

Forest Conservation Plan

[Name] Family Forest

[Town] , Vermont

Add Photo

Prepared by:

[Name], [Title]

Vermont Family Forests, PO Box 254, Bristol, VT 05443

[Month], 2010



Landowner

Date

Landowner

Date

Forest Planner

Date

Vermont Family Forests

Date

PROPERTY DATA SUMMARY

Landowners' Names:

Street Address:

Town/State/Zip:

Phone Number:

Town Where Land Is Located:

Grand List Description:

Total Land Enrolled for Use Value:

Orthophoto Numbers:

SPAN Number:

Forest Conservation Plan Overview:

The purpose of this document is to list the existing conditions, ownership objectives and planned conservation practices for the [NAME] Family Forest in [TOWN]. This plan and the prescribed management activities have been designed to meet the owners' objectives while fulfilling the criteria of the Use Value Appraisal (UVA) Program and Vermont Family Forests. The planned conservation practices have been designed to achieve ownership objectives without undermining the ecological functions and processes by which forests sustain themselves over time. This plan shall be revised and updated as conditions change and more information becomes available.

[This plan is an update to a plan written in 1998 by.] This is a 15-year management plan that should be updated in 10 years as required by the UVA program.

Natural Setting:

The property is located in the [BIOPHYSICAL REGION]. [DESCRIPTION]. Natural Community types found on the property include:

- [NC TYPE]
- [NC TYPE]

General Description of Property:

Location – The [NAME] Family Forest is located.

Administration – The parcel is listed as [XX] acres according to the grand list. [XX] acres are currently enrolled in the UVA program and [XX] acres are excluded for [HOUSE SITE].

Boundaries – [BLAZED, BARBED WIRE, UPGRADE NEEDED].

Topography – Elevation on the property ranges from about [XX] feet to about [XX] feet in the northeast corner of the property. Slopes on the property range from [XX – XX%].

Landowner Objectives for Parcel

- Improving wildlife habitat
- Recreation activities including [walking, hiking, XC-skiing, bird watching, mountain biking, snowmobiling, horseback riding, camping and wildlife viewing] on well designed and maintained trails
- Maple sugaring
- Collecting non-timber forest products
- Sequestering and storing carbon
- Restoring ecological functions and processes
- Producing high quality forest products on a sustainable basis
- Protecting rare and endangered species
- Maintaining a healthy forest
- Enhancing scenic beauty
- Protecting water quality
- Maintaining site productivity
- Protecting biological diversity
- Protecting cultural resources
- Maintaining a forest in good condition for future generations
- Having a place to find peace and solitude

Optional Elements to Include in Plan:

- More detailed description of current vegetation
- Delineations of current cover on natural communities map with accompanying table
- Plant species list
- Plant pressings
- Additional map with special features indicated
- Photographs
- Historical maps
- Involvement with Audubon Vermont and Forest Bird Initiative
- Other elements of interest to landowner:

FOREST HEALTH SUMMARY

Conservation & maintenance of soil and water resources

Status--- [location, extent, condition, operability, erosion extent, special features, etc.]

Water Quality Practices			
Satisfactory	Needs Work	Not Applicable at Present	
		✓	Protective strips with minimal soil disturbance, nearly-complete canopy closure, and many large trees are maintained between the access network and surface water.
		✓	There is little or no exposed soil in the protective strip.
✓			Stream crossings have been properly restored and non-permanent structures have been removed.
✓			Bridges and culverts are properly sized and installed at right angles across streams.

Access Network Practices			
Satisfactory	Needs Work	Not Applicable at Present	
✓			The timber harvesting access network including truck roads, skid trails, and log landings is well located and occupies less than 10% of the area.
		✓	Truck road grades are 3% to 10% and any grades in excess of 10% are less than 300 feet in length.
✓			Skid trail grades are 3% to 15% and any grades in excess of 15% are less than 300 feet in length.
		✓	Truck roads are properly drained according to the VT AMP's.
		✓	Skid trails are properly drained according to the VT AMP's.
		✓	Log landings are on nearly-level, stable ground; away from protective strips; have water diversions installed; and are properly graded to prevent erosion and sedimentation.
✓			Post-harvest use of the access network has been restricted prevent erosion and site disruption.
		✓	Sediment from roads and trails is prevented from reaching streams by turn-ups and broad-based dips.
		✓	Drainage ditches do not feed directly into streams or other surface waters.

The most advanced soil erosion on:	Skid trail(s)	Truck road(s)	Log landing(s)
None to slight			
Rill (1-6" deep)			
Initial gully (6-12" deep)			
Marked gully (12-14" deep)			

Advanced gully (+24" deep)			
Not applicable	✓	✓	✓

Maintenance of forest ecosystem health

Status--- [Processes or agents beyond the range of historic variation, insects, disease, exotic species, domestic animals, etc]

Satisfactory	Needs Work	
	✓	Invasive exotic species do not pose a significant threat.
✓		Domestic animals have been prevented from grazing in the area.

FOREST USE SUMMARY

Maintenance of long-term socio-economic benefits

Cultural Elements or Archeological Sites--- (Notes: Stonewalls or piles; Cellar holes; Fence (barbed wire); Structure; Dump; Evidence of former road; Remnant landscape plants (lilac, apples, day lilies); Sites of cultural, historical, archaeological, and community significance should be identified and included on forest maps.

Recreation--- (Notes: Existing uses, condition of trails, roads, and recreation facilities. Notes:)

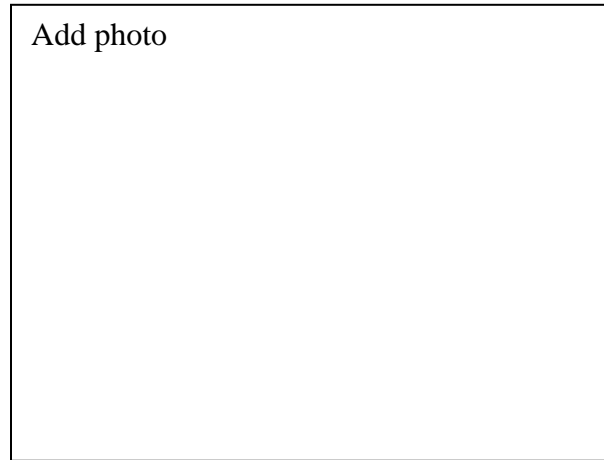
Scenic Beauty--- (Notes: On and off site visibility, quality, issues. Notes:)

SCHEDULE OF CONSERVATION ACTIVITIES

Management standards allow for carrying out prescribed activities within three years of the treatment year. Conservation activities are described in more detail in the following sections.

Treatment Year	Stand #	Conservation Activity	Silvicultural Guide or Tech. Reference, Prescription # or Letter, if appropriate
2020	ALL	Re-examine.	

MANAGEMENT AREA XX



Acreage: XX
 Cover Type: XXXX
 Natural
 Community
 Type: XXXX

---OVERVIEW ---

Area Description and Land Use History--- This area occupies XXXX of the property and is situated on a XXXX slope. This area is dominated by XXXX.

[Forest pasturing and cutting history, years since agricultural abandonment, etc.]

Soils and Site Productivity--- [drainage, enrichment, operability, productivity]

Soil type:

Site index (SPECIES): XX (determined from soils – USDA SCS, 1971)

Site class: X (determined from soils – USDA SCS, 1971)

Conservation of biological diversity

Habitat Conditions		
Satisfactory	Needs Work	
	✓	There are at least four (1-21”+; 4-15”+ DBH) cavity and/or snag trees per acre.
✓		There are at least four (1-21”+; 4-15”+ DBH) down trees per acre.
	✓	There are at least three vigorous and wind-firm legacy trees (19”+ DBH)

Wildlife Use and Habitat Observations --- [Bear use, Deer browse, Hare browse, Moose browse, Mast species:, Aspen clones, Vernal pools, Caves and mines, Seeps, Deer wintering areas].

Unique and/or Fragile Communities --- [DESCRIPTION]

- Timber management in natural communities ranked as “very rare” (S1) and “rare” (S2) has been reviewed and approved by VTFW Natural Heritage Biologists.
- Timber management in natural communities ranked as “uncommon” (S3), “common” (S4), and “very common” (S5) but with little or no evidence of past human disturbance has been reviewed and approved by VTFW Natural Heritage Biologists.
- No Unique communities noted.

Invasive/exotic species--- [Norway maple, European black alder, Japanese and common barberry, winged euonymous/burning bush, Russian olive, autumn olive, glossy buckthorn, honeysuckle spp., common buckthorn, black locust, multiflora rose]

Insects and diseases--- [beech bark disease, sugar maple borer, white pine weevil, white pine blister rust, butternut canker,]

Maintenance of productive capacity

Access Distance: less than 1 mile

BAF: 10 **Number of points:** X

Date of data collection: XX 2010

Present Age Class of Dominants and Co-Dominants: XX-XX years

Dominant and Co-Dominant basal area per acre: XX sq. ft.

Acceptable Timber Growing Stock basal area per acre: XX sq. ft.

Quadratic Mean Stand Diameter: XX inches

Number of Dominant and Co-Dominant trees per acre: XX

Species Composition:

Species	% of Total Basal Area of Dominants and Co- Dominants

Stand Age Class Structure: [Even-aged; Two-aged; Uneven-aged; Being regenerated]

Timber Status: [Non-stocked – less than 10% commercial species; High risk – won’t last 10 years; Sparse stand – total basal area less than “C” level; Low stand quality – acceptable growing

stock basal area less than “C” level; Economically mature – 50% of the area is within 5 years of maturity age; Immature – more than 5 years to maturity, less than 50% of basal area is mature]

Even-Aged Timber Stands: [Overstocked; Well stocked; Adequately stocked; Inadequately stocked]

Uneven-aged Timber Stands:

Size Class Distribution		Existing Basal Area (square feet/acre)			
(name)	(inches DBH)	Total	AGS	UGS	Cull
Seedlings-Saplings	2-4”				
Poles	6-10”				
Mid-size	12-14”				
Large trees	16”+				
Elders and seedlings	24”+ and declining				
Total					

Timber Quality:

Dominant and Co-dominant Trees		
Quality	Basal Area	#Stems
	(square ft/acre)	(per acre)
Acceptable – USFS Tree Grade #2 or better		
Non-acceptable – less than #2 but could be sold		
Cull – no sawtimber potential		
Mature –USFS Tree Grade #2 or better & at goal age or DBH		

Regeneration--- (Notes: species, extent, vigor, browse, competition, etc.)

Primary Landowner Objectives for Area

- Improving wildlife habitat
- Recreation activities including [walking, hiking, XC-skiing, bird watching, mountain biking, snowmobiling, horseback riding, camping and wildlife viewing] on well designed and maintained trails
- Maple sugaring

- Collecting non-timber forest products
- Sequestering carbon
- Restoring ecological features and processes
- Producing high quality forest products on a sustainable basis
- Protecting rare and endangered species
- Maintaining a healthy forest
- Enhancing scenic beauty
- Protecting water quality
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--- SCHEDULE OF CONSERVATION ACTIVITIES ---

Long Range Vegetation Management Objectives and Approaches ---

Even-aged Management:

Rotation age:

Stewardship cycle: years

acres to regenerate: per year or per stewardship cycle.

Or:

Uneven-aged management:

Desired diameter (DBH) for principal species: XX inches

Maturity age: XX years

Stewardship cycle: XX years

acres to regenerate: XX per year or XX per stewardship cycle

Conservation Activities ---

Based on *NE – 603: Silvicultural Guide for Northern Hardwood Types – Prescription XX: “PRESCRIPTION”*. [practice description, potential cost-share, include access, wildlife and water quality practices, seasons for operation]

Year*	Acres	Forest Conservation Practices	
		Activity	Specifications
		No treatment recommended.	Reexamine in 10 years.
		Pre-commercial cleaning.	
		Crop tree release.	Identify XX crop trees per acre and release crowns on 2-3 sides. Crop trees should be well formed, high quality hardwoods. Try to retain high quality examples of all species present to maintain stand diversity. Removals can be used as firewood or left on the ground to enrich the soil.
		Intermediate thinning.	Basal area should be reduced to not less than XX sq. ft./acre by removing low quality hardwoods and occasional declining spruce.
		Individual tree selection	Individual tree selection should be used to harvest mature and over mature trees that are at target diameters. Residual basal area between the groups should not be less than XX sq. ft./acre.
		Group selection/group shelterwood.	XX acres of this area should be regenerated using group selection harvesting techniques.

			Group selection cuts should not be larger than XX acre in size. Group shelterwood cuts should not be larger than XX acre in size and at least XX sq. ft./acre should be retained in large groups to encourage regeneration of XXX. Groups should be located to take advantage of mature and overmature trees, especially XXX. Groups should also be located to take advantage of high-quality advanced regeneration if possible.
		Irregular shelterwood.	
		Salvage cut.	
		Control invasive exotics.	
		Planting.	
		Increase the number of large cavity and snag trees.	XXX low-quality trees greater than 16" DBH should be girdled in this area to meet snag targets.
		Increase the number of down trees.	XXX low-quality trees greater than 14" DBH should be felled and left in this area to meet down tree targets.
		Retain wind-firm "legacy" trees.	XXX vigorous and wind-firm legacy trees (19"+ DBH) should be retained in this area.
		Prevent grazing by domestic animals.	
		Improve grade on portions of skid trails, truck roads, and/or landings.	
		Install erosion control on skid trails, truck roads, and/or landings.	
		Improve stream crossings.	
		Remove non-permanent structures at stream crossings.	
		Reduce unauthorized use.	
		List measures to protect sites of cultural, historical, archaeological, and community significance.	
2020	ALL	Re-examine.	

(* ± 3 years from this date)

FORESTRY GLOSSARY

(by S. DeBonis and P. van loon, Vermont Land Trust)

Acceptable Growing Stock (AGS): Any potential crop tree to be retained and managed to meet the landowner's objectives. UVA guidelines (for sawlog production) describe AGS as trees of commercial species which have the potential to produce one 12-foot log or two non-contiguous 8-foot logs.

Acre: A standard unit of area measure. One acre equals: 43,560 square feet; 4840 square yards; 10 square chains.

Advanced regeneration: Natural regeneration that is established prior to a timber harvest.

Adventitious buds: Buds that form in an unusual spot on a tree, usually on the bole.

Age Class: One of the intervals, commonly 10-20 years, into which the age range of trees are divided for classification.

AMP's: Accepted management practices pertaining to logging operations developed by the Department of Forests, Parks and Recreation and outlined in the booklet titled "Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont."

Apical meristem: The growing tip of a tree stem or root.

Aspect: The direction towards which a slope faces.

Basal Area: The cross sectional area of the stem of a tree at 4.5 feet above the ground (dbh). The basal area of a stand is the summation of all the trees or classes of trees per unit area of land. Basal area is expressed in square feet per acre. Basal area is directly related to stand volume and density.

Biomass: The total weight of all harvestable vegetation from a stand. This term can also be used to describe a harvest that results in all material being processed into chips.

Board Foot: The volume of solid wood equivalent to a piece 12 inches long, 12 inches wide and 1 inch thick. A measure of standing or felled timber usually related to sawlogs.

Bog: A poorly drained, wet area with very acidic (ph 4.0 or less), peaty soil. Bogs receive little or no ground water influence and support vegetation such as sedges, mosses, orchids and black spruce.

Bole: The stem of a tree.

Browse: Buds, leaves, and twigs of seedling and sapling regeneration that are utilized as a food resource by wildlife.

Canopy: The combined cover of individual tree crowns.

Chain: A measurement of horizontal distance, 66 feet. Areas expressed in square chains can immediately be converted to acres by dividing by 10.

Cleaning: The removal of competing vegetation to release desired regeneration for optimal growth.

Clearcut: A silvicultural method which removes all trees from a designated area at one time for the purpose of creating a new, even-aged stand. This management system is usually used to regenerate shade-intolerant tree species. Variations include patch and strip clearcutting.

Climax: An association of plants and animals that will prevail in the absence of disturbance.

Codominant: Trees with crowns forming the general level of the forest canopy and receiving full sunlight from above but comparatively little from the sides.

Crop Trees: Trees to be grown to the end of the rotation.

Crown: The branches and twigs of the upper part of a tree.

Cruise: A survey of forest stands to determine the number, size and species of trees, as well as terrain, soil condition, access and any other factors relevant to forest management planning.

Cull: Trees that have no current or potential commercial value.

Diameter at Breast Height (dbh): The diameter of a standing tree measured at 4.5 feet above the ground and expressed in inches.

Epicormic branching: Branches that sprout from adventitious buds on the bole of a tree, usually when it is stressed or is subjected to full sunlight.

Dominant: Trees with well developed crowns which are above the canopy and receive direct sunlight from above and partially from the side.

Even-aged: An age class description of a stand in which the age of the trees is relatively close, usually within 20 years. Stands with two distinct age classes can also be referred to as even-aged.

Even-aged Management: Timber management that produces a stand of trees with relatively little difference in age usually 10-20 years. Even-age silvicultural systems include clearcut, seed-tree and shelterwood.

Forest Management Plan (FMP): A long range plan designed to identify a landowner's goals and objectives and the silvicultural methods that will be employed to achieve those goals. FMP's in Vermont are typically written for a 15 year period and updated every 10 years.

Forest Type: A natural group or association of different species of trees which commonly occur together over a large area. Forest types are defined by one or more of the dominant species of trees in the type. Common commercial types in the northeast are: beech-birch-maple; beech-red maple; mixedwood; spruce-fir; white pine.

Forestry: The art and science of growing and managing forests and forest lands for the continuing use of their resources.

Girdle: To destroy the conductive tissue of a tree in a ring around the bole.

Group Selection: An uneven-aged harvesting method designed to favor intolerant or intermediate species. Trees are generally removed in groups in areas ranging from 1/20-2 acres in size.

Habitat: The place where a plant or animal can live and maintain itself.

Hardwoods: Broad-leaved trees which lose their leaves in the fall.

Harvest: A silvicultural treatment that is intended to establish regeneration. A harvest is generally a higher level of cutting intensity than a thinning.

High-grading: A liquidation cut in which only the best quality, highest value trees are removed. Cuts of this nature are short sighted and exploitative and result in the degradation of the forest ecosystem.

Hydrologic Class: A measure of a bare soil's runoff characteristics. Group A soil has a high water infiltration rate and a low runoff potential. Group D soil has a very slow rate of water infiltration and is prone to high runoff.

Improvement Cutting: A silvicultural treatment in which poor quality and low value trees are removed to give the best trees more room to grow.

Individual Tree Selection: An uneven-aged harvesting method designed to favor tolerant species. Trees are removed individually to maintain a continuous and uniform crown cover. Also referred to as single tree selection.

Intermediate: Trees whose crowns reach the canopy level but receive little or no direct light from above and none from the sides.

Intermediate Treatments: Harvesting methods employed during even-aged management. The removal of trees from a stand between the time of establishment and the final harvest with the purpose of improving stand growth and/or species composition and/or health.

Intolerant Species: Trees unable to grow and develop in the shade of other species. Intolerant commercial species in Vermont include: paper birch and aspen.

Landing: Any place where logs are assembled for further transport.

Liquidation Cutting: Removal of all merchantable products from the forest with no regard for stand improvement or regeneration, usually preceding the sale of the land.

Log Rule: A table or formula showing estimated volumes, usually in board feet, for various log diameters and lengths.

Mast: Nuts, berries, and seeds utilized by wildlife as a food resource.

Maturity: Expressed in two ways: 1. Financial maturity occurs when a tree has reached the point where it has maximized value growth from the prospective market place; 2. Biological maturity occurs when a tree has reached the point where the energy costs of maintaining itself exceeds the energy input from photosynthesis. Financial maturity is reached long before biological maturity.

MBF: The abbreviation for one thousand board feet.

Mean Stand Diameter (MSD): The arithmetic mean diameter of the trees in a stand.

Medial Diameter (MDL): This is developed by determining by the sum of each diameter class multiplied by the basal area in that class and then dividing the result by the total basal area. MDL is useful in stands with a high proportion of saplings because it is less influenced by these small trees and more accurately the size of the crop trees.

Mixed Hardwoods: Timber stands characterized by a mixture of hardwood species.

Overmature: A stand of trees that is older than normal rotation age for the type.

Overstory: Those trees making up the main canopy.

Overstory: The upper crown canopy of the forest. The overstory is usually referenced as the larger trees in the stand.

Phloem: Tissue of the inner bark that conducts photosynthate from the leaves down to the roots.

Pioneer: Shade intolerant species that are the first trees to develop in an area after or the abandonment of a field or after a disturbance that covers a fairly large area. Pioneer species include aspen and paper birch.

Pole or Pole Timber: A tree or trees greater than 4.0 inches dbh and less than 10.0 inches dbh.

Precommercial Thinning: An intermediate harvesting operation in a young stand that does not generate income.

Prescription: A course of action to effect change in a forest stand (harvest, planting, TSI).

Q-factor: A devise used to describe the structure of an uneven aged stand. The q-factor is the ratio of the number of trees in a diameter class divided by the number of trees in the next smaller diameter class. The lower the q-factor, the higher the proportion of large diameter trees.

Regeneration: Renewal of a tree crop by natural or artificial means.

Release: The freeing of well-established seedlings or saplings from surrounding growth.

Residual: Trees that are left to grow in a stand after a silvicultural treatment.

Rotation: The length of time required to grow an even aged crop of trees to a desired age.

Rotation Age: The age at which an even aged stand is considered ready for harvest.

Salvage Cut: The removal of dead, dying and damaged trees after a natural disaster or insect or disease infestation to utilize the wood before it loses all of its commercial value.

Sanitation Cut: The removal of dead, dying or damaged trees to prevent or interrupt the spread of insects or disease.

Sapling: Trees taller than 4.5 feet but less than 5.0 inches dbh.

Sawlog: A log considered suitable in size and quality for producing lumber. Regional standards apply for diameter, length and freedom from defect. Sawlog is also used to refer to a tree that has reached sufficient size to produce a sawlog. Small sawlog trees are 12-16 inches dbh, medium sawlog trees are 17-20 inches dbh, and large sawlog trees are 22 inches dbh or greater.

Sawtimber: Trees that have obtained a minimum diameter at breast height that can be felled and processed into sawlogs. Typical minimum size limits for commercial species in Vermont are 8 inches dbh for softwoods and 12 inches dbh for hardwoods.

Seedlings: Trees that are less than 4.5 feet tall.

Seed Tree: An even-aged silvicultural method in which most of the merchantable trees are removed in the first cut, leaving a few scattered trees of desirable species to serve as a seed source for the new stand. The seed trees are removed after successful regeneration has developed. The seed tree method is a regeneration cut used to create an even-aged stand of shade intolerant species.

Selection method: An uneven-aged silvicultural system where individual trees, or groups of trees, are removed from a stand to ensure a sustained yield from an uneven-aged stand.

Shade tolerance: The ability of trees to reproduce and grow in the shade of other trees. Tolerance ratings are very tolerant, tolerant, intermediate, intolerant, and very intolerant.

Shelterwood: An even-aged silvicultural system in which the mature trees are removed in a series of partial cuts that take place over a small portion of the rotation. The residual trees are left as a seed source and to provide shade and protection for the new seedlings. Three types of cuttings are used in this method:

1. The preparatory cut, in which the least desirable trees are removed to improve the quality and growth of the stand,
2. The seed cut, in which the regeneration is established,
3. The removal cut (or cuts) in which the mature trees are cut to release the regeneration.

Variations of this method include the group, irregular, strip, and uniform shelterwood.

Silviculture: Manipulation of the forest ecosystem to achieve specific goals and objectives.

Site Class: A measurement of the quality of the soil in terms of its potential productivity. A site class of 1 indicates that the soil is highly productive and a site class of 4 is considered non-productive, usually due to excessively wet, dry, or thin soil.

Site Index: A measure of the relative productive capacity of an area. Site index is species specific and is based on a comparison of tree age and height.

Skid Trail: Any path in the woods over which multiple loads of logs are hauled, usually by a skidder or tractor. Primary skid trails are the main pathways that enter the landing.

Skidder: A four wheel drive, tractor-like vehicle, articulated in the middle for maneuverability, with a cable or grapple on the back end designed to bring logs or whole trees to the landing once that they have been felled.

Slope: A relative measure of steepness of the ground. Slope can be computed by dividing the rise in elevation by the horizontal distance traveled. Slope is usually expressed in percent (rise ft /run) X 100. Slope can be derived automatically using various forest measurement tools.

Snag: A standing, dead tree.

Softwood: Coniferous trees, usually “evergreen” (the exception being tamarack), with needles or scale-like leaves.

Stand (Treatment Unit): A community of trees possessing sufficient uniformity in regards to composition, constitution, age, spatial arrangement or condition to be distinguishable from adjacent communities.

Stocking: An indication of the number of trees in a stand as compared to the optimum number of trees required to achieve some management objective, usually improved growth rates or increased timber values.

Stocking Level: Stocking levels are calculated by comparing either the basal area or the number of trees the site could support, if the growth potential of the land was fully utilized, to the basal area or number of trees actually on the site. UVA stocking categories include: understocked, adequately stocked, or overstocked.

Strip Cut: A timber harvesting operation where all of the merchantable trees are cut within a long narrow strip. An even-aged cutting method usually used to regenerate spruce and fir.

Stumpage: The value of timber as it stands in the woods just before harvest (“on the stump”). Loggers are usually bid on timber based on its stumpage value. Stumpage can also be used to refer to standing timber.

Succession: The orderly and predictable replacement of one plant community by another over time in the absence of disturbance.

Suppressed: Trees with crowns entirely below the general level of the forest canopy that receive no direct sunlight from above or the sides.

Thinning: A silvicultural treatment that reduces stand density to allow the best trees to grow with less competition. There are three kinds of thinning: crown thinning, low thinning, and free thinning.

Timber Stand Improvement (TSI): A non-commercial timber harvest conducted in stands of timber to improve the health, growth rate, and form of the remaining trees.

Tolerant Species: Trees that can grow satisfactorily in the shade of other trees. Tolerant species of commercial importance in Vermont include sugar maple, beech, red spruce, and hemlock.

Truck Road: A road capable of supporting a trailer truck that hauls logs from the landing to the mill.

Understory: Those plants growing under the main canopy.

Uneven aged: An age class description of a stand of trees that contains more than two distinct age classes and a variety of size classes.

Uneven-aged (All-aged) Management: Timber management that produces a stand composed of a variety of age classes. Harvesting methods used in uneven-aged management include individual tree and group selection.

UVA: Use Value Appraisal. A property tax incentive program offered by the State of Vermont to forest land owners who have at least 25 acres of contiguous forest land and agree to manage their land according to state standards under an approved FMP.

Vigor: The health and vitality of a tree. Vigor can most accurately be assessed by observations of foliage (density, width and color) and percent live crown.

Volume Table: A table that utilizes tree dbh or log diameters and log length(usually 16 feet) to estimate board foot volumes according to a set of assumptions (“log rules”) about how the log will be processed into boards.

Windthrow: A tree or trees that have been toppled by high winds. A common phenomena along the edge of strip cuts and clearcuts.

Xylem: Vascular tissue of the outer wood that conducts water and nutrients from the roots to the upper part of the tree.

Yield: Total forest growth over a specified period of time, less mortality, unmarketable fiber and cull.

Yield Table: A species-specific representation of the amount of useable wood fiber a forest can be expected to produce during a single rotation based on site index.

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FOREST HEALTH CONSERVATION CHECKLIST

Best conservation practices to protect water quality, site productivity, native biological diversity, and carbon sequestration and storage in forests managed for timber and fuelwood.

Updated 3/02/2010

Introduction

Vermont Family Forests™, Inc. is a not-for-profit organization working to conserve the health of the forest community and, when appropriate, promoting the careful cultivation of local family-owned forests for community benefits. Vermont Family Forests (VFF) has adopted a set of principles to guide forest conservation activities. One of these principles states that “ECOLOGICAL FORESTRY should conserve native biodiversity, water quality, site productivity and scenic beauty; use only biological pest control; and mimic natural processes.” The following forestry practices have been designed for forest friends and stewards who are interested in practicing ecological forestry. They are most applicable to the following natural community types: Northern Hardwood Forest; Rich Northern Hardwood Forest; Mesic Red Oak-Northern Hardwood Forest; Red Spruce – Northern Hardwood Forest; Hemlock-Northern Hardwood Forest; Mesic Maple-Ash-Hickory-Oak Forest; and the Valley Clayplain Forest. Owners of lands in the VFF-certified pool agree to comply with the VFF Forest Health Conservation Checklist to the maximum practical extent.

Accessing the Forest

Skid Trails, Truck Roads, and Log Landings

- ✓ Truck roads, skid trails, and log landings should be built and maintained in full compliance with the standards contained in the *Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont* (VT FP&R 1987). The drainage structures should remain fully functional with post-harvest use.
- ✓ Avoid spring harvests and rutting that extends beyond the A soil horizon.
- ✓ To maximize the soil’s ability to store carbon, harvesting should only be done when the soil is completely frozen.
- ✓ It is strongly recommended that all skid trails, truck roads, and log landings be designed and constructed prior to the inception of harvesting.
- ✓ The timber harvesting access network should not expose mineral soil on more than 5% of the treated area.
- ✓ Properly buffer and protect special habitats such as cliffs, caves, talus slopes, beaver meadows, vernal pools, spring seeps, and remnant patches of old growth forest.
- ✓ Take special care to protect wetlands, particularly those with muck and peat soils and a thick organic layer as these wetland soils are capable of storing ten times as much carbon as other soils in the region.
- ✓ Use low-impact logging equipment, including small forwarders, to minimize residual stand damage and soil compaction.
- ✓ Winter harvesting is preferred to protect breeding birds. Delay summer harvests until after August 1st.
- ✓ Skid trails, truck roads, and log landings -- should only be used when adequately dry or frozen.
- ✓ Minimize the width, number and extent of truck roads and skid trails -- particularly in or near sensitive areas such as stream crossings, protective strips, and steep slopes.
- ✓ Road and trail networks should be planned to avoid fragmenting forest blocks and to avoid creating linear openings in the forest. These can serve as vectors for predators or contribute to desiccation of leaf litter on the forest floor.

- ✓ Log landings should: be located on nearly-level, stable ground; be kept away from protective strips; have water diversions installed; and be graded to prevent erosion and sedimentation.

Protective Strips and Buffer Strips

- ✓ Protective strips -- characterized by minimal soil disturbance, nearly-complete canopy closure, and many large, mature trees - should be maintained between the access network and surface waters according to Table 4 in the Vermont AMPs at a minimum.
- ✓ Areas of exposed soil that occur within the protective strip should be seeded using native species and sources to the maximum extent possible and mulched with material free of invasive exotics and applied according to Table 3 in the AMPs.
- ✓ Stream buffer strips should: be kept free of logging vehicles; have only little or no tree cutting; and be at least 25 feet in width.
- ✓ Particular care should be taken to prevent stream bank erosion in order to avoid the release of sediment and stored carbon.

Stream Crossings

- ✓ Stream crossings should be restored and non-permanent structures should be removed as soon as possible.
- ✓ Streams should be crossed with bridges or culverts which are properly sized according to Table 2 in the Vermont AMPs and installed at right angles.
- ✓ Sediment should be prevented from reaching streams by using turn-ups or broad-based dips on truck roads and skid trails prior to all stream crossings. Drainage ditches should not feed directly into streams or other surface waters.

Closeout

- ✓ Post-harvest use of the access network should be restricted in order to prevent erosion, compaction, and site disruption.

Vegetation Management

- ✓ The single tree and small group selection methods should be used for communities with gap-phase replacement (e.g. northern hardwoods) and the irregular shelterwood method should be used for communities with stand-replacing disturbance regimes (e.g. spruce-fir). Uneven-aged management by area regulation is recommended. Where the group-selection method is employed, canopy openings of 0.25 acres or less are preferred. Where the group-shelterwood method is employed, the size of the regenerated areas can be increased. Clear-cutting and whole-tree harvesting should be avoided.
- ✓ Forests generally sequester and store the most carbon when left untouched. Therefore, it is not recommended to artificially create canopy gaps other than those that are deemed essential to meet non-ecological forest functions and values.
- ✓ Gradual or soft edges between habitats are preferred. Allow native shrubs, saplings, and some overstory trees to remain along the harvest boundary. Edges may also be “feathered” by retaining more trees closer to the uncut forest and gradually fewer trees closer to the harvested area.
- ✓ Manage for at least four large and secure cavity, snag, and/or decadent, living trees per acre on average, with one exceeding 21 inches diameter breast height (DBH) and four exceeding 15 inches DBH.¹ Leave trees that have cavities of varying sizes and are located in the upper trunk of the tree. Also, give priority to hardwood trees with cavities, rather than softwood, as they remain intact longer.
- ✓ Manage for at least four downed trees or 16+ foot long logs per acre on average, with one exceeding 21” DBH and four exceeding 15” DBH.
- ✓ Grow the largest trees and use the longest rotations possible within site and log quality limitations. Retain a minimum of three vigorous and wind-firm legacy trees per acre measuring over 19 inches DBH. Intermediate treatments should raise the average (mean) diameter of the residual dominant and co-dominant trees of the forest.

¹ To address safety issues, this may be accomplished by clustering cavity and snag trees in areas such as riparian zones and wetlands and away from access roads and trails.

- ✓ Any forest management in natural communities that are ranked as “very rare”(S1) and “rare” (S2) or in natural communities ranked as “uncommon” (S3), “common” (S4), and “very common”(S5) but with little or no evidence of past human disturbance should be reviewed and approved by the VT F&W Natural Heritage Biologists.
- ✓ When planting, use only local sources of native species, plant three or more species, and include deciduous species.
- ✓ When thinning or regenerating stands, favor native species over non-native species and trees and shrubs that produce seeds and fruits.
- ✓ Use natural regeneration to the maximum practical extent.
- ✓ Biological legacies of the forest community -- including coarse dead wood, logs, and snags; trees that are large, living, and old; buried seeds; soil organic matter; invertebrates; sprouting plants; and mycorrhizal fungi -- should be protected to aid in post-harvest recovery and to keep the forest from becoming "oversimplified".
- ✓ Promote the seed bearing capacities of poorly represented members of the forest.
- ✓ Tree felling should be avoided on slopes exceeding 60%.
- ✓ In general, leave as much biomass on site as possible including all materials that are less than 3 inches in diameter.
- ✓ Promote a vertical stand structure that includes over-story, mid-story, shrub, and herbaceous vegetation layers.
- ✓ Most woody, invasive exotics should be removed before harvesting forest products. The use of agrochemical pesticides or hormone herbicides must be avoided.
- ✓ Use biodegradable, non-petroleum bar and chain oil to protect forest workers and groundwater supplies.
- ✓ The use of genetically modified organisms or “GMOs” must be avoided.
- ✓ Residual stand damage -- including basal wounds, broken and/or scraped tops, and exposed roots -- should be confined to 10% or fewer of the dominant or co-dominant trees.
- ✓ It is recommended that all trees to be removed be marked prior to the inception of harvest.
- ✓ Average annual removal of woody biomass from the site should not exceed 70% of the average annual growth.
- ✓ Avoid grazing by domestic animals and support active control of deer populations.

Sensitive and Special Habitat Areas

Areas including wetlands, raptor nests, upturned tree roots, seeps, vernal pools, hard/soft mast species, and other unique or fragile, natural or cultural sites including areas of historical or community significance sites require identification and protection.² Harvesting and road building in wetlands, including the construction of new roads or expansion of the width of existing roads by more than 20%, will require a permit or review by the Wetlands Office of the Water Quality Division (802) 241-3770. The UVM publication "Wetlands Rules and Regulations: What they mean to your logging operation in Vermont" should be referred to when building or upgrading access and managing vegetation around wetlands.

² Cultural resources should be protected by following best management practices contained in *Stonewalls and Cellarholes* (VT ANR 1994). Well-drained terraces within 100 feet of permanent streams and having south to west aspect are potential prehistoric sites. These should be mapped and/or otherwise identified and avoided. If site disruption is likely, the Vermont Division of Historic Preservation should be consulted with permission of the landowner(s).

**Table 1: Recommended Distances Between
Drainage Structures on Logging Roads**

Feet

Road Grade (Percent)	Distance Between Waterbars	Distances Between Culverts	Distances Between Turnups, Dips & Pole Culverts
1	400	450	500
2	250	300	300
5	135	200	180
10	80	140	140
15	60	130	130
20	45	120	120
25	40	65	----
30	35	60	----
40	30	50	----

Table 2: Guide for Determining Culvert Size When Permanent and Temporary Truck Roads Cross Streams.

DRAINAGE AREA - The number of acres sloping toward the stream

Well Drained Soils	Shallow Soils with Frequent Rock Outcrops Or Impermeable Soil Conditions	Recommended Pipe Diameter (Inches)
16	4	15
25	7	18
40	12	21
55	16	24
84	27	30
130	47	36
190	64	42
260	90	48
335	120	54
400	166	60
550	205	66
650	250	72

Table 3: Methods of Seeding and Mulching Logging Roads, Log Landings and Skid Trails.

Temporary Cover

Material	Rate of Application	Recommended Time of Application
(A) Straw or hay free of invasive species seed	60 bales/acre	Any time
(B) Domestic Ryegrass	20 lbs./acre	Fall (for spring growth)

OR

Permanent Cover

Material	Rate of Application	Recommended Time of Application
(A) Soil Conservation Mix*	42 lbs./acre	April 15-June 15 Or Aug. 1-Sept 15

*Use mixes that contain native species only.

Table 4: Protective Strip Width Guide

Slope of Land Between Roads or Landings and Streambanks or Lake Shores (percent)**	Minimum Width Between Roads or Landings and Stream (Feet Along Surface of Ground)
0-10	50
11-20	70
21-30	90
31-40*	110

*Add 20 ft. for each additional 10% side slope.