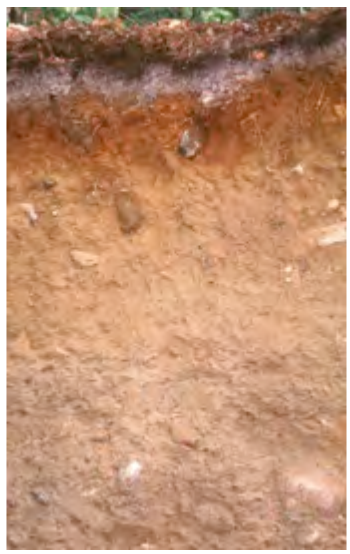
MAINE
ASSOCIATION OF
PROFESSIONAL
SOIL
SCIENTISTS

MAINE STATE SOIL



CHESUNCOOK

GUIDELINES FOR MAINE CERTIFIED SOIL SCIENTISTS FOR SOIL IDENTIFICATION AND MAPPING

FEBRUARY 2004

Revised March 2009

These standards were adopted by the Maine Association of Professional Soil Scientists April 4, 1989, and revised March 1992, March 1993, February 1995, September 2000, February

2004, and March 2009

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INTRODUCTION

The Maine Association of Professional Soil Scientists (MAPSS) was originally formed as the Maine Association of Consulting Soil Scientists in 1975. The founding members were consulting soil scientists who recognized the need for an association that could provide for the exchange of technical, political, and regulatory information that influence and guide their profession. The association was renamed the Maine Association of Professional Soil Scientists approximately 2 years later to encourage the participation of other professionals in soil science or related fields, such as the USDA Natural Resources Conservation Service (formerly the Soil Conservation Service) and the Maine Department of Environmental Protection (DEP). Today, MAPSS has more than 60 members with various professional backgrounds, including NRCS, DEP, soil consultants, wetlands scientists, site evaluators, students, and others with interest in the natural sciences. The organization's original goals and objectives for ensuring the success and promoting the advancement of the soil science profession remain unchanged. MAPSS will strive to continue providing guidance, education, and training to its members and the public on soil science issues of interest and concern.

Soil surveys are one of the primary services that professional soil scientists provide for their clients in Maine. Soil Surveys continue to grow as a means to define and analyze soil resources for development. Soil surveys are recognized by planners as an efficient way to delineate depth to bedrock or wetness that need to be overcome for a proposed development to be economically feasible and environmentally safe. High intensity soil surveys in Maine utilize the soil series and soil phase concept, and are based on many of the technical standards of the National Cooperative Soil Survey.

This publication brings the various technical standards for soil surveys adopted by the Maine Association of Professional Soil Scientists together in one document. This is not a static document. As needed, other technical material will be added and updates will be issued. The guidelines should be interpreted and applied only in conjunction with the USDA, Natural Resources Conservation Service soil survey manual, and the National Soils Survey Handbook. Although this publication is being prepared for MAPSS members, it is anticipated that town, regional and state planners will also be interested in the publication. Planners are encouraged to contact a MAPSS member if they have any questions about the technical aspects of this publication and to be certain that the most current technical criteria is being referenced.

Traditionally, soils information in Maine has been available in the form of county soil surveys, produced by the USDA, Natural Resources Conservation Service in cooperation with other government agencies. These surveys are available for approximately 80 percent of the state. These medium intensity surveys utilize aerial photography as base maps, commonly at scales of 1:15840, 1:24000, or 1:20000. While the information provided in these surveys is valuable for broad land use planning, resource inventories, forestry and agricultural planning, they do not provide enough detail for site specific plan review, etc.

As the demand for more detailed soils information continues to grow, be it for stormwater management, erosion and sediment control plans, hydric soil delineation, or to determine development densities, it is apparent that high intensity soil surveys, at scales of 1 inch equals 50, 100 or 200 feet are necessary to meet the needs of resource planners and engineers to address these site-specific issues.

The Maine Association of Professional Soil Scientists, on April 4, 1989, formally adopted minimum standards for two classes of high intensity soil surveys in Maine, as well as a class for medium-high intensity, and a class for medium intensity soil surveys. The remainder of this section defines these minimum soil survey standards.

The standards are designed to match the kind of survey with the amount of soil information needed by planners and others to make reasonable land use decisions. Only local needs and concerns can determine the class of survey for a particular project. However, one can generalize that intensive uses that cause concern about hydric soil boundaries or the location of suitable areas for phosphorus control measures for example, would need a high intensity soil survey (Class A or Class B). Less intensive uses such as ski areas may only need a medium high intensity soil survey (Class C). A medium intensity soil survey (Class D) such as an existing Natural Resources Conservation Service Survey or one provided by a private soil consultant would be appropriate for some projects. For narrow, linear projects, a Class L Soil Survey may be appropriate.

STANDARDS FOR SOIL SURVEY

Classes of Soil Surveys

There are five classes of soil survey defined in these guidelines. They differ in the degree of detail and supporting information required. Minimum standards are listed for each soil survey class with Class A being the most detailed and Class D being the least detailed. Class L is a completely separate class of soil survey from Class A through Class D. It does not continue the progressive decrease in level of detail from Class A through Class D but was created to address the unique needs for long, linear projects such as wind farm access roads which may be many miles long but which do not have any proposed adjacent development. Stating that a soil survey was conducted in accordance with a particular class of these guidelines means that it meets all four of the listed requirements for that class. In some situations it may be appropriate to conduct a soil survey using two or more classes, provided it is clearly stated as such and where the classes were conducted. This might be done for a large property where only a portion is to be developed and the remainder is to be open space. An example would be a subdivision of shorefront lots with the back of the property remaining an undeveloped common area. The developed area may need a class A soil survey while the back part may only need a class C or D survey.

Class A (High Intensity)

1. Map units will not contain dissimilar limiting individual inclusions larger than one-eighth acre. Dissimilar limiting inclusions may total more than one-eighth acre per map unit delineation, in the aggregate, if not contiguous.

2. Scale is 1 inch equals 100 feet or larger (e.g. 1" = 50').

3. Ground control—base line and test pits for which detailed data is recorded are accurately located under the direction of a registered land surveyor or qualified professional engineer.

4. Base map with 2-foot contour lines with ground survey, or aerial survey with ground control.

Class B (High Intensity)

1. Map units will not contain dissimilar limiting individual inclusions larger than one acre. Dissimilar limiting inclusions may total more than one acre per map unit delineation, in the aggregate, if not continuous.

2. Scale of 1 inch equals 200 feet or larger (e.g. 1" = 100').

3. Ground control—test pits for which detailed data is recorded are located by means of compass by chaining, pacing, or taping from known survey points; or other methods of equal or greater accuracy.

4. Base map with 5-foot contour lines.

Class C (Medium High Intensity)

1. Map units will not contain dissimilar limiting individual inclusions larger than 5 acres. Dissimilar limiting inclusions may total more than 5 acres per map unit delineation, in the aggregate, if not contiguous.

2. Scale of 1 inch equals 500 feet or larger (e.g. 1" = 400').

3. Ground control—as determined by the mapper.

4. Base map—as determined by the mapper.

Class D (Medium Intensity)

1. Map units may contain dissimilar limiting individual inclusions larger than 5 acres provided that each dissimilar limiting inclusion is smaller than the

minimum map unit size utilized. Dissimilar inclusions within a map unit may total more than the minimum map unit size, in the aggregate, if not contiguous.

2. Scale of 1 inch equals 2,000 feet or larger (e.g. 1" = 1320').
3. Ground control—as determined by the mapper.
4. Base map—as determined by the mapper.

Class L (For Linear Projects)

Purpose – This soil survey standard is designed to provide the minimum soil information necessary to allow for the design and construction of long but narrow projects such as access roads, utility lines or trails with little or no adjacent development. In remote, difficult to access sites such as mountains or roadless areas, soil observations may be made entirely by use of a hand shovel, screw or Dutch auger. For areas which are more accessible, deeper soil observations should be made in order to properly classify the soils.

1. Class L soil survey map units shall be made on the basis of parent material, slope, soil texture, soil depth to dense till or bedrock (which ever is shallowest) and soil wetness (drainage class and/or oxyaquic conditions) at the Class A High Intensity Map Unit size. The preferred method of naming the soil map units is by assigning a soil series name or names for complexes. If soils are classified to the series level in remote areas not readily accessible to equipment and/or without road cuts, it shall be noted in the narrative that soils were classified by shallow observations only.

2. Scale is 1 inch equals 100 feet or larger (e.g. 1” = 50’).

3. Ground Control – base line and test pits for which detailed data are recorded are located to sub-meter accuracy under the direction of a qualified professional.

4. Base map with two foot contour lines.

Completed Soil Survey

A complete soil survey submitted for public record shall consist of the following:

Soil Map Requirements
Soil Narrative Report Requirements
Soil Profile Log Description Requirements

1. Soil Map Requirements

The soil map shall meet the requirements of Class A, B, C, D, or L soil surveys, as outlined in these Guidelines.

a. Map Units and Soils Classification

The soil survey map units shall be designed according to the standards of the National Cooperative Soil Survey, and the soils shall be classified at the series level according to the current Keys to Soil Taxonomy. Soil map units are phases of soil series.

b. Map Preparation by a Maine Certified Soil Scientist

All soil surveys submitted for the public record, with the exception of Natural Resources Conservation Service soil surveys, shall be stamped, dated and signed by a Maine Certified Soil Scientist licensed by the Maine Board of Certification for Geologists and Soil Scientists.

c. Accurate Soil Boundary Placement

Soil boundaries are observed throughout their length and their placement corresponds to changes in soils and/or landforms. Map unit boundary placement shall be based on soil characteristics, using observations of vegetation, landforms, and other site features as indications of changes in soil conditions.

d. Map Unit Purity

The soil(s) within an area enclosed by a map unit boundary will have a minimum of 75 percent of the soil(s) that provide the name of that map unit or similar soils (soils that differ so little from the named soil(s) in the map unit that there are no important differences in interpretations). No one similar soil is greater than the named soil(s). The total amount of dissimilar soils (soils that differ sufficiently from the named soil(s) to affect major interpretations) shall not exceed 25 percent of the map unit.

e. Map Legend and Map Unit Description

The soil map legend shall include a symbol for each map unit, and the name of the map unit. Special and ad hoc symbols are used to indicate areas that will affect use and management of the soil(s), but are too small to be delineated at the mapping scale used. They shall be identified and named in the map legend.

f. Conventional, Special, and Ad Hoc Symbols Legend

Conventional symbols on soil maps represent water and cultural features to help users locate areas on the map. Special symbols identify areas of soils and miscellaneous areas. Special symbols are also used to show land features that are too small to be delineated at the scale of mapping, but that have a significant effect on use and management (i. e., rock outcrop, wet spot). Ad hoc soil symbols are used for areas that have special conditions that the soil scientist wants to show on the map. Symbols must be defined to include the size of the area that each represents. Conventional and special symbols used in soil mapping are shown and described in Appendix 3.

g. Identification of Map Units

Soil survey map units are designed to provide important information for the more common uses of soils within the survey area, with the purpose of the soil survey as the guiding factor. [The map units must also be mappable at the selected level of the soil survey, whether it is Class A, B, C, D or L.]

Taxonomic class names at the series level, and accompanying phase terms, are used to name map units. They are described in terms of their variation in soil properties within the limits defined by the Official Series Descriptions. Ranges of inclusions may also be used to establish a map unit name at the categorical level above the series. Following is a brief discussion of map unit identification. Refer to the National Soils Handbook and Soil Survey Manual for a more complete and detailed discussion.

A soil survey *map unit* is a collection of land areas defined and named in terms of their soil (taxonomic) components and miscellaneous land areas. Each individual area on the map is a *delineation*. Each delineation consists of a piece of the landscape and is identified with and associated with position in the landscape and changes in topography slope, aspect, configuration, stoniness, vegetation, depth to seasonal groundwater table, depth to seasonal high groundwater table, depth to bedrock, depth to impermeable layer, kinds of soil (soil horizons) and miscellaneous land areas.

Soil series is the most homogenous category in Soil Taxonomy and is commonly used to name map units in Class A, B, C, D and L soil surveys. As a taxonomic class, a soil series is a group of soils that have horizons similar in arrangement and differentiating properties. Soil series are differentiated on all applicable properties of the higher categories in Soil Taxonomy in addition to the differentiating properties of the series control section, such as kind, thickness and arrangement of horizons (their color, texture, structure, reaction, humus, rock fragments and mineral composition). The soils of a series have a relatively narrow range in sets of properties, although the surface layer texture and such features as slope, stoniness, degree of erosion, flood hazard and landscape position may vary.

If the range in properties of a taxon (soil series) is too wide for the purposes of the soil survey, or if some features outside the soil itself are significant for use and management, a *phase* of the taxonomic unit (series) is used in naming and delineating the map unit. The phases most commonly used in Maine and New England are surface texture, slope, stoniness, flooding, and substratum phases.

Miscellaneous land areas are land areas that have little or no soil and support little or no vegetation. They are non-soil land areas. Rock outcrop, beaches, dump areas, talus areas and some man-made areas are examples. "Rock outcrop," "beaches," and "dumps" for example are used in the same manner as the names of soil taxa (i.e., soil series name) in naming map units.

h. **Kinds of Soil Map Units-(From Soil Survey Manual)**

Soils differ in size and shape of their areas, in degree of contrast with adjacent soils, and in geographic relationships. Four kinds of map units are used in soil surveys to show the relationships. The four kinds are as follows (see appendix 3):

1. Consociations – In a consociation delineated areas are dominated by a single soil taxon (or miscellaneous area) and similar soils. As a rule, at least one-half of the pedons in each delineation of a soil consociation are of the same soil component providing the name for the map unit. Most of the remainder of the delineation consists of soil components so similar to the named soil that major interpretations are not affected significantly. Consociations are named for the phase of the taxon or miscellaneous area that dominates the map unit if the potential phases are similar.
2. Complexes – Complexes consist of two or more dissimilar components occurring in a regularly repeating pattern. The major components of a complex can not be shown separately at the scale of mapping. The first part of the

name of a soil complex is formed by using names of taxa, usually soil series joined by hyphens. The names of two or three taxa may be used to name a complex, followed by the surface texture phase term if the surface texture of all major components is the same; otherwise the taxa are followed by the word “complex”. The name of the most extensive component is used first.

3. Associations – Associations consist of two or more dissimilar components occurring in a regularly repeating pattern. The major components of an association can be shown separately at the scale used for making the soil map but there is no need to separate them for the purpose of the soil survey. Names of associations are similar to those of complexes except that the word “association” always appears in the name.
4. Undifferentiated Groups – Undifferentiated groups consist of two or more components that are not consistently associated geographically but that are included in the same map unit because use and management are the same or very similar for common uses. Generally, they are included together because some common feature such as steepness, stoniness, or flooding determines use and management. The term “undifferentiated group” refers to groups of taxa at the level of classification indicated in the name of the map unit, not to a single taxa. The word “and” connecting the names of the components distinguishes undifferentiated groups from complexes, associations and consociations.

2. Soil Narrative Report Requirements

The soil scientist shall provide a Soil Narrative Report as a required supplement to the soil survey map. Reference shall be made on the Soil Survey Map to the Soil Narrative Report and Soil Profile Descriptions (Test Pit Logs).

a. Format

The Soil Narrative Report may be in a narrative or tabular format (style preference per the Soil Scientist). The soil narrative report shall contain the following information as a minimum:

b. Title Section

The title section shall contain the following information:

1. Site Reference (Subdivision, Property Owner, Project Name)
2. Location of the Site
3. Date of report
4. Date of soil profile observations
5. Base map information
   a) Contour map – foot intervals (e.g. 1', 2', 5', 10', 20', etc)
   b) Scale of map used for mapping purpose 1"= X'
   c) Type of base map (e.g. Land Surveyor, U.S.G.S., Tax Map, aerial photo etc.)
6. Ground Control
   a. Test pits located by (surveyor, GPS, hip chain, tape, or pace and compass)
7. Class of Soil Survey Map (e.g. A, B, C, D), which includes a reiteration of Soil Survey Requirements for that class

   Example: Class B – Soil Survey

   1. Mapping units of 1 acre or greater.
   2. Scale of 1"=200' or larger.
   3. Up to 35% inclusions in mapping units of which no more than 25% may be dissimilar soils.
   4. Ground control – test pits located from known, surveyed, control points.
   5. Base map with 5' contour lines.

8. Soil Scientist Certification Statement:

   "The accompanying soil profile descriptions, soil survey map and this soil narrative report entitled "____________", dated "_____________" were done in accordance with the standards adopted by the Maine Association

of Professional Soil Scientists, February 1995, as amended and prepared by "___________________" C.S.S. #___.

9. Purpose of Soil Map

   The soil scientist shall provide a narrative describing the purpose for preparing soil maps for each project. This narrative should explain that soils which are considered non-limiting for one use may be considered limiting for another use. Map unit design is at least in part influenced by the intended use of the soil survey and that information provided may not always be adequate for uses other than that for which the soil survey was originally developed.

   Example: This soil survey was prepared for a residential subdivision utilizing subsurface wastewater disposal and private water supplies.

10. Signature of Certified Soil Scientist
11. Professional C.S.S. #
12. Professional stamp
13. Date

c. <u>Map Unit Description</u>

The Soil Narrative Report shall contain a description for each Map Unit named on the Soil Survey Map. These descriptions shall contain at least the following information: (NOTE: These soil descriptions should not be the generic O.S.D.(s) but actual descriptions of soils found on-site though a copy of the O.S.D.(s) may be included for informational and comparison purposes)

1. Name of Soil Map Unit
2. Soil Taxonomic Classification
3. Setting Information that includes:

   a. Parent material
   b. Landform
   c. Position in Landscape
   d. Slope Gradient Ranges
4. Composition and Soil Characteristics
   a. Drainage Class
   b. Typical Profile Description
   c. At a minimum, soil observation logs used to detail each soil series and miscellaneous area named in the soil map legend should contain the following (see tables in appendix):
   d. Master Horizons – O, A, E, B, C and R horizons and appropriate sub-horizons should be noted and a description provided for the mineral soil horizons.
   e. Texture – The texture of the mineral soil horizons as per the textural Triangle.
   f. Texture Modifiers – Size and quantity of coarse fragments should be used when describing any textural modifier.
   g. Structure – Type, grade and size
   h. Consistency – Describe soil consistence in terms of rupture resistance for moist soils. Also take into consideration resistance to penetration by a knife.
   i. Color – This should include a Munsell notation and associated Munsell color.
   j. Fragments – Size, type and percentage of coarse fragments should be recorded.
   k. Redoximorphic Features – Percent redoximorphic features and contrast should be stated.
5. Hydrologic Soil Group
6. Surface Run-off
7. Permeability
8. Depth to bedrock
9. Hazard to Flooding
10. Inclusions (within each map unit)
   a. Similar Soils[1]
   b. Dissimilar Soils[1]

Note [1] : The proposed Use and Management will determine what are Similar or Dissimilar Soils.

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d. Use and Management

The soil narrative report shall include a discussion of the intended use of the property and soil survey and how the soils will be managed including how soil limitation(s) which may affect the intended use will be overcome.

Example: Development with subsurface wastewater disposal:
Adams soil is suitable for subsurface wastewater disposal in accordance with State of Maine Rules for Subsurface Wastewater Disposal. This soil requires a 24-inch separation distance from the bottom of the disposal area and the seasonal high groundwater table. This soil requires a minimum hydraulic loading rate of 2.6 and 1.3 square feet/gpd for disposal beds and chamber area, respectively. Adams soil is suited for building site development with buildings with full foundations.

3. Soil Profile Log Description Requirements

All soil survey reports shall include soil observation logs for those test pits or borings described by the soil scientist while gathering data to prepare soil maps. As a minimum, one detailed soil observation log is required for each series and miscellaneous area named in the soil map legend. The location and number of test pits needed to properly identify and map an area of soils can vary significantly, depending on the complexity of the landscape and the purpose of the soil survey. The depth of the test pits to be logged should also be adequate to allow for complete examination and classification of the soil profiles, particularly if depth to limitations such as restrictive layers or bedrock is relevant. Test pits dug with a backhoe or by similar means are often necessary to verify subsoil and substratum characteristics. The location of these test pits shall be shown on the soil map(s).

Soil observation logs are not required for those test pits or borings that are used to verify consistency within a map unit for which detailed information is not generally gathered. The location of these soil observations do not need to be shown on the soil map(s).

STATE OF MAINE CATENA KEY

The soil catena concept is a useful guide to understand the complex nature of soils that blanket the landscape. A soil catena is a sequence of soil series that extend across relief positions and are developed from similar parent material. Relief influences soil formation primarily through its effect on drainage, runoff, and erosion. The key that follows uses the catena concept by matching parent material and drainage, for each series. This is helpful in identifying the relationship of one series to others. It is intended to be used only as a guide; the Official Series Description should be used to identify the soil being evaluated.

(Series listed in *(ITALICS)* have a mesic soil temperature regime and are no longer used in Maine.)

(Series listed as underlined are from outside MLRA Region R.- These series may have different soil properties from what was described when these soils were first identified in Maine.)

PARENT MATERIAL Of the soils catena and selected characteristics of the **deepest, best drained member**	**SOIL DRAINAGE CLASS**						
	Excessively Drained	**Somewhat Excessively Drained**	**Well Drained**	**Moderately Well Drained**	**Somewhat Poorly Drained**	**Poorly Drained**	**Very Poorly Drained**
A. Soils formed in Glacial Till							
1. Dark gray fine-grained quartzite, slate, phyllite, and some calcareous sandstone							
a. Coarse-loamy soils			Bangor Penquis[3]	Dixmont	→		
b. Loamy-skeletal soils		Thorndike[2]	Danforth Winnecook[3]	Shirley	→		
c. Coarse-loamy soils with dense basal till		Monson[2]	Elliottsville[3]	Chesuncook	Telos	Monarda	Burnham
2. Calcareous dark gray shale, silt-stone, phyllite, and limestone							
a. Fine-loamy soils			Caribou Mapleton[3]	Conant	→	Easton	Washburn*****
b. Fine-loamy soils with dense basal till				Perham	Daigle	Aurelie	
3. Dark gray limestone and calcareous shale							
a. Coarse-loamy soils		← *(BENSON[2])*	Linneus[3]				
4. Red sandstone and conglomerate							
a. Loamy soils		Creasey[2]					

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5. Fine-grained quartzite, slate, and some granite							
a. Coarse-loamy soils with dense basal till			Plaisted	Howland		Monarda	Burnham
6. Mica schist and phyllite with some granite and gneiss							
a. Coarse-loamy soils with a spodic horizon	Abram[1]	Lyman[2] *(HOLLIS[2])*	Berkshire *(CHARLTON)* Tunbridge[3] →	Sunapee *(SUTTON)*		Lyme ***(LEICESTER)***	
b. Coarse-loamy soils with a spodic horizon & dense basal till			Marlow *(PAXTON)*	Dixfield Peru *(WOODBRIDGE)*	Colonel *(RIDGEBURY)*	Brayton ← Pillsbury →	Peacham *(WHITMAN)*
c. Coarse-loamy soils with a spodic horizon having > 6% organic carbon			Hogback[2] Rawsonville[3]				
7. High elevation soils with a cryic temperature regime (generally at elevations greater than 2500 feet)							
a. Coarse-loamy soils with a spodic horizon			Sisk Saddleback[2]	Surplus	→	Bemis	
b. Loamy-skeletal soils with a spodic horizon			Enchanted[4]				
8. Granite, gneiss and some schist							
a. Sandy-skeletal soils with a spodic horizon	Schoodic[1]	Hermon Canaan[2]		Waumbek	←	Naskeag[3]	
b. Coarse-loamy soils with a spodic horizon & dense sandy basal till			Becket	Skerry	Westbury		
c. Coarse-loamy over sandy or sandy-skeletal soils			Monadnock				
B. Soils formed in Glaciofluvial Material Mainly on deltas, terraces, eskers, kames and beaches							
1. Granite, gneiss, some sandstone and lesser amounts of slate, shale and phyllite							
a. Sandy-skeletal soils with a spodic horizon	Colton *(HINCKLEY)*			Duane			
b. Sandy soils with a spodic horizon	*(WINDSOR)*	Adams		Croghan *(DEERFIELD)*	← ← Au Gres	Moosilauke Naumburg Kinsman *(WALPOLE)*	Searsport *(SCARBORO)*
c. Sandy soils with a cemented spodic horizon					Finch *(SAUGATUCK)*		
d. Sandy soils		*(MERRIMAC)*					

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2. Slate, shale, phyllite and lesser amounts of granite, gneiss and limestone							
a. Sandy-skeletal soils		Masardis ←	Stetson	Sheepscot			
b. Coarse-loamy over sandy or sandy-skeletal soils			Allagash *(AGAWAM)*	Madawaska *(NINIGRET)* Machias	→ ← *(RED HOOK)*	*(FREDON)* *(ATHERTON)*	*(HALSEY)* →
c. Sandy soils				Skowhegan	→		
C. Soils formed in Marine and Glaciolacustrine Deposits (Including some loess caps)							
1. Silt and clay deposits							
a. Fine soils			*(SUFFIELD)*	Buxton	Lamoine	Scantic	Biddeford
b. Fine-silty soils				Boothbay	→	Swanville *(CANANDAIGUA)*	→
2. Very fine sand and silt deposits							
a. Coarse-silty soils with a spodic horizon			Salmon *(HARTLAND)*	Nicholville *(BELGRADE)* *(SCIO)*	←	Roundabout *(RAYNHAM)*	
3. Loamy material over silt and clay deposits							
a. Coarse-loamy over clayey soils			Melrose	Elmwood	Swanton	→	Whately
4. Sandy material over loamy deposits							
a. Sandy over loamy soils				*(ELDRIDGE)*			
5. Fine-silty soils in tidal areas							Gouldsboro Sulfaquents
D. Soils formed in Alluvial Deposits							
1. Slate, phyllite and schist							
a. Coarse-silty soils			Fryeburg *(HADLEY)*	Lovewell *(WINOOSKI)*	Cornish	Charles *(LIMERICK)*	Medomak *(SACO)*
b. Coarse-silty soils without a cambic horizon			Lille				
2. Granite, gneiss and schist							
a. Coarse-loamy soils			Ondawa	Podunk		Rumney	
b. Sandy soils	Sunday						
E. Organic Soils (pH given in 0.01M $CaCl_2$)							
1. Folists							
a. Very shallow & shallow to bedrock soils, pH < 4.5		←	Ricker				

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b. Deep & very deep to bedrock soils, pH <4.5		Mahoosuc					
2. Fibrists							
a. pH < 4.5							Vassalboro
b. Terric soils, pH <u>></u> 4.5							Togus
c. Soils formed from mainly sphagnum, pH < 4.5							<u>Waskish</u>
3. Hemists							
a. pH < 4.5							Sebago
b. pH <u>></u> 4.5							<u>Rifle</u>
c. Terric soils, pH < 4.5							Chocorua
d. Tidal area soils							Sulfihemists
4. Saprists							
a. pH <u>></u> 4.5							Bucksport
b. Terric soils, pH <u>></u> 4.5							Wonsqueak Pondicherry <u>Markey</u>
c. Undifferentiated soils							Borosaprists

<u>All these organic soils are very deep (>60 inches) to bedrock unless otherwise noted.</u>
<u>These Terric organic soils range from 16 to 51 inches in thickness over mineral soil.</u>

<u>Footnotes are for mineral soils:</u>
1 Very shallow (<10 inches of mineral soil above bedrock)
2 Shallow (10 to <20 inches of mineral soil above bedrock)
3 Moderately deep (20 to <40 inches of mineral soil above bedrock)
4 Deep (40 to <u><</u>60 inches of mineral soil above bedrock)
<u>All others</u> are Very deep (>60 inches of mineral soil above bedrock)

*****Washburn is an inactive series & no current description is available

Last updated February 2000; **<u>subject to change</u>**

SOIL WETNESS

Soil wetness refers to the duration, depth and oxidation state of a seasonal high water table. There are two kinds of seasonal water tables which soil mappers should identify when working in the field. One is associated with a water table that becomes at least partially devoid of oxygen resulting in the formation of redoximorphic features. These soils are mapped according to soil drainage classes as described below. The other kind is associated with a water table that does not become devoid of oxygen so that redoximorphic features do not form. These soils however have other morphological indicators of soil wetness. They should be mapped according to the discussion of Soils With Oxyaquic Conditions below.

SOIL DRAINAGE CLASSES

Seven soil drainage classes are recognized based on the duration and depth of a seasonal high water table. A seasonal high water table is a zone of saturation at the highest average depth during the wettest part of the year for that soil. It persists in the soil for more than a few weeks and occurs within six feet of the soil surface.

Very Poorly Drained. Water is removed from the soil so slowly that the water table remains at or above the surface most of the year. A seasonal high water table is at or above the surface from at least October through July and sometimes throughout the year. In August and September the water table may recede below twelve inches. The high water table severely limits the use of these soils for most agricultural, forestry, and urban activities. These soils are hydric and typically support a wetland plant community.

Poorly Drained. Water is removed from the soil so slowly that the soil remains wet most of the year. A seasonal high water table is at or near the surface from October through June. In July, August and September it may recede below sixteen inches. The seasonal high water table limits the use of these soils for most agricultural, forestry, and urban activities. These soils are hydric and typically support a wetland plant community.

Somewhat Poorly Drained. Water is removed from the soil slowly enough to keep it wet for significant periods of time, but not the entire year. A seasonal high water table is at seven inches to sixteen inches in depth from October through May and sometimes June. From July to October it may recede below thirty inches in depth. A seasonal water table limits the use of these soils for some agricultural, forestry and urban activities. These soils are not hydric in Maine, and are commonly found in the transitional landscape positions between wetland and upland soils.

Moderately Well Drained. Water is removed from the soil somewhat slowly, so that the soil is wet for a short, but significant period of time. A seasonal water table is at sixteen inches to forty inches in depth from November through May. The seasonal water table may be a moderate limitation to agricultural, forestry, and urban activities, however, these limitations can typically be overcome by simple corrective measures and practices.

Well Drained. Water is removed from the soil readily, but not rapidly, and the soil does not have a seasonal high water table within forty inches of the surface throughout the year. These soils typically are not limiting for agricultural, forestry, and urban activities because of wetness.

Somewhat Excessively Drained. Water is removed form the soil rapidly, and the soil does not have a seasonal high water table. These soils are droughty during the summer months. Droughtiness is a moderate limitation for agricultural, forestry, and urban uses that require good plant growth.

Excessively Drained. Water is removed from the soil very rapidly, and the soils do not have a seasonal high water table. Droughtiness is a limiting factor for establishing and sustaining most types of vegetation in these soils. Therefore, their use for agricultural, forestry, and urban activities that require healthy plant growth is limited.

In addition to observing the water level in soil, the seasonal high water table can be inferred by soil morphology (surface layer, organic content, redoximorphic features, and color pattern), landscape position, slope and vegetation. The Key to Soil Drainage Classes uses soil morphology and common site indicators to help the soil scientist determine the drainage class of a soil.

In the natural landscape there is a wide variation of soil morphological features. Because of this variability, not all soils will necessarily fit precisely into one of the seven drainage classes. The Key to Soil Drainage Classes on the following pages is intended to be used as a guide, and may not be the sole determinant for identifying the soil drainage class. Soil Scientists must use their expertise and professional judgement to evaluate soil properties, soil forming processes, as well as other indicators to correctly determine the appropriate drainage class. The soil scientist must recognize soil features that reflect present drainage conditions. For example, sometimes redoximorphic features in marine sediments is related to a nearly saturated condition caused by very fine pores, and does not represent the actual water table. Some soils have relic redoximorphic features that reflect former wetness conditions and not the present water table. Each soil and its associated landscape should be examined thoroughly to identify the actual drainage conditions.

Soils With Oxyaquic Conditions

Some soils have a seasonal high water table which does not result in the development of redoximorphic features because they do not become devoid of oxygen. Since soils with oxygenated water react similarly to those that have an anaerobic water table for most uses and management purposes, it is important to identify and map them. These soils are typically located in either cool climates (coastal, high elevations or northern parts of the State) on long sloping landforms, particularly those formed by lodgment till or where the slope levels out at the base of a long slope. They are most common where there are both cool temperatures and wetter positions in the landscape. Cool temperatures reduce microbial activity and long sloping landforms provide for oxygenated water. These soils may have redoximorphic features in dense parent material but commonly lack them in the soil horizons above the pan. In order to determine the depth to the seasonal high water table it is necessary to look for other morphological indicators of wetness within the soil and take into consideration a number of other site-related factors. These soils should be mapped as variants of the soil series that they are most similar to and would react like, for use and management. For instance, if a soil classifies as being moderately well drained according to depth and type of redoximorphic features, but has evidence of oxyaquic conditions consistent with the depth to a seasonal high water table of a somewhat poorly drained soil, it should be mapped as a somewhat poorly drained variant of the wetter soil series.

Indicators of Soils With Oxyaquic Conditions

Soils with oxyaquic conditions commonly (but not always):

1. are in slight to strongly concave positions in the landscape but may be on a uniform slope.

2. have a very stony to rubbly surface that may be covered with organic duff.
3. have vegetation that is shallow rooted but not because of dense till, bedrock, very coarse textured soil horizons, or a seasonal water table with redoximorphic features present.
4. have thickened organic horizons as compared to better drained soils in the vicinity
5. have an A or thickened A horizon where better drained soils in the vicinity do not have an A or have a thin A horizon.
6. are less well developed than better drained soils in the vicinity. Commonly, they will classify as Inceptisols while better drained soils in the vicinity will classify as Spodosols or have spodic properties.
7. have evidence of organic matter streaking or different shades of olive and brown in the B horizon (poly value and/or poly chromatic).
8. have vegetation that is hydrophytic or the vegetation is upland but has evidence of stress such as tree roots growing along the ground surface, multi-stems and/or buttressing.
9. have a large contributing (upslope) watershed to create the groundwater table and for the hydraulic gradient necessary to push it along.

MAINE ASSOCIATION OF PROFESSIONAL SOIL SCIENTISTS
(THE NATURAL RESOURCES CONSERVATION SERVICE)
SUPPLEMENTAL KEY FOR THE IDENTIFICATION OF SOIL DRAINAGE CLASS*

2/28/90
4/01/92 Rev.
4/01/93 Rev.
4/04/94 Rev. *(Based upon the Maine Association of Professional Soil Scientists, Key to Drainage Classes,
March 05/02)
3/21/96 Rev.
3/17/99 Rev.
3/01/00 Rev.
3/05/02 Rev.

Use this key starting at the first drainage class listed (very poorly drained). If the soil being evaluated does not exhibit the soil morphological
features for that drainage class, go to the next drainage class. Continue through each drainage class until the soil being evaluated
meets the soil morphological features for a particular drainage class.

DRAINAGE CLASS	SOIL MORPHOLOGICAL FEATURES	COMMON SITE INDICATORS
VERY POORLY DRAINED	1) Has organic soil material that extends from the surface [1] to a depth of 16 inches or more. (Histosols) [2] or, 2) Has organic soil material that extends from the surface to a depth of 8 to 16 inches (Histic Epipedon) [3] and is directly underlain by a horizon that has a depleted or gleyed matrix. or, 3) Has organic soil material that extends from the surface to a depth of 4 to 8 inches and is directly underlain by a horizon that has a depleted or gleyed matrix or,	Level or nearly level; occupies lowest position in the landscape. Commonly in the depressions and is seasonally ponded or flooded. Common plant species include: rushes, cattails, sedges, sphagnum moss, tamarack, willow, black spruce, northern white cedar, and red maple.

	4) Mineral soils with sulfidic materials within 20 inches of the mineral soil surface; Alluvial soils with an umbric epipedon or,	
POORLY DRAINED	1) Has dominant textures in the upper 20 inches (below the “A” or “Ap” horizon if present) of loamy fine sand or coarser and has redoximorphic features or has a Bh or Bhs horizon that is value 3 or less and chroma 2 or less, which is directly underlain by a horizon with redoximorphic features, within 7 inches of the mineral soil surface; or 2) Has an Ap horizon that is 7 inches thick or greater with a value of 3 or less and chroma of 2 or less and a texture in all subhorizons within 20 inches of the mineral soil surface of loamy fine sand or coarser and have redoximorphic features directly beneath the Ap horizon or, 3) Has a depleted or gleyed matrix within 20 inches of the mineral soil surface and redox depletions with value 4 or more and chroma 2 or less in ped interiors that are less than 7 inches below the mineral soil surface or, 4) Has an Ap horizon that is 7 inches thick or greater with value of 3 or less and chroma of 2 or less and has a depleted or gleyed matrix within 20 inches of the mineral soil surface and has redox depletions with value 4 or more and chroma 2 or less in ped interiors or a depleted or gleyed matrix directly beneath the Ap horizon or,	Level to gently sloping; sideslopes, toe slopes, depressions, and seepage areas. Common plant species include: sedges, alders, willow, red maple, gray birch, and aspen
SOMEWHAT POORLY DRAINED	1) Is not very poorly or poorly drained and has redoximorphic features at a epth of less than 16 inches below the mineral soil surface or,	Level to strongly sloping; long smooth side slopes, broad depressions and seepage areas. Common plant species include: red osier dogwood, alders, willow, spruce, balsam fir, red maple, elm, aspen, gray and yellow birch.
MODERATELY WELL DRAINED	2) Has redoximorphic features at a depth of 16 inches to less than 40 inches elow the mineral soil surface or,	Level to steep; crests and upper part of long smooth slopes and broad

		terraces. Common plant species include: northern hardwoods, white and red pine, hemlock, and grasses.
WELL DRAINED	Soil depth is at least 20 inches to bedrock and has a texture of loamy very fine and or finer and redoximorphic features, if present, are 40 nches or more below the mineral soil surface. [4] or,	Level to very steep; knolls, complex slopes and terraces. Common plant species include: northern hardwoods, white and red pine, hemlock, and grasses
SOMEWHAT EXCESSIVELY DRAINED	1) Soil depth is 10 to 20 inches to bedrock with a loamy or loamy-skeletal article-size class . 2) Soil depth is 20 inches or greater to bedrock with a sandy or sandy-skeletal particle-size class with a loamy cap 10 inches thick or greater.	Level to very steep; knolls, convex slopes and terraces. Common plant species include: northern hardwoods, white and red pine, white and red spruce, hemlock, and grasses.
EXCESSIVELY DRAINED	1) Soil depth is less than 10 inches to bedrock. 2) Sandy or sandy-skeletal particle-size class with a loamy cap less than 10 inches thick.	Level to very steep; knolls, convex slopes and terraces. Common plant species include: northern hardwoods, white and red pine, white and red spruce, hemlock and grasses. Vegetation also includes shrubs, ferns, mosses, and lichens.

1 Surface excludes loose leaves, needles and twigs.
2 Twenty-four inches or more if 75 percent or more of the volume is sphagnum fibers. Organic soil excludes Folists in this key.
3. Eight to 24 inches if 75 percent or more of the volume is sphagnum fibers.
4. Soils that are coarse-loamy over sandy or sandy-skeletal and tack redoximorphic features within 40 inches of the mineral soil surface also are well drained.

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APPENDIX 1

TERMINOLOGY USED IN SOILS SURVEY

SLOPE

Percent	Descriptive Terms: Simple	Descriptive Terms: Complex
0-3	Level & Nearly Level	Level & Nearly Level
3-8	Gently sloping	Undulating
8-15	Strongly sloping	Rolling
15-25	Moderately steep	Hilly
25-45	Steep	Steep
45+	Very steep	Very steep

PERMEABILITY

Inches/ Hour	Class
0.0 – 0.01	Extremely slow
0.01 – 0.06	Very slow
0.06 – 0.2	Slow
0.2 – 0.6	Mod. Slow
0.6 – 2.0	Moderate
1.0 – 6.0	Mod. Rapid
6.0 – 20.0	Rapid
> 20.0	Very Rapid

ORGANIC MATTER*

Percent	Adjective
< 0.5	Very low
0.5 – 1.0	Low
2.0 – 2.0	Mod low
2.0– 4.0	Moderate
4.0 – 8.0	High
> 8.0	Very high

*****Based on the upper 10 inches of soil

SOIL TEXTURAL CLASSES

Texture	Textural Class	General
cos, s ls	Coarse	Sandy
sl fsl	Moderately Coarse	Loamy
vfsl l sil si	Medium	
cl scl sicl	Moderately Fine	
sc sic c	Fine	Clayey

AVAILABLE WATER CAPACITY

Inches/40" Profile*	Class
0 – 2.4	Very Low
2.4 – 3.2	Low
3.2 – 5.2	Moderate
5.2 +	High

*or to a limiting layer

SURFACE RUNOFF

Class	Probable Slope Gradient
Negligible	Concave
Very low	< 1
Low	1 to < 5
Medium	5 to < 10
High	10 to < 20
Very high	≥ 20

SOIL REACTION

Term	pH
Ultra acid	< 3.5
Extremely acid	3.5-4.4
V. Strongly acid	4.5-5.0
Strongly acid	5.1-5.5
Mod. Acid	5.6-6.0
Slightly acid	6.1-6.5
Neutral	6.6-7.3
Slightly alkaline	7.4-7.8
Mod. Alkaline	7.9-8.4
Str. Alkaline	8.5-9.0
V. str. alkaline	> 9.0

FLOODING FREQUENCY

None	No reasonable chance (e.g., <1 time in 500 years)
	1-5 times in 100 years
Rare	>5 to 50 times in 100 years
Occasional	>50 times in 100 years
Frequent	

Adapted (2/2000) from NRCS- NSSH PART 644 Exhibit L-5,
Field Book for Describing and Sampling Soils
And the Soil Survey Manual

REVISED 3/2009

TERMINOLOGY USED IN SOILS SURVEY (continued)

CLASSES OF SURFACE STONES & BOULDERS

Class	% Surface covered	Distances in meters between stones or boulders if the diameter is:			Name
		0.25m	0.6m	1.2m	
1	0.01-0.1	≥8	≥20	≥37	Stony or bouldery
2	0.1-3.0	1-8	3-20	6-37	Very stony or very bouldery
3	3.0-15	0.5-1	1-3	2-6	Extremely stony or extremely bouldery
4	15-50	0.3-0.5	0.5-1	1-2	Rubbly
5	50-90	<0.3	<0.3	<1	Very Rubbly

DEPTH TO BEDROCK CLASSES

Very shallow	< 10 inches of mineral soil over bedrock
Shallow	10 to ≤ 20 inches of mineral soil over bedrock
Moderately deep	20 to ≤ 40 inches of mineral soil over bedrock
Deep	40 to ≤ 60 inches of mineral soil over bedrock
Very deep	> 60 inches of mineral soil over bedrock

TERMS FOR ROCK FRAGMENTS

Size	Noun	Adjective
SHAPE- SPHERICAL or CUBELIKE (mm in diameter)		
>2-75mm	gravel	gravelly
>2-5mm	fine gravel	fine gravelly
>5-20mm	medium gravel	medium gravelly
>20-75mm	coarse gravel	coarse gravelly
>75-250mm	cobbles	cobbly
>250-600mm	stones	stony
>600mm	boulders	bouldery
SHAPE- FLAT (mm in length)		
>2-150mm	channers	channery
>150-380mm	flagstones	flaggy
>380-600mm	stones	stony
>600mm	boulders	bouldery

TEXTURE MODIFIERS - *(adjectives)*

ROCK FRAGMENTS: Size & Quantity [1]	Code		Criteria: Percent (By Volume) of Total Rock Fragments and Dominated By (*name size*): [1]
	Conv.	PDP/ NASIS	
ROCK FRAGMENTS (> 2 mm; ≥ Strongly Cemented)			
Gravelly	GR	GR	≥ 15% but < 35% gravel
Fine Gravelly	FGR	GRF	≥15% but < 35% fine gravel
Medium Gravelly	MGR	GRM	≥15% but < 35% med. gravel
Coarse Gravelly	CGR	GRC	≥ 15% but < 35% coarse gravel
Very Gravelly	VGR	GRV	≥ 35% but < 60% gravel
Extremely Gravelly	XGR	GRX	≥ 60% but < 90% gravel
Cobbly	CB	CB	≥ 15% but < 35% cobbles
Very Cobbly	VCB	CBV	≥ 35% but < 60% cobbles
Extremely Cobbly	XCB	CBX	≥ 60% but < 90% cobbles
Stony	ST	ST	≥ 15% but < 35% stones
Very Stony	VST	STV	≥ 35% but < 60% stones
Extremely Stony	XST	STX	≥ 60% but < 90% stones
Bouldery	BY	BY	≥ 15% but < 35% boulders
Very Bouldery	VBY	BYV	≥ 35% but < 60% boulders
Extremely Bouldery	XBY	BYX	≥ 60% but < 90% boulders
Channery	CN	CN	≥ 15% but < 35% channers
Very Channery	VCN	CNV	≥ 35% but < 60% channers
Extremely Channery	XCN	CNX	≥ 60% but < 90% channers
Flaggy	FL	FL	≥ 15% but < 35% flagstones
Very Flaggy	VFL	FLV	≥ 35% but < 60% flagstones
Extremely Flaggy	XFL	FLX	≥ 60% but < 90% flagstones
PARAROCK FRAGMENTS (> 2 mm; < Strongly Cemented) [2, 3]			
Parabouldery	PBY	PBY	(same criteria as bouldery)
Very Parabouldery	VPBY	PBYV	(same criteria as very bouldery)
Extr. Parabouldery	XPBY	PBYX	(same criteria as ext. bouldery)
etc.	etc.	etc.	(same criteria as non-para)

[1] The "Quantity" modifier (e.g., *very*) is based on the total rock fragment content. The "Size" modifier (e.g., *cobbly*) is independently based on the largest, dominant fragment size. For a mixture of sizes (e.g., *gravel and stones*), a smaller size–class is named only if its quantity (%) sufficiently exceeds that of a larger size–class. For field texture determination, a smaller size-class must exceed 2 times the quantity (vol. %) of a larger size class before it is named (e.g., 30% gravel and 14% stones = *very gravelly*, but 20% gravel and 14% stones = *stony*). For more explicit naming criteria see NSSH-Part 618, Exhibit 618.11(Soil Survey Staff, 2001b).

[2] Use "Para" prefix if the rock fragments are soft (i.e., meet criteria for "para"). [Rupture Resistance - Cementation Class is < *Strongly Cemented*, and do not slake (slake test: ≈3cm (1 inch) diam. block, air dried, then submerged in water for ≥ 1 hour; collapse / disaggregation = "slaking").]

[3] For "Para" codes, add "P" to "Size" and "Quantity" code terms. Precedes noun codes and follows quantity adjectives, e.g., paragravelly = *PGR*; very paragravelly = *VPGR*.

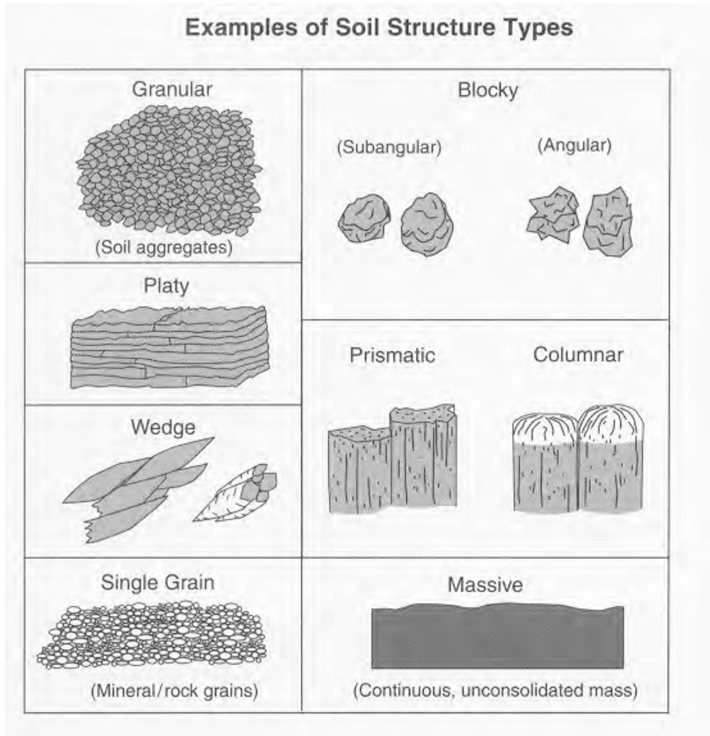
(SOIL) STRUCTURE

(Soil) Structure is the naturally occurring arrangement of soil particles into aggregates that results from pedogenic processes. Record **Grade**, **Size**, and **Type**. For compound structure, list each **Size** and **Type**; e.g., *medium and coarse SBK parting to fine GR.* Lack of structure (structureless) has two end members: *massive (MA)* or *single grain (SG).* A complete example is: *weak, fine, subangular blocky* or *1, f, sbk.*

(SOIL) STRUCTURE - TYPE (formerly **Shape**) -

Type	Code		Criteria: (definition)
	Conv.	NASIS	
NATURAL SOIL STRUCTURAL UNITS (pedogenic structure)			
Granular	gr	GR	Small polyhedrals, with curved or very irregular faces.
Angular Blocky	abk	ABK	Polyhedrals with faces that intersect at sharp angles (planes).
Subangular Blocky	sbk	SBK	Polyhedrals with sub-rounded and planar faces, lack sharp angles.
Platy	pl	PL	Flat and tabular-like units.
Wedge	—	WEG	Elliptical, interlocking lenses that terminate in acute angles, bounded by slickensides; not limited to vertic materials.
Prismatic	pr	PR	Vertically elongated units with flat tops.
Columnar	cpr	COL	Vertically elongated units with rounded tops which commonly are "bleached".
STRUCTURELESS			
Single Grain	sg	SGR	No structural units; entirely noncoherent; e.g., loose sand.
Massive	m	MA	No structural units; material is a coherent mass (not necessarily cemented).
ARTIFICIAL EARTHY FRAGMENTS OR CLODS [1] (non-pedogenic structure)			
Cloddy [1]	—	CDY	Irregular blocks created by artificial disturbance; e.g., tillage or compaction.

[1] Used only to describe oversized, "artificial" earthy units that are not pedogenically derived soil structural units; e.g., the direct result of mechanical alteration; use **Blocky Structure Size** criteria.


Examples of Soil Structure Types
Granular
(Soil aggregates)
Blocky
(Subangular)
(Angular)
Platy
Prismatic
Columnar
Wedge
Single Grain
(Mineral/rock grains)
Massive
(Continuous, unconsolidated mass)

(SOIL) STRUCTURE - GRADE

Grade	Code	Criteria
Structureless	0	No discrete units observable in place or in hand sample.
Weak	1	Units are barely observable in place or in a hand sample.
Moderate	2	Units well-formed and evident in place or in a hand sample.
Strong	3	Units are distinct in place (undisturbed soil), and separate cleanly when disturbed.

(SOIL) STRUCTURE - SIZE

Size Class	Code		Criteria: structural unit size [1] (mm)		
	Conv.	NASIS			
			Granular Platy [2] Thickness	Columnar, Prismatic, Wedge [3]	Angular & Subangular Blocky
Very Fine (Very Thin)[2]	vf (vn)	VF (VN)	< 1	< 10	< 5
Fine (Thin) [2]	f (tn)	F (TN)	1 to < 2	10 to < 20	5 to < 10
Medium	m	M	2 to < 5	20 to < 50	10 to < 20
Coarse (Thick) [2]	co (tk)	CO (TK)	5 to < 10	50 to < 100	20 to < 50
Very Coarse (Very Thick) [2]	vc (vk)	VC (VK)	≥ 10	100 to < 500	≥ 50
Extr. Coarse	ec	EC	—	≥ 500	—

[1] Size limits always denote the smallest dimension of the structural units.
[2] For platy structure only, substitute *thin* for *fine* and *thick* for *coarse* in the size class names.
[3] Wedge structure is generally associated with Vertisols (for which it is a requirement) or related soils with high amounts of smectitic clays.

USDA-NRCS *2-43* *September 2002*

RUPTURE RESISTANCE FOR:
Blocks, Peds, and Clods - Estimate the class by the force required to rupture (break) a soil unit. Select the column for the appropriate soil water state (*dry* vs. *moist*) and/or the *Cementation* column, if applicable.

Dry [1] Class Code [3]	Moist [1] Class Code [3]	Cementation [2] Class Code [3]	Specimen Fails Under
Loose L d(lo)	Loose L m(lo)	*[Not Applicable]*	*Intact specimen not obtainable*
Soft S d(so)	Very Friable VFR m(vfr)	Non-Cemented NC	Very slight force between fingers. <8 N
Slightly Hard SH d(sh)	Friable FR m(fr)	Extremely Weakly Cemented EW	Slight force between fingers. 8 to < 20 N
Mod. Hard MH d(h)	Firm FI m(fi)	Very Weakly Cemented VW	Moderate force between fingers. 20 to < 40 N
Hard HA d(h)	Very Firm VFI m(vfi)	Weakly Cemented W c(w)	Strong force between fingers. 40 to < 80 N
Very Hard VH d(vh)	Extr. Firm EF m(efi)	Moderately Cemented M	Moderate force between hands. 80 to < 160 N
Extremely Hard EH d(eh)	*Slightly* Rigid SR m(efi)	Strongly Cemented ST c(s)	Foot pressure by full body weight. 160 to < 800 N
Rigid R d(eh)	Rigid R m(efi)	Very Strongly Cemented VS	Blow of < 3 J but not body weight. 800 N to < 3 J
Very Rigid VR d(eh)	Very Rigid VR m(efi)	Indurated I c(I)	Blow of ≥ 3 J. *(3 J = 2 kg weight dropped 15 cm).*

[1] Dry Rupture Resistance column applies to soils that are moderately dry or drier *(Moderately Dry* and *Very Dry* **Soil Water State** sub-classes). Moist column applies to soils that are slightly dry or wetter (*Slightly Dry* through *Satiated* **Soil Water State** sub-classes; Soil Survey Staff, 1993; p. 91).
[2] This is not a field test; specimen must first be air dried and then submerged in water for a minimum of 1 hour prior to test (Soil Survey Staff, 1993; p. 173).
[3] Codes in parentheses (e.g., d(lo); Soil Survey Staff, 1951) are obsolete.

Mottles - Contrast - Record the color difference between the mottle and the dominant matrix color. Use this table or the following chart to express the difference. [1st table: Obsolete —shown here for historical purposes]

Contrast Class	Code	*Difference in Color Between Matrix and Mottle* *Hue* [1]	*Value*		*Chroma*
Faint [2]	F	same page	0 to ≤ 2	and	≤ 1
Distinct	D	same page	> 2 to < 4	and	< 4
				or	
			≤ 4	and	> 1 to < 4
		1 page	≤ 2	and	≤ 1
Prominent	P	same page	≥ 4	or	≥ 4
		1 page	> 2	or	> 1
		≥ 2 pages	≤ 0	or	≥ 0

[1] One Munsell® Color Book page = 2.5 hue units. Table contents compiled from material in or intended by the Soil Survey Manual (Soil Survey Staff, 1993).

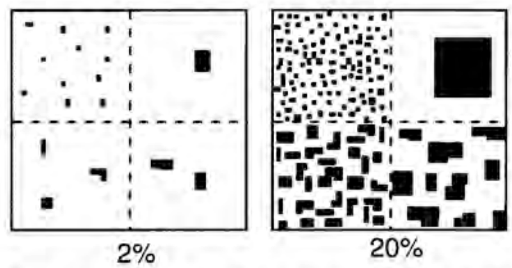
Contrast Class	Code	*Difference in Color Between Matrix and Mottle* (Δ means "difference between")			
		Hue (h)	***Value (v)***		***Chroma (c)***
Faint [†]	F	Δh = 0;	Δv ≤ 2	and	Δc ≤ 1
		Δh = 1;	Δv ≤ 1	and	Δc ≤ 1
		Δh = 2;	Δv = 0	and	Δc = 0
Distinct [†]	D	Δh = 0;	Δv ≤ 2	and	Δc > 1 to < 4
		or	Δv > 2 to < 4	and	Δc < 4
		Δh = 1;	Δv ≤1	and	Δc > 1 to < 3
		or	Δv > 1 to < 3	and	Δc < 3
		Δh = 2;	Δv = 0	and	Δc > 0 to < 2
		or	Δv > 0 to < 2	and	Δc < 2
Prominent [†]	P	Δh = 0;	Δ ≥ 4	or	Δc ≥ 4
		Δh = 1;	Δ ≥ 3	or	Δc ≥ 3
		Δh = 2;	Δ ≥ 2	or	Δc ≥ 2
		Δh ≥ 3;			

[†] If compared colors have both a Value ≤ 3 and a Chroma of ≤ 2, the contrast is *Faint*, regardless of Hue differences.

MOTTLES - Describe mottles (areas of color that differ from the matrix color). These colors are commonly lithochromic or lithomorphic (attributes retained from the geologic source rather than from pedogenesis; e.g., gray shale). Mottles exclude: Redoximorphic Features (RMF) and Ped and Void Surface Features (e.g., clay films). Record **Quantity Class** (in NASIS/PDP, estimate a numerical value "Percent of Horizon Area Covered"), **Size**, **Contrast**, **Color**, and **Moisture State** (D or M). **Shape** is an optional descriptor. A complete example is: *few, medium, distinct, reddish yellow, moist, irregular mottles* or *f, 2, d, 7.5 YR 7/8, m, z, mottles.*

Mottles - Quantity (Percent of Area Covered)

Quantity Class	Code Conv.	Code NASIS	Criteria: range in percent
Few	f	%	< 2% of surface area
Common	c	%	2 to < 20% of surface area
Many	m	%	≥ 20% of surface area



Mottles - Size - Record mottle size class. Use length if it's greater than 2 times the width; use width if the length is less than two times the width. Length is the greater of the two dimensions. (New size classes to be consistent with the new RMF size classes.)

Size Class	Code	Criteria
Fine	1	< 2 mm
Medium	2	2 to < 5 mm
Coarse	3	5 to < 20 mm
Very Coarse	4	20 to < 76 mm
Extremely Coarse	5	≥ 76 mm

PERMEABILITY

Estimate the **Permeability Class** for each horizon. Guidelines for estimating permeability are found in Exhibit 618-9, NSSH (Soil Survey Staff, 2001).

Permeability Class	Code		Criteria: estimated in / hr [1, 2]
	PDP	NASIS	
Impermeable	IM	IM	< 0.0015
Very Slow	VS	VS	0.0015 to < 0.06
Slow	S	SL	0.06 to < 0.2
Moderately Slow	MS	MS	0.2 to < 0.6
Moderate	M	MO	0.6 to < 2.0
Moderately Rapid	MR	MR	2.0 to < 6.0
Rapid	RA	RA	6.0 to < 20
Very Rapid	VR	VR	≥ 20

[1] These class breaks were originally defined in English units and are retained here, as no convenient metric equivalents are available.
[2] To convert µm / sec (NASIS Permeability, Ksat units) to in / hr, multiply µm / sec by 0.1417; e.g. (100 µm / sec) x (0.1417) = 14.17 in / hr. To convert in / hr to µm / sec multiply by 7.0572.

SATURATED HYDRAULIC CONDUCTIVITY (K_{sat})

Saturated Hydraulic Conductivity is used to convey the rate of water movement through soil under (field) saturated conditions. Record the **Average K_{sat} (X)**, **Standard Deviation (s)**, and **Number of Replications (n)** of each major layer/ horizon as measured with a constant-head method (e.g., Amoozemeter, Guelph Permeameter, etc.). ***NOTE***: This data element should be measured rather than estimated and subsequently placed into classes. Estimates of water movement based on texture or other proxies must use the preceding "Permeability Class Table."

FLOODING - Estimate the **Frequency, Duration**, and **Months** that flooding is expected; e.g., *rare, brief, Jan. - March.*

Frequency - Estimate how often, typically, that it floods.

Frequency Class	Code		Criteria: estimated, average number of flood events per time span [1]
	PDP	NASIS	
None	NO [2]	NO	No reasonable chance (e.g., < 1 time in 500 years)
Very Rare		VR	≥ 1 time in 500 years, but < 1 time in 100 years
Rare	RA	RA	1 to 5 times in 100 years
Occasional [3]	OC	OC	> 5 to 50 times in 100 years
Frequent [3, 4]	FR	FR	> 50 times in 100 years
Very Frequent [4,5]	—	VF	> 50% of all months in year

[1] Flooding Frequency is an estimate of the current condition, whether natural or human-influenced (such as by dams or levees).

[2] In PDP, *None* class (< 1 time in 100 years) spans both *None* and *Very Rare* NASIS classes.

[3] Historically, *Occasional* and *Frequent* classes could be combined and called *Common*; not recommended.

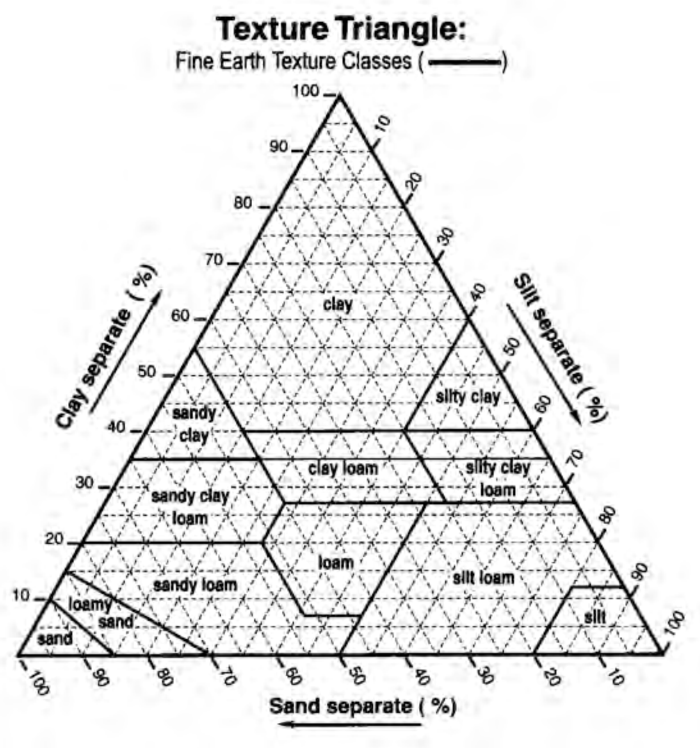
[4] *Very Frequent* class takes precedence over *Frequent*, if applicable.

[5] The *Very Frequent* class is intended for tidal flooding.

Adapted (2/2000) from NRCS- NSSH PART 644 Exhibit L-5,
Field Book for Describing and Sampling Soils
And the Soil Survey Manual

APPENDIX 2

TEXTURAL TRIANGLE



REVISED 3/2009

APPENDIX 3

EXAMPLES OF MAP UNIT DESCRIPTIONS

The following examples of map unit descriptions are intended as only one example of many variations that will adequately meet MAPSS Standards as outlined on page 3 of this document. For a consociation both the narrative and tabular forms are shown, both of which are acceptable provided all the required elements outlined in the standards are met. As with all phases of soil identification and mapping, information in addition to the minimum required elements may be added to map unit descriptions as necessary to meet the intent or purpose of the soil survey.

Example of Consociation - Narrative Form

ScA - Scantic silt loam, 0 to 3 percent slopes.

Scantic soils are very deep and poorly drained. They formed in glaciomarine or glaciolacustrine deposits. These soils occur on nearly level concave positions on the landscape. Slopes range from 0 to 3 percent and are concave in shape.

A typical pedon was described for this soil at TP 15. Typically, the surface layer is 5 inches of very dark grayish brown silt loam. The subsoil is 6 inches of mottled light olive brown silty clay loam over mottled olive silty clay loam. The substratum is very firm gleyed greenish gray silty clay to greater than 40 inches in depth. Depth to bedrock is greater than 60 inches.

Scantic soils are found on the landscape in association with Lamoine silt loam, 1 to 3 percent slopes; Lamoine silt loam, 3 to 8 percent slopes; and Biddeford muck, 0 to 1 percent slopes.

Permeability is moderately slow in the surface horizon and slow to very slow below that depth. Runoff is slow. Hydrologic group is D. K-Factor is .32.

These soils are dominantly forested. Common tree species include speckled alder, red maple, balsam fir, and gray birch.

These Scantic soils have very low potential for septic systems, for dwellings, and for general development. They have very low potential for road building. These soils have excess water which may make soils unsuitable for septic systems or result in poor system performance due to excess water. Dwellings with basements will be affected by excess water, requiring footing and underslab drains, sump pumps, waterproofing, and larger footings. Roads will require ditching, culverts, riprap and fill and will be subject to increased long-term maintenance due to wetness and potential high frost action. Corrective measures to overcome soil limitations may not be permitted on these hydric soils without some local, state, or federal wetlands permit(s).

Map unit boundaries were located using a combination of pacing and orientation to control points established by a Professional Land Surveyor. Boundaries were located with an accuracy of approximately 50 feet in most areas. Minimum map unit delineation is about 1 acre or less.

These Scantic soils are hydric as defined by the National Technical Committee on Hydric Soils.

Example of Consociation - Tabular Form

Map Unit Name: Biddeford mucky peat, 0 to 3 percent slopes.

BIDDEFORD
(Histic Humaquept)

SETTING

Parent Material:	Derived from marine & lacustrine sediments.
Landform:	Nearly level lowlands.
Position in Landscape:	Usually occupies the lowest position within the landscape.
Slope Gradient Ranges:	(A) 0-3%

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Biddeford soil is very poorly drained with the perched water table within 0.5 feet of the soil surface, and may be ponded at the surface for some portion of the year.
Typical Profile Description:	Surface Layer: Very dark brown mucky peat, 0-12" Subsurface Layer: Gray silt loam, 12-16" Subsoil Layer: Olive gray/dark gray silty clay, 16-35" Substratum: Gray silty clay & silty clay loam, 35-65"
Hydrologic Group:	Group D
Surface Run Off:	Very slow
Permeability:	Moderate or moderately slow in upper horizons, slow or very slow in substratum.
Depth to Bedrock:	Deep, more than 40 inches.
Hazard to Flooding:	This soil is intermittently ponded, and may rarely flood in areas adjacent to streams and rivers during periods of prolonged wetness.

INCLUSIONS (Within Mapping Unit)

Similar:	Scantic
Contrasting:	Whately, Roundabout

USE AND MANAGEMENT

Development with subsurface wastewater disposal: The limiting factor for building site development is wetness due to a high water table throughout the year. Biddeford soil has very low potential for dwellings with foundations and road construction due to ponding and low strength. Biddeford soil is unsuitable for subsurface wastewater disposal as defined by the State of Maine Subsurface Wastewater Disposal Rules. Biddeford soil is usually classified a wetland, based on the combined consideration of hydric conditions, hydrology, and vegetation.

Example of a Complex—Narrative Form

LsB - Lamoine-Scantic complex, 0 to 8 percent slopes

Soils in this complex consist of 60 percent Lamoine silt loam, 3 to 8 percent slopes, bouldery; 30 percent Scantic silt loam, 0 to 3 percent slopes, bouldery; and 10 percent other soils. Major inclusions are Buxton silt loam, 3 to 8 percent slopes; Howland silt loam, 0 to 3 percent slopes, and Monarda muck, 0 to 1 percent slopes. These soils are so closely intermingled on the landscape that it is not possible to map them separately.

Lamoine soils are very deep and somewhat poorly drained. They formed in glaciomarine or glaciolacustrine sediments. These soils occur on nearly level to gently sloping ridges. Slopes range from 1 to 5 percent. These Lamoine soils occur on the hummock tops and sideslopes in a convex position.

A typical pedon for this soil was described at TP24. Typically, the surface layer is 4 inches of dark brown silt loam. The subsoil is 4 inches of dark yellowish brown silt loam over light olive brown silt loam to 15 inches in depth. The substratum is firm mottled olive silty clay loam to greater than 40 inches in depth. Depth to bedrock is greater than 60 inches.

Permeability is moderate to moderately slow in the surface layer, moderately slow to slow in the subsoil, and slow or very slow in the substratum. Surface runoff is medium. Hydrologic group is D. K-Factor is .32.

These soils are forested. Common tree species include balsam firm, white spruce, red maple, and gray birch.

Scantic soils are very deep and poorly drained. They formed in silty glaciomarine or glaciolacustrine deposits. These soils occur between hummocks on gently sloping ridges. Slopes range from 0 to 3 percent and are concave in shape.

A typical pedon for this soil was described at TP25. There is a 4 inches thick surface layer of very dark grayish brown silt loam. The subsoil is 4 inches of mottled olive brown silt loam over mottled light olive gray silty clay loam to a depth of 18 inches. The substratum is very firm mottled light olive gray silty clay loam to greater than 40 inches in depth. Depth to bedrock is greater than 60 inches.

Permeability is moderate to moderately slow in the surface layer, moderately slow to slow in the upper subsoil, and slow to very slow in the lower subsoil and in the substratum. Surface runoff is medium. Hydrologic group is D. K-Factor is .32.

These soils are forested. Common tree species include maple, balsam fir, white spruce and poplar.

Map unit boundaries were located using a combination of pacing and taping to control points established on the ground by a Professional Land Surveyor. Boundaries were located with an accuracy of approximately 50 feet in most areas. Minimum map unit delineation size is about 1 acre.

Lamoine soils have low potential for septic systems due to excess water that will negatively affect system performance. Some Lamoine soils will have very low potential or be unsuitable for septic systems at the "wet" end of this drainage class. Dwellings with basements will have medium potential for overcoming existing soil limitations such as excess water. Typically corrective measures are footing and underslab drains, sump pumps, waterproofing, and larger footings. Roads will have low potential in these soils and will require ditching, culverts, riprap and fill to overcome excess water and potential high frost action. Overall, these Lamoine soils have low potential for development due to excess water in the substratum and the potential for high frost action.

Scantic soils have very low potential for septic systems, for dwellings, and for general development. They have very low potential for road building. These soils have excess water which may make soils unsuitable for septic systems or result in poor system performance due to excess water. Dwellings with basements will be affected by excess water, requiring footing and underslab drains, sump pumps, waterproofing, and larger footings. Roads will require ditching, culverts, riprap, fill, and increased long-term maintenance due to wetness and potential high frost action.

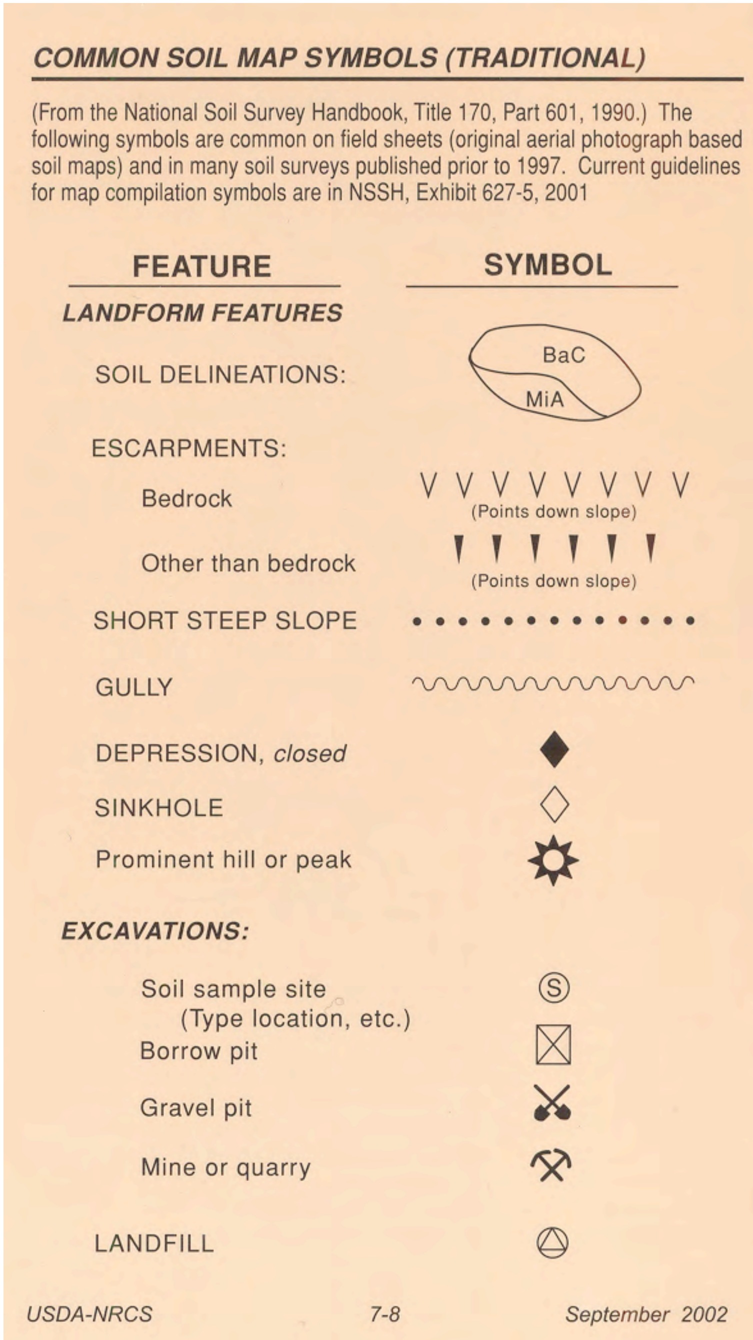
Scantic soils are hydric as defined by the National Technical Committee on Hydric Soils. Soil disturbance, filling, or dredging on or near these Scantic soils may require local, state and federal approval.

APPENDIX 4

CONVENTIONAL AND SPECIAL SYMBOLS

Introduction

Conventional symbols on soil maps represent water and cultural features to help users locate areas on the map. Special symbols identify areas of soils and miscellaneous areas. Special symbols are also used to depict land features that are too small to be delineated at the scale of mapping, but that have a significant effect on use and management (i.e., rock outcrop, wet spot). Ad hoc soil symbols are used for areas that have distinct conditions that the soil scientist wants to show on the map that are not defined in the following table. Symbols must be defined and specify the size of the area that each represents. Conventional and special symbols are described in the following table. Refer to the Soil Survey Manual for a more detailed discussion.



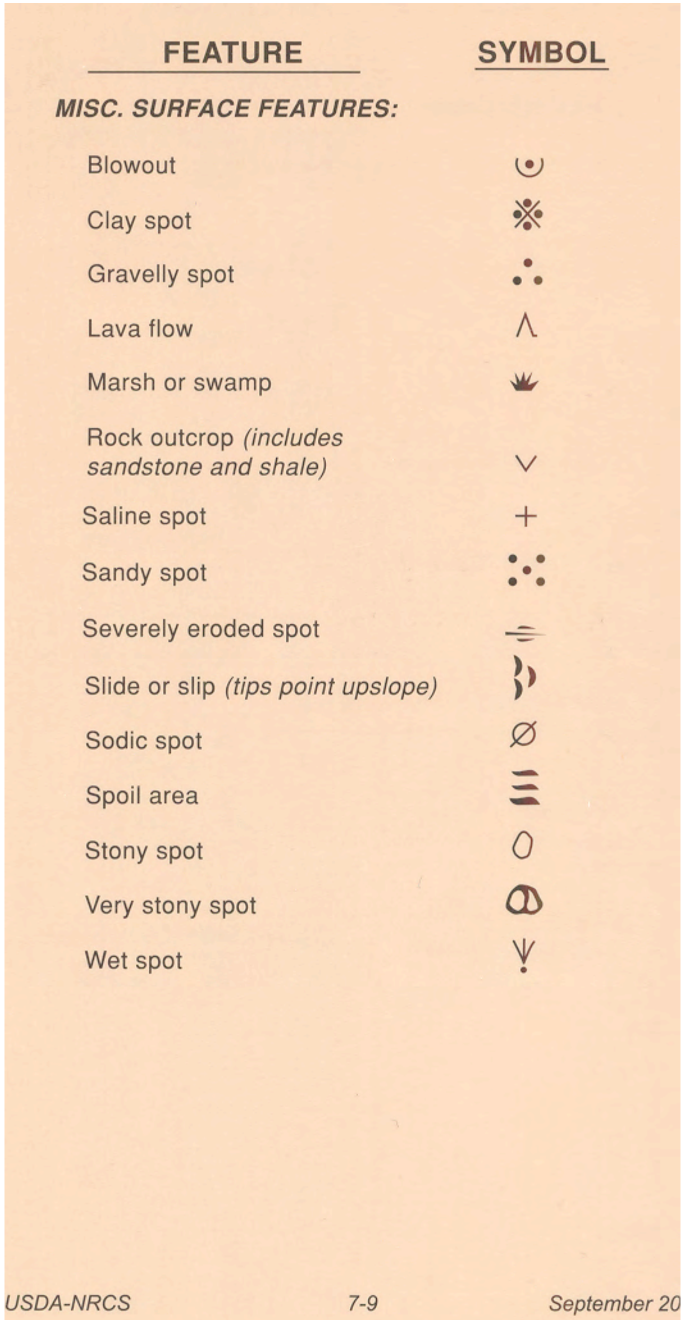
COMMON SOIL MAP SYMBOLS (TRADITIONAL)

(From the National Soil Survey Handbook, Title 170, Part 601, 1990.) The following symbols are common on field sheets (original aerial photograph based soil maps) and in many soil surveys published prior to 1997. Current guidelines for map compilation symbols are in NSSH, Exhibit 627-5, 2001

FEATURE	SYMBOL
LANDFORM FEATURES	
SOIL DELINEATIONS:	BaC / MiA
ESCARPMENTS:	
Bedrock	(Points down slope)
Other than bedrock	(Points down slope)
SHORT STEEP SLOPE	
GULLY	
DEPRESSION, *closed*	
SINKHOLE	
Prominent hill or peak	
EXCAVATIONS:	
Soil sample site (Type location, etc.)	
Borrow pit	
Gravel pit	
Mine or quarry	
LANDFILL	

USDA-NRCS *7-8* *September 2002*

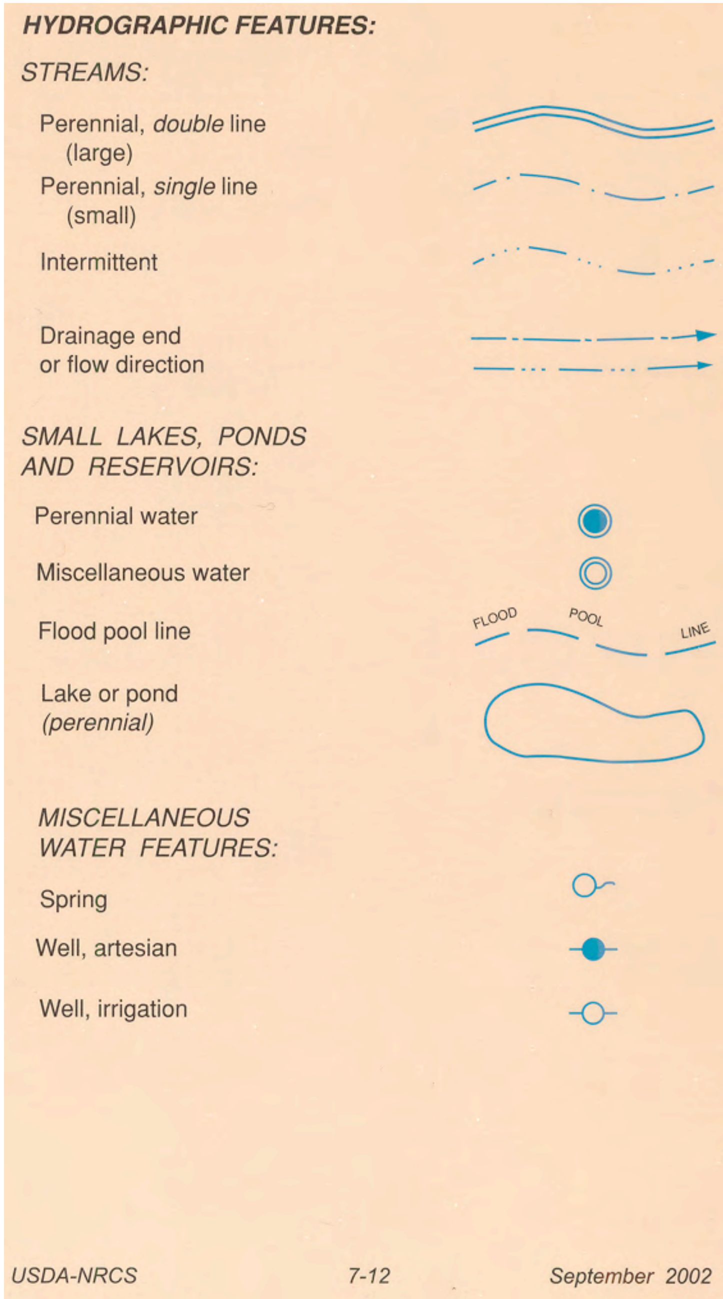
CONVENTIONAL AND SPECIAL SYMBOLS LEGEND



FEATURE	SYMBOL
MISC. SURFACE FEATURES:	
Blowout	
Clay spot	
Gravelly spot	
Lava flow	
Marsh or swamp	
Rock outcrop *(includes sandstone and shale)*	
Saline spot	
Sandy spot	
Severely eroded spot	
Slide or slip *(tips point upslope)*	
Sodic spot	
Spoil area	
Stony spot	
Very stony spot	
Wet spot	

USDA-NRCS *7-9* *September 20*

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND



HYDROGRAPHIC FEATURES:

STREAMS:

Perennial, *double* line (large)

Perennial, *single* line (small)

Intermittent

Drainage end or flow direction

SMALL LAKES, PONDS AND RESERVOIRS:

Perennial water

Miscellaneous water

Flood pool line

Lake or pond *(perennial)*

MISCELLANEOUS WATER FEATURES:

Spring

Well, artesian

Well, irrigation

USDA-NRCS *7-12* *September 2002*

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

APPENDIX 5

GUIDE TO MAP SCALES AND MINIMUM SIZE DELINEATIONS[1]

A soil survey is generally designed to provide soil information for a specified purpose or objective. The amount or type of information needed to meet the objective or purpose of the soil survey and the complexity of the soils on the ground determine the map scale.

When using soil maps, one must remember that *scale*, *accuracy*, and *detail* are not the same thing.

Map Scale is the relationship between corresponding distance on a map (a piece of paper) and the actual distance on the ground.

Map Accuracy is the precision with which map information is obtained, measured, and recorded.

Map Detail is the amount of information shown on a map. The more information, the more detailed the map.

In many places the pattern of soils is very complex, and in some places soils grade imperceptibly to other soils. Because of this, the soil units, even on a large-scale soil survey map, may not be absolutely homogenous or pure; thus, on-site soil investigations are needed for specific small land area uses. For example, on-site investigations are needed to determine the suitability of a 0.1 acre plot for subsurface wastewater disposal for map units on a 1:20,000 scale soil survey.

A common misuse of soil maps is to "blow them up" to a larger scale. This does not result in a more detailed or accurate map. In fact, the "blown up" map is misleading because if the mapping was done at the larger ("blown up") scale, more detail could be shown. For example, soil survey maps at a 1:20,000 scale "blown up" to a 1:12,000 scale are no more accurate or detailed than the original 1:20,000 map.

Map scale must accommodate legible delineations of the smallest size necessary for the standards of purity. Many users who need precise information about the soils of small areas focus their attention on a small part of the map and concentrate on relatively few delineations at one place on the map. They are not distracted by numerous boundaries and symbols on other parts of the map. They are seeking accurate information about a small discrete area. Consequently, the map scale for this group of users will need to be large enough to accommodate delineations of the smallest size to meet their requirements. This is commonly called the minimum size delineation.

The minimum size delineation, that is, the largest size of a contiguous limiting dissimilar soil is determined by the map scale and/or the need of the user. Although it is not possible to reduce the minimum size delineation as shown in the attached table and provide a legible product, it is possible to increase the size of the minimum delineation if this meets the needs of the user. See Section 2, "Class of Soil Survey", of the Soil Survey Standards for the minimum size delineation.

Taken from previous work of John Ferwerda, except last paragraph.

GUIDE TO MAP SCALES AND MINIMUM SIZE DELINEATIONS

MAP SCALE		IN/MILE	MINIMUM SIZE DELINEATION[1]	
RATIO	**COMMON**		**ACRES**	**HECTACRES**
1:500	1" = 42'	126.7	0.0025	0.001
1:2,000	1" = 166.7'	31.7	0.040	0.016
1:5,000		12.7	0.25	0.10
1:6,000	1" = 500'	10.56	0.30	0.12
1:7,920	1" = 660'	8.00	0.62	0.25
1:10,000		6.34	1.00	0.41
1:12,000	1" = 1,000'	5.28	1.43	0.57
1:15,840	1" = 1,320'	4.00	2.5	1.0
1:20,000	1" = 1,667'	3.17	4.0	1.6
1:24,000	1" = 2,000' (7.5' Series)	2.64	5.7	2.3
1:31,680		2.00	10.0	4.1
1:62,500	1" = 5,208' (15'Series)	1.01	39	15.8
1:63,360	1" = 5,280' (Wildlands/Timber)	1.00	40	16.2
1:100,000		0.63	100	40.5
1:125,000		0.51	156	63
1:250,000		0.25	623	252
1:300,000		0.21	897	363
1:500,000		0.127	2,500	1,000
1:750,000		0.084	5,600	2,270
1:1,000,000		0.063	10,000	4,000
1:5,000,000		0.013	249,000	101,000
1:7,500,000		0.0084	560,000	227,000
1:15,000,000		0.0042	2,240,000	907,000
1:30,000,000		0.0021	9,000,000	3,650,000
1:88,000,000		0.0007	77,000,000	31,200,000

[1]The "minimum size delineation" is taken as a 1/4" x 1/4" inch square area (1/16 sq. in.). Cartographically, this is about the smallest area in which a symbol can be printed readily. Smaller areas can be delineated, and the symbol lined in from outside, but such very small delineations drastically reduce map legibility.

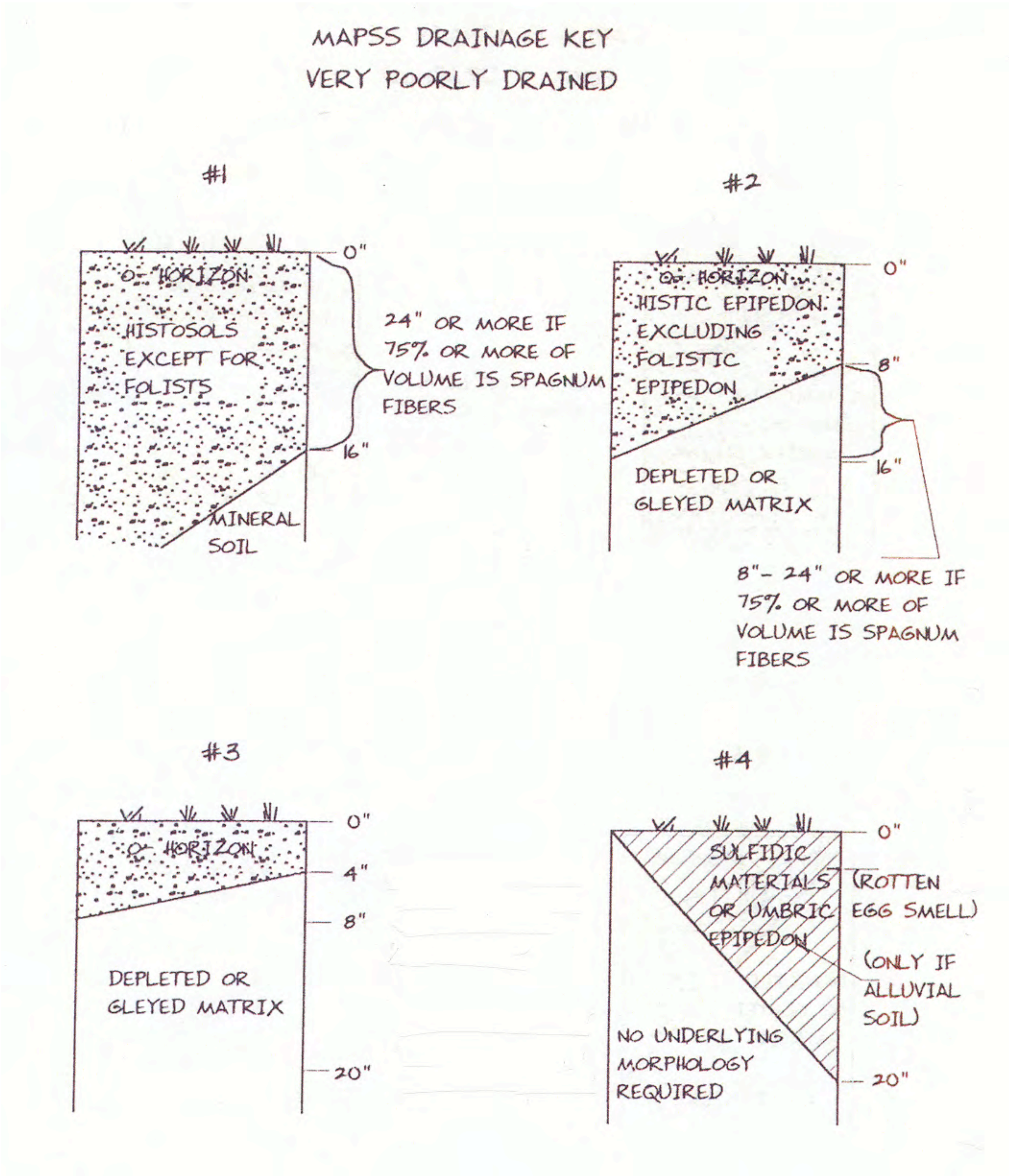
GUIDE TO MAP SCALES AND MINIMUM SIZE DELINEATION FOR MAPSS CLASSES OF SOIL SURVEYS

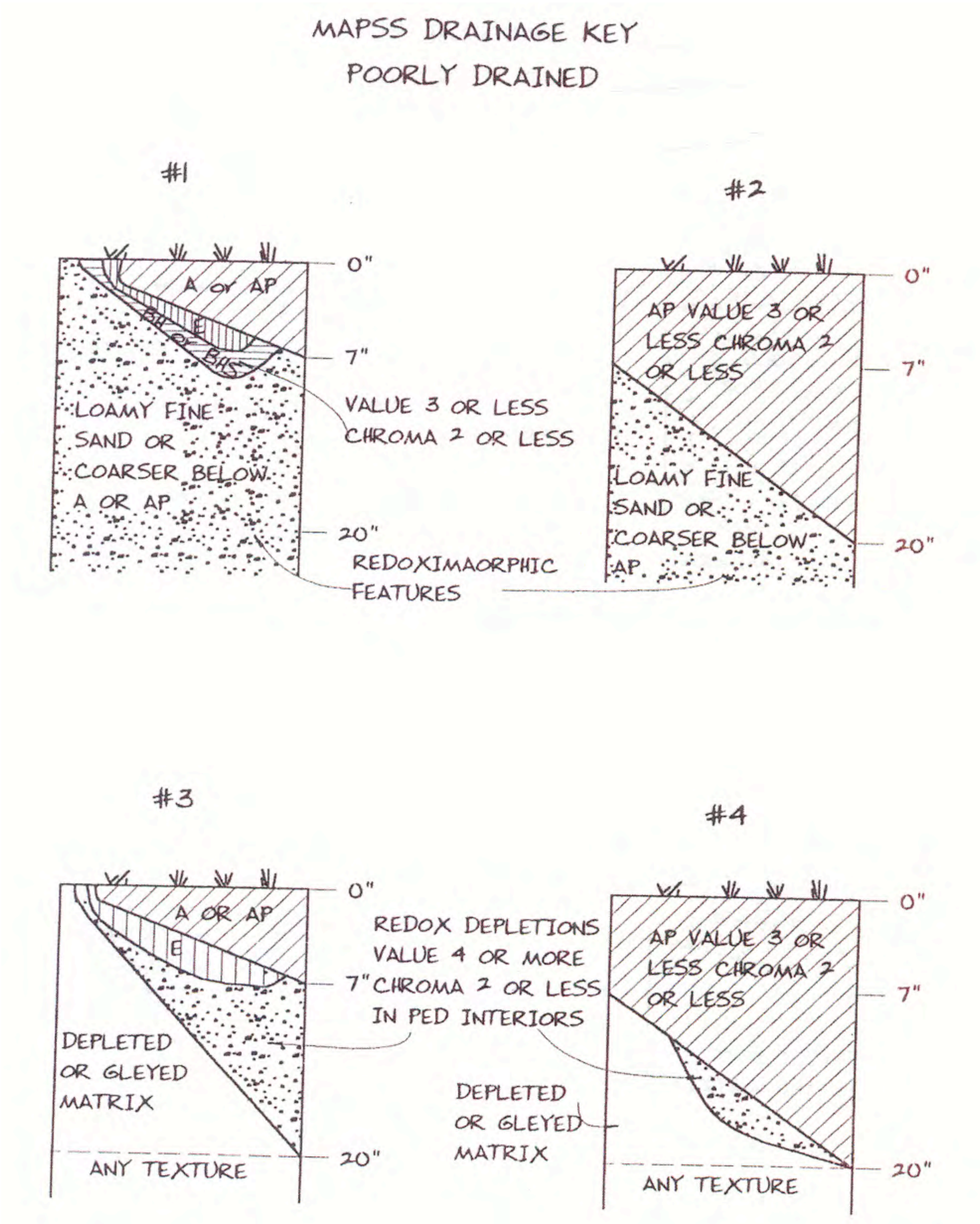
Ratio	Class	Scale		Minimum Size of Dissimilar Limiting Inclusion	
1:1200	Class A	1" = 100' or larger	5445 sq. ft.	0.125 acres	
1:2400	Class B	1" = 200' or larger	43,560 sq. ft.	1 acre	
1:6000	Class C	1" = 500' or larger	217,800 sq. ft.	5 acres	
1:24000	Class D	1" = 2000' or larger		> 217,800 sq. ft.	greater than 5 acres

APPENDIX 6

DIAGRAMS OF MAINE DRAINAGE CLASSES

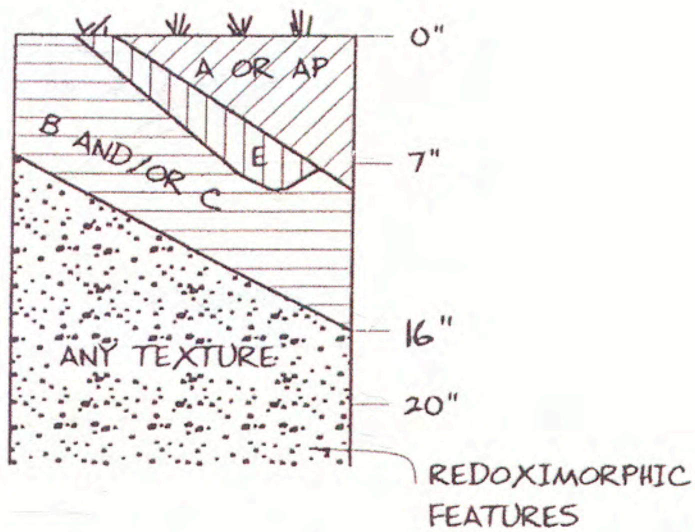
The following diagrams attempt to graphically represent the technical criteria for each of the seven drainage classes detailed in the MAPSS *Key to Drainage Classes*. The diagrams are intended to be used as a general guide and training tool for both soil scientists and non-soil scientists. Do not rely solely on these diagrams for determining the drainage class of a soil because they may not accurately reflect all field situations and the technical criteria outlined in the MAPSS *Key to Drainage Classes*.


MAPSS DRAINAGE KEY
VERY POORLY DRAINED
#1
O- HORIZON
HISTOSOLS
EXCEPT FOR
FOLISTS
MINERAL
SOIL
0"
16"
24" OR MORE IF
75% OR MORE OF
VOLUME IS SPAGNUM
FIBERS
#2
O- HORIZON
HISTIC EPIPEDON
EXCLUDING
FOLISTIC
EPIPEDON
DEPLETED OR
GLEYED MATRIX
0"
8"
16"
8"- 24" OR MORE IF
75% OR MORE OF
VOLUME IS SPAGNUM
FIBERS
#3
O- HORIZON
DEPLETED OR
GLEYED MATRIX
0"
4"
8"
20"
#4
SULFIDIC
MATERIALS
OR UMBRIC
EPIPEDON
(ROTTEN
EGG SMELL)
(ONLY IF
ALLUVIAL
SOIL)
NO UNDERLYING
MORPHOLOGY
REQUIRED
0"
20"

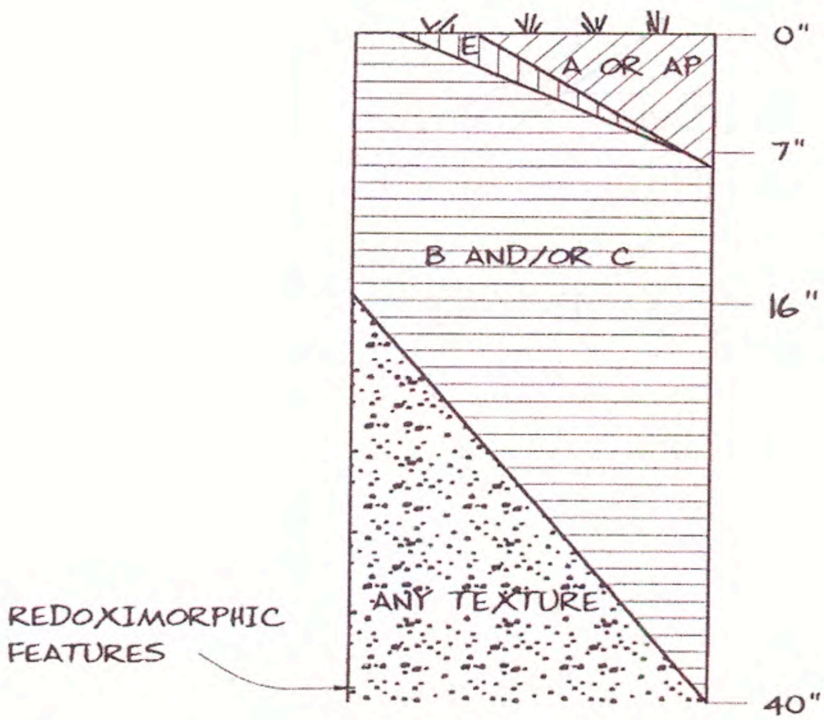


Revised 3/2009

MAPSS DRAINAGE KEY
SOMEWHAT POORLY DRAINED

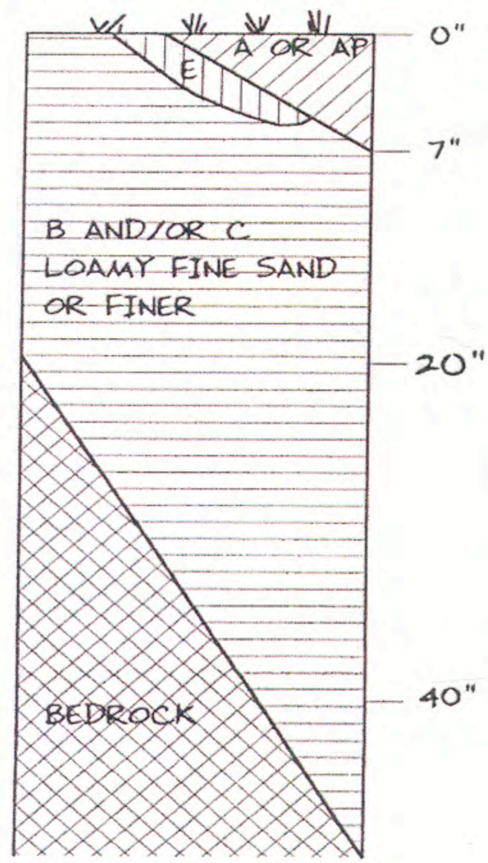


MAPSS DRAINAGE KEY
MODERATELY WELL DRAINED



MAPSS DRAINAGE KEY

WELL DRAINED



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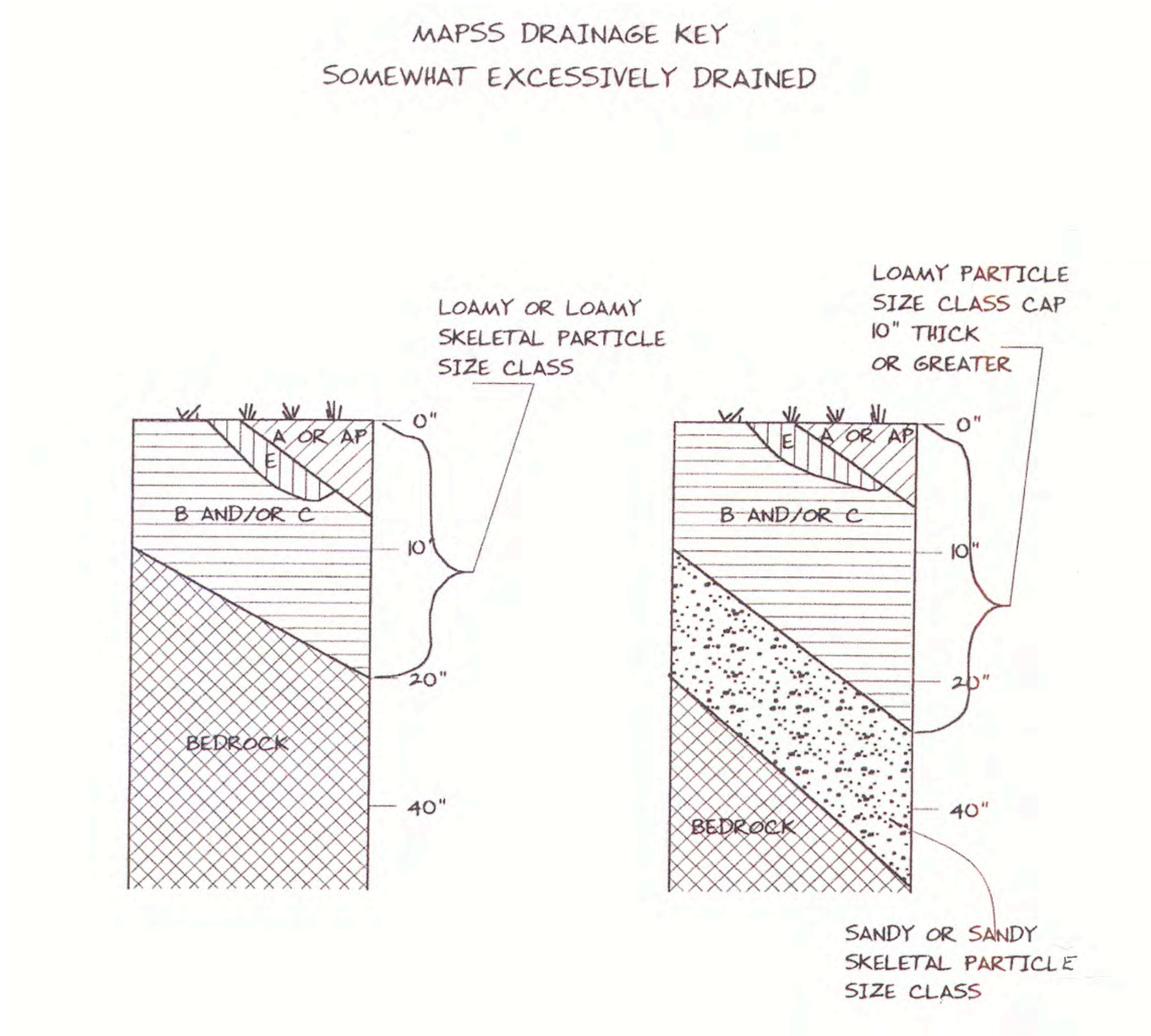
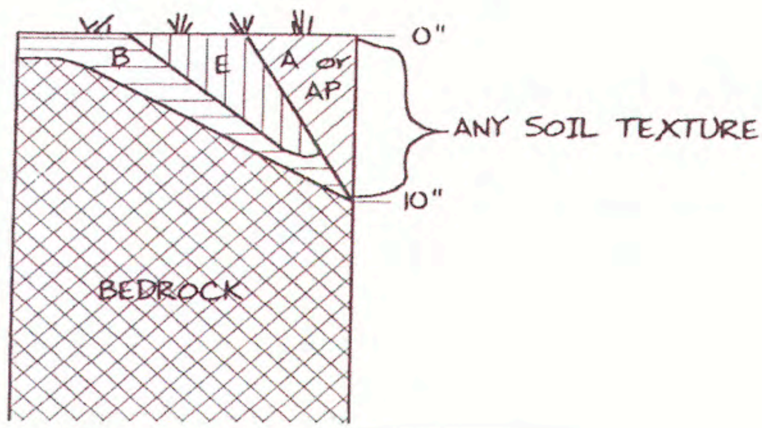
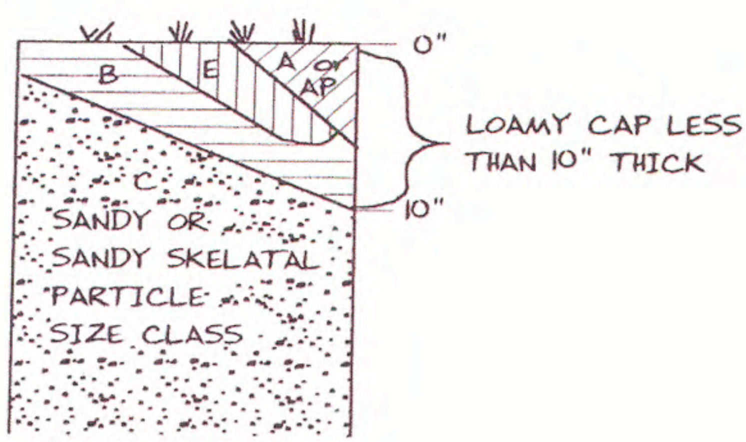


Revised 3/2009

MAPSS DRAINAGE KEY
EXCESSIVELY WELL DRAINED





9

APPENDIX 7

HYDRIC SOILS OF MAINE

Introduction

Hydric soils are developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. This list includes phases of soil series that may or may not have been drained. Some series, designated as hydric, have phases that are not hydric depending on water table, flooding, and ponding characteristics.

This list of hydric soils was created by computer using criteria developed by the National Technical Committee for Hydric Soils. The criteria are selected soil properties that are documented in Soil Taxonomy (Soil Survey Staff, 1975, 1990, 1999) and Soil Interpretations Records (Soil Survey Staff, 1983).

This list will have a number of agricultural and nonagricultural applications. These include assistance in land-use planning, conservation planning, and assessment of potential wildlife habitat. A combination of the hydric soil, hydrophytic vegetation, and hydrology criteria defines wetlands as described in the 1987 Corps. Of Engineers Wetland Delineation Manual. Therefore, an area that meets the hydric soil criteria must also meet the hydrophytic vegetation and wetland hydrology criteria in order for it to be classified as a jurisdictional wetland.

Definition of Hydric Soil

A *hydric soil* is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. The following criteria reflect those soils that are likely to meet this definition.

Criteria For Hydric Soils

1. All Histels except Folistels and Histosols except Folists, or

2. Soils in Aquic suborder, great groups, or subgroups, Albolls suborder, Pachic subgroups, or Cumulic subgroups that are:

   a. Somewhat poorly drained with a water table equal to 0.0 foot (ft) from the surface during the growing season, or

   b. poorly drained or very poorly drained and have either:

      (1) water table equal to 0.0 ft. during the growing season if textures are coarse sand, sand, or fine sand in all layers within 20 inches (in), or for other soils

      (2) water table at less than or equal to 0.5 ft from the surface during the growing season if permeability is equal or greater than 6.0 in/hour (h) in all layers within 20 in, or

      (3) water table at less than or equal to 1.0 ft from the surface during the growing season if permeability is less than 6.0 in/h in any layer within 20 in, or

3. Soils that are frequently ponded for long duration or very long duration during the growing season, or

4. Soils that are frequently flooded for long duration or very long duration during the growing season.

List Of Hydric Soils

The State list includes at least one phase of the series that meets the hydric soil criteria.

The list does not include soils that are classified at categories higher than the series level in Soil Taxonomy (Soil Survey Staff 1975, 1990, 1999) nor does it include miscellaneous land types. The list is useful in identifying map units that may contain hydric soils. The state wide list was developed from "Hydric Soils of the United States."

The general list of Hydric Soils of Maine is computer generated from a national database that is periodically updated. The most current list is available from the State Conservationist, Natural Resources Conservation Service, 967 Illinois Avenue, Bangor, Maine 04401-2700.

NRCS has developed local lists of map units that contain hydric soils for each county in Maine. The local lists are available from the State Conservationist, NRCS, 967 Illinois Avenue, Bangor, Maine 04401-2700 or from your local Soil and Water Conservation Districts, and are the preferred lists for use in identifying hydric soils. The local lists are developed using the national list of hydric soils and the criteria for hydric soils.

Hydric Soil Indicators

The state list of hydric soils presents soil series that meet the hydric soil criteria. However, field identification of hydric soils is based on saturation, reduction, and development of soil morphological features that indicate anaerobic conditions in the upper part. A list of National Hydric Soil Indicators is being developed and tested by the Corps of Engineers, United States Fish and Wildlife Service, Natural Resources Conservation Service, and the Environmental Protection Agency. A separate regional list of indicators has been developed by federal, private and university soil scientists to identify hydric soils as they are defined in New England (see Field Indicators for Identifying Hydric Soils in New England, Version 3, 2004). The New England Interstate Water Pollution Control Commission (NEIWPCC) has adopted this regional list of indicators. It is possible that state regulatory agencies in New England may also adopt this list for administering their wetland protection programs. Soil scientists and others should be aware of the current technical indicators being used by state and federal agencies for hydric soil determinations and delineations in their respective region.

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APPENDIX 8

PRIME FARMLAND

PRIME FARMLAND SOILS

The U.S. Depar1ment of Agriculture (USDA) defines prime farmland as the best nationwide for producing food, feed, fiber, forage and oil seed crops. Criteria for prime farmland is tied directly to soil properties. Prime farmland can be in cultivation, forest, pasture or idle and it can be remote or inaccessible.

Specific criteria have been established by the USDA to determine which soils will be classified as prime farmland soils. These include:

- . Soil Temperature
- . Soil Moisture
- . Rooting Depth
- . Soil pH
- . Flooding Frequency
- . Soil Permeability
- . Stoniness
- . Erodibility and Slope

In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable sodium and salt content and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively eroded or saturated with water for long periods of time and either do not flood frequently during the growing season or are protected from flooding.

In the face of development pressure, accurate identification of prime farmlands is becoming more important at the local, state and federal level.

Local Importance

With the passage of Maine's Growth Management Law – “An Act to Promote Orderly Economic Growth and Natural Resource Conservation" – all municipalities are required to develop a growth management plan. One of the goals of these plans is to "safeguard agricultural and forest resources from development which threatens those resources." Identifying prime farmland soils is a key to meeting this objective.

State Importance

Agricultural land, especially the best and most productive, is a natural resource. The Department of Environmental Protection is charged with reviewing the wise use of Maine's natural resources.

Federal Importance

The “Farmland Protection Policy Act”, passed in the early 1980's, also addresses this issue. The purpose of this act is to “minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to assure that Federal programs are administered in a manner compatible with State, unit of local government, and private programs and policies to protect farmland." As a result, any project that involves federal money or technical assistance, such as highways, wastewater treatment, plants, subsidized housing projects, even projects financed by the Farmers Home Administration, must be evaluated for their impact on farmland.

MAINE PRIME FARMLAND SOILS

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606AdA	*AGAWAM FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES*
606AdB	*AGAWAM FINE SANDY LOAM, 2 TO 8 PERCENT SLOPES*
607AgA	*ALLAGASH FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES*
614AgA	*ALLAGASH FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES*
601AgA	*ALLAGASH FINE SANDY LOAM, 0 TO 3 PERCENT SLOPES*
610AgA	*ALLAGASH FINE SANDY LOAM, 0 TO 3 PERCENT SLOPES*
607AgB	*ALLAGASH FINE SANDY LOAM, 2 TO 8 PERCENT SLOPES*
614AgB	*ALLAGASH FINE SANDY LOAM, 2 TO 8 PERCENT SLOPES*
601AgB	*ALLAGASH FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES*
610AgB	*ALLAGASH FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES*
615AgB	*ALLAGASH VERY FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES*
031AlB	*ALLAGASH VERY FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES*
614BaA	*BANGOR SILT LOAM, 0 TO 2 PERCENT SLOPES*
614BaB	*BANGOR SILT LOAM, 2 TO 8 PERCENT SLOPES*
027Bab	*BANGOR SILT LOAM, 3 TO 8 PERCENT SLOPES*
602BaB	*BANGOR SILT LOAM, 3 TO 8 PERCENT SLOPES*
614BmB	*BANGOR SILT LOAM, MODERATELY DEEP, 2 TO 8 PERCENT SLOPES*
005BeB	*BECKET FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES*
031BcB	*BECKET FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES*
613BeB	*BECKET FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES*
610BeB	*BERKSHIRE FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES*
602BhB	*BERKSHIRE LOAM, 0 TO 8 PERCENT SLOPES*
607CgA	*CARIBOU GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES*
608CgA	*CARIBOU GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES*
607CgB	CARIBOU GRAVELLY LOAM, 2 TO 8 PERCENT SLOPES
608CgB	CARIBOU GRAVELLY LOAM, 2 TO 8 PERCENT SLOPES
606CfB	CHARLTON FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
610ChB	CHESUNCOOK SILT LOAM, 3 TO 8 PERCENT SLOPES

615CeB	CHESUNCOOK SILT LOAM, 3 TO 8 PERCENT SLOPES
617ChB	CHESUNCOOK SILT LOAM, 3 TO 8 PERCENT SLOPES
615DaB	DANFORTH CHANNERY SILT LOAM, 3 TO 8 PERCENT SLOPES
005DfB	DIXFIELD FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
610DfB	DIXFIELD FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
611DaB	DIXFIELD FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
613DfB	DIXFIELD FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
615DfB	DIXFIELD FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
611 DsB	DIXFIELD-COLONEL COMPLEX, 3 TO 8 PERCENT SLOPES
617DgB	DIXFIELD-COLONEL COMPLEX, 3 TO 8 PERCENT SLOPES
027ElB	ELDRIDGE FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
601EgB	ELDRIDGE FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
617EcB	ELLIOTTSVILLE-CHESUNCOOK COMPLEX, 3 TO 8 PERCENT SLOPES
610EtB	ELLIOTTSVILLE- THORNDIKE COMPLEX, 3 TO 8 PERCENT SLOPES
005EmB	ELMWOOD FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
606EmB	ELMWOOD FINE SANDY LOAM, 2 TO 8 PERCENT SLOPES
610Fr	FRYEBURG SILT LOAM
615Fr	FRYEBURG SILT LOAM
613Fr	FRYEBURG VERY FINE SANDY LOAM
602Ha	HADLEY SILT LOAM
606Ha	HADLEY SILT LOAM
608Ha	HADLEY SILT LOAM
614Ha	HADLEY SILT LOAM
607HaA	HADLEY SILT LOAM, LEVEL
607HaB	HADLEY SILT LOAM, UNDULATING
615HoB	HOWLAND SILT LOAM, 3 TO 8 PERCENT SLOPES
608LnB	LINNEUS SILT LOAM, 0 TO 8 PERCENT SLOPES
027Le	LOVEWELL VERY FINE SANDY LOAM
601 Le	LOVEWELL VERY FINE SANDY LOAM
613Lo	LOVEWELL VERY FINE SANDY LOAM
610Lc	LOVEWELL-CORNISH COMPLEX, OCCASIONALLY FLOODED

614MaB	MACHIAS FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
607MaA	MACHIAS GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES
608MaA	MACHIAS GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES
607MaB	MACHIAS GRAVELLY LOAM, 2 TO 8 PERCENT SLOPES
608MaB	MACHIAS GRAVELLY LOAM, 2 TO 8 PERCENT SLOPES
031 MaB	MADAWASKA FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
610MaB	MADAWASKA FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
601 MaB	MADAWASKA FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
610MDB	MADAWASKA-ALLAGASH ASSOCIATION, GENTLY SLOPING
607MhB	MAPLETON SHALY SILT LOAM, 0 TO 8 PERCENT SLOPES
608MhB	MAPLETON SHALY SILT LOAM, 0 TO 8 PERCENT SLOPES
005MaB	MARLOW FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
027MbB	MARLOW FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
031 MrB	MARLOW FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
601 MrB	MARLOW FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
610MeB	MARLOW FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
613MaB	MARLOW FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
614MeA	MELROSE FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES
606MeB	MELROSE FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
614MeB	MELROSE FINE SANDY LOAM, 2 TO 8 PERCENT SLOPES
602MeB	MELROSE FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
606MkB	MERRIMAC FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
005MkB	MERRIMAC FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
005MnB	MONADNOCK FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
613MnB	MONADNOCK FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
607NcA	NICHOLVILLE SILT LOAM, 0 TO 2 PERCENT SLOPES
617NGB	NICHOLVILLE-CROGHAN COMPLEX, 0 TO 5 PERCENT SLOPES
606NgB	NINIGRET FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
005On	ONDAWA FINE SANDY LOAM
031On	ONDAWA FINE SANDY LOAM
606On	ONDAWA FINE SANDY LOAM

614On	ONDAWA FINE SANDY LOAM
613Od	ONDAWA FINE SANDY LOAM, OCCASIONALLY FLOODED
005PbB	PAXTON FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
606PbB	PAXTON LOAM, 2 TO 8 PERCENT SLOPES
615PeB	PENQUIS-PLAISTED COMPLEX, 3 TO 8 PERCENT SLOPES
615PhB	PENQUIS- THORNDIKE COMPLEX, 3 TO 8 PERCENT SLOPES
607PeA	PERHAM GRAVELLY SILT LOAM, 0 TO 2 PERCENT SLOPES
608PeA	PERHAM GRAVELLY SILT LOAM, 0 TO 2 PERCENT SLOPES
607PeB	PERHAM GRAVELLY SILT LOAM, 2 TO 8 PERCENT SLOPES
608PeB	PERHAM GRAVELLY SILT LOAM, 2 TO 8 PERCENT SLOPES
614PhB	PERHAM SILT LOAM, 0 TO 8 PERCENT SLOPES
005PkB	PERU FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
031 PeB	PERU FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
027BaB	PERU FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
601 PaB	PERU FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
607PgA	PLAISTED GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES
608PgB	PLAISTED GRAVELLY LOAM, 0 TO 8 PERCENT SLOPES
607PgB	PLAISTED GRAVELLY LOAM, 2 TO 8 PERCENT SLOPES
614PgB	PLAISTED GRAVELLY LOAM, 2 TO 8 PERCENT SLOPES
602PgB	PLAISTED GRAVELLY LOAM, 3 TO 8 PERCENT SLOPES
615PtB	PLAISTED SILT LOAM, 3 TO 8 PERCENT SLOPES
005Py	PODUNK FINE SANDY LOAM
606Py	PODUNK FINE SANDY LOAM
614Py	PODUNK FINE SANDY LOAM
613Pt	PODUNK FINE SANDY LOAM, OCCASIONALLY FLOODED
607SaA	SALMON SILT LOAM, 0 TO 2 PERCENT SLOPES
031SkB	SKERRY FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
617SkB	SKERRY FINE SANDY LOAM, 3 TO 12 PERCENT SLOPES
005SkB	SKERRY FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
613SkB	SKERRY FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
614SeA	STETSON FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES

602StB	STETSON FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
614SeB	STETSON FINE SANDY LOAM, 2 TO 8 PERCENT SLOPES
607SgA	STETSON GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES
608SgA	STETSON GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES
607SgB	STETSON GRAVELLY LOAM, 2 TO 8 PERCENT SLOPES
608SgB	STETSON GRAVELLY LOAM, 2 TO 8 PERCENT SLOPES
614SuB	SUFFIELD SILT LOAM, 2 TO 8 PERCENT SLOPES
614SvB	SUFFIELD VERY FINE SANDY LOAM, 2 TO 8 PERCENT SLOPES
606SxB	SUTTON LOAM, 0 TO 8 PERCENT SLOPES
005TyB	TUNBRIDGE-LYMAN COMPLEX, 3 TO 8 PERCENT SLOPES
027TrB	TUNBRIDGE-LYMAN COMPLEX, 3 TO 8 PERCENT SLOPES
610TuB	TUNBRIDGE-LYMAN COMPLEX, 3 TO 8 PERCENT SLOPES
611TuB	TUNBRIDGE-LYMAN COMPLEX, 3 TO 8 PERCENT SLOPES
613TyB	TUNBRIDGE-LYMAN COMPLEX, 3 TO 8 PERCENT SLOPES
617TuB	TUNBRIDGE-LYMAN COMPLEX, 3 TO 8 PERCENT SLOPES
601TrB	TUNBRIDGE-LYMAN FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES
606Wn	WINOOSKI SILT LOAM
607Wn	WINOOSKI SILT LOAM
608Wn	WINOOSKI SILT LOAM
614Wn	WINOOSKI SILT LOAM
005WrB	WOODBRIDGE FINE SANDY LOAM, 0 TO 8 PERCENT SLOPES
606WrB	WOODBRIDGE LOAM, 0 TO 8 PERCENT SLOPES

APPENDIX 9

SOIL SERIES OF MAINE CLASSIFICATIONS

SOIL SERIES USED IN MAINE & THEIR CLASSIFICATION ACCORDING TO THE *KEYS TO SOIL TAXONOMY*, *EIGHTH EDITION 1999* (1/2004 SUBJECT TO CHANGE)

SERIES	ST	CLASSIFICATION (SUBJECT TO CHANGE)
ABRAM	ME	LOAMY, ISOTIC, FRIGID LITHIC HAPLORTHODS
ADAMS	NY	SANDY, ISOTIC, FRIGID TYPIC HAPLORTHODS
ALLAGASH	ME	COARSE-LOAMY OVER SANDY OR SANDY-SKELETAL, ISOTIC, FRIGID TYPIC HAPLORTHODS
ATHERTON	NY	FINE-LOAMY, MIXED, ACTIVE, NONACID, MESIC AERIC ENDOAQUEPTS
AU GRES	MI	SANDY, MIXED, FRIGID TYPIC ENDOAQUODS
AURELIE	ME	FINE-LOAMY, MIXED, ACTIVE, NONACID, FRIGID, SHALLOW AERIC EPIAQUEPTS
BANGOR	ME	COARSE-LOAMY, ISOTIC, FRIGID TYPIC HAPLORTHODS
BECKET	NH	COARSE-LOAMY, ISOTIC, FRIGID OXY AQUIC HAPLORTHODS
BEMIS	ME	COARSE-LOAMY, MIXED, ACTIVE, ACID, SHALLOW AERIC CRYAQUEPTS
BENSON	VT	LOAMY-SKELETAL, MIXED, ACTIVE, MESIC LITHIC EUTRUDEPTS
BERKSHIRE	MA	COARSE-LOAMY, ISOTIC, FRIGID TYPIC HAPLORTHODS
BIDDEFORD	ME	FINE, ILLITIC, NONACID, FRIGID HISTIC HUMAQUEPTS
BOOTHBAY	ME	FINE-SILTY, MIXED, SUPERACTIVE, FRIGID AQUIC DYSTRIC EUTRUDEPTS
BRAYTON	ME	COARSE-LOAMY, MIXED, ACTIVE, NONACID, FRIGID AERIC EPIAQUEPTS
BUCKSPORT	ME	EUIC, FRIGID TYPIC HAPLOSAPRISTS
BURNHAM	ME	COARSE-LOAMY, MIXED, SUPERACTIVE, NONACID, FRIGID, SHALLOW HISTIC HUMAQUEPTS
BUXTON	ME	FINE, ILLITIC, FRIGID AQUIC DYSTRIC EUTRUDEPTS

CANAAN	NH	LOAMY-SKELETAL, MIXED, FRIGID LITHIC HAPLORTHODS
CARIBOU	ME	FINE-LOAMY, ISOTIC, FRIGID TYPIC HAPLORTHODS
CHARLES	ME	COARSE-SILTY, MIXED, SUPERACTIVE, NONACID, FRIGID AERIC FLUVAQUENTS
CHESUNCOOK	ME	COARSE-LOAMY, ISOTIC, FRIGID AQUIC HAPLORTHODS
CHOCORUA	NH	SANDY OR SANDY-SKELETAL, MIXED, DYSIC, FRIGID TERRIC HAPLOHEMISTS
COLONEL	ME	COARSE-LOAMY, ISOTIC, FRIGID, SHALLOW AQUIC HAPLORTHODS
COLTON	NY	SANDY-SKELETAL, ISOTIC, FRIGID TYPIC HAPLORTHODS
CONANT	ME	FINE-LOAMY, ISOTIC, FRIGID AQUIC HAPLORTHODS
CORNISH	ME	COARSE-SILTY, MIXED, SUPERACTIVE, FRIGID FLUV AQUENTIC DYSTRUDEPTS
CROGHAN	NY	SANDY, ISOTIC, FRIGID AQUIC HAPLORTHODS
DANFORTH	ME	LOAMY-SKELETAL, ISOTIC, FRIGID TYPIC HAPLORTHODS
DIXFIELD	ME	COARSE-LOAMY, ISOTIC, FRIGID AQUIC HAPLORTHODS
DIXMONT	ME	COARSE-LOAMY, ISOTIC, FRIGID AQUIC HAPLORTHODS
DUANE	NY	SANDY-SKELETAL, MIXED, FRIGID, ORTSTEIN TYPIC HAPLORTHODS
DUXBURY	VT	SANDY, ISOTIC, FRIGID TYPIC HAPLORTHODS
EASTON	ME	FINE-LOAMY, MIXED, SUPERACTIVE, NONACID, FRIGID AERIC ENDOAQUEPTS
ELDRIDGE	VT	SANDY OVER LOAMY, MIXED, ACTIVE, NONACID, MESIC AQUIC UDORTHENTS
ELLIOTTSVILL	ME	COARSE-LOAMY, ISOTIC, FRIGID TYPIC HAPLORTHODS
ELMWOOD	ME	COARSE-LOAMY OVER CLAYEY, MIXED OVER ILLITIC, SUPERACTIVE, FRIGID AQUIC DYSTRIC EUTRUDEPTS
ENCHANTED	ME	LOAMY-SKELETAL, ISOTIC TYPIC HUMICRYODS
FINCH	MI	SANDY, MIXED, FRIGID, ORTSTEIN, SHALLOW TYPIC DURAQUODS
FREDON	NJ	COARSE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED,

		ACTIVE, NONACID, MESIC AERIC ENDOAQUEPTS
FRYEBURG	ME	COARSE-SILTY, MIXED, SUPERACTIVE, FRIGID FLUVETIC DYSTRUDEPTS
GOULDSBORO	ME	FINE-SILTY, MIXED, SUPERACTIVE, NONACID, FRIGID TYPIC SULFAQUENTS
HALSEY	NJ	COARSE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, ACTIVE, NONACID, MESIC TYPIC HUMAQUEPTS
HERMON	ME	SANDY-SKELETAL, ISOTIC, FRIGID TYPIC HAPLORTHODS
HOGBACK	VT	LOAMY, ISOTIC, FRIGID LITHIC HAPLOHUMODS
HOWLAND	ME	COARSE-LOAMY, ISOTIC, FRIGID AQUIC HAPLORTHODS
KINSMAN	NH	SANDY, ISOTIC, FRIGID TYPIC ENDOAQUODS
LAMOINE	ME	FINE, ILLITIC, NONACID, FRIGID AERIC EPIAQUEPTS
T-LILLE	ME	COARSE-SILTY, MIXED, SUPERACTIVE, ACID, FRIGID TYPIC UDIFLUVENTS
LINNEUS	ME	COARSE-LOAMY, ISOTIC, FRIGID DYSTRIC EUTRUDEPTS
LOVEWELL	ME	COARSE-SILTY, MIXED, SUPERACTIVE, FRIGID FLUV AQUENTIC DYSTRUDEPTS
LYMAN	MA	LOAMY, ISOTIC, FRIGID LITHIC HAPLORTHODS
LYME	NH	COARSE-LOAMY, MIXED, ACTIVE, ACID, FRIGID AERIC ENDOAQUEPTS
MACHIAS	ME	COARSE-LOAMY OVER SANDY OR SANDY-SKELETAL, MIXED, FRIGID AQUIC HAPLORTHODS
MADAWASKA	ME	COARSE-LOAMY OVER SANDY OR SANDY-SKELETAL, ISOTIC, FRIGID AQUIC HAPLORTHODS
MAHOOSUC	ME	DYSIC TYPICCRYOFOLISTS
MAPLETON	ME	FINE-LOAMY, MIXED, SUPERACTIVE, FRIGID DYSTRIC EUTRUDEPTS
MARKEY	MI	SANDY OR SANDY-SKELETAL, MIXED, EUIC, FRIGID TERRIC HAPLOSAPRISTS
MARLOW	NH	COARSE-LOAMY, ISOTIC, FRIGID OXY AQUIC HAPLORTHODS
MASARDIS	ME	SANDY-SKELETAL, ISOTIC, FRIGID TYPIC HAPLORTHODS

MEDOMAK	ME	COARSE-SILTY, MIXED, SUPERACTIVE, NONACID, FRIGID FLUV AQUENTIC HUMAQUEPTS
MELROSE	ME	COARSE-LOAMY OVER CLAYEY, MIXED OVER ILLITIC, SUPERACTIVE, FRIGID OXY AQUIC DYSTRUDEPTS
MONADNOCK	NH	COARSE-LOAMY OVER SANDY OR SANDY-SKELETAL, ISOTIC, FRIGID TYPIC HAPLORTHODS .
MONARDA	ME	COARSE-LOAMY, MIXED, ACTIVE, ACID, FRIGID, SHALLOW AERIC EPIAQUEPTS
MONSON	ME	LOAMY, ISOTIC, FRIGID LITHIC HAPLORTHODS
MOOSILAUKE	NH	SANDY, MIXED, FRIGID AERIC ENDOAQUEPTS
NASKEAG	ME	SANDY, ISOTIC, FRIGID TYPIC ENDOAQUODS
NAUMBURG	NY	SANDY, ISOTIC, FRIGID TYPIC ENDOAQUODS
NICHOLVILLE	NY	COARSE-SILTY, ISOTIC, FRIGID AQUIC HAPLOR THODS
ONDAWA	ME	COARSE-LOAMY, MIXED, ACTIVE, FRIGID FLUVENTIC DYSTRUDEPTS
PEACHAM	VT	COARSE-LOAMY, MIXED, ACTIVE, NONACID, FRIGID, SHALLOW HISTIC HUMAQUEPTS
PENQUIS	ME	COARSE-LOAMY, ISOTIC, FRIGID TYPIC HAPLORTHODS
PERHAM	ME	FINE-LOAMY, ISOTIC, FRIGID AQUIC HAPLORTHODS
PERU	NH	COARSE-LOAMY, ISOTIC, FRIGID AQUIC HAPLORTHODS
PILLSBURY	NH	COARSE-LOAMY, MIXED, ACTIVE, ACID, FRIGID AERICEPIAQUEPTS
PLAISTED	ME	COARSE-LOAMY, ISOTIC, FRIGID OXY AQUIC HAPLORTHODS
PODUNK	ME	COARSE-LOAMY, MIXED, ACTIVE, FRIGID FLUV AQUENTIC DYSTRUDEPTS
PONDICHERRY	NH	SANDY OR SANDY-SKELETAL, MIXED, EUIC, FRIGID TERRIC HAPLOSAPRISTS
RAWSONVILLE	VT	COARSE-LOAMY, ISOTIC, FRIGID TYPIC HAPLOHUMODS
RED HOOK	NY	COARSE-LOAMY, MIXED, SUPERACTIVE, NONACID, MESIC AERIC ENDOAQUEPTS
RICKER	VT	DYSIC LITHIC CRYOFOLISTS

RIFLE	MI	EUIC, FRIGID TYPIC HAPLOHEMISTS
ROUNDABOUT	ME	COARSE-SILTY, MIXED, ACTIVE, NONACID, FRIGID AERIC EPIAQUEPTS
RUMNEY	ME	COARSE-LOAMY, MIXED, ACTIVE, NONACID, FRIGID FLUV AQUENTIC ENDOAQUEPTS
SADDLEBACK	ME	LOAMY, ISOTIC LITHIC HUMICRYODS
SALMON	NY	COARSE-SILTY, ISOTIC, FRIGID TYPIC HAPLOR THODS
SCANTIC	ME	FINE, ILLITIC, NONACID, FRIGID TYPIC EPIAQUEPTS
SCHOODIC	ME	LOAMY-SKELETAL, MIXED, ACTIVE, ACID, FRIGID LITHIC UDORTHENTS
SEARSPORT	ME	SANDY, MIXED, FRIGID HISTIC HUMAQUEPTS
SEBAGO	ME	DYSIC, FRIGID FIBRIC HAPLOHEMISTS
SHEEPSCOT	ME	SANDY-SKELETAL, ISOTIC, FRIGID AQUIC HAPLORTHODS
T-SHIRLEY	ME	LOAMY-SKELETAL, ISOTIC, FRIGID TYPIC ENDOAQUODS
SISK	ME	COARSE-LOAMY, ISOTIC OXY AQUIC HUMICRYODS
SKERRY	NH	COARSE-LOAMY, ISOTIC, FRIGID AQUIC HAPLORTHODS
SKOWHEGAN	ME	SANDY, ISOTIC, FRIGID AQUIC HAPLORTHODS
STETSON	ME	SANDY-SKELETAL, ISOTIC, FRIGID TYPIC HAPLORTHODS
SUFFIELD	MA	COARSE-SILTY OVER CLAYEY, MIXED, ACTIVE, MESIC DYSTRIC EUTRUDEPTS
SUNAPEE	NH	COARSE-LOAMY, ISOTIC, FRIGID AQUIC HAPLORTHODS
SUNDAY	ME	MIXED, FRIGID TYPIC UDIPSAMMENTS
SURPLUS	ME	COARSE-LOAMY, ISOTIC AQUIC HAPLOCRYODS
SWANTON	ME	COARSE-LOAMY OVER CLAYEY, MIXED OVER ILLITIC, SUPERACTIVE, NONACID, FRIGID AERIC EPIAQUEPTS
SW ANVILLE	ME	FINE-SILTY, MIXED, ACTIVE, NONACID, FRIGID AERIC EPIAQUEPTS
TELOS	ME	COARSE-LOAMY, ISOTIC, FRIGID, SHALLOW AQUIC HAPLORTHODS
THORNDIKE	ME	LOAMY-SKELETAL, ISOTIC, FRIGID LITHIC HAPLORTHODS
TOGUS	ME	SANDY OR SANDY-SKELETAL, MIXED, EUIC, FRIGID TERRIC

		HAPLOFIBRISTS
TUNBRIDGE	*VT*	*COARSE-LOAMY, ISOTIC, FRIGID TYPIC HAPLORTHODS*
VASSALBORO	*ME*	*DYSIC, FRIGID TYPIC HAPLOFIBRISTS*
WASKISH	*MN*	*DYSIC, FRIGID TYPIC SPHAGNOFIBRISTS*
WAUMBEK	*NH*	*SANDY-SKELETAL, ISOTIC, FRIGID AQUIC HAPLORTHODS*
WESTBURY	*NY*	*COARSE-LOAMY, ISOTIC, FRIGID TYPIC FRAGIAQUODS*
WHATELY	*ME*	*COARSE-LOAMY OVER CLAYEY, MIXED OVER ILLITIC, SUPERACTIVE, NONACID, FRIGID MOLLIC EPIAQUEPTS*
WHITMAN	*MA*	*COARSE-LOAMY, MIXED, ACTIVE, NONACID, MESIC TYPIC HUMAQUEPTS*
WINNECOOK	*ME*	*LOAMY-SKELETAL, ISOTIC, FRIGID TYPIC HAPLORTHODS*
WON SQUEAK	*ME*	*LOAMY, MIXED, EUIC, FRIGID TERRIC HAPLOSAPRISTS*

ITALICS *= Series with a mesic temperature regime, no longer used in Maine.*

UNDERLINED SERIES = Series from outside MLRA Region R- these series may have different soil properties from what was described when these soils were first identified in Maine.

T - represents a Tentative Series that has not been Established as yet.

APPENDIX 10

SOIL PROFILE TEST PIT DESCRIPTION FORM

Test Pit # ____________

Soil Series ____________

Depth (Inches)	Matrix Color (Moist)		Texture & Modifier	Consistency	Structure			Redoximorphic Features			
	HVC	Munsell Color			Grade	Size	Shape	Color	QTY	Size	Contrast

Remarks:

Test Pit # ____________

Soil Series ____________

Depth (Inches)	Matrix Color (Moist)		Texture & Modifier	Consistency	Structure			Redoximorphic Features			
	HVC	Munsell Color			Grade	Size	Shape	Color	QTY	Size	Contrast

Remarks:

USDA-NRCS

PEDON DESCRIPTION

PEDON ID #: DRAFT 3/2002

Series or Component Name: Caveat Emptor	**Map Unit Symbol:** CaC	**Photo #:** 127A	**Classification:** fine, smectitic, mesic, Typic Argiudoll	**Soil Moist. Regime** (Tax.): Udic (≈ 27" annual)
Describer(s): PJS & DAW	**Date:** 10/12/2000	**Weather:** sunny	**Temp.:** Air: 78 °F; Soil: Depth:	**Latitude:** 40 ° 49 ' 10.0 " N; **Longitude:** 96 ° 46 ' 06.1 " W; **Datum:** NAD '83
Location: NE 1/4, SW 1/4 Sec. 20 T. 10N R. 6E				
UTM: Zone: mE: mN:	**Topo Quad:** Emerald, NE 7.5 topo 1978	**Site ID:** S; Yr: 2002; State: NE - County: 109 - Pedon #: 006	**Soil Survey Area:** Lancaster, Co	**MLRA / LRU:** 106
Transect: ID: 2; Stop #: 6; Interval: 10m				
Landscape: upland	**Landform:** low hill	**Microfeature:** ———	**Anthro:** furrow	**Elevation:** 1240 '
Aspect: 34 °E	**Slope (%):** 6%	**Slope Complexity:** simple	**Slope Shape:** (Up & Dn / Across) VV (convex, convex)	
Hillslope Profile Position: shoulder	**Geom. Component:** nose slope	**Microrelief:** micro-low	**Physio. Division:** Interior Plains	**Physio. Province:** Central Lowland
Physio. Section: Dissected Till Plain	**State Physio. Area:** ———	**Local Physio. Area:** Middle Creek Basin		
Drainage: WD (Well Drained)	**Flooding:** none	**Ponding:** none	**Soil Moisture Status:** moist	**Permeability:** slow (est.) low (ave.= 0.011 cm/hr; K_{sat}: n=3; depth: 35–50 cm)
Land Cover / Use: Soybeans (CRC)				
Parent Material: loess, over pedisediment, over till	**Bedrock:** Kind: Sandstone; Fract.: Hard.: Depth: (in adjacent gully) > 15 m	**Lithostrat. Units:** Group: Formation: Member: Peoria Loess, Gillman Canyon, unnamed pedisediment, unnamed till		
Erosion: R Kind: (Rill) Degree: 1	**Runoff:** VH (Very High)	**Surface Frag %:** GR: CB: ST: BD: CN: FL: Kind: – 0 –	**Diagnostic Horz. / Prop.:** Kind: mollic, argillic; Depth: 0 – 30 cm, 30 – 90 cm	
P. S. Control Section: Depth Range: 30 – 80 cm	Ave. Clay %: 37%	Ave. Rock Frag %: < 1%		

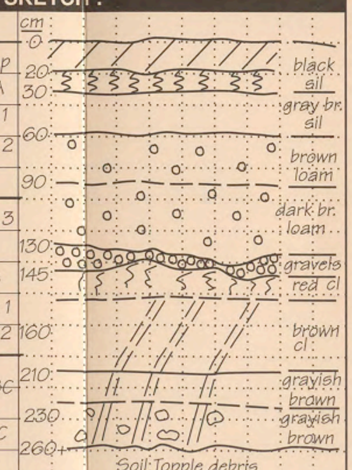
VEGETATION :

SYMBOL	COMMON NAME	% GD COVER
GLYCI	Soybean stubble	1%
DIGIT2	Crabgrass	5%

MISCELLANEOUS FIELD NOTES / SKETCH :

deep polygonal joints in till: ≈ 30° angle; 10 - 20 cm diam. 20, white, $CaCO_3$ lined seams (1-4 cm diam.) in center bounded by brown / black Fe / Mn zone which is bounded by yellow / br. Fe (goethite) halo at 250 cm depth.

		M	cm
Peoria Loess	loess	Ap	0–20
		A	20–30
		Bt 1	30–60
	colluvial loess with scattered gr.	Bt 2	60–90
Gillman Canyon	colluvial loess	2 Bt 3	90–130
pedisediment			130–145
Pre-Illinoian till	red paleosol	3B	145–
	weathered, oxidized leached	4Bt 1	
		4Bt 2	–160–210
	mottled, unoxidized, leached	4 BC	210–230
	mottled, unoxidized, unleached	4C	230–260+



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Component Name: | Map Unit Symbol: | Date:

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd	Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cn Col Mst Sp Loc
1	LP	0 – 20	Ap	Abrupt Smooth	10YR 4/2	10YR 3/1	silt loam (sil)	— 0 —		common, fine & med. granular	Slightly Hard	Friable	non-sticky	non-plastic	None
2	LP	20 – 30	A	CW	10YR 4/2	10YR 3/1	sil	— 0 —		3 f,m abk.	MH	FI	SO	PO	↓
3	LP	30 – 60	Bt1	GW	2.5 Y 6/2	10YR 5/3	sicl	— 0 —		2 m,c sbk	H	VFI	SS	MP	↓
4	LP	60 – 90	2Bt2	GW	10YR 6/3	70% 10YR 4/3 30% 10YR 5/3	sicl	2% scattered f,m rounded gr.		2 m pr ⇒ 2 m sbk	H	VFI	SS	MP	↓
5	LP	90 – 130	2Bt3	AW	10YR 4/4	40% 7.5YR 4/3 60% 7.5YR 3/3	sil	2% scattered f,m rounded gr.		1 m, co. pr ⇒ 2 m sbk	MH	FI	SS	SP	↓
6	LP	130 – 145	3B	AW	7.5YR 5/4	7.5YR 4/6	xgrscl	85% f, m, co. rounded gravels mixed lithology		0 sg	L	L	SO	SO	↓
7	LP	145 – 160	4Bt1	GW	7.5YR 5/6	7.5YR 4/6	cl	10% f, rounded gr., mixed lithology		2 m sbk ⇒ 3 vf,f sbk	VH	EF	MS	MP	↓
8	LP	160 – 210	4BT2	DW	7.5YR 4/4	7.5YR 4/4	cl	1% f,m rounded gr., mixed lithology		3 co., vco pr ⇒ 3 f, m sbk	EH	SR	MS	MP	15% coarse, faint, 10 YR 4/3 mottles, M, irregular, on ped faces
9	LP	210 – 230	4BC	DI	2.5YR 7/2	2.5YR 5/2	c	1% f,m rounded gr., mixed lithology		3 co, vco pr ⇒ 2 m sbk	EH	R	VS	VP	None
10	SP	230 – 260+	4C	—	2.5YR 7/2	2.5YR 5/2	c	1% f,m rounded gr., mixed lithology		3 co, vco pr ⇒ 3 f,m abk	R	R	VS	VP	None

	Redoximorphic Features % Sz Cn Hd Sp Kd Loc Bd Col	Concentrations % Sz Cn Hd Sp Kd Loc Bd Col	Ped / V. Surface Features % Dst Cont Kd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer (agent)	Clay %	CCE	Notes
1	None	None	None	1 m T; 2 vf, f T	few, very fine, dendr. tubular	5.0 *	NE, H2			(* pH by pocket pH meter, 1:1 soil to water)
2	↓	↓	↓	1 m T; 2 vf,f T	2 vf TE	6.0	NE, H2			
3	↓	↓	↓	2 vf T; 1 f T	2 vf,f TE	6.7	NE, H2			
4	↓	↓	↓	1 vf T; 1 f T	2 vf,f TE	6.9	NE, H2			
5	↓	↓	↓	few, very fine, between peds	2 vf TE	7.2	NE, H2			
6	↓	↓	20%, prominent, discontinuous clay films on rock fragments	None	3 vf,f IR	7.1	NE, H2			gravel pavement with scattered, small gully fills
7	↓	↓	85%, P, cont. (C), clay films (CLF) on all ped faces (PF)	↓	2 vf,f TE	7.1	NE, H2			till joint ghosts remain; truncated paleosol; strong argillans & pedo. structure
8	common, med., distinct 10 YR 6/3 iron depletions in matrix	↓	40%, D, discont. (D), CLF on PF	↓	2 vf TE; 1 f TE	7.6	NE, H2			till joints ghost and fade upwards to top at 45°; clay & Fe/Mn coated prisms
9	f, 3, P, 10 YR 2/1, MNF, APE	↓	27%, D, patchy (P), CLF on ped and void faces (PVF)	↓	2 vf TE	7.7	SL, H2			polygonal till joints ghost & tip 30° to North (downslope)
10	c, 4, P, 2.5 / N, MNF, on prism faces (APF)	c, vco, P, white, I, $CaCO_3$ nodules along joints (CRK) & in matrix (MAT)	7%, P, discont., pressure faces (PRF) on pf throughout	↓	1 vf,f IG	8.2	SL, H2 (nodules VE)			till joints tip 30° to North (down slope)

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Appendix 11

Descriptions for Standard Landforms and Miscellaneous Surface Features

DESCRIPTIONS FOR STANDARD LANDFORM AND MISCELLANEOUS SURFACE FEATURES

LABEL	NAME	
BLO	Blowout	A small saucer, cup, or trough-shaped hollow or depression formed by wind erosion, on a pre-existing sand deposit. Typically ___ to ___ acres.
BPI	Borrow pit	An open excavation from which soil and underlying material have been removed, usually for construction purposes. Typically ___ to ___ acres.
CLA	Clay spot	A spot where the surface texture is silty clay or clay in areas where the surface layer is sandy loam, loam, silt loam, or coarser. Typically ___ to ___ acres.
DEP	Depression, closed	A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and is without a natural outlet for surface drainage. Typically ___ to ___ acres.
ESB	Escarpment, bedrock	A relatively continuous and steep slope or cliff, which was produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.
ESO	Escarpment, nonbedrock	A relatively continuous and steep slope or cliff, which generally is produced by erosion but can be produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.
GPI	Gravel pit	An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel. Typically ___ to ___ acres.
GRA	Gravelly spot	A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area with less than 15 percent fragments. Typically ___ to ___ acres.
GUL	Gully	A small channel with steep sides cut by running water through which water ordinarily runs only after a rain, or after ice or snow melts. It generally is an obstacle to wheeled vehicles and is too deep to be obliterated by ordinary tillage.
LDF	Landfill	An area of accumulated waste products of human habitation that can be above or below natural ground level. Typically ___ to ___ acres.
LAV	Lava flow	A solidified body of rock formed through lateral, surface outpouring of molten lava from a vent or fissure. Often lobate in shape. Typically ___ to ___ acres.
LVS	Levee	An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow of lowlands.
MAR	Marsh or swamp	A water saturated, very poorly drained area, intermittently or permanently covered by water. Sedges, cattails, and rushes dominate marsh areas. Trees or shrubs dominate swamps. Not used in map units where the named components are poorly or very poorly drained. Typically ___ to ___ acres.
MPI	Mine or quarry	An open excavation from which soil and underlying material are removed and bedrock is exposed. Also denotes surface openings to underground mines. Typically ___ to ___ acres.
MIS	Miscellaneous water	Small, constructed water area that is used for industrial, sanitary, or mining applications and contains water most of the year. Typically ___ to ___ acres.
WAT	Perennial water	Small, natural or constructed lake, pond, or pit that contains water most of the year. Typically ___ to ___acres.

ROC	Rock outcrop	An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where "Rock outcrop" is a named component of the map unit. Typically ___ to ___ acres.
SAL	Saline spot	An area where the surface layer has an electrical conductivity of 8 mmhos cm -1 more than the surface layer of the named soils in the surrounding map unit, which has an EC of 2 mmhos cm -1 or less. Typically ___ to ___ acres.
SAN	Sandy spot	A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer. Typically ___ to ___ acres.
ERO	Severely eroded spot	An area where on the average 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units that are named severely eroded, very severely eroded, or gullied. Typically ___ to ___ acres.
SLP	Short, steep slope	Narrow soil area that has slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.
SNK	Sinkhole	A closed depression formed either by solution of the surficial rock or by collapse of underlying caves. Typically ___ to ___ acres.
SLI	Slide or slip	A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces. Typically ___ to ___ acres.
SOD	Sodic spot	An area where the surface layer has a sodium adsorption ratio that is at least 10 more than the surface layer of the named soils in the surrounding map unit which have a sodium adsorption ratio of 5 or less. Typically ___ to ___ acres.
SPO	Spoil area	A pile of earthy materials, either smoothed or uneven, resulting from human activity. Typically ___ to ___ acres.
STN	Stony spot	A spot where 0.01 to 0.1 percent of the surface cover is rock fragments that are greater than 10 inches in diameter in areas where the surrounding soil has no surface stones. Typically ___ to ___ acres.
STV	Very stony spot	A spot where 0.1 to 3 percent of the surface cover is rock fragments that are greater than 10 inches in diameter where the surrounding soil has less than 0.01 percent of the surface cover of stones. Typically ___ to ___ acres.
WET	Wet spot	A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit. Typically ___to ___ acres.

DESCRIPTION FOR AD HOC FEATURES

___	________	______________________________________
___	________	______________________________________
___	________	______________________________________
___	________	______________________________________
___	________	______________________________________
___	________	______________________________________

APPENDIX 12

Order Form - Field Book for Describing and Sampling Soils

United States Department of Agriculture
NRCS Natural Resources Conservation Service
SOILS

Home / Site Map / Comments

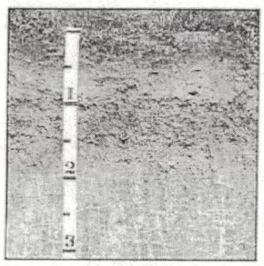
Soil Survey | Soil Use | Education | Gallery | Classification | Procedures | Research | NCSS

Subsections

- Field Book
- Soil Survey Manual
- National Soil Survey Handbook
- Lab Methods Manual
- Editing Guides
- NASIS Tools
- National Instructions
- Technical Notes
- Federal Geographic Data Committee
- Code of Federal Regulations

NOTE: The ***Field Book for Describing and Sampling Soils, Version 2.0, Septemb*** *available in hard copy form. This version corrects minor errors in the original 1998 and substantially updates the contents based on related source documents. Please d of any earlier version. Additional upgrades can and will occur that will replace all document. Minor upgrades will have a new date at the bottom of each updated pag upgrades will also have a different version number.* ***Users are responsible for the p correct application of the most current information.***

Field Book
for Describing and
Sampling Soils



Version 2.0

Revised, Refined, and Compiled by:
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E.C. Benham, and W.D. Broderson

National Soil Survey Center
Natural Resources Conservation Service
U.S. Department of Agriculture
Lincoln, Nebraska

How to obtain the Field Book

Hard copies (waterproof, 6 x 8 inch binder) can from 2 sources:

1) US Government Printing Office (GPO). You
   a) Call their toll-free phone number (1-866--512-1800). Ask for stock **#001-000-04706-0** (Field Book for Describing a Soils).
   b) On the internet go to the GPO bookstore a "soils" or "field book for describing soils". The (including shipping and handling). Rush delive

2) A limited number of courtesy copies are avai members of the National Cooperative Soil Surv National Soil survey Center, Lincoln, NE: email doug.wysocki@usda.gov or by phone: (402) 43

Foreword

Acknowledgments

The Present Science and Art of Soil Descripti

This information comes from the Field Book for Describing and Sampling Soils by Wysocki, Benham, and Broderson, 2002. The printed Field Book is published on 4" paper in a six-ring, loose-leaf binder similar to those used for Color Books. The maj address Site Description, Soil Profile Description, and Geomorphology, with additio information in sections on Geology, Soil Taxonomy, Locations, Field Sampling, an Miscellaneous topics such as conversion of units. The Field Book is also tabbed for reference.

Questions concerning the Field Book may be directed to:

Douglas A. Wysocki
National Soil Survey Center
MS 34
100 Centennial Mall North
Lincoln, NE 68508-3866
(402) 437-4155

Appendix 13

Commonly Asked Questions About Soil Surveys

COMMONLY ASKED QUESTIONS ABOUT SOIL SURVEYS

WHAT IS A SOIL SURVEY?:

A soil survey is an inventory of the soil resources of an area based on a field investigation. Using the results of the field investigation, a soil map is prepared as well as a written report, called a narrative that describes and classifies the soils and interprets their suitability and limitations for various uses.

HOW IS A SOIL SURVEY MADE?:

A soil survey is similar to a forest inventory except that most of the resource being mapped is not visible above ground. Soil scientists use base maps such as aerial photographs and topographic maps when making a soil map because they can see land forms as well as other features which help define the extent of a particular soil type. They then make numerous soil observations within the various landforms to collect soil data. Finally, they use descriptions and analyses of the soils observed for comparison to established soil series to determine specific soil types present in the soil survey area. Some of the characteristics used to differentiate soil series include: the various combinations of sand, silt, clay and rock fragments which make up the soil (texture); depth to water table; depth to bedrock; the presence or absence of dense layers (hardpan) and the acidity level of the soil. Once a soil map is made, the soil scientist prepares an I accompanying report to describe and classify the soils and interpret them for various uses.

ARE ALL SOIL SURVEYS THE SAME?:

While the same standards are generally used in making all soil surveys in Maine, the end product can vary widely. One of the reasons for this variability is the level of detail desired for the survey. A soil survey of the United States would not be able to show the level of detail that a soil map of a state or county would or one prepared for an individual landowner. Large scale soil surveys of a state or county can only show broad soil categories and are useful for general planning purposes. For instance, the soil surveys prepared by NRCS (formerly SCS) which are available at County Soil and Water Conservation Districts, are useful to towns when deciding where growth should be encouraged. They are not however, useful for locating small areas of wetland on a property or where to site a septic system. For that kind of information a High Intensity Soil Survey would be needed which can separate soils down to areas as small as ⅛ acre. In comparison, an NRCS soil map typically will only differentiate soils down to about 4 acres in size for fields and may only differentiate down to 15 acres or more in *size for wooded areas. This often is larger than an entire property and is certainly larger than most building lots which means that the property or lot may be an "Inclusion". An inclusion is an area of soil which differs, sometimes significantly, from the soil for which the map unit is named but is too small to show as a separate map unit (smaller than the minimum map unit size). The minimum size of allowable, significantly different, inclusions should be determined by the purpose of the soil survey.*

Another reason for the variation in soil surveys is the purpose for the soil survey. There are many different kinds of soil in Maine with over 100 established soil series. It would be nearly impossible to make a soil map which separates soils on the basis of every difference, no matter how small or important. Therefore, soils are often grouped together into what are called "soil map units" if the differences in properties are not significant and do not affect the intended use. For example, if a soil survey was being done to determine the potential for spreading septage on a property, where bedrock is only a concern if it occurs at a depth of less than 30 inches, the soil scientist may choose not to investigate whether or not bedrock is present at a greater depth in all soil pits because of cost, difficulty (if machinery is not available to excavate soil pits) and the fact that it doesn't affect use and management of the site for the purpose of the survey. If, however, the survey was for a subdivision where septic systems were to be installed and buildings with basement were to be constructed, it would be important to know if bedrock was present to a greater depth. On the other hand, a survey for a subdivision may not differentiate soils on the basis of how much topsoil was present over sandy soils which is quite important if a site is to be used for septage spreading. It is therefore, quite important to know the level of detail and purpose of the soil survey in order to determine whether or not it may be appropriate for a specific use.

WHAT IS THE ADVANTAGE OF HAVING A SOIL SURVEY MADE (IS IT WORTH THE COST)?:

Answer - *Generally speaking, the cost of a high intensity soil survey can be recouped many times over through cost savings realized by having detailed knowledge of the soil resources of a property and using that information to plan an intended use accordingly.*

Land Owner Perspective - *Land owners can gather much useful information from having a soil survey made of their property if they have a specific use in mind. Some regulated uses such as septage spreading require a soil survey but others just make good sense. If a land owner is planning on subdividing a property, the division of the land should be based upon soil types. Otherwise, one or more lots may not have suitable soils for septic systems which means unbuildable lots or the expense of having a new property survey and design plans. A property may also contain wetlands that prevent development or require expensive permits to cross but could be avoided if their presence and extent were known. Knowing the soil types in advance can help with the planning so that building sites and access can be achieved in the most cost effective manner. If the* *landowner intends to build interior roads, knowing the soil types will help in choosing the best location. For land owners wishing to build a home on a property, a soil survey can indicate where the best location is for constructing a basement that will not be wet or for building a road that will not sink into a wetland or be subject to flooding. The relative cost for development can be obtained on the basis of soil survey data by referring to the document Soil Potential Ratings for Low Density Development available at your county Soil and Water Conservation District Office. Soil surveys can also be helpful for other uses such as for forestry or agriculture. That is because some soil types are more productive than others for growing certain tree species or crops. It would also help to know here to spend management dollars for the best return.*

Town Perspective - *For a town, soil survey data can be invaluable information on which to base a permitting decision. It enables the town officials to determine if a property is suitable for an intended use and whether the proposal works with the strengths of the property or against them. Issues such as wetland impacts can be determined on the presence or absence of wetland (hydric) soils, a necessary component of all wetlands. Groundwater and surface water threats can also be assessed on the basis of soil survey information. Even the potential value of a property can be determined by knowing its potential for certain uses (useful to tax assessors). Without soil survey information, a town may permit the use of a property for an incompatible use. On the other hand, the town may deny the use of a property for which it is well suited. A good decision is a well informed decision.*

IS THERE A DIFFERENCE BETWEEN A LICENSED SITE EVALUATOR AND A CERTIFIED SOIL SCIENTIST?:

Yes, there is a difference between a Licensed Site Evaluator and a Certified Soil Scientist. A Site Evaluator is only licensed to evaluate soil properties for the purposes of siting a septic system and must report their findings in terms specified by the Maine State Plumbing Code. They can also design a septic system on the basis of that soil evaluation. Site Evaluators can not however, evaluate soil properties for any other purpose and can not prepare a soil map or soil survey. To make hydric soil determinations, to make a soil map or soil survey, or to determine suitability of soils on a property for anything other than septic systems, you must be a Maine Certified Soil Scientist or an NRCS Soil Scientist. Most Maine Certified Soil Scientists are also Licensed Site Evaluators but most Licensed Site Evaluators are not also Maine Certified Soil Scientists.

WHAT DO THE SYMBOLS ON A SOIL MAP MEAN AND HOW DO I TRANSLATE THEM INTO INFORMATION USEFUL TO ME?:

The three letter symbols on soil maps, surrounded by solid lines that represent their boundaries, are called "map units". Typically, map units are named for the type of soil that makes up the majority of the soil in the map unit. There are however inclusions of *similar and dissimilar soils in most map units that the user should know about. This information can be found in the soil narrative, which is a written report about the soil survey. The symbols are abbreviation for one or more of the over 100 soil series established in Maine and for the slope of the land. Established means that the soil has been officially recognized as having a unique set of properties and it commonly occurs in Maine. The properties of all established soil series have been studied, use and management for a number of purposes can be predicted and published information is available to the public about them. The first two letters of the symbol represent the abbreviation for the soil name and the third letter represents the symbol for slope.*

To find out what the symbols mean for a particular soil map, look for the legend on the soil map, which defines them. Each soil map legend should be reviewed because there are no standard symbols for each soil type and therefore the symbols can have different meanings on different maps. You should also read the soil narrative which, is a written report that accompanies each soil survey. This report is another source of information about the soil map units and also mentions what differences the soils on the project site may have from established soil series (if any). Soil scientists typically name a soil map unit after a soil series that has soil properties most closely representative of what they have actually found. Sometimes the soils found have properties, which are very close to an established soil and sometimes there are significant differences. It is therefore important to read the narrative and determine if and how the soils are different from an established soil series. The narrative should also explain how those differences affect use and management of the soils for the intended use, as compared to the established soil series for which it is named. You can also contact the soil scientist whose name is on the maps and report for that information.

Once you know the soil series name, there are a couple of sources you can go to for information on their use and management for a number of uses. One is the NRCS website; me.nrcs.usda.gov. Find the Electronic Field Office Technical Guide and go to Section 2. Here you will find what is called ***"Interpretation Records".*** *These have been developed by NRCS for a number of uses of each soil series including forestry, wildlife, crops and a whole host of urban uses such as housing, roads, gravel sources, ponds etc. This same information can be obtained at your local Soil and Water Conservation District Office (there are 16 located throughout the state). The SWCD's also have copies of a document called "****Soil Potential Ratings for Low Density Development****" which rates each soil in the county on its potential for; buildings with basements, roads and septic systems. A separate Soil Potential Ratings document was developed for each county. This document will give information on whether or not a particular soil can be used for each of the three categories and if there are any limitations. If there are limitations, they will be listed and also what cost can be expected in order to overcome the limitation(s). Please note, these documents have been developed to replace the outdated Soil Suitability Guide, which is no longer appropriate for use.* ***PLEASE DISCARD ANY COPIES YOU MAY HAVE OF THE SOIL SUITABILITY GUIDE AND, IF IT IS***

REFERENCED IN A TOWN ORDINANCE, MAKE AN EFFORT TO HAVE THE ORDINANCE CHANGED TO DELETE THIS OUTDATED REFERENCE AND REPLACE IT WITH A REFERENCE TO SOIL POTENTIAL RATINGS*. Should you have any questions about this recommendation, contact the Maine State Soil Scientist at 287-2666 or your local Soil and Water Conservation District Office (which is also the local NRCS Field Office).*

WHO DO I CONTACT TO GET A SOIL SURVEY MADE OF MY PROPERTY?:

Other than soil surveys made by the Natural Resources Conservation Service for public purposes, all soil surveys made in the state must be made by a Maine Certified Professional Soil Scientist. To obtain the names of certified soil scientists in the state, you can contact the clerk for the Board of Certification at 624-8627 (there is a modest fee for a printout of the list of licensees for the entire state), the Maine State Soil Scientist's Office at 287-2666, your town Code Enforcement Office or visit the Maine Association of Professional Soil Scientists Web Site at WWW.MAPSS.ORG. You can also contact the Maine State Soil Scientist for questions regarding soil surveys.