvial land. In places this soil is dissected by small secondary stream channels and sloughs that carry excess water when the main stream channel is near capacity.

This soil is wooded and is used mainly as wildlife habitat. In places a few cottonwoods are harvested for local use. Management group 10 (IIIs–2).

Rabideux Series

The Rabideux series consists of nearly level to steep, well-drained soils on terraces, moraines, and low, stabilized dunes. These soils formed in 15 to 30 inches of silt loam over deep fine sand or very gravelly sand. The vegetation is dominantly paper birch, white spruce, and quaking aspen. Elevation ranges from 300 to 1,300 feet. These soils are near soils of the Nancy series.

In a representative profile a thin mat of decomposing organic matter and many roots overlies a layer of light-gray silt loam about 2 inches thick. The next layers are dark reddish-brown, reddish-brown, and dark-brown silt loam and have a combined thickness of about 7 inches. Below is grayish-brown and brown silt loam to a depth of about 17 inches. The underlying material is olive-brown silt loam and olive-gray very gravelly sand.

Most areas of Rabideux soils are wooded, but a few areas are cleared and used as cropland. The principal crops are bromegrass, oats, barley, and hardy vegetables. The wooded areas are used as wildlife habitat. Recreational uses include a few cabins, campgrounds, and trails. The substratum is a source of sand, gravel, and road fill.

Rabideux silt loam, nearly level (0 to 3 percent slopes) (RaA).—This soil has the profile described as representative of the series. It is on high terraces (fig. 3).

Representative profile (SW¼SW¼ sec. 20, T. 26 N., R. 4 W.):

O1—2 inches to 0, dark reddish-brown (5YR 2/2) mat of decomposing organic matter; many fine roots; extremely acid; clear, wavy boundary.

A2—0 to 2 inches, light-gray (10YR 6/1) silt loam; a few patches of dark gray (10YR 4/1) and brown (10YR 5/3); very thin, platy structure; very friable; many roots; very strongly acid; abrupt, irregular boundary.

B21—2 to 2½ inches, dark reddish-brown (2.5YR 2/2) silt loam; moderate, fine, granular structure; very friable; many dark, fine, hard concretions; a few weakly cemented fragments in upper ½ inch; common roots; very strongly acid; clear, wavy boundary.

B22—2½ to 5 inches, reddish-brown (5YR 3/4) silt loam; a few patches of brown (10YR 5/4); weak, fine, granular structure; very friable; common roots; very strongly acid; clear, irregular boundary.

B3—5 to 9½ inches, dark-brown (7.5YR 4/4) silt loam; many large patches of yellowish brown (10YR 5/4 and 5/6); weak, fine, granular structure; very friable; slightly smeary when rubbed between the fingers; common roots; very strongly acid, clear, wavy boundary.

A2b—9½ to 12 inches, grayish-brown (2.5Y 5/2) silt loam; many patches of light olive brown (10YR 5/4); weak, thin, platy structure; very friable; a few roots; very strongly acid; clear, wavy boundary.

B2b—12 to 16½ inches, brown (10YR 4/4) silt loam; a few large patches of dark brown (7.5YR 4/4); weak, fine granular structure; very friable; common, fine pores; a few roots; strongly acid; clear, wavy boundary.

C1—16½ to 23 inches, olive-brown (2.5Y 4/4) silt loam; weak, thin, platy structure; friable; a few roots; strongly acid; clear, smooth boundary.

IIC2—23 to 48 inches, olive-gray (5Y 4/2) very gravelly sand; single grain; loose; many cobblestones; a few pockets of fine sand; strongly acid.

The silty material ranges from 15 to 30 inches in thickness over very gravelly sand.

Figure 3.—An area of Rabideux silt loam, nearly level, on terraces bordering the Susitna River in the northern part of the survey area. Mountains of the Alaska Range are in the background.

Permeability is moderate in the mantle of silt loam and rapid in the substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is slow.

Included with this soil in mapping are a few patches of shallower soils. Also included are small tracts of Chulitna, Kalifonsky, and Nancy soils.

Most of this Rabideux soil is wooded, but several tracts are cleared and used as cropland. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. Most of the wooded areas are used as wildlife habitat. In places, however, a few trees are harvested to provide logs and fuel. Use of this soil for recreational purposes is limited to a few lakeshore cabins, trails, and campsites. In several places the substratum is a source of gravel and road fill. Management group 2 (IIc–2).

Rabideux silt loam, undulating (3 to 7 percent slopes) (RaB).—This soil is on terraces and low moraines. Slopes are short and irregular.

Permeability is moderate in the silt loam and rapid in the very gravelly substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of about 30 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. Fertility is low.

Included with this soil in mapping are small tracts of Chulitna, Kalifonsky, and Nancy soils.

Most of this Rabideux soil is wooded, but a few areas are cleared and used as cropland. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables. The wooded areas are used mainly as wildlife habitat. A few areas are used for lakeshore cabins, campsites, and trails. The substratum is a source of gravel and road fill. Management group 4 (IIe–2).

Rabideux silt loam, rolling (7 to 12 percent slopes) (RaC).—This soil is on moraines. Slopes are short and irregular.

Permeability is moderate in the silt loam and rapid in the very gravelly substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of about 30 inches. Runoff is medium, and the hazard of water erosion is moderate in cleared areas. Fertility is low.

Included with this soil in mapping are small areas of Chulitna, Kalifonsky, and Nancy soils. Also included are a few areas where slopes are short and are steeper than those of this soil.

Most areas of this Rabideux soil are wooded, but a few small tracts are cleared and used as pasture and cropland. The principal crops are bromegrass, oats, barley, and hardy vegetables. In a few places the substratum is a source of gravel and road fill. Management group 7 (IIIe–2).

Rabideux silt loam, hilly (12 to 20 percent slopes)

(RaD).—This soil is on moraines. Slopes are short and choppy.

Permeability is moderate in the silt loam and rapid in the very gravelly substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of about 30 inches. Runoff is rapid, and the hazard of water erosion is severe in cleared areas. Fertility is low.

Included with this soil in mapping are small tracts of Chulitna soils. Also included are a few small depressions where drainage is poor and a few areas where slopes are moderately steep.

This Rabideux soil is wooded and is used as wildlife habitat. In a few places the substratum is a source of gravel and road fill. Management group 14 (IVe–1).

Rabideux silt loam, moderately steep (20 to 30 percent slopes) (RaE).—This soil is on moraines. Slopes are short and irregular.

Permeability is moderate in the silt loam and rapid in the very gravelly substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is rapid, and the hazard of erosion is very severe on unprotected areas.

Included with this soil in mapping are patches of Chulitna soils. Also included are a few areas where slopes are steep.

This Rabideux soil is wooded and is used as wildlife habitat. Management group 20 (VIe–1).

Rabideux silt loam, steep (30 to 45 percent slopes) (RaF).—This soil is on moraines. Slopes are irregular and seldom are more than 300 feet long.

Permeability is moderate in the mantle of silt loam and rapid in the substratum. Available moisture capacity is moderate. Plant roots can penetrate to a depth of about 30 inches. Runoff is very rapid, and the hazard of water erosion is very severe.

Included with this soil in mapping are small areas of Chulitna soils. Also included are a few small tracts of shallow soils.

This Rabideux soil is wooded and is used mainly as wildlife habitat. Management group 25 (VIIe–1).

Rabideux silt loam, shallow, nearly level (0 to 3 percent slopes) (RbA).—This soil occupies several broad tracts on high terraces. The mantle of silt loam is 15 to 20 inches thick over the very gravelly substratum, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the silt loam and rapid in the very gravelly substratum. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of 24 inches. Runoff is slow. Fertility is low.

Included with this soil in mapping are a few patches of Kashwitna and Nancy soils.

Most of this Rabideux soil is wooded, but a few small areas are cleared and used as cropland and pasture. The principal crops are bromegrass, oats, barley, and a few hardy vegetables. The wooded areas are used as wildlife habitat. In a few places the substratum is a source of gravel and road fill. Management group 9 (IIIs–1).

Rabideux silt loam, shallow, undulating (3 to 7 percent slopes) (RbB).—This soil occupies a few large tracts on high terraces. The mantle of silt loam is 15 to 20 inches thick over the very gravelly substratum, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the silt loam and rapid in the very gravelly substratum. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of 24 inches. Runoff is slow to medium, and the hazard of erosion is slight to moderate. Fertility is low.

Included with this soil in mapping are a few small areas where the soil is shallower to very gravelly material than this soil. Also included are small tracts of Kashwitna and Nancy soils and a few areas where slopes are short and moderate.

Most of this Rabideux soil is wooded, but several small tracts are cleared and used as cropland. The principal crops are oats, barley, bromegrass, and hardy vegetables. The wooded areas are used as wildlife habitat. Scattered areas provide sites for cabins on lakeshores, trails, and camps. In several places the material in the substratum is a source of gravel and road fill. Management group 6 (IIIe–1).

Rabideux silt loam, shallow, rolling (17 to 12 percent slopes) (RbC).—This soil is in scattered areas on moraines. Slopes are short and irregular. Depth to gravelly material is less than in the profile described as representative of the series, but the two profiles otherwise are similar.

Permeability is moderate in the silt loam and rapid in the very gravelly substratum. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of 24 inches. Runoff is medium, and the hazard of erosion is moderate. Fertility is low.

Included with this soil in mapping are patches of Rabideux soils that are underlain by sand. Also included are a few small tracts of Kashwitna and Nancy soils and a few wet spots.

Most of this Rabideux soil is wooded and is used as wildlife habitat. In several places the substratum is a source of gravel and road fill. Recreational uses include a few lakeshore cabins and trails. Management group 6 (IIIe–1).

Rabideux silt loam, shallow, hilly (12 to 20 percent slopes) (RbD).—This soil occupies scattered tracts on moraines. Slopes are short and irregular. The mantle of silt loam is 15 to 20 inches thick over the very gravelly substratum, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the silt loam and rapid in the very gravelly substratum. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of 24 inches. Runoff is rapid, and the hazard of water erosion is severe in cleared areas. Fertility is low.

Included with this soil in mapping are a few areas that are underlain by sand. Also included are a few areas where slopes are moderately steep and a few small depressions where drainage is poor.

Most of this Rabideux soil is wooded and is used as wildlife habitat. In a few places the substratum is a source of gravel and road fill. Management group 15 (IVe–2).

Rabideux silt loam, shallow, moderately steep (20 to 30 percent slopes) (RbE).—This soil is on moraines. Slopes are choppy. The mantle of silt loam is 15 to 20 inches thick over very gravelly material, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the silt loam and rapid in the very gravelly substratum. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of

24 inches. Runoff is rapid, and the hazard of water erosion is very severe. Fertility is low.

Included with this soil in mapping are a few areas where slopes are 30 to 45 percent. Also included are small areas of Chulitna soils and a few spots of soil that are underlain by sand.

Most of this Rabideux soil is wooded and is used mainly as wildlife habitat. In a few places, however, the gravelly substratum is a source of road fill. Management group 20 (VIe–1).

Rabideux silt loam, sandy substratum, nearly level (0 to 3 percent slopes) (RdA).—This soil is on broad terraces. It formed in 15 to 25 inches of silt loam over sand, but its profile otherwise is similar to that described as representative of the series.

Permeability is moderate in the mantle of silt loam and rapid in the sandy substratum. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is slow. Fertility is low.

Included with this soil in mapping are small tracts of Chulitna and Nancy soils.

The acreage of this Rabideux soil is wooded and is used mainly as wildlife habitat. In a few places, however, the sandy substratum is a source of road fill. Management group 11 (IIIs–3).

Rabideux silt loam, sandy substratum, undulating (3 to 7 percent slopes) (RdB).—This soil is on broad terraces. Slopes are short and irregular. This soil formed in a mantle of silt loam 15 to 25 inches thick over sand, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the mantle of silt loam and rapid in the sandy substratum. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is slow to medium, and the hazard of erosion is slight to moderate in cleared areas.

Included with this soil in mapping are patches of Chulitna and Nancy soils.

This Rabideux soil is wooded and is used mainly as wildlife habitat. In places the sandy substratum is used as a source of road fill. Management group 8 (IIIe–3).

Rabideux silt loam, sandy substratum, rolling (7 to 12 percent slopes) (RdC).—Some areas of this soil are on scattered stabilized dunes near streams, and others are on terraces. This soil formed in a mantle of silt loam 15 to 25 inches thick over deep sand, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the mantle of silt loam and rapid in the sandy substratum. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is medium in cleared areas, and the hazard of water erosion is moderate. Fertility is low.

Included with this soil in mapping are patches of Chulitna soils. Also included are a few areas where slopes are short and range from 12 to 20 percent.

This Rabideux soil is wooded and is used as wildlife habitat. The trees are mainly paper birch and white spruce. The sandy substratum is a source of road fill. Management group 8 (IIIe–3).

Rabideux silt loam, sandy substratum, hilly (12 to 20 percent slopes) (RdD).—This soil is on scattered stabilized dunes along streams and lakes. It formed in silt loam 15 to 25 inches thick over sand, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the silt loam and rapid in the sandy substratum. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is rapid, and the hazard of erosion is severe. Fertility is low.

Included with this soil in mapping are small areas of Chulitna soils. Also included are a few areas where the slope is moderately steep.

This Rabideux soil is wooded and is used as wildlife habitat. Management group 17 (IVe–4).

Rabideux silt loam, sandy substratum, moderately steep (20 to 30 percent slopes) (RdE).—This soil is on a few narrow terrace escarpments. It formed in silt loam 15 to 25 inches thick over deep sand, but the profile otherwise is like that described as representative of the series.

Permeability is moderate in the silt loam and rapid in the sandy substratum. Available moisture capacity is low to moderate. Plant roots can penetrate to a depth of 30 inches. Runoff is rapid, and the hazard of water erosion is very severe in exposed areas. Fertility is low.

Included with this soil in mapping are a few sandy spots. Also included are a few patches of soils of the Bernice series.

This Rabideux soil is wooded and is used as wildlife habitat. Management group 20 (VIe–1).

Salamatof Series

The Salamatof series consists of nearly level, very poorly drained peat soils in muskegs. The peat material was derived chiefly from sphagnum moss, but partly from sedges. The vegetation is dominantly sphagnum moss, sedges, and low-growing shrubs, but stands of stunted, slow-growing black spruce occur in many places. Elevation ranges from 25 to 1,200 feet. These soils generally are near soils of the Dinglishna and Jacobsen series.

In a representative profile a surface layer of raw sphagnum moss 9 inches thick overlies coarse dark-brown to brown peat that extends to a depth of 60 inches or more.

The areas of Salamatof soils are under vegetation and are used as wildlife habitat.

Salamatof peat (0 to 3 percent slopes) (Sa).—This is the only Salamatof soil mapped in the survey area. It is in muskegs that range from a few acres to more than 1,000 acres in size.

Representative profile (SE¼NE¼ sec. 22, T. 22 N., R. 6 W.):

Oi1—0 to 9 inches, brown (10YR 4/3), when wet, to pale-brown (10YR 6/3) when squeezed dry, raw, undecomposed sphagnum moss peat; many roots; many, dark-colored, coarse woody particles; extremely acid; gradual boundary.

Oi2—9 to 60 inches, dark-brown (7.5YR 3/2), when wet, to brown (7.5YR 4/2) when squeezed dry, coarse moss peat; a few thin strata of coarse sedge peat; a few woody particles; a few live roots to a depth of 18 inches; peat material is slightly finer below a depth of 24 inches; extremely acid.

In places the peat material is darker and more finely divided than that described for the series. Pockets and very thin lenses of light-colored volcanic ash and buried logs are fairly common in the peat. Near the mouth of the Susitna River, thin layers of silt are in the profile.

The water table generally is at a depth of less than 12 inches in this soil. Roots can penetrate to a depth of less than 18 inches. Runoff is very slow. Fertility is very low.

Included with this soil in mapping are patches of dark woody peat soils and small tracts of Dinglishna, Jacobsen, Kalifonsky, and Moose River soils. Also included are many small shallow ponds.

This Salamatof soil is under vegetation and is used as wildlife habitat. Management group 27 (VIIw–1).

Schrock Series

The Schrock series consists of nearly level, well-drained soils that formed in silty and sandy alluvial sediment. These soils are on terraces and alluvial plains. The vegetation is dominantly paper birch and white spruce. Elevation ranges from 100 to 500 feet. These soils generally are near soils of the Niklason and Susitna series.

In a representative profile a mat of decomposing forest litter overlies a surface layer of dark-brown silt loam about 3 inches thick. Below is about 5 inches of dark-brown silt loam streaked with dark yellowish brown and about 10 inches of olive-brown silt loam that contains a few strata of fine sand. The underlying material is dark grayish-brown, stratified silt loam and fine sand.

Most of the acreage of Schrock soils is wooded and is used as wildlife habitat.

Schrock silt loam, nearly level (0 to 3 percent slopes) (ShA).—This is the only Schrock soil mapped in the survey area. It is on alluvial plains and low terraces.

Representative profile (NE¼NW¼ sec. 20, T. 26 N., R. 4 W.):

O1—3 inches to 0, dark reddish-brown (5YR 2/2) mat of decomposing moss, leaves, and twigs; many fine roots; mycelia; extremely acid; clear, wavy boundary.

A1—0 to 3 inches, dark-brown (7.5YR 3/2) silt loam; moderate, fine, granular structure; very friable; many roots; very strongly acid; clear, wavy boundary.

B2—3 to 8 inches, dark-brown (10YR 4/3) silt loam; streaks of dark yellowish brown (10YR 4/4); weak, fine, granular structure; friable; common roots; very strongly acid; gradual boundary.

B3—8 to 18 inches, olive-brown (2.5Y 4/4) silt loam; a few large patches of light olive brown (2.5Y 5/4) and dark yellowish brown (10YR 4/4); weak, thin, platy structure; friable; common roots; a few almost horizontal very dark brown streaks of buried organic material; a few strata of fine sand that are ¼ to ½ inch thick; strongly acid; gradual boundary.

C—18 to 42 inches, dark grayish-brown (2.5Y 4/2) stratified silt loam and fine sand; massive; very friable; a few strata of gray, medium and coarse sand; a few rounded pebbles in lower part of horizon; a few roots to a depth of 30 inches; strongly acid.

In places this soil has a very thin leached A2 horizon. The soil material below a depth of 10 inches consists of layered silt loam and fine sand. These layers range from less than an inch to several inches in thickness and vary in number and in arrangement. In most places the sediment is 40 to 60 inches thick over very gravelly sand.

Permeability and available moisture capacity are moderate in this soil. Plant roots can penetrate to a depth of 30 inches. Runoff is slow. Fertility is low.

Included with this soil in mapping are a few small areas of poorly drained Moose River soils in depressions. Also included are a few undulating areas and a few well-drained soils that are shallower to gravel than this soil.

All areas of this Schrock soil are wooded and are used as wildlife habitat. Management group 1 (IIc–1).

Slikok Series

The Slikok series consists of nearly level, poorly drained soils that formed in deep mucky silt loam sediment in depressions, in seepage areas, and along small drainageways. The vegetation consists mainly of alder, willow, black spruce, moss, and sedges. Elevation ranges from 50 to 1,200 feet. These soils generally are near soils of the Coal Creek and Jacobsen series.

In a representative profile a thick mat of organic material and about 10 inches of black mucky silt loam overlie a thick dark-gray silt loam layer.

Slikok soils are under vegetation and are used as wildlife habitat.

Slikok mucky silt loam (0 to 3 percent slopes) (Sm).—This is the only Slikok soil mapped in the survey area. It is in depressions and low-lying areas along secondary streams.

Representative profile (NE¼SW¼ sec. 12, T. 25 N., R. 6 W.):

O1—8 to 4 inches, dark reddish-brown (5YR 2/2) mat of coarse decomposing organic material; many roots; very strongly acid; clear, wavy boundary.

O2—4 inches to 0, black (5YR 2/1) finely divided organic material; a few, coarse, woody fragments; common roots; very strongly acid; clear, wavy boundary.

A1—0 to 10 inches, black (10YR 2/1) mucky silt loam; massive; very friable; common roots; very strongly acid; gradual boundary.

C—10 to 50 inches, dark-gray (10YR 4/1) silt loam; many pockets of black (10YR 2/1) mucky silt loam; a few thin strata of very fine sand between a depth of 24 and 50 inches; massive; very friable; a few roots to a depth of 20 inches; very strongly acid.

The surface mat of organic material ranges from about 6 to 15 inches in thickness. The C horizon ranges from silt loam to mucky silt loam in texture. In many places this soil is underlain by gravelly material at a depth of 40 to 60 inches. A few spots contain many stones and boulders, which are shown on the map by the symbol for stoniness.

The water table generally is near or at the surface of this soil, but occasionally it drops to a depth of 2 or 3 feet. Plant roots can penetrate to a depth of 20 inches. Runoff is slow.

Included with this soil in mapping are patches of soils of the Jacobsen and Moose River series.

This Slikok soil is under vegetation and is used as wildlife habitat. Management group 19 (IVw–2).

Susitna Series

In the Susitna series are nearly level, well-drained soils that formed in stratified silty and sandy sediment laid down by water. These soils are on broad alluvial plains. The vegetation in uncleared areas consists of paper birch, white spruce, cottonwood, and native grasses (fig. 4). Elevation ranges from 10 to 400 feet. Susitna soils generally are near Niklason and Schrock soils.

In a representative profile a thin mat of decomposing forest litter overlies a layer of dark-gray fine sandy loam about 3 inches thick. Below is dark-gray layered silt loam, fine sand, and very fine sand.

Most of the acreage of Susitna soils is wooded, but a few areas are cleared and are used for hay, small grains, hardy vegetables, and pasture.

Susitna fine sandy loam (0 to 3 percent slopes) (Ss).—This soil has the profile described as representative of the

Figure 4.—**Bluejoint native grass growing on a Susitna fine sandy loam.**

series. It is on broad alluvial plains along the major streams of the survey area and on islands in large rivers.

Representative profile (NE¼NE¼ sec. 27, T. 22 N., R. 5 W.):

O1—2 inches to 0, dark-brown (10YR 2/2) partly decomposed organic matter; many roots; very strongly acid; clear, smooth boundary.

A1—0 to 3 inches, very dark gray (10YR 3/1) fine sandy loam; weak, medium, granular structure; very friable; many roots; very strongly acid; clear, wavy boundary.

C—3 to 45 inches, dark-gray (5Y 4/1) silt loam, fine sand, and very fine sand in sorted stratified layers that range from less than 1 inch to 5 inches in thickness; a few isolated patches of very dark brown (10YR 3/2), buried organic material; massive; very friable; a few roots to a depth of 30 inches; strongly acid.

In places the thin dark-colored A horizon is absent. The texture of the A1 horizon ranges from fine sandy loam to silt loam within short distances, but it generally is fine sandy loam in the uppermost 7 inches. The strata of silty and sandy sediment in the C horizon vary in number, thickness, and arrangement. The sediment commonly ranges from 40 to 60 inches in thickness over very gravelly sand.

Permeability and available water capacity are moderate in this soil. Plant roots can penetrate to a depth of 30 inches. Runoff is slow. In places this soil is flooded occasionally for short periods. Water erosion is a hazard in areas near rivers and streams.

Included with this soil in mapping are sloughs, abandoned secondary channels, and small depressions where drainage is somewhat poor. Also included are patches of Moose River, Niklason, Schrock, and Wasilla soils.

Most of this Susitna soil is wooded, but a few areas are cleared and used as cropland. The principal crops are perennial grasses, oats, barley, potatoes, and hardy vegetables. The wooded areas are used mainly as wildlife habitat, though a few trees are harvested to provide logs and fuel. Management group 1 (IIc–1).

Susitna and Niklason fine sandy loams, overflow (0 to 3 percent slopes) (Sw).—The soils in this mapping unit are on flood plains along the major streams of the survey area and on islands in large rivers. Some areas consist only of Susitna soils; other areas consist of Niklason soils, and others are made up of both soils. Each soil has a profile similar to the one described as representative of its respective series.

Included with these soils in mapping are patches of Gravelly alluvial land and Mixed alluvial land. Also included are a few small tracts of Chena soils. These areas generally are dissected by many sloughs and by small stream channels.

The soils in this unit generally are flooded one or more times each year for short periods. In places along the banks of streams the hazard of erosion is severe.

The soils in this unit commonly are wooded, and the trees are large cottonwoods. In places the understory is a dense stand of willows that provides habitat for wildlife. Management group 18 (IVw–1).

Terrace Escarpments

Terrace escarpments (Te) consist mainly of silty and sandy material along flood plains of the Susitna River. The areas are very steep and are made up of active landslides and gullies that are separated by alternate strips and patches of stabilized areas. The active landslides are almost bare of vegetation, but willow, alder, and paper birch grow on most of the stabilized patches. Included in mapping are a few small areas of Bernice soils and a few wet seepage spots.

The hazard of water erosion is very severe on Terrace escarpments. In places floodwaters undercut the areas and cause new landslides and gullies.

Stabilized areas of Terrace escarpments are wooded and are used as wildlife habitat. Management group 30 (VIIIe–1).

Tidal Flats

Tidal flats (Tf) consist of layered tidal deposits on broad areas along the edges of Cook Inlet. The flats range from sand to clay in texture. They are inundated regularly by high tides. Most areas are bare of vegetation, but sparse stands of beach wild-rye and sedges grow in places. Included in mapping are a few patches of Tidal marsh, which occupies higher positions and has a more dense cover of vegetation than Tidal flats.

Tidal flats are used as wildlife habitat, mainly by shore birds and migratory waterfowl. Management group 32 (VIIIw–1).

Tidal Marsh

Tidal marsh (Tm) consists of nearly level, poorly drained, bluish-gray, clayey, tidal sediment. It is on plains along the edges of Cook Inlet. Although the areas are a few feet above the level of average high tides, they are inundated occasionally by exceptionally high tides and by overflow from fresh-water streams that empty into Cook Inlet. The vegetation consists of dense stands of grasses, sedges, and other plants that commonly grow in coastal meadow.

Included with Tidal marsh in mapping are patches of Clunie peat. Also included are a few moderately well drained soils on narrow natural levees along small streams.

This land type is used as wildlife habitat, chiefly by migratory waterfowl and by moose as a calving ground in spring. Management group 23 (VIw–1).

Wasilla Series

In the Wasilla series are nearly level, poorly drained soils that formed in silt loam and silty clay loam sediment laid down by water. Some of these soils are on flood plains along secondary streams, and others are in shallow depressions on broad alluvial plains along the major rivers of the survey area. The vegetation is dominantly alder, willow, and patches of grass, but cottonwood and paper birch grow in scattered areas. Elevation ranges from 10 to 400 feet. These soils generally are near soils of the Killey and Susitna series.

In a representative profile a mat of organic matter overlies about 2 inches of dark-brown silt loam. The next layer is mottled very dark grayish-brown silt loam about 5 inches thick. Below is dark-gray and olive-gray, layered silt loam and silty clay loam sediment that contains brownish and reddish mottles.

Most of the acreage of Wasilla soils is wooded.

Wasilla silt loam (0 to 3 percent slopes) (Wa).—This is the only Wasilla soil mapped in the survey area. It is on flood plains along secondary streams and in shallow depressions on alluvial plains along large rivers.

Representative profile (SW¼NE¼ sec. 33, T. 16 N., R. 5 W.):

O1—4 to 2 inches, very dark brown (10YR 2/2) mat of coarse, partly decomposed organic matter; many fine roots; clear, smooth boundary.

O2—2 inches to 0, black (10YR 2/1), finely divided organic matter; many fine roots; very strongly acid; clear, smooth boundary.

A1—0 to 2 inches, dark-brown (7.5YR 3/2) silt loam; moderate, fine, granular structure; slightly sticky, slightly plastic; many fine roots; strongly acid; abrupt, wavy boundary.

AC—2 to 7 inches, very dark grayish-brown (2.5Y 3/2) silt loam; a few, fine, prominent mottles of yellowish red (5YR 4/6); a few streaks of dark reddish brown; weak, fine, granular structure; slightly sticky, nonplastic; common roots; strongly acid; gradual boundary.

C1g—7 to 13 inches, dark-gray (5Y 4/1) silt loam; common, medium, distinct mottles of light yellowish brown (10YR 4/4); weak, thin, platy structure; slightly sticky, slightly plastic; a few roots; a few streaks of dark reddish brown; strongly acid; clear, smooth boundary.

IIC2g—13 to 23 inches, dark-gray (5Y 4/1) silty clay loam; a few, medium, prominent mottles of strong brown (7.5YR 5/6); patches of olive gray; moderate, thin, platy structure; moderately firm; slightly sticky, plastic; a few roots; common fine pores; strongly acid; clear, smooth boundary.

IIIC3g—23 to 40 inches, olive-gray (5Y 5/2) silt loam, fine sandy loam, and silty clay loam in stratified layers as much as 3 inches thick; common, coarse, distinct mottles of dark yellowish brown (10YR 4/4) and a few, medium, prominent mottles of dark reddish brown (5YR 3/4); massive; nonsticky, nonplastic; a few pockets of sandy clay loam; a few rounded pebbles; strongly acid.

In places the dark-brown A1 horizon is absent. The silt loam and silty clay loam water-laid sediment ranges from 40 inches to many feet thick over gravelly material.

Permeability is moderate in the silt loam sediment and moderately slow in the silty clay loam layers. Unless artificially drained, this soil is nearly saturated throughout the growing season. The water table generally is at a depth of more than 2 feet, but in places floods occur occasionally for short periods. Plant roots can penetrate to a depth of about 24 inches.

Included with this soil in mapping are patches of Killey, Moose River, and Susitna soils.

Wasilla silt loam is in vegetation and is used as wildlife habitat. Management group 13 (IIIw–2).

Whitsol Series

In the Whitsol series are nearly level to hilly, well-drained, silty soils on terraces and moraines. The vegetation is dominantly paper birch and white spruce. Elevation ranges from about 100 to 800 feet. These soils generally are near soils of the Kashwitna and Nancy series.

In a representative profile a mat of decomposing moss and forest litter overlies a gray silt loam layer, about 2 inches thick, that rests abruptly on dark reddish-brown to strong-brown silt loam about 9 inches thick. Next is dark-brown, yellowish-brown, and olive-brown silt loam that extends to a depth of about 23 inches. Below is olive silt loam and olive-gray very fine sandy loam that rests abruptly on very gravelly sand at a depth of about 44 inches.

Most areas of these soils are wooded and are used as wildlife habitat, but a few areas are cleared and used as cropland. The principal crops are bromegrass, oats, barley, potatoes, and hardy vegetables.

Whitsol silt loam, nearly level (0 to 3 percent slopes) (WhA).—This soil has the profile described as representative of the series. It is on broad areas on high terraces.

Representative profile (SE¼NE¼ sec. 18, T. 20 N., R. 4 W.; 50 feet northwest of quarter corner marker):

O1—3 inches to 0, dark reddish-brown (5YR 2/2), mat of decomposing moss and forest litter; many roots; mycelia; very strongly acid; abrupt, wavy boundary.

A2—0 to 2 inches, gray (10YR 5/1), silt loam; weak, thin, platy structure; very friable; many roots; charcoal fragments; very strongly acid; abrupt, irregular boundary.

B21—2 to 4 inches, dark reddish-brown (5YR 3/4), silt loam; patches of brown (7.5YR 4/4); moderate, fine, granular structure; very friable; common roots; a few very fine concretions; strongly acid; clear, wavy boundary.

B22—4 to 11 inches, strong-brown (7.5YR 5/6), silt loam; streaks and patches of dark brown (7.5YR 4/4) and yellowish brown (10YR 5/4); weak, thin, platy structure; friable; slightly smeary when rubbed between the fingers; common roots; strongly acid; abrupt, wavy boundary.

A2b—11 to 13 inches, grayish-brown (2.5Y 5/2), silt loam; weak, thin, platy structure; friable; a few roots; strongly acid; abrupt, broken boundary.

B2b—13 to 17 inches, dark-brown (7.5YR 4/4) and yellowish-brown (10YR 4/4), silt loam; convoluted color pattern; a few patches of material from A2b horizon; weak, fine, subangular blocky structure; very friable; gritty when rubbed between the fingers; a few roots; strongly acid; clear, wavy boundary.

B3b—17 to 23 inches, dark yellowish-brown (10YR 4/4) and olive-brown (2.5Y 4/4), silt loam; convoluted color pattern; weak, thin, platy structure; friable; a few roots; a few fine pores; strongly acid; gradual boundary.

C1—23 to 34 inches, olive (5Y 4/3) silt loam; moderate, thin, platy structure; friable; a few roots; a few fine pores; strongly acid; clear, smooth boundary.

C2—34 to 44 inches, olive-gray (5Y 4/2) very fine sandy loam; massive; friable; a few streaks of olive brown (2.5Y 4/4); strongly acid; clear, smooth boundary.

C3—44 to 56 inches, olive (5Y 4/3), very gravelly sand; single grain; loose; a few pockets of silt and fine sand; many rounded cobblestones; strongly acid.

In places the B horizon has a patchy or convoluted color pattern, but the color generally is fairly uniform throughout the horizon. In places the C1 horizon contains a few thin strata of fine sand and very fine sand. The mantle of silt loam ranges from 40 to 60 inches in thickness over sand or very gravelly sand.

Permeability is moderate in this soil, and available moisture capacity is moderate to high. Plant roots can penetrate to a depth of about 30 inches. Runoff is slow. Fertility is low.

Included with this soil in mapping are patches of Chulitna, Kashwitna, and Nancy soils. Also included are a few small depressions and undulating areas.

Most of this Whitsol soil is wooded, but a few areas are cleared and used as cropland. The principal crops are bromegrass grown for hay and silage, oats, barley, potatoes, and hardy vegetables. The wooded areas are used mainly as wildlife habitat, but in places paper birch and white spruce are harvested to provide logs and fuel. Management group 2 (IIc–2).

Whitsol silt loam, undulating (3 to 7 percent slopes) (WhB).—This soil is on terraces and low moraines.

Permeability is moderate, and available moisture capacity is moderate to high. Plant roots can penetrate to a depth of 30 inches. Runoff is slow to medium, and the hazard of erosion is slight to moderate. Fertility is low.

Included with this soil in mapping are a few tracts of Whitsol silt loam, rolling, and patches of Chulitna, Kashwitna, and Nancy soils. Also included are a few small depressions where drainage is poor.

Most of this Whitsol soil is wooded, but a few areas are cleared and used as cropland. The principal crops are bromegrass grown for hay and silage, oats, barley, potatoes, and hardy vegetables. The wooded areas are used mainly as wildlife habitat, though in places a few paper birch and white spruce are harvested to provide logs and fuel. Management group 4 (IIe–2).

Whitsol silt loam, rolling (7 to 12 percent slopes) (WhC).—This soil is on low moraines. Slopes are short and irregular.

Permeability is moderate, and available moisture capacity is moderate to high. Plant roots can penetrate to a depth of 30 inches. Runoff is medium, and the hazard of erosion is moderate. Fertility is low.

Included with this soil in mapping are patches of Chulitna and Nancy soils. Also included are a few tracts of Whitsol silt loam, hilly, and a few small depressions where drainage is poor.

Most of this Whitsol soil is wooded, but a few areas are cleared and used as cropland. The principal crops are bromegrass grown for hay and silage, oats, barley, potatoes, and hardy vegetables. The wooded areas are used as wildlife habitat, and a few areas near lakes and streams are used for recreational cabins and campsites. Management group 7 (IIIe–2).

Whitsol silt loam, hilly (12 to 20 percent slopes) (WhD).—This soil occupies areas on moraines.

Permeability is moderate, and available moisture capacity is moderate to high. Plant roots can penetrate to a depth of 30 inches. Runoff is medium to rapid, and the hazard of erosion is moderate to severe. Fertility is low.

Included with this soil in mapping are patches of Chulitna and Nancy soils. Also included are a few areas where slopes are short and moderately steep.

Most of this Whitsol soil is wooded and is used mainly as wildlife habitat. A few areas near lakes and streams are used for recreational cabins and campsites. Management group 14 (IVe–1).

Whitsol silt loam, moderately steep (20 to 30 percent slopes) (WhE).—A few areas of this soil are on moraines and terrace escarpments. Slopes generally are short and irregular.

Permeability and available moisture capacity are moderate. Plant roots can penetrate to a depth of about 30 inches. Runoff is rapid, and the hazard of erosion is very severe. Fertility is low.

Included with this soil in mapping are small areas of Chulitna and Nancy soils.

All of this Whitsol soil is wooded and is used as wildlife habitat. Management group 20 (VIe–1).

Use and Management of the Soils

This section contains information concerning the use and management of soils in the Susitna Valley Area for crops and pasture, woodland, wildlife, recreation, and engineering.

Crops and Pasture

This subsection discusses land clearing, fertilizer needs, and yields of suitable crops. Then the system of capability classification used by the Soil Conservation Service is described, and suggested management by groups of soils, or capability units, is given.

Land clearing

Most of the soils in the Susitna Valley Area are wooded. If cleared, however, many of these soils are potentially suitable for crops and pasture. Harvesting the merchantable trees before clearing land for crops prevents waste and facilitates clearing.

The well-drained soils can be cleared at any time of the year except in winter, when deep snows are a hindrance. If the soil is not frozen, brush and trees that are left after logging can be removed by a bulldozer equipped with a scarifier blade.

If the soil is frozen, brush and trees can be cut by a bulldozer equipped with a shearing blade. This method is effective in improving pasture or in clearing light brush and trees from areas not intended for intensive development. In places where trees larger than about 6 inches in diameter are sheared, however, removing stumps and heavy roots is difficult and time consuming. After the soil thaws in spring or in summer, stumps and large roots can be moved to windrows by a scarifier blade. Small stumps and roots can be removed by a large breaking plow or a heavy disk, but this method generally involves the difficult task of removing many roots and other debris by hand before the soil can be tilled. If these materials are left in the soil, they decompose slowly, and the larger pieces are likely to interfere with cultivation for many years.

Freeing roots and stumps of as much soil as possible before pushing them into windrows for burning is a significant practice to be followed in clearing land in the Area. This practice is especially important where soils are shallow to gravel and stones that can interfere with tillage.

Poorly drained soils generally can be cleared with heavy equipment if they are frozen or are artificially drained. Such soils commonly have a thick mat of moss or sedges on the surface. This mat should be removed during clearing because it tends to prevent the soil from drying.

In undisturbed soils on uplands, organic matter commonly concentrates on the surface in a mat that is 2 to 4 inches thick. It is important that some of this material be left on the surface during land clearing. If the material is mixed with the underlying mineral soil, it helps to maintain good soil tilth and to promote infiltration of water.

Leaving a strip of vegetation of adequate width and spacing on areas where soil blowing is a hazard helps to protect the soil from blowing by strong winds.

Keeping windrows and debris intended for burning clear of wooded areas and brush helps to keep fires from spreading.

Fertilizer requirements

Good growth of crops in the Area depends largely on whether the soils are adequately fertilized. Large amounts of fertilizer that contains nitrogen, phosphorus, and potassium are needed on all of the soils. Nitrogen is especially needed on newly cleared soils because much nitrogen is used by bacteria in decomposing the organic material. Periodic testing of the soil generally is the most efficient method of determining fertilizer needs. The requirements depend upon the fertility or tilth of the soil, the need of the crop, past management, and other factors. On the basis of experience and research, the Alaska Agricultural Experiment Station (*11*) periodically publishes minimum fertilizer application rates. These rates, provided as a guide for determining fertilizer needs, are general suggestions and are subject to change.

Under continued cultivation the structure of the soils in the survey area tends to break down. Adding manure or other organic material helps to maintain tilth. Most of the soils are strongly acid or very strongly acid, and field tests have shown that liming is beneficial for most crops.

Suitable crops

Only crops that grow in cool climates where the days in summer are long are adapted to the Susitna Valley Area. Perennials must be winter hardy (*5*).

Smooth bromegrass is the principal grass crop, but a variety of timothy developed by the Alaska Agricultural Experiment Station grows in many places. These perennial grasses provide hay, silage, and pasture. Other perennial grasses that are adapted to the Area include meadow foxtail, red fescue, reed canarygrass, and Kentucky bluegrass.

Annual crops suitable for silage are grown from a mixture of oats and peas or of oats and vetch.

Climatically adapted varieties of red clover, alsike clover, white Dutch clover, sweetclover, and alfalfa, generally seeded with grasses, are grown, but not extensively.

Spring barley and oats are the main cereal crops. The harvested grains commonly need artificial drying for safe storage. The crops generally are sold or are used for livestock feed, but the oat varieties adapted to the Area are suitable for milling, and the barley varieties are suitable for malting.

Root and leafy vegetables that mature early are especially well suited to the Area. These crops include potatoes, carrots, head lettuce, cabbage, radishes, turnips, onions, garden peas, rutabagas, broccoli, brussels sprouts, cauliflower, beets, and celery. Tomatoes, cucumbers, and sweet corn generally can be grown only in greenhouses.

Several varieties of raspberries, strawberries, and currants are also well suited. Native berries include lingenberries, blueberries, raspberries, mooseberries (highbush cranberries), cloudberries, and currants. Except for the Siberian crabapple, fruit trees have not been grown successfully.

Estimated yields

Estimated average yields per acre of principal crops grown on soils in the Area are given in table 2. These estimates are averages expected over several years and are given for two levels of management. The yields in columns A are expected under average management, and those in columns B are expected under improved management. The estimates were made on the basis of information from the Alaska Agricultural Experiment Station, the Alaska Agricultural Crop Reporting Service (*18*), agricultural fieldworkers, and farmers.

Practices and conditions under average management include the following: (1) Minimum amounts of fertilizer are applied according to results of occasional soil tests, but fertility is commonly not adequate for optimum plant growth; (2) sod crops, barnyard manure, and crop residue are used to a limited extent, but the quality and quantity generally are inadequate for the most efficient use of moisture and plant nutrients; (3) conservation practices to control soil blowing and water erosion are applied to a limited extent, but they generally are not adequate on all fields; (4) weeds and harmful insects are controlled to some extent on cropland, but seldom on pastures; (5) cutting and grazing of forage is only partly regulated, and stands are weakened by overgrazing; (6) artificial drainage is adequate on soils that require it; (7) the soil reaction generally is below the desirable range for optimum plant growth.

TABLE 2.—*Estimated average yields per acre of principal crops under two levels of management*

[Yields in columns A can be expected under an average level of management; those in columns B can be expected under improved management. Absence of data indicates that the crop is not grown or is not suited to the soil specified. Gravelly alluvial land, Gravel pits, Terrace escarpments, Tidal flats, and Tidal marsh are not included in this table, because they are not suitable for crops]

Soil	Oats		Barley		Bromegrass-hay (two cuttings)		Silage				Potatoes		Pasture productivity [2]
							Oats and peas		Grass [1]				
	A	B	A	B	A	B	A	B	A	B	A	B	
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	
Bernice sandy loam, steep													Poor.
Caswell silt loam	50	65	40	55	2.0	3.3	8.0	10.5	3.0	4.7	8.5	12.0	Good.
Chena fine sandy loam					1.0	2.0			2.0	3.0			Poor.
Chulitna silt loam, nearly level	50	65	40	55	2.3	3.5	8.5	11.0	3.2	5.0	9.0	13.0	Good.
Chulitna silt loam, undulating	50	65	40	55	2.3	3.5	8.5	11.0	3.2	5.0	8.5	12.5	Good.
Chulitna silt loam, rolling	45	60	35	50	2.0	3.3	8.0	10.5	3.0	4.8	8.0	12.0	Good.
Clunie peat													Poor.
Coal Creek silt loam					2.0	3.5	8.0	11.0	3.0	5.0			Good.
Delyndia silt loam, nearly level	45	60	35	50	2.0	3.0	8.0	10.5	3.0	4.5	7.5	11.0	Good.
Delyndia silt loam, undulating	45	60	35	50	2.0	3.0	8.0	10.5	3.0	4.5	7.5	11.0	Good.
Delyndia silt loam, rolling	40	55	30	45	2.0	3.0	7.5	10.2	3.0	4.5	7.0	10.5	Good.
Delyndia silt loam, hilly	35	50	25	40	1.3	2.5	6.8	9.5	2.0	3.5			Fair.
Delyndia-Salamatof complex													Poor.
Dinglishna sandy loam													Poor.
Dinglishna-Moose River complex													Poor.
Flat Horn silt loam, nearly level	55	70	45	60	2.5	3.5	9.0	12.0	3.5	5.0	9.0	13.0	Good.
Flat Horn silt loam, undulating	55	70	45	60	2.5	3.5	9.0	12.0	3.5	5.0	8.5	12.5	Good.
Homestead silt loam, nearly level	35	50	25	40	1.5	2.5	6.0	8.5	2.0	3.2			Fair.
Homestead silt loam, undulating	35	50	25	40	1.5	2.5	6.0	8.5	2.0	3.2			Fair.
Homestead silt loam, rolling	35	50	25	40	1.5	2.5	6.0	8.5	2.0	3.2			Fair.
Homestead silt loam, hilly					1.2	2.0			1.8	2.8			Fair.
Homestead silt loam, moderately steep					1.0	1.8			1.5	2.5			Fair.
Jacobsen very stony silt loam													Poor.
Kalifonsky silt loam	40	55	30	45	2.0	3.3	8.0	11.0	3.0	4.5	6.0	9.0	Good.
Kashwitna silt loam, nearly level	40	55	30	45	2.0	3.0	7.2	10.0	3.0	4.2	6.5	10.0	Good.
Kashwitna silt loam, undulating	40	55	30	45	2.0	3.0	7.2	10.0	3.0	4.2	6.5	10.0	Good.
Kashwitna silt loam, rolling	40	55	30	45	1.8	3.0	7.2	10.0	3.0	4.2	6.5	10.0	Good.
Kashwitna silt loam, hilly	35	50	25	40	1.5	2.5	6.8	9.5	2.0	3.5			Fair.
Kashwitna silt loam, moderately steep					1.0	2.0			1.5	2.8			Fair.
Kashwitna silt loam, steep													Poor.
Killey-Moose River complex					1.2	2.5	6.0	8.5	1.8	2.8			Good.
Lucile silt loam	40	55	30	45	2.0	3.0	7.5	10.5	3.0	4.5	7.0	10.5	Good.
Mixed alluvial land													Poor.
Moose River silt loam													Fair.
Nancy silt loam, nearly level	50	65	40	55	2.3	3.5	8.5	11.0	3.2	5.0	8.5	12.5	Good.
Nancy silt loam, undulating	50	65	40	55	2.3	3.5	8.5	11.0	3.2	5.0	8.5	12.5	Good.
Nancy silt loam, rolling	45	60	35	50	2.0	3.2	8.0	10.5	3.0	4.8	8.0	12.0	Good.
Nancy silt loam, hilly	40	55	30	45	1.8	3.0	7.0	10.0	2.3	4.0			Good.
Nancy silt loam, moderately steep					1.2	2.3			1.7	3.0			Fair.
Nancy silt loam, steep													Poor.
Nancy silt loam, sandy substratum, nearly level	50	65	40	55	2.3	3.5	8.5	11.0	3.2	5.0	9.0	13.0	Good.
Nancy silt loam, sandy substratum, undulating	50	65	40	55	2.3	3.5	8.5	11.0	3.2	5.0	8.5	12.5	Good.
Nancy silt loam, sandy substratum, rolling	45	60	35	50	2.0	3.2	8.0	10.5	3.0	4.8	8.0	12.0	Good.
Nancy silt loam, sandy substratum, hilly	40	55	30	45	1.8	3.0	7.0	10.0	2.3	4.2			Good.
Nancy silt loam, sandy substratum, moderately steep					1.2	2.3			1.7	3.0			Fair.
Niklason fine sandy loam	45	60	35	50	2.0	3.0	8.0	10.5	3.0	4.5	7.5	11.0	Good.
Rabideux silt loam, nearly level	50	65	40	55	2.3	3.5	8.5	11.0	3.2	5.0	8.5	12.5	Good.
Rabideux silt loam, undulating	50	65	40	55	2.3	3.5	8.5	11.0	3.2	5.0	8.5	12.5	Good.
Rabideux silt loam, rolling	45	60	35	50	2.0	3.3	8.0	10.5	3.0	4.8	8.0	12.0	Good.
Rabideux silt loam, hilly	40	55	30	45	1.8	3.0	7.0	10.0	2.3	4.2			Good.
Rabideux silt loam, moderately steep					1.2	2.3			1.7	3.0			Fair.
Rabideux silt loam, steep													Poor.
Rabideux silt loam, shallow, nearly level	40	55	30	45	2.0	3.0	7.0	9.5	2.8	4.2	6.5	10.0	Good.
Rabideux silt loam, shallow, undulating	40	55	30	45	2.0	3.0	7.0	9.5	2.8	4.2	6.5	10.0	Good.
Rabideux silt loam, shallow, rolling	40	55	30	45	1.8	3.0	7.0	9.5	2.5	4.0	6.0	9.5	Good.
Rabideux silt loam, shallow, hilly	35	50	25	40	1.5	2.5	6.5	9.0	2.0	3.3			Fair.
Rabideux silt loam, shallow, moderately steep					1.0	2.0			1.5	2.8			Fair.

See footnotes at end of table.

TABLE 2.—*Estimated average yields per acre of principal crops under two levels of management*—Continued

Soil	Oats		Barley		Bromegrass-hay (two cuttings)		Silage				Potatoes		Pasture productivity [2]
							Oats and peas		Grass [1]				
	A	B	A	B	A	B	A	B	A	B	A	B	
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	
Rabideux silt loam, sandy substratum, nearly level	45	60	35	50	2.0	3.0	7.2	9.5	2.8	4.2	7.5	11.0	Good.
Rabideux silt loam, sandy substratum, undulating	45	60	35	50	2.0	3.0	7.2	9.5	2.8	4.2	7.5	11.0	Good.
Rabideux silt loam, sandy substratum, rolling	40	60	30	50	1.8	3.0	7.0	9.5	2.5	4.0	7.0	10.5	Good.
Rabideux silt loam, sandy substratum, hilly	35	50	25	40	1.5	2.5	6.5	9.0	2.0	3.3	------	------	Fair.
Rabideux silt loam, sandy substratum, moderately steep	----	----	----	----	1.0	2.0	------	------	1.5	2.8	------	------	Fair.
Salamatof peat	----	----	----	----	------	------	------	------	------	------	------	------	
Schrock silt loam, nearly level	55	70	45	60	2.5	3.5	9.0	12.0	3.5	5.0	9.5	13.5	Good.
Slikok mucky silt loam	----	----	----	----	1.5	2.5	7.0	9.0	2.0	3.5	------	------	Fair.
Susitna fine sandy loam	55	70	45	60	2.5	3.5	9.0	12.0	3.5	5.0	9.0	13.0	Good.
Susitna and Niklason fine sandy loams, overflow	----	----	----	----	2.0	3.0	------	------	2.8	4.0	------	------	Good.
Wasilla silt loam	45	60	35	50	2.5	3.5	8.0	11.0	3.5	5.0	7.0	10.5	Good.
Whitsol silt loam, nearly level	55	70	45	60	2.5	3.5	9.0	12.0	3.5	5.0	9.5	13.5	Good.
Whitsol silt loam, undulating	55	70	45	60	2.5	3.5	9.0	12.0	3.5	5.0	9.5	13.5	Good.
Whitsol silt loam, rolling	50	65	40	55	2.5	3.5	8.5	11.0	------	------	------	------	Good.
Whitsol silt loam, hilly	45	60	35	50	2.3	3.3	8.0	10.5	------	------	------	------	Good.
Whitsol silt loam, moderately steep	----	----	----	----	1.8	3.0	------	------	------	------	------	------	Fair.

[1] Yields of grass silage are for a second cutting only; first cuttings commonly are harvested for hay.

[2] Pasture productivity ratings are based on the number of acres of improved pasture required to produce sufficient forage for one dairy cow, or an equivalent animal unit, for the entire pasture season under average management. The ratings are as follows: *Good*, 1 acre or less; *fair*, 1 to 2 acres; *poor*, more than 2 acres.

The following practices and conditions are included under improved management: (1) Fertilizer is applied at maximum rates determined from periodic soil tests, and adequate fertility is maintained for optimum plant growth; (2) barnyard manure, crop residue, and grass crops are used intensively, and sufficient organic matter is maintained for the most efficient use of moisture and plant nutrients; (3) conservation practices are applied to the fullest extent for control of soil blowing and water erosion; (4) weeds and harmful insects are controlled on crops as well as on pasture; (5) cutting and grazing of forage are carefully managed to maintain vigorous stands; (6) artificial drainage is adequate on soils that require it; (7) if necessary, lime is applied at rates required to bring the soil reaction within the range that is most desirable for optimum plant growth.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering.

In the capability system, all kinds of soil are grouped at three levels, the capability class, subclass, and unit. These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils (none in Area) have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils (none in Area) are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. In this survey they are designated management groups. The soils in one capability unit 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 generally designated by adding an Arabic numeral to the subclass symbol; for example, IIe–1 or IIIs–2. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass. In this survey the capability unit numbers are in parentheses following the management group numbers.

Management groups

In the pages that follow, management groups of the Susitna Valley Area are described, and suggestions are given for the use, management, and conservation of the soils in each group. The names of soil series represented in a management group are mentioned in the description of each group, but this does not mean that all soils in a given series are in the group. To find the names of all the soils in any management group, refer to the "Guide to Mapping Units" at the back of this survey.

Fertilizer is needed and lime is beneficial for most of the soils in management groups 1 through 19. Lime and fertilizer, however, should be added to the soils in accordance with the needs indicated by tests and field trials. No specific recommendations are made as to the amounts and kinds of fertilizer needed, the most suitable crop varieties, or the best seeding rates, because these elements change as new developments occur in farming. Current information and recommendations are available from the local Extension Service agent and from the Alaska Agricultural Experiment Station.

MANAGEMENT GROUP 1 (IIc–1)

This group consists of nearly level, well-drained soils of the Flat Horn, Schrock, and Susitna series. These soils formed in deep silty and sandy sediment laid down by water. Most of these soils are on alluvial plains and low terraces.

Permeability and available moisture capacity are moderate in these soils. The soils are very strongly acid near the surface and strongly acid in the subsoil. Fertility is low. Plant roots generally can penetrate to a depth of 30 inches. Runoff is slow, and the hazard of erosion generally is slight, but in places along the river streambank erosion occurs.

Most of the acreage of these soils is wooded. A few areas have been cleared for cultivation, and the principal crops are bromegrass, barley, oats, potatoes, and hardy garden vegetables.

Organic matter is needed to help keep these soils in good tilth and to promote efficient use of moisture and plant nutrients. Returning crop residue to the soil, adding manure, and including grasses and legumes in the cropping sequence are ways to help maintain the content of organic matter. Leaving a border of native vegetation along unstable streambanks in areas cleared for cultivation helps to control accelerated erosion.

MANAGEMENT GROUP 2 (IIc–2)

In this group are nearly level, well-drained silt loams of the Chulitna, Nancy, Rabideux, and Whitsol series. These soils formed in moderately deep and deep wind-laid silt over very gravelly or sandy material. They are on terraces.

Permeability is moderate in the silty material, and available moisture capacity is moderate to high. These soils are strongly acid to very strongly acid. Fertility is low. Plant roots can penetrate to a depth of about 30 inches. Runoff is slow, and the hazard of erosion is slight.

Most of the acreage of the soils in this group is wooded, but scattered tracts are cleared for crops. The principal crops are bromegrass, barley, potatoes, and hardy vegetables.

Organic matter is needed to help keep these soils in good tilth and to promote efficient use of moisture and plant nutrients. Returning crop residue to the soil, adding manure, and including grasses and legumes in the cropping sequence are ways to help maintain the content of organic matter. In places shallow drainage ditches or fill materials are needed to remove excess water from wet spots.

MANAGEMENT GROUP 3 (IIe–1)

Only Flat Horn silt loam, undulating, is in this group. This well-drained soil is on terraces. It formed in a mantle of silty material underlain by stratified fine sand and silt.

Permeability is moderate in this soil, and available moisture capacity is moderate. This soil is strongly acid, and fertility is low. Plant roots can penetrate to a depth of 30 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate.

Most of the acreage of this soil is forested. A few acres, however, have been cleared for cultivation, and the principal crops are bromegrass, barley, potatoes, and hardy vegetables.

Organic matter is needed to keep this soil in good tilth and to promote efficient use of moisture and plant nutrients. Returning crop residue to the soil, adding manure, and including grasses and legumes in the cropping system are ways to help maintain the content of organic matter. Farming on the contour, using grassed waterways, and growing grass crops help to control erosion.

MANAGEMENT GROUP 4 (IIe–2)

This group consists of undulating, well-drained silt loams of the Chulitna, Nancy, Rabideux, and Whitsol series. These soils are moderately deep to deep over very gravelly or sandy material. They are on terraces.

Permeability is moderate in the silty material, and available moisture capacity is moderate to high. These soils are strongly acid to very strongly acid. Fertility is low. Plant roots generally can penetrate to a depth of about 30 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate.

Most of the acreage of the soils in this group is wooded, but a few areas are cleared for use as cropland. The major crops are bromegrass, barley, oats, potatoes, and hardy vegetables.

Organic matter is needed to help keep these soils in good tilth and to promote efficient use of moisture and plant nutrients. Returning crop residue to the soil, adding manure, and including grasses and legumes in the cropping sequence are ways to help maintain the content of organic matter. Farming on the contour, using grassed waterways, and growing grasses in the rotation are practices that help to control water erosion. In places shallow drainage ditches or fill materials are needed to remove excess water from wet spots.

MANAGEMENT GROUP 5 (IIw–1)

Only Caswell silt loam is in this group. This nearly level, moderately well drained soil is in depressions and along the edges of muskegs. It formed in moderately deep silty and sandy sediment over very gravelly material.

Permeability and available moisture capacity are moderate in this soil. The soil is strongly acid to very strongly acid. Fertility is low. Plant roots can penetrate to a depth of 30 inches. Runoff is slow, and the hazard of erosion is slight.

Most of Caswell silt loam is wooded, but it is suitable for farming. All crops adapted to the Area are suited. In places drainage ditches would likely be needed to remove excess water. Returning crop residue to the soil, adding manure, and including grasses in the cropping sequence are ways to help maintain the content of organic matter needed to keep this soil in good tilth and to promote efficient use of plant nutrients.

MANAGEMENT GROUP 6 (IIIe–1)

This group consists of undulating and rolling, well-drained silt loams of the Kashwitna and Rabideux series. These soils are shallow to very gravelly material. They are on uplands.

Permeability is moderate in the uppermost part of these soils and rapid in the lower part. Available moisture capacity is low to moderate. These soils are strongly acid to very strongly acid. Fertility is low. Plant roots can penetrate to a depth of about 24 inches. Runoff is slow to medium, and the hazard of erosion is slight to moderate.

Most of the acreage of these soils is wooded, though a few areas are cleared and are used for crops. The principal crops are bromegrass, barley, oats, potatoes, and hardy vegetables.

Organic matter is needed to help keep these soils in good tilth and to promote efficient use of moisture and plant nutrients. Returning crop residue to the soil, adding manure, and including grasses and legumes in the cropping sequence are ways to help maintain the content of organic matter. Farming on the contour, using grassed waterways, contour stripcropping, and growing grasses in the rotation are practices that help to reduce washing and to keep gullies from forming.

MANAGEMENT GROUP 7 (IIIe–2)

In this group are rolling, well-drained silt loams of the Chulitna, Nancy, Rabideux, and Whitsol series. These soils are moderately deep and deep over very gravelly material and are on uplands.

Permeability is moderate in the silty material. Available moisture capacity is moderate to high. These soils are strongly acid to very strongly acid. Fertility is low. Plant roots can penetrate to a depth of about 30 inches. Runoff is medium, and the hazard of water erosion is moderate.

Most of the acreage of the soils in this group is wooded, but a few areas are cleared and are used for crops. The principal crops are bromegrass, barley, oats, potatoes, and hardy vegetables.

Returning crop residue to the soil, adding manure, and including grasses in the cropping sequence are ways to help maintain the content of organic matter needed to keep these soils in good tilth. Farming on the contour, using grassed waterways, and growing grass crops in the rotation are practices that help to control water erosion.

MANAGEMENT GROUP 8 (IIIe–3)

In this group are undulating and rolling, well-drained and excessively drained silt loams of the Delyndia and Rabideux series. These soils formed in a mantle of silty material over deep fine sand. They are on uplands.

Permeability is moderate in the uppermost part of these soils and rapid in the sandy material. Available moisture capacity is low to moderate. These soils are very strongly acid. Fertility is low. Plant roots can penetrate to a depth of 30 inches. Runoff is slow to medium, and the hazard of erosion is slight to moderate.

Most of the acreage of these soils is wooded, but a few areas are cleared and are used for crops. The principal crops are bromegrass, barley, oats, potatoes, and hardy vegetables. During seasons of low rainfall, or if rain is poorly distributed, yields are likely to be lowered by shortage of moisture. Consequently, organic matter is needed to promote efficient use of moisture in these soils. Returning crop residue to the soil, adding manure, and including grasses in the cropping sequence are ways to help to maintain the content of organic matter. Using grassed waterways and farming on the contour are practices that help to control water erosion.

MANAGEMENT GROUP 9 (IIIs–1)

In this group are nearly level, well drained and moderately well drained silt loams of the Kashwitna, Lucile, and Rabideux series. These soils are shallow over very gravelly material. They are on uplands.

Permeability generally is moderate in the uppermost

part of these soils and rapid in the very gravelly substratum. Available moisture capacity is low to moderate. These soils are very strongly acid. Fertility is low. Plant roots can penetrate to a depth of about 24 inches. Runoff is slow, and the hazard of water erosion is slight.

Most of the acreage of the soils in this group is wooded, but a few areas are cleared and are used for crops. The principal crops are bromegrass, barley, oats, potatoes, and hardy vegetables.

Organic matter is needed to help keep these soils in good tilth and to promote efficient use of moisture and plant nutrients. Returning crop residue to the soil, adding manure, and including grasses in the cropping sequence are ways to help maintain the content of organic matter.

MANAGEMENT GROUP 10 (IIIs–2)

Only Niklason fine sandy loam is in this group. This soil is nearly level, well drained, and shallow to moderately deep over very gravelly material. It is on alluvial plains along the banks of rivers and streams.

Permeability is moderate in the uppermost part of this soil and rapid in the very gravelly substratum. Available moisture capacity is low to moderate. This soil is strongly acid. Plant roots can penetrate to a depth of 20 to 30 inches. Runoff is slow. The hazard of erosion is slight, except in places along rivers where streambanks commonly are undercut and washed away.

Niklason fine sandy loam is wooded, but it is suitable for cultivation. All crops adapted to the Area are suited. Organic matter is needed to help keep this soil in good tilth and to promote efficient use of moisture and plant nutrients. Returning crop residue to the soil helps to maintain the content of organic matter. Leaving areas next to streams in vegetation helps to control water erosion.

MANAGEMENT GROUP 11 (IIIs–3)

In this group are nearly level, well-drained and somewhat excessively drained silt loams of the Delyndia and Rabideux series. These soils are on uplands. They are silty in the uppermost part and sandy in the subsoil and in the substratum.

Permeability is moderate in the silt loam part of this soil and moderately rapid in the sandy material. Available moisture capacity is low to moderate. These soils are very strongly acid. Fertility is low. Plant roots can penetrate to a depth of 30 inches. Runoff is slow, and the hazard of erosion is slight.

Most of the acreage of these soils is wooded, but a few areas are cleared and are used for crops. The principal crops are bromegrass, barley, oats, potatoes, and hardy vegetables.

Organic matter is needed to help keep these soils in good tilth and to promote efficient use of moisture and plant nutrients. Returning crop residue to the soil, adding manure, and including grasses in the cropping sequence are ways to help maintain the content of organic matter.

MANAGEMENT GROUP 12 (IIIw–1)

Only Kalifonsky silt loam is in this group. It is nearly level, poorly drained, and 15 to 30 inches deep over very gravelly sand. This soil is on the edges of muskegs and in depressions.

Permeability is moderate in this soil. The soil is strongly acid. Fertility is low. Plant roots generally can penetrate to a depth of about 24 inches. If this soil is not drained, the water table fluctuates between depths of 12 and 40 inches. The soil is nearly saturated during most of the growing season. Runoff is slow, and the hazard of erosion is slight.

Kalifonsky silt loam is wooded. If cleared and artificially drained, it would be suitable for crops. Grasses, small grains, and hardy vegetables are suited.

MANAGEMENT GROUP 13 (IIIw–2)

Only Wasilla silt loam is in this group. This soil is nearly level and poorly drained. It is on flood plains and in depressions.

Permeability is moderate in the uppermost part of this soil and moderately slow in the subsoil and in the substratum. This soil is strongly acid. Fertility is low. Plant roots can penetrate to a depth of about 24 inches. The water table generally is at a depth of 2 to 4 feet. Runoff is slow, and erosion is not a hazard.

Wasilla silt loam is covered by natural vegetation. The areas generally are wet throughout the growing season. If this soil were cleared and artificially drained, it would be suitable for crops and for pasture.

MANAGEMENT GROUP 14 (IVe–1)

In this group are hilly, well-drained silt loams of the Nancy, Rabideux, and Whitsol series. These soils are moderately deep and deep over very gravelly or sandy material. They are on uplands. Slopes are short and irregular.

Permeability is moderate in the silty part of these soils. Available moisture capacity is moderate to high. These soils are strongly acid to very strongly acid. Fertility is low. Plant roots can penetrate to a depth of 30 inches. Runoff is rapid, and the hazard of water erosion is severe.

Most of the acreage of the soils in this group is wooded. Keeping a cover of grass on areas that are cleared helps to control water erosion.

MANAGEMENT GROUP 15 (IVe–2)

This group consists of hilly, well-drained silt loams of the Kashwitna and Rabideux series. These soils are shallow to very gravelly material. They are on uplands and have short and irregular slopes.

Permeability is moderate in the uppermost part of these soils and rapid in the lower part. Available moisture capacity is low to moderate. These soils are strongly acid. Fertility is low. Plant roots can penetrate to a depth of 24 inches. Runoff is rapid, and the hazard of water erosion is severe.

Most of the acreage of these soils is wooded, but a few areas are cleared and are used for crops. Keeping a cover of grass on areas cleared for cultivation helps to control the hazard of water erosion.

MANAGEMENT GROUP 16 (IVe–3)

In this group are nearly level to rolling, moderately well drained and well drained silt loams of the Homestead series. These soils are shallow to coarse gravelly material. They are on uplands.

Permeability is moderate in the uppermost 5 to 10 inches of these soils and rapid in the coarse-textured underlying material. Available moisture capacity is low. These soils are strongly acid to very strongly acid. Fertility is low.

Plant roots can penetrate to a depth of 15 inches. Runoff is slow to medium, and the hazard of erosion is slight to moderate.

The soils in this group are wooded. If cleared for crops, they should remain in grasses most of the time. These soils tend to be droughty. They are shallow to gravel and are not suited to crops that need deep tillage.

MANAGEMENT GROUP 17 (IVe–4)

In this group are hilly, well drained and excessively drained silt loams of the Delyndia and Rabideux series. These soils formed in a mantle of silt loam over deep sand. They are on uplands and have short irregular slopes.

Permeability is moderate in the silt loam part of these soils and rapid in the sandy material in the substratum. Available moisture capacity is low to moderate. These soils are very strongly acid. Fertility is low. Plant roots can penetrate to a depth of 30 inches. Runoff is rapid, and the hazard of water erosion is severe.

Most of the acreage of the soils in this group is wooded, but a few areas have been cleared and are used as cropland. These soils are better suited to grasses than to cultivated crops. Keeping a protective cover of plants on the areas helps to prevent soil washing.

MANAGEMENT GROUP 18 (IVw–1)

This group consists of soils of the Killey, Moose River, Niklason, and Susitna series. These soils are nearly level and are well drained to somewhat poorly drained. They formed in medium-textured and coarse-textured sediment laid down by water. The areas are in a complex irregular pattern on flood plains. Patches of other soils generally are included with these soils.

Permeability is moderate in these soils. The soils are strongly acid and very strongly acid. Fertility is low to moderate. Plant roots can penetrate to a depth of about 15 to 30 inches. Some of these soils have a high water table during most of the growing season, and others are seasonally flooded for short periods. Runoff is slow.

All areas of the soils in this group have a cover of vegetation. In places the native grasses are suitable for limited grazing. If these soils are used for crops, artificial drainage or protection from flooding is needed. These practices, however, are not feasible on many small areas of included soils. If the soils in this group were cleared and drained or protected from flooding, they would be suited to grasses and small grains grown for forage. In places small areas of included soils that occupy slightly higher positions in the landscape are suitable for growing hardy vegetables.

MANAGEMENT GROUP 19 (IVw–2)

In this group are nearly level, poorly drained soils of the Coal Creek and Slikok series. These soils formed in deep silty material, in shallow depressions, and along small drainageways. The surface layer is silt loam or mucky silt loam.

Permeability of these soils is moderate. The water table is at a depth of as much as 36 inches. These soils are strongly acid to very strongly acid, and fertility is moderately low. Plant roots generally can penetrate to a depth of 20 to 30 inches. Runoff is slow.

The soils in this group are in vegetation. If artificially drained, they would be suitable for hardy vegetables and also for grasses and small grains grown for forage. In places these soils support native grasses that are suitable for limited grazing.

MANAGEMENT GROUP 20 (VIe–1)

This group consists of moderately steep, well-drained silt loams of the Kashwitna, Nancy, Rabideux, and Whitsol series. These soils are underlain by sand or very gravelly sand. They are on uplands. Slopes are short and irregular.

Permeability is moderate in the mantle of silt loam, and available moisture capacity is low to moderate. These soils are strongly acid to very strongly acid. Fertility is low. Plant roots can penetrate to a depth of 24 to 30 inches. Runoff is rapid, and the hazard of water erosion is very severe.

Most of the acreage of the soils in this group is wooded. These soils are not suitable for cultivation, because the hazard of gully erosion is severe on areas that are cleared. They are well suited to woodland, wildlife habitat, and recreational activities. If cleared, these soils can be improved for permanent pasture by preparing a rough seedbed, adding fertilizer, and seeding to adapted perennial grasses. Topdressing annually with fertilizer, regulating grazing, and controlling weeds are practices that help to keep permanent stands of grass in good condition.

MANAGEMENT GROUP 21 (VIe–2)

In this group are well-drained, hilly and moderately steep silt loams of the Homestead series. These soils are very shallow to coarse gravelly material. They are on uplands. Slopes are irregular.

Permeability is moderate in the silty surface layer and rapid in the very gravelly underlying material. Available moisture capacity is low. These soils are strongly acid. Fertility is low. Plant roots can penetrate to a depth of 15 inches. Runoff is rapid, and the hazard of water erosion is severe.

Most of the soils in this group have a cover of plants. They are not suitable for cultivation and should be left in permanent vegetation. Cleared areas can be renovated and seeded to perennial grasses for permanent pasture, but grazing must be carefully regulated to maintain a good stand of grass. Topdressing annually with fertilizer and controlling weeds are also needed.

MANAGEMENT GROUP 22 (VIs–1)

Only Chena fine sandy loam is in this group. This soil is nearly level, well drained, and shallow to silty and sandy sediment over sand and gravel. It is on alluvial plains along the major streams of the survey area.

Permeability is rapid, and available moisture capacity is low. This soil is medium acid. Fertility is low. Plant roots can penetrate to a depth of 15 inches. Runoff is slow, and the hazard of erosion is slight.

Most of Chena fine sandy loam is wooded. This soil is not suitable for cultivation, because of shallowness and low available moisture capacity. If cleared, areas of this soil could be renovated and seeded to perennial grasses for permanent pasture. Adding fertilizer, controlling weeds, and regulating grazing are practices that help to maintain satisfactory stands of grass.

MANAGEMENT GROUP 23 (VIw–1)

Only Tidal marsh is in this group. It consists of nearly level, poorly drained, clayey tidal sediment on plains along the edges of Cook Inlet.

Permeability and runoff are very slow. The areas of Tidal marsh are wet throughout the growing season, and they are inundated occasionally by exceptionally high tides or are flooded by overflow from fresh-water streams.

Tidal marsh supports stands of sedges, native grasses, and aquatic plants. In many places the vegetation is suitable for limited grazing. Topdressing with fertilizer and seeding to adapted perennial grasses are practices that help to improve the quality and quantity of forage for livestock.

MANAGEMENT GROUP 24 (VIw–2)

This group consists of nearly level, poorly drained soils of the Dinglishna and Moose River series. These soils formed in stratified silty and sandy sediment. They are on the edges of muskegs and along flood plains of small streams.

Permeability generally is moderate in most of these soils, but the cemented layer in the subsoil of the Dinglishna soils restricts the movement of air and water. The soils are strongly acid to very strongly acid. Fertility is low. Plant roots can penetrate to a depth of 12 to 15 inches. Runoff is very slow. The water table generally is near the surface, but in years when rainfall is less than normal it recedes rapidly to a depth of several feet for short periods. Some areas remain ponded for as much as several weeks.

The acreage of the soils in this group is wooded. In places native grasses are suitable for limited grazing. The soils in this group are not suitable for cultivation, but if artificially drained they could be seeded to adapted grasses, fertilized, and used for producing permanent forage.

MANAGEMENT GROUP 25 (VIIe–1)

In this group are steep, well-drained silt loams of the Kashwitna, Nancy, and Rabideux series. These soils are shallow to moderately deep over very gravelly material. They are on uplands, and they have irregular slopes.

Permeability is moderate in the mantle of silt loam and rapid in the gravelly substratum. These soils are strongly acid to very strongly acid. Fertility is low. Plant roots can penetrate to a depth of about 24 to 30 inches. Runoff is rapid, and the hazard of water erosion is very severe.

All areas of the soils in this group are wooded. These soils are not suitable for crops or for improved pasture. The areas should be left in vegetation.

MANAGEMENT GROUP 26 (VIIe–2)

Only Bernice sandy loam, steep, is in this group. This excessively drained soil is very shallow to very gravelly material. It is on uplands.

Permeability is rapid in this soil. The soil is very strongly acid. Fertility is very low. Plant roots can penetrate to a depth of 20 inches. Runoff is rapid, and the hazard of erosion is very severe.

Bernice sandy loam, steep, is wooded. It is not suitable for cultivated crops or for improved pasture and should remain in permanent vegetation.

MANAGEMENT GROUP 27 (VIIw–1)

This group consists of soils of the Clunie and Salamatof series. These soils are in or near the edges of muskegs. The areas are made up mainly of Clunie and Salamatof peats, but patches of Delyndia soils in a complex associated with Salamatof soils occur in a few areas. Clunie and Salamatof peats are nearly level and very poorly drained. Delyndia soils are nearly level to hilly and somewhat excessively drained.

These soils are slightly acid to extremely acid. The water table in the very poorly drained soils generally is at or near the surface, but at times it drops to a depth of several feet. Plant roots can penetrate to a depth of about 12 to 20 inches.

The soils in this group are covered by vegetation that is suitable for limited grazing in places. These soils are not suitable for cultivation or for improved pasture.

MANAGEMENT GROUP 28 (VIIw–2)

Only Jacobsen very stony silt loam is in this group. This soil is nearly level and poorly drained. It is on the edges of muskegs and on the flood plains of small streams.

Permeability is moderate in this soil. The soil is very strongly acid. Fertility is low. Plant roots can penetrate to a depth of about 18 inches. The water table is high, and the surface generally is wet during most of the growing season.

Jacobsen very stony silt loam is in vegetation. It is not suitable for cultivation or for improved pasture. In a few places the plants are suitable for limited grazing.

MANAGEMENT GROUP 29 (VIIw–3)

Only Mixed alluvial land is in this group. It is nearly level and consists of sandy and gravelly sediment laid down by water. The areas are along the edges of rivers and streams.

Most areas of this soil are flooded frequently, though the small included tracts are rarely flooded.

Mixed alluvial land is in natural vegetation. It is not suitable for cultivation, but in places patches of grasses are suitable for limited grazing.

MANAGEMENT GROUP 30 (VIIIe–1)

Only Terrace escarpments is in this group. It consists mainly of silty and sandy material along flood plains of the Susitna River. The areas are steep and narrow and are made up of active landslides and gullies that are separated by alternate strips and patches of stabilized areas.

The stabilized areas generally are wooded or are covered by brushy vegetation. The active landslides and gullies are almost barren of vegetation. Terrace escarpments is not suitable for crops or for pasture. Leaving the areas in vegetation helps to control accelerated erosion.

MANAGEMENT GROUP 31 (VIIIs–1)

Only Gravel pits are in this group. The pits are more than 3 acres in size. They generally are well drained, but a few are ponded.

Gravel pits generally are barren, but sparse stands of grasses, forbs, shrubs, and tree seedlings grow in places. The areas have no value for farming.

MANAGEMENT GROUP 32 (VIIIw–1)

This group consists of Gravelly alluvial land and Tidal flats. These land types are nearly level and are on tidal plains and flood plains along the major streams of the survey area. The areas are frequently inundated or flooded

and are almost barren of vegetation. They have no value for farming.

Woodland

About 72 percent of the acreage of the Susitna Valley Area is wooded, but only about two-thirds of the woodland has a potential for annually producing at least 20 cubic feet of industrial wood per acre (*13*). Trees in the Area that have commercial value are paper birch (*Betula papyrifera*), white spruce (*Picea glauca*), quaking aspen (*Populus tremuloides*), and cottonwood (*Populus balsamifera* and *Populus trichocarpa*) (*13*). Black spruce (*Picea mariana*) is also common, especially on poorly drained soils, but the trees generally are small and spindly and have little or no commercial value.

Woodland groups

The soils in the Susitna Valley Area have been placed in woodland groups on the basis of soil characteristics that affect the growth of trees. Each group is made up of soils that are similar in potential productivity, use suitability, and management needs, determined by information collected during the preparation of this survey and data published by Farr (*4*), Gregory (*6*), Hutchinson (*8*), and the U.S. Forest Service, Institute of Northern Forestry (*23*).

In the paragraphs that follow, the woodland groups recognized in the Susitna Valley Area are described. For the soils in Groups I, II, and III, table 3 provides data on site index and growth and yield rates, by wood crops. In addition, the table gives ratings for the limitations and hazards of the soils for woodland use. The factors considered are erosion hazard, windthrow hazard, plant competition, and equipment limitations. These factors are discussed in the paragraphs that follow. Data are not provided for Groups IV and V in table 3, because the soils in these groups do not support commercial stands of timber.

Erosion hazard is the degree of potential soil erosion that is likely to occur following cutting operations or where soil is exposed along roads, trails, fire lanes, and log decking areas. Among the characteristics of the soil that affect erosion are slope, stability, infiltration, and permeability. The rating is *slight* if the hazard of erosion is negligible; *moderate* if special attention and practices are needed to control erosion; and *severe* if intensive management is needed to control erosion.

Windthrow hazard is the danger of trees being blown down by wind. It depends on soil characteristics that control development of tree roots and affect stability. The rating is *slight* if trees are not expected to be blown down by commonly occurring winds; *moderate* if some trees are expected to blow down during periods of excessive wetness and high winds; and *severe* if many trees are expected to blow down during periods of soil wetness and moderate or high winds.

Plant competition is the invasion or growth of undesirable kinds of plants on different kinds of soil when openings are made in the canopy. The rating is *slight* if undesirable plants do not hinder growth and establishment of seedlings of desirable kinds of trees; *moderate* if undesirable plants hinder, but do not prevent growth and establishment of desirable tree seedlings; and *severe* if the undesirable plants must be reduced to allow desirable tree seedlings to survive and grow.

Equipment limitations are based on soil characteristics and features of relief that restrict or prevent use of conventional equipment for planting and harvesting wood crops, for constructing roads, and for controlling fires. The rating is *slight* if no restrictions exist relative to the kind of equipment that can be used or to the time of year that the equipment can be used; *moderate* if there are seasonal restrictions of less than 3 months or if other restrictions caused by slope, wetness, stones, or other soil characteristics moderately limit use of equipment; and *severe* if a period of 3 months or more exist when equipment cannot be used or if there are other severe restrictions caused by steep slopes or extreme wetness. This type of hazard is likely to require both detailed scheduling of logging and specialized equipment.

GROUP I

In this group are nearly level to steep, well-drained, shallow to moderately deep soils of the Chulitna, Flat Horn, Kashwitna, Nancy, Rabideux, and Whitsol series. Most of these soils are in the Rabideux-Salamatof, Nancy-Kashwitna, Nancy-Delyndia, and Kashwitna-Homestead associations shown on the "General Soil Map" in the back of this survey. These soils are on terraces and moraines. Slopes are short and irregular and seldom are more than 300 feet long. Elevation generally is less than 600 feet, but on a few moraines it is as much as 1,300 feet.

The soils in this group support about 65 percent of the trees that have potential commercial value in the survey area. A mixture of paper birch and white spruce is common, but quaking aspen grows in a few places. Paper birch is dominant throughout most of the Area, but the proportionate stocking varies. Both paper birch and aspen are pioneer trees that characteristically invade burned-over areas. White spruce, the climax tree, generally becomes established in young stands of paper birch or aspen, but it generally remains in the understory position for many years. Both paper birch and aspen are susceptible to infection and decay. Because of the latitude of the Area, however, aspen tends to remain vigorous longer and to decay more slowly than stands that grow in other parts of Alaska. Generally, as stands on the soils in this group reach 90 to 100 years, they begin to deteriorate rapidly, and white spruce, if present, becomes dominant (*12*).

Stands that are dominantly paper birch or aspen generally are of even age. These stands range from less than 40 years on recently burned or cutover areas, commonly near the railroad, to about 120 years in the northern part of the Area. White spruce is in the understory of most of the younger stands.

Age and height measurements show that mature paper birch, 70 to 100 years old, on these soils commonly attain a height of 55 to 65 feet. A few stands that are 60 to 70 years of age average 50 to 60 feet in height. The diameter at breast height for mature paper birch ranges from about 8 to 14 inches, and the average diameter is about 11 inches. Preliminary woodland inventory statistics for the Susitna Valley Area show that the net volume of paper birch averages about 965 cubic feet per acre and that the gross annual growth averages about 20 cubic feet per acre. These figures, however, include stands of all ages and densities of stocking. In well-stocked mature stands the

TABLE 3.—*Woodland suit*

[Absence of data indicates that the tree

Woodland group and series	Site index for— [1]			Average annual growth for— [2]		
	Aspen	Birch	White spruce	Aspen	Birch	White spruce
				Cu. ft./acre	*Cu. ft./acre*	*Cu. ft./acre*
Group I: Shallow to moderately deep, well-drained soils on uplands. Chulitna, Flat Horn, Kashwitna, Nancy, Rabideux, Whitsol.	51	52	68	27. 2	27. 1	23. 2
Group II: Very shallow, somewhat excessively drained and excessively drained soils on uplands. Bernice, Chena, Delyndia, Homestead.	53	51	56	32. 7	26. 0	15. 6
Group III: Shallow to deep, well-drained soils on alluvial plains. Niklason, Schrock, Susitna.	----------	48	68	----------	22. 6	23. 2

[1] The height, in feet, of the dominant vegetation taken at or calculated to an index age of 50 years for aspen and birch, and 100 years for white spruce. Site index data are based on field measurements and on information published by Gregory (*6*).

[2] Growth figures represent the average annual growth increment, in cubic feet per acre, at age 65 for aspen; age 85 for birch; and age

estimated net volume of trees larger than 4.5 inches at breast height ranges up to 2,800 cubic feet per acre and annual growth up to 50 cubic feet per acre.

Few mature stands of white spruce are in the Area. According to Lutz (*12*), white spruce can attain a height of 100 feet and a diameter at breast height of more than 20 inches. In general, however, the largest trees in the Area are 60 to 70 feet in height and 8 to 12 inches in diameter. Lutz estimates that at the age of 160 years good stands of white spruce would yield 3,900 cubic feet, or 15,500 board feet per acre.

The hazard of erosion is severe on these soils if slope is more than 12 percent. In places roads, skid trails, and deep tracks of heavy equipment made during harvesting collect and concentrate runoff water from heavy rains or melting snow, which causes gullies to form rapidly. Minimum disturbance of the surface soil during harvesting helps to control water erosion. In addition, unprotected areas should be fertilized and seeded to adapted grasses as soon as feasible after harvest. The hazards of windthrow, plant competition, and equipment limitations generally are moderate on these soils.

Limited use is made of the trees on the soils in this group, and in many places the paper birch and aspen are overmature. In a few accessible places, trees are harvested to provide fuel, and a few white spruce are harvested to provide logs for houses. In addition, limited quantities of rough lumber are supplied by small sawmills that operate from time to time.

GROUP II

In this group are nearly level to steep, somewhat excessively drained and excessively drained, very shallow soils of the Bernice, Chena, Delyndia, and Homestead series. These soils are on alluvial plains along major streams of the survey area and on terraces, outwash plains, and moraines. Most of these soils are in the Nancy-Kashwitna and Nancy-Delyndia associations shown on the "General Soil Map" in the back of this survey, but many small tracts occur in other associations. Elevation ranges from 50 to 500 feet.

The soils in this group support about 20 percent of the trees that have potential commercial value in the survey area. The stands on most of these soils are similar in composition and in age to the stands that grow on the soils in Group I. The Chena soils, however, support a few stands of cottonwood, and in places quaking aspen is dominant on the Bernice, Delyndia, and Homestead soils.

The hazard of erosion and equipment limitations are severe on the Bernice soils and on scattered hilly to steep areas of Delyndia and Homestead soils. Minimum disturbance of the surface mat of organic material on these soils during harvesting helps to control erosion. In addition unprotected and scraped areas should be seeded to grasses as soon as possible after harvesting. Plant competition is moderate on these soils.

The average annual growth and yield rates are slightly higher for aspen and slightly lower for birch on these soils than on the soils in Group I. According to limited field measurements, however, growth and yield rates of white spruce are significantly lower on the soils in this group.

A few trees on the soils in this group are harvested to provide logs and fuel for local use.

GROUP III

This group consists of nearly level, well-drained soils of the Niklason, Schrock, and Susitna series. These soils are on alluvial plains along the major streams and rivers of the survey area. Most of these soils occur in the Susitna-Schrock association shown on the "General Soil Map" in the back of this survey.

The soils in this group support about 15 percent of the trees that have potential commercial value in the survey area. Cottonwood is dominant on most of these soils. Black cottonwood (*Populus trichocarpa*) and balsam poplar

ability grouping of the soils

does not generally grow on the soil]

Yield for— [3]			Management hazards and limitations			
Aspen	Birch	White spruce	Erosion hazard	Windthrow hazard	Plant competition	Equipment limitations
Cu. ft./acre 1, 768	*Cu. ft./acre* 2, 307	*Cu. ft./acre* 3, 013	Slight if slope is 0 to 3 percent; moderate if slope is 3 to 12 percent; severe if slope is more than 12 percent.	Moderate	Moderate	Moderate.
2, 124	2, 211	2, 033	Slight if slope is 0 to 3 percent; moderate if slope is 3 to 12 percent; severe if slope is more than 12 percent.	Moderate	Moderate	Slight if slope is less than 20 percent; moderate if slope is 20 percent and more.
----------	1, 923	3, 013	Slight	Moderate	Moderate	Moderate.

130 for white spruce, as determined from tables published by Capps (*3*), and by Gregory (*6*).

[3] Yields represent the volume yield, in cubic feet per acre, from trees more than 4.5 inches in diameter at breast height in well-stocked stands at age 65 for aspen, 85 for birch, and 130 for white spruce.

(*Populus balsamifera*) grow in the Area, and both commonly are referred to as cottonwood because it is difficult to distinguish one from the other on most sites. Many of the cottonwood stands are essentially pure, but white spruce is common in some of the older stands, and paper birch has become established in a few stands. Many of the cottonwood trees on these soils grow from 80 to 100 feet in height and to more than 24 inches in diameter. Exceptionally large trees are 120 to 140 feet in height and 3 to 5 feet in diameter.

The soils in this group have slight to moderate hazards or limitations in the growing and harvesting of timber. In places, however, operations are delayed for short periods because of occasional flooding. The hazard of windthrow, plant competition, and equipment limitations on these soils generally are moderate. In places these factors present management and harvesting problems, but these generally can be overcome.

The average annual growth and yield rates for white spruce are estimated to be equal to those of white spruce that grow on the soils in Group I. Limited field measurements for paper birch and aspen, however, indicate that growth and yield rates for these trees are less than for those on soils in Group I and Group II.

A few trees on the soils in this group are harvested to provide logs for local use.

GROUP IV

This group consists of nearly level soils of the Caswell, Coal Creek, Dinglishna, Kalifonsky, Lucile, Moose River, Slikok, and Wasilla series. Caswell soils are well drained, and Lucile soils are moderately well drained, but the others are poorly drained. These soils are scattered throughout most of the survey area.

The soils in this group commonly support stands of slow-growing black spruce that have no commercial value. A few areas, however, are covered by dense stands of alder and willow.

GROUP V

In this group are nearly level, poorly drained and very poorly drained soils of the Clunie, Jacobsen, and Salamatof series. These soils are in muskegs and on tidal plains. They occur mainly in the Clunie-Tidal Marsh and Salamatof-Jacobsen associations shown on the "General Soil Map" in the back of the survey.

The soils in this group do not support commercial stands of timber. The vegetation on the soils in muskegs is dominantly sphagnum moss, sedges, and low-growing shrubs, but clumps of black spruce grow in places. The vegetation on the soils on tidal plains is grasses, sedges, and other aquatic plants.

Wildlife [3]

A variety of mammals, birds, and fish frequent the Susitna Valley Area. Moose are the most important game animal. They are primarily browsing animals that feed on young growth of willow, birch, and aspen. In places moose also eat a few farm crops, and in spring and early in summer they feed on aquatic plants, grasses, and other succulent plants. The moose population fluctuates in accordance with such factors as availability and quality of browse, weather conditions, hunting pressure, and population density of predators. In summer and early in fall moose generally migrate to high elevations near timberlines on mountain slopes that border the Area. Late in fall and in winter moose commonly migrate to lower elevations, where browse is more readily available and snow is less deep.

Both black bear and brown bear are in the Area. The diet of these omnivorous animals consists of large and

[3] Based on information supplied by JACK C. DIDRICKSON, game biologist of the Alaska Department of Fish and Game, and on the work of RHODES and BARKER (*14*).

small mammals, fish, insects, and a variety of wild herbs and berries. Among the important furbearers are beaver, coyote, fox, lynx, marten, mink, muskrat, otter, weasel, and wolves. Other animals include porcupine, snowshoe hare, red squirrel, ground squirrel, shrew, and mice.

The Area is also a nesting ground and stopover for a variety of ducks and geese, sandhill cranes, whistling swans, and other migratory birds and waterfowl. Spruce grouse and willow, rock, and whitetail ptarmigan are the main upland game birds. Other birds are hawks, eagles, falcons, ravens, and many kinds of songbirds and shorebirds.

The principal fish are burbot, grayling, salmon, suckers, trout, and whitefish.

Mosquitoes and many kinds of flies, ants, bees, and other insects are fairly numerous. They are an important part of the diet for some of the larger wildlife.

The kinds and abundance of wildlife depend largely on the type and condition of habitat, which, in turn, is related to the kinds of soil and land use. Some kinds of wildlife are adapted to woodland, and others to muskegs, brushy areas, or marshes. A few of the larger animals, moose, for example, need all of these areas at various times of the year for food, cover, and calving.

Distribution of wildlife in relation to the soil associations in the Susitna Valley Area is discussed in the paragraphs that follow. The associations are described in the section "General Soil Map," and the soils in each association are delineated on the map in the back of this survey.

RABIDEUX-SALAMATOF ASSOCIATION.—The contrasting soils and vegetation in this association are favorable for wildlife habitat. Consequently, most of the wildlife common to the Susitna Valley Area, except for those types that frequent only coastal plains, can be found in this association.

Most of the Rabideux soils, which are dominant in this association, are wooded. The stands consist of overmature paper birch that are being gradually replaced by white spruce. These trees commonly have a dense understory of woody shrubs and herbaceous plants that furnish excellent cover for both large and small animals and songbirds. Willow, paper birch, and aspen seedlings, however, are not common in this association. A wide variety of food generally is available on Rabideux soils for birds and for animals other than moose.

The cover of vegetation on the Rabideux soils is interrupted by many areas of very poorly drained Salamatof soils in open muskegs and by soils along streams that support scattered patches of brush (fig. 5). The vegetation on Salamatof soils is dominantly sphagnum moss, aquatic plants, and low-growing shrubs. These open wet areas provide excellent habitat for such birds as terns, snipes, yellowlegs, and sandhill cranes. Small ponds and streams in some of the muskegs are used by ducks for feeding and nesting. In places moose eat the aquatic plants at night, and black bear eat the berries that grow in these areas on Salamatof soils.

The most important habitat in the association consists of the many brushy areas along streams and in areas between open muskegs and wooded soils on uplands. These areas provide abundant and varied food and cover suitable for many kinds of wildlife in the survey area.

In this association are many small lakes, rivers, and streams that are used by a variety of migratory waterfowl, including ducks, geese, loons, and swans. In summer and early in fall most of the streams provide valuable spawning beds for fairly heavy runs of salmon. In addition to the salmon, rainbow trout, grayling, and Dolly Varden trout are in many of the lakes and streams. These waters are also

Figure 5.—**Stands of willow brush provide browse for moose on Killey-Moose River complex on flood plain of a small stream.**

used by furbearing animals, especially beaver, mink, and otter.

NANCY-KASHWITNA ASSOCIATION.—The major soils in this association support vegetation that is dominantly paper birch. The stands vary greatly in age, but they generally are much younger than the stands in the Rabideux-Salamatof association. In general, the understory is not so dense and does not provide so much cover or so great a variety of food for wildlife as the understory in older stands. The quantity and condition of browse for moose vary, but the total available browse per acre in winter probably is greater than in other associations in the survey area. The favorable browse conditions are partly the result of many forest fires that occurred in this section of the Area 50 or 60 years ago.

Many small tracts of contrasting soils in this association afford suitable habitat for almost all kinds of animals and birds that frequent the Area. Small lakes, ponds, and streams are used by waterfowl, furbearers, and all kinds of fish, including spawning runs of salmon.

NANCY-DELYNDIA ASSOCIATION.—The major soils in this association support vegetation that is dominantly paper birch. The understory is fairly dense and provides good cover for a variety of mammals and birds. Readily available browse occurs along the Little Susitna River, along small streams, and between wooded areas and muskegs. Most kinds of wildlife common to the Area frequent this association. Moose migrate in and out of the Area, but because the adjoining open muskegs and Tidal flats are favorite calving grounds, the number of moose generally is greatest in spring.

KASHWITNA-HOMESTEAD ASSOCIATION.—The kinds and abundance of wildlife habitat in this association are similar to those in the Nancy-Kashwitna association. Most of the wildlife common to the Area, except those that frequent only the coastal areas, populate this association. A few moose use this habitat almost the year around, but the number of moose is greatest in winter.

SUSITNA-SCHROCK ASSOCIATION.—The soils in this association are along the major rivers and streams in the survey area. The vegetation on the Susitna and Schrock soils consists mainly of stands of large cottonwoods. The understory includes dense patches of alder and willow. Many of the other soils in the association support dense patches of young willow that are used by moose for browse in winter. These areas are heavily browsed in winter.

Furbearers, especially those that frequent streams, also concentrate in this association. In addition, black bear and brown bear frequent the river banks in summer and early in fall to eat salmon. Some of the best pools for sport fishing in the Area are near the mouth of the small streams that flow into the Susitna River, where schools of rainbow trout and grayling tend to congregate at various times of the year.

CLUNIE-TIDAL MARSH ASSOCIATION.—The soils in this association are nearly level and very poorly drained. They are on broad low-lying areas along Cook Inlet. The vegetation, a wide variety of aquatic plants, is used primarily and heavily by migratory waterfowl and shorebirds. In spring, however, this is a favorite calving area for moose.

SALAMATOF-JACOBSEN ASSOCIATION.—In this association are nearly level, very poorly drained peats in large open muskegs and nearly level, very poorly drained mineral soils along the edges of muskegs. On the Salamatof peats, which are dominant in this association, the vegetation consists of sphagnum moss, aquatic plants, and low shrubs. The vegetation on the mineral soils generally consists of stunted black spruce or of willow and alder brush.

Birds and very small animals frequent the large open muskegs. These areas are favorite nesting areas for sandhill cranes, terns, snipes, and similar birds. In addition, a few ducks use small ponds in the muskegs, and a few moose feed on the aquatic plants early in summer. Patches of brush on the edges of muskegs provide an abundance of browse and other food for large animals. A few small mammals and birds use the dense stands of black spruce for habitat, but otherwise these stands generally are sparsely populated by wildlife.

Recreation

In recent years recreational activities have increased rapidly in the Susitna Valley Area. This increase is especially apparent in the northern part of the Area, where a new highway and secondary roads make many of the lakes and streams and much of the woodland more readily accessible for camping and other outdoor activities. In addition, several State and privately operated campgrounds offer opportunities for fishing, boating, hunting, and hiking. Winter sports are also popular, and groups are now traveling many of the trails by snow machines. Dogsled racing and skiing in the nearby mountains are also favorite winter sports.

The soils in the Area differ in their suitability for selected recreational uses. For example, one soil may be well suited to campsites or picnic areas, but another may be poorly suited for such use. In table 4 the soils in the Area are rated according to their limitations for recreational buildings, campsites for tents and trailers, picnic grounds and other intensive play areas, and paths and trails. These ratings are useful mainly as a guide in selecting sites for recreation and in planning recreational developments. They do not eliminate the need for onsite inspection of an area before making a final determination concerning its suitability for a specific use. The ratings are based on soil features only and generally do not reflect the influence of such factors as location, esthetic value, present use, problems of sewage disposal and water supply, access roads, and kinds and density of vegetation. Most parts of the survey area are favorable for hunting, fishing, and similar activities, but these uses are not considered in the table, because they seldom are confined to a specific site.

The ratings used in table 4 are *slight*, *moderate*, *severe*, and *very severe*. A rating of *slight* means that the soil is relatively free of limitations that affect its use for the purpose specified or that limitations can be easily overcome.

A rating of *moderate* means that limitations generally can be overcome by careful planning, good design, and good management.

A rating of *severe* means that limitations are difficult to correct or that the practices needed generally are not economically feasible.

A rating of *very severe* means that extreme measures are needed to overcome limitations and that use of the soil for the specified purpose is not practical.

In the paragraphs that follow, each recreational use considered in table 4 is defined.

TABLE 4.—*Ratings and limitations of the soils for recreational purposes*

Map symbol	Soil name	Campsites for tents and trailers	Recreational buildings	Paths and trails	Picnic areas	Play areas
BeF	Bernice sandy loam, steep.	Severe: slopes of 12 to 45 percent.	Severe: slopes of 12 to 45 percent.	Moderate: slopes of 12 to 45 percent.	Severe: slopes of 12 to 45 percent.	Very severe: slopes of 12 to 45 percent.
Ca	Caswell silt loam	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Severe: seasonal high water table.
Ch	Chena fine sandy loam.	Moderate: subject to flooding.	Moderate: subject to flooding.	Slight: subject to flooding.	Moderate: subject to flooding.	Moderate: subject to flooding.
ClA	Chulitna silt loam, nearly level.	Moderate: slippery or soft when wet.	Moderate: fair stability.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Slight: slippery or soft when wet.
ClB	Chulitna silt loam, undulating.	Moderate: slippery or soft when wet.	Moderate: fair stability.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Moderate: slopes of 3 to 7 percent.
ClC	Chulitna silt loam, rolling.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.	Slight	Moderate: slopes of 7 to 12 percent.	Severe: slopes of 7 to 12 percent.
Cn	Clunie peat	Very severe: poorly drained; high water table.	Very severe: poorly drained; high water table.	Severe: poorly drained; high water table.	Very severe: poorly drained; high water table.	Very severe: poorly drained; high water table.
Co	Coal Creek silt loam	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.
DeA	Delyndia silt loam, nearly level.	Slight: slippery or soft when wet.	Slight: fine sand below a depth of about 11 inches.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Slight: slippery or soft when wet.
DeB	Delyndia silt loam, undulating.	Slight: slippery or soft when wet	Slight: fine sand below a depth of about 11 inches.	Slight: slippery or soft when when wet.	Moderate: slippery or soft when wet.	Severe: slopes of 3 to 7 percent.
DeC	Delyndia silt loam, rolling.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.	Slight: slippery or soft when wet.	Moderate: slopes of 7 to 12 percent.	Severe: slopes of 7 to 12 percent.
DeD	Delyndia silt loam, hilly.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Moderate: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.
Dm	Delyndia-Salamatof complex. For Delyndia part see Delyndia silt loam, nearly level; for Salamatof part see Salamatof peat.					
Dn	Dinglishna sandy loam.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.
Dr	Dinglishna-Moose River complex.	Severe: poorly drained; high water table.	Severe: poorly drained; high water table.	Severe: poorly drained; high water table.	Severe: poorly drained; high water table.	Severe: poorly drained; high water table.

TABLE 4.—*Ratings and limitations of the soils for recreational purposes*—Continued

Map symbol	Soil name	Campsites for tents and trailers	Recreational buildings	Paths and trails	Picnic areas	Play areas
FhA	Flat Horn silt loam, nearly level.	Moderate: slippery or soft when wet.	Slight: fine sand at a depth of about 9 inches.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Slight: slippery or soft when wet.
FhB	Flat Horn silt loam, undulating.	Moderate: slippery or soft when wet.	Slight: fine sand at a depth of about 9 inches.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Moderate: slopes of 3 to 7 percent.
Ga	Gravelly alluvial land.	Severe: subject to flooding.	Very severe: subject to flooding.	Moderate: subject to flooding.	Severe: subject to flooding.	Very severe: subject to flooding.
Gv	Gravel pits	Severe: gravelly material near surface.	Very severe: gravelly material near surface.	Moderate: gravelly material near surface.	Severe: gravelly material near surface.	Severe: gravelly material near surface.
HoA	Homestead silt loam, nearly level.	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.
HoB	Homestead silt loam, undulating.	Slight: slippery or soft when wet.	Slight: hazard of water erosion.	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.	Moderate: slopes of 3 to 7 percent.
HoC	Homestead silt loam, rolling.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.	Slight: slippery or soft when wet.	Moderate: slopes of 7 to 12 percent.	Severe: slopes of 7 to 12 percent.
HoD	Homestead silt loam, hilly.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Moderate: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.
HoE	Homestead silt loam, moderately steep.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Moderate: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.
Ja	Jacobsen very stony silt loam.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.
Ka	Kalifonsky silt loam	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.
KsA	Kashwitna silt loam, nearly level.	Moderate: slippery or soft when wet.	Slight	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.
KsB	Kashwitna silt loam, undulating.	Moderate: slippery or soft when wet.	Slight: erosion hazard slight to moderate.	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.	Moderate: slopes of 3 to 7 percent.
KsC	Kashwitna silt loam, rolling.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.	Slight: slippery or soft when wet.	Moderate: slopes of 7 to 12 percent.	Severe: slopes of 7 to 12 percent.
KsD	Kashwitna silt loam, hilly.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Moderate: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.
KsE	Kashwitna silt loam, moderately steep.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Moderate: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.
KsF	Kashwitna silt loam, steep.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.
Kr	Killey-Moose River complex.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.

TABLE 4.—*Ratings and limitations of the soils for recreational purposes*—Continued

Map symbol	Soil name	Campsites for tents and trailers	Recreational buildings	Paths and trails	Picnic areas	Play areas
Lu	Lucile silt loam	Moderate: slippery or soft when wet.	Moderate: seasonal high water table.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Moderate: seasonal high water table.
Me	Mixed alluvial land	Severe: subject to flooding.	Severe: subject to flooding.	Moderate: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.
Mr	Moose River silt loam.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.
NaA	Nancy silt loam, nearly level.	Moderate: slippery or soft when wet.	Slight: silt loam over very gravelly sand.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Slight: slippery or soft when wet.
NaB	Nancy silt loam, undulating.	Moderate: slippery or soft when wet.	Slight: hazard of water erosion slight to moderate.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Moderate: slopes of 3 to 7 percent.
NaC	Nancy silt loam, rolling.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.	Slight: slippery or soft when when wet.	Moderate: slopes of 7 to 12 percent.	Severe: slopes of 7 to 12 percent.
NaD	Nancy silt loam, hilly.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Moderate: slopes of 12 to to 20 percent.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.
NaE	Nancy silt loam, moderately steep.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Moderate: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.
NaF	Nancy silt loam, steep.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.
NcA	Nancy silt loam, sandy substratum, nearly level.	Moderate: slippery or soft when wet.	Slight: silt loam over sand.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Slight: slippery or soft when wet.
NcB	Nancy silt loam, sandy substratum, undulating.	Moderate: slippery or soft when wet.	Slight: hazard of water erosion slight to moderate.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Moderate: slopes of 3 to 7 percent.
NcC	Nancy silt loam, sandy substratum, rolling.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.	Slight: slippery or soft when wet.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.
NcD	Nancy silt loam, sandy substratum, hilly.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Moderate: slopes of 12 to 20 percent.	Moderate: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.
NcE	Nancy silt loam, sandy substratum, moderately steep.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Moderate: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.
Nk	Niklason fine sandy loam.	Slight: subject to occasional flooding.	Slight: subject to occasional flooding.	Slight: subject to occasional flooding.	Slight: subject to occasional flooding.	Slight: subject to occasional flooding.
RaA	Rabideux silt loam, nearly level.	Moderate: slippery or soft when wet.	Slight: silt loam over very gravelly sand.	Slight: slippery or soft when wet.	Moderate: slippery or soft wet.	Slight: slippery or soft when wet.
RaB	Rabideux silt loam, undulating.	Moderate: slippery or soft when wet.	Slight: hazard of water erosion slight to moderate.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Moderate: slopes of 3 to 7 percent.

TABLE 4.—*Ratings and limitations of the soils for recreational purposes*—Continued

Map symbol	Soil name	Campsites for tents and trailers	Recreational buildings	Paths and trails	Picnic areas	Play areas
RaC	Rabideux silt loam, rolling.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.	Slight: slippery or soft when wet.	Moderate: slopes of 7 to 12 percent.	Severe: slopes of 7 to 12 percent.
RaD	Rabideux silt loam, hilly.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Moderate: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.
RaE	Rabideux silt loam, moderately steep.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Moderate: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.
RaF	Rabideux silt loam, steep.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.	Severe: slopes of 30 to 45 percent.
RbA	Rabideux silt loam, shallow, nearly level.	Moderate: slippery or soft when wet.	Slight: silt loam over very gravelly sand.	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.
RbB	Rabideux silt loam, shallow, undulating.	Moderate: slippery or soft when wet.	Slight: hazard of erosion slight to moderate.	Slight: slippery or soft when wet.	Slight: slippery or soft when wet.	Moderate: slopes of 3 to 7 percent.
RbC	Rabideux silt loam, shallow, rolling.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.	Slight: slippery or soft when wet.	Moderate: slopes of 7 to 12 percent.	Severe: slopes of 7 to 12 percent.
RbD	Rabideux silt loam, shallow, hilly.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Moderate: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.
RbE	Rabideux silt loam, shallow, moderately steep.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Moderate: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.
RdA	Rabideux silt loam, sandy substratum, nearly level.	Moderate: slippery and soft when wet.	Slight: silt loam over sand.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Slight: slippery or soft when wet.
RdB	Rabideux silt loam, sandy substratum, undulating.	Moderate: slippery or soft when wet.	Slight: hazard of erosion slight to moderate.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Moderate: slopes of 3 to 7 percent.
RdC	Rabideux silt loam, sandy substratum, rolling.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.	Slight: slippery or soft when wet.	Moderate: slopes of 7 to 12 percent.	Severe: slopes of 7 to 12 percent.
RdD	Rabideux silt loam, sandy substratum, hilly.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Moderate: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.
RdE	Rabideux silt loam, sandy substratum, moderately steep.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Moderate: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.
Sa	Salamatof peat	Very severe: high water table.	Very severe: high water table.	Severe: high water table.	Very severe: high water table.	Very severe: high water table.
ShA	Schrock silt loam, nearly level.	Moderate: slippery or soft when wet.	Slight: silt loam over stratified fine sand and very fine sand.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Slight: slippery or soft when wet.
Sm	Slikok mucky silt loam.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.
Ss	Susitna fine sandy loam.	Slight	Slight: fine sandy loam over stratified fine sand and very fine sand.	Slight	Slight	Slight.

TABLE 4—*Ratings and limitations of the soils for recreational purposes*—Continued

Map symbol	Soil name	Campsites for tents and trailers	Recreational buildings	Paths and trails	Picnic areas	Play areas
Sw	Susitna and Niklason fine sandy loams, overflow.	Severe: subject to flooding in places.	Severe: subject to flooding in places.	Moderate: subject to flooding in places.	Severe: subject to flooding in places.	Severe: subject to flooding in places.
Te	Terrace escarpments	Severe: very steep.	Severe: very steep.	Severe: very steep.	Severe: very steep.	Severe: very steep.
Tf	Tidal flats	Very severe: subject to flooding.	Very severe: subject to flooding.	Severe: subject to flooding.	Very severe: subject to flooding.	Very severe: subject to flooding.
Tm	Tidal marsh	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.
Wa	Wasilla silt loam	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.	Severe: high water table; subject to flooding.
WhA	Whitsol silt loam, nearly level.	Moderate: slippery or soft when wet.	Moderate: fair stability.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Slight: slippery or soft when wet.
WhB	Whitsol silt loam, undulating.	Moderate: slippery or soft when wet.	Moderate: fair stability.	Slight: slippery or soft when wet.	Moderate: slippery or soft when wet.	Moderate: slopes of 3 to 7 percent.
WhC	Whitsol silt loam, rolling.	Moderate: slopes of 7 to 12 percent.	Moderate: slopes of 7 to 12 percent.	Slight: slippery or soft when wet.	Moderate: slopes of 7 to 12 percent.	Severe: slopes of 7 to 12 percent.
WhD	Whitsol silt loam, hilly.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Moderate: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.	Severe: slopes of 12 to 20 percent.
WhE	Whitsol silt loam, moderately steep.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Moderate: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.	Severe: slopes of 20 to 30 percent.

Campsites for tents and trailers are areas suitable for tents, small trailers, camper units, and the activities that accompany outdoor living. Except for shaping and leveling areas for tents and parking, little site preparation is needed. The soil must be able to support heavy traffic by people, vehicles, and horses.

Recreational buildings (without septic tanks) are suitable for seasonal or year-round cabins, picnic shelters, service buildings, washrooms, and bathrooms.

Picnic areas are used for pleasure outings at which a meal can be prepared. Little preparation of the site is required, other than clearing areas of brush and providing fireplaces and picnic tables.

Play areas are used for various forms of play and for such organized games as baseball, badminton, and volleyball. Intensive foot traffic is involved, and a nearly level surface that is firm and well drained generally is needed. An important consideration is whether a good cover of plants can be established and maintained on the site.

Engineering Uses of the Soils

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, and pipelines; the foundations of buildings; facilities for storing water; structures for controlling erosion; drainage systems; and systems for disposing of sewage. Among the properties most important to the engineer are shear strength, compaction characteristics, soil drainage, permeability, shrink-swell characteristics, grain size, plasticity, and reaction. Also important are depth to seasonal high water table, flooding hazard, and relief. Such information is available in this section. Engineers can use it to—

1. Make studies that will aid in selecting and developing sites for industries, businesses, residences, and recreational areas.
2. Make estimates of the engineering properties of soils for use in the planning of systems for drain-

ing cropland and pasture, grassed waterways, farm ponds, irrigation systems, terraces and diversions, and other structures for conserving soil and water.

3. Make preliminary evaluations of soil conditions that will aid in selecting locations for highways, airports, pipelines, cables, and sewage disposal fields and in planning more detailed surveys of the soils at the selected locations.
4. Locate probable sources of sand, gravel, and other materials for use in construction.
5. Correlate the performance of engineering structures with the soil mapping units to develop information for general planning that will be useful in designing and maintaining new structures.
6. Determine the suitability of the soils for cross-country movement of vehicles and of construction equipment.
7. Supplement information obtained from other published maps, reports, and aerial photographs for the purpose of making maps and reports that can be readily used by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

Used with the soil map to identify the soils, the engineering interpretations in this section are useful for many purposes. It should be emphasized, however, that these interpretations are not a substitute for the sampling and testing needed at a site chosen for a specific engineering work that involves heavy loads or at a site where excavations are to be deeper than the depths of the layers here reported. Nevertheless, by using this survey, an engineer can select and concentrate on those soils most important for his proposed kind of construction, and in this manner reduce the number of soil samples taken for laboratory testing and complete an adequate soil investigation at minimum cost.

The soil mapping units shown on the maps in this survey may include small areas of a different soil material. These included soils may be as much as 2 acres in size. They are too small to be mapped separately and generally are not significant to the farming in the area, but they may be important in engineering planning.

Information of value in planning engineering work is given throughout the text, particularly in the sections "Descriptions of the Soils" and "Formation and Classification of Soils."

Some of the terms used in this publication have a special meaning to soil scientists and a different meaning to engineers. The Glossary defines many such terms as they are used in soil science.

Much of the information in this section is given in tables. Table 5 gives engineering test data, table 6 gives engineering properties of the soils, and table 7 gives engineering interpretations of the soils.

Engineering classification systems

Soil scientists of the United States Department of Agriculture (USDA) classify soils according to texture (*20*). In some ways this system of naming textural classes is comparable to the systems most commonly used by engineers for classifying soils; that is, the system of the American Association of State Highway Officials (AASHO) (*1*) and the Unified system developed by the U.S. Department of Defense (*22*).

Most highway engineers classify soil material in accordance with the AASHO system. In this system soil materials are classified in seven principal groups. The groups range from A–1 (gravelly soils having high bearing capacity, the best soils for subgrade) to A–7 (clayey soils having low strength when wet, the poorest soils for subgrade). If the soil material is near a classification boundary, it is given a symbol showing both classes; for example, A–2 or A–4. Highly organic soils, such as peat and muck, are not included in the AASHO classification, because their use as construction material is not practical.

Within each group, the relative engineering value of the soil material is indicated by a group index number. These numbers range from 0 for the best material to 20 for the poorest. The group index number for the tested soils of the Susitna Valley Area is shown in parentheses following the soil group symbol in table 5.

Some engineers prefer to use the Unified Soil Classification System (*22*). In this system soil materials are identified as coarse grained (eight classes), fine grained (six classes), or highly organic. An approximate classification of soils by this system can be made in the field.

Engineering test data

Table 5 gives test data for samples obtained from four soil series that are extensive in the Susitna Valley Area. Selected layers were tested by standard procedures in the Roads Materials Laboratory of the Alaska Department of Highways. The samples were chosen to represent the range in properties in the soils of each series. If more than one profile was sampled, one represents the modal, or typical, soil of the series. The other profiles, though within the range permitted in the series, differ from the modal in texture, consistence, or some other property that is significant in engineering. The results of the tests can be used as a guide in estimating the engineering properties of the soils in the survey area. Tests were made for moisture density relationships, grain-size distribution, liquid limit, and plasticity index.

In the moisture density tests, a sample of the soil material is compacted several times with a constant compactive effort, each time at a successively higher moisture content. The moisture content is increased until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest density obtained in the compaction test is termed "maximum dry density." Moisture-density data are important in planning earthwork because generally the soil is more stable if it is compacted to about its maximum dry density when it is at about the optimum moisture content.

Mechanical analyses were made to determine the percentages of clay and coarser material in the soils. The analyses were done by the combined sieve and hydrometer methods. The percentage of clay determined by the hydrometer method should not be used as a basis for naming textural classes of soils.

TABLE 5.—*Engineer*

[Tests performed by the Alaska Department of Highways, Road Materials Laboratory, in cooperation with the U.S. Department of way Officials (AASHO) (*1*). Absence of an entry indicates

Soil name and location	Parent material	Depth from surface	Moisture density data [1]		Mechanical analysis [2]					
			Maximum dry density	Optimum moisture	Percentage passing sieve					
					3 in.	2 in.	1½ in.	1 in.	¾ in.	⅜ in.
		Inches	*Lb./cu. ft.*	*Percent*						
Moose River silt loam:										
NE¼SW¼ sec. 7, T. 21 N., R. 4 W. (Modal)	Layered silty and fine sandy sediment laid down by water.	0–6	75	31						
		6–50	99	17						
SW¼NE¼ sec. 24, T. 20 N., R. 5 W. (Coarser substratum than modal)	Layered silty and fine sandy sediment laid down by water.	4–32	102	16			100	98	98	98
		32–50	130	6	100	97	86	74	65	49
SE¼NW¼ sec. 25, T. 26 N., R. 5 W. (Finer texture than modal)	Layered silty and fine sandy sediment laid down by water.	0–8	103	18						
		8–36	82	30						
Nancy silt loam:										
NW¼NW¼ sec. 20, T. 23 N., R. 4 W. (Modal)	Silt loam underlain by very gravelly sand.	3½–9	73	35						
		16–24	90	26			100	97	97	93
		24–40	126	10		100	92	84	80	72
SW¼SW¼ sec. 8, T. 23 N., R. 4 W. (Shallower to gravelly material than modal)	Silt loam underlain by very gravelly sand.	3–5	71	39						
		10–18	89	26					100	99
		18–50	132	6	93	82	74	64	51	43
NW¼SW¼ sec. 30, T. 20 N., R. 4 W. (Sandy substratum)	Silt loam underlain by sand.	3½–7½	90	26						
		16–28	106	16						
		28–45	104	15						100
Rabideux silt loam:										
SW¼SW¼ sec. 20, T. 26 N., R. 4 W. (Modal)	Silt loam underlain by very gravelly sand.	2½–5	66	44						
		16½–23	84	31						
		23–48	135	6.5	100	90	82	68	61	46
SE¼SE¼ sec. 31, T. 26 N., R. 4 W. (Shallower to gravelly material than modal)	Silt loam underlain by very gravelly sand.	1½–4	71	41						
		10–15	78	35		100	99	98	97	96
		15–32	121	10	95	91	87	79	73	62
NE¼NE¼ sec. 30, T. 26 N., R. 6 W. (Finer substratum than modal)	Silt loam underlain by glacial till.	4–12	69	42						
		13½–20	86	28			100	98	96	94
		20–40	126	10	100	94	92	87	84	77

See footnotes at end of table.

ng test data

Commerce, Bureau of Public Roads (BPR), in accordance with standard procedures of the American Association of State High- no determination was made or information does not apply]

Mechanical analysis [2]—Continued								Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued				Percentage smaller than—							
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.			AASHO	Unified [3]
								Percent			
---	100	97	58	48	26	4	2	[4] NV	[5] NP	A–4(2)	ML
---	100	98	32	21	12	5	4	NV	NP	A–2–4	SM
97	97	94	42	28	12	3	1	NV	NP	A–4(1)	SM
40	33	20	6	4	2	1	0	NV	NP	A–1–a(0)	GW
---	100	98	43	27	11	5	5	NV	NP	A–4(2)	SM
---	100	98	83	61	50	19	10	41	NP	A–5(8)	ML
---	---	100	73	61	41	9	4	NV	NP	A–4(8)	ML
92	91	87	77	57	41	8	5	NV	NP	A–4(8)	ML
66	57	45	19	18	11	5	3	NV	NP	A–1–b(0)	SM
---	100	99	76	66	43	9	3	NV	NP	A–4(8)	ML
99	99	96	91	65	35	5	1	33	NP	A–4(8)	ML
33	25	14	3	3	2	1	1	NV	NP	A–1–a(0)	GW
---	100	97	63	56	41	10	5	NV	NP	A–4(6)	ML
---	100	97	71	62	44	14	8	NV	NP	A–4(7)	ML
99	98	84	9	7	6	5	4	NV	NP	A–3(0)	SP–SM
---	---	100	68	62	36	8	2	NV	NP	A–4(7)	ML
---	100	98	88	78	41	9	3	NV	NP	A–4(8)	ML
37	29	13	2	2	2	1	1	NV	NP	A–1–a(0)	GP
---	100	99	71	61	32	2	0	NV	NP	A–4(7)	ML
96	96	91	70	62	38	7	1	NV	NP	A–4(7)	ML
52	46	23	3	3	2	1	1	NV	NP	A–1–a(0)	GP
100	99	98	75	64	37	5	1	NV	NP	A–4(8)	ML
92	88	86	71	60	30	8	5	NV	NP	A–4(7)	ML
69	61	46	27	21	12	3	1	NV	NP	A–2–4(0)	SM

TABLE 5.—*Engineering*

Soil name and location	Parent material	Depth from surface	Moisture density data [1]		Mechanical analysis [2]					
			Maximum dry density	Optimum moisture	Percentage passing sieve					
					3 in.	2 in.	1½ in.	1 in.	¾ in.	⅜ in.
		Inches	*Lb./cu. ft.*	*Percent*						
Susitna silt loam:										
SE¼SE¼ sec. 28, T. 26 N., R. 5 W. (Modal)	Layered silty and very fine sandy sediment laid down by water.	0–5	95	20	------	------	------	------	------	------
		5–46	99	19	------	------	------	------	------	------
SW¼NE¼ sec. 35, T. 26 N., R. 5 W. (Coarser surface layer than modal)	Layered silt and very fine sandy sediment laid down by water.	0–8	103	16	------	------	------	------	------	------
		8–36	100	18	------	------	------	------	------	------
SW¼SW¼ sec. 10, T. 24 N., R. 5 W. (Coarser texture than modal)	Layered silty and very fine sandy sediment laid down by water.	0–4	93	21	------	------	------	------	------	------
		4–38	96	20	------	------	------	------	------	------

[1] Based on AASHO Designation T180–57, Method D, Note 2 (*1*).

[2] Mechanical analysis according to AASHO Designation T88–57 (*1*). Results by this procedure may differ somewhat from the results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method, and the various grain-size 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 the calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

TABLE 6.—*Estimated engineering*

[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 soils. The soils
tions for referring to other series that appear in the first column

Soil series, land types, and map symbols	Depth to seasonal high water table	Depth from surface of typical profile	Classification
			Dominant USDA texture
	Ft.	*In.*	
Bernice: BeF	(1)	0–9	Sandy loam
		9–30	Very gravelly coarse sand
Caswell: Ca	2–4	0–32	Stratified silt and sand
		32–40	Very gravelly sand
Chena: [2] Ch	4+	0–6	Fine sandy loam
		6–11	Loamy sand
		11–40	Very gravelly sand
Chulitna: ClA, ClB, ClC	(1)	0–37	Silt loam
		37–44	Very gravelly sand
Clunie: [2] Cn	0–2	0–37	Peat
		37–50	Silty clay loam
Coal Creek: Co	1–4	0–45	Silt loam
*Delyndia: DeA, DeB, DeC, DeD, Dm	(1)	0–11	Silt loam
		11–17	Loamy fine sand
		17–40	Fine sand
For properties of Salamatof soils in mapping unit Dm, refer to Salamatof series.			

See footnotes at end of table.

test data—Continued

Mechanical analysis [2]—Continued								Liquid limit	Plasticity index	Classification	
Percentage passing sieve—Continued				Percentage smaller than—							
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.			AASHO	Unified [3]
								Percent			
---	100	100	83	58	18	5	3	NV	NP	A–4(8)	ML
---	---	100	61	42	16	7	6	NV	NP	A–4(5)	ML
---	---	100	27	15	9	4	4	NV	NP	A–2–4(0)	SM
---	---	100	59	42	17	7	5	NV	NP	A–4(5)	ML
---	100	99	70	44	17	0	0	NV	NP	A–4(7)	ML
---	100	99	66	43	18	4	2	NV	NP	A–4(6)	ML

[3] SCS and BPR have agreed to consider that all soils having plasticity indexes within 2 points from A-line are to be given a borderline classification. An example of a borderline classification so obtained is SP–SM.
[4] No value.
[5] Nonplastic.

properties of the soils

in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instruc- of this table. Absence of data indicates that no estimate was made]

Classification—Continued		Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
						In./hr.	*In./in. of soil*	*pH value*	
SM	A–4, A–2	100	95–100	60–70	30–40	2. 00–6. 30	0. 15–0. 20	4. 5–5. 0	Low.
GW or GP	A–1	40–50	30–40	20–30	0–5	6. 30–20. 0	0. 03–0. 05	4. 5–5. 0	Low.
SM or ML	A–4	95–100	95–100	70–85	40–55	0. 63–2. 00	0. 20–0. 25	4. 5–5. 5	Low.
GM–GP	A–1	40–50	30–40	20–30	5–15	6. 3–20. 0	0. 03–0. 05	4. 5–5. 5	Low.
ML or SM	A–4	100	100	70–85	40–55	2. 00–6. 30	0. 25–0. 30	5. 6–6. 0	Low.
SM	A–2	100	95–100	50–75	15–30	2. 00–6. 30	0. 10–0. 15	5. 6–6. 0	Low.
GW, GP or GM–GP	A–1	40–50	30–40	20–30	0–15	6. 30–20. 0	0. 03–0. 05	5. 6–6. 0	Low.
ML	A–4	100	100	90–100	70–90	0. 63–2. 00	0. 25–0. 30	4. 5–5. 5	Low.
GW or GM–GW	A–1	40–50	30–40	20–30	0–15	6. 30–20. 0	0. 03–0. 05	5. 1–5. 5	Low.
Pt	---	---	---	---	---	---	---	5. 6–7. 3	High shrink; low swell.
CL	A–7	100	100	100	85–95	0. 06–0. 20	0. 28–0. 32	6. 1–7. 3	Moderate.
ML	A–4	100	100	90–100	70–90	0. 63–2. 00	0. 25–0. 30	5. 1–5. 5	Low.
ML	A–4	100	100	90–100	70–90	0. 63–2. 00	0. 25–0. 30	4. 5–5. 0	Low.
SM	A–2, A–4	100	100	70–80	30–40	0. 63–20. 0	0. 10–0. 15	5. 1–5. 5	Low.
SM	A–2	100	95–100	65–80	20–35	---	0. 05–0. 07	5. 1–5. 5	Low.

TABLE 6.—*Estimated engineering*

Soil series, land types, and map symbols	Depth to seasonal high water table	Depth from surface of typical profile	Classification: Dominant USDA texture
	Ft.	*In.*	
*Dinglishna: Dn, Dr	0–2	0–14	Sandy loam and loamy sand
		14–20	Sand (strongly cemented)
For properties of Moose River soils in mapping unit Dr, refer to Moose River series.			
Flat Horn: FhA, FhB	(1)	0–9	Silt loam
		9–40	Fine sand, very fine sand, silt loam (stratified)
Gravelly alluvial land: Ga	[2] 0–3		Very gravelly and cobbly sand
Gravel pits: Gv. No valid estimates can be made.			
Homestead: HoA, HoB, HoC, HoD, HoE	(1)	0–7	Silt loam
		7–28	Very gravelly sand
Jacobsen: Ja	0–2	0–27	Very stony silt loam
Kalifonsky: Ka	½–3½	0–22	Silt loam
		22–40	Very gravelly sand
Kashwitna: KsA, KsB, KsC, KsD, KsE, KsF	(1)	0–14	Silt loam
		14–20	Gravelly sandy loam
		20–30	Very gravelly sand
*Killey: Kr	2–3	0–10	Silt loam
		10–36	Fine sandy loam and fine sand
For properties of Moose River soils in this mapping unit refer to the Moose River series.			
		36–44	Gravelly and very gravelly coarse sand
Lucile: Lu	4+	0–16	Silt loam
		16–30	Very gravelly sand
Mixed alluvial land: Me. No valid estimates can be made.			
Moose River: Mr	[2] 0–2	0–42	Silt loam, stratified fine sand and silt
Nancy:			
NaA, NaB, NaC, NaD, NaE, NaF	(1)	0–24	Silt loam
		24–40	Very gravelly sand
NcA, NcB, NcC, NcD, NcE	(1)	0–28	Silt loam
		28–40	Sand
Niklason: [2] Nk	(1)	0–17	Silt loam and loamy fine sand (stratified)
		17–40	Very gravelly sand
Rabideux:			
RaA, RaB, RaC, RaD, RaE, RaF	(1)	0–23	Silt loam
		23–48	Very gravelly sand
RbA, RbB, RbC, RbD, RbE	(1)	0–15	Silt loam
		15–32	Very gravelly sand
RdA, RdB, RdC, RdD, RdE	(1)	0–20	Silt loam
		20–40	Sand
Salamatof: Sa	0–1	0–60	Peat
Schrock: ShA	(1)	0–18	Silt loam
		18–42	Stratified fine sand and silt loam
Slikok: Sm	0–2	0–50	Silt loam

See footnotes at end of table.

properties of the soils—Continued

Classification—Continued		Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
						In./hr.	*In./in. of soil*	*pH value*	
SM	A–2, A–4	100	100	60–70	30–40	2. 00–6. 30	0. 15–0. 20	4. 5–5. 0	Low.
						<0. 06		4. 5–5. 0	Low.
ML	A–4	100	100	85–95	75–85	0. 63–2. 00	0. 25–0. 30	4. 5–5. 5	Low.
SM	A–4	100	95–100	80–90	40–50	0. 63–2. 00	0. 20–0. 25	5. 1–5. 5	Low.
GW or GP	A–1	30–50	20–40	15–30	0–5	6. 30–20. 0	0. 30–0. 05		Low.
ML	A–4	95–100	90–100	80–90	70–80	0. 63–2. 00	0. 25–0. 30	4. 5–5. 5	Low.
GW or GM	A–1	40–50	20–40	15–30	0–15	6. 30–20. 0	0. 03–0. 05	5. 1–5. 5	Low.
ML	A–4	25–55	20–50	20–30	15–25	0. 63–2. 00	0. 06–0. 08	4. 5–5. 0	Low.
ML	A–4	90–100	90–100	85–95	75–85	0. 63–2. 00	0. 25–0. 30	5. 1–5. 5	Low.
GW or GM	A–1	40–50	30–40	20 30	0–15	6. 30–20. 0	0. 03–0. 05	5. 1–5. 5	Low.
ML	A–4	100	100	90–100	75–90	0. 63–2. 00	0. 25–0. 30	4. 5–5. 0	Low.
SM	A–1	60–70	50–60	40–50	15–25	2. 00–6. 30	0. 10–0. 15	4–5–5. 5	Low.
GW or GP	A–1	40–50	30–40	20–30	0–5	6. 30–20. 0	0. 03–0. 05	5. 1–5. 5	Low.
ML	A–4	100	100	90–100	70–80	0. 63–2. 00	0. 25–0. 30	4. 5–5. 0	Low.
SM	A–4	100	90–100	75–85	40–50	0. 63–2. 00	0. 20–0. 25	4. 5–5. 0	Low.
GW or GM	A–1	60–70	50–60	15–25	0–15	6. 30–20. 0	0. 03–0. 05	4. 5–5. 0	Low.
ML	A–4	100	100	90–100	70–80	0. 63–2. 00	0. 25–0. 30	4. 5–5. 0	Low.
GW or GP	A–1	40–50	30–40	20–30	0–5	6. 30–20. 0	0. 03–0. 05	5. 1–5. 5	Low.
SM	A–4	95–100	85–95	70–80	35–50	0. 63–2. 00	0. 20–0. 25	5. 1–5. 5	Low.
ML	A–4	100	100	95–100	70–80	0. 63–2. 00	0. 25–0. 30	4. 5–5. 5	Low.
GW, GM, GP–GM	A–1	30–65	25–60	10–45	0–20	6. 30–20. 0	0. 03–20. 5	5. 1–5. 5	Low.
ML	A–4	100	100	95–100	65–75	0. 63–2. 00	0. 25–0. 30	4. 5–5. 5	Low.
SM–SP	A–3	95–100	95–100	80–90	5–10	6. 30–20. 0	0. 04–0. 06	5. 1–5. 5	Low.
SM or ML	A–4	100	95–100	80–90	40–60	0. 63–2. 00	0. 20–0. 25	5. 1–5. 5	Low.
GW or GP	A–1	40–50	30–40	20–30	0–5	6. 30–20. 0	0. 03–0. 05	5. 1–5. 5	Low.
ML	A–4	100	100	95–100	70–80	0. 63–20. 0	0. 25–0. 30	4. 5–5. 5	Low.
GW or GP	A–1	30–50	25–40	10–25	0–5	6. 30–20. 0	0. 03–0. 05	5. 1–5. 5	Low.
ML	A–4	100	95–100	95–100	65–75	0. 63–2. 00	0. 25–0. 30	4. 5–5. 5	Low.
GW or GP		30–55	25–50	10–25	0–5	6. 30–20. 0	0. 03–0. 05	5. 1–5. 5	Low.
ML	A–4	100	100	95–100	60–80	0. 63–2. 00	0. 25–0. 30	4. 5–5. 5	Low.
SP or SM–SP	A–3	95–100	95–100	80–90	0–10	6. 30–20. 0	0. 04–0. 06	5. 1–5. 5	Low.
Pt								4. 0–5. 0	High shrink; low swell.
ML	A–4	100	100	95–100	60–80	0. 63–2. 00	0. 25–0. 30	4. 5–5. 5	Low.
SM or ML	A–4	100	95–100	90–100	40–60	2. 00–6. 30	0. 20–0. 25	5. 1–5. 5	Low.
OL	A–5 or A–4	100	100	100	80–90	0. 63–2. 00	0. 28–0. 32	4. 5–5. 0	Low.

TABLE 6.—*Estimated engineering*

Soil series, land types, and map symbols	Depth to seasonal high water table	Depth from surface of typical profile	Classification: Dominant USDA texture
	Ft.	*In.*	
*Susitna:[2] Ss, Sw For properties of Niklason soils in unit Sw, refer to Niklason series.	(1)	0–45	Fine sandy loam, stratified fine sand, very fine sand, and silt loam.
Terrace escarpments: Te. No valid estimates can be made.			
Tidal flats[2]: Tf	0–1		Stratified silt, clay, and very fine sand
Tidal marsh[2]: Tm	0–3		Stratified silt, clay, and very fine sand
Wasilla[2]: Wa	2–4	0–13 13–23 23–40	Silt loam Silty clay loam Silt loam, fine sandy loam, and silty clay loam
Whitsol: WhA, WhB, WhC, WhD, WhE	(1)	0–44 44–56	Silt loam, very fine sandy loam Very gravelly coarse sand

[1] Depth to seasonal water table is not a factor.
[2] Susceptible to flooding.

TABLE 7.—*Engineering*

[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 soils for referring to other series that appear

Soil series and map symbols	Suitability as a source of—				
	Topsoil	Sand	Gravel	Road subgrade	Highway location
Bernice: BeF	Poor: very shallow over coarse material.	Fair: sandy material mixed with gravel.	Good: a few cobblestones.	Good	Strongly sloping to steep; erosion hazard severe on exposed embankments.
Caswell: Ca	Fair: sandy layers.	Silty and sandy material in uppermost 30 inches; very gravelly substratum.	Unsuitable in uppermost 30 inches; good in substratum.	Poor in uppermost 30 inches; good in substratum.	Seasonal high water table.
Chena: Ch	Poor: very shallow over coarse material.	Fair: sandy material mixed with gravel and cobblestones.	Good: a few cobblestones.	Good	Subject to flooding in places.
Chulitna: ClA, ClB, ClC	Good	Poor: silt loam over very gravelly substratum.	Unsuitable in uppermost 30 to 40 inches; good in substratum.	Poor in uppermost 40 inches; good in substratum.	Highly erodible on exposed embankments; short irregular slopes in places.

properties of the soils—Continued

Classification—Continued		Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
						In./hr.	*In./in. of soil*	*pH value*	
SM or ML	A–4	100	100	95–100	40–60	0. 63–2. 00	0. 20–0. 25	5. 1–5. 5	Low.
CL or CH	A–6 or A–7	100	100	90–100	80–90	(3)	(3)	(3)	(3).
CL or CH	A–6 or A–7	100	100	90–100	80–90	(3)	(3)	6. 1–7. 3	(3).
ML	A–4	100	100	95–100	75–85	0. 63–2. 00	0. 25–0. 30	5. 1–5. 5	Low.
CL	A–6 or A–7	100	100	95–100	70–80	0. 20–0. 63	0. 28–0. 32	5. 1–5. 5	Moderate.
SM, ML	A–4	100	95–100	80–90	35–60	0. 20–0. 63	0. 25–0. 30	5. 1–5. 5	Low to moderate.
ML	A–4	100	100	95–100	70–80	0. 63–2. 00	0. 25–0. 30	5. 1–5. 5	Low.
GW or GP	A–1	40–50	30–40	10–20	0–5	6. 30–20. 0	0. 03–0. 05	5. 1–5. 5	Low.

[3] Variable.

interpretations of the soils

in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions in the first column of this table]

Soil features affecting—					Degree and kind of limitation for—	
Embankments, dikes, and levees	Pond reservoir areas	Drainage of cropland and pasture	Grassed waterways	Foundations for low buildings	Septic tank absorption fields	Sewage lagoons
Porous material; rapid seepage.	Not applicable	Not applicable	Not applicable	Rapid permeability; susceptible to sliding.	Severe: strongly sloping to steep.	Not applicable.
Susceptible to piping in uppermost 30 inches; porous material in substratum.	Porous material in substratum; excessive seepage.	Moderate permeability; seasonal high water table in uppermost 30 to 40 inches.	Not applicable	Seasonal high water table.	Severe: seasonal water table.	Severe: coarse material in substratum.
Porous material; rapid seepage.	Porous material; excessive seepage.	Not applicable	Not applicable	Rapid permeability; susceptible to occasional flooding in places.	Severe: subject to flooding.	Severe: rapid permeability.
Susceptible to piping in uppermost 30 to 40 inches; porous material in substratum.	Moderate permeability in uppermost 30 to 40 inches; moderate seepage.	Not applicable	Highly erodible.	Low shear strength and susceptibility to liquefaction in uppermost 30 to 40 inches; very gravelly material below a depth of 30 to 40 inches; rapid permeability.	Slight if slope is 0 to 7 percent; moderate if slope is 7 to 12 percent; ground water may be contaminated.	Severe: rapid permeability below a depth of 30 to 40 inches.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as a source of—				
	Topsoil	Sand	Gravel	Road subgrade	Highway location
Clunie: Cn	Unsuitable: peat material.	Unsuitable: peat material.	Unsuitable: peat material.	Unsuitable: peat material.	Unstable peat material; high water table.
Coal Creek: Co	Fair: seasonal high water table.	Unsuitable: silt loam.	Unsuitable: silt loam.	Poor: silty material.	Susceptible to frost action; seasonal high water table.
*Delyndia: DeA, DeB, DeC, DeD, Dm. For properties of Salamatof soils in mapping unit Dm, refer to Salamatof series in this table.	Fair: sandy material below a depth of 10 inches.	Fair: fine sandy material mixed with silt in places below a depth of 12 inches.	Unsuitable: no gravel.	Good	Susceptible to soil blowing on exposed embankments; slopes; cuts and fills needed in places.
*Dinglishna: Dn, Dr. For properties of Moose River soils in mapping unit Dr, refer to Moose River series in this table.	Poor: generally wet; contains strata of sand.	Poor: generally wet; strongly cemented material below a depth of 14 inches.	Unsuitable: no gravel.	Fair: difficult to excavate because of high water table.	High water table
Flat Horn: FhA, FhB	Good in surface layer; subsoil and substratum interbedded with fine sand.	Fair below a depth of 20 inches; silt interbedded with fine sand.	Unsuitable: no gravel.	Poor: silt interbedded with fine sand.	Susceptible to soil blowing on exposed embankments.
Gravelly alluvial land: Ga	Unsuitable: sandy material mixed with gravel and cobblestones.	Fair: sandy material mixed with gravel and cobblestones.	Good: subject to flooding; many cobblestones.	Good: subject to flooding.	Subject to flooding.
Gravel pits: Gv	Unsuitable				
Homestead: HoA, HoB, HoC, HoD, HoE.	Poor: very shallow to gravel.	Fair: sandy material mixed with gravel and cobblestones.	Good: 5 to 10 inches of silt on surface.	Good	A few stones; hilly and moderately steep in places.
Jacobsen: Ja	Unsuitable: very stony.	Unsuitable: very stony.	Unsuitable: very stony.	Poor: very stony; high water table.	High water table; seepage.

interpretations of the soils—Continued

Soil features affecting—					Degree and kind of limitation for—	
Embankments, dikes, and levees	Pond reservoir areas	Drainage of cropland and pasture	Grassed waterways	Foundations for low buildings	Septic tank absorption fields	Sewage lagoons
Unstable peat in uppermost 30 to 40 inches; clayey substratum has fair stability.	High water table; peat deposits.	Not applicable	Not applicable	Not applicable	Severe: high water table.	Not applicable.
Fair stability; susceptible to piping.	Moderate seepage; seasonal high water table.	Moderate permeability; seasonal high water table.	Not applicable	Poorly drained; low shear strength; seasonal high water table.	Severe: seasonal high water table.	Severe: high water table.
Sandy material; porous.	Sandy material; excessive seepage.	Not applicable	Low available water capacity; highly erodible.	Fine sand; rapid permeability.	Slight if slope is 0 to 7 percent; moderate if slope is 7 to 12 percent; severe if slope is more than 12 percent; ground water may be contaminated.	Severe: rapid permeability.
Sandy material; porous.	Fluctuating water table; strongly cemented material below a depth of 14 inches; lateral seepage.	Not applicable	Not applicable	Not applicable	Severe: high water table.	Severe: strongly cemented material in substratum at a depth of 14 inches.
Susceptible to piping.	Moderate permeability; moderate seepage.	Not applicable	Highly erodible	Moderate permeability; moderate shear strength.	Slight: moderate permeability; ground water may be contaminated.	Moderate: moderate permeability.
Very gravelly porous material.	Very porous; excessive seepage.	Not applicable	Not applicable	Subject to flooding.	Not applicable	Not applicable.
Very gravelly porous material.	Porous; excessive seepage.	Not applicable	Not applicable	Not applicable	Not applicable	Severe: porous material.
Very gravelly porous material.	Porous; excessive seepage.	Not applicable	Very shallow to gravel.	Rapid permeability; very gravelly sand.	Slight if slope is 0 to 7 percent; moderate if slope is 7 to 12 percent; severe if slope is more than 12 percent; ground water may be contaminated.	Severe: rapid permeability; coarse material.
Very stony	High water table; lateral seepage.	Not applicable	Not applicable	Poorly drained; high water table.	Severe: high water table.	Severe: very stony.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as a source of—				
	Topsoil	Sand	Gravel	Road subgrade	Highway location
Kalifonsky: Ka	Fair: seasonal high water table.	Unsuitable in uppermost 15 to 30 inches; poor in substratum; sandy material mixed with gravel.	Unsuitable in uppermost 15 to 30 inches; fair in substratum; high water table.	Fair in substratum; seasonal high water table; stones.	Seasonal high water table.
Kashwitna: KsA, KsB, KsC, KsD, KsE, KsF.	Fair: shallow to gravel.	Fair: thin surface layer of silt loam; sandy material mixed with gravel in substratum.	Good: thin surface layer of silt loam.	Good: thin surface layer of silt loam.	A few stones; irregular slopes in places.
*Killey: Kr For properties of Moose River soils in this mapping unit, refer to Moose River series in this table.	Fair: seasonal high water table; silt interbedded with sand.	Poor: seasonal high water table; silt interbedded with sand.	Poor: deep silt and sand sediment; seasonal high water table.	Fair to poor: seasonal high water table.	Seasonal high water table; susceptible to occasional flooding in places.
Lucile: Lu	Good: very gravelly material below a depth of 15 to 30 inches.	Poor: 15 to 30 inches of silt loam; sandy material mixed with gravel in substratum.	Good to fair: 15 to 30 inches of silt loam.	Good to fair: 15 to 30 inches of silt loam.	Shallow to gravelly material in substratum.
Mixed alluvial land: Me	Poor: variable texture that generally is too coarse.	Poor: variable texture; sandy material mixed with silt and gravel.	Fair: contains strata of silt and sand.	Good	Susceptible to flooding.
Moose River: Mr	Poor: high water table; stratified sand and silt.	Poor: high water table; sandy material interbedded with silt.	Poor: high water table; thick silty and sandy sediment.	Poor: high water table.	High water table; susceptible to flooding.
Nancy: NaA, NaB, NaC, NaD, NaE, NaF.	Good: very gravelly material below a depth of 20 to 30 inches.	Fair to poor: silt loam in uppermost 20 to 30 inches; sand mixed with gravel in substratum.	Good to fair: silt loam in uppermost 20 to 30 inches; very gravelly material in substratum.	Fair: silt loam in uppermost 20 to 30 inches.	Hilly, or moderately steep and steep in places.

interpretations of the soils—Continued

Soil features affecting—					Degree and kind of limitation for—	
Embankments, dikes, and levees	Pond reservoir areas	Drainage of cropland and pasture	Grassed waterways	Foundations for low buildings	Septic tank absorption fields	Sewage lagoons
Susceptible to piping in uppermost 15 to 30 inches; porous material in substratum.	Seasonal high water table; porous material in substratum permits excessive seepage.	Seasonal high water table.	Seepage spots	Poorly drained; seasonal high water table.	Severe: seasonal high water table; ground water may be contaminated.	Severe: coarse material in substratum; rapid permeability.
Susceptible to piping in uppermost 10 to 15 inches; very gravelly porous material in substratum.	Very porous material in substratum permits excessive seepage.	Not applicable	Shallow to very gravelly sand; cobblestones.	Shallow to rapidly permeable material in substratum.	Slight if slope is 0 to 7 percent; moderate if slope is 7 to 12 percent; severe if slope is more than 12 percent; ground water may be contaminated.	Severe: rapid permeability; coarse material; moderate to steep slopes in places.
Susceptible to piping.	Seasonal high water table; lateral seepage.	Subject to occasional flooding; seasonal high water table.	Poorly drained	Poorly drained; subject to occasional flooding in places; seasonal high water table.	Severe: seasonal high water table; ground water may be contaminated.	Severe: rapid permeability in substratum; high water table.
Susceptible to piping in uppermost 15 to 30 inches; porous material in substratum.	Porous material in substratum permits moderate to excessive seepage.	Not applicable	Very gravelly material below a depth of 15 to 30 inches.	Moderate permeability in uppermost 15 to 30 inches; low shear strength; very gravelly sand in substratum.	Moderate: seasonal high water table at a depth of 4 to 6 feet; ground water may be contaminated.	Severe: coarse material; rapid permeability below a depth of 15 to 30 inches.
Porous material	Porous material; excessive seepage.	Not applicable	Not applicable	Susceptible to flooding in places; variable texture.	Severe: susceptible to flooding.	Not applicable.
Susceptible to piping; fair to poor stability.	High water table; excessive lateral seepage.	Not applicable	Not applicable	Not applicable	Severe: high water table; susceptible to flooding.	Not applicable.
Highly susceptible to piping in uppermost 20 to 30 inches; porous material in substratum.	Porous material in substratum permits excessive seepage.	Not applicable	Highly erodible; gravelly spots.	Moderate permeability and susceptibility to liquefaction in uppermost 20 to 30 inches; rapid permeability in substratum.	Slight if slope is 0 to 7 percent; moderate if slope is 7 to 12 percent; severe if slope is more than 12 percent; ground water may be contaminated.	Severe: rapid permeability; moderately steep to steep in places.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as a source of—				
	Topsoil	Sand	Gravel	Road subgrade	Highway location
Nancy: Cont. NcA, NcB, NcC, NcD, NcE.	Good: sandy material below a depth of 20 to 30 inches.	Good: silt loam in uppermost 20 to 30 inches; fine sand in substratum mixed with silt in places.	Poor: sandy substratum.	Fair: silt loam over fine sand in uppermost 20 to 30 inches.	Highly erodible on exposed embankments; hilly or moderately steep in places.
Niklason: Nk	Fair in uppermost 10 to 30 inches; stratified silt and fine sand.	Fair: sandy and silty material mixed with gravel and cobblestones in substratum.	Good in substratum: sandy and silty in uppermost 10 to 30 inches.	Good	Susceptible to occasional flooding in places.
Rabideux: RaA, RaB, RaC, RaD, RaE, RaF.	Good: very gravelly material below a depth of 20 to 30 inches.	Fair in substratum: sandy and silty material mixed with gravel; unsuitable in uppermost 20 to 30 inches.	Good in substratum: unsuitable material in uppermost 20 to 30 inches.	Good below a depth of 20 to 30 inches.	Hilly, or moderately steep or steep in places.
RbA, RbB, RbC, RbD, RbE	Fair: 15 to 20 inches of silt loam over gravelly material.	Fair: silty material mixed with gravel and cobblestones below a depth of 15 to 20 inches.	Good: 15 to 20 inches of silt loam over gravelly material; cobblestones.	Good below a depth of 15 to 20 inches.	Hilly and moderately steep in places.
RdA, RdB, RdC, RdD, RdE.	Good: sandy material in substratum.	Fair: silt loam over fine sand in uppermost 15 to 25 inches.	Unsuitable: no gravel.	Fair below a depth of 15 to 25 inches; fine sand mixed with silt in places.	Hilly and moderately steep in places; highly erodible on exposed embankments.
Salamatof: Sa	Unsuitable: peat.	Unsuitable: peat.	Unsuitable: peat.	Unsuitable: peat.	Unstable peat; high water table.
Schrock: ShA	Good: stratified silt loam and fine sand.	Poor: excessive fines.	Unsuitable: no gravel.	Poor: silt loam.	Erodible on exposed embankments.
Slikok: Sm	Fair: high water table.	Unsuitable: no sand.	Unsuitable: no gravel.	Poor: mucky silt loam; high water table.	Unstable material; high water table; susceptible to frost action.

interpretations of the soils—Continued

Soil features affecting—					Degree and kind of limitation for—	
Embankments, dikes, and levees	Pond reservoir areas	Drainage of cropland and pasture	Grassed waterways	Foundations for low buildings	Septic tank absorption fields	Sewage lagoons
Susceptible to piping in uppermost 20 to 30 inches; porous sandy material in substratum.	Porous material in substratum permits excessive seepage.	Not applicable	Highly erodible	Moderate permeability and susceptibility to liquefaction in uppermost 20 to 30 inches; rapid permeability in substratum.	Slight if slope is 0 to 7 percent; moderate if slope is 7 to 12 percent; severe if slope is more than 12 percent; ground water may be contaminated.	Severe: rapid permeability; moderately steep to steep in places.
Susceptible to piping in uppermost 10 to 30 inches; porous gravelly material in substratum.	Excessive seepage.	Not applicable	Shallow to moderately deep over very gravelly material.	Well drained; rapid permeability below a depth of 10 to 30 inches; susceptible to occasional flooding in places.	Slight to severe: subject to flooding in places; ground water may be contaminated.	Severe: rapid permeability.
Uppermost 20 to 30 inches susceptible to piping; very porous gravelly material in substratum.	Porous material in substratum permits excessive seepage.	Not applicable	Highly erodible.	Moderate permeability and susceptibility to liquefaction in uppermost 20 to 30 inches; porous material in substratum.	Slight if slope is 0 to 7 percent; moderate if slope is 7 to 12 percent; severe if slope is more than 12 percent; ground water may be contaminated.	Severe: rapid permeability; moderately steep to steep in places.
Uppermost 15 to 20 inches susceptible to piping; porous very gravelly material in substratum.	Porous material in substratum permits excessive seepage.	Not applicable	Shallow to very gravelly material; cobblestones.	Shallow to very gravelly porous material.	Slight if slope is 0 to 7 percent; moderate if slope is 7 to 12 percent; severe if slope is more than 12 percent.	Severe: rapid permeability; moderate to steep slopes in places.
Uppermost 15 to to 25 inches highly susceptible to piping; porous sandy material in substratum.	Porous material in substratum permits excessive seepage.	Not applicable	Highly erodible; sandy spots.	Moderate permeability and susceptibility to liquefaction in uppermost 15 to 25 inches; loose fine sand in substratum.	Slight if slope is 0 to 7 percent; moderate if slope is 7 to 12 cent; severe if slope is more than 12 percent.	Severe: rapid permeability below a depth of 15 to 25 inches; moderate to moderately steep slopes in places.
Unstable peat	Peat; high water table.	Not applicable	Not applicable	Not applicable	Severe: high water table.	Not applicable.
Susceptible to piping.	Moderate permeability; moderate seepage.	Not applicable	Moderate permeability; moderate available water capacity.	Moderate permeability; moderate shear strength.	Slight: moderate permeability; ground water may be contaminated.	Moderate: moderate permeability.
Unstable material.	High water table; high content of organic matter.	Patches of stones; high water table.	Poorly drained; high water table.	Not applicable	Severe: high water table; ground water may be contaminated.	Severe: high content of organic matter; high water table.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as a source of—				
	Topsoil	Sand	Gravel	Road subgrade	Highway location
*Susitna: Ss, Sw. For properties of Niklason soils in the Sw mapping unit, refer to Niklason series in this table.	Fair to good: variable texture.	Poor: contains many strata of silty material.	Unsuitable: no gravel.	Fair: stratified sand and silt.	Susceptible to flooding in places.
Terrace escarpments: Te	Poor: generally coarse textured.	Poor: mixed with silt and gravel.	Fair: mixed with silt and sand.	Good, but difficult to excavate because of steep slopes.	Severe erosion hazard; steep slopes.
Tidal flats: Tf	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Subject to frequent flooding by exceptionally high tides; unstable material.
Tidal marsh: Tm	Poor: clayey; susceptible to flooding.	Unsuitable	Unsuitable	Poor: high water table.	Susceptible to frost heaving; high water table; subject to occasional flooding.
Wasilla: Wa	Good	Poor: excessive fines.	Unsuitable, deep silty and clayey material.	Poor: moderate shrink-swell potential.	Susceptible to frost action.
Whitsol: WhA, WhB, WhC, WhD, WhE.	Good	Poor: silt loam in the uppermost 40 to 60 inches.	Poor: silt loam in the uppermost 40 to 60 inches.	Poor in uppermost 40 to 60 inches; good in substratum.	Erodible on exposed embankments; hilly and moderately steep slopes in places.

interpretations of the soils—Continued

Soil features affecting—					Degree and kind of limitation for—	
Embankments, dikes, and levees	Pond reservoir areas	Drainage of cropland and pasture	Grassed waterways	Foundations for low buildings	Septic tank absorption fields	Sewage lagoons
Susceptible to piping; porous very gravelly material in substratum.	Excessive seepage.	Not applicable	Moderate permeability; moderate available water capacity.	Moderate permeability; subject to flooding in places.	Slight to severe: subject to flooding in places; ground water may be contaminated.	Severe: rapid permeability in substratum.
Variable texture; generally is gravelly, stony, and porous.	Not applicable	Not applicable	Not applicable	Not applicable	Severe: steep slopes.	Not applicable.
Clayey material; variable shrink-swell potential.	Not applicable	Not applicable	Not applicable	Not applicable	Severe: high water table; variable permeability.	Unsuitable.
Clayey material; variable shrink-swell potential.	High water table.	Not applicable	Not applicable	Poorly drained; slow permeability; clayey material; high water table.	Severe: slow permeability; high water table.	Severe: subject to occasional flooding; high water table.
Fair stability; susceptible to piping.	Seasonal high water table.	Moderately slow permeability.	Poorly drained	Poorly drained; seasonal high water table.	Severe: seasonal high water table; moderately slow permeability.	Severe: subject to flooding; seasonal high water table.
Susceptible to piping.	Moderate permeability; moderate seepage.	Not applicable	Highly erodible	Moderate permeability and susceptibility to liquefaction in uppermost 40 to 60 inches; very porous gravelly material in substratum.	Slight if slope is 0 to 7 percent; moderate if slope is 7 to 12 percent; severe if slope is 12 to 20 percent; ground water may be contaminated.	Severe: rapid permeability in substratum; moderate to moderately steep slopes in places.

The tests for liquid limit and plastic limit measure the effect of water on the consistence of soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semisolid to a plastic state. As 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 a semisolid to a plastic state. The *liquid limit* is the moisture content at which the material passes from a plastic to a liquid state. 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 in a plastic condition.

Engineering properties of the soils

Table 6 lists the soil series in the survey area and the map symbols for each mapping unit and gives estimates of soil properties that are significant to engineering. The estimates are based partly on test data in table 5 and partly on experience with soils within the Area and that gained in working with and observing similar soils in other areas.

In general, the estimates in table 6 apply only to the soil depths indicated in the table, but these data are reasonably reliable for soil material to a depth of about 5 feet. Depth to bedrock is more than 10 feet for all the soils in the survey area. Therefore, except for very deep excavations, bedrock does not affect use of the soils.

Soil texture is described in table 6 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 2.0 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classifications are defined in the Glossary of this soil survey.

In table 6, permeability is estimated in inches of water percolation per hour. The data are based on uncompacted soils from which free water has been removed. The estimates are based largely on texture, structure, and consistence.

Available water capacity, expressed as inches of water per inch of soil depth, is the capacity of a soil to hold water available for use by most plants. It is the estimated amount of water held in a soil between field capacity and the permanent wilting point of plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed as a pH value. The pH value and relative terms used to describe soil reaction are explained in the Glossary.

In table 6 shrink-swell potential indicates the volume change to be expected of a soil with change in moisture content. The estimates are based primarily on the amount and kind of clay in the soil.

Engineering interpretations of the soils

Table 7 gives ratings of the soils according to their suitability as a source of topsoil, sand, gravel, and road subgrade. It also lists soil features that affect the suitability of the soils for several engineering practices. In addition, ratings of the limitations of the soils for use as sites for septic tank absorption fields and sewage lagoons are given. The ratings and other interpretations are based on test data in table 5, on estimated soil properties in table 6, and on field experience.

Topsoil refers to soil material, preferably rich in organic matter, that is used as a topdressing on slopes, embankments, lawns, gardens, and the like. The suitability ratings are based mainly on the texture and on the organic-matter content of the soil. In this survey area, however, all of the soil material used for topsoil generally needs additions of fertilizer for satisfactory results.

The ratings for sand and gravel are based on the probability that mapped areas of the soils contain deposits of sand and gravel. The ratings do not reflect the quality or extent of the deposits. In the Susitna Valley Area, the soils on river terraces generally are underlain by rounded gravel, most of which is less than 3 inches in diameter. In some places, however, the deposits contain many cobblestones. The gravelly material on moraines commonly contains more fine-grained particles than that in other areas, and in places it contains many large stones and boulders.

Road subgrade refers to soil material that is used to build embankments. The suitability ratings are based on the performance of soil material moved from borrow pits for this purpose.

Soil features considered in rating the soils for highway locations are those that affect the overall performance of the soils. The ratings are based on undisturbed soils.

Although the hazard of frost action is not considered in the ratings indicated in table 7, it is a major concern where the soils in this survey area are used for engineering purposes. Most of the uplands is under a cover of wind-laid silt loam that ranges from less than 10 inches thick in Homestead soils to more than 40 inches thick in Whitsol soils. This material consists mainly of silt particles and is susceptible to severe frost action. It generally is not good material for construction. The material is soft and slippery when wet and may not support heavy equipment, and it is dusty when dry. In most of the well-drained soils on uplands the silt loam generally is underlain by very gravelly or sandy material that is not susceptible to frost action.

The poorly drained soils in depressions, on flood plains, and in seepage spots on moraines and terraces generally are highly susceptible to frost action. About one-third of the survey area is occupied by peat soils in muskegs. These soils are wet to the surface during most of the year and are difficult to drain. Peat has no value as construction material or as foundation material. If feasible, it should be excavated before construction work begins.

Because it is difficult to maintain proper control of moisture for compaction when soils are frozen, frost-susceptible material should not be used in constructing embankments and other earthworks in winter.

Embankments, dikes, and levees are low structures designed to impound or to divert water. The soil features considered in rating the soils for these purposes are mainly those that affect use of disturbed soil material for constructing earth fills.

The main feature considered in determining the suitability of the soils for pond reservoir areas is permeability of the undisturbed soil, which affects seepage.

The factors considered for providing drainage for cropland and pasture are the features that affect the installation and performance of surface and subsurface drainage systems. Among these features are permeability, seasonal high water table, restricting layers, and relief. Drainage of the soils of this survey area for cropland and pasture is physically possible, but it cannot be justified economically until a greater percentage of the acreage of the uplands is cleared of vegetation. Drainage of peat soils for farming in the Area is not advisable.

For grassed waterways, the soil features considered are those that affect the establishment, growth, and maintenance of plants and the construction of waterways. Among these features are stability (fig. 6), runoff, texture, and stones on and in the soil.

Foundations for low buildings are affected chiefly by features of the undisturbed soil that influence its capacity to support low buildings that have normal foundation loads. The substratum of the soil is evaluated because this layer generally provides the base for foundations. Specific values of bearing strength are not considered.

Septic tank absorption fields and sewage lagoons are influenced mainly by such soil features as seasonal high water table, susceptibility to flooding, permeability, and slope. In table 7 ratings of slight, moderate, and severe indicate the degree to which these features limit the use of the soils in this survey area for septic tank absorption fields and sewage lagoons.

Formation and Classification of Soils

In this section the factors that have affected the formation of soils in the Susitna Valley Area are discussed, and important processes in the differentiation of soil horizons are briefly described. Then, the current system of soil classification is explained, and the soil series represented in the survey area are placed in some of the categories of this system. The soil series of the Susitna Valley Area, including a profile representative of each series, are described in the section "Descriptions of the Soils."

Factors of Soil Formation

Soil is produced by the action of soil-forming processes on materials deposited or accumulated by geologic forces. The characteristics of the soil at any given point are determined by the interaction of five major factors: (1) parent material, (2) climate, (3) plants and animals, (4) relief, and (5) time.

Climate and plants and animals are the active factors of soil formation. They act on the parent material that has accumulated through the weathering of rocks and slowly change it into a natural body with genetically related horizons. The effects of climate and plants and animals are conditioned by relief. The parent material also affects the kind of profile that can be formed and, in extreme cases, determines it almost entirely. Finally, time

Figure 6.—**Exposed roadbanks in a Nancy silt loam, sandy substratum. These soils are highly susceptible to erosion.**

is needed for the changing of parent material into a soil. It may be much or little, but some time is always required for differentiation of soil horizons. Generally, a long time is needed for distinct horizons to form.

Parent material.—Parent material is the unconsolidated mass from which a soil forms. It determines the limits of the chemical and mineral composition of the soil.

In the Susitna Valley Area, the dominant soils on uplands formed in a mantle of silty deposits over sandy or gravelly material on terraces and glacial till (*10*). The loess deposits contain significant amounts of volcanic ash (*15*). The thickness of the loess ranges from 5 inches, as in the Homestead soils, to more than 40 inches, as in the Whitsol soils. The loess deposits generally are shallow in the southeastern section of the Area and thick in the central part. Most of the underlying terrace material consists of rounded gravel, cobblestones, and sand. In several large areas of Rabideux and Nancy soils, however, the gravelly material is covered by thick deposits of fine sand. Generally, the glacial till is loose and gravelly, but it contains a somewhat higher proportion of fine-grained material than the terrace deposits.

Soils on flood plains along the major streams of the Area formed in stratified silty and sandy water-laid sediment. This material ranges from a few inches in thickness, as in the Chena soils, to many feet in thickness, as in the Schrock and Susitna soils. The sediment was deposited over very gravelly and cobbly stream deposits.

The peat soils in the Clunie and Salamatof series formed principally from the remains of mosses, sedges, and other low-growing plants. Peat deposits commonly are many feet deep and are in bogs or muskegs that range from less than an acre to many square miles in size.

Climate.—The climate of the Susitna Valley Area generally is influenced by the cold, dry, continental climate of interior Alaska and the mild maritime climate of coastal areas bordering the Gulf of Alaska. It is characterized by cool summers and moderately cold winters. The annual precipitation ranges from 20 inches in the extreme southeastern part of the Area to 29 inches in the extreme northern part. Snow generally covers the surface from about the middle of October to the end of April, and accumulations commonly are 2 to 5 feet deep throughout much of the Area. Because evaporation and transpiration rates are low, much of the rainfall percolates through the soil and is effective in leaching. The soils therefore are acid and low in major plant nutrients. There is no permafrost in the Area.

Plants and animals.—Plants, burrowing animals, insects, bacteria, and fungi are important in the formation of soils. They add to the supply of organic matter, nitrogen, and other plant nutrients and alter the structure and porosity of the soils.

In this survey area the upland soils generally support vegetation mainly of paper birch, white spruce, and quaking aspen. Many of the poorly drained soils support black spruce or dense patches of willow and alder. The vegetation of most of the very poorly drained soils in muskegs, however, consists of thick moss, sedges, and low shrubs. Information concerning the vegetation in the Area is provided under "Woodland," in the section "Use and Management of the Soils."

Because of the cool climate in the Susitna Valley Area, biological activity is relatively slow. Woodland litter and other plant remains decompose slowly because they tend to accumulate on the surface of the soil. This mat of organic material commonly is 1½ to 4 inches thick on the well-drained soils, and it is thicker on the poorly drained soils. The insulating effect of the mat tends to delay thawing of the soils in spring.

Relief.—In this Area the influence of relief on soil formation is strongest in its effect on natural drainage. Soils in depressions and in low-lying areas commonly show characteristics associated with wetness. Those on uplands, including the Chulitna, Delyndia, Flat Horn, Homestead, Kashwitna, Nancy, Rabideux, and Whitsol soils, generally have colors and other characteristics that indicate good drainage. Differences among well-drained soils are largely the result of factors other than relief. For example, little consistent relationship exists between thickness of the mantle of loess or the distinctiveness of subsoil formation and steepness of slope or other features of relief.

Time.—A long time is needed for formation of soils that have distinct horizons. The length of time that parent material has been in place generally is reflected in the degree of formation of the soil profile.

All the soils of the Area formed after the recession of the last ice sheet and the subsequent deposition of loess and volcanic ash. Profile formation in the upland soils generally is much more advanced, especially in the Chulitna and Rabideux soils of the northern parts of the Area, than it is in the soils of the Matanuska Valley Area, which lies to the east (*16*). Although much of this difference in profile formation can be attributed to the more intensive leaching that results from heavier rainfall in the Susitna Valley Area (*15*), time also is an important factor. The processes of soil formation have been at work for a much longer time in the loess deposits of the Susitna Valley Area than in those of most the Matanuska Valley Area, where loess is still being deposited. Most of the well-drained soils in the Susitna Valley Area that formed in loess have a bisequal profile, characterized by a buried sequum that has horizons similar to those in the upper sequum. The distinct horizons of the buried sequum indicate a long interim stage between two separate periods of silt deposition.

Classification of Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about soils; to see their relationship to one another and to the whole environment; and to develop principles that help us to understand their behavior and response to kinds of treatment.

Thus, in classification, soils are placed in narrow categories that are used in detailed surveys so that knowledge about the soils can be organized and applied in managing farms, fields, and woodland; in developing rural areas; in engineering work; and in many other ways. The soils are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and later revised (*19*). The system currently used was adopted for general use by the National

Cooperative Soil Survey in 1965. It is under continual study. Therefore, readers interested in this system should search the latest literature available (*17*, *21*). The soil series of the Susitna Valley Area are placed in some categories of the current system in table 8.

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar origin are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available. The categories of the current system are briefly defined in the paragraphs that follow:

ORDERS. Ten soil orders are recognized. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. Two exceptions, the Entisols and the Histosols, occur in many kinds of climate. The four soil orders represented in the Susitna Valley Area are Entisols, Histosols, Inceptisols, and Spodosols.

Entisols have few, if any, clearly expressed characteristics. In the Susitna Valley Area, Entisols occur on alluvial plains in material recently deposited by water. They are represented by *Typic Cryorthents*, which are well drained and uniform in texture; by *Typic Cryofluvents*, which are well drained and stratified; and by *Typic Cryaquents*, which are poorly drained.

Histosols are composed primarily of organic material. They are represented in the Susitna Valley Area by *Terric Borofibrists*, which are moderately deep over a mineral substratum, and by *Cryic Sphagnofibrists*, which consist of deep sphagnum moss peat.

Inceptisols, soils in which the parent material has been modified, have weakly expressed horizons that are characteristic of those in other orders. In the Susitna Valley Area, the only Inceptisols that are recognized are soils that formed under cold, wet conditions. These soils, the Cryaquepts, are gray, bluish, or greenish and contain brown or reddish-brown mottles and streaks. The *Typic Cryaquepts* lack a thick dark upper horizon and a thick mat of organic material on the surface. *Aeric Cryaquepts* have characteristics associated with wetness, but they are browner than the Typic Cryaquepts. *Humic Cryaquepts* have a thick, dark-colored surface horizon. *Histic Cryaquepts* have a fairly thick accumulation of organic material on the surface.

Spodosols are soils in which leaching (eluviation) has resulted in an accumulation of organic carbon, together with iron and aluminum, in one horizon of the profile. This horizon generally is dark brown or dark reddish brown. Above the illuvial horizon a light-gray eluvial horizon commonly is at the surface of the mineral soil.

TABLE 8.—*Classification of soil series of Susitna Valley Area*

Series	Current classification			1938 classification
	Family	Subgroup	Order	Great group
Bernice	Sandy-skeletal, mixed	Typic Cryorthods	Spodosols	Podzols.
Caswell	Coarse-loamy, mixed	Sideric Cryaquods	Spodosols	Podzols.
Chena	Sandy-skeletal, mixed	Typic Cryorthents	Entisols	Alluvial soils.
Chulitna	Coarse-silty, mixed	Typic Cryorthods	Spodosols	Podzols.
Clunie	Loamy, mixed, euic	Terric Borofibrists	Histosols	Bog soils.
Coal Creek	Coarse-silty, mixed, acid	Humic Cryaquepts	Inceptisols	Humic Gley soils.
Delyndia	Sandy, mixed	Typic Cryorthods	Spodosols	Podzols.
Dinglishna	Sandy, mixed, ortstein	Typic Cryaquods	Spodosols	Ground-Water Podzols.
Flat Horn	Coarse-loamy, mixed	Typic Cryorthods	Spodosols	Podzols.
Homestead	Loamy-skeletal, mixed	Typic Cryorthods	Spodosols	Podzols.
Jacobsen	Loamy-skeletal, mixed, acid	Histic Cryaquepts	Inceptisols	Humic Gley soils.
Kalifonsky	Coarse-silty over sandy or sandy-skeletal, mixed, acid.	Typic Cryaquepts	Inceptisols	Low-Humic Gley soils.
Kashwitna	Coarse-silty over sandy or sandy-skeletal, mixed.	Typic Cryorthods	Spodosols	Podzols.
Killey	Coarse-loamy over sandy or sandy-skeletal, mixed, acid.	Aeric Cryaquepts	Inceptisols	Low-Humic Gley soils.
Lucile	Coarse-silty over sandy or sandy-skeletal, mixed.	Sideric Cryaquods	Spodosols	Podzols.
Moose River	Coarse-loamy, mixed, acid	Typic Cryaquents	Entisols	Low-Humic Gley soils.
Nancy	Coarse-silty over sandy or sandy-skeletal, mixed.	Typic Cryorthods	Spodosols	Podzols.
Niklason	Coarse-loamy over sandy or sandy-skeletal, mixed, acid.	Typic Cryofluvents	Entisols	Alluvial soils.
Rabideux	Coarse-silty over sandy or sandy-skeletal, mixed.	Typic Cryorthods	Spodosols	Podzols.
Salamatof	Dysic	Cryic Sphagnofibrists	Histosols	Bog soils.
Schrock	Coarse-loamy, mixed	Typic Cryorthods	Spodosols	Brown-Podzolic soils.
Slikok	Coarse-silty, mixed, acid	Histic Cryaquepts	Inceptisols	Humic Gley soils.
Susitna	Coarse-loamy, mixed, acid	Typic Cryofluvents	Entisols	Alluvial soils.
Wasilla	Fine-loamy, mixed, acid	Humic Cryaquepts	Inceptisols	Low-Humic Gley soils.
Whitsol	Coarse-silty, mixed	Typic Cryorthods	Spodosols	Podzols.

During the process of formation, these soils have become very strongly acid. In this survey area most of the Spodosols have a bisequal solum. The upper sequence of horizons generally ranges from 8 to 10 inches in thickness and rests on a buried sequum about 8 to 12 inches thick. In general, the characteristics of Spodosols are more strongly expressed in soils in the northern and western parts of the Area. These soils have darker illuvial horizons and contain more concretions of iron oxide than the more weakly expressed Spodosols in the eastern part of the Area.

Typic Cryorthods are well-drained Spodosols that are present in cold regions and have a moderate amount of organic matter in the illuvial horizon. *Typic Cryaquods* are cold Spodosols that have characteristics associated with wetness and, in addition, have a thick very firm illuvial horizon. *Sideric Cryaquods* are cold Spodosols that contain mottles in the eluvial horizon.

SUBORDERS. Each order is divided into suborders, primarily on the basis of those soil characteristics that seem to produce classes having the greatest genetic similarity. Suborders narrow the broad climatic range of the orders. The soil properties used to distinguish suborders are mainly those that reflect the presence or absence of water-logging or soil differences that result from the effects of climate or vegetation.

GREAT GROUPS. The suborders are divided into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used as a basis for distinguishing between great groups are those in which (1) clay, iron, or humus have accumulated; (2) a pan has formed that interferes with growth of roots, movement of water, or both; or (3) a thick, dark-colored surface horizon has formed. The other features commonly used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), or the dark-red or dark-brown colors associated with soils formed in material weathered from basic rock.

SUBGROUPS. Great soil groups are divided into subgroups. One of these represents the central, or typic, segment of the group. Other subgroups, called intergrades, have properties of the group, but have one or more properties of another great group, suborder, or order. Subgroups may also be made for soils that have properties that intergrade outside the range of any other great group, suborder, or order.

FAMILIES. Families are separated within a subgroup primarily on the basis of properties important to the growth of plants or to the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the name of a subgroup. The adjectives used are the class names for texture, mineralogy, temperature, and so on.

SERIES. The series is a group of soils that formed from a particular kind of parent material and have major horizons that, except for texture of the surface layer, are similar in important characteristics and in arrangement in the profile. The soils are given the name of a geographic location near ~~the~~ place where that series was first observed and mapped.

General Nature of the Area

This section is provided mainly for those who are unfamiliar with the survey area. Factors discussed are physiography and drainage; geology; climate; vegetation; and history, settlement, and industry.

Physiography and Drainage

The Susitna Valley Area includes the eastern part of the lowlands along the Susitna River. It lies to the north of Cook Inlet and extends northward between the Talkeetna Mountains and the Alaska Range. The Area generally slopes from north to south. Most of it is drained by the Susitna River and its tributaries, but a few streams that flow directly into Cook Inlet drain the southeastern part. Although most of the Area is between 50 to 500 feet above sea level, extreme elevations range from sea level at the tidal flats along Cook Inlet to slightly more than 1,300 feet on a few glacial moraines near Talkeetna.

The Susitna, the largest river in the Area, and its flood plains range from about a half mile to several miles in width. It is a braided, glacier-fed stream that is laden with silt and originates in the Alaska Range. Two of its major tributaries, the Chulitna and Yentna Rivers, also flow from the Alaska Range. Other streams originate in small glaciers in the Talkeetna Mountains to the east (*14*). The Little Susitna River and a few other streams in the southeastern part of the Area flow directly into Cook Inlet. A few of the smaller streams begin in the lowlands or on mountain foot slopes and generally are clear. The water level in most of the larger rivers and streams in the Area fluctuates rapidly. In many places the lowlands are susceptible to flooding during periods of glacial melting or when rainfall is heavy in the mountains.

In the southern part of the Area and along major streams, the relief generally is nearly level to undulating. Low hills where irregular slopes are rolling to steep are dominant in the eastern and northern parts of the Area. Ponds, lakes, and many muskegs where drainage is very poor occur throughout most of the area.

The muskegs and a belt of low-lying tidal plains next to Cook Inlet are treeless, but most of the Area is wooded. Paper birch, quaking aspen, and white spruce are dominant on uplands. Cottonwoods (balsam poplar and black cottonwood) are common on the flood plains of the larger streams, and black spruce grows on the edges of muskegs.

Geology

The Susitna Valley Area is underlain by bedrock that consists mainly of weakly consolidated coal-bearing rocks of Tertiary age (*24*). All of the bedrock is covered by thick deposits of glacial drift and alluvial sediment that consist mainly of gravelly and sandy material (*12*). Most of the Area has a mantle of silty wind-laid deposits that contain large quantities of volcanic ash. The loess ranges from a few inches to 5 or 6 feet in thickness.

Broad terraces and outwash plains are dominant in the southern part of the survey area and along the larger streams in the northern part. Hilly moraines are common in the eastern and northern sections; large tracts of ground moraine are west of the Susitna River, and flood plains are along the major rivers. Tidal plains as much as 2 miles

wide border Cook Inlet. Irregularly shaped, very poorly drained muskegs that range from a few acres to several thousand acres in size are in most parts of the Area. Ponds and lakes are common. Most of them are irregular in shape, but near the ground moraine they generally are long and narrow and slope from north to south.

Deposits of gravel and sand on terraces and outwash plains generally are well sorted and nearly free of fine material. Morainal deposits generally consist of poorly sorted very gravelly and stony material. The sediment on flood plains consists mainly of stratified deposits of silt and fine sand that range from a few inches to 6 feet thick over gravel. The tidal plains are dominantly clayey. Most of the muskegs consist of coarse, extremely acid peat derived mainly from sphagnum moss and sedges. Despite recent explorations for oil in many parts of the Area, the only geological deposits of economic importance are sand and gravel, which are used primarily for road construction.

Climate [4]

The climate of the Susitna Valley Area is influenced by marine conditions in the south and by continental conditions in the west, north, and east. The temperature ranges from 48° below zero to 93° above zero. The average daily maximum temperature in summer is in the mid to upper 60's, but temperatures of 32° F. or lower have been recorded during every month in summer. In winter the average minimum temperature ranges from about zero to 13°. The freeze-free period averages about 80 to 95 days. Tables 9 and 10, compiled from records kept at Susitna and at Talkeetna, give temperature and precipitation data considered representative of the Susitna Valley Area.

The average annual precipitation of about 20 inches or more greatly exceeds the amount of precipitation received

[4] By HAROLD W. SEARBY, regional climatologist for Alaska, National Weather Service, U.S. Department of Commerce.

TABLE 9.—*Temperature and precipitation data*

Month	Temperature [1]				Precipitation				
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—		Days with snow cover	Average depth of snow on ground last day of month
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—		
					Inches	*Inches*	*Inches*	*Number*	*Inches*
SUSITNA, ALASKA									
January	23	2	40	−30	1. 38	0. 29	4. 52	29	17
February	31	13	43	−17	1. 28	. 34	2. 13	28	13
March	35	12	45	−9	1. 16	. 60	1. 68	31	12
April	48	24	58	10	. 88	. 37	1. 61	17	1
May	60	32	71	20	1. 46	. 59	2. 34	1	0
June	69	41	80	33	1. 69	. 52	2. 94	0	0
July	70	46	79	38	2. 55	1. 24	3. 77	0	0
August	67	44	74	34	5. 52	2. 52	9. 71	0	0
September	57	38	65	27	5. 07	2. 49	7. 84	0	0
October	44	27	54	3	3. 53	1. 84	4. 20	3	1
November	31	13	41	−8	1. 82	. 16	4. 40	18	4
December	24	5	41	−27	1. 71	. 11	4. 20	26	10
Year	47	25			28. 05			153	
TALKEETNA, ALASKA									
January	20. 1	0. 6	37	−27	1. 86	0. 05	5. 55	31	29
February	25. 6	3. 7	41	−23	1. 69	. 02	3. 55	28	35
March	32. 2	6. 3	44	−19	1. 51	. 03	7. 22	31	27
April	44. 6	29. 2	55	−1	. 98	. 05	3. 46	26	8
May	56. 1	32. 7	69	24	1. 37	. 28	3. 47	8	0
June	65. 9	43. 8	81	35	2. 11	. 22	5. 07	0	0
July	68. 0	47. 6	80	42	3. 25	1. 13	6. 49	0	0
August	64. 4	44. 7	76	34	5. 14	. 97	11. 91	0	0
September	55. 6	37. 0	64	27	4. 87	1. 81	9. 91	[2]	0
October	41. 4	23. 9	54	−2	2. 63	1. 03	4. 47	12	5
November	26. 2	8. 6	40	−19	1. 63	. 09	4. 46	25	13
December	18. 6	. 2	37	−31	1. 57	. 18	4. 14	31	22
Year	43. 2	23. 2			28. 61			192	

[1] Maximum and minimum temperature data for Susitna are for period 1933–47. Maximum and minimum temperature data for Talkeetna are for period 1941–62.

[2] Less than 0.5 day.

TABLE 10.—*Probability of specified temperatures in spring and in fall*

Probability	Dates for given probability and temperature of —				
	16° F. or lower	20° F. or lower	24° F. or lower	28° F. or lower	32° F. or lower
SUSITNA, ALASKA					
Spring:					
1 year in 10 later than	May 3	May 13	June 1	June 11	June 25
2 years in 10 later than	April 30	May 11	May 29	June 7	June 22
5 years in 10 later than	April 16	May 5	May 18	May 31	June 13
Fall:					
1 year in 10 earlier than	October 8	September 23	September 5	August 30	August 20
2 years in 10 earlier than	October 11	September 25	September 8	September 2	August 23
5 years in 10 earlier than	October 21	October 3	September 19	September 12	September 2
TALKEETNA, ALASKA					
Spring:					
1 year in 10 later than	May 4	May 5	May 18	May 29	June 13
2 years in 10 later than	May 1	May 3	May 15	May 28	June 10
5 years in 10 later than	April 19	April 25	May 7	May 23	June 3
Fall:					
1 year in 10 earlier than	October 5	September 27	September 19	September 4	August 15
2 years in 10 earlier than	October 7	October 1	September 22	September 7	August 19
5 years in 10 earlier than	October 15	October 9	September 29	September 17	August 30

annually in Alaska's principal farming areas, except in the southern part of the Kenai Peninsula. The heaviest rainfall occurs late in the growing season, but moisture in the soil from melted winter snow leaves the soil saturated during the early part of the growing season. Thunderstorms occur in summer, but hail is rare.

In summer surface winds generally are light in intensity. From time to time in winter, however, windspeeds reach 20 to 40 miles an hour, and the average velocity is 12 miles or less per hour. The prevailing direction of the wind generally is from the north, though at times the direction is from the south.

Vegetation

Less than 1 percent of the acreage in natural vegetation in the Susitna Valley Area has been cleared for crops or for other uses. About three-fourths of the survey area is wooded. The remaining one-fourth consists largely of muskegs, where drainage is very poor, and of tidal plains that support low-growing plants. The root system of most plants, including trees, generally is shallow and is concentrated in the surface layer of the soil.

The kinds of trees in the Area and the age, density, and rate of growth of the stands depend largely upon such factors as characteristics of the soil, relief, past forest fires, and harvesting practices. The principal woody vegetation in the Area consists of a mixture of paper birch and white spruce (*12*). White spruce is the climax tree, but only a few pure stands remain, largely because of past forest fires and cutting practices. Slow-growing black spruce is common along the edges of muskegs and in other areas where drainage is poor. Quaking aspen is dominant on a few well-drained sites, and cottonwood is common on low-lying alluvial plains. Alder and willow grow in thickets on poorly drained soils along small streams. Most of the stands have a dense understory of shrubs and other plants. Additional information concerning kinds of trees in the Susitna Valley Area is provided under "Woodland" in the section "Use and Management of the Soils."

Muskegs, mainly very poorly drained peats, make up the principal nonwooded areas. These areas generally have a thick mat of sphagnum moss on the surface. Other plants include cottongrass, Labrador-tea, bog birch, dwarf willow, bog blueberry, crowberry, and cloudberry.

The tidal plains along Cook Inlet also are not wooded. The vegetation consists mainly of sedges, forbs, and grasses (*7*).

History, Settlement, and Industry

Before the discovery of gold late in the 19th century, fur trading was the principal occupation in the Susitna Valley Area, and explorations generally were confined to coastal regions. One of the first significant recorded expeditions into the Area was made by W. A. Dickey and party in 1896 (*3*). The group made geological investigations in sections of the valleys of the Susitna and Chulitna Rivers. In addition, they described and named Mt. McKinley.

Important gold discoveries in various parts of Alaska, including the region around Cook Inlet, led to increased prospecting and explorations (*9*). Placer gold was discovered in the district around Willow Creek in 1897 and in other nearby areas shortly thereafter. Although fur trading stations had been previously established in Susitna

and in Talkeetna, the trading posts and roadhouses that were constructed along trails and routes to the goldfields were the first significant permanent settlements.

Other settlements were established following construction of the Alaska Railroad, which connects Seward and Fairbanks. During the construction, which began on Knik Arm in 1915, several railroad camps were erected along the route. Kashwitna, Caswell, Montana, Sunshine, and Chase were the main camps in the Susitna Valley. Some of these camps became small trading centers and were railway stations for many years after the construction period. Though their names remain on a few maps of Alaska, most of these places are now abandoned or serve only as railroad sidings.

Homesteading of Federal land in the Area reached a peak in the 1950's. Most homesteads were near the railroad and along the Petersville Road leading from the Susitna River to placer mines about 40 miles to the west. Since Alaska achieved statehood in 1959, most public lands have been transferred to State jurisdiction, though a few areas have been sold at public auctions. Homesteading resulted in a few permanent rural settlements in the Area, but less than a thousand acres are estimated to have been cleared for crops. Many areas transferred to private ownership consisted of small tracts for recreational or business uses.

The recent construction of a major highway almost parallel to the Susitna River in the northern part of the Area has resulted in increased recreational activities. Many of the lakes, streams, and woodlands are more readily accessible and are used for a variety of activities. The Nancy Lake Recreational Area, a new State park, includes land near Red Shirt Lake.

Talkeetna, the only village in the Area, is near the railroad and is also accessible by a State highway. Talkeetna serves as a business and social center for the rural population and also as a center for many recreational activities, including fishing, hunting, and mountain climbing.

Except for widely scattered homesteads and cabin sites, the southern half of the Area and a large part west of the Susitna River are essentially unsettled. A few dirt roads lead into these areas, but they are not maintained and generally are not suitable for passenger cars.

Most of the roads and many of the trails were constructed as a result of intensive oil explorations, especially in the southern half of the Area. Most of the drilling activities and all of the presently producing oilwells, however, are outside the survey area.

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Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

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.

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.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

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.

Glacial till (geology). Unassorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

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.

Loess. Fine-grained material, dominantly of silt-sized particles, that has been deposited by wind.

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 0.6 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.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc and other elements obtained from the soil and carbon, hydrogen, and oxygen, obtained largely from the air and water, are plant nutrients.

Parent materal. 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: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

pH value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

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		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Runoff. 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 soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. 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.

Sequum. A sequence consisting of an illuvial B horizon and the overlying eluvial A horizon. If two sequa are present in a single soil profile, it is said to have a bisequum.

Silt. 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 formation on the surface of the earth that supports plants and that has properties resulting from the combined effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles, less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *Very coarse sand* (2.0 to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter). The separates recognized by the International Society of Soil Science are as follows: I (2.0 to 0.2 millimeters); II (0.2 to 0.02 millimeter); III (0.02 to 0.002 millimeter); IV (less than 0.002 millimeter).

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 grain* (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 (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

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."

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.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Map symbol	Mapping unit	Described on page	Management group	
			Number	Page
RaD	Rabideux silt loam, hilly	20	14	32
RaE	Rabideux silt loam, moderately steep	21	20	33
RaF	Rabideux silt loam, steep	21	25	34
RbA	Rabideux silt loam, shallow, nearly level	21	9	31
RbB	Rabideux silt loam, shallow, undulating	21	6	31
RbC	Rabideux silt loam, shallow, rolling	21	6	31
RbD	Rabideux silt loam, shallow, hilly	21	15	32
RbE	Rabideux silt loam, shallow, moderately steep	21	20	33
RdA	Rabideux silt loam, sandy substratum, nearly level	22	11	32
RdB	Rabideux silt loam, sandy substratum, undulating	22	8	31
RdC	Rabideux silt loam, sandy substratum, rolling	22	8	31
RdD	Rabideux silt loam, sandy substratum, hilly	22	17	33
RdE	Rabideux silt loam, sandy substratum, moderately steep	22	20	33
Sa	Salamatof peat	22	27	34
ShA	Schrock silt loam, nearly level	23	1	30
Sm	Slikok mucky silt loam	23	19	33
Ss	Susitna fine sandy loam	23	1	30
Sw	Susitna and Niklason fine sandy loams, overflow	24	18	33
Te	Terrace escarpments	24	30	34
Tf	Tidal flats	24	32	34
Tm	Tidal marsh	25	23	34
Wa	Wasilla silt loam	25	13	32
WhA	Whitsol silt loam, nearly level	25	2	30
WhB	Whitsol silt loam, undulating	26	4	31
WhC	Whitsol silt loam, rolling	26	7	31
WhD	Whitsol silt loam, hilly	26	14	32
WhE	Whitsol silt loam, moderately steep	26	20	33

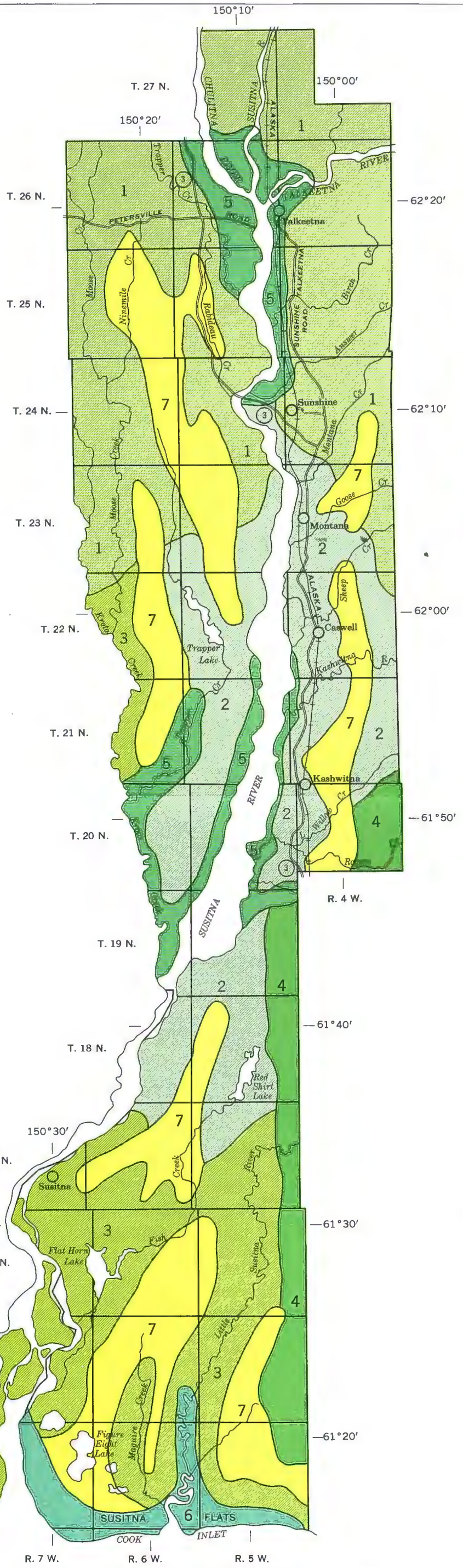
GUIDE TO MAPPING UNITS

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. In referring to a management group, read the introduction to the subsection it is in for general information about management of the soils. Facts about woodland, wildlife, and recreation are provided in the subsections beginning on p. 35, p. 37, and p. 39, respectively. Other information is given in tables as follows:

Acreage and extent, table 1, p. 5.
Estimated yields, table 2, pp. 28-29.

Engineering uses of the soils, tables 5, 6, and 7, pp. 46 through 61.

Map symbol	Mapping unit	Described on page	Management group	
			Number	Page
BeF	Bernice sandy loam, steep	6	26	34
Ca	Caswell silt loam	6	5	31
Ch	Chena fine sandy loam	7	22	33
ClA	Chulitna silt loam, nearly level	8	2	30
ClB	Chulitna silt loam, undulating	7	4	31
ClC	Chulitna silt loam, rolling	8	7	31
Cn	Clunie peat	8	27	34
Co	Coal Creek silt loam	9	19	33
DeA	Delyndia silt loam, nearly level	9	11	32
DeB	Delyndia silt loam, undulating	10	8	31
DeC	Delyndia silt loam, rolling	10	8	31
DeD	Delyndia silt loam, hilly	10	17	33
Dm	Delyndia-Salamatof complex	10	27	34
Dn	Dinglishna sandy loam	11	24	34
Dr	Dinglishna-Moose River complex	11	24	34
FhA	Flat Horn silt loam, nearly level	11	1	30
FhB	Flat Horn silt loam, undulating	12	3	30
Ga	Gravelly alluvial land	12	32	34
Gv	Gravel pits	12	31	34
HoA	Homestead silt loam, nearly level	12	16	32
HoB	Homestead silt loam, undulating	12	16	32
HoC	Homestead silt loam, rolling	13	16	32
HoD	Homestead silt loam, hilly	13	21	33
HoE	Homestead silt loam, moderately steep	13	21	33
Ja	Jacobsen very stony silt loam	13	28	34
Ka	Kalifonsky silt loam	14	12	32
KsA	Kashwitna silt loam, nearly level	14	9	31
KsB	Kashwitna silt loam, undulating	14	6	31
KsC	Kashwitna silt loam, rolling	15	6	31
KsD	Kashwitna silt loam, hilly	15	15	32
KsE	Kashwitna silt loam, moderately steep	15	20	33
KsF	Kashwitna silt loam, steep	15	25	34
Kr	Killey-Moose River complex	15	18	33
Lu	Lucile silt loam	16	9	31
Me	Mixed alluvial land	16	29	34
Mr	Moose River silt loam	17	24	34
NaA	Nancy silt loam, nearly level	17	2	30
NaB	Nancy silt loam, undulating	17	4	31
NaC	Nancy silt loam, rolling	18	7	31
NaD	Nancy silt loam, hilly	18	14	32
NaE	Nancy silt loam, moderately steep	18	20	33
NaF	Nancy silt loam, steep	18	25	34
NcA	Nancy silt loam, sandy substratum, nearly level	18	2	30
NcB	Nancy silt loam, sandy substratum, undulating	18	4	31
NcC	Nancy silt loam, sandy substratum, rolling	19	7	31
NcD	Nancy silt loam, sandy substratum, hilly	19	14	32
NcE	Nancy silt loam, sandy substratum, moderately steep	19	20	33
Nk	Niklason fine sandy loam	19	10	32
RaA	Rabideux silt loam, nearly level	20	2	30
RaB	Rabideux silt loam, undulating	20	4	31
RaC	Rabideux silt loam, rolling	20	7	31



SOIL ASSOCIATIONS *

1 — Rabideux-Salamatof association: Dominantly nearly level to steep, well-drained silt loams that are shallow and moderately deep over sand or gravelly sand and are on uplands; and nearly level, very poorly drained, fibrous peats in muskegs

2 — Nancy-Kashwitna association: Dominantly nearly level to steep, well-drained silt loams that are moderately deep and shallow over sand or gravelly sand; on uplands

3 — Nancy-Delyndia association: Dominantly nearly level to steep, well-drained and somewhat excessively drained silt loams that are moderately deep and shallow over sand or gravelly sand; on uplands

4 — Kashwitna-Homestead association: Dominantly nearly level to steep, well-drained silt loams that are shallow and very shallow over gravelly sand or gravelly sandy loam; on uplands

5 — Susitna-Schrock association: Dominantly nearly level, well-drained, stratified fine sandy loams and silt loams that are deep over sand or gravelly sand; on alluvial plains

6 — Clunie-Tidal Marsh association: Dominantly nearly level, very poorly drained, fibrous peats and poorly drained, clayey sediment; on tidal plains

7 — Salamatof-Jacobsen association: Dominantly nearly level, very poorly drained, fibrous peats in muskegs; and nearly level, very poorly drained, very stony silt loams along the edges of muskegs

* Texture named in soil associations is that of surface layer.

Compiled 1972

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

UNIVERSITY OF ALASKA INSTITUTE OF AGRICULTURAL SCIENCES

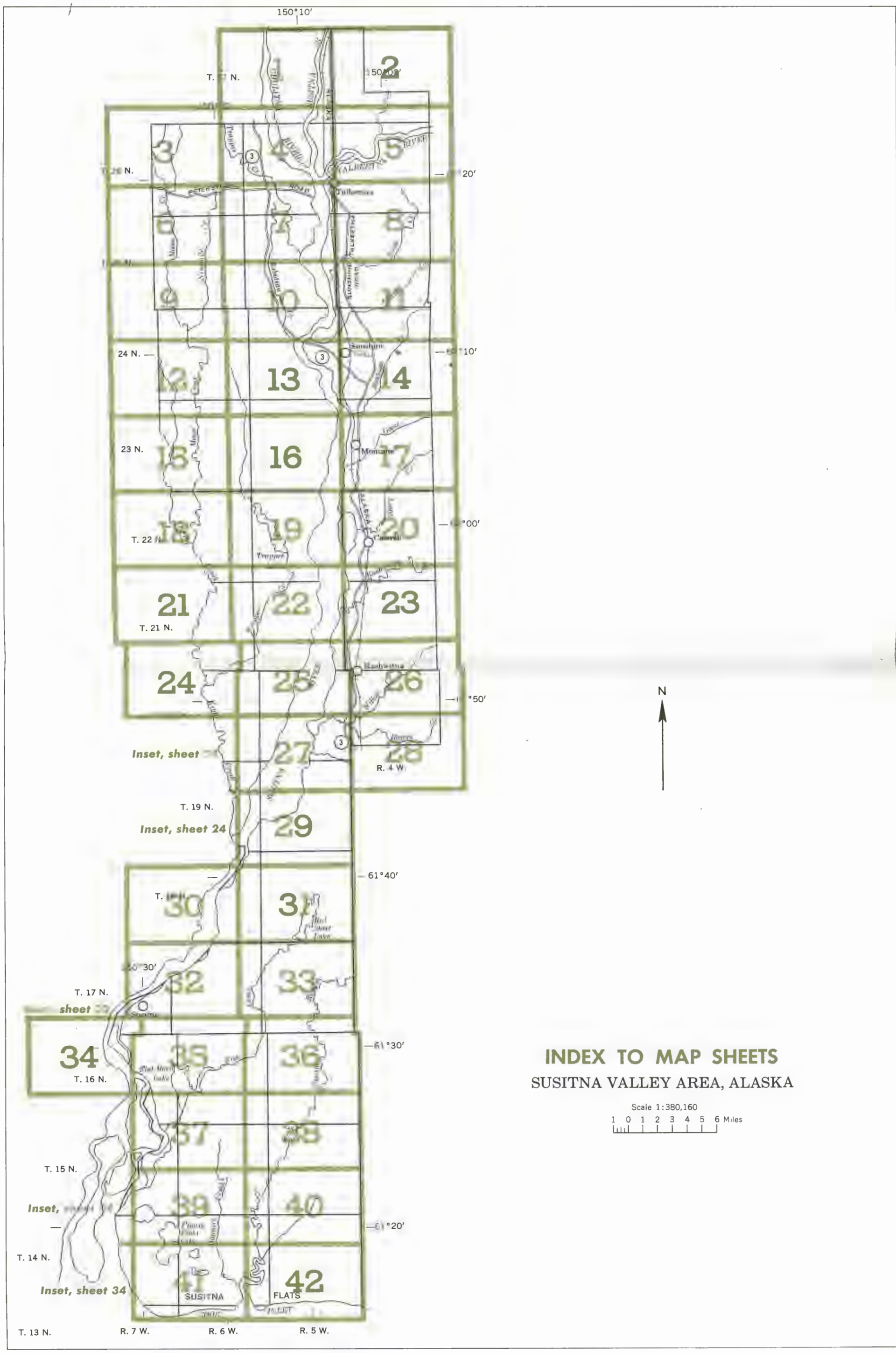
GENERAL SOIL MAP

SUSITNA VALLEY AREA, ALASKA

Scale 1:380,160

1 0 1 2 3 4 5 6 Miles

This map is for general planning. It shows only the major soils and does not contain sufficient detail for operational planning.

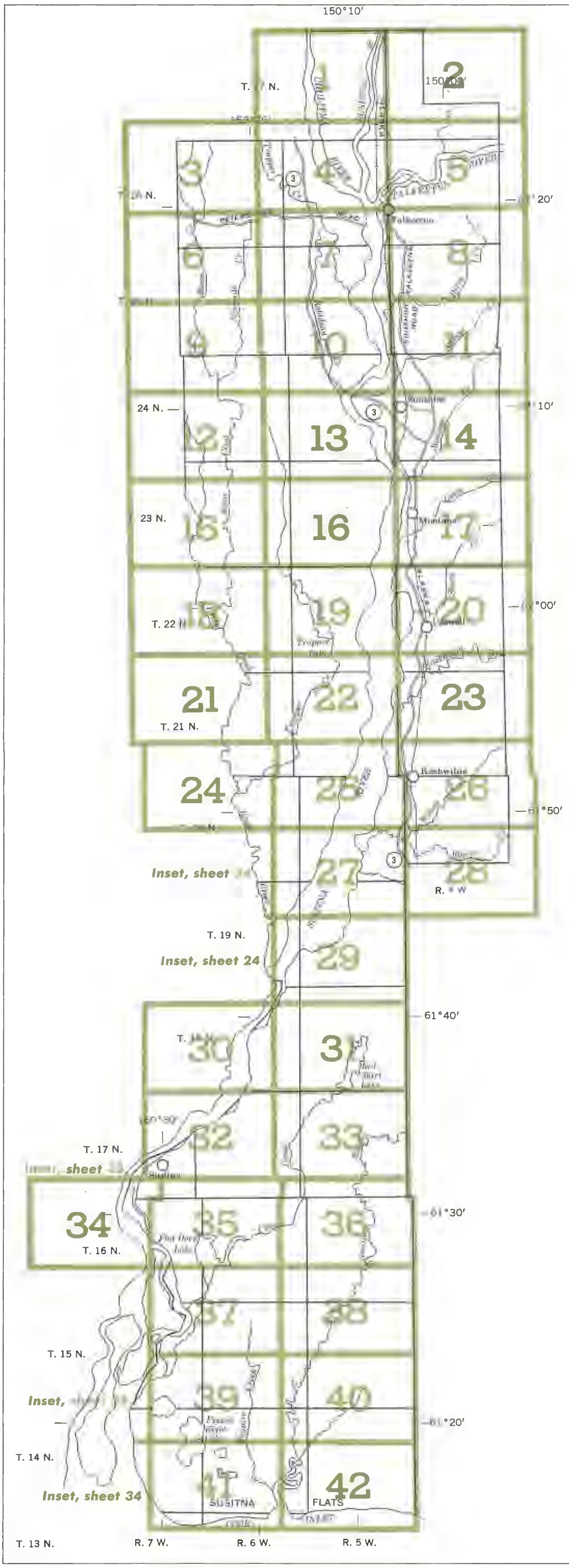


INDEX TO MAP SHEETS

SUSITNA VALLEY AREA, ALASKA

Scale 1:380,160

1 0 1 2 3 4 5 6 Miles



INDEX TO MAP SHEETS

SUSITNA VALLEY AREA, ALASKA

Scale 1:380,160

1 0 1 2 3 4 5 6 Miles

SUSITNA VALLEY AREA, ALASKA NO. 1

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 1

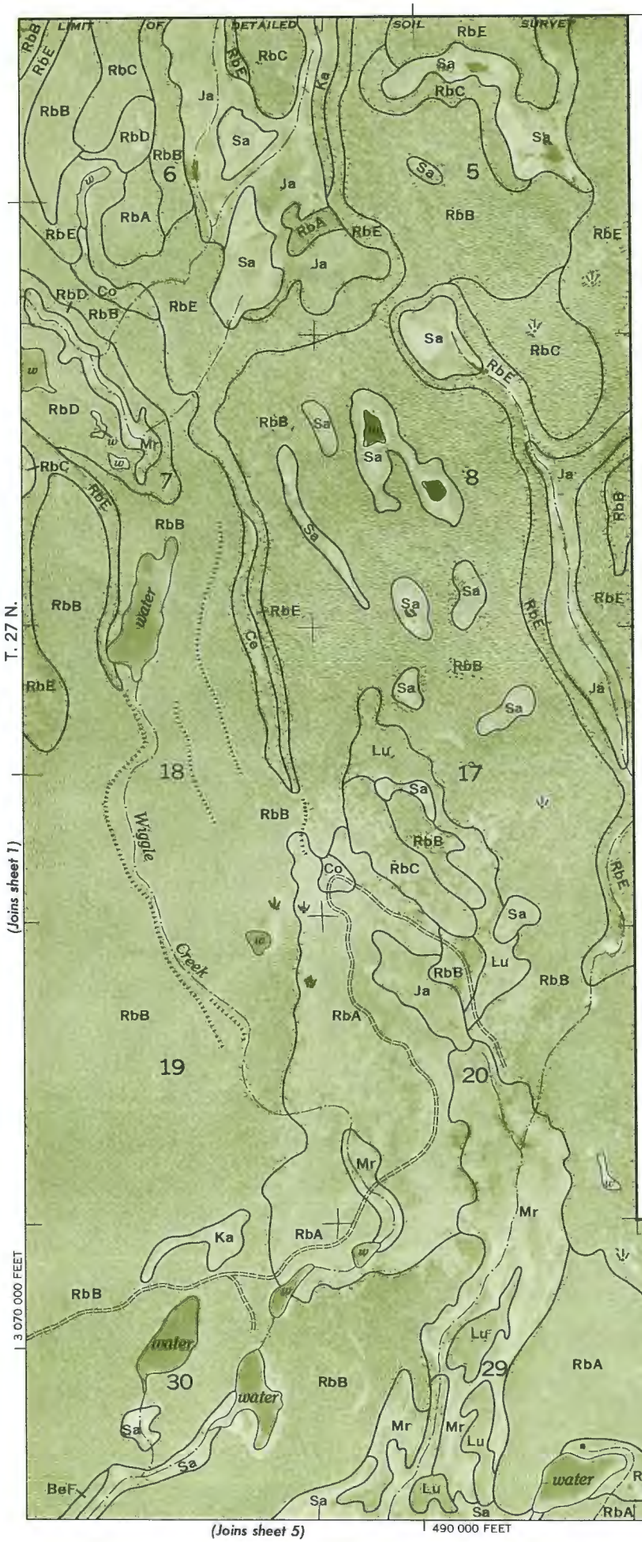
1 3/4 1/2 1/4 0 1 2 3 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 15 000 Feet

Scale 1 : 31 680

N

1



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SUSITNA VALLEY AREA, ALASKA NO. 2

SUSITNA VALLEY AREA, ALASKA NO. 3

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 3

1 ¾ ½ ¼ 0 1 2 3 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 15 000 Feet

Scale 1 : 31 680

N

(3)

N

3 Miles 2 1 0 0 1 2 3 4 5 Miles

15 000 Feet 10 000 5 000 0 0 1 000 2 000 3 000 4 000 5 000 Feet

Scale 1 : 31 680

1 inch = ½ mile

1 centimeter = 316.8 meters

3 050 000 FEET

3 060 000 FEET

480 000 FEET

450 000 FEET

R. 6 W. | R. 5 W.

T. 26 N. | T. 27 N.

(Joins sheet 1)

(Joins sheet 3)

(Joins sheet 5)

(Joins sheet 7)

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil conservation Service, and the University of Alaska, Institute of Agricultural Sciences.

SUSITNA VALLEY AREA, ALASKA NO. 4

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 5

SUSITNA VALLEY AREA, ALASKA NO. 5

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of Alaska, Institute of Agricultural Sciences.
Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

490 000 FEET

R. 4 W.

(Joins sheet 2)

T. 26 N. | T. 27 N.

3 060 000 FEET

(Joins sheet 4)

3 050 000 FEET

(Joins sheet 8)

520 000 FEET

CHUNILNA CREEK

TALKEETNA RIVER

TALKEETNA RIVER

Creek

Tower

TALKEETNA AIRPORT

DETAILED SOIL SURVEY LIMIT

5

N

3 Miles

2

15 000 Feet

10 000

5 000

Scale 1 : 31 680

(6)

N

Scale 1 : 31 680

3 Miles 2 1 0 15 000 Feet 10 000 5 000

¼ 0 ¼ 1 000 2 000 3 000 4 000 5 000

½ ¾

(Joins sheet 3)

R. 6 W.

440 000 FEET

3 040 000 FEET

T. 25 N. | T. 26 N.

3 020 000 FEET

410 000 FEET

(Joins sheet 7)

(Joins sheet 9)

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of Alaska, Institute of Agricultural Sciences.

SUSITNA VALLEY AREA, ALASKA NO. 6

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 7

SUSITNA VALLEY AREA, ALASKA NO. 7

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil conservation Service, and the University of Alaska, Institute of Agricultural Sciences.
Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

7

N

Scale 1 : 31 680

3 Miles 2 1 0

15 000 Feet 10 000 5 000 0

1 ¼ ½ ¾ 1

5 000 4 000 3 000 2 000 1 000 0

450 000 FEET

3 040 000 FEET

3 020 000 FEET

480 000 FEET

R. 6 W. | R. 5 W.

T. 25 N. | T. 26 N.

(Joins sheet 4)

(Joins sheet 6)

(Joins sheet 8)

(Joins sheet 10)

PETERSVILLE ROAD

TALKEETNA

Airstrip

Scotty Lake

Sawmill Lake

Trapper Creek

Rabideau Creek

Sunshine Station

Alaska Railroad

Birch Creek Slough

SUSITNA RIVER

N

R. 4 W.

520 000 FEET

3 040 000 FEET

(Joins sheet 5)

T. 25 N. | T. 26 N.

3 020 000 FEET

490 000 FEET

(Joins sheet 7)

(Joins sheet 11)

3 Miles 2 1 0 1

15 000 Feet 10 000 5 000 0

Scale 1 : 31 680

1 5 000 ¾ 4 000 ½ 3 000 ¼ 2 000 0 1 000

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

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SUSITNA VALLEY AREA, ALASKA NO. 8

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 9

9

N

SUSITNA VALLEY AREA, ALASKA NO. 9

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

410 000 FEET

3 010 000 FEET

R. 6 W.

(Joins sheet 6)

(Joins sheet 10)

(Joins sheet 12)

440 000 FEET

2 990 000 FEET

T. 24 N. | T. 25 N.

3 Miles

15 000 Feet

10 000

5 000

Scale 1 : 31 680

5 000 4 000 3 000 2 000 1 000 0 0

1 ¾ ½ ¼ 0 1

(10)

N

(Joins sheet 7) R. 6 W. | R. 5 W. 480 000 FEET

3 Miles 15 000 Feet

2 10 000

1 5 000

Scale 1 : 31 680

0 0

¼ 1 000

½ 2 000

¾ 3 000

1 4 000

5 000

(Joins sheet 9)

2 990 000 FEET

(Joins sheet 13) 450 000 FEET

3 010 000 FEET

(Joins sheet 11)

T. 24 N. | T. 25 N.

SUSITNA VALLEY AREA, ALASKA NO. 10

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 11

R. 4 W.

490 000 FEET

(Joins sheet 8)

3 010 000 FEET

T. 24 N. | T. 25 N. | (Joins sheet 10)

SUSITNA VALLEY AREA, ALASKA NO. 11

(Joins sheet 14)

520 000 FEET

2 990 000 FEET

11

N

3 Miles

15 000 Feet

10 000

5 000

Scale 1 : 31 680

5 000 4 000 3 000 2 000 1 000 0 0 1 000

1 ¾ ½ ¼ 0 1

Fish Lake
Birch Creek
Question Lakes
Little Question Lake
Lake Six
Lake Five
Lake Four
Lake Two
Lake One
Lake Long
Spruce Lake
Halfway Lake
East Sunshine Lake
Sunshine Lakes
Big Lake
Baldy Lake
Answer Creek
Middle Fork
North Fork
South Fork
Sunshine Creek
Question Mr.
SUNSHINE-TALKEETNA ROAD
ALASKA
SURVEY
DETAILED SOIL
LIMIT
water

N

(Joins sheet 9)

R. 6 W.

440 000 FEET

2 980 000 FEET

T. 23 N. | T. 24 N.

(Joins sheet 13)

410 000 FEET

(Joins sheet 15)

3 Miles

15 000 Feet

10 000

5 000

Scale 1 : 31 680

5 000 4 000 3 000 2 000 1 000 0

1 ¾ ½ ¼ 0

2 970 000 FEET

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

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SUSITNA VALLEY AREA, ALASKA NO. 12

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 13

13

N

SUSITNA VALLEY AREA, ALASKA NO. 13

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

450 000 FEET

R. 6 W. | R. 5 W.

(Joins sheet 10)

2 980 000 FEET

T. 23 N. | T. 24 N.

(Joins sheet 12)

(Joins sheet 14)

2 970 000 FEET

480 000 FEET

(Joins sheet 16)

SUSITNA RIVER

Rockys Lakes

Quer Creek

SUNSHINE CR

3 Miles 2 1 0 15 000 Feet 10 000 5 000

Scale 1 : 31 680

1 ¾ ½ ¼ 0 1 000 2 000 3 000 4 000 5 000

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 14

N

R. 4 W.

520 000 FEET

2 980 000 FEET

2 970 000 FEET

490 000 FEET

(Joins sheet 11)

(Joins sheet 13)

(Joins sheet 17)

T. 23 N. | T. 24 N.

Sunshine

Section House Lake

Woman Lake

SUNSHINE-TALKEETNA ROAD

ALASKA RAILROAD

SUSITNA RIVER

MONTANA CREEK

SURVEY

SOIL

DETAILED

OF

LIMIT

3 Miles 2 1 0 1

15 000 Feet 10 000 5 000 0 0

5 000 4 000 3 000 2 000 1 000 0

Scale 1 : 31 680

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

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SUSITNA VALLEY AREA, ALASKA NO. 14

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 15

SUSITNA VALLEY AREA, ALASKA NO. 15

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of Alaska, Institute of Agricultural Sciences.
Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

410 000 FEET

2 960 000 FEET

R. 6 W.

(Joins sheet 12)

T. 23 N.

(Joins sheet 16)

2 940 000 FEET

(Joins sheet 18)

440 000 FEET

15

N

3 Miles

15 000 Feet

10 000

5 000

Scale 1 : 31 680

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 16

(Joins sheet 13)

R. 6 W. | R. 5 W.

480 000 FEET

2 960 000 FEET

T. 23 N.

(Joins sheet 17)

(Joins sheet 15)

2 940 000 FEET

(Joins sheet 19)

450 000 FEET

SUSITNA RIVER

N

3 Miles 2 1 0 15 000 Feet 10 000 5 000

Scale 1 : 31 680

5 000 4 000 3 000 2 000 1 000 0 0 ¼ ½ ¾ 1

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil conservation Service, and the University of Alaska, Institute of Agricultural Sciences.

SUSITNA VALLEY AREA, ALASKA NO. 16

SUSITNA VALLEY AREA, ALASKA NO. 17

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil conservation Service, and the University of Alaska, Institute of Agricultural Sciences. Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4. Land division corners are approximately positioned on this map.

1 ¾ ½ ¼ 0 1 2 3 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 15 000 Feet

Scale 1 : 31 680

N

2 910 000 FEET

410 000 FEET

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 18

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of Alaska, Institute of Agricultural Sciences.

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 19

19

SUSITNA VALLEY AREA, ALASKA NO. 19

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of Alaska, Institute of Agricultural Sciences.
Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

450 000 FEET

R. 6 W. | R. 5 W.

(Joins sheet 16)

2 930 000 FEET

T. 22 N.

(Joins sheet 18)

(Joins sheet 20)

(Joins sheet 22)

480 000 FEET

TRAPPER LAKE

SUSITNA RIVER

Trapper Creek

water

N

3 Miles

15 000 Feet

10 000

5 000

Scale 1 : 31 680

(20)

N

R. 4 W.

(Joins sheet 17)

520 000 FEET

2 930 000 FEET

T. 22 N.

(Joins sheet 19)

(Joins sheet 23)

490 000 FEET

Caswell Lake

Caswell

SUSITNA RIVER

KASHWITNA RIVER

Caswell Creek

SHEEP CREEK

ALASKA

SLOUGH

SURVEY

INSTALLER

SOIL

LIMIT

Scale 1 : 31 680

3 Miles 2 1 0

15 000 Feet 10 000 5 000 0

5 000 4 000 3 000 2 000 1 000 0

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of Alaska, Institute of Agricultural Sciences.

SUSITNA VALLEY AREA, ALASKA NO. 20

SUSITNA VALLEY AREA, ALASKA NO. 21

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of Alaska, Institute of Agricultural Sciences.
Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

410 000 FEET

2 900 000 FEET

R. 6 W.

(Joins sheet 18)

T. 21 N. | T. 22 N.

(Joins sheet 22)

(Joins sheet 24)

440 000 FEET

21

N

3 Miles

15 000 Feet

10 000

5 000

Scale 1 : 31 680

5 000 4 000 3 000 2 000 1 000 0

(22)

N

R. 6 W. | R. 5 W.

480 000 FEET

T. 21 N. | T. 22 N.

2 900 000 FEET

2 890 000 FEET

450 000 FEET

(Joins sheet 19)

(Joins sheet 21)

(Joins sheet 23)

(Joins sheet 24)

(Joins sheet 25)

SUSITNA RIVER

Scale 1 : 31 680

3 Miles 2 1 0

15 000 Feet 10 000 5 000 0

5 000 4 000 3 000 2 000 1 000 0

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

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SUSITNA VALLEY AREA, ALASKA NO. 22

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 23

SUSITNA VALLEY AREA, ALASKA NO. 23

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

490 000 FEET — 520 000 FEET — 2 900 000 FEET — 2 890 000 FEET

R. 4 W. — T. 21 N. | T. 22 N.

(Joins sheet 22) — (Joins sheet 20) — (Joins sheet 26)

SUSITNA RIVER — KASHWITNA RIVER — Caswell Creek — Black Bear Creek — 197½ Mile — 196 Mile Creek — ALASKA — SURVEY — DETAILED — SOIL — OF — LIMIT

Sections: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 31, 32, 33, 34, 35, 36

Soil symbols: Ca, Co, Ga, Ja, Kr, Lu, Me, Mr, Nk, Sa, Ss, Sw, BeF, FhB, HoA, HoB, HoC, HoD, HoE, KsA, KsB, KsC, NaB, NaC, NaD, NaE, NaF, ShA, WhA, WhB, water

3 Miles — 15 000 Feet — 10 000 — 5 000 — 4 000 — 3 000 — 2 000 — 1 000 — 0

Scale 1 : 31 680

N

23

1 ¾ ½ ¼ 0 1 2 3 Miles

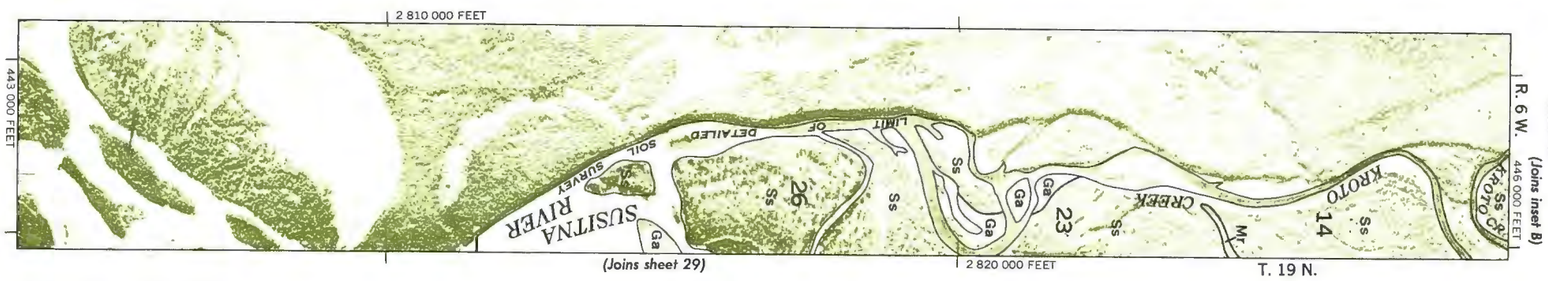
5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 15 000 Feet

Scale 1 : 31 680

N

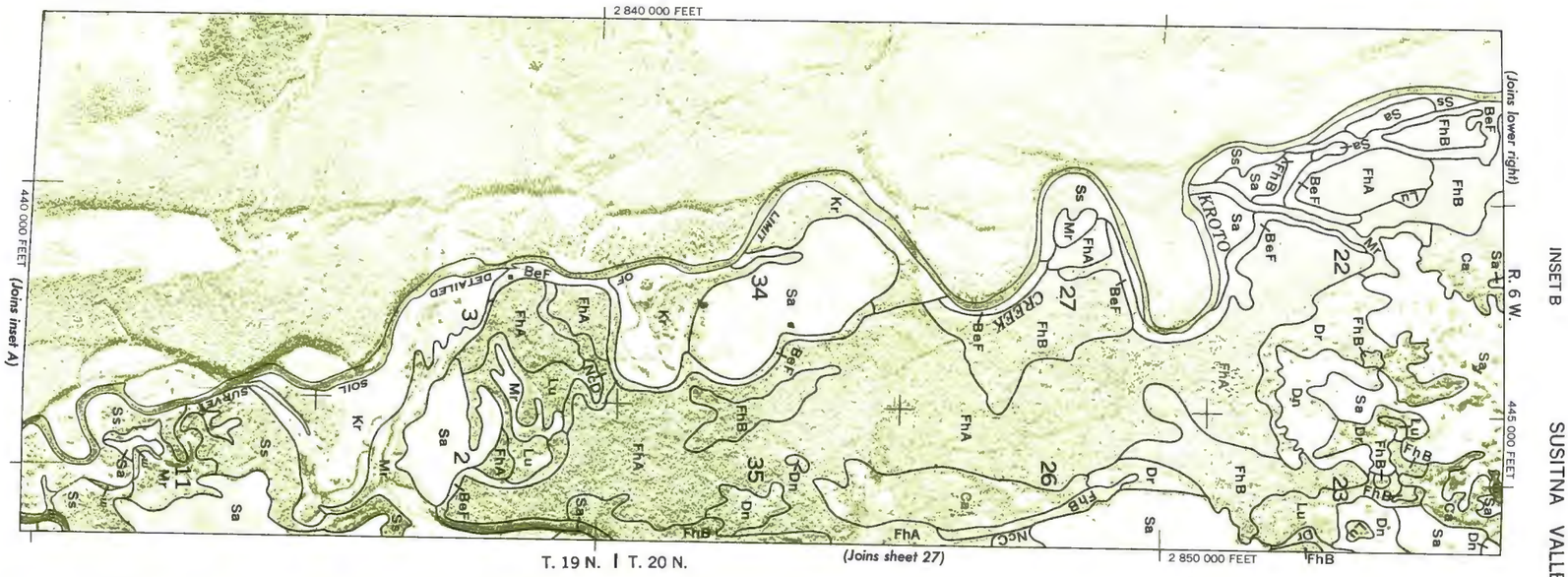
24

INSET A

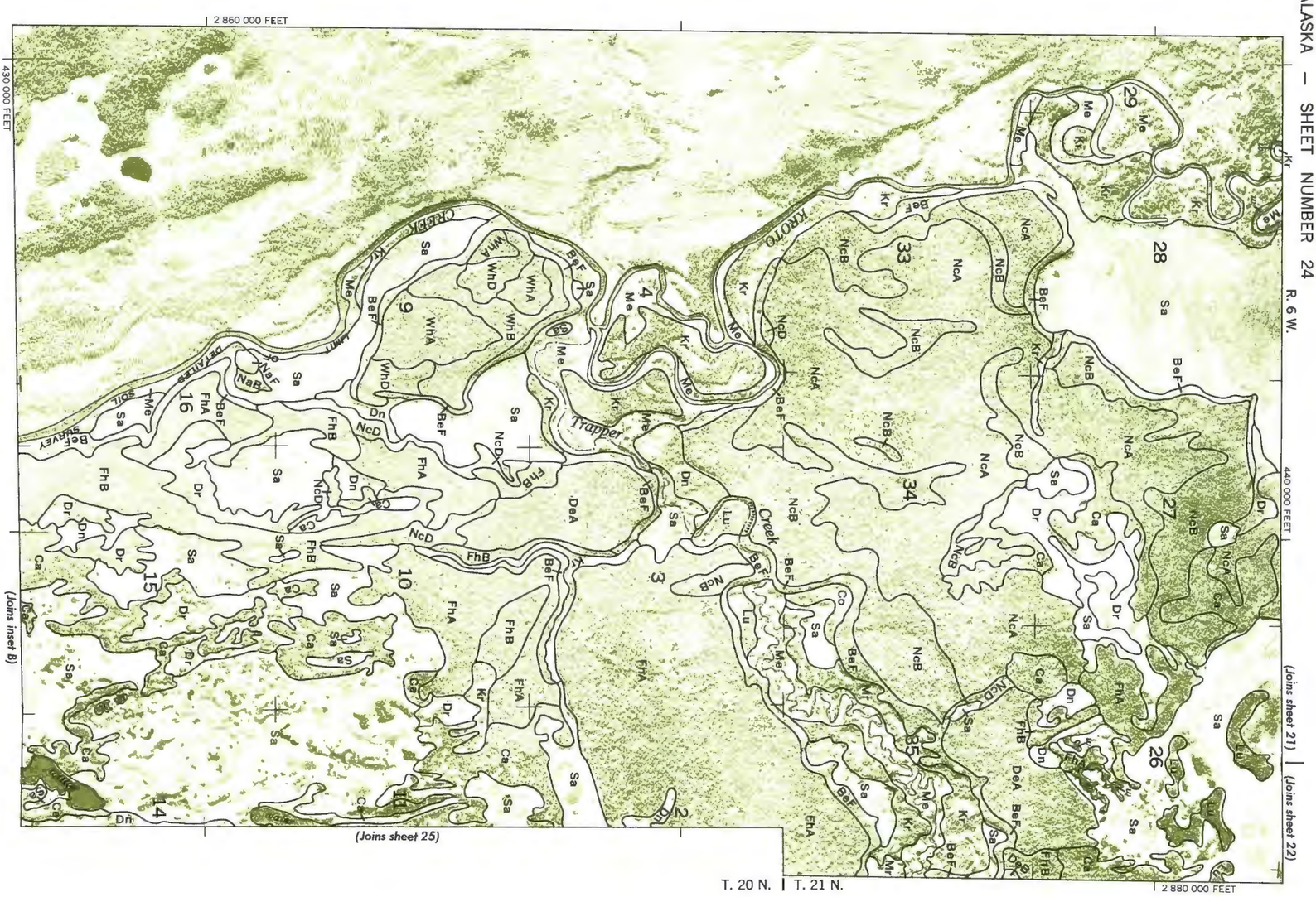


3,000 AND 10,000-FOOT GRID TICKS

INSET B



5,000 AND 10,000-FOOT GRID TICKS



Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

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SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 25

SUSITNA VALLEY AREA, ALASKA NO. 25

25

N

Scale 1 : 31 680

3 Miles 2 1 0

15 000 Feet 10 000 5 000 0

1 000 2 000 3 000 4 000 5 000

450 000 FEET

480 000 FEET

2 880 000 FEET

2 860 000 FEET

R. 6 W. | R. 5 W.

T. 20 N. | T. 21 N.

(Joins sheet 22)

(Joins sheet 26)

(Joins sheet 24)

(Joins sheet 27)

R I V E R

S U S I T N A

Kashwitna Lake

Trapper Creek

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 26

N

(Joins sheet 23)

R. 4 W.

520 000 FEET

2 880 000 FEET

T. 21 N.

T. 20 N.

2 860 000 FEET

(Joins sheet 25)

(Joins sheet 28)

490 000 FEET

Kashwitna

Kashwitna Lake

ALASKA

WILLOW

CREEK

LITTLE

SURVEY

DETAILED

LIMIT

SOIL

water

3 Miles

15 000 Feet

10 000

5 000

4 000

3 000

2 000

1 000

0

Scale 1 : 31 680

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of Alaska, Institute of Agricultural Sciences.

SUSITNA VALLEY AREA, ALASKA NO. 26

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 27

27

SUSITNA VALLEY AREA, ALASKA NO. 27

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

450 000 FEET — R. 6 W. | R. 5 W. — (Joins sheet 25)

2 850 000 FEET — T. 19 N. | T. 20 N.

(Joins inset B, sheet 24) — (Joins sheet 28) — (Joins sheet 29)

480 000 FEET

Delta Islands

SUSITNA RIVER — WILLOW CREEK — LITTLE WILLOW CREEK — LITTLE WILLOW CREEK — DETAILED SOIL SURVEY LIMIT

N

3 Miles — 15 000 Feet

Scale 1 : 31 680

1 ¾ ½ ¼ 0 1 2 3 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 15 000 Feet

Scale 1 : 31 680

N

28

2 830 000 FEET

(Joins sheet 27)

T. 20 N.

R. 4 W.

(Joins sheet 26)

490 000 FEET

520 000 FEET

2 850 000 FEET

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 28

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of Alaska, Institute of Agricultural Sciences.

SUSITNA VALLEY AREA, ALASKA NO. 28

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 29

29

SUSITNA VALLEY AREA, ALASKA NO. 29

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

450 000 FEET

R. 6 W. | R. 5 W.

(Joins sheet 27)

(Joins inset A, sheet 24)

2 820 000 FEET

T. 18 N. | T. 19 N.

(Joins sheet 31)

480 000 FEET

2 810 000 FEET

N

3 Miles

15 000 Feet

10 000

5 000

Scale 1 : 31 680

5 000 4 000 3 000 2 000 1 000 0

1 ¾ ½ ¼ 0 1 2 3 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 15 000 Feet

Scale 1 : 31 680

N

30

2 780 000 FEET

410 000 FEET

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 30

S U S I T N A R I V E R

DETAILED SOIL SURVEY LIMIT

440 000 FEET

R. 6 W.

(Joins sheet 32)

(Joins sheet 31)

T. 18 N.

2 800 000 FEET

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

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SUSITNA VALLEY AREA, ALASKA NO. 30

SUSITNA VALLEY AREA, ALASKA NO. 31

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

(Joins sheet 29)
(Joins sheet 30)
(Joins sheet 33)

450 000 FEET
480 000 FEET
2 800 000 FEET
2 780 000 FEET
R. 6 W. | R. 5 W.
T. 18 N.

SUSITNA RIVER
RED SHIRT LAKE
Butterfly Lake

N

3 Miles
15 000 Feet
10 000
5 000
Scale 1 : 31 680

SOIL SURVEY — DETAILED — OF — LIMIT

32

N

3 Miles 15 000 Feet 10 000

Scale 1 : 31 680

5 000 4 000 3 000 2 000 1 000 0 0 1 000 2 000 3 000 4 000 5 000

405 000 FEET | R. 7 W.

2 757 000 FEET

2 752 000 FEET

T. 17 N.

(Joins lower left)

SOIL SURVEY

DETAILED LIMIT

SUSITNA RIVER

28

Ss

Ca

Ss

402 000 FEET

(Joins sheet 34)

3,000 AND 5,000-FOOT GRID TICKS

(Joins sheet 30)

440 000 FEET

2 770 000 FEET

2 760 000 FEET

(Joins inset)

SUSITNA RIVER

SOIL SURVEY OF LIMITED

Susitna

410 000 FEET

(Joins sheet 34) | (Joins sheet 35)

R. 7 W. | R. 6 W.

(Joins sheet 35)

(Joins sheet 33)

T. 17 N.

SUSITNA VALLEY AREA, ALASKA NO. 32

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 33

33

N

450 000 FEET

R. 6 W. R. 5 W.

2 770 000 FEET

T. 17 N.

(Joins sheet 31)

(Joins sheet 32)

(Joins 35) (Joins sheet 36)

(Joins sheet 36)

480 000 FEET

2 760 000 FEET

SUSITNA VALLEY AREA, ALASKA NO. 33

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

3 Miles
2
10 000
15 000 Feet
5 000
Scale 1 : 31 680

1 3/4 1/2 1/4 0 1 2 3 Miles

5 000 4 000 3 000 2 000 1 000 0 5 000 10 000 15 000 Feet

Scale 1 : 31 680

N

INSET A

5,000 AND 10,000-FOOT GRID TICKS

INSET B

5,000 AND 10,000-FOOT GRID TICKS

5,000 AND 10,000-FOOT GRID TICKS

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 34

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

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SUSITNA VALLEY AREA, ALASKA NO. 34

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 35

SUSITNA VALLEY AREA, ALASKA NO. 35

R. 7 W. | R. 6 W.

T. 16 N. | T. 17 N.

2 750 000 FEET

410 000 FEET

(Joins sheet 32) | (Joins 33)

(Joins sheet 34)

(Joins sheet 36)

2 730 000 FEET

440 000 FEET

(Joins sheet 37)

SUSITNA RIVER

LIMIT OF SURVEY

FLAT HORN LAKE

Airstrip

Cabin

Cabins

Creek

35

N

3 Miles

15 000 Feet

10 000

5 000

Scale 1 : 31 680

36

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 36

N

R. 6 W. | R. 5 W.

(Joins sheet 33)

480 000 FEET

2 750 000 FEET

T. 16 N. | T. 17 N.

3 Miles

15 000 Feet

2

10 000

1

5 000

Scale 1 : 31 680

(Joins sheet 35)

2 730 000 FEET

450 000 FEET

(Joins sheet 38)

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the University of Alaska, Institute of Agricultural Sciences.

DETAILED SOIL SURVEY LIMIT

SUSITNA VALLEY AREA, ALASKA NO. 36

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 37

SUSITNA VALLEY AREA, ALASKA NO. 37

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil conservation Service, and the University of Alaska, Institute of Agricultural Sciences.
Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

410 000 FEET

2 720 000 FEET

R. 7 W. | R. 6 W.

(Joins sheet 35)

T. 15 N. | T. 16 N.

(Joins sheet 38)

2 700 000 FEET

440 000 FEET

(Joins sheet 39)

37

N

3 Miles

15 000 Feet

10 000

5 000

Scale 1 : 31 680

N

(Joins sheet 36) R. 6 W. | R. 5 W.

480 000 FEET

2 720 000 FEET

T. 15 N. | T. 16 N.

(Joins sheet 37)

2 700 000 FEET

450 000 FEET (Joins sheet 40)

3 Miles 2 1

15 000 Feet 10 000 5 000

Scale 1 : 31 680

5 000 4 000 3 000 2 000 1 000 0 0 1 000 ¼ ½ ¾ 1

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

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DETAILED SOIL SURVEY LIMIT

SUSITNA VALLEY AREA, ALASKA NO. 38

SUSITNA VALLEY AREA, ALASKA — SHEET NUMBER 39

R. 7 W. | R. 6 W.

410 000 FEET

2 695 000 FEET

T. 14 N. | T. 15 N.

(Joins inset B, sheet 34)

(Joins sheet 37)

(Joins sheet 40)

440 000 FEET (Joins sheet 41)

SUSITNA RIVER

Beaver Creek

Lake

Maguire Creek

FIGURE EIGHT LAKE

39

N

3 Miles

15 000 Feet

10 000

5 000

Scale 1 : 31 680

SUSITNA VALLEY AREA, ALASKA NO. 39

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

(Joins sheet 38)

R. 6 W. | R. 5 W.

480 000 FEET

2 695 000 FEET

(Joins sheet 39)

T. 14 N. | T. 15 N.

2 675 000 FEET

450 000 FEET

(Joins sheet 42)

N

3 Miles 15 000 Feet

2 10 000

1 5 000

Scale 1 : 31 680

5 000 4 000 3 000 2 000 1 000 0 0

1 ¾ ½ ¼ 0 1

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

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SUSITNA VALLEY AREA, ALASKA NO. 40

LIMIT OF DETAILED SOIL SURVEY

SUSITNA VALLEY AREA, ALASKA NO. 41

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Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.
Land division corners are approximately positioned on this map.

410 000 FEET

R. 7 W. | R. 6 W.

(Joins sheet 39)

2 665 000 FEET

(Joins inset A, sheet 34)

(Joins sheet 42)

FIGURE EIGHT LAKE

Maguire Creek

LITTLE SUSITNA RIVER

COOK INLET

Cabin

LIMIT OF DETAILED SOIL SURVEY

T. 13 N. | T. 14 N.

440 000 FEET

N

3 Miles 2 1 0

15 000 Feet 10 000 5 000 0

Scale 1 : 31 680

1 ¾ ½ ¼ 0

5 000 4 000 3 000 2 000 1 000 0

N

R. 6 W. | R. 5 W.

480 000 FEET

2 665 000 FEET

(Joins sheet 40)

(Joins sheet 41)

T. 13 N. | T. 14 N.

450 000 FEET

3 Miles 15 000 Feet 10 000

Scale 1 : 31 680

5 000 4 000 3 000 2 000 1 000 0 0 1 000 2 000 3 000 4 000 5 000

LITTLE SUSITNA RIVER

SUSITNA FLATS

C O O K I N L E T

Cabin

water

DETAILED SOIL SURVEY OF LIMIT

Land division corners are approximately positioned on this map.

Photobase from 1954 aerial photography. Positions of 10,000-foot grid ticks are approximate and based on the Alaska coordinate system, zone 4.

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SUSITNA VALLEY AREA, ALASKA NO. 42

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SUSITNA VALLEY AREA, ALASKA

UNIVERSITY OF ALASKA INSTITUTE OF AGRICULTURAL SCIENCES

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Divided
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (FY)
- Ford (FORD)

Grade
R. R. over
R. R. under
Buildings
School
Church
Mine and quarry
Gravel pit
Power line
Pipeline
Cemetery
Dams
Levee
Tanks
Well, oil or gas
Forest fire or lookout station
Windmill
Located object

BOUNDARIES

National or state
County
Limit of soil survey
Reservation
Land grant
Small park, cemetery, airport
Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches
Lakes and ponds
- Perennial (water, w)
- Intermittent (int)

Spring
Marsh or swamp
Wet spot
Drainage end or alluvial fan

RELIEF

Escarpments
- Bedrock
- Other

Short steep slope
Prominent peak
Depressions (Large / Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

Soil boundary and symbol (Dx)
Gravel
Stoniness
- Stony
- Very stony

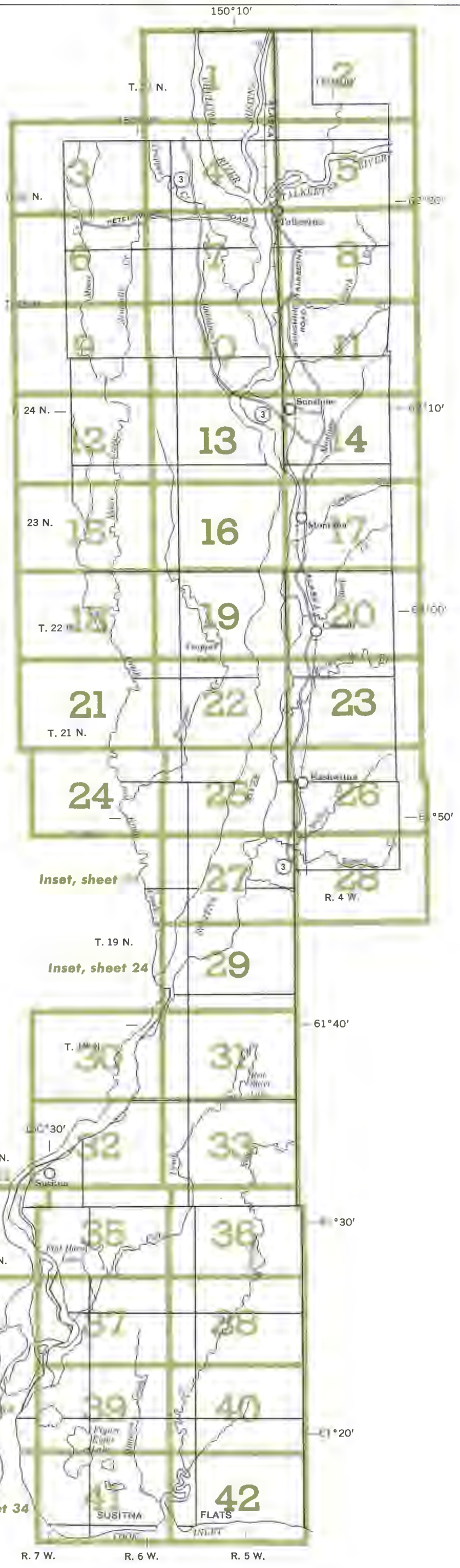
Rock outcrops
Chert fragments
Clay spot
Sand spot
Gumbo or scabby spot
Made land
Severely eroded spot
Blowout, wind erosion
Gully

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, A, B, C, D, E, or F, shows the slope. Most symbols without a slope letter are those of nearly level soils, but some are for land types that have a considerable range of slope.

SYMBOL	NAME
BeF	Bernice sandy loam, steep
Ca	Caswell silt loam
Ch	Chena fine sandy loam
ClA	Chulitna silt loam, nearly level
ClB	Chulitna silt loam, undulating
ClC	Chulitna silt loam, rolling
Cn	Clunie peat
Co	Coal Creek silt loam
DeA	Delyndia silt loam, nearly level
DeB	Delyndia silt loam, undulating
DeC	Delyndia silt loam, rolling
DeD	Delyndia silt loam, hilly
Dm	Delyndia-Salamatof complex
Dn	Dinglishna sandy loam
Dr	Dinglishna-Moose River complex
FhA	Flat Horn silt loam, nearly level
FhB	Flat Horn silt loam, undulating
Ga	Gravelly alluviol land
Gv	Gravel pits
HoA	Homestead silt loam, nearly level
HoB	Homestead silt loam, undulating
HoC	Homestead silt loam, rolling
HoD	Homestead silt loam, hilly
HoE	Homestead silt loam, moderately steep
Ja	Jocobsen very stony silt loam
Ka	Kalifansky silt loam
KsA	Kashwitna silt loam, nearly level
KsB	Kashwitna silt loam, undulating
KsC	Kashwitna silt loam, rolling
KsD	Kashwitna silt loam, hilly
KsE	Kashwitna silt loam, moderately steep
KsF	Kashwitna silt loam, steep
Kr	Killey-Moose River complex
Lu	Lucile silt loam
Me	Mixed alluvial lond
Mr	Moose River silt loam
NaA	Nancy silt loam, nearly level
NaB	Nancy silt loam, undulating
NaC	Nancy silt loam, rolling
NaD	Nancy silt loam, hilly
NaE	Nancy silt loam, moderately steep
NaF	Nancy silt loam, steep
NcA	Nancy silt loam, sandy substratum, nearly level
NcB	Nancy silt loam, sandy substratum, undulating
NcC	Nancy silt loam, sandy substratum, rolling
NcD	Nancy silt loam, sandy substratum, hilly
NcE	Nancy silt loam, sandy substratum, moderately steep
Nk	Niklason fine sandy loam

SYMBOL	NAME
RaA	Rabideux silt loam, nearly level
RaB	Rabideux silt loam, undulating
RaC	Rabideux silt loam, rolling
RaD	Rabideux silt loam, hilly
RaE	Rabideux silt loam, moderately steep
RaF	Rabideux silt loam, steep
RbA	Rabideux silt loam, shallow, nearly level
RbB	Rabideux silt loam, shallow, undulating
RbC	Rabideux silt loam, shallow, rolling
RbD	Rabideux silt loam, shallow, hilly
RbE	Rabideux silt loam, shallow, moderately steep
RdA	Rabideux silt loam, sandy substratum, nearly level
RdB	Rabideux silt loam, sandy substratum, undulating
RdC	Rabideux silt loam, sandy substratum, rolling
RdD	Rabideux silt loam, sandy substratum, hilly
RdE	Rabideux silt loam, sandy substratum, moderately steep
Sa	Salamatof peat
ShA	Schrock silt loam, nearly level
Sm	Slikak mucky silt loam
Ss	Susitna fine sandy loam
Sw	Susitna and Niklason fine sandy loams, overflow
Te	Terrace escarpments
Tf	Tidal flats
Tm	Tidal marsh
Wa	Wasilla silt loam
WhA	Whitsol silt loam, nearly level
WhB	Whitsol silt loam, undulating
WhC	Whitsol silt loam, rolling
WhD	Whitsol silt loam, hilly
WhE	Whitsol silt loam, moderately steep



N

INDEX TO MAP SHEETS

SUSITNA VALLEY AREA, ALASKA

Scale 1:380,160

1 0 1 2 3 4 5 6 Miles