

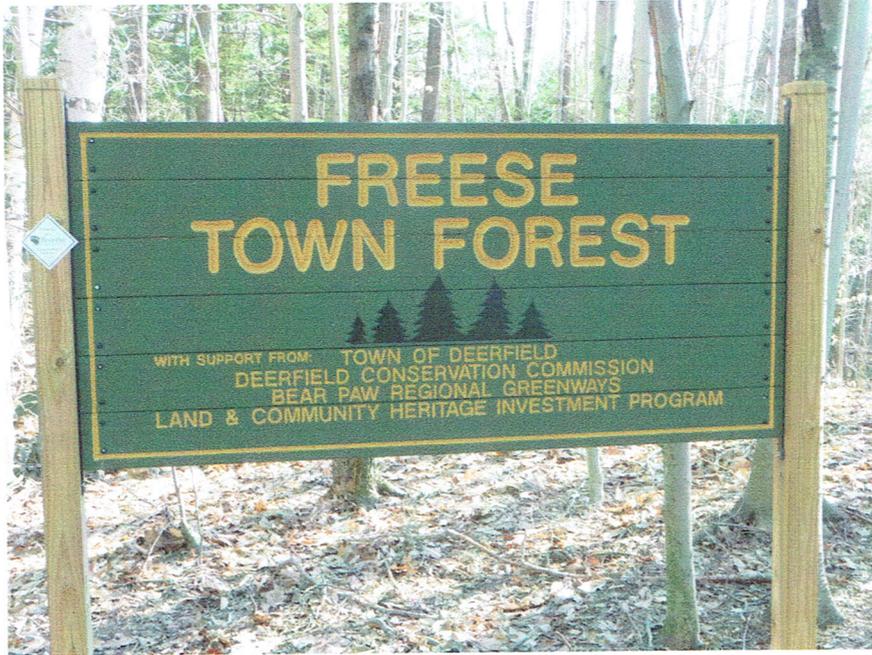
FOREST MANAGEMENT PLAN

for the

Freese Town Forest

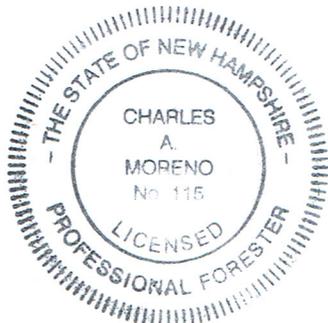
Deerfield, New Hampshire

174.4± acres



Commissioned By:
The Deerfield Conservation Commission

Prepared by:
Charles Moreno, LPF
Moreno Forestry Associates
PO Box 60, Center Strafford, NH 03815
(603) 335-1961
August 10, 2012



Charles Moreno, NH LPF #115
Consulting Forester

Report Copy # _____

FOREST MANAGEMENT PLAN
for the
Freese Town Forest
Deerfield, New Hampshire
174.4± acres



August 10, 2012

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The purpose of this plan is to provide natural resources information and forest and wildlife management recommendations to the Deerfield Conservation Commission, citizens of Deerfield, and others interested in the management of the Freese Town Forest in Deerfield, New Hampshire. This document is a work for hire done by Moreno Forestry Associates for the Town of Deerfield, New Hampshire, and may be used by the Town of Deerfield, New Hampshire for any purpose. No part of this plan, including all written material, maps, plan format and organization, is to be copied or reproduced for any other purpose, particularly commercial purposes, by anyone other than the Town of Deerfield, New Hampshire without proper citation to the author, Charles A. Moreno, Consulting Forester.



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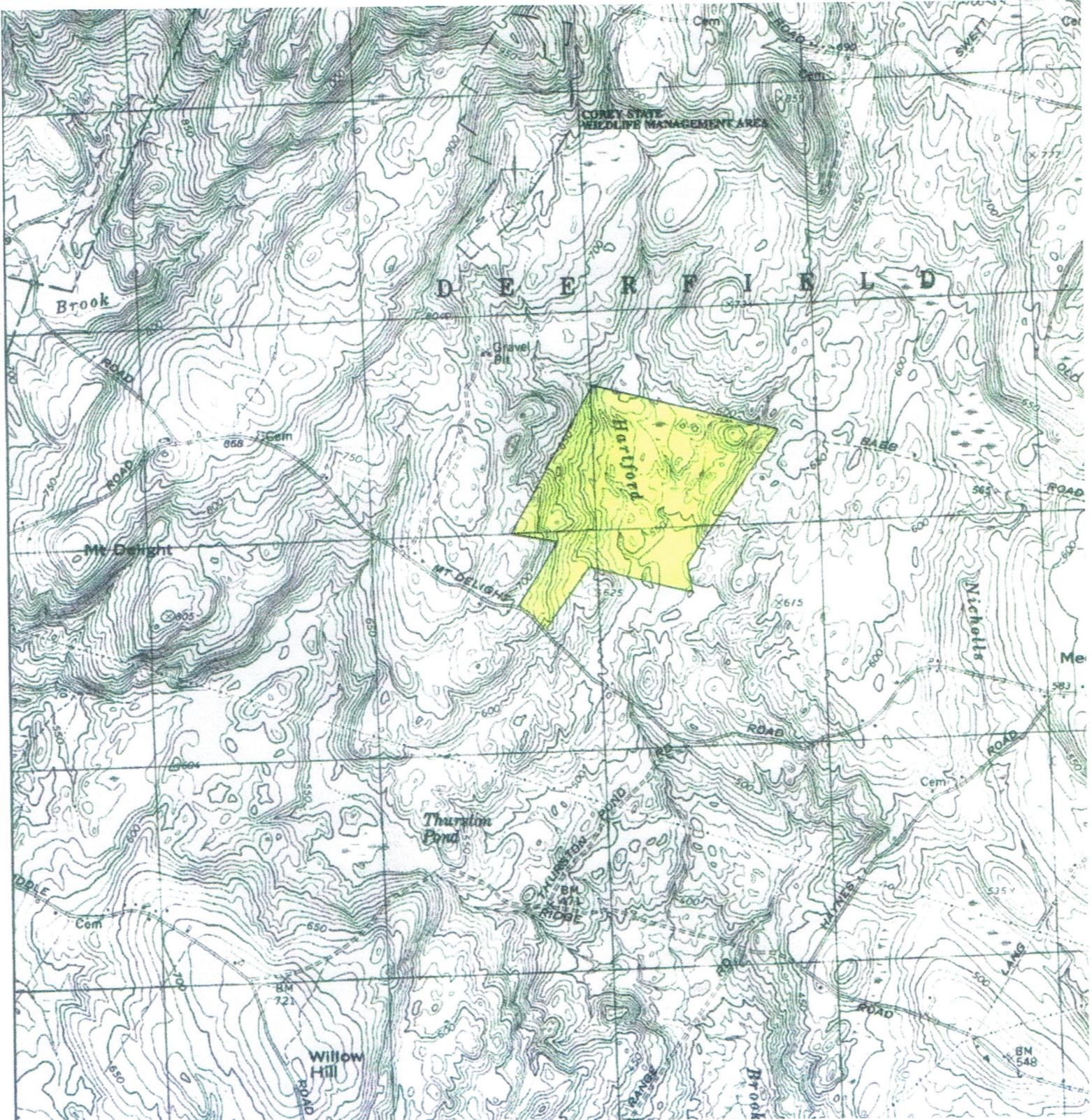
MAPS

**Locus Map of the
Freese Town Forest
Deerfield, New Hampshire
174.4± Acres**

MAP SCALE:



1 inch = 2000± feet



USGS Topographic Map, "Gossville" Quadrangle

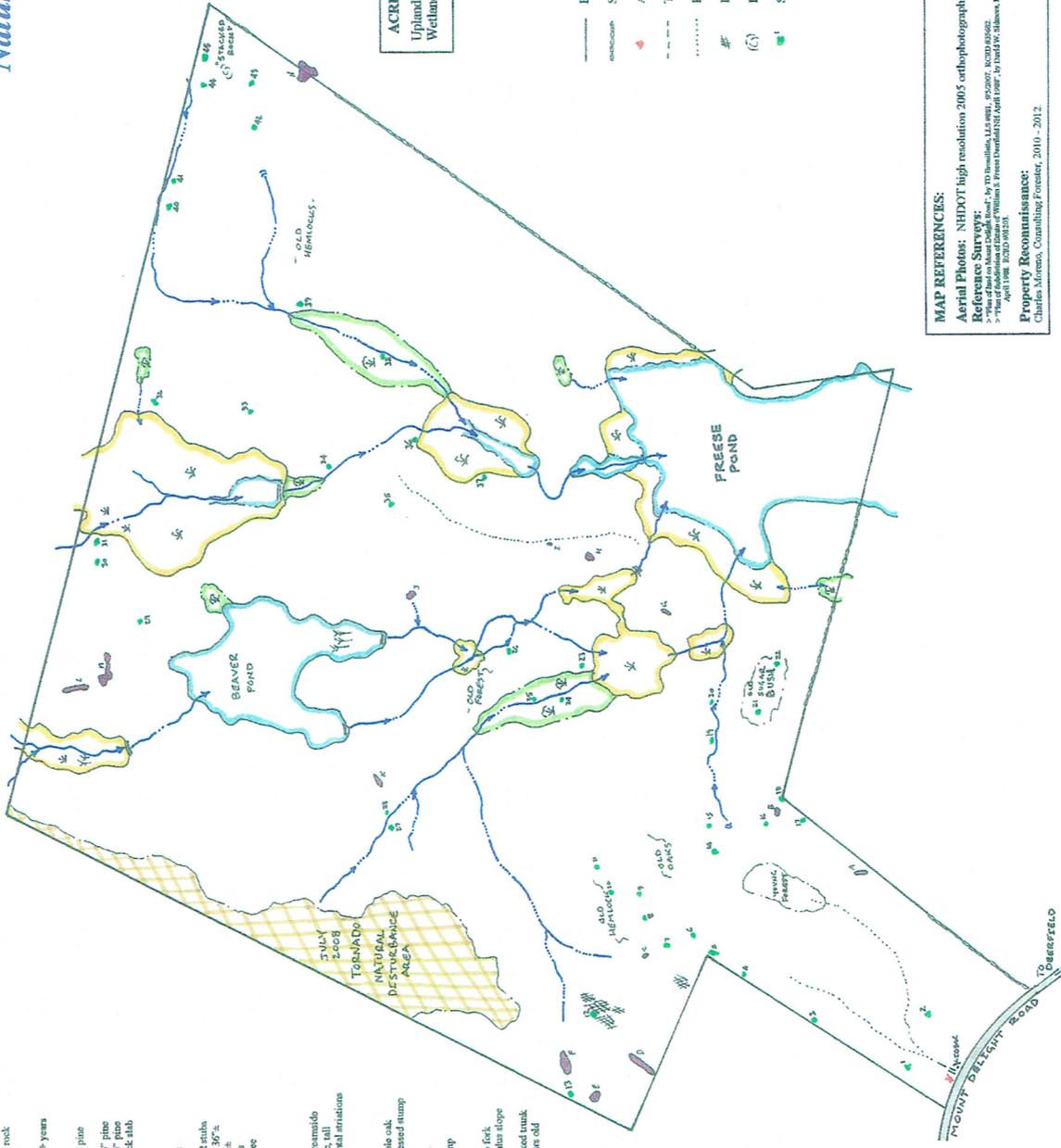
Natural and Physical Features Map of the Town of Deerfield's FREESE TOWN FOREST Deerfield, New Hampshire 174.4± acres

MAP SCALE:
1 inch = 400± feet
(1" = 650' ± on
8"2 x 11)

ACREAGE SUMMARY
Upland forest - 142.4± acres
Wetlands - 32.0± acres

MAP LEGEND

- | | |
|------------------|---------------------------------|
| Property line | Perennial stream |
| State wall | Seasonal stream |
| Access point | Intermittent/subsurface flow |
| Trail | Beaver dam |
| Footpath | Freshwater pond or marsh (Blue) |
| Ledge slab | Shrub/sedge swamp (Gold) |
| Rock formation | Forested swamp (Green) |
| Significant tree | Vernal pool (Purple) |



SIGNIFICANT TREE INDEX

- 1- Beech, 26" DBH, dead tree
- 2- Sugar maple, 23", on rock
- 3- Hemlock, 28", old
- 4- Hemlock, 28", old
- 5- Grove of old hemlock, 150+ years
- 6- Hemlock, 29", old
- 7- Red oak, 30", dead tree
- 8- White pine, large "pasture" pine
- 9- White pine, large "pasture" pine
- 10- White pine, large "pasture" pine
- 11- White pine, large "pasture" pine
- 12- Black cherry, 17", on rock slab
- 13- Several red spruce
- 14- White pine, 38"
- 15- Red oak, 32"
- 16- Red oak, 27" and 28"
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- 38- Red maple, 22", in swamp
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- 41- Yellow birch, 30", triple fork
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- 43- White birch, 17"
- 44- Yellow birch, 30", crooked trunk
- 45- Hemlock, 28", 150+ year old

MAP RESEARCHED and DRAWN BY:
Charles Moreno, Consulting Forester
Center Strafford, NH (603) 335-1961
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MAP REFERENCES:
Aerial Photos: NHDOT high resolution 2005 orthophotograph.
Reference: STRAFFORD, NH
> "Map of State of New Hampshire", by T.D. Swain, U.S. Geol. Surv., 1907; M200 45502.
> "Map of State of New Hampshire", by T.D. Swain, U.S. Geol. Surv., 1907; M200 45502.
April 1948; M200 45502.
Property Reconnaissance:
Charles Moreno, Consulting Forester, 2010 - 2012

MAP PREPARED FOR: The Town of Deerfield
This map is not intended as a legal description or for legal purposes.

Map of the FREESE TOWN FOREST

Deerfield, New Hampshire
174.4± acres

Showing Forest Types

Map Legend

- Property Line
- ∞ Stone Wall
- ≡ Shrub/sedge Swamp
- ☒ Forested Wetland
- - - Forest Type Change



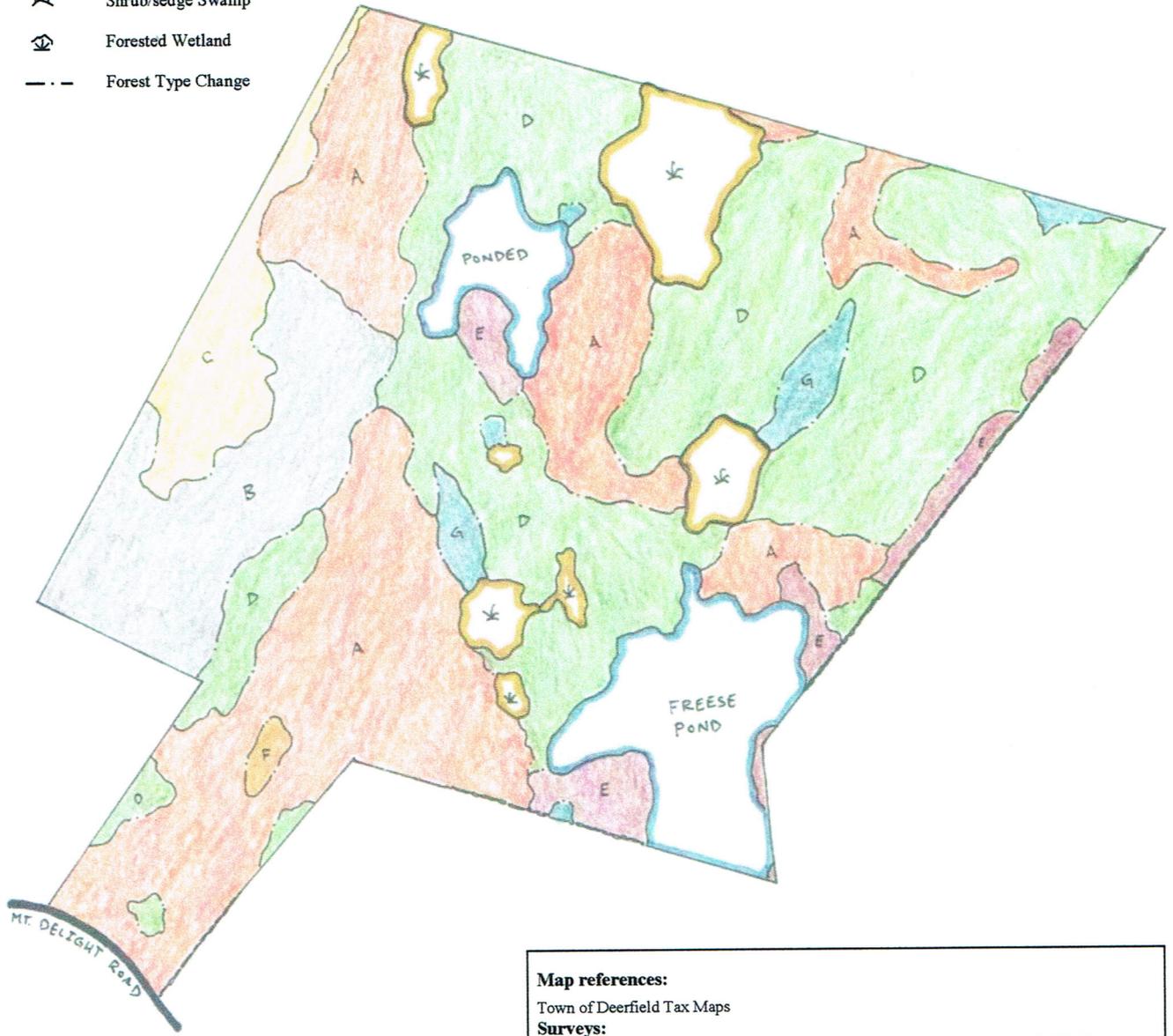
MAP SCALE:
1 inch = 600± feet

Forest Type Key

	<u>Acres</u>
A. Hardwood, Even-aged.....	55.8±
B. Hardwood, 2-aged, beech.....	17.0±
C. Tornado-affected area.....	5.6±
D. Hemlock/Hardwood.....	56.8±
E. Hemlock/Hardwood/Pine.....	6.2±
F. Young Forest.....	1.0±
G. Forested Wetlands.....	4.1±
Total Forested:	146.5±

Shrub and sedge/emergent swamp.....	11.4±
Ponded wetlands.....	16.5±
Total Open Wetlands:	27.9±

Property Total: 174.4±



Map researched and drawn by:
Charlie Moreno, Consulting Forester
Moreno Forestry Associates
Center Strafford, NH
(603) 335-1961 April 2012

Map references:
Town of Deerfield Tax Maps
Surveys:
> "Plan of land on Mount Delight Road", by TD Brouillette, LLS #881, 9/5/2007. RCRD #35662.
> "Plan of Subdivision of Estate of William S. Freese Deerfield NH April 1988", by David W. Sidmore, LLS, April 1988. RCRD #01203.
Aerial Photos: 2010 high resolution orthophotography from NHDOT series.
Field Examination: (C. Moreno, 2010-2012)

*This map is not intended as a legal description or for legal purposes.
Property lines, acreages, and interior details are approximate.*

Map of the
FREESE TOWN FOREST
 Deerfield, New Hampshire
 174.4± acres

Showing Management Recommendations



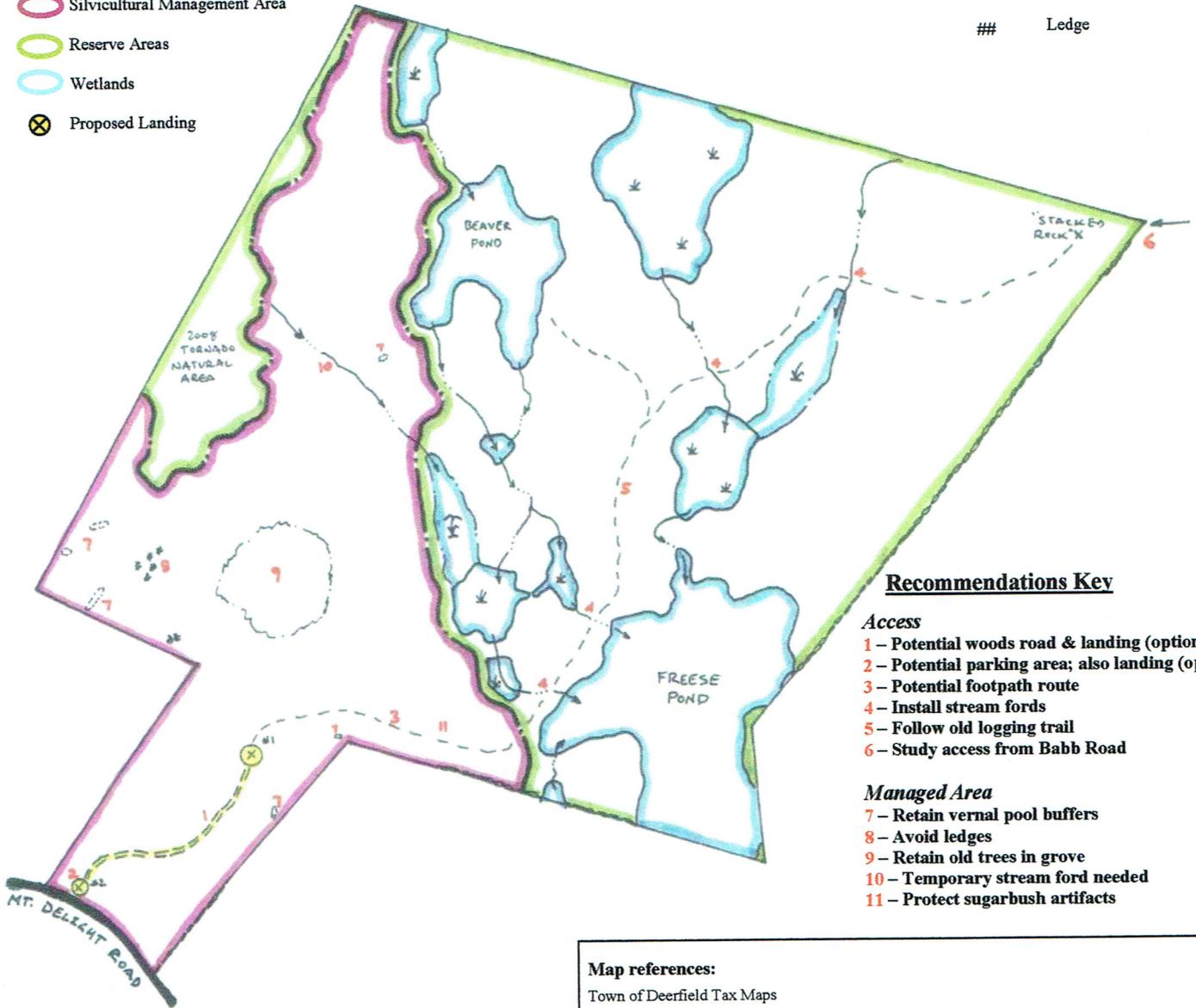
MAP SCALE:
 1 inch = 600± feet

Map Legend

- Property line
- ∞ Stone wall
- ⊗ Woods road (proposed)
- - - - Trail/Footpath
- ⊕ Forested wetland
- ↘ Shrub/sedge swamp
- ↗ Stream
- ⋯ Vernal pool
- ## Ledge

Management Areas

- Silvicultural Management Area
- Reserve Areas
- Wetlands
- ⊗ Proposed Landing



Recommendations Key

Access

- 1 – Potential woods road & landing (option #1)
- 2 – Potential parking area; also landing (option #2)
- 3 – Potential footpath route
- 4 – Install stream fords
- 5 – Follow old logging trail
- 6 – Study access from Babb Road

Managed Area

- 7 – Retain vernal pool buffers
- 8 – Avoid ledges
- 9 – Retain old trees in grove
- 10 – Temporary stream ford needed
- 11 – Protect sugarbush artifacts

Map references:

Town of Deerfield Tax Maps

Surveys:

- > "Plan of land on Mount Delight Road", by TD Brouillette, LLS #881, 9/5/2007. RCRD #35662.
- > "Plan of Subdivision of Estate of William S. Freese Deerfield NH April 1988", by David W. Sidmore, LLS, April 1988. RCRD #01203.

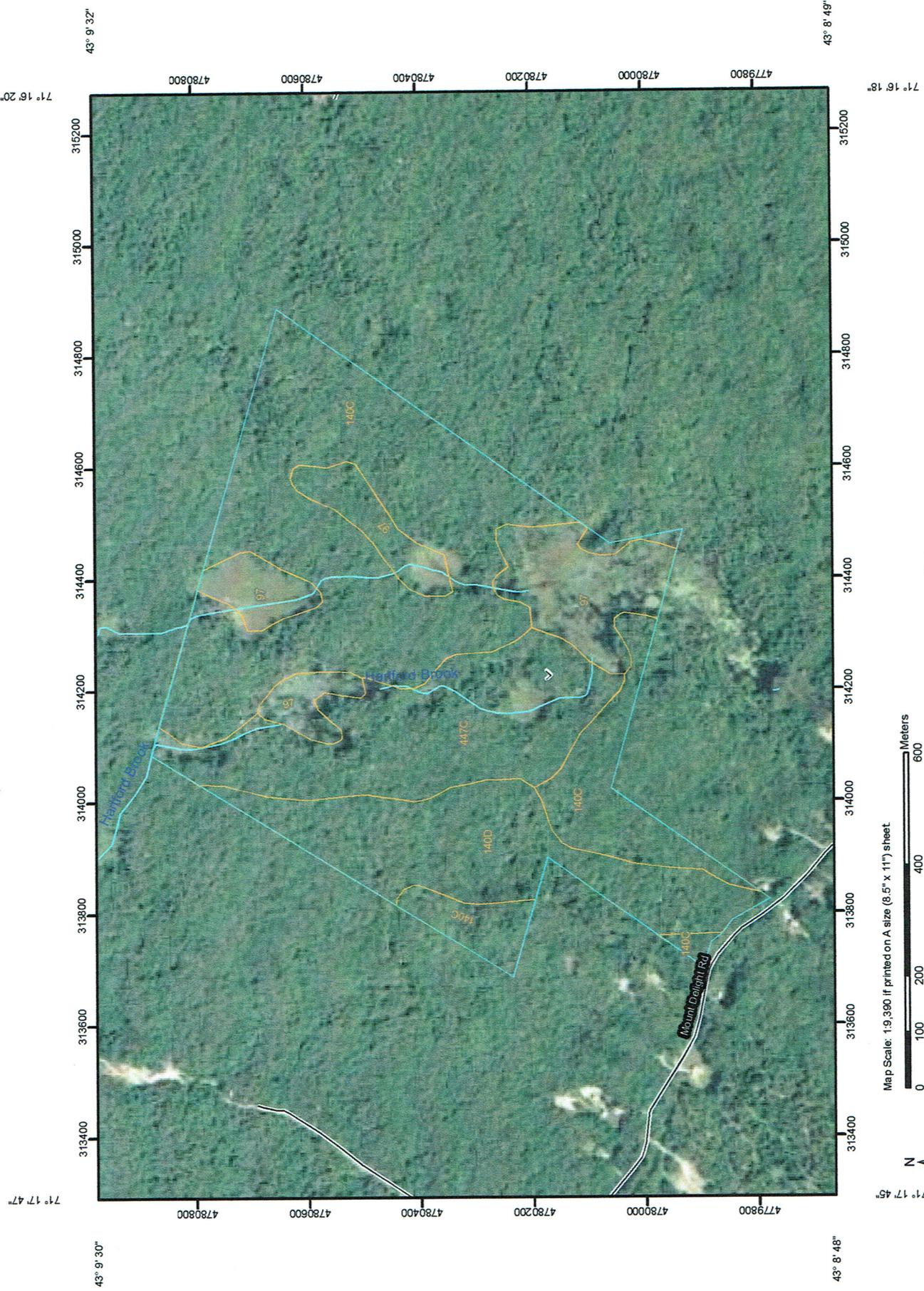
Aerial Photos: 2010 high resolution orthophotography from NHDOT series.

Field Examination: (C. Moreno, 2010-2012)

Map researched and drawn by:
 Charlie Moreno, Consulting Forester
 Moreno Forestry Associates
 Center Strafford, NH
 (603) 335-1961 August 2012

*This map is not intended as a legal description or for legal purposes.
 Property lines, acreages, and interior details are approximate.*

Soil Map—Rockingham County, New Hampshire
(Freese Town Forest, Deerfield, New Hampshire)



Map Scale: 1:9,390 if printed on A size (8.5" x 11") sheet



INTRODUCTION & OBJECTIVES

The FREESE TOWN FOREST

Deerfield, New Hampshire

INTRODUCTION

The Freese Town Forest is a large forested tract situated in the western section of Deerfield, New Hampshire. Permanently protected by conservation easement, the property contains a fine series of interconnected wetlands, as well as substantial upland forest. The property is mostly remote and recreationally undeveloped, though potential exists for backcountry use by the community. The forest is mid-aged, with scattered 150+ year old trees; due to challenging access, only about 1/3 of the total acreage is recommended for silvicultural management, with the remaining forest retained as reserve. The Freese tract is an integral part of an 8,000± acre undeveloped open space block which includes Nottingham Mountain and encompasses valuable wildlife habitat.

PROPERTY INFORMATION

LOCATION and GEOGRAPHY

The Freese Town Forest is located on the northeast side of Mt. Delight Road, approximately 2± miles west of the intersection with Meetinghouse Hill Road, and about 2.5± miles from the Deerfield Town Center.

The property is situated on the southerly edge of the Sebago-Ossipee Hills and Plain Ecoregion¹, approximately 30± miles inland from the Atlantic Ocean. Though mildly inland, on the region's first foothills, the sea still has a moderating effect on the area's climate and, consequently, influences the composition of its forests. The Freese Town Forest lies at the northerly extent of the Appalachian oak-pine zone, just shy of the transition hardwood-conifer zone². Thus shagbark hickory, a common species a few miles south, was not observed on the property, while red spruce has rare presence.

The property is situated within the Lamprey River watershed. Soils on the property are formed from glacial tills and are underlain by metamorphic bedrock. Topography is generally rolling (0 – 15±% grades), with moderately sloped knolls interspersed with level pockets. A few steep ridges are found (15–35±% grades) in the southwestern corner of the property. The property's low elevation is 550± feet above sea level at Freese Pond on the property's southeastern corner, and high elevation at 760± feet on the southwestern corner.

¹ Keys, J.E. and C.A. Carpenter. 1995. Ecological Units of the Eastern United States: First Approximation. U.S. Department of Agriculture, Forest Service.

² Sperduto, D. D. and W.F. Nichols. 2004. Natural Communities of New Hampshire. New Hampshire Natural Heritage Bureau and The Nature Conservancy.



REFERENCE INFORMATION

Surveys:

- > “Plat of Land on Mount Delight Road, Deerfield, N.H., Prepared for the Town of Deerfield Conservation Commission,” T.D. Brouillette Land Surveying, dated September 5, 2007, RCRD Plan #35662.

Aerial Photos: 2010 high resolution orthophotography from NHDOT series.

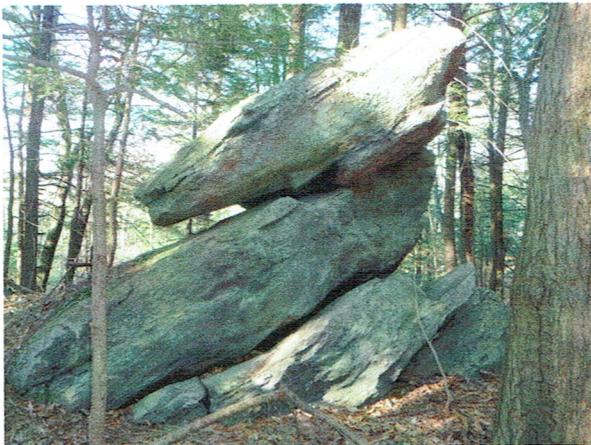
Tax Maps: Deerfield Tax Map 410, Lot 32

Acreeage: TOTAL – 174.4 Acres

Upland forest – 142.4± acres
Wetland forest – 4.1± acres
Wetlands (open) – 27.9± acres

PROMINENT PROPERTY FEATURES

- Freese Pond.
- The interior beaver pond.
- Various shrub/emergent wetlands.
- Old sugarbush with equipment remains.
- “Stacked rock”.



“Stacked Rock”, an interesting ledge outcrop in the Freese Town Forest’s northeast corner.



Remains of possible sugar shack.

- Groves of old forest.
- Significant trees.
- 2008 tornado natural disturbance area.



KEY PROPERTY FINDINGS

- The property has an extensive system of shrub/sedge swamps and ponded areas. Beaver have greatly influenced the property's wetlands.
- 82±% of property area is upland forest.
- The property's diverse habitats support a wide variety of species, with over 250 species of plants, animals, and algae recorded during a 2009 half-day Biothon.
- The property contains habitat for several threatened species or species of concern including Blanding's turtle, red-shouldered hawk, and goshawk.
- The forest is mostly mid-aged (75 – 100+ years old), but it has many old trees, 150+ years. Old trees include hemlocks, beech, yellow birch, red oak, and sugar maple; they are mostly scattered, but there are a few old groves.
- Beech dominates the forest understory, representing over 90±% of forest regeneration.
- There are relatively few white pines on the property.
- Sugar maple and white ash are found in greater than usual proportions. However, sugar maple or white ash regeneration is essentially non-existent on the property.
- Forest structure is headed towards complexity, with more advanced tree age differentiation, horizontal mottling, canopy stratification, and woody debris accumulation.
- The property is appears to be presently free of non-native, invasive plants.
- Access: There is substantial area with poor potential management access.
- Access: Presently, the property contains no road access or active landing area.



OVERALL PROPERTY MANAGEMENT TEMPLATE

Area Prescribed for Long-term Active Forest Management: 65± acres, covering the accessible areas between Mt. Delight Road and the west side of the Hartford Brook stream and wetland complex, are recommended for active silvicultural management. Forest excluded from management in the area west of Hartford Brook includes forested wetlands, buffer areas around vernal pools, extremely steep ground, and the 2008 tornado-affected area.

Recommended Forest Reserve Areas: Presently, the entire forested area east of Hartford Brook and its wetland complex is recommended for modified reserve status. “Modified reserve” means that forest management activities will not occur unless there is an acute natural disturbance, and upon analysis, the decision is made to salvage threatened or damaged timber and/or to carry-out reactive, restorative treatment. Furthermore, reserve status for this area can later be reconsidered if ready access is secured to the Freese Lot from Babb Road, off the property’s northeastern corner. In this case, establishment of systematic forest management may be considered congruent with the managed western section of the property.

MANAGEMENT OBJECTIVES

Recommendations for the management of the Freese Town Forest are based on the natural resource findings for this study and corresponding long-term management objectives which the Deerfield Conservation Commission (DCC) has considered for the property. These objectives include:

- **Protect and enhance wildlife habitat.** As part of an 8000± acre block of unfragmented open space, the Freese Town Forest provides extensive, remote forest with an outstanding network of ponded and emergent wetlands that provide habitat for a diversity of mammals, birds, reptiles, amphibians, and fish. The management objective is to provide remote habitat that benefits a broad diversity of wildlife. Enhancements to forest cover in the managed acreage can be accomplished in conjunction with silviculture. Interface with the NH Wildlife Action Plan for management of imperiled wildlife species.
- **Protect stream and wetland integrity.** Protect the integrity of the property’s wetlands, vernal pools, and streams by avoiding disruptive activities (recreational or forestry) in their vicinity. Avoid pollution sources, erosion and siltation, and changes in hydrology. This involves retaining protective buffers around wetland and vernal pool edges, and minimizing the number of stream crossings for trails or logging access. Stream crossings should be carefully selected with appropriate, functioning fords installed. NH Best Management Practices (BMP’s) should be applied for recreational trails and during harvest operations.
- **Manage for back-country recreational uses; expand community access.** Due to poor access and a general absence of trails, the Freese Town Forest is only lightly used by the community. Currently, the main recreational uses are hunting, nature study, and off-trail hiking. The DCC prefers to retain the property as an interesting, remote, back-country recreational option, given its network of sensitive wetlands, and the availability of several other town-owned conservation properties with extensive trail systems.



- **Financial:** Due to the limited accessibility to over half of the property's forest and a diminished inventory of valuable timber on the accessible area, it is likely that forest management activities on the Freese Town Forest will not generate much net income presently. In fact, woods road construction or forest stand improvement may require funding via harvesting revenue from the other Town Forest properties. If net revenues are realized, the DCC may reinvest the income into the management of the Freese Town Forest or for the other town-owned conservation properties. Maintenance and improvement projects which generally incur expense include improving access to the property, non-commercial forest stand improvement (TSI), boundary maintenance, invasive plant control, and trail establishment and maintenance. Volunteer work may help defray some of the expense. The DCC would like to remain revenue neutral (no net expense) in the management of the town properties under its purview.
- **Improve property access.** The potential for improving access to the Freese Town Forest is limited. Recreational access is nominally served by a minor trail that enters from Mt. Delight Road, but quickly terminates. Parking is limited. Access must be improved if silvicultural management of the property's western section is to occur. This may entail the creation of a woods road, approximately 900± feet long, to a former landing site. Forestry access to the eastern section of the property requires entrance via Babb Road and across abutting private property. The logistics and agreeability of adjacent landowners to allow an access right-of-way of Babb Road to the Freese Town Forest must be further studied. For the present, this half of the property is logistically inaccessible and thus recommended as reserve.
- **Sustainably manage the timber resource.** A fundamental objective of silviculturally managing the forest is to improve timber quality, growth, and value over the long-term. In the actively managed area of the property, periodic harvests are for the purpose of maintaining forest health and wildlife habitat, improving forest growth, and generating income for Town Forest management or other conservation purposes.
- **Maintain a healthy forest in managed areas:** 1) Improve forest growth and promote quality timber; 2) Remove diseased or poor quality trees (with low wildlife value); 3) Encourage the regeneration of diverse mid-successional species including red oak, white oak, sugar maple, white ash, black birch, yellow birch, and white pine. 4) Discourage beech regeneration; and 5) Manage for tree age variety, including patches of young growth, ample mid-aged forest, and eventually, extensive areas of older growth, 150 to 200+ years old.



RECOMMENDATIONS & LOGISTICS

CAPSULE RECOMMENDATIONS for PROPERTY

High Priority:

- *Conserve the property's prominent features.*

Medium Priority:

- **Access** – Install woods road and landing site.
- **Access** – Clear and install parking for 2 to 3 cars at property sign area.
- **Recreation & Water Quality** – Layout and demarcate a back-country footpath loop. Install basic stream/wetland crossings (stepping stones, bog bridges) for pedestrian travel only. Insure that stream and wetland integrity is not negatively affected by stream crossings.
- **Silviculture** – In the 65± acre actively managed area, promote a wide variety of hardwood, especially sugar maple, red oak, and black birch, as well as white pine regeneration, while minimizing the proliferation of beech. Long-term, improve timber growth and value, while enhancing forest structure for wildlife. Manage on a 15± year harvest cycle, not harvesting more volume than the forest is capable of re-growing every 15 years—as detailed in the silvicultural prescriptions. Apply NH Best Management Practices (BMP's) for forestry activities at stream crossings or in wetland riparian zones.
- **Wildlife** – In 65± acre active management area, manage existing forest to develop complex structure over time in terms of tree age, canopy cover, and woody debris. In addition to encouraging young growth and maintaining ample mid-aged forest, allow for the development of scattered older growth (150+ years) forest pockets and individual trees.
- **Wildlife** – In reserve areas, allow only low-impact, passive recreational activities to maintain high quality, potential breeding habitat to wildlife.

Low Priority:

- **Boundary Maintenance** – Property lines were surveyed (2007) and recently blazed (2011) by Thomas Brouillette, LLS. Axe-blaze of trees along the lines, followed by brush-painting of the blazes should be done every 10 years (next maintenance in 2021±). The Freese Town Forest has 12,000± feet of surveyed boundary that requiring periodic maintenance.
- **Access** – Study access logistics from Babb Road. Discuss feasibility of a forest management right-of-way with the abutting landowners.



FINANCIAL PROJECTIONS

The recommended area for improvement harvesting presently covers 65± acres, if access Option #1, with the installation of a 900± foot woods road, is followed. It is projected that the subsequent harvest will net about \$9,000±. This revenue projection considers that the majority of harvested trees will be poor quality, low-value with the objective of improving the stand.

The cost of installing a 900± foot woods road with a landing site to access present and future silvicultural management is projected as \$3,000± due to extremely rocky terrain with some steep slopes. A gravel parking area for community access to the property, located along Mt. Delight Road is estimated at another \$3,000±.

If Option #2 is used, the forestry landing site would be installed immediately off of or very near Mt. Delight Road, saving considerable cost. The landing would then be converted to a parking area, again at reduced cost. However, due to longer access into the forest, it is possible that somewhat less area will be accessible to management, resulting in less harvest revenue.

The property access options are discussed in more detail in the next section. A summary of projected costs/revenues follows:

	<u>Option #1</u>	<u>Option #2</u>
Projected net income:		
65± acre forest improvement cut	\$ 9,000±	
50± acre forest improvement cut		\$6,500±
Projected costs:		
Woods road and landing installation	(\$ 3,000)±	(\$1,000)±
Parking lot installation	(\$ 3,000)±	(\$1,000)±
Other	0±	0±
PROJECTED NET REVENUE	\$3,000±	\$4,500±



FOREST ACCESS and RECREATIONAL USE

Forest Management Access

Forest management access requires good truck access to a specific staging area or “landing site”. The landing site is the location where harvested trees are gathered from the forest, and then processed and loaded on trucks for marketing.

Less than half (65± acres) of the Freese Town Forest’s forested acreage is feasibly accessible to forest management. The accessible area covers the southwestern “half” of the property, i.e., all forest west of Hartford Brook. To access this area, investment must be made to install a woods road and landing. From an aesthetic and logging feasibility aspect, perhaps the best option is to construct a 900± foot long woods road that roughly follows the course of an existing rudimentary logging trail. The old trail enters at the property sign location and leads to a heavily grown-in landing site (now identified as Forest Type F). The landing site is located where the tract widens, allowing for skidding distances of 0 to 2600± feet. Due to rocky soils and a somewhat steep grade, the cost of road construction is projected at \$3,000±. No stream crossings are required.

A second forestry access option is to install a much shorter woods road (0 to 100± feet long), with the landing on or near Mt. Delight Road. The landing can later be re-graded and graveled for use as the property parking area. This option saves considerable cost and is less disruptive to the interior of the property. However, skidding distances to the northwestern corner of the property will increase to an almost untenable 3,500± feet; the furthest acreage (10 to 15± acres) may be too distant for feasible access. Furthermore, there will be a major visual change along Mt. Delight Road where the present unbroken forest edge would then have a .4± acre clearing. This clearing may actually be too large for the desired small parking area; thus part of the clearing may need to be blocked off. 15 years hence, and thereafter, when the property is harvested again, the parking area must be reused as the landing, requiring remedial work at the end of the operation(s).

The “back” half of the Freese Town Forest is remote. Access from Mt. Delight Road necessitates the interior landing site (Option #1) to reduce skidding distances. It also requires the crossing of several streams including Hartford Brook. While these steps are possible, the costs, both environmentally and monetarily, appear to presently outweigh the benefits. The stream crossings require the use of portable bridges, corduroy/brush matting, appropriate season use, and post-harvest remediation. Disruption from a skid road through this central stream area, even if left unlogged, may be considerable, given the nominally undisturbed nature of the area which was last logged 50± years ago. Moreover, due to long skidding distances, a considerable area of the property will likely still be inaccessible (4,000+ foot hauling distances).

A possible property access option to the northeastern section that requires further investigation is via Babb Road. Babb Road is a discontinued road that ends approximately 1500± feet shy of the Freese lot’s northeastern corner. Though the feasibility is questionable, a woods road may perhaps be extended from the terminus of Babb Road to the Town Forest. This entails landowner permission (2 - 3 landowners) and considerable expense. However, there is the possibility that the abutting landowners desire a woods road for forest management, and are thus willing to allow the road and share the cost. Again, the disruption involved in creating this access must be weighed against the option of leaving the area alone.



Recreational Use and Access

There is minimal parking available off Mt. Delight Road presently (1 to 2 cars); however, public use of the Freese Town Forest is so light that more parking has not been fully warranted. The property lacks trails and does not hold a major attractant such as a swimming area, factors that limit usage. Currently, hunting, remote nature observation/photography, and trail-less hiking are the main activities on the property.

There is intrinsic recreational value in a forested tract that remains remote. First, some outdoor enthusiasts prefer a backcountry experience through less traveled, less tame areas. Habitats that are undisturbed by a heavily-used trail network may provide better opportunities for nature photography, study, and observation. Finally, the area remains accessible to hunting without conflict with other recreational uses. Given that several of the other town-owned forests contain good trail access and host a different set of recreational activities, the Deerfield Conservation Commission currently leans toward perpetuating the remote nature of the Freese Town Forest.

If any access improvements are made, they will be of a modest nature. A parking area that holds 2 to 3 cars is under consideration. The extension of a footpath loop, perhaps to Freese Pond or the more northerly beaver pond is a possibility. A footpath is a meandering trail 2 to 3 feet wide that generally does not require the cutting of trees or ground grading. These simple pathways are intended for pedestrian travel only, primarily walking or snowshoeing.



NATURAL RESOURCES

NATURAL RESOURCE SUMMARY

SOILS PROFILE

Soil mapping is derived from the NRCS Web Soil Survey for Rockingham County. Soils types are described below.

Upland Soils

- 1) *Chatfield-Hollis-Canton (140)* – Underlying nearly two-thirds of the property, this soil complex is variable, including shallow-to-bedrock areas (*Hollis*), with some exposed ledge or low ridges. Most areas consist of glacial till material (*Chatfield*) or gravelly pockets (*Canton*), which tend to be well-drained. The soil complex ranges from pockets of low productive potential—ledgy, shallow soil areas—to broad areas with good productivity especially for red oak, black birch, and white pine. Enriched areas grow fine sugar maple and white ash.

Mesic or Wetland Soils

- 2) *Greenwood and Ossipee (97)* – Underlies ponded areas on the property where soils are an accumulation of organic peat. The layer of water-saturated mucky peat can exceed 5 feet in depth.
- 3) *Scituate-Newfields (447)* – These intermixed sandy loams (till) underlay a broad area in the central portion of the property. Soils range from moist uplands to somewhat poorly drained forested wetlands. This soil complex has a seasonally high water table and is prone to wetness, particularly in spring and late fall. Logging equipment can easily create ruts soil during wet seasons. The soils are productive for mixed hardwoods and hemlock. While white pine grows well, trees may be prone to blowdown in moist areas.

SURFACE WATER RESOURCES

The Freese Town Forest lies within the Lamprey River watershed, about 3 miles upstream from the Lamprey. Hartford Brook, a first order, headwater stream in this area, and a tributary stream to the Lamprey, bisects the property in a north – south direction. The brook, generally 8 to 12± feet wide, does not always follow a well-defined course through the property. It is interrupted by a series of beaver impoundments, including the 12± acre Freese Pond which overlaps into the southeastern corner of the property. Additionally, Hartford Brook follows a braided course in the property's central area, with split channels that later rejoin downstream.

A second, seasonal stream system flows into Freese Pond from the property's central and northeastern areas. Several wetlands are associated with this stream complex. Finally, intermittent flowages are part of a third stream (seasonal) system flowing to Hartford Brook from the property's western area. These flowages emanate from steep ledgy ground; in their initial stages, the streams have subsurface flow through accumulated rock while intermittently emerging with a defined surface channel.



The Freese Town Forest hosts an outstanding assortment of freshwater wetlands that cumulatively cover approximately 28± acres, or 16% of the property area. These are generally palustrine (shallow-water) and include two beaver ponds, seven shrub/emergent swamps (most are former beaver impoundments), several forested wetlands, and 14 (potential) vernal pools. Both ponds and the majority of the shrub/emergent swamps are the result of extensive beaver activity on the property since at least the 1970's. The forested wetlands typically follow stream courses, covering the surrounding high water table riparian zone. The property's vernal pools are primarily located in the central and western area of the property, and have generally short hydroperiods.

Please refer (page 2) to the property's *Natural and Physical Features Map* for an illustration of the parcel's wetlands and streams.

WILDLIFE HABITAT

LANDSCAPE CONTEXT

The Freese Town Forest is situated in the southeastern edge of an 8,000± acre block of undeveloped and unfragmented land that straddles the Deerfield—Epsom town line. This block is large enough and sufficiently diverse to provide habitat for a variety of species from large mammals (such as moose and black bear) to forest interior birds (such as wood thrushes and goshawks) to less common waterfowl (black ducks, buffleheads, hooded mergansers, and pied-billed grebe). Though situated on the perimeter of the open space block, the Freese Town Forest provides continuity, travel corridors, and outstanding habitat for wildlife.

PROPERTY HABITATS

The Freese Town Forest's core forest habitats include extensive mast forest (beech and oak); softwood thermal forest; and wetland forest. Wetland habitats include shrub/scrub wetland; emergent wetland; ponded wetland; vernal pool; and stream/riparian.

Forest Habitats

Mast forest is represented by Forest Types A, B, and C, covering nearly 45% of the property's forest. Beech is the primary source of hard mast—beechnuts—on the property. Red oak acorns provide an abundant secondary source. White oak acorns are less common, but highly favored by wildlife. Older oaks with well-developed, spreading crowns are important for copious acorn production; silvicultural management of the forest will aim to retain and grow large-crowned oaks. The property's mast resource supports a large turkey population.

Occasional large-crowned beech trees with a triple upper-trunk branching habit provide ideal raptor nesting sites. Other animals (fisher, porcupine, flying squirrels) den in the hollow trunks of beech decayed by bark disease. The tornado-affected beech/oak stand contains substantial downed woody debris for cover, and abundant snags and cavity trees for nesting/denning sites. Pileated woodpeckers are now active in this site.

Softwood thermal forest (Forest Types D and E) is mostly found in the tract interior, also covering about 45% of the property's forest. Significantly, hemlock is a primary overstory species. Winter and summer temperature extremes are moderated under the dense hemlock shade. Deer are attracted to the lower snow depths beneath hemlock, while ruffed grouse and



snowshoe hare burrow into the snow under the hemlock cover. Barred owl and green throated black warblers are commonly found in this habitat.

Wetland forests (Forest Type G) are limited in extent on the property but contain well-sheltered thermal conditions due to the hemlock component. Shallow-rooted trees in this habitat are prone to blowdown, thus creating ground level cavities for denning. The property's wetland forests are generally densely stocked with trees; thus fruit-bearing wetland shrubs such as highbush blueberry are not abundant in this habitat type.

Wetland Habitats

Shrub/scrub wetlands on the property are generally associated with beaver activity. These areas have cycled through a period of flooding, but are now mostly drained due to the breakdown of their respective beaver dams. Remnant snags of previously flooded forest remain in some areas. Soils are still saturated by a high water table. Some areas have re-vegetated densely, with speckled alder, winterberry holly and highbush blueberry, as well as meadowsweet and steplebush spirea. Scattered young red maples are also present. The dense shrub and woody stem growth provide cover and food for a variety of mammals, birds, reptiles, and amphibians.

Emergent wetlands are shallow water habitats that include sedge meadow and shallow marsh on the edge of the property's ponded habitats. Persistent emergent vegetation is found including sedges, cattails, and hydrophytes. Remnant snags in these areas provide habitat for cavity use (tree swallows), perching (kingbirds, kingfisher, green heron), and nesting (wood ducks, great blue heron).



Emergent vegetation on beaver pond edge.

Ponded wetlands—The property contains two extensive ponded environments, both created by beaver activity. The ponds contain hydrophytes and floating-leaved plants through the course of the summer. Mammals such as bats, muskrat, mink, otter, beaver, and moose use these areas in conjunction with other wetland habitats.



Vernal pools—The property contains 14 potential vernal pools, most of which contain open water. The pools are ephemeral—generally flooding during the spring and sometimes autumn, and drying out during the summer. The resulting fish-free habitat provides important breeding sites for many amphibians, reptiles, and fresh-water crustaceans. Wood frogs, spring peepers, pickerel frogs, spotted salamanders, and fairy shrimp are indicator species utilizing vernal pools. The surrounding upland forest and any nearby forested wetlands are critical to the year-round activities of several of these species.

The flooding longevity after spring thaw—the hydroperiod—is an important factor in the habitat quality of a vernal pool. Many species associated with vernal pools occur in greatest abundance when the hydroperiod is long, not drying until July or later.³ Only a few of the pools appear to have a substantial hydroperiod. A summary of vernal pool conditions is found in the Appendix A.

³ Matt Tarr and Kimberly J. Babbitt. "The Importance of Hydroperiod in Wetland Assessment". UNH.



Stream/riparian—The Freese property contains a perennial stream, Hartford Brook, as well as several interconnecting seasonal streams. The streams, their embankments and riparian areas provide potential habitat and travel corridors for two-lined salamander, ribbon snake, mink, otter, and deer. Retaining shaded conditions along stream embankments where forest canopy is present helps regulate water temperature for fish.

SPECIES OF CONCERN / NATURAL COMMUNITIES

The New Hampshire Natural Heritage Bureau was consulted in April 2012 about the potential presence of rare species (plant or animal) or exemplary natural communities on the subject property. A database check (Appendix B) indicates that Blanding's turtle (state-endangered species) was located on the property in 2011. Wood turtle (species of concern) was found within a 1 mile radius of the property. The property is not known to contain any rare/exemplary natural communities, either as listed in Natural Heritage Bureau records or through present field inspection of upland habitats. Wetland habitats were not examined closely enough to definitively indicate the presence, or lack, of any unique natural communities.

It is likely that the Freese Town Forest occasionally harbors less common birds, mostly migratory, such as osprey, but possibly nesting, including red-shouldered hawk, northern goshawk, Cooper's hawk, green heron, and pied-billed grebe. The New Hampshire Wildlife Action Plan (WAP) should be consulted prior to engaging in management activities. Furthermore, any new information regarding observed rare species should be reported to the Natural Heritage Bureau and added to the WAP data base.

WILDLIFE HABITAT RECOMMENDATIONS

Wildlife habitat management has two general approaches on the Freese Town Forest. In active, silviculturally managed areas, it is integrated as part of improvement harvesting. In reserve areas, including forest and wetlands, habitat management is passive, allowing nature to take its course with minimal human interventions or disturbance.

General habitat recommendations for all areas include:

- ***Retain extensive low-disturbance, trail-less areas on the property*** to provide sections of undisturbed habitat for wildlife breeding, nesting, and denning.
- Monitor the property for invasive plants, and immediately remove any plants found.
- Discourage pollution sources and disturbances (soil/forest) near the property's streams and wetlands to maintain water quality and avoid damage to these sensitive habitats.
- Retain a significant area as forest reserve to allow older growth conditions to develop naturally over time.

Specific recommendations for forested, silvicultural areas include:

- Retain and encourage the growth of broad-crowned, mast-producing oaks.
- Encourage and/or introduce alternative sources of hard mast sources such as white oak, American chestnut, and beaked hazelnut.
- Retain snags, cavity trees, blowdowns, and downed woody debris.
- Promote the growth of fruit-bearing wetland shrubs, by clearing small patches near forested wetland edges.



- Through improvement cutting, increase forest canopy layering over time and develop more complex forest structure.
- Retain significant hemlock thermal cover and travel corridors.
- Retain and allow the growth of old legacy trees over time (trees that reach 200 to 300+ years). These may include scattered individuals as well as ancient tree groves.
- Leave a 50± foot minimal harvest buffer along the property's active vernal pools. Within 200 feet of the vernal pools, apply low-impact practices.
- Minimize stream crossings when harvesting.



FOREST RESOURCES

SPECIES COMPOSITION

The Freese Town Forest has relatively low tree species diversity, with two tree species—beech and hemlock—dominating the property's overstory canopy. Beech and hemlock are also prevalent in the understory on the entire property. Most of the other species are found in particular stands or in small pockets; a few (red oak, red maple) are widespread through the property, but not as common as beech or hemlock.

A qualitative approximation of the property's forest overstory tree species abundance is:

Abundant	– Beech and hemlock.
More Common	– Red oak.
Common	– Red maple, black birch, sugar maple, white birch.
Less Common	– White ash, yellow birch, white pine.
Scarce	– Black cherry, basswood, hophornbeam, big-tooth aspen.
Rare	– White oak, red spruce, American elm, red pine, black gum, black ash.
Not Observed	– Shagbark hickory, black oak, pitch pine, red cedar, balsam fir, ironwood, gray birch, quaking aspen, black willow.

FOREST STRUCTURE and COMPOSITION

The physical structure of a forest is shaped by its history of establishment and disturbances. The present forest in the Freese property interior was established after field abandonment during the Civil War period (1860 – 1870±). The land had been entirely cleared and used as (sheep) pasture. After abandonment it reverted to forest, with the initial forest containing a substantial proportion of white pine. Timber harvesting followed in the 20th century, with most white pine removed by 1960±. It is possible that one of the harvests was a timber salvage operation after the Hurricane of 1938.

Two to three timber harvests occurred on the property since forest establishment. Each disturbance created large openings or small gaps in the forest canopy, with corresponding light openings on the forest floor on which a new generation of trees became established. Thus, much of the forest stands are three-aged, or two-aged, with scattered old residuals which escaped harvesting. This oldest set of trees, some of which approach 150± years of age, hark back to the originally established forest.

Heavily harvested sections—clear cut—of the Freese Town Forest regenerated back as even-aged stands of trees. Since much of the forest has not been harvested in the past 50 years, shade tolerant, late-successional species have become established in the forest understory. Beech saplings predominate in much of the forest understory, particularly hardwood-dominated stands. Hemlock and beech regeneration are found under hemlock stands. Mid-successional species such as red oak, black birch, and white ash have not thrived under the closed canopy forest conditions. White pine regeneration is absent due to the lack of seed sources.

As the forest matures, the lack of diverse regeneration is increasingly an issue. Beech can easily grow to dominate forest composition, as demonstrated in Forest Type B, to the exclusion of other



forest species. This can be a self-perpetuating condition, as beech readily grows under its own shade.

Over time, the amount of natural woody debris on the forest floor accumulates, particularly in well stocked, dynamic stands. Woody debris recycles into the earth, adding valuable nutrients to the soil, and providing important habitat for microorganisms and wildlife. As long as woody debris are not removed from the forest, and sufficient numbers of standing, but decaying, trees are retained, the amount of accumulation should not vary markedly between managed and unmanaged stands. Trees with decay, though not valuable as timber, supply valuable habitat for cavity-feeding/nesting birds. Remnant old trees may provide denning sites for mammals such as flying squirrels and porcupine.



SILVICULTURAL OVERVIEW and SCHEDULING

SILVICULTURAL OVERVIEW

The key issue for the Freese property's forest is its determined conversion to a beech-dominated composition. In actively managed areas, this trend can be discouraged by creating small canopy openings adjacent to other tree species that serve as seed sources. *It is critical to retain ample numbers of healthy trees of the species that are desired for regeneration.* These include red oak, black birch, yellow birch, sugar maple, white ash, and white oak. In addition, any white pine on the property (there are few) should be retained as a seed source. Regeneration is most successful if the harvest occurs immediately after a good seed year. Since the various species have good seed crops in different years, it is not possible to schedule an optimal harvest time that encourages all of the desired species.

Once favorable regeneration is established, follow-up treatment is necessary to insure its survival. Beech seedlings and saplings will continue to sprout, vigorously competing with the new growth. These must be removed, often manually with a rotary brush saw, to allow the other species growing space. Two brush saw treatments, 3 to 7± years apart, may be needed before the regeneration reaches viable sapling/pole size. These treatments are a cost operation, and must be subsidized from timber income either from the Freese lot or one of the other town forests.

With the establishment of a favorable generation of young trees, the future course of the forest will be set, allowing for the continuation of a diverse species, increasingly multi-aged condition.

In the reserve areas, the trend towards beech domination will not be actively interrupted. The regeneration of diverse species must rely on random natural disturbance events which may create large enough openings to allow other growth. An acute disturbance may not always succeed as evidenced in the tornado-disturbed stand, where beech sprouts now dominate the young forest growth. However, sections of the reserve area forest contain ample red oak and pockets of white pine, which may be enough to inspire some future diversity.

Timber value per acre on the Freese Town Forest is estimated at about \$400±/acre. With careful, sustainable management—i.e., the woodlot is not overcut and the finest trees are allowed to fully mature (125+ years) and reproduce—it is possible to increase the forest's per acre value over time. However, this increase will not be dramatic in the case of the Freese Town Forest, because substantial areas in the actively managed section will be eventually devoted to regenerating favorable young growth.

HARVEST CYCLE

Silvicultural treatment of the managed areas of Freese Town Forest is planned on a 15± year harvest interval. With the exception of salvage harvests (due to severe storm events, for example) and regeneration release work, the property should not be harvested more than once within this interval. Silvicultural prescriptions are detailed under the forest type descriptions, which follow this section.



The prescribed harvests are on a sustainable level: The timber (chipwood, cordwood, pulp, sawlogs) removed generally does not exceed the forest's capacity to re-grow this timber volume over the intervening growing-cycle (15±) years. However, a needed salvage harvest may exceed this volume, thus necessitating a longer harvest interval, i.e., 20 to 25± years.

HARVEST LOGISTICS

One landing site, as detailed in the “Forest Management Access” section, is needed for the prescribed harvesting on the Freese Town Forest. Mechanized biomass harvesting is an efficient method of operation, enabling the removal of poor-quality, low-value trees for improvement harvesting, while managing the long skidding distances. Certain conventional logging crews may be able to navigate the long skids while also removing low quality trees. A cut-to-length operation is also feasible, though local contractors are lacking.

Due to the use of one landing site, and the size of the project area, the harvest should be bid and staged as one operation. Harvesting can be carried-out any time of year with reasonably dry conditions. Spring mud-season and late fall should typically be avoided.

TREATMENT SCHEDULE

The silvicultural treatment schedule for the silviculturally managed area of the Freese Town Forest projected for the future 30+ years is as follows:

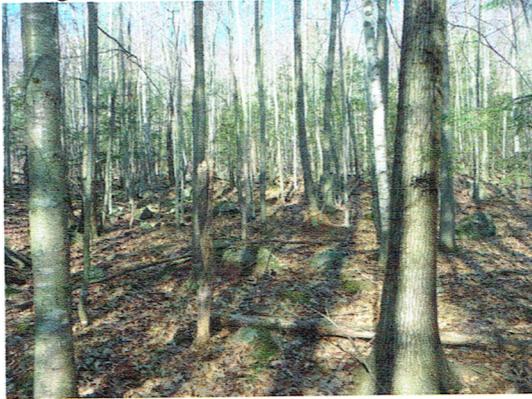
<u>Harvest Schedule</u>	<u>Timeframe</u>	<u>Elapsed Time from Present</u>
Present (1 st)	2015±	3± years
Future (2 nd)	2030±	18± years
Future (3 rd)	2045±	33± years



FOREST TYPES

A. Hardwood, Even-Aged – 55.8± acres

Description – This forest type is characterized as almost exclusively hardwood and even-aged. As an even-aged stand, the trees which form the overstory canopy are nearly the same age (within 25 years



Variant A1: Upland hardwood mix.



Red oak is prevalent in Variant A3.

of one another). Furthermore, the overstory canopy is entirely, or almost entirely, closed with few breaks, or “gaps”. This forest type has at least 3 variants, all defined by species mix, described as follows: A1) Perhaps most widespread, this variant occupies rocky, upland sites with a prevalence of beech, red maple, red oak, and black birch. Beech bark disease and Nectria in black birch are common diseases. Pockets with understory and mid-story hemlock give the appearance of a hemlock-hardwood type. Red oak and black birch have promise to develop as future sawtimber. A2) This hardwood variant occupies moist sites, and has a corresponding diversity of species. Enriched areas contain an abundance of sugar maple and white ash. A3) is a red oak variant, found in two pockets in the northwest and northeastern corners of the property. The stands’ red oak provides a copious mast source for wildlife and is developing into high quality timber for the future.



Sugar maple in A2 enriched site.

<i>Species Composition</i>	A1) Upland Hardwood Variant	A2) Mixed Hardwood (Moist Area) Variant	A3) Red Oak Variant
Primary ¹	Beech, red maple, red oak, and black birch.	Red maple, red oak, black birch, yellow birch.	Red oak.
Secondary ²	Sugar maple, white ash, yellow birch, white birch, and hemlock.	Sugar maple, white ash, white birch.	Beech, red maple.
Tertiary ³	Black cherry.		Black birch.
Regeneration (saplings)	Abundant beech; sugar maple, hemlock, and striped maple in areas.	Sparse. Beech with some striped maple.	Beech.



Forest Structure: Forest Type A

Forest Structure	A1) Upland Hardwood Variant	A2) Mixed Hardwood (Moist Area) Variant	A3) Red Oak Variant
Composition			
Stand Structure	Even-aged w/ older residuals and inclusions	Even-aged	Even-aged
Successional Stage	Mid to late-intermediate	Mid to late intermediate	Late intermediate
Stand Age	75-90//100± years	75-90± years	90-100± years
Tree Size			
DBH range	7 – 20± inches	8 - 16± inches	9 – 20± inches
Mean DBH	12± inches	10± inches	13± inches
Avg. Max. Height	70± feet	75± feet	70± feet
Stand Density			
Relative Stocking	Considerable to dense	Considerable to dense	Considerable
Basal Area/Acre	135± sq. ft./acre	160± sq. ft./acre	120± sq. ft./acre
Trees/Acre	175± trees	280± trees	140± trees
Canopy Closure	90-100± %	100±%	90-100±%
Wildlife/Ecological			
Wildlife Features	Beech w/ raptor nesting branch structure; mast; numerous tree cavities; rock crevices.		
Canopy Stratification	Moderate – some midstory with a well-established overstory.	Fair – Sparse understory and mid-story layers.	Good – Some understory/mid-story; full overstory.
Woody Debris	Moderate to good accumulation, including some large trunks.	Good accumulation of mostly small stems and branches.	Good accumulation.
Invasive Plants	No known incidence.	No known incidence.	No known incidence.

Forest Type A -- Prescription

Objectives – While containing potentially valuable hardwood species such as red oak, sugar maple, and black birch, this forest type is evolving towards a beech-dominated composition. In actively managed areas, promote a diverse species regeneration, including white pine, while discouraging the expansion of beech. Over the short-term, continue to develop high quality hardwoods and allow the growth of broad-crowned mast trees.

Silvicultural Sequence: Even-aged (present)→Multi-aged (2050)

Harvest Cycle: 15± years

Silvicultural Treatments:

2015±: *Improvement cut/Crown thinning.*

2030±: *Single-tree/micro-group selection.*

2045±: *Single-tree selection/Expanded micro-groups.* Follow-up with *TSI (inter-sapling release)* in understory.



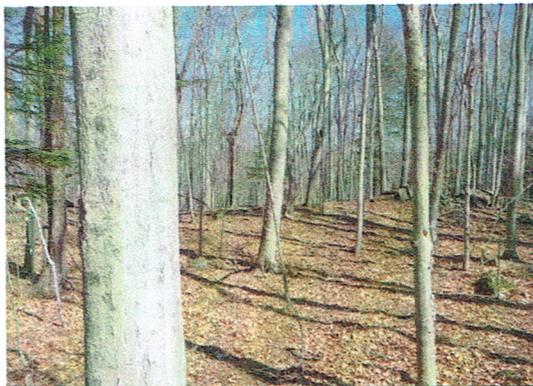
B. Hardwood, Two-Aged, Beech – 17.0± acres

Description – Found as one stand in the southwestern section of the property, this forest type is recognized by its abundance of beech, at times representing over 75% of the species mix. Much of the beech is afflicted with beech bark disease and is found in various states of decline, though some of the larger decaying trunks provide denning or cavity-nesting opportunities. A small percentage of the beech (<5%) are disease resistant/free.

Red oak is also a noteworthy component of this stand, with scattered excellent quality trees. Trees run 12 to 16"± DBH. Black birch and sugar maple



Beech dominates Forest Type B.



Incipient beech bark disease is common in Forest Type B.

are also secondary components with future sawtimber potential, and right now generally range from 6 – 10"± DBH and 8 – 16"± DBH, respectively. Though the underlying rocky till soils are favorable for white pine growth, few pines are

presently found, having been virtually eliminated during timber harvesting 50+ years ago. The lack of pine seed sources presents a challenge to regenerating white pine, and underscores the importance of retaining ample seed sources of the species desired for future regeneration, including red oak, sugar maple, and birch.

While the main Forest Type (B1) variant has an open understory or contains beech sapling undergrowth, Variant (B2) contains hemlock in the mid-story and understory. Occasional hemlocks are also found in the overstory. These hemlock islands likely provide yarding or travel “way stations” for deer. Small hemlock islands are also found as inclusions within Forest Type A.



B1 Variant contains hemlock in the understory/mid-story.

Species Composition –

Primary – Beech.

Secondary – Red oak, black birch, sugar maple, hemlock, red maple, yellow birch, white birch.

Tertiary – White pine, white ash, and black cherry.

Regeneration – Beech and hemlock.



Forest Structure: Forest Type B

Forest Structure	B1) Beech Variant	B2) Beech with Hemlock Understory Variant
Composition		
Stand Structure	Even-aged and two-aged w/ older residuals.	Even-aged and two-aged w/ older residuals
Successional Stage	Mid-intermediate	Mid to late intermediate
Stand Age	75 // 110 – 130+ years	85-100+ years
Tree Size		
DBH range	6 – 22± inches (up to 40")	6 - 18± inches
Mean DBH	14± inches	13± inches
Avg. Max. Height	70+ feet	65± feet
Stand Density		
Relative Stocking	Considerable	Considerable
Basal Area/Acre	155± sq. ft./acre	120± sq. ft./acre
Trees/Acre	140± trees	140± trees
Canopy Closure	90-100± %	80 - 100±%
Wildlife/Ecological		
Wildlife Features	Many beech snags and cavity trees. Rocky—large strewn boulders and ledge with den sites/shelter.	Deer yarding/travel waypoints. Sapsucker activity in hemlocks.
Canopy Stratification	Good – some understory; ample mid-story, full overstory.	Good – Dense understory, full overstory.
Woody Debris	Good, including ample large branches and trunks.	Good accumulation, including some large trunks.
Invasive Plants	No known incidence.	No known incidence.

Forest Type B -- Prescription

Objectives – Retain ample beech cavity and den trees for wildlife, while encouraging the regeneration and growth of a greater diversity of species. Sugar maple, white ash, red oak, black birch, yellow birch, and white pine should all be favored. Over long-term, develop greater stand complexity, i.e., multi-aged structure.

Silvicultural Sequence: Even-aged and two aged (Present)→Multi-aged (2050)

Harvest Cycle: 15± years

Silvicultural Treatments:

2015±: *Improvement cut/Crown thinning.* Also, *micro-group selection* in specific areas.

2030±: *Single-tree selection/Expanded micro-groups.*

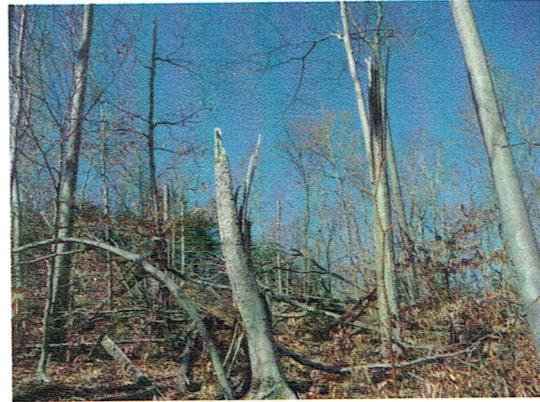
2045±: *Single-tree selection/Expanded micro & small groups.* Follow-up with *TSI (inter-sapling release)* in understory.



C. Tornado-affected Area – 5.6± acres

Description – On July 24, 2008, a formidable tornado left a 60 mile swath of destruction through southeastern New Hampshire. The tornado first touched down at this Mount Delight Road site on the western edge of the Freese Town Forest.

Formerly containing elements of both Forest Types A and B—even-aged, high beech composition—this patch of forest was wholly altered. A majority of the beech were uprooted or snapped; red oaks fared only slightly better, with generally more left standing. The downed trees and branches cover the forest floor in a dense tangle that is difficult to walk through. Much of the downed



wood is raised off the ground by branches; thus it will likely take 2 or 3± decades for the felled trees to decompose. As of the spring of 2012, beech sprout growth has densely re-vegetated the area.

Salvage of downed timber was carried out on the abutting property immediately west of the property line. The differences between the un-salvaged Town Forest stand and the adjacent biomass salvage stand are qualitatively documented as follows—on the Town Forest, Forest Type C contains: 1) A tangle of downed trees, treetops, branches, and uprooted stumps; 2) Residual standing trees include live trees, break-offs, stubs, and dangling tops; 3) Partially

uprooted trees, or “tip-ups”; 4) Beech was more affected than oak; 5) Pockets with variable density; and 6) The residual beech understory was left, and new dense beech understory has sprouted. The abutting salvaged stand now lacks many of these structural elements.

Species Composition

Primary – Beech (residuals).

Secondary – Black birch, red oak, and sugar maple (residuals).

Regeneration – Primarily dense growth of beech sprouts.



Forest Structure –

Composition	Stand Structure	Two-aged w/ scattered older residuals
	Successional Stage	Late intermediate
	Stand Age	20-50//80-100± years (older residuals 120-150+)
Tree Size	DBH range	2– 24± inches
	Mean DBH	11± inches
	Avg. Maximum Height	65-70± feet
Stand Density	Relative Stocking	Light/Moderate
	Basal Area/Acre	60± sq. ft./acre
	Trees/Acre	90± trees
	Canopy Closure	30± %
Wildlife/ Ecological	Wildlife Features	Abundant ground level cover from downed trees. Many stubs and snags left—Pileated woodpeckers are active.
	Canopy Stratification	Moderate – dense understory (including woody debris), some lower midstory, and open residual overstory (including snags).
	CWD	Heavy accumulation of downed large and small trees/branches on forest floor.
	Invasive Plants	No known incidence.

Forest Type C -- Prescription

Objectives – Maintain area in natural condition with no attempt to salvage storm-damaged timber. This stand is intended to provide unique wildlife habitat and may serve as a future scientific study area showing the long-term effects of acute natural disturbance events.

Natural Sequence: Two-aged (present)→Multi-aged (2050)

Harvest Cycle: N/A

Silvicultural Treatment: Maintain as a reserve area with no attempt to salvage storm damage. Allow stand to recover and evolve naturally from past natural disturbance event (2008 tornado).



D. Hemlock/Hardwood – 56.8± acres

Description – Hemlock/Hardwood is the most extensive forest type on the Freese Town Forest, found primarily in the older, more interior areas of the property. Though the matrix forest is old, with scattered residuals over 150 years of age, the present stands largely consist of somewhat younger trees. This condition is due to a long history of forest disturbance, primarily logging, since the establishment of these forest areas during the Civil War era (mid 1800’s). Within the openings created by each logging operation, a new generation of trees grew, thus today, in addition to relic 150+ year old hemlocks and oaks, the stands have younger sets of trees. A defining characteristic of this forest type is the general lack of white pine; this species was harvested for lumber and largely eliminated by 1960±.



D1 Variant has a sparse understory due to heavy shading.

At least three variants were identified in the Hemlock/hardwood forest type. D1) is two to three aged with scattered old residuals. These stands are generally mid-aged with a dense canopy, resulting in open understory conditions. D2) is an older variant, with a greater contingent of trees in the 120-150± age class. Also densely stocked, there is generally little understory. D3) is also an older variant, albeit less with less dense overstory and areas of beech and hemlock understory/midstory.



An old residual hemlock stands amongst younger growth in Hemlock/Hardwood Variant D3.

Most of this forest type lies in the less-readily accessible interior property area. Much of this area is slated as modified reserve, without *active* silvicultural management. However, an acute natural disturbance may trigger a salvage response—certainly a question for the town and the managers of the forest to address depending on the nature of the disturbance. Furthermore, access may eventually be developed to the northeastern corner through abutting property(s). This may also induce the active management of the

forest through a planned series of carefully rendered improvement harvests.

<i>Species Composition</i>	D1) Mid-aged Variant	D2) Older, densely stocked Variant	D3) Older, lightly stocked Variant
Primary	Hemlock, red maple, red oak.	Hemlock.	Hemlock, beech, black birch.
Secondary	Black birch, yellow birch, white birch, and beech.	Red oak, red maple, sugar maple.	Yellow birch, white birch, red maple.
Tertiary	White pine, black cherry.	White pine (tall 60 – 90’)	
Regeneration (saplings)	Generally sparse, but some hemlock and beech in openings.	No regeneration under dense canopy.	Beech and hemlock in openings.



Forest Structure: Forest Type D

Forest Structure	D1) Mid-aged Variant	D2) Older, densely stocked Variant	D3) Older, lightly stocked Variant
Composition			
Stand Structure	Two and three aged with older residuals.	Even-aged and two-aged.	Even-aged, with older residuals.
Successional Stage	Mid-intermediate	Mature	Late intermediate
Stand Age	50±//85±//115± years. Residuals up to 150± years.	120-150± years	90-120± years. Residuals up to 150± years.
Tree Size			
DBH range	4 – 20± inches (36")	10 - 24+ inches (36")	8 – 20± inches (36")
Mean DBH	12± inches	15 inches	12± inches
Avg. Max. Height	65± feet	65± feet	60± feet
Stand Density			
Relative Stocking	Considerable to dense	Considerable to dense	Considerable
Basal Area/Acre	135± sq. ft./acre	170± sq. ft./acre	100± sq. ft./acre
Trees/Acre	185± trees	140± trees	120± trees
Canopy Closure	100± %	100±%	80-100±%
Wildlife/Ecological			
Wildlife Features	Dense winter/summer thermal cover. Moose, deer, grouse, snowshoe hare usage.		
Canopy Stratification	Moderate – some midstory (branches) and dense overstory.	Moderate – Sparse understory and mid-story layers; full overstory.	Good – Some understory/mid-story; reasonably full overstory.
Woody Debris	Moderate accumulation. Some large trunks.	Moderate to good accumulation of large trunks.	Fair accumulation.
Invasive Plants	No known incidence.	No known incidence.	No known incidence.

Forest Type D -- Prescription

Objectives – Most of this forest type lies within the property area slated for reserve (modified) status. If this status changes and active management is initiated, silvicultural goals are to 1) manage towards more structural complexity (multi-aged, multi-canopies); 2) encourage the regeneration of quality hardwoods and white pine; and 3) retain substantial hemlock cover for wildlife.

Silvicultural Sequence: Even-aged/two-aged (Present)→Multi-aged (2050)

Harvest Cycle: 15± years

Silvicultural Treatments (If stands are actively managed):

2015±: *Single-tree selection/micro group selection.*

2030±: *Single-tree selection/Expanded group selection/Liberation (of regeneration).*

2045±: *Single-tree selection/Expanded group selection/Liberation (of regeneration).*



E. Hemlock/Hardwood/Pine – 6.2± acres

Description – Limited in area to several small pockets where pine escaped harvest in the past, this forest type contains hemlock, white pine, and mixed hardwoods in the overstory canopy. Similar to Forest Type D, Hemlock-Hardwood, the presence of hemlock in Forest Type E imparts a heavily shaded, aesthetic appearance to the stands. In several areas, these scenic stands lie adjacent to the property’s large beaver ponds. While the stands are largely inaccessible to forest management, they contain some healthy, good quality pine and oak timber. These trees—especially white pine—will provide a critical seed source for other stands in the property, where large seed-producing pines are missing.



Species Composition –

Primary – White pine.

Secondary – Red oak, hemlock, beech, white birch, black birch, and red maple.

Regeneration – Hemlock and beech.

Forest Structure –

Composition	Stand Structure	Even-aged
	Successional Stage	Late-intermediate
	Stand Age	90-120+ years
Tree Size	DBH range	12 – 28± inches (38”+)
	Mean DBH	18± inches
	Avg. Maximum Height	<i>White pine</i> : 90-100+ feet
Stand Density	Relative Stocking	Considerable to dense
	Basal Area/Acre	190± sq. ft./acre
	Trees/Acre	160± trees
	Canopy Closure	90-100± %
Wildlife/ Ecological	Wildlife Features	Red oaks provide a good mast source. Tall pines are utilized for perching/roosting. Stand contains good vertical structure.
	Canopy Stratification	Good to excellent – understory, midstory, and overstory canopy layers all present with an occasional supercanopy tree.
	CWD	Good accumulation, including some larger trunks and branches.
	Invasive Plants	No known incidence.



Forest Type E -- Prescription

Objectives – Most of the stands of this forest type lie in areas slated for modified reserve status, ie., without active management. If due to an intense natural disturbance a salvage response is induced, then attempt to retain as much white pine and red oak as possible to serve as a continued seed source.

Natural Sequence: Even-aged (present)→Three/multi-aged (2050)

Harvest Cycle: 15± years

Silvicultural Treatments:

2015±: No planned treatment.

2030±: No planned treatment.

2045±: No planned treatment.



F. Young Forest – 1.0± acres

Description – This minor, but distinct, forest type is found as one small stand in the southern section of the forest. This pocket was probably cleared and utilized as a landing site for logging in the late 1970's±. Since that time, hardwood sapling growth has densely filled the once open patch. This growth does not include early-successional forest species such as gray birch and aspen. However, as a differentiated patch from the surrounding more mature forest, this stand has value to wildlife for cover and dense low canopy.



Species Composition

Primary – Beech and black birch.

Secondary – Red maple.

Regeneration – None, at present, under the high density stems and canopy.

Forest Structure –

Composition	Stand Structure	Even-aged
	Successional Stage	Regenerating to young-intermediate
	Stand Age	30± years
Tree Size	DBH range	<1– 5± inches
	Mean DBH	1 – 2± inches
	Avg. Maximum Height	40± feet
Stand Density	Relative Stocking	Dense
	Basal Area/Acre	n/a
	Trees/Acre	1100± trees
	Canopy Closure	90-100± %
Wildlife/ Ecological	Wildlife Features	Differentiated patch from surrounding forest. Dense hardwood canopy.
	Canopy Stratification	Moderate – little understory, but dense mid-story and overstory. This forest type has minimal vertical height.
	CWD	Little accumulation.
	Invasive Plants	No known incidence.

Forest Type F -- Prescription

Objectives – This small patch will likely be re-used as the landing site for forestry operations on the property. In this capacity, after periodic clearing, the stand will re-grow, thus perpetuating young forest conditions over time.

Silvicultural Sequence: Even-aged (present)→Even-aged (2050)

Harvest Cycle: 15± years

Silvicultural Treatments:

2015; 2030; 2045±: Re-clear every 15 years for temporary use as forest landing site.



Charles Moreno, Consulting Forester
 Strafford, New Hampshire, (603) 335-1961
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G. Forested Wetlands – 4.1± acres

Description – This forest type encompasses forested areas that occupy the property’s poorly-drained soils. On the Freese Town Forest, this includes several patches which generally follow rocky stream drainages on moist, *Scituate-Newfields* soils. Since these soils are not overly water-saturated, they tend to support fairly dense hardwood-hemlock forest. Hemlock, in a mid-story and overstory canopy position, imparts an evergreen feel to this forest type. Due to the dense shading, the property’s forested wetlands do not have an abundance of wetland shrubs.



Uprooted yellow birch in one of property’s forested wetlands.

Species Composition

Primary – Red maple, hemlock.
 Secondary – Yellow birch, white ash.
 Tertiary – American elm, black gum.

Forest Structure –

Composition	Stand Structure	Even-aged with old residuals
	Successional Stage	Mid to late-intermediate
	Stand Age	85 - 100± years
Tree Size	DBH range	6 – 20± inches
	Mean DBH	13± inches
	Avg. Maximum Height	55-60± feet
Stand Density	Relative Stocking	Considerable to dense
	Basal Area/Acre	160 sq. ft./acre
	Trees/Acre	180± trees
	Canopy Closure	100± %
Wildlife/ Ecological	Wildlife Features	Underground denning/nesting locations (crevices and holes in root tip-ups and stump hollows).
	Canopy Stratification	Moderate – well developed overstory, with light or no understory or midstory.
	CWD	Moderate accumulation
	Invasive Plants	No known incidence.

Forest Type G -- Prescription

Objectives – Several of the property’s forested wetlands are within the reserve area of the property, and are not likely to be ever harvested. In the actively managed area of the property, minimize disturbance to wetland soils, especially near stream courses and wetland interiors. Create small openings on wetland edges to promote fruit-bearing shrubs for wildlife. Retain old residuals within wetlands as legacy trees.

Silvicultural Sequence: Even-aged (present)→Three-aged (2050)

Harvest Cycle: 15± years



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Silvicultural Treatments:

2015±: *No treatment* in wetland interiors or near stream courses.

Single-tree selection on forested wetland edges.

2030±: *No treatment.*

2045±: *No treatment* in wetland interiors or in basin swamp.

Single-tree selection on forested wetland edges.



APPENDICES

VERNAL POOL INVENTORY
Freese Town Forest, Deerfield, New Hampshire

March-April 2012

VP	Area (±)	Type	Vernal Pool Hydroperiod*	Vegetation/Hydrology	Woody Debris
A	1,125 sq. ft.	Open, Rocky	Short	Elongated, rocky pool. Shallow. Surrounded by hemlock/hardwood forest.	Light
B	1,750 sq. ft.	Open, Rocky	Short	Open, with rocks. Shaded with perimeter hemlock and red maple.	Moderate
C	1,200 sq. ft.	Partially Vegetated	Short	Small, shallow pool, with an uprooted tree. Hemlock/hardwood surround.	Moderate
D	4,500 sq. ft.	Open	Medium-Long	Large, elongated pool just within property boundary. Shaded by surrounding hemlock and mixed hardwoods.	Light
E	2,400 sq. ft.	Open	Medium	Rocky hummocks. Shaded by hemlock, red maple, and white pine.	Moderate
F	2,250 sq. ft.	Open, Rocky	Short	Rocky, shallow. Shaded by hemlock and hardwoods, including a black gum.	Moderate
G	480 sq. ft.	Open	Short-Medium	Small, open, shallow pool. Shaded by hemlock and red oak. Probably limited functionality.	Moderate
H	1,600 sq. ft.	Open	Medium	Open, shaded, circular pool.	Moderate
I	300 sq. ft.	Open, Rocky	Short	Minor, shallow pool. Probably limited functionality.	Moderate
J	450 sq. ft.	Open, Rocky	Short	Small, shallow pool, shaded by hemlock, red maple, black birch, and one black gum.	Substantial
K	375 sq. ft.	Open, Rocky	Short	Small, seep-like pool. Partly shaded by hemlock, yellow birch, red maple, and red oak.	Light
L	6,125 sq. ft.	Open	Medium-Long	Large open pool with few rocks. Shaded by hemlock and mixed hardwoods.	Moderate
M	3,150 sq. ft.	Open	Short	Essentially two pools which temporarily connect during high water. Shallow. Shaded.	Moderate
N	5,000 sq. ft.	Open	Medium-Long	Large, isolated pool on property boundary. Shaded by hemlock and mixed hardwoods including black gum.	Moderate

NOTES:

- > All vernal pool locations and observations were conducted in March-April 2012. Vertebrate/invertebrate presence requires springtime assessment.
- > Most of the listed vernal pools are year-round ephemeral, with dry period(s), but may hold water in seasons besides spring, including summer, late fall and winter.
- > The area covered by each vernal pool is the estimated average size, i.e., the inundated area during early spring (March-April) conditions.
- > Vernal pool hydroperiod is **estimated** by the depth of the pool and the vegetation present. Precise assessment requires 3 or more observations through the course of the spring/summer, which are then repeated over at least two to three years.
- > Hydroperiod* key (length of time typically holding water after spring thaw in spring/summer): **Short**--<60 days; **Medium**--80± days; **Long**-->100 days.
- > "Woody debris" includes all tree or shrub deadfall--trunks, branches, twigs--as well as live branches. Branches and twigs provide anchoring locations for amphibian egg masses. Partially submerged trunks may be used by turtles for basking.



NEW HAMPSHIRE NATURAL HERITAGE BUREAU

DRED - DIVISION OF FORESTS & LANDS
 PO Box 1856 -- 172 PEMBROKE ROAD, CONCORD, NH 03302-1856
 PHONE: (603) 271-2214 FAX: (603) 271-6488

To: Charles Moreno, Moreno Forestry Associates
 PO Box 60
 Center Strafford NH 03815

From: Sara Cairns, NH Natural Heritage Bureau
Date: 4/4/2012

Re: Review by NH Natural Heritage Bureau of request dated 4/2/2012

NHB File ID: 1150 **Town:** Deerfield
Project type: Landowner Request **Location:** Freese Town Forest (Tax Map 410, Lot 32)

I have searched our database for records of rare species and exemplary natural communities on the property(s) identified in your request. Our database includes known records for species officially listed as Threatened or Endangered by either the state of New Hampshire or the federal government, as well as species and natural communities judged by experts to be at risk in New Hampshire but not yet formally listed.

NHB records on the property(s):

	Mapping Precision	% within tract	Last Reported	Listing Status		Conservation Rank	
				Federal	NH	Global	State
Vertebrate species (For more information on animal species, contact Kim Tuttle, NH F&G at 271-6544) Blanding's Turtle (<i>Emydoidea blandingii</i>)	Good	49	2011	--	E	G4	S1

NHB records within one mile of the property(s):

	Last Reported	Listing Status		Conservation Rank	
		Federal	NH	Global	State
Vertebrate species (For more information on animal species, contact Kim Tuttle, NH F&G at 271-6544) Wood Turtle (<i>Glyptemys insculpta</i>)	2006	--	SC	G4	S3
Natural Community Black gum - red maple basin swamp	1991	--	NH	Global	State

Listing codes: T = Threatened, E = Endangered, SC = Special Concern
 Rank prefix: G = Global, S = State, T = Global or state rank for a sub-species or variety (taxon)
 Rank suffix: 1-5 = Most (1) to least (5) imperiled. "-", "U, NR" = Not ranked.
 B = Breeding population, N = Non-breeding, H = Historical, X = Extirpated.

NOTE: This review cannot be used to satisfy a permit or other regulatory requirement to check for rare species or habitats that could be affected by a proposed project, since it provides detailed information only for records actually on the property.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status	Conservation Status
Federal: Not listed	Global: Apparently secure but with cause for concern
State: Listed Endangered	State: Critically imperiled due to rarity or vulnerability
Description at this Location	
Conservation Rank: Not ranked	
Comments on Rank:	
Detailed Description: 2011: Area 12903: 1 adult observed.	
General Area: 2011: Area 12903: Roadside.	
General Comments:	
Management	
Comments:	
Location	
Survey Site Name: Thurston Pond	
Managed By: Freese Town Forest	
County: Rockingham	USGS quad(s): Gossville (4307123)
Town(s): Deerfield	Lat, Long:
Size: 1.9 acres	Elevation:
Precision: Within (but not necessarily restricted to) the area indicated on the map.	
Directions: 2011: Area 12903: Mt. Delight Road, Deerfield, south of Lamprey River headwaters.	
Dates documented	
First reported: 2011-06-07	Last reported: 2011-06-07

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 2 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

Biothon Tally Freese Town Forest - Deerfield, New Hampshire June 6, 2009

Birds (37)	Plants (137)	Plants (continued)	Invertebrates (9)	Mammals (6)	Insects (33)	Amphibians (11)	Algae (12)
Baltimore oriole	American elm	marsh fern	amphipod (scud) - aquatic	beaver	ant	2-lined salamander	blue-green - <i>coelospaerillum</i>
barred owl	arrow arum	marsh speedwell	aquatic earthworms (annelid)	black bear	aurora damselfly	bull frog	desmid - <i>desmikum</i>
black & white warbler	basswood	marsh St. Johns wort	earthworm	chipmunk	beaverpond baskettail	dusky salamander	desmid - <i>goneiozygo</i>
black throated green warbler	beach	meadow rue	flatworm (planaria)	moose	bling midge	green frog	desmid - <i>pleurotaenium</i>
blue-headed vireo	black ash	meadowsweet	horseshair worms	red squirrel	black ant	red backeds salamander	diatom - <i>labelaria</i>
bluejay	black birch	mountain fly honeysuckle	leech	white tailed deer	blackfly	red ert	diatom - <i>asterionella</i>
brown creeper	black cherry	narrow beech fern	neritoides		caddisfly case - <i>tricoptera</i>	wood frog	diatom - <i>cymbella</i>
Canada goose	black huckleberry	narrow leaf pond weed	striped leech (brown & red)		chalk front corporal	spotted salamander	diatom - <i>gomphonema</i>
cedar waxwing	blackberry	New York fern	slugs	chain pickerel	chironomid	spring peeper	green - <i>dictyosphaerium</i>
chickadee	blackberry	Northern arrowwood	Crustaceans (6)		common white tail dragonfly	tadpoles	green - <i>mesostigma ?</i>
common yellowthroat	bladderwort	Northern bugleweed	bosmina		crane fly	wood frog	green - <i>oedogonium</i>
flicker	blue flag	Pennsylvania bittercress	cyclopoid (copepod)		cyclops water flea - <i>polyphemus</i>		green - <i>spirogyra</i>
grackle	blue joint grass	permanthes	cyclops water flea (polyphemus)		deerly		
great blue heron	blue violet	pickers weed	diaphanosoma		dog tick		
great crested flycatcher	boneset	plincushion moss	eubosmina		dragonfly (<i>Odonata ereploxanophis</i>)		
hairy woodpecker	bracken fern	pink ladsalipper	harpacticoid (copepod)		ebony jewelwing		
hermit thrush	bristly blackberry	poison ivy	Mollusks (1)		eight spotted forester moth		
hummingbird	britsly dewberry	polystichen moss	fingerail clam		frosted ellin		
kingbird	British soldier lichen	red maple			grasshopper		
least flycatcher	bulrush	red oak			large whirrigig beetle		
loon	bunchberry	red trillium			mayfly (<i>baetis</i>)		
ovenbird	bushy pond weed	royal fern			mosquito		
phoebe	butter bush	ruffed stemmed goldenrod			perfoliid stonely		
pileated woodpecker	Canadian mayflower	Sagittarius arrowhead			predacious diving beetle		
red eyed vireo	cardinal flower	sensitive fern			red spotted purple		
red shouldered hawk	carex slipata	sheep laurel			spreawing damselfly		
red winged blackbird	cattail	spatterdock			springtail (<i>Collembola</i>)		
robin	checkerberry	speckled alder			water boatman		
scarlet tanager	Christmas fern	sphagnum moss			water mites - <i>hydrachnoid</i>		
swamp sparrow	cinnabum fern	spicebush			water strider		
tree swallow	clintonia	spike bush					
turkey vulture	dark green bulrush	star flower					
veery	deadly nightshade	stiff clubmoss					
white breasted nuthatch	deerberry	striped maple					
winter wren	duck potato	sugar maple					
wood pewee	dwarf ginseng	sun dew					
yellow warbler	early coral root orchid	sweet flag					
	elodea	sweet scented bedstraw					
	false hellebore	tall meadow rue					
	false lily of the valley	three way sedge					
	false solomon seal	tree club moss					
	fringed sedge	tropterus wood fern					
	gold thread	tussock sedge					
	ground cedar	Virginia creeper					
	ground pine	water hemlock					
	hairy cat moss	water horehound					
	halburd tearthumb	watercress					
	hay scented fern	watersield					
	heartleaved aster	white ash					
	heartleaved tearthumb	white birch					
	hemlock	white birch					
	high bush blueberry	white lilies					
	hobblebush	white nettle					
	hop sedge	white oak					
	hophornbeam	white pine					
	horsemint	white turtle head					
	indian pipe	white violet					
	interior sedge	whorled aster					
	jack in the pulpit	wild sarsparilla					
	Japanese barberry	winterberry holy					
	jewelweed	witch hazel					
	joe-pye-weed	wood aster					
	leather leaf	woody leaved violet					
	lesser burread	woolgrass					
	low bush blueberry	yellow birch					
	lurid sedge	yellow lilies					
	maleberry	yellow sedge					
	maple leaved viburnum	yellow water lily					

CHARLES MORENO, LPF
Consulting Forester, Forest Ecologist
New Hampshire Licensed Professional Forester #115
Maine Forester License #2000

EDUCATION

B.S. FORESTRY – University of New Hampshire, Magna Cum Laude, May 1980
SAF Study Tour of France – Three-week study of French silvicultural methods, September 1983

PROFESSIONAL SERVICE and AFFILIATIONS

Forest Stewards Guild – Board of Directors (1999-2005), Chair (2005)
Society of American Foresters (SAF) – NH Chairman (1996)
New Hampshire Tree Farm Program – Executive Committee (1984-87)
Society for the Protection of New Hampshire Forests

WORK EXPERIENCE

1980 - Present FORESTRY CONSULTANT, founder and proprietor of Moreno Forestry Associates. Thirty-two years experience managing private and public forests in New Hampshire. Projects include forest and wildlife management planning and implementation, ecological assessments, forest inventory and appraisals, timber sales, mapping, forest taxation and litigation, forest improvement and habitat enhancement, and conservation plans for towns, corporations, and private landowners. 30,000+ acres under management.

1984- Present TOWN FOREST MANAGER for the Towns of Exeter, Londonderry, Candia, Plaistow, Brentwood, East Kingston, Deerfield, Epping, Brentwood, Sandown, Rye, Pittsfield, Derry, Dover, Madbury, Strafford, and Rochester developing/implementing multiple-use plans for publicly owned forests.

1985- 1992 ALTON TOWN FORESTER. Consultant to the Town on Current Use Assessment and NH Timber Tax matters.

1980- 1988 K-F TREE FARM, Forest Manager. Experience in all areas of woodland and wildlife management in this intensively managed, 700-acre property in Alton, New Hampshire. Selected as 1988 Belknap County Tree Farm of the Year.

PROFESSIONAL RECOGNITION

New Hampshire Outstanding Forester Award (Society of American Foresters) -- 2001
National Outstanding Tree Farm Inspector Award -- 1999
Austin Cary Practicing Professional Award – (New England SAF, 1998)
NH Wildlife Stewardship Award – 1995
Outstanding New Hampshire Tree Farm Award 1987, 1992, 2002, & 2006
NH Tree Farm Inspector of the Year – 1985, 1990, 1992, 1993, 1998
Xi Sigma Pi (Forestry Honor Society, 1978)
Eagle Scout (1976)



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