

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

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

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

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

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

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

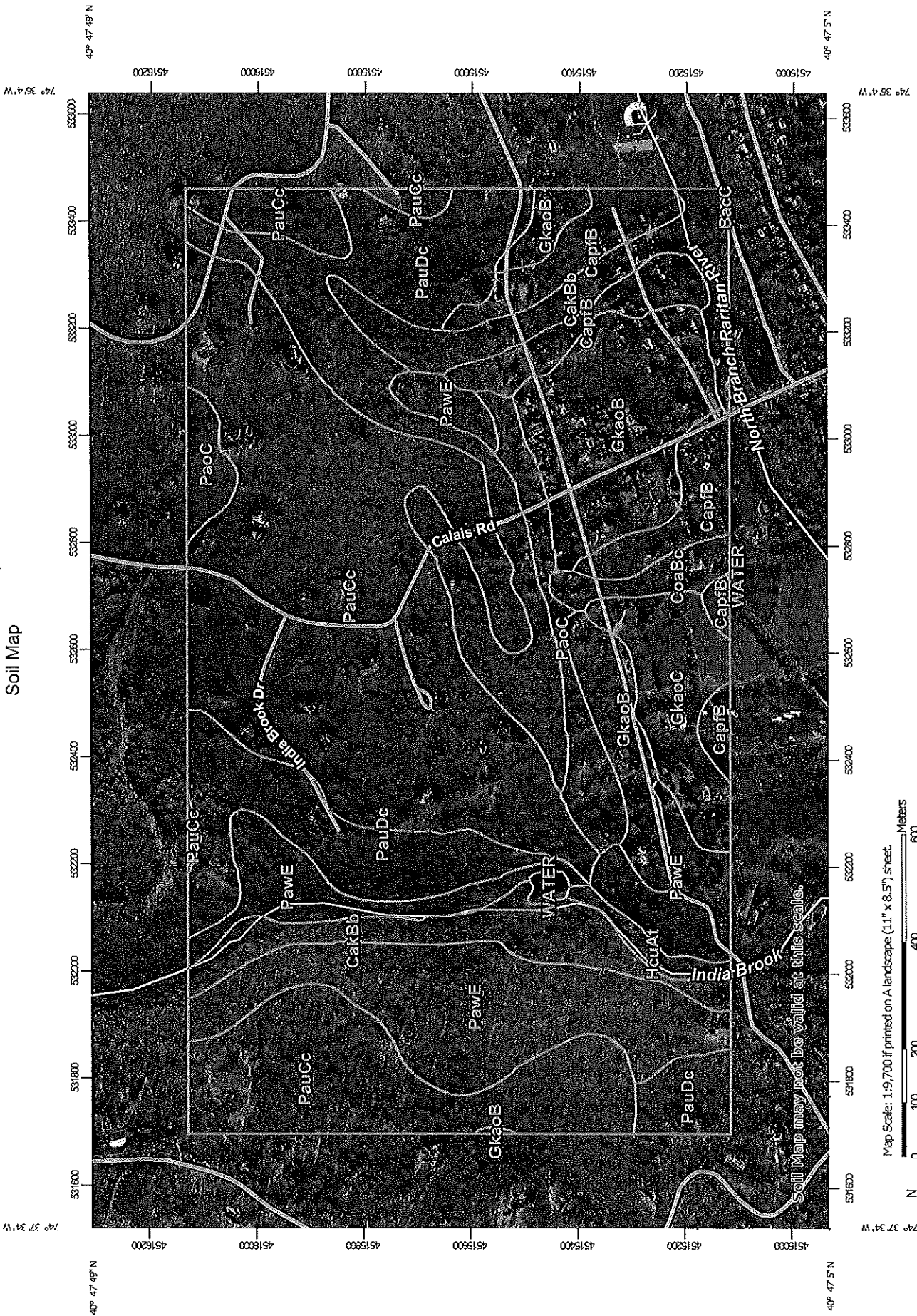
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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Soil Map













































Map Scale: 1:9,700 if printed on A landscape (11" x 8.5") sheet

0 100 200 400 600 Meters

0 450 900 1800 2700 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Soils	 Stony Spot
 Area of Interest (AOI)	 Very Stony Spot
 Soil Map Unit Polygons	 Wet Spot
 Soil Map Unit Lines	 Other
 Soil Map Unit Points	 Special Line Features
 Special Point Features	 Water Features
 Blowout	 Streams and Canals
 Borrow Pit	 Transportation
 Clay Spot	 Rails
 Closed Depression	 Interstate Highways
 Gravel Pit	 US Routes
 Gravelly Spot	 Major Roads
 Landfill	 Local Roads
 Lava Flow	 Background
 Marsh or swamp	 Aerial Photography
 Mine or Quarry	
 Miscellaneous Water	
 Perennial Water	
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Morris County, New Jersey
 Survey Area Data: Version 13, Sep 13, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 26, 2011—May 1, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BacC	Bartley gravelly loam, 8 to 15 percent slopes	0.2	0.1%
CakBb	Califon loam, 0 to 8 percent slopes, very stony	32.7	7.4%
CapfB	Califon variant loam, 3 to 8 percent slopes	28.4	6.4%
CoaBc	Cokesbury loam, 0 to 8 percent slopes, extremely stony	5.1	1.1%
GkaoB	Gladstone gravelly loam, 3 to 8 percent slopes	43.8	9.9%
GkaoC	Gladstone gravelly loam, 8 to 15 percent slopes	16.5	3.7%
HcuAt	Halboro-Codorus complex, 0 to 3 percent slopes, frequently flooded	2.9	0.7%
PaoC	Parker gravelly sandy loam, 3 to 15 percent slopes	15.6	3.5%
PauCc	Parker-Gladstone complex, 0 to 15 percent slopes, extremely stony	157.3	35.4%
PauDc	Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony	76.5	17.2%
PawE	Parker-Rock outcrop complex, 25 to 45 percent slopes	64.4	14.5%
WATER	Water	0.9	0.2%
Totals for Area of Interest		444.3	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

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

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up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

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

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

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

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

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An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Morris County, New Jersey

BacC—Bartley gravelly loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: b0lc
Elevation: 200 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bartley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bartley

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pre-wisconsin glacial loamy drift and/or colluvium; over residuum weathered from limestone and/or residuum weathered from gneiss

Typical profile

Ap - 0 to 11 inches: gravelly loam
Bt - 11 to 32 inches: loam
Bx - 32 to 42 inches: sandy loam
2C - 42 to 88 inches: very fine sandy loam
2R - 88 to 157 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 24 to 36 inches to fragipan; 60 to 88 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Gladstone

Percent of map unit: 5 percent

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Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Washington, eroded

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Turbotville

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

CakBb—Califon loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: b0ll
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Califon, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Califon, Very Stony

Setting

Landform: Flats
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till derived from gneiss and/or colluvium derived from gneiss

Typical profile

Ap - 0 to 10 inches: loam

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BA - 10 to 16 inches: loam
Bt - 16 to 23 inches: clay loam
Bx - 23 to 50 inches: loam
C - 50 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 30 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Annandale, very stony

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Cokesbury, very stony

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Gladstone

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

CapfB—Califon variant loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: b0lq
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Califon, friable subsoil, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Califon, Friable Subsoil

Setting

Landform: Drainageways, hillslopes
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Till derived from gneiss and/or colluvium derived from gneiss

Typical profile

A - 0 to 3 inches: loam
BA - 3 to 12 inches: gravelly loam
Bt1 - 12 to 20 inches: gravelly sandy clay loam
Bt2 - 20 to 32 inches: sandy clay loam
BC - 32 to 40 inches: sandy loam
C - 40 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

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Minor Components

Cokesbury

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Gladstone

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Parker

Percent of map unit: 5 percent
Landform: Knobs
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

CoaBc—Cokesbury loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: b0ls
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Cokesbury, extremely stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cokesbury, Extremely Stony

Setting

Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope

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Down-slope shape: Linear

Across-slope shape: Concave

Parent material: Till derived from gneiss and/or colluvium derived from gneiss

Typical profile

Ap - 0 to 9 inches: loam

BA - 9 to 15 inches: loam

Bt - 15 to 25 inches: gravelly clay loam

Bx - 25 to 35 inches: loam

C - 35 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 8 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: 20 to 30 inches to fragipan

Natural drainage class: Poorly drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Hydric soil rating: Yes

Minor Components

Annandale

Percent of map unit: 5 percent

Landform: Ridges

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Califon

Percent of map unit: 5 percent

Landform: Flats

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Gladstone

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

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Hydric soil rating: No

GkaoB—Gladstone gravelly loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2v7gk
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Gladstone and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gladstone

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy colluvium derived from granite and gneiss and/or loamy residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 10 inches: gravelly loam
Bt1 - 10 to 22 inches: sandy clay loam
Bt2 - 22 to 37 inches: loam
C - 37 to 66 inches: sandy loam
R - 66 to 76 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 60 to 80 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

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Minor Components

Califon

Percent of map unit: 5 percent
Landform: Flats
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Annandale

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Parker

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

GkaoC—Gladstone gravelly loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2v7gl
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 170 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Gladstone and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gladstone

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope

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Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Loamy colluvium derived from granite and gneiss and/or loamy residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 10 inches: gravelly loam

Bt1 - 10 to 22 inches: gravelly sandy clay loam

Bt2 - 22 to 37 inches: gravelly loam

C - 37 to 66 inches: gravelly sandy loam

R - 66 to 76 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 65 to 67 inches to lithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Califon

Percent of map unit: 5 percent

Landform: Flats

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Annandale

Percent of map unit: 5 percent

Landform: Hillslopes

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Parker

Percent of map unit: 5 percent

Landform: Hillslopes

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

HcuAt—Hatboro-Codorus complex, 0 to 3 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2w06g
Elevation: 90 to 680 feet
Mean annual precipitation: 47 to 51 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 180 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Hatboro, frequently, and similar soils: 60 percent
Codorus, occasional, and similar soils: 35 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hatboro, Frequently

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Loamy alluvium derived from greenstone and/or phyllite and/or quartzite and/or schist

Typical profile

A - 0 to 11 inches: silt loam
Bg1 - 11 to 18 inches: silt loam
Bg2 - 18 to 29 inches: silt loam
BCg - 29 to 44 inches: silt loam
Cg1 - 44 to 55 inches: silty clay loam
Cg2 - 55 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

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Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: B/D

Hydric soil rating: Yes

Description of Codorus, Occasional

Setting

Landform: Flood plains

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave

Parent material: Loamy alluvium derived from phyllite and/or mica schist and/or greenstone and/or old loamy alluvium derived from phyllite and/or mica schist and/or greenstone

Typical profile

Ap - 0 to 11 inches: silt loam

Bw1 - 11 to 18 inches: silt loam

Bw2 - 18 to 40 inches: gravelly silt loam

2C - 40 to 80 inches: very gravelly silt loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: About 18 to 30 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Delanco

Percent of map unit: 5 percent

Landform: Stream terraces

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

PaoC—Parker gravelly sandy loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: b0mp
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Parker and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker

Setting

Landform: Knobs
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly sandy loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

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Minor Components

Gladstone

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Annandale

Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Califon

Percent of map unit: 3 percent
Landform: Flats
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Califon, friable subsoil

Percent of map unit: 2 percent
Landform: Hillslopes, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

PauCc—Parker-Gladstone complex, 0 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 1lpc4
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

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Map Unit Composition

Parker, extremely stony, and similar soils: 55 percent

Gladstone, extremely stony, and similar soils: 35 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Hills

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Nose slope

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam

Bw1 - 5 to 20 inches: very gravelly loam

Bw2 - 20 to 31 inches: very gravelly sandy loam

C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 15 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Somewhat excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Gladstone, Extremely Stony

Setting

Landform: Hills

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Loamy colluvium derived from granite and gneiss and/or loamy residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 10 inches: gravelly sandy loam

B - 10 to 22 inches: gravelly sandy clay loam

BC - 22 to 37 inches: sandy loam

Custom Soil Resource Report

C - 37 to 96 inches: sandy loam

Properties and qualities

Slope: 0 to 15 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Califon

Percent of map unit: 5 percent

Landform: Flats

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Califon, friable subsoil

Percent of map unit: 5 percent

Landform: Hillslopes, drainageways

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Side slope, base slope

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

PauDc—Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 1lpc5

Elevation: 250 to 1,200 feet

Mean annual precipitation: 30 to 64 inches

Mean annual air temperature: 46 to 79 degrees F

Custom Soil Resource Report

Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 55 percent
Gladstone, extremely stony, and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 15 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Gladstone, Extremely Stony

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy colluvium derived from granite and gneiss and/or loamy residuum weathered from granite and gneiss

Typical profile

Ap - 0 to 10 inches: gravelly sandy loam

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Bt - 10 to 22 inches: gravelly sandy clay loam
BC - 22 to 37 inches: gravelly sandy loam
C - 37 to 96 inches: sandy loam

Properties and qualities

Slope: 15 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Califon

Percent of map unit: 5 percent
Landform: Flats
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Califon, friable subsoil

Percent of map unit: 5 percent
Landform: Hillslopes, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

PawE—Parker-Rock outcrop complex, 25 to 45 percent slopes

Map Unit Setting

National map unit symbol: b0mt
Elevation: 250 to 1,200 feet
Mean annual precipitation: 30 to 64 inches
Mean annual air temperature: 46 to 79 degrees F

Custom Soil Resource Report

Frost-free period: 131 to 178 days
Farmland classification: Not prime farmland

Map Unit Composition

Parker, extremely stony, and similar soils: 75 percent
Rock outcrop: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parker, Extremely Stony

Setting

Landform: Knobs
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and gneiss

Typical profile

A - 0 to 5 inches: very gravelly sandy loam
Bw1 - 5 to 20 inches: very gravelly sandy loam
Bw2 - 20 to 31 inches: very gravelly sandy loam
C - 31 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 25 to 45 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Down-slope shape: Convex
Across-slope shape: Linear

Typical profile

R - 0 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 25 to 45 percent
Depth to restrictive feature: 0 inches to lithic bedrock

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Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydrologic Soil Group: D

Hydric soil rating: Unranked

Minor Components

Gladstone, extremely stony

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

WATER—Water

Map Unit Setting

National map unit symbol: b0p9

Mean annual precipitation: 30 to 64 inches

Mean annual air temperature: 46 to 79 degrees F

Frost-free period: 131 to 178 days

Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf