Vermont Soil Fact Sheet- Detailed Definitions and Explanations

General Information

The Vermont Soil Fact Sheet was developed to organize a variety of data about a particular soil map unit on one page.

Vermont Important Farmland Classification

Important Farmland ratings help to identify soil map units that represent the best land for producing food, feed, fiber, forage, and oilseed crops. Important Farmland inventories identify soil map units that are Prime Farmland, Additional Farmland of Statewide Importance, and Additional Farmland of Local Importance

Prime Farmland (**Prime**)

The national definition of Prime Farmland was modified to include information that applies to soils in Vermont. The national definition can be found in the Code of Federal Regulations (7CFR657).

Soil map units are Prime Farmland if they have the best combination of physical and chemical characteristics for producing food, feed fiber, forage, and oilseed crops and are also available for these uses. The present land use may be cropland, pasture, forestland, or other land uses, but not urban and built-up or water. Location, tract size, and accessibility to markets and support industries are not considered when making a Prime Farmland determination.

Prime Farmland has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods. These soils have an adequate and dependable water supply from precipitation, a favorable temperature and growing season, acceptable acidity or alkalinity, and few or no surface stones or boulders. They are permeable to water and air, are not excessively erodible or saturated with water for a long period of time, and don't flood frequently or are protected from flooding.

To qualify as a Prime Farmland soil map unit, the dominant soils must meet all of the following conditions:

* Soil temperature and growing season are favorable.

* Soil moisture is adequate to sustain commonly grown crops throughout the growing season in 7 or more years out of 10.

* Water moves readily through the soil and root-restricting layers are absent within 20 inches of the surface.

* Less than 10 percent of the surface layer consists of rock fragments larger than 3 inches in diameter.

* The soils are neither too acid nor too alkaline for, or the soils respond readily to additions of lime.

* The soils are not frequently flooded (less often than once in 2 years) and have no water table, or the water table can be maintained at a sufficient depth during the growing season for the growth of commonly grown crops.

* Slope is favorable (generally less than 8 percent) and the soils are not subject to serious erosion.

* The soils are typically deep (greater than 40 inches to bedrock), but include moderately deep soils (20 to 40 inches) with adequate available water capacity.

Additional Farmland of Statewide Importance (**Statewide**)

This is land, in addition to Prime Farmland, that is of Statewide importance for the production of food, feed, fiber, forage, and oilseed crops. In Vermont, criteria for defining and delineating Statewide Important Farmland was determined by the appropriate state agencies, working with the Natural Resources Conservation Service.

The dominant soils, in these soil map units, have limitations resulting from one or more of the following:

* Excess slope and erosion hazard,

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* Excess wetness or slow permeability,

* A flooding hazard,

* Shallow depth (less than 20 inches) to bedrock or other layers that limit the rooting zone and available water capacity,

* Moderately low to very low available water capacity.

Additional Farmland of Local Importance (**Local**)

In some areas, there is a need to identify additional farmlands for the production of food, feed, fiber, forage, and oilseed crops that has not been identified by the other categories in the Important Farmland system. These lands can be identified as Additional Farmland of Local Importance by the appropriate local agencies. In places, Additional Farmlands of Local Importance may include tracts of land that have been designated for agriculture by local ordinance.

In Vermont, a few soil map units in certain counties have been identified as Additional Farmland of Local Importance. The local Natural Resources Conservation Districts made these designations, with assistance from local NRCS personnel and concurrence by the State Conservationist.

For many soil map units on less than 15 percent slope that are somewhat poorly drained to very poorly drained the major limiting factors that need to be overcome are surface stones that cover 0.1 to 3.0 percent of the surface and wetness. However, many of these areas may have never been cleared of surface stones because the wetness limitation was too difficult to overcome.

NPSL. stands for “Not Prime, Statewide, or Local” and replaces “not rated”

Important Farmland Determinations

An Important Farmland classification of Prime, Statewide, Local is assigned to soil map units based on the characteristics of the dominant soils in the soil map unit. Determinations of unique are based on the specific crop and are not directly related to the soil map unit.

In most cases, Important Farmland determinations are made on a soil map unit basis. They are never made for individual components of a soil map unit. For example, if the area in question is a delineation of a Prime soil map unit the whole area is considered Prime regardless of any map unit inclusions within the delineation.

The Important Farmland designation of individual delineation's of a soil map unit can't be changed without an onsite investigation and a change in the official copy of the soil map where the area is located. This would only occur after an evaluation of a representative sample of all delineation's of the specific soil map unit within the soil survey area.

There are exceptions. Prime, Statewide, and Local soil map units can't be urban or buildup. A delineation of a Prime, Statewide, or Local soil map unit, which has been converted to urban or build up, should no longer be considered Important Farmland. The delineation should be changed to an appropriate soil map unit on the official copy of the soil map.

Delineations of some soil map units that are Prime, Statewide, or Local have a wetness, bedrock, or slope limitation. These soil map units are footnoted in the soil surveys legends at the end of this report. It is assumed that delineations of these map units are Prime, Statewide, or Local unless an onsite determines that the delineation should not be Important Farmland. A determination that the delineation is not Important Farmland doesn't require that change is made in the soil map unit symbol. See the FOOTNOTES section for more details.

The following footnotes are used:

FOOTNOTE “a” - If the upper slope class limit of the soil map unit is between 9 and 15 percent then the areas of the soil map unit that exceed 8 percent slope don’t qualify as Prime, Statewide, or Local. If the upper slope class limit exceeds 15 percent then the areas of the soil map unit that exceed 15 percent slope don’t qualify as Important Farmland.

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FOOTNOTE “b” - The soils in this soil map unit have a wetness limitation that may be difficult and/or unfeasible to over come. Areas of this soil map unit don’t qualify as Prime, Statewide, or Local, if artificial drainage is not feasible.

FOOTNOTE “c” - Bedrock outcrops commonly cover more than 2 percent of the surface. Areas of this soil map unit will not qualify as Prime, Statewide, or Local, if bedrock outcrops are extensive enough to prohibit efficient farming.

Vermont Agricultural Value Group

Agricultural value groups are a land classification system that can be used to compare the "relative value" for crop production of one soil map unit to another. They can be a useful tool in administering national, state, and local land use programs and regulations.

Soil map units were placed in their respective Agricultural Value Groups assuming that it was feasible to apply the corrective measures needed to overcome the soil limitations identified in the soil potential study. Soil map units associated with bedrock or wetness are identified by footnotes, defined in the section Footnotes, and are listed on the soil survey legends. Users of this report are encouraged to consider the footnotes and the need for on-site investigations.

Agricultural Value Groups Descriptions

Agricultural Value Groups consist of soil map units that have similar characteristics, limitations, management requirements, and potential for crop production. Soil map units in Group 1 have the most potential for crop production and soil map units in Groups 11 and 12 have the least potential for crop production. The description and makeup of the Agricultural Value Groups are as follows:

1 – These soil map units have an Important Farmland rating of Prime. Most of the soil map units are in Land Capability Class 1 or 2. Their relative value is 100.

2 – These soil map units have an Important Farmland rating of Statewide. Most of the soil map units are in Land Capability Class 2. Their relative value is 97.

3 – These soil map units have an Important Farmland rating of Prime. Most of the soil map units are in Land Capability Class 2 or 3. Their relative value is 84.

4 – These soil map units have an Important Farmland rating of Statewide. Most of the soil map units are in Land Capability Class 2, 3, or 4. Their relative value is 82.

5- These soil map units have an Important Farmland rating of Statewide. Most of the soil map units are in Land Capability Class 3. Their relative value is 69.

6- These soil map units have an Important Farmland rating of Statewide. Most of the soil map units are in Land Capability Class 2, 3, or 4. Their relative value is 63.

7- These soil map units have an Important Farmland rating of Statewide. Most of the soil map units are in Land Capability Class 3. Their relative value is 57.

8- These soil map units have limitations for crop production that can be overcome. Most of the soil map units are in Land Capability Class 4 or 6. Low crop yields, low available water capacity, and erosion hazard tend to be the major limitations. This group includes a few soil map units that have an Important Farmland rating of Local. Their relative value is 52.

9- These soil map units have limitations that are difficult to overcome and they are usually considered to be unsuitable for crop production. Limiting factors can include but are not limited to slope, wetness, surface stones, and bedrock outcrops. On-site investigations are strongly recommended to determine the feasibility of installing corrective measures and using these soils for crop production. If the user determines, that corrective measures can't be installed then the area in question should be placed in Agricultural Value Group 11. Normally, the cost of overcoming corrective measures and laws governing the installation of corrective measures should not be considered when making this determination. In some situations, if laws prevent the installation of corrective measures, the area in question should be placed in Agricultural Value Group 11. Most of the soil map units are in Land Capability

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Class 5, 6, or 7. Their relative value is 43.

10- These soil map units have limitations are very difficult to overcome and they are usually considered to be unsuitable for crop production. Limiting factors can include but are not limited to slope, wetness, surface stones, and bedrock outcrops. They can be used as cropland only after intensive and expensive installation of various corrective measures. On-site investigations are strongly recommended to determine feasibility of installing corrective measures and using these soils for crop production. . If the user determines, that corrective measures can't be installed then the area in question should be placed in Agricultural Value Group 11. Normally, the cost of overcoming corrective measures and laws governing the installation of corrective measures should not be considered when making this determination. In some situations, if laws prevent the installation of corrective measures, the area in question should be placed in Agricultural Value Group 11. Most of the soil map units are in Land Capability Class 5, 6, or 7. Their relative value is 22.

11- These soil map units are considered to have very limited potential for crop production. Most of the soil map units are in Land Capability Class 7 or 8. Only in rare situations, and usually after great expense, are these soil map units converted for crop production. Their relative value is 0.

12- These soil map units are areas within a digitized or published soil survey that have never been mapped because of restricted access or the policy on mapping urban areas that was in place at the time. An onsite should be conducted to determine if areas of these soil map units should be assigned to a different Agricultural Value Group. No relative value is assigned.

FOOTNOTE “d”- The soils in this soil map unit have a wetness limitation that may not be feasible to over come. Areas of this soil map unit, where artificial drainage is not feasible should be placed in Agricultural Value Group 11.

FOOTNOTE “e”- Bedrock outcrops cover more than 2 percent of the surface. Areas of this soil map unit should be placed in Agricultural Value Group 11, if bedrock outcrops are extensive enough to prohibit efficient farming.

Possible Uses

Agricultural Value Groups and relative values may be useful in many state and local programs, including:

* design and implementation of Agricultural Land Evaluation and Site Assessment (LESA) systems;

* implementation of Public Law 97-98, the Farmland Protection Policy Act (FPPA);

* rating of agricultural soils for appraisal under Vermont’s Use Value Program of Agricultural and Forest Land;

* rating of agricultural soils for appraisal under Town Tax Stabilization Programs;

* assessment of agricultural soils by land trusts, landowners, bankers, realtors; and

* broad resource planning by state agencies and town and regional planning commissions.

Vermont Residential On-site Waste Disposal Group

This information identifies the new onsite sewage disposal class and footnote of the map unit.
Ratings are based on Vermont Environmental Protection Rules, August 16, 2002, based on 20% maximum slope – for lots created on or after June 14, 2002.

It doesn’t replace onsite investigation.

These are the five major classes.
Class I - WELL SUITED
Class II - MODERATELY SUITED
Class III - MARGINALLY SUITED

Vermont Residential On-site Waste Disposal Group

Class IV - NOT SUITED
Class V - NOT RATED

The combination of class and footnote provides information on the major soil properties affecting the class assignment. A brief summary of the ratings groups follows. (For more detailed information on the individual classes, see Appendix A.)

Ia - WELL SUITED - Soil map units with rapid permeability
Ib - WELL SUITED - Soil map units with rapid permeability and limited slope
Ic - WELL SUITED - Soil map units with moderate permeability
Id - WELL SUITED - Soil map units with moderate permeability and limited slope

IIa - MODERATELY SUITED - Soil map units with slow permeability
IIb - MODERATELY SUITED - Soil map units with slow permeability and limited slope
IIc - MODERATELY SUITED - Soil map units with moderate depth to bedrock
IId - MODERATELY SUITED - Soil map units with moderate depth to bedrock and limited slope
IIe - MODERATELY SUITED - Soil map units with rapid permeability and steep slope
IIf - MODERATELY SUITED - Soil map units with moderate permeability and steep slope
IIg - MODERATELY SUITED - Soil map units with flooding limitation
IIh - MODERATELY SUITED - Soil map units with moderate depth to seasonal high water table (SHWT)

IIIa - MARGINALLY SUITED - Soil map units with marginal depth to bedrock
IIIb - MARGINALLY SUITED - Soil map units with flooding limitation and moderate depth to SHWT
IIIc - MARGINALLY SUITED - Soil map units with marginal depth to SHWT and gentle slope
IIId - MARGINALLY SUITED - Soil map units with marginal depth to SHWT and moderate slope
IIIe - MARGINALLY SUITED - Soil map units with marginal depth to SHWT and limited slope
IIIf - MARGINALLY SUITED - Soil map units with SHWT and depth to bedrock limitation

IVa - NOT SUITED - Soil map units not suited due to excessive wetness
IVb - NOT SUITED - Soil map units not suited due to limited depth to bedrock and steep slope
IVc - NOT SUITED - Soil map units not suited due to very limited depth to bedrock on moderate slopes
IVd - NOT SUITED - Soil map units not suited due to slow permeability and steep slope

V - NOT RATED MAP UNITS

Physical and Chemical Properties

This table shows estimates of some physical and chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils. **Depth** to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. The estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification. The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Soil reaction (**pH**) is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

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Physical and Chemical Properties

Saturated hydraulic conductivity refers to the ability of a soil to transmit water or air. The term **"permeability**" indicates saturated hydraulic conductivity (Ksat). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. The estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water. Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments. Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size. Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Water Features

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

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 four hydrologic soil groups are:

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.

Water table refers to a saturated zone in the soil. The water features table indicates depth to the top (upper limit) of the saturated zone in most years. Estimates of the upper limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

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.

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Water Features

Duration and frequency are estimated. Duration is expressed as extremely brief if 0.1 hour to 4 hours, very brief if 4 hours to 2 days, brief if 2 to 7 days, long if 7 to 30 days, and very long if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. None means that flooding is not probable; very rare that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); rare that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); occasional that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); frequent that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and very frequent that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Soil Features

Hydric Soil?

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology. Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

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. 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 specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established. These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, USDA, 1999) and in the "Soil Survey Manual" (Soil Survey Staff, USDA, 1993).

If soils are wet enough for a long enough period 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 in this survey area are specified in "Field Indicators of Hydric Soils in the United States" (USDA, NRCS, 2002). (A separate guide, "Field Indicators for Identifying Hydric Soils in New England," is also available. Please consult with the State Wetlands Office for more information.)

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Using the completed soil descriptions, soil scientists can then compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

This survey can be used to locate probable areas of hydric soils.

Soil components with a value of “yes” meet the definition of hydric soils and, in addition, have at least one of the hydric soil indicators. This rating can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site.

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Soil Features

Depth to Bedrock
This table gives estimates of depth to a bedrock layer, if bedrock is a restrictive feature normally associated with the soil. The estimates are used in land use planning that involves engineering considerations. Depth to top is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

The **Land Capability Classification** system shows the suitability of soils for most agricultural uses. Soils are grouped according to their limitations for agricultural crops, the risk of damage when they are used, and the way they respond to management. The grouping does not consider major, and generally expensive, landforming activities that would change slope, depth, or other characteristics of the soils, nor does it consider major land reclamation projects.

Soils are grouped at three levels: capability class, subclass, and unit. Classes and subclasses have been used in this study. Capability classes are designated by Roman numerals I through VIII in older soil survey reports, and by Arabic numerals 1 through 8 in newer soil survey reports. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or require very careful management, or both.

Class 5 soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for crop production.

Class 7 soils have very severe limitations that make them unsuitable for crop production.

Class 8 soils and miscellaneous land areas have limitations that nearly prelude their use for crop production.

Capability subclasses indicate the major kinds of limitations within each capability class. Within most capability classes there can be up to four subclasses. Adding a small letter e, w, s, or c, to the class numeral indicates the subclass. An example is 2e.

The letter e represents a risk of erosion,
w means that water in or on the soil will interfere with plant growth or crop production,
s represents a shallow, droughty, or surface stoniness limitation, and
c represents a climate limitation that is very cold or very dry.

Land Use Limitations

This table shows the degree and kind of soil limitations that affect dwellings with basements and pond reservoir areas. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development.

Slight indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected.

Moderate indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation.

Severe indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Land Use Limitations

Dwellings are single-family houses of three stories or less. For **dwellings with basements**, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet.

The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the saturated hydraulic conductivity (Ksat) of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Agricultural Yield Data

The average yields per acre that can be expected of the principal crops under a high level of management are shown in the crop yield table. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of the soil component(s) in the map unit is shown just above the yield data.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the crop yield table are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Woodland Management

This table can help forest owners or managers plan the use of soils for wood crops.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of slight indicates that no particular prevention measures are needed under ordinary conditions. A rating of moderate indicates that erosion-control measures are needed in certain silvicultural activities. A rating of severe indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of slight indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of moderate indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of severe indicates

Woodland Management

that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of slight indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of moderate indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of severe indicates that many trees can be blown down during these periods.

Potential productivity of merchantable or common trees on a soil is expressed as a **site index**. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

Contacting Support

Questions about the Vermont Soil Fact Sheets should be directed to Martha Stuart, Vermont soils dataset manager. Email: martha.stuart@vt.usda.gov Phone: 802-295-7942 ext 28

For a copy of the report titled “Farmland Classification Systems for Vermont Soils”, dated April, 2003, contact:

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