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New Hampshire Soil Data Dictionary *March 18, 2013*

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INTRODUCTION

The following document is comprised of definitions and terms used for New Hampshire soil data.

Index 1 contains information about the Soil Attribute Data Spreadsheet and other available soil data tables, including the attribute name, attribute label, minimum and maximum values, unit of measure, and attribute descriptions.

Index 2 contains detailed information about selected attributes, such as Drainage Class, Important Farm Class, and Hydrologic Groups.

This data dictionary provides essential information about the soil properties and interpretations contained in the tables located on the NH NRCS website and in the data distributed via Web Soil Survey (WSS). The description, units of measure, and labeling of soil attributes conforms to the standards of the USDA National Cooperative Soil Survey (NCSS). The tables and data located in Web Soil Survey is the official soil dataset for New Hampshire. They take precedence over any other source of soil information.

The attribute information is specific for each Soil Survey Area (for example: Soil Survey of Hillsborough County, Western Part) and reflects the most current level of understanding of soil properties and their behavioral characteristics. This data may not agree with previously published soil survey reports that represent historical records of our level of knowledge at the time of publication. Likewise, the attribute data that is provided in these indexes and tables are subject to change as the soil survey program continues to refine our ability to measure and interpret soil physical and chemical properties. It is the responsibility of the user of this information to adequately document when these attributes were retrieved for a specific purpose and that any land use decision made based on these attributes reflect the NCSS standards at that time. Because this data is subject to change, it is the user's responsibility to update their records as appropriate and not to rely on data previously downloaded from the NH NRCS web site or from the NH GRANIT web site. The Soil Attribute Data Spreadsheet table represents only a small fraction of the complete soil dataset for New Hampshire. For all of the data tables available, please use Web Soil Survey.

Although soil series are used to name soil map units, soil series and soil map units are not the same. A soil map unit is a collection of areas on the landscape having properties similar to the series used to name the map unit. In other words, a soil series is a specific taxonomic grouping while a map unit is a more flexible concept based on that taxonomic grouping. For example, a map unit named 'Becket fine sandy loam, 3 to 8 percent slopes' indicates a collection of areas that have soil properties that are within the defined range of the Becket series, with slopes generally between 3 and 8 percent. However, inclusions of soil properties that fall outside the range of the Becket series are also allowed in the map unit, as long as they are similar soils that will not affect the use and management of the area within the map unit. These are called similar inclusions. There will also be some areas that have properties that are outside the concept of the map unit. If these areas are different enough from the central concept of the map unit to affect use and management (such as a pocket of poorly drained Pillsbury, in a well drained map unit), they are called contrasting inclusions. In this example, the Becket series is the major component and the Pillsbury series is a minor component. The NRCS maintains attribute data for all the components in its database making the soil data quite complex. While most of these attributes may have more than one value in the National database, the attribute description defines only one value for each map unit. Therefore, the attribute data contained in the spreadsheet is appropriate for use in a GIS.

County-wide soil surveys produced by the USDA Natural Resources Conservation Service are typically produced at a scale of 1:20,000 or 1:24,000 and should not be altered or "blown up" to larger scales. The smallest soil area that can be shown on the county-wide soil surveys is 3 to 5 acres in size. These maps are intended for general land use planning purposes only and are accurate for this purpose. They do not display sufficient precision to be used for site-specific applications.

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Soil Correlation

All NRCS soil surveys undergo a quality control process called correlation. Soil correlation requires that data entered into the soil survey database meet NCSS standards. For example, it requires that soil taxonomy is properly used, that each map unit in a soil survey is distinguished from all others, and that the proper interpretations are assigned to each map unit. Correlation ensures that adjacent soil surveys are joined and facilitates the effective transfer of technology.

Soil Survey Correlation Dates

NH003 Carroll County Jan. 1974 (Amended Nov, 2006)

NH005 Cheshire County Sept. 1985

NH607 Coos County Dec. 1999 (Amended 2012)

NH009 Grafton County Oct. 1986

NH601 Hillsboro County, Eastern Part Feb. 1980

NH602 Hillsboro County, Western Part May 1983

NH015 Rockingham County April, 1986

NH017 Strafford County July, 1968 (Amended Jan. 2000)

NH019 Sullivan County March, 1981 July, 1997 (Amended July, 2000)

NH609 Merrimack-Belknap Soil Survey 2010

References

Soil Survey Staff, Natural Resources Conservation Service, National Soil Survey Handbook, title 430-VI (Washington, D.C., U.S. Government Printing Office, November 1996).

US Department of Agriculture, Soil Survey Division Staff. 1993. Soil Survey Manual. USDA Agricultural Handbook 18 (revised). US Government Printing Office, Washington, DC.

Schoeneberger, P.J., Wysocki, D.A., Benham, E.C., and Broderson, W.D. 2012. Field Book for Describing and Sampling Soils, Version 3.0. Natural Resources Conservation Service, USDA, National Soil Survey Center, Lincoln, NE.

Hurt, G.W., and L.M. Vasilas, editors. Version 7.0, 2010. Field Indicators of Hydric Soils in the United States.

Federal Register. September 18, 2002. Hydric Soils of the United States.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Society of Soil Scientists of Northern New England. SSSNNE Special Publication No. 3, Version 4.0, February 2011, Site Specific Mapping Standards for New Hampshire and Vermont.

Web addresses:

Web Soil Survey: http://websoilsurvey.nrcs.usda.gov

Field Book for Describing and Sampling Soils: ftp://ftp-fc.sc.egov.usda.gov/NSSC/Field_Book/FieldBookVer3.pdf Soil Survey Manual: http://soils.usda.gov/technical/manual/

NRCS National Soil Survey Handbook: http://soils.usda.gov/technical/handbook/

Geospacial Data Gateway: http://datagateway.nrcs.usda.gov/

Field Indicators of Hydric Soils in US: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046970.pdf Site Specific Mapping Standards for New Hampshire and Vermont: http://www.sssnne.org/nh-vt.pdf

NRCS NH webpage: http://www.nh.nrcs.usda.gov/

NRCS NH Soils: http://www.nrcs.usda.gov/wps/portal/nrcs/main/nh/soils/

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Index 1 - Descriptions for Data (in the Soil Attribute Data Spreadsheet) Attribute and description (Includes Unit of Measure where applicable)

Areaname: Area Name. The name given to the specified geographic area.

Areasymbol: Area Symbol. A symbol that uniquely identifies a single occurrence of a particular type of area (e.g. Rockingham Co., New Hampshire is: NH015).

bedrock_deep: Bottom Depth. The distance from the soil surface to the deepest depth to bedrock for any of the major components.

bedrock_shallow: Top Depth. The distance from the soil surface to the shallowest depth to bedrock for any of the major components.

bulk_density: Bulk Density 0.33 bar H2O: The oven-dry weight of the fine earth fraction (< 2 mm) of the soil per unit volume of soil at a water tension of 1/3 bar. This is the average value of the layer with the highest bulk density from any one of the major components in the map unit; the value may be from any horizon. (Grams per cubic Centimeter)

drainclass: Drainage Class. An estimate of the natural drainage class (i.e., the prevailing wetness conditions) of a soil. The drainage class for the major components are listed, separated by a ";" if there is more than one major component. (See Table 2 for more information.)

Farmclass: Farm Class. Identification of map units as prime farmland, farmland of statewide importance, or farmland of local importance. The criteria in Table 2 define farmland in New Hampshire for the purpose of carrying out the provisions of the Farmland Protection Policy Act of 1981. (See Table 2 for more information.)

flooding: Flooding frequency. The annual probability of a flood event expressed as a class. Flooding is defined as the temporary covering of the soil surface by flowing water from any source, such as streams overflowing their banks, runoff from adjacent or surrounding slopes, inflow from high tides, or any combinations of sources. This value represents any one or all of the major components in the map unit.

forsoilgrp: NH Forest Soil Group. Interpretative class for the map unit, based on interpretations developed in NH. (See Table 2 for more information.)

gravel: Source of Gravel. The likelihood that this soil is a viable source of gravel. The rating is for the first major component in the map unit.

Hel: HEL. The overall Highly Erodible Lands (HEL) classification for the mapunit based on the rating of its components for wind and water HEL classification. The ratings are highly erodible, potentially highly erodible, and not highly erodible.

Hydpct: Hydric Percentage. The total percentage of hydric components in the map unit, includes minor Components (also known as inclusions).

Hydric: Hydric Soil Rating A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enoughduring the growing season to develop anaerobic conditions in the upper part. Hydric soils along with hydrophytic vegetation and wetland hydrology are used to define wetlands. (Y or N for the first major component in the map unit)

Hydrogrp: Hydrologic Group. A group of soils having similar runoff potential under similar storm and cover conditions. The hydrologic group for the major components are listed, separated by a ";" if there is more than one major component. (Groups A, B, C, D – see Table 2 for more information)

kfactor: Kw. An erodibility factor which quantifies the susceptibility of soil particles to detachment and movement by water. This factor is adjusted for the effect of rock fragments. This value is from the surface horizon of the first major component in the map unit.

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Landcapclass: Capability Class and Subclass. Land capability classification is a system of grouping soils primarily on the basis of their capability to produce common cultivated crops and pasture plants without deteriorating over a long period of time. The Class is a rating of the soil for non-irrigated agricultural use, which indicates progressively greater limitations, and narrower choices for use. (1 to 8). The subclass is the second category in the land capability classification system. (Subclass codes are e, w, s, and c.)

mukind: Mapunit Kind. Code identifying the kind of map unit: Consociation (C); Association (A); Undifferentiated Group (U); Complex (X).

Muname: Map Unit Name. Correlated name of the map unit (recommended name or field name for surveys in progress).

Musym: Map Unit Symbol. The symbol used to uniquely identify the soil map unit in the soil survey.

parent material: Parent Material. The Parent Material for the first major component in the map unit.

perm_max: Ksat. Permeability is also known as Saturated Hydraulic Conductivity, which is the amount of water that would move vertically through a unit area of saturated soil in unit time under unit hydraulic gradient. This is the average value of the layer with the highest permeabilities from any horizon from any of the major components in the map unit. (micrometers per second)

perm_min: Ksat. Permeability is also known as Saturated Hydraulic Conductivity, which is the amount of water that would move vertically through a unit area of saturated soil in unit time under unit hydraulic gradient. This is the average value of the layer with the lowest permeabilities from any horizon from any of the major components in the map unit. (micrometers per second)

Ponding: Ponding Frequency. Ponding frequency class is the number of times ponding occurs over a period of time. This value represents any one or all of the major components in the map unit.

Sand: Source of Sand. The likelihood that this soil is a viable source of sand. The rating for the first major component in the map unit is given.

shwt_deep: Seasonal High Water Table - Bottom Depth. The deepest depth to the seasonal high water table for any of the major components in the map unit. (centimeters)

shwt_shallow: Seasonal High Water Table - Top Depth. The shallowest depth to the seasonal high water table for any of the major components in the map unit. (centimeters)

slope_high: Slope Gradient. The difference in elevation between two points, expressed as a percentage of the distance between those points. The highest value in the range is expressed for this attribute. (percent slope)

slope_low: Slope Gradient. The difference in elevation between two points, expressed as a percentage of the distance between those points. The lowest value in the range is expressed for this attribute. (percent slope)

statelegnum: NH State Legend Number. The NH State-Wide Numerical Legend Number and slope designator. This symbol will be the same as the musym for those soil surveys that used the NH State Legend Numbers otherwise it serves as a conversion of the alpha map unit symbol to the NH State-Wide Numerical Legend.

Tfactor: T. T factor is a soil loss tolerance factor. The maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained. This value is from the first major component in the map unit. (Tons per acre per year)

wt_kind: Water Table Kind. The kind of water table if a seasonal high water table exists in the soil. Entries are either apparent or perched. A perched water table is where free water is restricted from moving downward in the soil by a restrictive feature, in most cases a hard pan. Therefore, there is a dry layer of soil underneath a wet layer. An apparent water table is one where there is free water present in all horizons from its upper boundary to below 2 meters or to the depth of observation. The water table kind listed is for the first major component in the map unit.

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Index 2 - Selected Definitions

Drainage Class

Drainage classes are inferred through observations of landscape position and soil morphology. In many soils, the depth and duration of wetness are related to the quantity, nature, and pattern of redoximorphic features (*National Soil Survey Handbook*). Natural drainage class refers to the frequency and duration of wet periods under conditions similar to those under which the soil developed. Alteration of the water regime by people, either through drainage or irrigation, is not a consideration unless the alterations have significantly changed the morphology of the soil. The following definitions from the *Field Book for Describing and Sampling Soils* are the traditional, national criteria for Natural Soil Drainage Classes.

excessively

Water moves through the soil very rapidly. Internal free water commonly is very rare or very deep. The soils are commonly coarse-textured, have very high saturated hydraulic conductivity, and lack redoximorphic features.

somewhat excessively

Water moves through the soil rapidly. Internal free water commonly is very rare or very deep. The soils are commonly coarse-textured, have high saturated hydraulic conductivity, and lack redoximorphic features.

<u>well</u>

Water moves through the soil readily, but not rapidly. Internal free-water commonly is deep or very deep; annual duration is not specified. Water is available to plants in humid regions during much of the growing season. Wetness does not inhibit growth of roots for significant periods during most growing seasons. The soil is deep to, or lacks redoximorphic features.

moderately well

Water moves through the soil slowly during some periods of the year. Internal free water commonly is moderately deep and may be transitory or permanent. The soil is wet for only a short time within the rooting depth during the growing season. The soil commonly has a moderately low, or lower, saturated hydraulic conductivity class within 1 meter of the surface, or periodically receives high rainfall, or both.

somewhat poorly

The soil is wet at a shallow depth for significant periods during the growing season. Internal freewater is commonly shallow to moderately deep and transitory to permanent. Unless the soil is artificially drained, the growth of most mesophytic plants is markedly restricted. The soil commonly has a low or very low saturated hydraulic conductivity class, or a high water table, or receives water from lateral flow, or persistent rainfall, or some combination of these factors.

poorly

The soil is wet at shallow depths periodically during the growing season or remains wet for long periods. Internal free-water is shallow or very shallow and common or persistent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soil, however, is not continuously wet directly below plow depth. The water table is commonly the result of low or very low saturated hydraulic conductivity class or persistent rainfall, or a combination of both factors.

very poorly

Water is at or near the soil surface during much of the growing season. Internal free-water is shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Commonly, the soil occupies a depression or is level. If rainfall is persistent or high, the soil can be sloping.

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New Hampshire Drainage Class Interpretative Limits

Drainage class interpretive limits have been developed in New Hampshire to be used as a tool in documenting observable soil properties that meet the definition of each drainage class for use in complying with state and town land use regulations and administrative rules. These interpretive limits are abridged from the <u>Site Specific Mapping Standards for New Hampshire and Vermont</u>. For full definitions and clarification, please refer to this document.

Excessively Drained Soils:

Soils with textures of very fine sand or coarser in all horizons within the control section.

Somewhat Excessively Drained Soils:

Soils that have textures in any horizon within the particle size control section of loamy very fine sand or finer; and have moderately rapid to rapid permeability in some portion of the control section or are shallow to bedrock.

Well Drained Soils:

Soils that have textures in any horizon within the particle size control section of loamy very fine sand or finer, and have moderate permeability.

Moderately Well Drained Soils:

Soils that have distinct or prominent redoximorphic features that are not relict features, between a depth of 15 inches and 40 inches below the soil surface.

Somewhat Poorly Drained Soils:

Soils that have common distinct or prominent redoximorphic features, that are not relict features, at a depth less than 15 inches below the soil surface.

Poorly Drained Soils:

Soils that have a depleted or gleyed matrix within 10 inches of the top of the mineral layer and directly underlying an A or Ap horizon.

or

Soils that have a depleted matrix within 20 inches of the top of the mineral layer and directly underlying a thick or very thick, dark A or Ap horizon is a horizon that is 4 inches or more thick.

For more information see: The Site Specific Soil Standards for New Hampshire and Vermont.

Very Poorly Drained Soils:

Soils having organic soil materials at or near the soil surface that are greater than 4 inches thick and are directly underlain by a horizon with a depleted or gleyed matrix.

or

Soils that are flooded daily by tides.

For more information see: The Site Specific Soil Standards for New Hampshire and Vermont.

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Important Farm Class

The Farmland Protection Policy Act of 1981 was established to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses, and to assure that Federal programs are administered in a manner that, to the extent practicable, will be compatible with state, unit of local government, and private programs and policies to protect farmland. The following criteria define farmland in New Hampshire for the purpose of carrying out the provisions of the Farmland Protection Policy Act of 1981, P.L. 97-98, December 22, 1981.

Prime Farmland

- Soils that have an aquic or udic moisture regime and sufficient available water capacity within a
 depth of 40 inches to produce the commonly grown cultivated crops adapted to New Hampshire in 7
 or more years out of 10.
- Soils that are in the frigid or mesic temperature regime.
- Soils that have a pH between 4.5 and 8.4 in all horizons within a depth of 40 inches.
- Soils that have either no water table or have a water table that is maintained at a sufficient depth during the cropping season to allow cultivated crops common to New Hampshire to be grown.
- Soils that have a saturation extract less than 4 mmhoc/cm and the exchangeable sodium percentage is less than 15 in all horizons within a depth of 40 inches.
- Soils that are not frequently flooded during the growing season (less than a 50% chance in any year or the soil floods less than 50 years out of 100.)
- The product of the erodibility factor times the percent slope is less than 2.0 and the product of soil
 erodibility and the climate factor does not exceed 60.
- Soils that have a permeability rate of at least 0.06 inches per hour in the upper 20 inches.
- Soils, that have less than 10 percent of the upper 6 inches consisting of, rock fragments larger than 3 inches in diameter.

Unique Farmland

This is farmland other than prime that is used for the production of specific high-value food and fiber crops in New Hampshire. Sites represent a special combination of soil quality, location, growing season and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods. In order to qualify as unique farmland, a high-value food or fiber crop must be actively grown. In New Hampshire, unique farmland crops include, but are not necessarily limited to apples, peaches, pears, plums, strawberries, raspberries, cranberries, blueberries, pumpkins, squash, and tomatoes.

Areas of unique farmland are site specific and not cannot be related to soil map units, therefore they are not identified in the database.

Farmland of Statewide Importance

Land that is not prime or unique but is considered farmland of statewide importance for the production of food, feed, fiber, forage and oilseed crops. Criteria for defining and delineating farmland of statewide importance are determined by a state committee chaired by the Commissioner, New Hampshire Department of Agriculture, Markets and Food, with members representing the University of New Hampshire Cooperative Extension, New Hampshire Association of Conservation Districts and the New Hampshire Office of State Planning. The NRCS State Soil Scientist serves on this committee in an advisory capacity. The original criteria were established on June 20, 1983. It was updated on December 7, 2000.

Soils of statewide importance are soils that are not prime or unique and:

- Have slopes of less than 15 percent
- Are not stony, very stony or bouldery
- Are not somewhat poorly, poorly or very poorly drained
- Includes soil complexes comprised of less than 30 percent shallow soils and rock outcrop and slopes do not exceed 8 percent.
- Are not excessively drained soils developed in stratified glacial drift, generally having low available water holding capacity.

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Farmland of Local Importance

Farmland of local importance is farmland that is not prime, unique or of statewide importance, but has local significance for the production of food, feed, fiber and forage. Criteria for the identification and delineation of local farmland is determined on a county-wide basis by the individual County Conservation District Boards. The original criteria were established on June 20, 1983. Updates are noted according to the county initiating the update. The criteria for soils of local importance is as follows:

Belknap County

Soils that are not prime or unique farmland or soils of statewide importance and meet the following criteria:

- Have slopes less than 25%
- Are not extremely stony or bouldery
- Are not poorly or very poorly drained
- Complexes consisting of less than 40 percent shallow soils and rock outcrop and slopes do not exceed 25 percent.
- Includes excessively drained soils developed in stratified glacial drift.

Carroll County

- Soils that are poorly drained, have artificial drainage established and are being farmed.
- Specific soil map units identified from the NRCS county soil survey legend, as determined by the Conservation District Board.

Cheshire County

- Soils that are poorly drained, have artificial drainage established and are being farmed.
- Specific soil map units identified from the NRCS county soil survey legend, as determined by the Conservation District Board.

Coos County

- Soils that are poorly drained, have artificial drainage established and are being farmed.
- Specific soil map units identified from the NRCS county soil survey legend, as determined by the Conservation District Board.
- All land that is in active farm use.

Grafton County

 Specific soil map units identified from the NRCS county soil survey legend, as determined by the Conservation District Board.

Hillsborough County

- Soils that are poorly drained, have artificial drainage established and are being farmed.
- Specific soil map units identified from the NRCS county soil survey legend, as determined by the Conservation District Board.

Merrimack County

Soils that are not prime or unique farmland or soils of statewide importance and meet the following criteria:

- Have slopes less than 25%
- Are not extremely stony or bouldery
- Are not poorly or very poorly drained
- Complexes consisting of less than 40 percent shallow soils and rock outcrop and slopes do not exceed 25 percent.
- Includes excessively drained soils developed in stratified glacial drift.

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Rockingham County

- Soils that are poorly drained, have artificial drainage established and are being farmed.
- Specific soil map units identified from the NRCS county soil survey legend, as determined by the
- Conservation District Board.

Strafford County

- Soils that are poorly drained, have artificial drainage established and are being farmed.
- Specific soil map units identified from the NRCS county soil survey legend, as determined by the
- Conservation District Board.

Sullivan County

- Soils that are poorly drained, have artificial drainage established and are being farmed.
- Specific soil map units identified from the NRCS county soil survey legend, as determined by the Conservation District Board.

Flooding

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Descriptive term used to describe the number of times flooding occurs over a period of time and expressed as a class. Frequencies used to define classes are generally estimated from evidence related to the soil and vegetation. They are expressed in wide ranges that do not indicate a high degree of accuracy. From the *National Soil Survey Handbook*.

none

No reasonable possibility of flooding; near 0 percent chance of flooding in any year or less than 1 time in 500 years.

very rare

Flooding is very unlikely but possible under extremely unusual weather conditions; less than 1 percent chance of flooding in any year or less than 1 time in 100 years, but more than 1 time in 500 years.

rare

Flooding unlikely but possible under unusual weather conditions; 1 to 5 percent chance of flooding in any year or nearly 1 to 5 times in 100 years.

occasiona

Flooding is expected infrequently under usual weather conditions; 5 to 50 percent chance of flooding in any year or 5 to 50 times in 100 years.

freguent

Flooding is likely to occur often under usual weather conditions; more than a 50 percent chance of flooding in any year or more than 50 times in 100 years, but less than a 50 percent chance of flooding in all months in any year.

very frequent

Flooding is more likely to occur very often under usual weather conditions; more than a 50 percent chance of flooding in all months of any year.

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NH Forest Soil Groups

NH Forest Soil Groups (NHFSGs) consist of map units that are similar in their potential for commercial forest products, their suitability for native tree growth, and their use and management. The groups were assigned separately for each soil survey area in New Hampshire. Considered in grouping the map units are depth to bedrock, texture, saturated hydraulic conductivity, available water capacity, drainage class, and slope. The grouping applies only to soils in the State of New Hampshire.

The NHFSGs have been developed to help land users and managers in New Hampshire evaluate the relative productivity of soils and to better understand patterns of plant succession and how soil and site interactions influence management decisions. The soils are assigned to one of five groups (IA, IB, IC, IIA, and IIB). Several map units in New Hampshire either vary so greatly or have such a limited potential for commercial forest products that they have not been assigned an NHFSG. These soils are listed as NC (Not Classified). Examples of NC map units are very poorly drained soils and soils at high elevations. The kinds of tree species generally growing in climax stands in each of the five NHFSGs vary from county to county, and even area to area.

General Definitions

- **IA** This group consists of very deep, loamy, moderately well drained or well drained soils. Generally, these soils are more fertile than other soils and have the most favorable soil moisture relationships.
- **IB** The soils in this group are generally sandy or loamy over sandy material and are slightly less fertile than group IA soils. Group IB soils are moderately well drained or well drained. Their soil moisture is adequate for good tree growth, but it may not be quite as abundant as that in group IA soils.
- **IC** The soils in this group are in areas of outwash sand and gravel. They are moderately well to excessively drained. Their soil moisture is adequate for good softwood growth but is limited for hardwoods.
- **IIA** This diverse group includes many of the same soils as those in groups IA and IB. The soils are separated into a unique group, however, because they have physical limitations that make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness.
- **IIB** The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface. Productivity is generally less than that of soils in the other groups.
- **NC** Not Classified. The map units in this category either vary so greatly or have such a limited potential for commercial forest products that they have not been assigned to an NHFSG. Commonly, onsite visit would be required to evaluate the situation.

The full description for each group varies for each Soil Survey Area – see the following pages for a full description for each County:

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NH Forest Soil Groups

Carroll County

- IA This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as beech, sugar maple, red maple, white birch, yellow birch, aspen, white ash, and northern red oak in varying combinations with red and white spruce, balsam fir, hemlock, and occasionally white pine. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon persistent hardwood control efforts.
- **IB** The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with red spruce, balsam fir, and hemlock. Hardwood competition is moderate to severe on these soils. Successional softwood regeneration is dependent upon hardwood control.
- **IC** The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., red spruce and hemlock. Balsam fir is a persistent component in many stands, but is shorter lived than red spruce and hemlock. White pine, red maple, aspen, and paper birch are common in early and mid-successional stands. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.
- **IIA** This diverse group includes many of the same soils as in groups IA and IB. However, these mapping units have been separated because of physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Usually, productivity of these soils is not greatly affected by their physical limitations. However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly. Due to the diverse nature of this group, it is not possible to generalize about successional trends or to identify special management opportunities.
- **IIB** The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface. Productivity of these poorly drained soils is generally less than soils in other groups. Successional trends are toward climax stands of shade tolerant softwoods, i.e., spruce in the north and hemlock further south. Balsam fir is a persistent component in stands in northern New Hampshire and red maple is common on these soils further south. Due to abundant natural reproduction in northern New Hampshire, these soils are generally desirable for production of spruce and balsam fir, especially pulpwood. Red maple cordwood stands or slow-growing hemlock sawtimber are common in more southerly areas. However, due to poor soil drainage, forest management is somewhat limited. Severe windthrow hazard limits partial cutting, frost action threatens survival of planted seedlings, and harvesting is generally restricted to periods when the ground is frozen.
- **NC** Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an onsite visit would be required to evaluate the situation.

March 18, 2013

NH Forest Soil Groups

Cheshire County

IA - This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as red oak, beech, sugar maple, red maple, white birch, yellow birch, aspen, and white ash in varying combinations with red spruce, hemlock, and white pine. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon persistent hardwood control efforts.

- **IB** The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red oak, red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with white pine, red spruce, balsam fir, and hemlock. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.
- **IC** The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. White pine, red maple, aspen, and paper birch are common in early and mid-successional stands. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., hemlock and red spruce. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.
- **IIA** This diverse group includes many of the same soils as in groups IA and IB. However, these mapping units have been separated because of physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Usually, productivity of these soils is not greatly affected by their physical limitations. However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly. Due to the diverse nature of this group, it is not possible to generalize about successional trends or to identify special management opportunities.
- **IIB** The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface. Productivity of these poorly drained soils is generally less than soils in other groups. Successional trends are toward climax stands of shade tolerant softwoods, i.e., red spruce and hemlock. Red maple is common and a persistent component in many stands with balsam fir. These soils generally support stands of hemlock, red spruce, and balsam fir. Red maple cordwood stands or slow-growing hemlock sawtimber are common. However, due to poor soil drainage, forest management is somewhat limited. Severe windthrow hazard limits partial cutting, frost action threatens survival of planted seedlings, and harvesting is generally restricted to periods when the ground is frozen.
- **NC** Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an onsite visit would be required to evaluate the situation.

March 18, 2013

NH Forest Soil Groups

Coos County

- **IA** This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as beech, sugar maple, red maple, white birch, yellow birch, aspen, white ash, and northern red oak in varying combinations with red and white spruce, balsam fir, and occasionally white pine and hemlock. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon persistent hardwood control efforts.
- **IB** The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with red spruce, balsam fir, and hemlock. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.
- **IC** The soils in this group are outwash sands and gravels. Soil drainage is excessively drained to moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., red spruce and balsam fir. Balsam fir is a persistent component in many stands, but is shorter lived than red spruce. White pine, red maple, aspen, and paper birch are common in early and midsuccessional stands. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.
- **IIA** This diverse group includes many of the same soils as in groups IA and IB. However, these map units have been separated because of physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Usually productivity of these soils is not greatly affected by their physical limitations. However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly. Due to the diverse nature of this group, it is not possible to generalize about successional trends or to identify special management opportunities.
- **IIB** The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface. Productivity of these poorly drained soils is generally less than soils in other groups. Successional trends are toward climax stands of shade tolerant softwoods, i.e., spruce and balsam fir. Balsam fir is a persistent component in stands in northern New Hampshire. Due to abundant natural reproduction in northern New Hampshire, these soils are generally desirable for production of spruce and balsam fir, especially pulpwood. However, due to poor soil drainage, forest management is somewhat limited. Severe windthrow hazard limits partial cutting, frost action threatens survival of planted seedlings, and harvesting is generally restricted to periods when the ground is frozen.
- **NC** Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an onsite visit would be required to evaluate the situation.

March 18, 2013

NH Forest Soil Groups

Grafton County

- **IA** This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as beech, sugar maple, red maple, white birch, yellow birch, aspen, white ash, and northern red oak in varying combinations with red and white spruce, balsam fir, hemlock, and occasionally white pine. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon persistent hardwood control efforts.
- **IB** The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with red spruce, balsam fir, and hemlock. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.
- **IC** The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., red spruce and hemlock. Balsam fir is a persistent component in many stands, but is shorter lived than red spruce and hemlock. White pine, red maple, aspen, and paper birch are common in early and mid-successional stands. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.
- **IIA** This diverse group includes many of the same soils as in groups IA and IB. However, these mapping units have been separated because of physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Usually, productivity of these soils is not greatly affected by their physical limitations. However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly. Due to the diverse nature of this group, it is not possible to generalize about successional trends or to identify special management opportunities.
- **IIB** The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface. Productivity of these poorly drained soils is generally less than soils in other groups. Successional trends are toward climax stands of shade tolerant softwoods, i.e., spruce in the north and hemlock further south. Balsam fir is a persistent component in stands in northern New Hampshire and red maple is common on these soils further south. Due to abundant natural reproduction in northern New Hampshire, these soils are generally desirable for production of spruce and balsam fir, especially pulpwood. Red maple cordwood stands or slow-growing hemlock sawtimber are common in more southerly areas. However, due to poor soil drainage, forest management is somewhat limited. Severe windthrow hazard limits partial cutting, frost action threatens survival of planted seedlings, and harvesting is generally restricted to periods when the ground is frozen.
- **NC** Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an onsite visit would be required to evaluate the situation.

March 18, 2013

NH Forest Soil Groups

Hillsborough County, Eastern Part

- **IA** This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as beech, sugar maple, red maple, white birch, yellow birch, aspen, white ash, and northern red oak in varying combinations with red and white spruce, balsam fir, hemlock, and occasionally white pine. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon hardwood control efforts.
- **IB** The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with red spruce, balsam fir, and hemlock. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.
- **IC** The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., red spruce and hemlock. Balsam fir is a persistent component in many stands, but is shorter lived than red spruce and hemlock. White pine, red maple, aspen, and paper birch are common in early and mid-successional stands. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.
- **IIA** This diverse group includes many of the same soils as in groups IA and IB. However, these mapping units have been separated because of physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Usually, productivity of these soils is not affected by their physical limitations. However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly. Due to the diverse nature of this group, it is not possible to generalize about successional trends or to identify special management opportunities.
- **IIB** The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface. Productivity of these poorly drained soils is generally less than soils in other groups. Successional trends are toward climax stands of shade tolerant softwoods, i.e., spruce in the north and hemlock further south. Balsam fir is a persistent component in stands in northern New Hampshire and red maple is common on these soils further south. Due to abundant natural reproduction in northern New Hampshire, these soils are generally desirable for production of spruce and balsam fir, especially pulpwood. Red maple cordwood stands or slow-growing hemlock sawtimber are common in more southerly areas. However, due to poor soil drainage, forest management is somewhat limited. Severe windthrow hazard limits partial cutting, frost action threatens survival of planted seedlings, and harvesting is generally restricted to periods when the ground is frozen.
- **NC** Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an onsite visit would be required to evaluate the situation.

March 18, 2013

NH Forest Soil Groups

Hillsborough County, Western Part

- **IA** This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as beech, sugar maple, red maple, white birch, yellow birch, aspen, white ash, and northern red oak in varying combinations with red and white spruce, balsam fir, hemlock, and occasionally white pine. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon persistent hardwood control efforts.
- **IB** The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with red spruce, balsam fir, and hemlock. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.
- **IC** The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., red spruces and hemlock. Balsam fir is a persistent component in many stands, but is shorter lived than red spruce and hemlock. White pine, red maple, aspen, and paper birch are common in early and mid-successional stands. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.
- **IIA** This diverse group includes many of the same soils as in groups IA and IB. However, these mapping units have been separated because of physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Usually, productivity of these soils is not greatly affected by their physical limitations. However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly. Due to the diverse nature of this group, it is not possible to generalize about successional trends or to identify special management opportunities.
- **IIB** The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface. Productivity of these poorly drained soils is generally less than soils in other groups. Successional trends are toward climax stands of shade tolerant softwoods, i.e., spruce in the north and hemlock further south. Balsam fir is a persistent component in stands in northern New Hampshire and red maple is common on these soils further south. Due to abundant natural reproduction in northern New Hampshire, these soils are generally desirable for production of spruce and balsam fir, especially pulpwood. Red maple cordwood stands or slow-growing hemlock sawtimber are common in more southerly areas. However, due to poor soil drainage, forest management is somewhat limited. Severe windthrow hazard limits partial cutting, frost action threatens survival of planted seedlings, and harvesting is generally restricted to periods when the ground is frozen.
- **NC** Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an onsite visit would be required to evaluate the situation.

March 18, 2013

NH Forest Soil Groups

Merrimack-Belknap Soil Survey Update

IA - The successional trends on these soils are toward stands of shade tolerant hardwood, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as beech, sugar maple, red maple, white birch, yellow birch, aspen, white ash, and northern red oak in varying combinations with red and white spruce, balsam fir, hemlock, and occasionally white pine. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon persistent hardwood control efforts. This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships.

IB - Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with red spruce, balsam fir, and hemlock. The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.

IC - Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management. The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., red spruce and hemlock. Balsam fir is a persistent component in many stands, but is shorter lived than red spruce and hemlock. White pine, red maple, aspen, and paper birch are common in early and midsuccessional stands.

IIA - This diverse group includes many of the same soils as in groups IA and IB. However, these mapping units have been separated because of physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Due to the diverse nature of this group, it is not possible to generalize about successional trends or to identify special management opportunities. Usually, productivity of these soils is not greatly affected by their physical limitations. However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly.

IIB - Productivity of these poorly drained soils is generally less than soils in other groups. Due to abundant natural reproduction in northern New Hampshire, these soils are generally desirable for production of spruce and balsam fir, especially pulpwood. Red maple cordwood stands or slow-growing hemlock sawtimber are common in more southerly areas. However, due to poor soil drainage, forest management is somewhat limited. Severe windthrow hazard limits partial cutting, frost action threatens survival of planted seedlings, and harvesting is generally restricted to periods when the ground is frozen. Successional trends are toward climax stands of shade tolerant softwoods, i.e., spruce in the north and hemlock further south. Balsam fir is a persistent component in stands in northern New Hampshire and red maple is common on these soils further south. The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface.

NC - Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an onsite visit would be required to evaluate the situation.

March 18, 2013

NH Forest Soil Groups

Rockingham County

IA - This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, beech and sugar maple, and the less tolerant northern red oak. Due to higher moisture holding capacity and fertility of these soils, sugar maple, white ash, and yellow birch are more abundant on these soils. Successional stands frequently contain a variety of hardwoods such as northern red oak, beech, sugar maple, red maple, white birch, gray birch, black birch, yellow birch, aspen, white ash, and black cherry in varying combinations with white pine and hemlock. At higher elevations, some red spruce and balsam fir may be found. Due to severe hardwood competition, white pine is difficult to establish on these soils. However, once established, white pine grows well on these soils. The soils in this group are well suited for production of high quality hardwood sawtimber and veneer. Many stands will contain a variety of valuable hardwood species with sugar maple and northern red oak being the most common.

- **IB** The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but usually not as abundant as in group IA soils. Forests growing on these soils generally have successional trends toward climax hardwood forests of beech and/or oak. Beech and oak (predominantly northern red oak) are less demanding of soil moisture and fertility and are tolerant of shade (beech is very tolerant and oak is intermediate in tolerance). Oak and white pine are very common on these soils. Successional stands, especially those which are heavily cutover, frequently contain a variety of hardwood species such as northern red oak, black oak, white oak, red maple, aspen, paper birch, gray birch, sugar maple, and beech in various combinations with white pine and hemlock. At higher elevations, some red spruce and balsam fir may be present. Hardwood competition on these soils varies from moderate to severe. The coarser textured, well drained soils in this group (moderate hardwood competition) are well suited for production of white pine under intensive management. Soils in this group are well suited for the production of northern red oak, in nearly pure stands or in combination with white pine. Most other valuable hardwoods, i.e., sugar maple, white ash, yellow birch, and black birch are less abundant on these soils.
- **IC** The soils in this group are derived from coarse textured, infertile glacial deposits of outwash sands and gravels. The soils are somewhat excessively to excessively drained and moderately well drained. On the somewhat excessively to excessively drained soils in this group, soil moisture is adequate for good softwood growth, but limited for hardwoods. Moderately well drained soils in this group have adequate moisture for hardwood growth, but are limited by low fertility. The successional trends on these coarse textured, less fertile soils are toward stands of shade tolerant hemlock. However, white pine is very common on these soils and most stands are successional stands of white pine in various combinations with northern red oak, black oak, white oak, red maple, gray birch, white birch, and aspen. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are well suited for softwood production, especially white pine. White pine can be maintained and reproduced on these soils with moderate levels of hardwood control.
- **IIA** This diverse group includes many of the same soils as in groups IA and IB. However, these mapping units have been separated because of physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Usually, productivity of these soils is not greatly affected by their physical limitations. However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly. Due to the diverse nature of this group, it is not possible to generalize about successional trends or to identify special management opportunities.
- **IIB** The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface. This high water table greatly restricts rooting depth, but provides virtually unlimited moisture for tree growth. Productivity of these poorly drained soils is generally less than soils in the other groups. Successional trends are toward climax stands of shade tolerant hemlock. Hemlock, red maple and white maple are common on these soils. Due to poor soil drainage, forest management activities are limited. Severe windthrow hazard limits partial cutting, frost action threatens survival of planted seedlings and harvesting is usually restricted to dry periods or when the ground is frozen.

March 18, 2013

NH Forest Soil Groups

Rockingham County cont.

NC - Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an onsite visit would be required to evaluate the situation.

Strafford County

- **IA** This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple, less tolerant northern red oak. Due to higher moisture holding capacity and fertility of these soils, sugar maple, white ash, and yellow birch are more abundant on these soils. Successional stands frequently contain a variety of hardwoods such as northern red oak, beech, sugar maple, red maple, white birch, gray birch, black birch, yellow birch, aspen, white ash, and black cherry in varying combinations with white pine and hemlock. At higher elevations, some red spruce and balsam fir may be found.
- **IB** The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with red spruce, balsam fir, hemlock, and white pine. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.
- **IC** The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., red spruce and hemlock. White pine, red maple, aspen, paper birch, and grey birch are common in early and mid-successional stands. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.
- **IIA** This diverse group includes many of the same soils as in groups IA and IB. However, these mapping units have been separated because of physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Usually, productivity of these soils is not greatly affected by their physical limitations. However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly. Due to the diverse nature of this group, it is not possible to generalize about successional trends or to identify special management opportunities.
- **IIB** The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface. Productivity of these poorly drained soils is generally less than soils in other groups. Successional trends are toward climax stands of shade tolerant softwoods such as hemlock. Red maple is common on these soils. Red maple cordwood stands or slow-growing hemlock sawtimber are common. However, due to poor soil drainage, forest management is somewhat limited. Severe windthrow hazard limits partial cutting, frost action threatens survival of planted seedlings, and harvesting is generally restricted to periods when the ground is frozen.
- **NC** Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an onsite visit would be required to evaluate the situation.

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NH Forest Soil Groups

Sullivan County

- **IA** This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as beech, sugar maple, red maple, white birch, yellow birch, aspen, white ash, and northern red oak in varying combinations with red and white spruce, balsam fir, hemlock, and occasionally white pine. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon persistent hardwood control efforts.
- **IB** The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with red spruce, balsam fir, and hemlock. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.
- **IC** The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., red spruce and hemlock. Balsam fir is a persistent component in many stands, but is shorter lived than red spruce and hemlock. White pine, red maple, aspen, and paper birch are common in early and mid-successional stands. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.
- **IIA** This diverse group includes many of the same soils as in groups IA and IB. However, these mapping units have been separated because of physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Usually, productivity of these soils is not greatly affected by their physical limitations. However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly. Due to the diverse nature of this group, it is not possible to generalize about successional trends or to identify special management opportunities.
- **IIB** The soils in this group are poorly drained. The seasonal high water table is generally within 12 inches of the surface. Productivity of these poorly drained soils is generally less than soils in other groups. Successional trends are toward climax stands of shade tolerant softwoods, i.e., spruce in the north and hemlock further south. Balsam fir is a persistent component in stands in northern New Hampshire and red maple is common on these soils further south. Due to abundant natural reproduction in northern New Hampshire, these soils are generally desirable for production of spruce and balsam fir, especially pulpwood. Red maple cordwood stands or slow-growing hemlock sawtimber are common in more southerly areas. However, due to poor soil drainage, forest management is somewhat limited. Severe windthrow hazard limits partial cutting, frost action threatens survival of planted seedlings, and harvesting is generally restricted to periods when the ground is frozen.
- **NC** Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an onsite visit would be required to evaluate the situation.

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Hydric Soils

The three essential characteristics of wetlands are hydric soils, wetland hydrology, and hydrophytic vegetation.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a soil is hydric, more specific information, such as information about the depth and duration of the water table, is needed. Criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2010).

Map units that are made up dominantly of hydric soils may have small areas of minor non-hydric components in the higher positions on the landform. Map units that are made up dominantly of non-hydric soils may have small areas of minor hydric components in the lower positions on the landform.

Hydrologic Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A - Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B - Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C - Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D - Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

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Land Capability Class and Subclass (Non-irrigated)

Land capability classification is a system of grouping soils primarily on the basis of their capability to produce common cultivated crops and pasture plants without deteriorating over a long period of time. The Capability Class is a rating of the soil for non-irrigated agricultural use, which indicates progressively greater limitations, and narrower choices for use. The subclass is the second defining category in the land capability classification system. For example: A rating of 6w indicates a severely limited soil for cultivation due to excess water.

Capability Class:

- 1. Soils have slight limitations that restrict their use.
- 2. Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
- Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both,
- 4. Soils have very severe limitations that restrict the choice of plants or require very careful management, or both.
- 5. Soils have little or no hazard of erosion but have other limitations, impractical to remove, that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
- 6. Soils have severe limitations that make them generally unsuited to cultivation and that limit their use mainly to pasture, range, forestland, or wildlife food and cover.
- 7. Soils have very severe limitations that make them unsuited to cultivation and that restrict their use mainly to grazing, forestland, or wildlife.
- 8. Soils and miscellaneous areas have limitations that preclude their use for commercial plant production and limit their use to recreation, wildlife, or water supply or for esthetic purposes.

Capability subclass:

- e Soils for which the susceptibility to erosion is the dominant problem or hazard affecting their use,
- w Soils for which excess water is the dominant hazard or limitation affecting their use,
- s Soils that have soil limitations within the rooting zone, such as shallowness of the rooting zone,
- **c** Soils for which the climate (temperature or lack of moisture) is the major hazard or limitation affecting their use.

Map unit

Consociation - A soil map unit in which a single soil type (or similar soil types) dominates the delineated area.

Complex - A soil map unit consisting of two or more types of soil in an intricate pattern that is not practical to map separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Association - A soil map unit of two or more types of soil that are geographically associated in a repeating pattern. Soil types could be mapped as consociations at a scale of 1:24,000 or less.

Undifferentiated Group - Two or more soil types that are mapped as one map unit because they are not Group consistent in their pattern or soil-landscape relationship and their differences are not significant to the purpose of the survey or to soil management.

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Parent Material

Parent material is the general physical, chemical, and mineralogical composition of the unconsolidated material, mineral or organic, in which the soil forms.

Anthropogenic - Human influenced material, such as an area that was cut and filled.

Alluvium - Material is unconsolidated clastic material, deposited by running water.

Lacustrine - Material deposited in ancient lake beds. Typically composed of fine-textured materials such as silt, clay, and fine sand. The material commonly contains stratified deposits called varves.

Marine - Material deposited on the sea bed or ancient tidal flats. Typically composed of clays and silts.

Organic Material - Parent material is organic material. Organic soils have a minimum of from 12 to 20 percent organic carbon depending on the amount of clay and the duration of saturation with water.

Outwash - Stratified material (chiefly sand and gravel) removed or "washed out" from a glacier by melt-water streams and deposited in front of or beyond the end moraine or the margin of an active glacier. The coarser material is deposited nearer to the ice.

Residuum - Material formed in place from the underlying bedrock.

Till - Material is dominantly unsorted and unstratified drift, generally unconsolidated, deposited directly by and underneath a glacier. Typically consists of a mixture of clay, silt, sand, gravel, stones, and boulders.

Ponding Frequency

Ponding is standing water in a closed depression. The water is removed only by deep percolation, transpiration, or evaporation or by a combination of these processes. Ponding frequency classes are based on the number of times that ponding occurs over a given period. Frequency is expressed as none, rare, occasional, and frequent.

None - Ponding is not probable. The chance of ponding is nearly 0 percent in any year.

Rare - Ponding is unlikely but possible under unusual weather conditions. The chance of ponding is nearly 0 percent to 5 percent in any year.

Occasional - Ponding occurs, on the average, once or less in 2 years. The chance of ponding is 5 to 50 percent in any year.

Frequent - Ponding occurs, on the average, more than once in 2 years. The chance of ponding is more than 50 percent in any year.