

Forest Management Plan
for the
Meadowsend Timberlands Property

Vt-15 Delectable Mountain Forest
Barnard, Vermont

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PROPERTY LOCATION AND BRIEF DESCRIPTION

Meadowsend Timberlands Ltd. tract number "VT-15" is commonly called the "Delectable Mountain Forest" property. It is a contiguous parcel of 992 acres that spans a southwest portion of Barnard, Vermont in an area known as the Chateauguay. The entire west side of this forest abuts the large State of Vermont owned Les Newell Wildlife Management Area and collectively the two compose a sizable forested area. The parcel is accessed a town dirt road known as the Chateauguay Road, which is access by the West Hill Road off of Route 12, ½ mile north of the town center of Barnard. The Delectable Forest is within a 5-mile radius of 3 other MTL properties that jointly comprise over 3,600 acres of forestland. Here on Delectable approximately 981 acres are forested, primarily consisting sugar maple, white ash, red spruce and white birch. The remaining 9 acres are nonforestland, which includes access roads and log landings. The Delectable Mountain property is located in the Southern Green Mountains biophysical region. This region is different from the rest of the state due to its unique features of climate, geology, soils, topography, and natural communities found here. Like the Northern Green Mountains, this region has cool temperatures and rainfall is heavy, creating natural community types that often have northern characteristics

WOODLOT HISTORY

The Delectable Mountain Forest was purchased by MTL in October of 1991 from a Philip Dean of Marion Massachusetts. Dean purchased the same land from a Joseph Tokarski in December of 1979. Mr Tokarski still lives in the area. The ownership prior to 1979 has not been researched by MTL, though land use history can be gleaned through field evidence.

Wood cutting and sugaring has been the predominant use on this property over the past 150 years. These activities occurred over much of the forest. Agriculture was also an integral part of the land use prior to that. This use was contained mainly on the gently sloped areas and along the town roads found within the property. Most of this later use is located in stand 35, where many stone foundations are found along with old tilled fields.

The oldest evidence of timber harvests found on the property is in stand 37 and 38 on the northern slopes of north compartment. Evidence found includes a straight, v-notched, descending horse skid. A handful of these old skid trails were found and likely mean that the earlier logging unfolded in the late 1800's.

More recent timber harvests that have taken place in the western portions of the property and were conducted during the mid to late 1900's. The earlier phase of these timber harvests focused on stand 37 in the north compartment, while the more recent cuttings involved mainly stand 32 where a tremendous amount of TSI-girdling is found.

Based on scant information Philip Dean conducted a timber harvest in the early 1990's in the north compartment, largely in stand 38. According to some notes the harvest yielded approximately 100mbf of hardwood logs and a total of \$11,700 were used to build/improve access. Unfortunately, this road improvement is was short lived because the closure was incomplete which has lead to heavy erosion.

Since, MTL has owned the property no timber harvests have been implemented, though many of the corner stones of forest management are in place. The following is a summary of MTL management history:

2001-Conducted through timber/non-timber inventory. Placed conservation easement on property.

2002-Developed GIS map and database and forest management plan.

PLAN PURPOSE

There are many reasons for crafting a comprehensive Forest Management Plan. The first and foremost is to create a dynamic tool to manage the forest under a set of ownership objectives. To begin to meet these objectives a detailed evaluation of the resource's components is conducted. Broadly speaking those components are, the timber resource, wetlands, wildlife habitat and riparian areas. With this type of review and consideration it is possible to prescribe and implement a strategy to manage all the resources in a sustainable manner. This forest management plan sets the stage for the implementation of generalized treatments to help achieve the core MTL ownership objectives on the Delectable Mountain Forest. This forest plan is designed for a 10-year period. This particular plan can be amended at any time as may be necessitated by changing conditions. Further, on the ground conditions may dictate some small deviations from the plan and will be made by the forester at the time of implementation. In addition to this forest management document there are two additional types of management plans that MTL uses to better guide its mission of long-term forest investment and management: Master-Land Base Management Plan and Pre-Harvest Management Plan.

The Master Land Base Plan serves as the collective management guide for MTL's entire investment land base

of 40 plus properties. The master plan is the device that identifies the trends, commonalities and the general management of the 30,000-acre forestland ownership. The *Pre-Harvest Plan* is developed on a harvest-by-harvest case. Once the initial implementation of planning set forth by the forest management document is conducted (i.e. timber harvest), the managing forester develops a detailed pre-harvest plan. This "pre-plan" serves as a much more accurate depiction of the applied forestry approach and methods set forth. It serves as a detailed tool for those involved in the management linkage, particularly the harvest operation and forest certification. All are on file at the main office.

LANDOWNER OBJECTIVES

The objectives of Meadowsend Timberlands is to generate periodic, sustainable income from the growing and harvesting trees while adhering to the following principles:

- Enhancement of a sustainable timber resource in both quality and quantity over time
- Be responsible stewards of the land while continually raising our standards of forest management
- Provide opportunities for education and low impact recreation
- Provide a variety of habitats for wildlife enrichment and diversification
- Maintain a healthy, productive and aesthetically pleasing forest that is exemplary in nature
- Maintain or enhance the water quality of streams and wetlands
- Maintain the stability and integrity of the portion of ecosystem within our control
- Meet the standards for "FSC" forest certification and continued Tree Farm status
- Consider the elements of a natural forest ecosystem during management decisions
- Uphold the concepts of environmental conservation by keeping this land open-green-space

PROCEDURES

FOREST INVENTORY

A forest inventory was conducted to evaluate the various timber types and wildlife habitats on the property. The forest inventory was further used to evaluate the stocking and composition of the forest, to estimate the growth rates and the timber volume and products on the woodlot, also observed and evaluated was the status of non-timber resources (i.e. wildlife, site indicators, archaeology, etc.). The data were also used to calculate the present market value of the timber on the property.

A total of 136 sample points were taken systematically on a grid of 600x600 feet within the forested area. Approximately one point sampled every 8 acres. A 20 BAF prism was used to sample the forest at each point. The trees that fell within the sample at each point were recorded by species with their diameters tallied to the nearest inch with a Biltmore stick. The trees were multigraded as veneer, grade sawlogs, pallet/boltwood, pulpwood, or growing stock. All the trees greater than 5.5 inches in diameter were tallied. Trees less than 6 inches in diameter were considered to be unmerchantable. Merchantable stems were estimated in multiples of eight feet. Hardwood sawlogs were estimated to a 10-inch small end diameter while pine sawlogs were estimated to an 8 inch small end diameter and spruce/fire sawlogs were estimated to a 6 inch small end diameter. Pulpwood and growing stock was estimated in eight-foot lengths to a 4-inch top. Biological structure was also inventoried at each point by the use of the 20 BAF prism as either standing snag or downed wood. Both products are further broken out into 3 separate size classes and reported as counts per acre. All tree regeneration occurrences are inventoried at each point as well and are reported as percent occurrence out of all total regeneration present.

FOREST MANAGEMENT MAPPING

In order to more accurately determine volume, the forest was divided into 2 compartments. Dividing the property into separate compartments allows for greater management flexibility, especially at the planning level, where operational access, forest inventory and management prescriptions are more practically applied. Within these 2 compartments a total of 8 different forest stands types occur. The stands were separated from each other because they differed from one another in tree size, species composition and or density which then constitutes a cover type (Table 1). Each cover type has a fixed-cover type number designation and the two compose MTL's *Standardized Forest Type Classification*. This classification system has a total of 48 different cover classes and forms the critical linkage to the entire MTL ownership and its Geographical Information System. The computer program Two Dog was used to expand the data collected at the sample points to the entire forest. A computer printout of the stand level data is found in the forest data section of the plan.

Delectable Mountain Forest has been mapped by the use of a Geographic Information System (GIS). Much of the information collected in the inventory can be linked to the map which allows one to spatially view the data.

FOREST TYPE		TREE SIZE CLASS		CROWN CLOSURE (%)	
H	Hardwood	1	0-6"	A	75-100%
S	Softwood	2	6.1-10"	B	25-74%
HS	Hardwood > 50%	3	10.1-14"	C	0-24%
SH	Softwood > 50%	4	14.1 & up		

Table 1. MTL cover classification

<u>MTL COVER CLASSES</u>			
<u>Seedling/ Cut Over</u>	<u>Sapling/ Small Poles</u>	<u>Large Poles/ Small Sawlogs</u>	<u>Sawtimber</u>
1 - H1A	13 - H2A	25 - H3A	37 - H4A
2 - H1B	14 - H2B	26 - H3B	38 - H4B
3 - H1C	15 - H2C	27 - H3C	39 - H4C
4 - S1A	16 - S2A	28 - S3A	40 - S4A
5 - S1B	17 - S2B	29 - S3B	41 - S4B
6 - S1C	18 - S2C	30 - S3C	42 - S4C
7 - HS1A	19 - HS2A	31 - HS3A	43 - HS4A
8 - HS1C	20 - HS2B	32 - HS3B	44 - HS4B
9 - HS1C	21 - HS2C	33 - HS3C	45 - HS4C
10 - SH1A	22 - SH2A	34 - SH3A	46 - SH4A
11 - SH1B	23 - SH2B	35 - SH3B	47 - SH4B
12 - SH1C	24 - SH2C	36 - SH3C	48 - SH4C
<u>Non-Forest</u>		<u>Other</u>	
49 - landing	55 - marsh	70 - biological reserve	
50 - road	56 - bog	71 - orchard	
51 - power line	57 - forested wetland		
52 - agriculture	58 - swamp		
53 - exclusion	59 - stream/brook-riparian		
54 - open water	60 - river-riparian		

Table 2. MTL cover type classification

GEOLOGICAL ATTRIBUTES

TOPOGRAPHY

The property rests on the eastern flanks of the central Green Mountains. The greatest elevation is found in stand 37 in the south compartment where it reaches nearly 2,450 feet. The lowest elevation of 1,380 feet is found in stand 34 in the north compartment near Locust Brook.

The terrain ranges from gentle slopes to ledge-laden inoperable slopes. In general the majority of the ground is moderately sloping and often complemented by rolling terrain that folds often into drainages.

ASPECT

Due to the sheer size of the property and its topographical variety, all aspects are found. Northeasterly is the dominating aspect however.

BROOKS, PONDS & WETLANDS

The headwaters of Delectable Forest are largely springfields or *seeps*, where ground water is discharged throughout the year. Innumerable seasonal streams feed the two major secondary brooks that are on the forest. Each of the compartments has a major secondary brook that drainages its acreage. Both of these brooks feed into a

primary brook called Locust Brook which flows north for less than 5 miles and then empties into the White River, just west of Bethel center. All forest management is implemented giving consideration to the protection of this water resource by having the least amount of impact to the hydrology of the seep and riparian communities.

SOILS

The soils are quite variable on this property. They range from high elevation thin soils to deeper more productive soils. These soils have a parent material of highly complex pattern of metamorphosed igneous and sedimentary rock that came to be by a series of volcanic, mountain building and sedimentation activity. The great mountain building event that born this bedrock was the Grenville Orogeny, a period that unfolded over one billion years ago-the oldest rock formation in the northeast. The *generalized* resulting bedrock of this area is quartzite, gneiss and schist, all of which are non-calcareous and generally acidic. However, in this region there is a band of calcareous quartzite bedrock, known as the Plymouth member of the Hoosic formation. This mildly calcareous mixture of sandstone and marine deposits stretches from Pittsfield south to Andover. Most of the soils found on the property are very productive for tree grow, the exception being the higher elevations of nutrient poor sites and isolated ledge outcrop areas. Based on field evidence the most suited tree for the soils in the softwood types are red spruce, hemlock, and white pine, in the hardwood types sugar maple, yellow/white birch and white ash. The soils are mapped by the United States Department of Agriculture, Natural Resource Conservation Service (formally the Soil Conservation Service). A soils map and a non-technical description of this soil are included in appendix.

This calcareous mixture of sandstone and marine deposits mentioned above enriches a high proportion of the northern hardwood sites on Delectable, particularly in the north compartment in stands 25, 37 and 38.

FOREST MANAGEMENT

MANAGEMENT COMPARTMENTS

Delectable Mountain is broadly divided into 2 separate management compartments. The location of the boundary between these compartments is based both on topography and road access. The north compartment is 404 acres and is access by Town Highway #46 and the south compartment is 588 acres and is accessed by Town Highway #48. Because each compartment is geographically smaller than the entire property, forest management planning can be done described more specifically.

FOREST STANDS

Based on information collected during the timber cruise and from aerial photo interpretation, the forest has been divided into 8 different forest stands over the 2 compartment units. As mentioned above, wetland areas and some non-forested areas are found on the property in addition to the forestland. Although these non-forested areas are typed out on the map, they are not considered assemblages of stands. Stands are aggregates of trees that have similar characteristics, and are the basic units of forest management. Stands differ from one another in species composition, density and often age. Stand differences occur due to soil conditions, aspect and very commonly past land use. MTL forest typing is broad. There are many smaller forest types within the broad types but these variations are addressed on the ground by experienced field foresters. Due to the size of the MTL ownership micro management is not an option. A description of each stand and a chart describing its characteristics can be found in the data section of this plan. The location of each stand can be identified by looking at the forest type map found in the appendix of this plan.

AGE-AGE CLASS DISTRIBUTION

The woodland on this property is composed several age groups with the most common being about 80 years. As mentioned earlier, this is due to past disturbances that have gone on over the last 150 years including agriculture, mining and logging.

The structure of this property is primarily even-age. In some areas a strong amount of advanced regeneration (sapling) is present, much of this is found in areas cut in the past 20 years. The juxtaposition of trees of different age classes has important implications for long-term forest and wildlife management. MTL considers a well-balanced forest to have three different age classes: seedlings/saplings, poletimber, and sawtimber. A balance of age classes is desirable for the sustained yield of forest products. A mixture of age classes is also important for providing a variety of wildlife habitats.

GROWTH RATES

An in depth growth study was beyond the scope of this management plan however a non-scientific evaluation of several increment cores and stumps was. Growth of the spruce averages 12 rings per inch for a DBH average of 10 inches, which corresponds to a growth rate of approximately 3% per year while the hardwood collectively averaged 9 rings per inch for a DBH average of 12 inches. This has a corresponding growth rate of 3% as well. These rates are well in line with what is thought to be with in the norm for this region.

ALLOWABLE CUT

For sustainability reasons, the amount of wood volume to be removed from this property should not exceed the volume of wood grown between the time of cutting entries. Therefore, the amount of wood cut will be equal to or less than the amount of wood grown between the period of cuttings. Due to stocking and species composition or silvicultural objectives it may be necessary to cut more, or less during a specific entry. This must be done in a way that does not compromise long-term sustainability. Hypothetically, this is straightforward, nevertheless solid volume numbers grown, growing and removed are essential to establishing an allowable cut volume. Presently a growth factor of 2% is being applied to the softwood collectively and calculates a total volume of 12,000 board feet per year for sawlog products, with a total of 8 cords of pulp/growing stock volume added each year. For the hardwood, a growth factor of 3% has been applied which results in a current growth of 52,000 board feet per year of sawlog volume and a total of 157 cords of pulp/growing stock growing per year. This plan is being written MTL is working on a growth and yield program that will aid in producing allowable cut guidelines.

TREE QUALITY AND TREE HEALTH

The tree quality on the Delectable Forest is somewhat variable, but is generally good to excellent. Like all land, the tree quality and health is strongly related to the soil properties and the manner that the forests have been treated historically. By considering these two aspects of Delectable, present and future qualitative observations can be made.

Tree health and quality on the property is good to excellent. Hardwoods are well formed and vigorous when found on the right site, which most often is the case. Specifically speaking, sugar maple, white ash, yellow birch and white birch are very healthy and of excellent quality. Northern hardwoods in this region are known for their high quality, especially sugar maple. Through forest management, strides are always being made to upgrade the quality of the timber resource.

Sugar maple though is not without its ailments. Throughout the entire property the *Eutapella* canker and the maple borer is found in some trees, however neither seem to be a major health concern and efforts to keep them in check will be carried out during timber harvests.

American beech is a important component of this forested property and ranges in health according to its degree of *nectria* tolerance. In a very few areas the beech bark disease is not seen and other areas it moderate to heavy. A general observation is the beech found on the drier sites have more health problems than those located on the cool/moist sites.

Softwood health and quality is good to excellent for the most part. The red spruce encountered on the property is fair to good in health. Most stands of spruce show a small degree of root rot. This is believed to be caused by the *Armillaria* fungus, but the mobilization of aluminum due to acidic deposition is plausible explanation for the root death and subsequent slow growth. Fortunately where this occurs, the isolated dieback creates a gap disturbance affect and typically causes a bloom in regenerating back to spruce/fir. The white pine also appears to be in good health. Little blister rust is found. Due to the large tree size there is likely some red rot in the wood.

The 1998 ice storm caused moderate damage to isolated areas of the property. Much of the damage is confined to the higher elevations of both compartments. The areas that received the most amounts of damage were those that were selectively thinned prior to the ice-loading event (stand 38) and the higher elevated sites (stand 32 and 37). Species receiving the greatest damage were sugar maple, beech, black cherry and white birch respectively. Health problems will arise to varying degrees based on the severity of damage and the species.

STOCKING AND VOLUMES

Stocking is a term used to describe the relative density of the trees in a stand. Stands may be understocked, overstocked, or fully stocked. Stands that are fully stocked have trees that are fully utilizing the growing space available to them. Due to past circumstances much of the property has grown to the point where the dominant forest types size is fully or overstocked. To fully utilize the available growing space thinning prescriptions are in order where these types are of commercial size and structure.

SILVICULTURAL GUIDELINES

Silvicultural System

Delectable Mountain will be managed on the tract level by a combination of the two silvicultural systems; even-age or uneven-age forest management. At the stand level, one of the two systems will be applied. Many factors are considered in order to determine the appropriate system for the given stand including; forest type, forest community type, present condition and future objectives of the stand. A particular stand or forest type has a mixture of species, and each species within the stand has certain living requirements and an expected live span. The living requirements for a particular species are provided for by the various silvicultural methods chosen and its life span dictates the rotation length. The stand dynamics including both the rotation length and species living requirements are best understood on

the community level.

On a natural community level there are basically two forest communities, northern hardwood and lowland spruce fir. Understanding the successional trends of both communities and how disturbance regimes affect this successional path helps guide both the choice of the silvicultural system and corresponding methods used in forest management.

Below are generalized silvicultural systems and methods that will be broadly applied to the natural forest communities on Delectable Mountain and the forest stands within them. The methods and their corresponding cutting cycles, rotation ages and target diameters are also generalized and are used as management guidelines. Like all good forestry, the most appropriate silvicultural methods are best applied on the ground rather than on paper.

Northern Hardwood Silviculture

Northern hardwood communities on Delectable Mountain will be managed with both even-age and uneven-age systems. Even-age methods including clearcutting, seed tree, shelterwood, overstory removal and patch cut applications will be used to regenerate a new stand when deemed necessary. Ideally, these will be applied in a way that will mimic both large scale and disturbances such as wind or ice. This approach will likely be used to increase the stands composition of shade intolerant species and/or to adjust the age class distribution over the tract level. Rotation length in this community will be approximately 125 years.

Uneven-age silviculture will be the most frequently applied system for managing the northern hardwood communities. Methods of uneven-age management will involve a combination of single tree and group selection which will mimic single tree and canopy gap disturbances. These silvicultural methods will be used to create and/or maintain a multi-aged stand of largely mid-tolerant and shade tolerant species. Depending on a number of considerations, the cutting cycles of this uneven-age system will be between 15 and 30 years. Target diameters of the northern hardwood community will have parameters however because the variability of growth patterns due to site and weather factors, the targets may not be reached or may be exceeded. Target diameters are as follows.

White Pine	18-22	White Ash	16-20
Hemlock	14-18	Black Cherry	16-20
Balsam Fir	10-14	White Birch	10-14
Red Spruce	12-18	Yellow Birch	16-22
		Beech	16-22
Sugar Maple	16-22	Aspen	10-14
Red Maple	14-18		

Lowland Spruce-Fir Silviculture

All of the spruce-fir and other softwood communities will be primarily managed with the uneven-age silvicultural system. Instead of constant forest cover over entire stands however, the stand will be managed via small patch cuts and groups to create small even age blocks of varying ages. It will take several cuttings to reach this state. These methods are chosen to reflect the most common natural disturbances in these softwood stands. Patches will be made where established softwood regeneration is present, or in situations where regeneration is like to be obtainable. Paper birch is a large component in this type and will be encouraged where appropriate. Riparian corridors will be left well stocked however the occasional tree may be cut.

White pine Silviculture

Stand type 46 contains some very nice White pine in a natural community that is likely better suited for spruce/fir. Consequently management will be geared less towards a future as a pine stand however any pine regeneration will be welcome. The goal will be to continue to grow the pine overstory trees out until maturity – they are currently quite large- and allow site suited regeneration to come in. The silviculture will be uneven-age utilizing single tree and small group openings.

FUTURE POTENTIAL

This forest management document is the first known comprehensive plan ever to be created for this property. Considering this increased level of management and goal of increasing tree size and quality, the property will become a more flourishing resource through careful planning and implementation. Given the ownership objectives and thoughtful treatments the property has high resource potential. With this planning and circumspect this land will continue to produce valuable timber products, non-timber products, and valuable open space for recreation and wildlife habitat.

WILDLIFE ECOLOGY

Wildlife use on this property is extensive and varied. Three broad habitats are found on the property and are deemed essential for the present and future wildlife ecology. The northern hardwood communities provide great

amounts of food for much of the mammalian and bird species, most notable through the hard mast of beechnuts and softmast of the cherries. Lowland spruce-fir provides travel corridors, thermal cover and prey evading cover as well as travel corridors for both predator and prey, and the swamp and riparian communities provide all the requirement for the amphibians and fish populations that are present. High levels of standing snags create excavating, perching and nesting opportunities.

A myriad of other attributes found on the near 2 square miles of forestland provide the basis for the natural communities present, hence the wildlife. Management considering all of the habitat components will continue to help enrich and diversify the property.

Forest Community Fauna

The following is a break down of the two natural communities with a generalized list of characteristic mammals, bird and amphibians.

NORTHERN HARDWOOD:

<u>Mammals</u>	<u>Birds</u>	<u>Reptiles</u>
Red squirrel	Scarlet tanager	Wood frog
Chipmunk	Veery	Spotted salamander
Masked shrew	Black and white warbler	Eastern newt
White-footed mouse	Black throated blue	Northern two-lined salamander
Northern flying squirrel	Eastern wood pewee	Spring salamander
Woodland jumping mouse	Oven bird	Redbacked salamander
Deer mouse	Piliated woodpecker	Redbelly snake
Snowshoe hare	Downy woodpecker	
Porcupine	Rose breasted grosbeak	
Fisher	Hermit thrush	
White-tailed deer	Re-cyed verio	
Black bear		

MONTANE SPRUCE-FIR

<u>Mammals</u>	<u>Birds</u>
Red squirrel	Olive-sided fly catcher
Porcupine	Ruby-crowned kinglet
Moose	Yellow-rumped warbler
	Blackpoll warbler
	Bay-breasted warbler
	Red-breasted nut hatch
	Bicknell's thrush

RECREATION

A fair amount of recreational use is conducted on the property. Trails are located throughout the property and serve as the major recreational venue along with hunting on the property. This use includes bicycle, motorcycle, ATV, truck and snowmobiles which use the public road status and its link to the Les Newell Area. The heavy use of motorized vehicles during the sensitive season has been creating problems with road/trail degradation. This issue of misuse will be addressed with gates and signs given the cooperation of the town. Legally, by the deed restrictions set forth by the conservation easement, all motorized vehicular use (including ATV's) on the Delectable Forest is completely prohibited. This restriction excludes all town rights-of-ways. VAST has a strong interest in the property with a main trail corridor running through the property. Hunting forms another strong use by local residents, a few hunting camps are located near the property.

ARCHAEOLOGICAL ATTRIBUTES

With field evidence a lot of historical attributes can be conjured. A number of old homestead foundations are scattered throughout the property, most are confined to the vicinity of the old town roads. Five out of the six known foundations are located just off Town Road #48 in the south compartment. The most recently active homestead is found among stand 7 were field abandonment succession can still be witnessed. All remnants of past civilizations will be protected from damage during all forest management operations.

RARE SPECIES & UNIQUE NATURAL COMMUNITIES

An in-depth flora and fauna survey was not within the scope of this plan. The Vermont Department of Fish and Wildlife 1997 Significant Habitat Map shows no deer yards, wetlands or significant habitats. With the abundant acreage of rich northern hardwood communities a moderate population of butternut is found. All butternut encountered on Delectable is in decline and expected to become fully extinct within the next decade or so. There is a small population of male fern (*Dryopteris filix-mas*), a threatened plant in Vermont. One other unique community of special

importance is a large vernal pool. Both the fern and the vernal pool are located in the south compartment and are considered special ecological zones and thus deemed a Special Treatment Area (STA) where specific legal management provisions must be adhered to by MTL.

OPERATIONAL CONSIDERATIONS

SPECIAL OPERATIONAL CONSIDERATIONS

Special operational considerations must be implemented during timber harvests given a number of specific deed restrictions concerning ecological protection. The following is a list of the Special Treatment Areas and their brief operational requirement and/or restriction. (More specific language is found in the Grant of Development Rights and Conservation Restrictions.)

- 1.) **Surface Water Buffer Zones (SWBZ)**- within 50 feet of all major brooks, management objectives will principally be the maintenance of ecological integrity, where machinery will be prohibited (except for skid trail crossing) and any wood cut within the SWBZ must not lower the residual stocking below the A line.
- 2.) **Male Fern Zone**- a ¼ acre area in stand 25 of the south compartment that prohibits all forest management activities.
- 3.) **Vernal Pool Buffer**- 50 feet buffer around the large vernal pool in the eastern portion of stand 35 that prohibits all forest management activities.

ACCESS

Currently operational access for forestry management is less than adequate when considering conventional logging systems of rubber tired skidders and tracked dozers. This inadequate state is due to the poor shape and non-existent interior road access and will not permit log truck travel. Any size commercial timber harvest will require road/landing improvement or building. The Town of Barnard has control over all of the roads and permission needs to be granted to upgrade the town roads. No gating or waterbaring is allowed which means erosion and rutting will be a continual problem. Therefore, MTL can only do the minimum amount of repair which allows for logging access because it is assumed that any improvements made will be quickly lost.

North Compartment: Town Highway #46 accesses a small ½ acre landing in stand 34 where little or no improvement is necessary however a portion of this is thought to be on an abutters property. Beyond the landing, however, the road improvements carried out under the Dean ownership have all been lost due to improper road closure. From the landing in stand 34 the road will require improvement through stand 25, approximately 1,000 feet. Improvements will involve reshaping road/ditching and installation of 1 or 2 culverts. From this point, road building will be required for approximately 4,000 feet. Layout will likely follow the old skid trail since it runs low on the slope and involves little gradient. Road building material will be mined on-site. A dry, well-drained site is found in the northwest section of stand 25 and merits review for a possible barrow pit. This road once complete will access the 400 acres in the north compartment.

South Compartment: Town Highway #48 potentially accesses the entire south compartment, however, its current state of disrepair prohibits any commercial access without improvement work. From the beginning of TH #48 to far western portion of stand 38, a total of approximately 7,000 feet will require improvements. Improvements will involve reshaping/rebuilding road surface/ditching and installing culverts. Road building material will be mined on-site. A dry, well-drained soil is likely found under the high shoulders of the spruce in stand 35 and merits review for a possible barrow pits if needed. Two log landings will be constructed and an old landing at Buster's bus will be re-opened.

OPERABILITY

Most of the property can be operated by commercial timber harvesting equipment because much of the terrain is moderately sloped. A fair percentage of the property is quite steep and requires strategic layout and approach to minimize negative impacts on the ground. Within these steep areas some ground will be deemed inoperable by current terrestrial based logging techniques. These areas are mostly confined to the proximity of the height of land in stand 37. Many of the accessible steep areas, like those found in stand 25 are best suited for small dozers.

LOCAL MARKETS

At this point local markets for sawlog forest products are sufficient to support a timber harvest, particularly hardwood. Domestic spruce-fir and hemlock markets in the area pay very little and therefore strong consideration must be given to Canadian markets. The low-grade pulpwood markets are a considerable distance away and local logging capacity to move such wood is limited. Finding adequate low-grade markets are a challenge to managing this property

and will continue to be so in the future.

LOCAL LOGGING CAPACITY

The local logging capacity and infrastructure is in place to carry out the treatments prescribed in this plan. All logging treatments planned will attempt to not involve whole tree harvesting due to the many negative ramifications they create, especially on soils that are low in fertility.

CONSERVATION EASEMENT

In 2002 a conservation easement was placed on the property. This easement is held and monitored by the Vermont Land Trust. The easement precludes development on all but 2 acres of the property but it does allow for one unimproved camp. Forest management guidelines need to be followed including special treatment areas which were already mentioned. A forest management plan is required as is notification of forest management activities. A copy of the actual easement document can be found in the tract files in the New London office.

Forest Stand Management Table

Tract: VT15

Compartment: NORTH

Date: 10/15/02

Stand #: 32

Acres: 65

Approx. Stand Age: 80

Broad Forest Type: HS3B Forest Type: Mixedwood

Community Type: Red spruce-northern hardwood

Basal Area/Acre: 106

Stocking Level: Fully stocked

Timber Quality: Fair to good

Trees/Acre: 153

Mean Stand Diameter: 10.8

Acceptable Growing Stock BA/Acre: 49

Forest Composition

Species	%Trees	Ven/Saw Vol. (bf)	Pallet Vol. (bf)	Pulp Vol. (co)
Red Spruce	19	173,746	0	72
Misc. Softwood	2	0	0	18
Black Cherry	5	15,356	6,041	65
Sugar Maple	23	46,942	42,668	195
Yellow Birch	18	12,057	24,745	163
White Birch	11	7,859	9,216	78
Beech	18	0	0	129
White Ash	5	28,826	2,060	45
Total	100	284,785	84,730	765
Total Vol/Acre		4,381	1,304	12

Regeneration

31%	Red Spruce
20%	Beech
17%	Other
17%	Moose Maple
14%	Sugar Maple

Damage/Insects/Disease: Some spruce decline and ice damage **Drainage:** Well to excessively well drained

Soil: Thin over ledge **Aspect:** Northeasterly

Operational Access: Busters bus landing and new landing off of TH46 **Archeological:** None encountered

Terrain: Moderate slopes with benches and a ridgeline, otherwise quite gentle

Wildlife Management: Bear sign **Special Management Practices:** Retain bear scared beech

Silvicultural Prescription: Un-evenage management creating patches of spruce and mixed hardwood regeneration through individual tree, group selection and patch cutting winter of 2002 or summer of 2003 and into 2004. The western portion of stand may be able to be operated in conjunction with cutting on the south compartment.

Forest Stand Management Table

Tract: VT15

Compartment: NORTH

Date: 10/15/02

Stand #: 37

Acres: 92

Approx. Stand Age: 85 years

Broad Forest Type: H4A

Forest Type: Northern hardwood

Community Type: Northern hardwood

Basal Area/Acre: 114

Stocking Level: Fully stocked

Timber Quality: Excellent

Trees/Acre: 160

Mean Stand Diameter: 10.9

Acceptable Growing Stock BA/Acre: 43

Forest Composition

<u>Species</u>	<u>%Trees</u>	<u>Ven/Saw Vol. (bf)</u>	<u>Pallet Vol. (bf)</u>	<u>Pulp Vol. (co)</u>
Black Cherry	3	0	0	47
Sugar Maple	44	194,954	53,933	528
Red Maple	1	27,488	0	12
Yellow Birch	20	71,235	25,371	307
White Birch	5	60,585	33,392	54
Beech	11	0	19,043	79
Aspen	7	0	0	53
White Ash	3	0	0	47
Hophornbeam	7	0	0	29
Total	100	354,262	131,739	1,155
Total Vol/Acre		3,834	1,426	12

Regeneration

31%	Sugar Maple
18%	Red Spruce
18%	Beech
12%	Yellow Birch
6%	Black Cherry
6%	Red Maple
6%	Moose Maple

Damage/Insects/Disease: General crown damage at higher elevations from 1998 ice storm, and some crown dieback in maple, beech die back and mortality from stress including beech bark disease.

Soil: loam over ledge, shallow up high

Drainage: Well drained except for seeps

Operational Access: New landing off of TH 46

Archeological: None encountered

Terrain: Upland gradual to steep with benches and ridgelines

Aspect: Northerly

Wildlife Management: A lot of bear sign

Special Management Practices: Retain or promote healthy beech

Silvicultural Prescription: Un-even age management with a 20 year cutting cycle. Individual tree/group selection cutting 2003-2004. Within this variable stand some small, up to 3 acre patches may also be cut where suitable regeneration is present to regenerate intolerant to mid tolerant species including black cherry. One portion of the stand has exceptional trees with jst the right combination of soil depth, drainage and aspect. In this 50 acre area a conservative single tree cutting will be conducted. This is a variable stand which calls for some on the ground judgment by field forester.