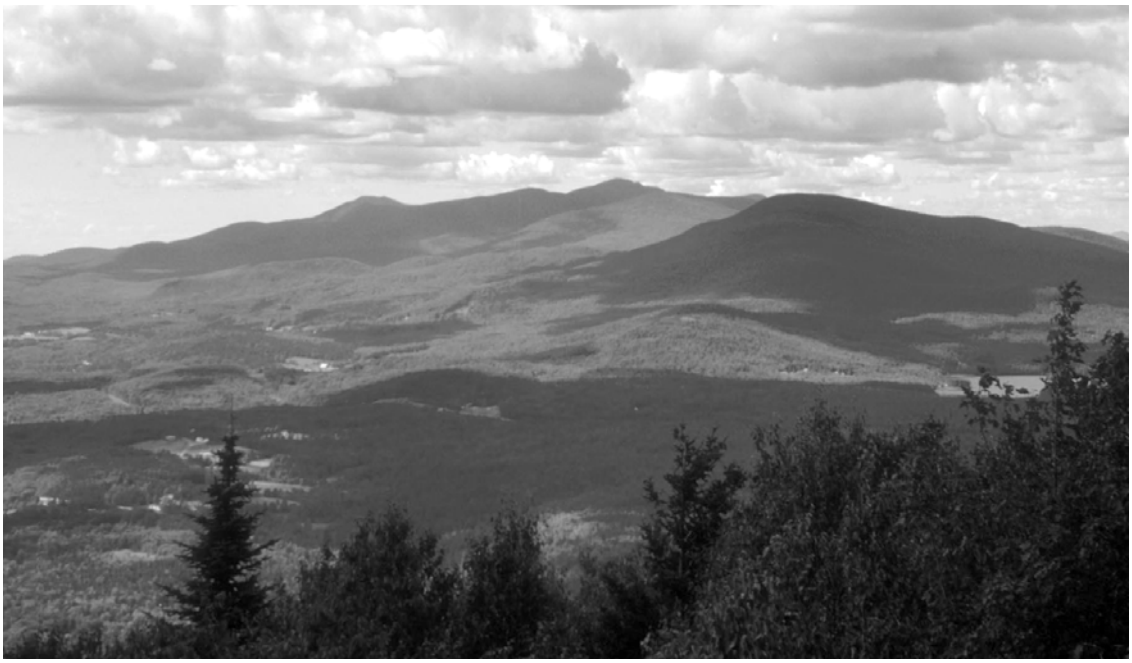
FOREST VALUE GROUPS

and

FOREST SOIL POTENTIAL STUDY

FOR VERMONT SOILS



UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
Colchester, Vermont

in cooperation with

VERMONT DEPARTMENT OF FORESTS,
PARKS AND RECREATION

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Vermont County Forest Value Group Listings are available ...

- **from local NRCS offices**
- **from the State Soil Scientist or Soil Resource Specialist (see Contact Information)**
- **on the Web: see individual County Soil Survey folders in Section II, Part A. Soils Information, in the Electronic Field Office Tech Guide (http://efotg.nrcs.usda.gov/efotg_locator.aspx?map=VT)**

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FOREWORD

This updated report replaces earlier versions that were issued on November 18, 2003, November 27, 2002, August 1999, and February 25, 1991.

The format and organization of this report differs from earlier versions in an attempt to improve its clarity. The information is presented in two parts: this narrative report and separate listings for each county based on its soil survey legend. Information on Forest Value Groups has been compiled and presented in Part A, while the Forest Soil Potential Study that the Forest Value Groups are based on is detailed in Part B.

In the county listings, the Forest Value Group ratings have been updated in the counties where soil mapping is still on-going, Caledonia and Essex Counties, and also in recently completed Orleans County. In the Grand Isle County Forest Value Group listing, several map units were added to complete the digital soil survey certification. Until the soil mapping is completed for the entire state and digitized and certified, further updates may be necessary.

NRCS appreciates and welcomes comments regarding possible improvements to this report and other information related to soils and forest management. Please refer all comments to either the State Soil Scientist or the Soil Resource Specialist (see Contact Information at the back of this report.)

PART A. FOREST VALUE GROUPS

This report presents statewide Vermont Forest Value Groups and relative values for woodland production and management for over 1500 soil map units identified in Natural Resources Conservation Service (NRCS) county soil survey legends. The Forest Value Group designations can be used for many resource management activities, including:

* Design and implementation of Forest Land Evaluation and Site Assessment (FLESA) systems;
* Evaluation of primary and secondary forest soils under criterion 9C of Vermont's Land Use and Development Law, Act 250;
* Rating of forest soils for appraisal under Vermont's Use Value Program of Agricultural and Forest Land;
* Assessment of forest soils by private land trusts, landowners, bankers, realtors; and
* Broad resource planning by state agencies and town and regional planning commissions.

Forest Value Group ratings do not constitute a recommendation for land use. They are intended to provide planners and decision makers with information on a soil's relative potential for woodland management activities. Many factors other than soils are considered in a comprehensive evaluation of a site's potential for woodland production and management. Two such factors include current land use and distribution and extent of each kind of soil map unit. For example, there may be 200 acres of a soil map unit within the planning area, but 160 acres of it may be in rural housing and unavailable for woodland management activities. Or there may be several map units with a high rating, but their total acreage may be small within the planning unit. In many cases, a landowner's goals and objectives are the most important factors in woodland management.

A forest soil potential study led by NRCS, and detailed in this report, formed the basis for development of the Forest Value Groups and their relative values. The forest soil potential study determined the relative costs associated with overcoming various soil limitations as applied to a single use - woodland productivity and management. Some criteria used in the forest soil potential study should be kept in mind when using the Forest Value Group ratings:

- Sugar Maple was used as the indicator species for northern hardwoods for most soil map units.

- On soils formed in glaciofluvial deposits (generally sandy and/or gravelly soils), Eastern White Pine tends to dominate northern hardwoods. Because of this, Eastern White Pine was used as the indicator species for soil map units formed in glaciofluvial deposits.

- Several hundred soil map units were considered to have very limited potential for commercial forestry and were assigned a rating of zero. These map units are in Forest Value Group 7. Although they have some forestry potential, it was deemed to be of a very limited nature. When necessary, the potential of these map units should be evaluated on a case-by-case basis. Map units with a rating of zero are composed primarily of:

    - Organic soils (Histosols),

    - Soils with a cryic soil temperature regime (generallly above 2,500 - 3,000 feet in elevation),

    - Miscellaneous land types (e.g., urban land, pits, quarries, sand and gravel pits),

    - Very poorly drained mineral soils, and

    - Soils on slopes exceeding 60 percent.

- The forest soil potential ratings are based on the integration of numerous data derived from the literature and the knowledge of technical specialists in the field of silviculture in Vermont. Some of these data are estimates. Potential yields on specific soil map units are examples of estimates used in the report. The forest soil potential ratings are only as accurate as the estimates used to derive them. The estimates and the ratings are subject to change as more precise data becomes available.

- Monetary benefits and costs associated with potential yields and soil corrective measures can change due to inflation, changes in market value, or technological changes. Such changes can affect the forest soil potential ratings and thereby warrant an update of the study and this report.

Soil map units in Forest Value Group 1 have very high potential productivity for producing and harvesting timber. Those in Forest Value Group 2 have high potential productivity. Those in Forest Value Group 3 have moderate potential productivity. Those units in Forest Value Group 4 have moderately low potential productivity. Map units in Forest Value Group 5 have low potential productivity, and those in Forest Value Group 6 have very low potential productivity. Map units in Forest Value Group 7 have very limited potential productivity. The relative values that the Forest Value Groups are based on are index numbers and do not represent dollar net returns for a given forestry use. Determinations of the absolute profitability of woodland production on a specific soil map unit are not possible from the relative values. The relative values may be used, however, to compare the relative profitability of growing trees on various soils.

With the exception of broad planning activities, on-site investigations are recommended when using this report. Three factors justify the need for on-site investigations:

- They are needed to assess variations in site conditions within a map unit delineation (i.e. stoniness, aspect, rock outcrops, wetness) which may affect tree growth.

- They are needed to assess the steeper portions of soil map units that range from 25 to 60 percent slopes. Steeper portions of these map unit delineations may be unsuitable for timber harvesting.

- They are needed to access the unique landscape characteristics of a map unit delineation. For example, there are numerous delineations of Lyman-Tunbridge complex, 3 to 8 percent slopes throughout the state. In some instances, however, these delineations may be inaccessible because of irregular slope patterns or the presence of large streams and drainageways. These site characteristics can result in small, inefficient tract sizes, may hamper logging equipment, and can even make a site poorly suited for forestry without additional, expensive land shaping activities.

PART B. FOREST SOIL POTENTIAL STUDY

Introduction

Soil survey interpretations have been prepared and provided to users of soil surveys for many years. They have been in the form of land capability classes, woodland suitability groups, and soil interpretation ratings for many non-agricultural uses. An example of soil interpretation ratings are the *slight, moderate*, and *severe* interpretative designations. These designations provide a uniform national system of describing soil limitations for various uses. However, this system does have some shortcomings.

* It is based on the most limiting soil property, rather than on a combination of restrictive features;

* It does not indicate corrective measures needed to overcome restrictive soil features; and

* It does not array groups of soils from highest to lowest potential for a given use.

The third shortcoming - not arraying soils - has become a significant issue in Vermont. The Woodland Management and Productivity tables in published soil survey reports provide useful information regarding forest management concerns and potential productivity. But it is difficult to weigh the relative value of one soil map unit against another. Questions arise regarding the specific differences or similarity between two soil map units: How much better is one soil map unit from another? Can this difference be measured? If so, how? State programs and recent legislation have indicated a need for a numerical rating system rather than the traditional system of assigning a suitability or describing limitations for soil map units. In particular, several state programs need a system to evaluate soils for their forestry value relative to other soils in a given locale.

In 1985, NRCS (then known as the Soil Conservation Service), working in consultation with state and private forest managers, began a forest soil potential study to develop a numerical rating system for NRCS soil map units in relation to their woodland productivity and management potential.

The purpose of a soil potential study is to identify within an area the relative suitability of soils for a given use while considering economic, social, and environmental values. Policy and procedures for conducting soil potential studies were established by NRCS in 1978. These guidelines, set forth in the National Soil Survey Handbook (1983), were followed during the study.

Technical specialists with NRCS and the Vermont Department of Forests, Parks and Recreation and private foresters and landowners comprised the study committee and provided input for the study (see Table 5 for a list of participants).

Three earlier studies were considered when developing the format for this study: Soil Potential Ratings for Haul Roads (CCCD, 1984) from Coos County, New Hampshire; Forestland Evaluation and Assessment Systems (SCS, 1981) from Hanover County, Virginia; and Soil Potential Ratings for Timber Production (SCS, 1983) from Mt. Hood National Forest, Oregon.

Development of the Forest Soil Potential Ratings

The study determined a Soil Potential Index (SPI) for each soil map unit in the state. SPI's are calculated from the equation:

$$SPI = P - (CM + CL)$$

To solve the equation, the *performance index* (P), *costs of corrective measures* (CM), and *costs of continuing limitations* (CL) were converted to dollars to provide a common basis of comparison. The *performance index* was converted to dollars by multiplying the estimated yield by market value and then subtracting the common harvest cost. *Costs of corrective measures* were estimated on dollar per cutting unit basis, as were *costs of continuing limitations*.

Corrective Measures and Continuing Limitations

Corrective measures and continuing limitations, and their associated costs, were determined by the Study Committee and were based on *evaluating criteria for producing and harvesting timber* (see Table 1). The corrective measures are practices commonly used in the state. Costs are based on the experience of the Study Committee and are in dollars per 50 acre cutting unit. Cost explanations and derivations of the corrective measures for each of the evaluating criteria are as follows: (Note: *Slight* soil limitations do not require corrective measures and associated costs – see Table 2.)

> Soil Drainage Class - Soil drainage class is one of the factors used to estimate seedling mortality. Seedling mortality is caused mainly by too much water or too little water within the root zone. Map units with a *moderate* or *severe* rating for seedling mortality require conventional silvicultural management practices to avoid losses due to seedling mortality. No costs for corrective measures were anticipated. (Note: Very poorly drained mineral and organic soils were considered to have very limited potential for commercial forest production. They were assigned a rating of zero.)
>
> Effective Rooting Depth - Restricted rooting depth is the principal cause of windthrow. Map units with a *moderate* or *severe* ratings for windthrow require extra care when harvesting. Even-aged management strip cutting or patch cutting may be needed to reduce the windthrow hazard. No costs for corrective measures were anticipated.

Erodibility - Erodibility or erosion hazard is the probability that damage may occur as a result of site preparation and following cutting operations where the soil is exposed - along roads, skid trails, fire lanes, and log handling areas. Map units with a *moderate* rating for erosion hazard were assigned a cost of $50/cutting unit, reflecting the cost of installing 6 additional water bars per cutting unit. Soils with a *severe* rating were assigned a cost of $100/cutting unit, reflecting the cost of 12 additional water bars per cutting unit. Map units with a *moderate* or *severe* rating were also assigned a continuing limitation cost per cutting unit to maintain the water bars. The cost reflects the cost of 1/2 hour additional dozer time required each day to repair the water bars.

Rock Outcrop - Rock outcrops affect access for logging equipment. Map units with a *moderate* rating for equipment limitations due to rock outcrops were assigned a cost of $20/MBF harvested/cutting unit. This cost reflects the repairs required due to additional wear and tear on equipment and special skid road designs required because of the limited site accessibility. Map units with a *severe* rating were assigned a cost of $30/MBF harvested/cutting unit.

Seasonal High Water Table - Soils with a *moderate* or *severe* rating for equipment limitations because of seasonal high water tables in the soil require that logging operations be performed when the soil is dry or frozen. No costs were assigned for this restriction on equipment use.

Slope - As the slope gradient increases, it becomes more difficult to use conventional equipment. Map units with a *moderate* rating for equipment limitations because of slope were assigned a cost of $750/cutting unit to cover the cost of special skid road designs and $100/cutting unit to cover the cost of 12 additional water bars. Map units with a *severe* rating were assigned a cost of $1125/cutting unit for special skid road designs and $100/cutting unit for additional water bars. Map units rated as *severe* were also assigned an additional $1500/cutting unit to cover the additional on-site dozer time required to work on the steeper slope. Soils with *moderate* or *severe* ratings were assigned an additional continuing limitation cost per cutting unit to maintain the water bars. The cost reflects the cost of 1/2 hour additional dozer time required each day to repair the water bars. (Note: Soils with slopes greater than 60% were considered to be unsafe for operating logging equipment and to have a very limited potential for commercial forest production. They were assigned a rating of zero.)

Surface Stones or Boulders - Map units with a *moderate* rating for equipment limitations because of surface stones or boulders were assigned a cost of $12/MBF per cutting unit. This cost reflects the increased labor and machine time required due to the surface stones and

boulders. Soils with a *severe* rating were assigned a cost of $30/MBF per cutting unit.

Surface Texture - Soils with a *moderate* rating for equipment limitations because of surface texture were assigned a cost of $525/cutting unit, reflecting the cost of 1.5 days of additional dozer time required to close the site. Soils with a *severe* rating were assigned a cost of $700/cutting unit, reflecting the cost of 2 additional days of dozer time to close the site.

Ranking

After calculating the soil potential indexes, the soil map units were ranked numerically from lowest SPI to highest SPI. The SPI values ranged from 0 to 26,400. These values were converted to a scale of 0-100 as follows:

$$(SPI/26{,}400)(100) = SPI\ (100\ Scale)$$

Relative values for each Forest Value Group were based on the same scale of 0 to 100, with 100 denoting the highest forest value and 0 denoting the lowest. Soil map units with a relative value of 0 include all soil map units identified as having very limited potential for commercial forestry.

Once all map units were assigned a relative value, they were arrayed numerically and placed in one of seven Forest Value Groups (see Table 3).

Assumptions

In order to expedite the rating assignment, the following assumptions were made:

Management Practices - The ratings assume the following management practices:

- Plant and soil resources are managed for high levels of production.
- Stands are established, fully stocked, even-aged, and are composed of mixed northern hardwoods or eastern white pine.
- No costs of site preparation, stand establishment, weeding, pre-commercial thinning or release are considered.
- Silvicultural management is for natural regeneration.
- Commercial thinning is practiced.
- Minimum impact road designs are used for harvesting.
- Soils are managed to prevent degradation of plant and soil resources.

Yields - The NRCS Staff Forester established the estimated yield information for all soils. The Soil Interpretation Record (SCS-SOI-5) and the SCS Forest Soils Database was used as a basis for the estimates. The SCS-SOI-5's provide potential productivity information based on site index. Site index values on the SCS-SOI-5's were rounded to the nearest multiple of 5.

Yield per cutting unit in each map unit was estimated using the following formula:

> Yield by site index in board feet (BF) per acre divided by 1000 board feet per thousand board feet (MBF) times .20 times 50. The yield of MBF was multiplied by .20 and by 50 to reflect the 20% harvest and 50 acre cutting unit. The yields were considered to be the best available estimates at the time of the study.

Common Harvest Method - The common harvest method is considered the standard and is used where there are *slight* soil limitations or no soil limitations. Assumptions are:

- Harvesting is by 50 acre cutting unit with 20 percent of the unit being harvested.
- Production is based on yield for a 100 year rotation and harvest of saw timber.
- Rubber tired skidders are used.
- Truck road access is in place and the site is accessible.
- 2000 feet of skid road with grade of less than 6 percent is installed per cutting unit.
- 12 water bars and/or drainage dips are installed and maintained per cutting unit.
- The site is closed after harvesting. This includes removing stream crossings, seeding and mulching, and installing final water bars.

Common Harvest Method Costs - The common harvest method cost was assumed to be $60/MBF of saw logs harvested.

Corrective measures and continuing limitations - Assumptions used for estimating the cost of corrective measures and continuing limitations are:

- The standard harvest output is equal to 3 MBF/day.
- Dozer cost is $350/day or $35/hour.

Market value - The market value for sugar maple was assumed to be $185/MBF mill delivered. The market value for eastern white pine was assumed to be $160/MBF mill delivered.

Discussion

The forest soil potential study ratings were derived using corrective measures considered technically feasible with current knowledge and technology. The willingness or probability of landowners applying such measures was not considered.

As mentioned earlier, monetary benefits and costs used in the study may change due to inflation, market value, or technological changes. More precise data may become available regarding yields and costs of corrective measures. Changes in these factors will affect the soil potential ratings, warranting a review and possible update of this study. NRCS will have responsibility for reviewing the study and initiating any necessary updates. Questions and comments regarding such updates should be directed to the NRCS State Soil Scientist in Colchester, Vermont (see contact information at the end of this report).

The ratings are based on soil map units of county soil survey legends in Vermont. See Table 4 for the Status of Soil Surveys in Vermont. An identifying symbol precedes the soil map unit name in the legends. There are four types of map units used in the soil surveys: phases, complexes, associations, and undifferentiated groups. The following is a brief definition of each. A further explanation of the different types of map units can be found in the National Soils Handbook (Soil Survey Staff, 1983).

- *Phases* - Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of one series can differ in texture of the surface layer, slope, stoniness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, *Buckland loam, 8 to 15 percent slopes, very stony* is a phase of the Buckland series.

Some map units are made up of two or more major soils or *miscellaneous areas*. These map units are known as complexes, associations, or undifferentiated groups. *Miscellaneous areas* have little or no soil material and support little or no vegetation. *Fill land* is an example.

- A *complex* consists of two or more soils or miscellaneous areas occuring in such an intricate pattern or in such small areas that they cannot be shown separately at the scale of the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. *Tunbridge-Lyman complex, 35 to 60 percent slopes, very rocky,* is an example.

- An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. *Peru-Berkshire-Colton association, 3 to 35 percent slopes, very stony,* is an example.

- An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. For example, all the soils in any specific undifferentiated group will have the same Forest Value Group rating. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. *Berkshire and Monadnock fine sandy loams, 8 to 15 percent slopes, very stony* is an example of an undifferentiated group.

The numerical rating of complexes and associations is dependent on the proportion of the different soils within each map unit. These proportions are explained in the Detailed Map Unit Descriptions of soil survey reports and are estimates of the *average* composition of the map unit throughout the entire survey area. These proportions often differ from one soil survey area to another.

GLOSSARY

Continuing Limitation-

soil limitations for woodland production which cannot be mitigated through the application of corrective measures. These include maintenance costs of corrective measures or substandard performance in the form of reduced yields.

Corrective Measures-

installations and management practices used to overcome or minimize soil limitations identified by the evaluation criteria. The corrective measures are practices commonly used in Vermont.

Cost of Continuing Limitations (CL)-

an index of the reoccurring costs resulting from permanent soil limitations. All index values represent dollar costs associated with the continuing limitation. These costs are expressed in dollars/cutting unit. (see Table 2)

Cost of Corrective Measures (CM)-

the one time cost of various corrective measures needed to overcome soil limitations. All index values represent dollar costs associated with the corrective measures. These costs are expressed in dollars/cutting unit. (see Table 2)

Drainage Class-

the frequency and duration of saturation or partial saturation in the soil. Seven classes of natural soil drainage are recognized: excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Drainage class is used to estimate seedling mortality. Note that very poorly drained soils were considered to have very limited potential for commercial forestry and were given a rating of zero.

Effective Rooting Depth-

the depth to a layer that greatly restricts roots (i.e. bedrock). Effective footing depth is used to estimate windthrow hazard.

Equipment Limitations-

the limits on the use of equipment, year round or seasonally, as a result of soil characteristics, such as wetness, slope, rock outcrops, etc.

Erodibility-

the degree to which soils are subject to erosion. The soil erodibility factor (K) and the slope range of the map unit are used to predict erosion hazard. Evaluation of the effect of these two soil qualities on overall ranking indicates the majority of the variation is attributed to slope range. It is this soil criteria which is used for development of the evaluating criteria.

Evaluating Criteria-

soil properties and site features that affect the production and harvesting of timber. They include drainage class, effective rooting depth, erodibility, rock outcrop, seasonal high water table, slope, soil temperature, surface stones or boulders, and surface texture. (see Table 1)

Rock Outcrop-

exposures of bare, non-vegetated bedrock. The exposures are presumed to be a part of a large body of underground bedrock. In Vermont, these exposures are usually uneven in slope and can create areas that are inaccessible for large machinery. Soil map units with 10 percent or more outcrops are normally named as complexes or associations of soil and “Rock Outcrop.”

Seasonal High Water Table-

the upper surface of the perched or apparent water table within the soil in wet times of the year. Of particular interest to this study is the duration at which the water table is at a depth of 15 inches or less from the soil surface.

Seedling Mortality-

the probability of death of naturally-occurring or planted tree seedlings as influenced by kinds of soil or topographic conditions.

Slope-

is the inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Corresponds to the rise or fall, in feet, of the land across 100 horizontal feet.

Soil Potential Index (SPI)-

the numerical rating of a soil map unit's relative potential for the production and harvesting of timber. The SPI is used to rank soil map units from very high potential to very low potential and is derived from indexes of soil performance, cost of corrective measures, and costs established for continuing limitations. The SPI is expressed by the equation:

SPI = P - (CM + CL), where

P = performance index,

CM = index of costs of corrective measures needed to overcome or minimize the effects of soil limitations,

CL = index of costs resulting from continuing limitations.

Soil Temperature Regime-

based on the mean annual soil temperature. Three classes of soil temperature regimes are recognized in Vermont: mesic, frigid, and cryic. The mesic soil temperature regime is restricted to areas of the Connecticut River Valley, the Champlain Valley, and the Vermont Valley along US Route 7 from Brandon to Bennington. The cryic soil temperature regime is generally above 2500 feet in elevation in Vermont. The frigid soil temperature regime occurs throughout the remainder of Vermont. Note that soils with a cryic soil temperature regime were considered to have very limited potential for commercial forestry and were given a rating of zero.

Surface Stones or Boulders-

rock fragments on the soil surface. Stones range from 10 to 24 inches in diameter and boulders are more than 24 inches in diameter. Classes of rock fragments on the surface are: non-stony, stony, bouldery, very stony, very bouldery, extremely stony, and extremely bouldery.

Surface texture-

refers to the USDA texture of the surface layer. The soil texture mentioned in soil map unit names refers to the surface texture.

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Table 1. Evaluating Criteria for Producing and Harvesting Timber in Vermont by Degree of Limitation

	Degree of Limitation		
CRITERIA	**Slight**	**Moderate**	**Severe**
Drainage Class[1]	Well drained, moderately well drained, somewhat poorly drained	Somewhat excessively drained, poorly drained	Excessively drained
Effective Rooting Depth (inches)	> 30	20-30	< 20
Erodibility (% slope)[2]	0-15	15-35	> 35
Rock Outcrop (class)	Non-rocky, rocky	Very rocky	"Rock outcrop" is in map unit name
Seasonal High Water Table (Duration at <15")	< 2 months	2-6 months	> 6 months
Slope (%)[2]	0-15	15-35	> 35
Soil Temperature Regime[3]	Frigid, Mesic		
Surface Stones or boulders (class)	Non-stony, stony bouldery	Very stony, Very bouldery	Extremely stony, Extremely bouldery
Surface texture[4]	Fine sandy loam, sandy loam, loamy fine sand, fine sand	Silt loam, very fine sandy loam, silty clay loam, loam, and Humods[5]	Clay, silty clay

1. Very poorly drained soils were considered to have very limited potential for commercial forestry and were given a rating of zero.
2. Soil map units with slopes greater than 60 percent were considered to have very limited potential for commercial forestry and were given a rating of zero.
3. Soils with a cryic soil temperature were considered to have very limited potential for commercial forestry and were given a rating of zero.
4. Soil textures mentioned in soil map unit names refer to the surface texture.
5. Humods include the Hogback, Houghtonville, Killington, Mundal, Rawsonville, Wilmington, and Worden soil series. See Soil Taxonomy for more information on Humods.

Table 2. Corrective Measures, Continuing Limitations and Associated Costs for Harvesting Timber in Vermont.

EVALUATING CRITERIA	CORRECTIVE MEASURES AND/OR CONTINUING LIMITATIONS	COST ($/CUTTING UNIT)
Drainage	Conventional silvicultural management practices	0
Effective Rooting Depth	Even-aged mgt, strip cutting, or patch cutting	0
Erodibility	Installation of water bars ▪ *Moderate limitation* ▪ *Severe limitation* Maintenance of additional water bars	 $50 $100 $17.50 x days in cutting unit
Rock Outcrop	Equipment repair and special skid design ▪ *Moderate limitation* ▪ *Severe limitation*	 $20/MBF harvested $30/MBF harvested
Seasonal high water table	Time of operation	0
Slope	Special skid road design ▪ *Moderate limitation* ▪ *Severe limitation* Installation of additional water bars ▪ *Moderate limitation* ▪ *Severe limitation* Maintenance of additional water bars Additional on-site dozer time ▪ *Moderate limitation* ▪ *Severe limitation*	 $750 $1125 $100 $100 $17.50 x days in cutting unit 0 $1500
Surface Stones or boulders	Increased labor and machine time ▪ *Moderate limitation* ▪ *Severe limitation*	 $12/MBF harvested $30/MBF harvested
Surface Texture	Additional dozer time ▪ *Moderate limitation* ▪ *Severe limitation*	 $525 $700

Table 3. Forest Value Groups, their Relative Value and Potential Productivity

Forest Value Group	Relative Value	Potential Productivity
1	100	Very High
2	83	High
3	74	Moderate
4	63	Moderately Low
5	51	Low
6	31	Very Low
7	0	Very Limited

Table 4. Status of Soil Surveys in Vermont, December 2003

County	Published Soil Survey	Soil Survey on CDROM	Digital Soil Survey	Mapping Ongoing
Addison	yes[1]	no	yes	
Bennington	no[2]	no	yes	
Caledonia	no	no	no	yes
Chittenden	yes	no	no[3]	
Essex	no	no	no	yes
Franklin	yes	no	yes	
Grand Isle	yes[1]	no	yes	
Lamoille	yes	no	yes	
Orange	yes	no	yes	
Orleans	no[2]	no	no	
Rutland	yes	no	yes	
Washington	no[2]	yes	yes	
Windham	yes	no	yes	
Windsor	no[2]	no	yes	

1. The published soil surveys of Addison and Grand Isle Counties are out of print.

2. The soil surveys of Bennington, Orleans, Washington, and Windsor Counties are currently in various stages of publication.

3. A digital soil survey for Chittenden County exists, but the quality is uncertain and it is not certified.

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