MAINE
ASSOCIATION OF
PROFESSIONAL
SOIL
SCIENTISTS

MAINE STATE SOIL

CHESUNCOOK

GUIDELINES FOR MAINE CERTIFIED SOIL SCIENTISTS FOR SOIL IDENTIFICATION AND MAPPING

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Revised 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. <u>Soil Map Requirements</u>

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. <u>Soil Narrative Report Requirements</u>

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. <u>Format</u>

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. <u>Title Section</u>

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. Map Unit Description

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.

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 <u>underlined</u> 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]					

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 ≥ 4.5							Togus
c. Soils formed from mainly sphagnum, pH < 4.5							Waskish
3. Hemists							
a. pH < 4.5							Sebago
b. pH ≥ 4.5							Rifle
c. Terric soils, pH < 4.5							Chocorua
d. Tidal area soils							Sulfihemists
4. Saprists							
a. pH ≥ 4.5							Bucksport
b. Terric soils, pH ≥ 4.5							Wonsqueak Pondicherry Markey
c. Undifferentiated soils							Borosaprists

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

Footnotes are for mineral soils:
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 ≤60 inches of mineral soil above bedrock)
All others are Very deep (>60 inches of mineral soil above bedrock)

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

Last updated February 2000; **subject to change**

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.