

# FOREST MANAGEMENT PLAN

*for the*

## Carolyn Orr Conservation Land

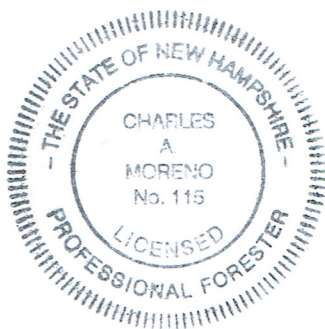
Atkinson, New Hampshire



Prepared for:  
Atkinson Conservation Commission  
Atkinson, New Hampshire

Prepared by:  
Charles Moreno, Consulting Forester  
Moreno Forestry Associates  
Center Strafford, New Hampshire  
(603) 335-1961

October 7, 2013



A handwritten signature in black ink, appearing to read "Charles Moreno".

Charles Moreno, LPF #115  
Consulting Forester

Report Copy # \_\_\_\_\_

**FOREST MANAGEMENT PLAN**  
*for the*  
**Carolyn Orr Conservation Land**  
**Atkinson, New Hampshire**  
64.3± acres



*Cattails dominate portions of the Bryant Brook Meadow.*

**October 7, 2013**

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The author of this forest management plan, Charles A. Moreno, certifies that the contents of the plan, except where footnoted, but including all written material, maps (base information referenced), plan format and organization, are original to the author.

The purpose of this plan is to provide natural resources information and forest and wildlife management recommendations to the Atkinson Conservation Commission, citizens of Atkinson, and others interested in the management of the Carolyn Orr Conservation Land in Atkinson, New Hampshire. This document is a work for hire done by Moreno Forestry Associates for the Town of Atkinson, New Hampshire, and may be used by the Town of Atkinson, New Hampshire for any purpose. Copying of this plan by any other individual or organization, including all written material, plan content and format, requires appropriate citation and/or the written permission of Charles A. Moreno, Consulting Forester.



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## MAPS

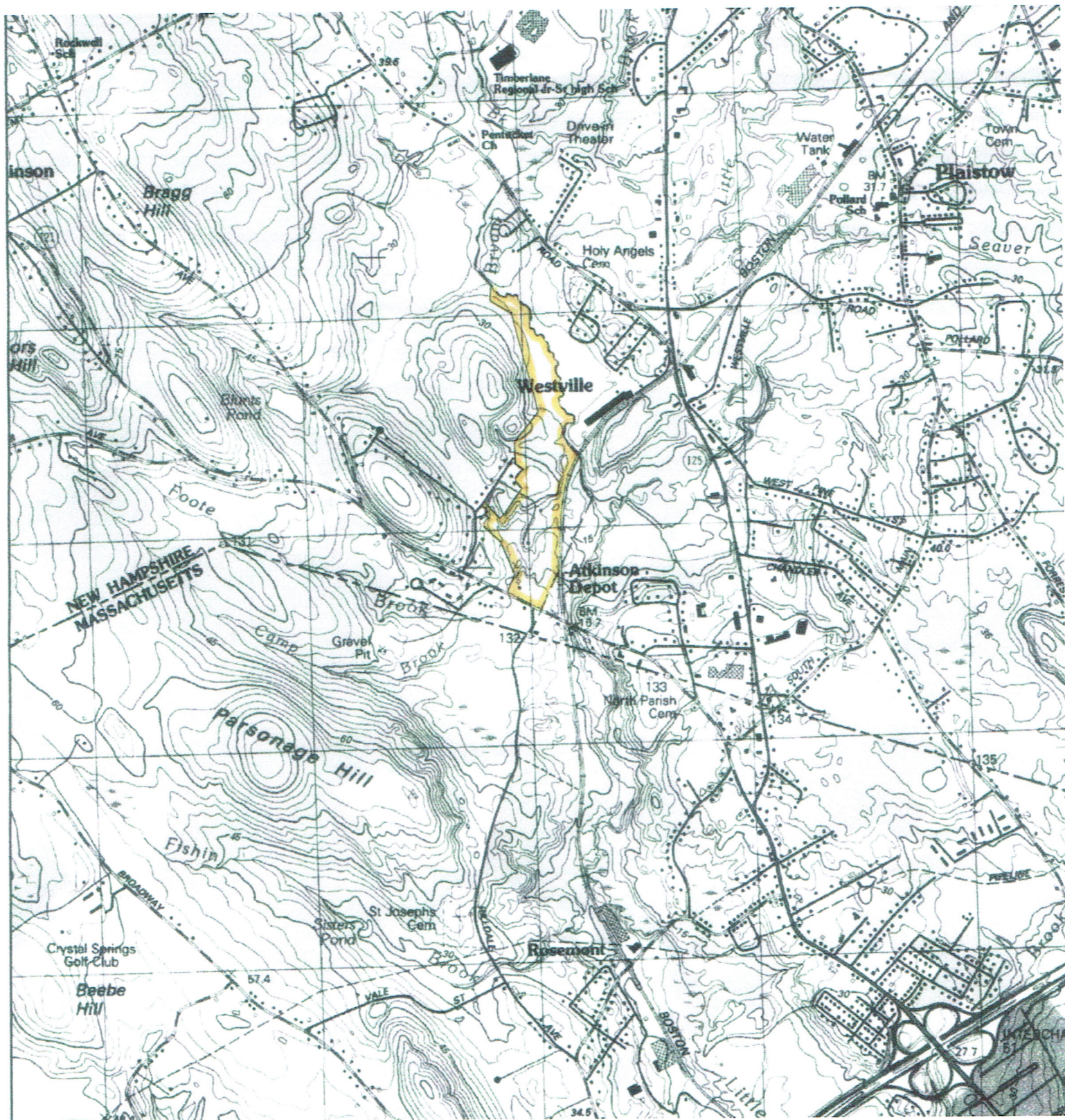


MAP SCALE:



1 inch = 2000± feet

## Locus Map of the Town of Atkinson's Carolyn Orr Conservation Land



USGS Topographic Map, "Haverhill" Quadrangle



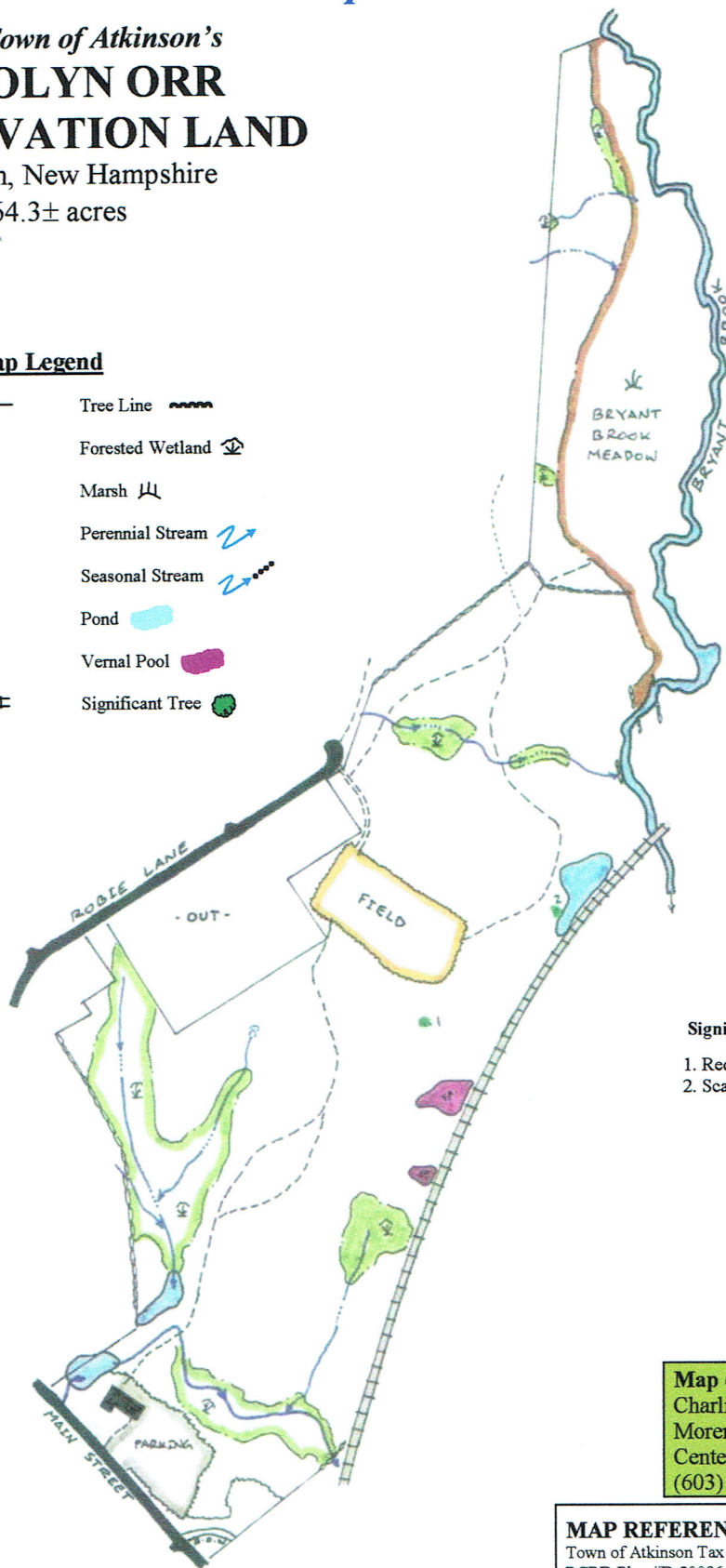
# Physical & Natural Features Map

## for the Town of Atkinson's CAROLYN ORR CONSERVATION LAND

Atkinson, New Hampshire  
64.3± acres

### Map Legend

Property Line	———	Tree Line	~~~~~
Stonewall or Old Mill Site	∞	Forested Wetland	☞
Community Center	■	Marsh	≡
Gravel Road	- - - -	Perennial Stream	~
Trail	- · - · -	Seasonal Stream	~ · · ·
Footpath	·····	Pond	■
Railroad Tracks	≡≡≡	Vernal Pool	■
		Significant Tree	●



MAP SCALE:

1 inch = 500± feet

### Significant Tree Index

1. Red Oak, 48"± DBH, forked
2. Scarlet Oak, 19"±

Map drawn by:  
Charlie Moreno, Consulting Forester  
Moreno Forestry Associates  
Center Strafford, NH  
(603) 335-1961 October 2013

### MAP REFERENCES:

Town of Atkinson Tax Maps  
RCRD Plan #D-20086. R.S.L. Layout & Design, Inc. (Dec 1989).  
Aerial Photography: Google Earth & bing.com maps  
Property Reconnaissance/Forest Inventory:  
Moreno Forestry Associates, 2012-2013.

# Forest Types Map

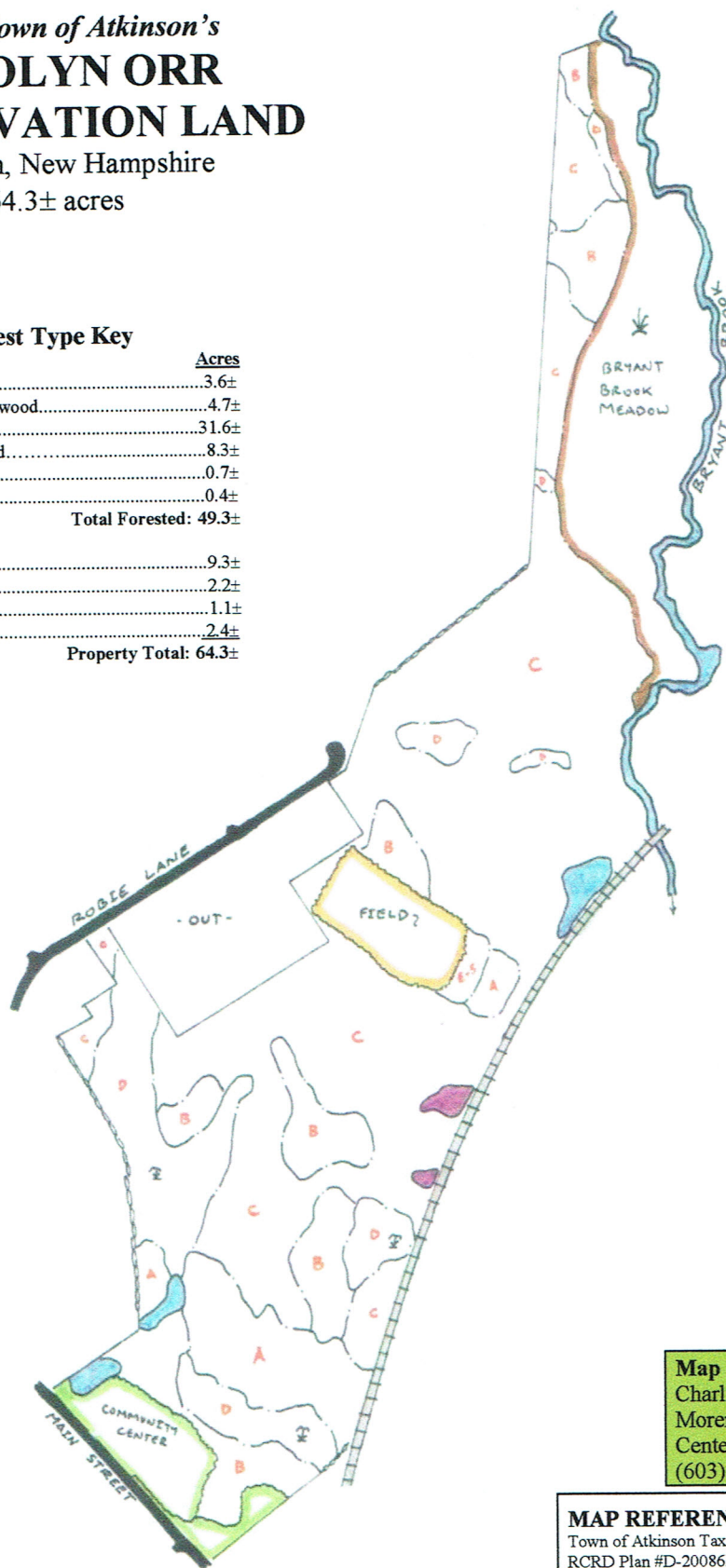
## for the Town of Atkinson's CAROLYN ORR CONSERVATION LAND

Atkinson, New Hampshire

64.3± acres

### Forest Type Key

	Acres
A. White Pine.....	3.6±
B. White Pine/Hardwood.....	4.7±
C. Hardwood.....	31.6±
D. Forested Wetland.....	8.3±
Early-successional.....	0.7±
Vernal Pools.....	0.4±
<b>Total Forested:</b>	<b>49.3±</b>
Marsh.....	9.3±
Field.....	2.2±
Ponds (3).....	1.1±
Community Center.....	2.4±
<b>Property Total:</b>	<b>64.3±</b>



MAP SCALE:

1 inch = 500± feet

### Map Legend

Property Line	—
Stonewall	— — —
Railroad Tracks	— + + + —
Tree Line	~ ~ ~
Forest Type Delineation	— · — · —
Forested Wetland	— — —
Marsh	— — —
Pond	— — —
Vernal Pool	— — —

Map drawn by:  
Charlie Moreno, Consulting Forester  
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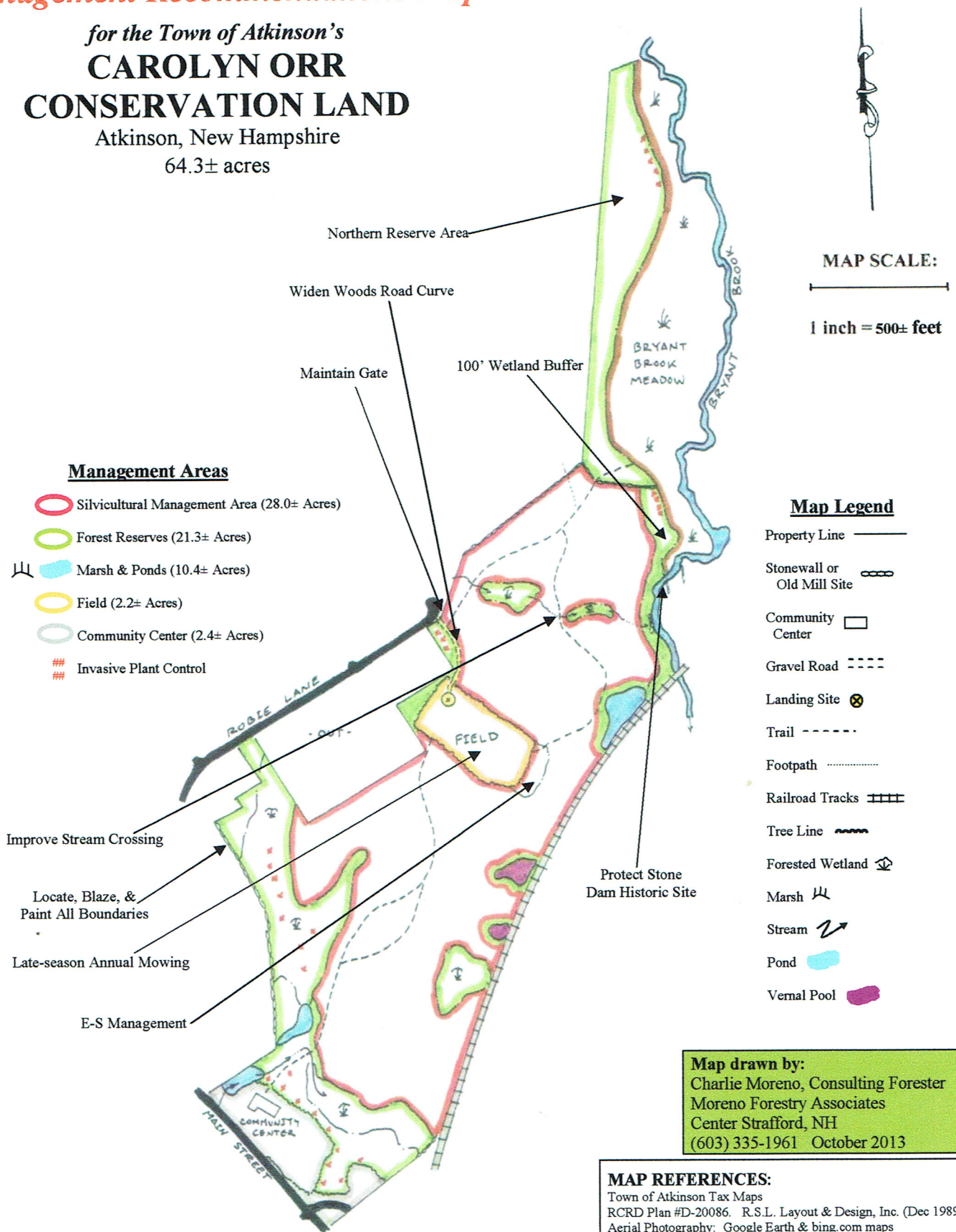
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Property Reconnaissance/Forest Inventory:  
Moreno Forestry Associates, 2012-2013.



# Management Recommendations Map

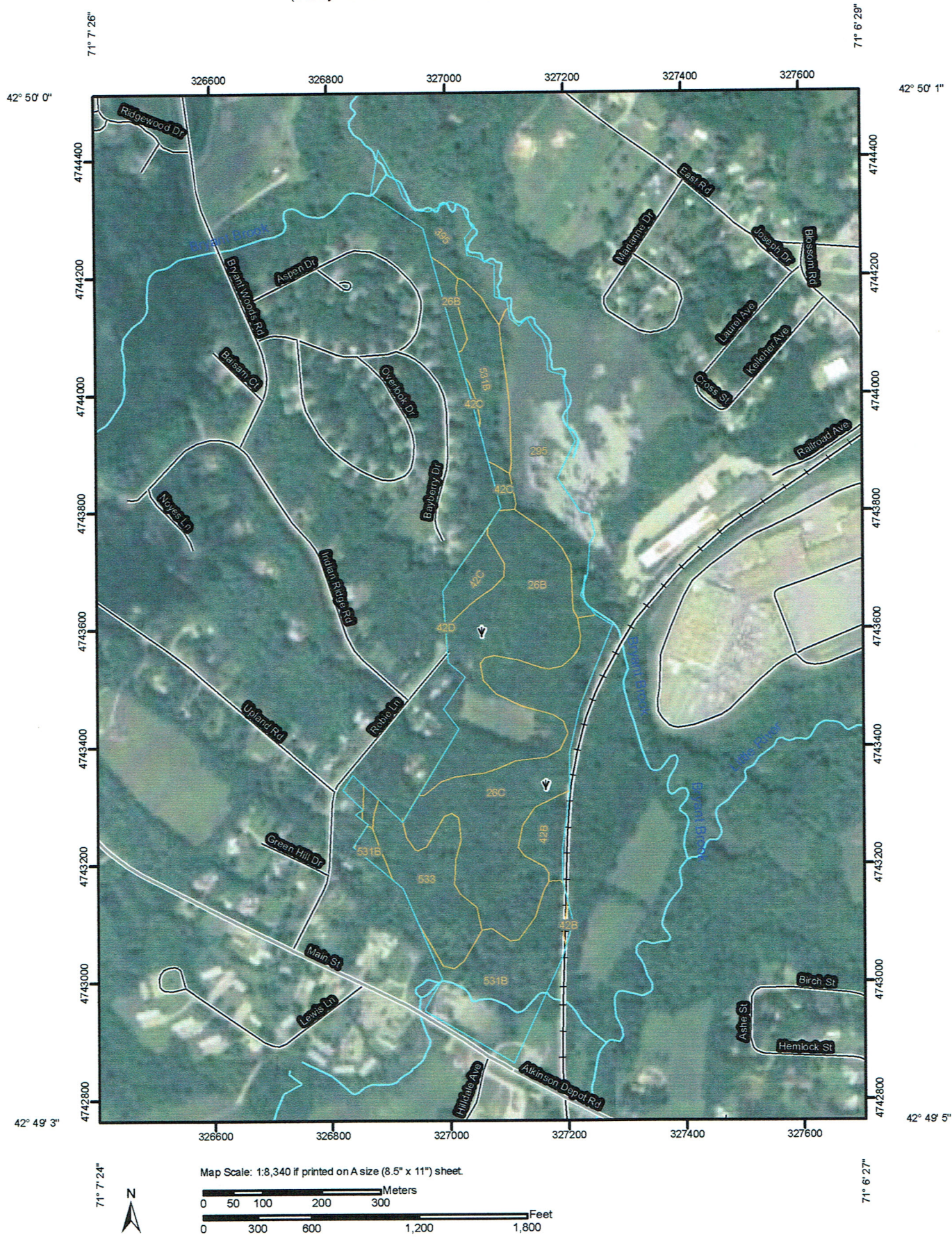
## for the Town of Atkinson's CAROLYN ORR CONSERVATION LAND

Atkinson, New Hampshire  
64.3± acres





Soil Map—Rockingham County, New Hampshire  
(Carolyn Orr Conservation Land, Atkinson, New Hampshire)



Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

6/7/2013  
Page 1 of 3



# **INTRODUCTION**

## **CAROLYN ORR CONSERVATION LAND**

### **Atkinson, New Hampshire**

### **INTRODUCTION**

The Carolyn Orr Conservation Land (herein referred to as the “Orr Lot”) is a 64.3± acre community-owned property in the southeast corner of Atkinson, which includes the town’s Community Center. The land, acquired by the town in 1990 using Land Conservation Investment Program (LCIP) funds, was once part of the Trinity House Camp – a summer camp for girls.

The property is now managed forest and fieldland. It contains a variety of cover types and habitats; surface water features include forested wetlands, ponds, seasonal streams, and vernal pools. The property is a popular community destination for passive recreational use. Nearly a mile of trails leads through scenic upland hardwood and pine forest, passing through a field that is regularly mowed and maintained for wildlife.

This forest plan is intended as a guide for the management and protection of the Orr Lot’s natural resources, as well as to address community use and recreational activity on the property. The plan is based on detailed forest analysis in concert with the objectives of the Atkinson Conservation Commission, which is responsible for the management of the property. The plan is a “working” document; over time it will likely require updating to reflect ongoing management activities, unforeseen natural disturbances and conditions, as well as evolving community interests.

### **PROPERTY INFORMATION**

#### **LOCATION and GEOGRAPHY**

The Carolyn Orr Conservation Land is situated on the north side of Main Street (aka NH Route 121) in the southeastern section of Atkinson. The property occupies the open space roughly bounded by Bryant Brook (Atkinson-Plaistow town line) to the north, the railroad tracks to the east, NH Route 121 on the south, and Robie Lane on the west. The New Hampshire-Massachusetts state line is less than a ¼ mile south of the property.

The land is situated on the Gulf of Maine Coastal Lowland<sup>1</sup>, about 15± miles inland from the Atlantic Ocean, and lies near the northerly extent of the Appalachian oak-pine forest<sup>2</sup>. Soils in this region, where climate is moderated by the sea, are formed from glacial tills and marine deposits and are underlain by metamorphic bedrock. The land is generally level to moderately sloped, with elevations ranging from about 60 to 120± feet above sea level.

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

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





## REFERENCE INFORMATION

**Deeds:** Recorded at the Rockingham County Registry of Deeds (RCRD), with the Town of Atkinson named as Grantee.

- > Initial conveyance, 5.0547± acres granted by the Society for the Protection of New Hampshire Forests on March 13, 1990; RCRD Book 2829, Page 2100.
- > Main forest conveyance granted by the Society for the Protection of New Hampshire Forests on August 7, 1990; RCRD Book 2847, Page 58.

### Surveys:

>“A Survey & Plat of a Subdivision and a Boundary Line Adjustment, Prepared For Society for the Protection of New Hampshire Forests, Situated in the Town of Atkinson, N.H.”, by R.S.L. Layout & Design, Inc. (December 1989). RCRD #D-20086.

>“A Survey & Plat of Property, Prepared For Trinity House Camp, Inc., Situated in the Town of Atkinson, N.H.”, by R.S.L. Layout & Design, Inc. (November 1989). RCRD #D-19949.

**Aerial Photos:** Bing.com (NH DOT 2010 series).

**Tax Maps:** Atkinson Tax Maps, 3 contiguous parcels, as follows—

- Map 5, Lot 35—northern strip;
- Map 5, Lot 48—containing main forest/field area;
- Map 5, Lot 67—Community Center area.

**Acreage: TOTAL – 64.3± acres (according to survey)**

Established upland forest –	39.9± acres
Forested wetlands –	8.3± acres
Early-successional/young forest –	0.7± acres
Field land –	2.2± acres
Ponds, marsh, shrub swamp –	10.8± acres
Community Center area –	2.4± acres

**Area prescribed for active forest management: 28.0± acres**



## **OBJECTIVES, LOGISTICS, & RECOMMENDATIONS**

## **FOREST MANAGEMENT OBJECTIVES**

Recommendations for the management of the Orr Lot are based on natural resource findings and long-term management objectives, which the Atkinson Conservation Commission has considered for the property. These objectives include:

- **Manage for light recreational uses.** The extensive trail system is widely used by local residents for walking, often with dogs. Other low-impact uses are snowshoeing, cross-country skiing, geo-caching, and nature study. ATV travel is prohibited.
- **Maintain a healthy forest in managed areas:** 1) Foster resilience to insects and disease; 2) Encourage tree species diversity that reflects natural community types; 3) Manage for a mixed age forest, both integrated and in sections; this includes patches of forest regeneration and young growth, ample mid-aged forest, and older residuals, including trees 150+ years old; and 4) An upcoming comprehensive forest thinning (winter-spring-summer 2014±) will serve to improve forest growth and promote quality timber.
- **Enhance wildlife habitat.** The Orr Lot is a substantial open space area within a highly fragmented and developed surrounding landscape. It provides transitory habitat to migrant and itinerant wildlife, as well as specialized habitat to local species such as wood turtle, red fox, and deer. The management objective is to protect wildlife features such as the vernal pools and ponds, and to enhance/perpetuate the outstanding mast-producing forest.
- **Protect water quality and wetland/stream integrity.** Trail-based recreation is the property's primary use; therefore, priority must be placed on preventing trail erosion and maintaining adequate stream fords. With the exception of one crossing, well-constructed fords are found on trails at stream crossing points. Continue to discourage ATV usage to avoid soil rutting and erosion. The property is fairly litter-free, however, pet waste is a potential pollution source—install pet waste stations at trail heads. Protect the integrity of the property's forested wetlands and seasonal streams by continuing low-impact recreational usage and strict application of BMP's in silvicultural management areas. Maintain no-cut forest buffers along Bryant Brook, Bryant Brook Meadow, the ponds, and the vernal pools.
- **Sustainably manage the timber resource.** In silviculturally managed areas, upgrade timber quality, growth, and value over long-term. Periodic harvests are for the purpose of maintaining forest health and wildlife habitat, improving forest growth, and insuring natural regeneration. Timber income is for conservation uses, including conservation land management.
- **Control exotic, invasive plants.** Intensive effort is needed to control the burgeoning presence of non-native, invasive plants while they are still in manageable numbers. Over time, these plants threaten to diminish the property's biodiversity, habitat, ecological functioning, and scenic beauty.
- **Maintain the forest's scenic beauty.** Manage for natural forest attributes, though minor forest grooming may occur along entrance areas and main trails. NH Best Management Practices (BMP's) must be implemented by contractors during forest harvest operations. Avoid damage to stone walls and historical features.





## CAPSULE RECOMMENDATIONS for PROPERTY

### ***High Priority:***

- **Invasive Plant Control** – Immediately (spring 2014) initiate invasive plant control program. Implementation involves focus areas and strategic use of volunteers and contractors. Seed capture and complete uprooting of plants is the first line of action, though herbicide use by licensed applicators is likely necessary in severe areas. Timber sale proceeds may provide some project funding.
- **Wildlife** – Promote management of the existing forest *towards complex structure* in terms of mixed tree age, forest canopy layering, and accumulated woody debris. Perpetuate the property's outstanding mast resource by promoting the growth of broad-crowned oaks and hickories. (Disease-resistant American chestnut may be introduced as an additional mast species.) Take silvicultural measures to encourage the regeneration of upland hardwood species. While generally promoting mixed-aged forest (seedling-sapling, pole, older forest, and "ancient", 150-200± year, trees), also continue to manage the small patch of early-successional forest southeast of the field. Finally, continue to maintain the field as short-grass habitat. Late season mowing may be considered.
- **Silviculture** – Long-term implementation of forest management with the purposes of maintaining forest health, enhancing habitat, naturally regenerating the forest, improving timber growth and value, and creating complex forest structure. Management may be carried out sustainably on a *12 to 15± year harvest cycle*—harvests should not exceed the timber volume that the forest is capable of re-growing *in 15 years*—as detailed in the silvicultural prescriptions.
- **Water Quality** – Promote removal of pet waste by dog walkers by installing a pet waste station at the two main trailheads. Also, apply NH Best Management Practices (BMP's) for recreational and forestry activities at stream crossings or in wetland riparian zones.

### ***Medium Priority:***

- **Recreation** – The properties trails are generally in good condition, with the exception of one stream crossing as delineated on *Recommendations Map*. Install an appropriate trail ford—either a three-sided box culvert or small bridge. Expansion of trail network is not recommended, as additional trails will invariably run too close to sensitive features such as the vernal pools or Bryant Brook Meadow. Develop an interpretive trail map with corresponding educational points along the trail leading into the forest from the Community Center.

### ***Lower Priority:***

- **Boundary Maintenance** – Some of the property lines appear to have been recently blazed and painted. Re-paint these lines with long-lasting surveying paint. Also, locate, blaze, and paint any remaining boundaries. Blazes should be re-brushed every 10 years. The Orr Lot requires approximately 5,800± feet of boundary maintenance.



## FINANCIAL PROJECTIONS

Presently, improvement harvesting on the 28± forested acres designated for silvicultural management will generate perhaps \$14,000±, and net \$10,000± after forestry and access improvement costs. This revenue projection considers that poorer quality, low-value, and declining trees would be removed in improvement harvesting. Income from the upcoming forest thinning can provide funding for other needed projects on the Orr Lot such as invasive control, boundary blazing, trail crossing upgrades, and early-successional habitat maintenance.

Invasive plant control is a high priority project, requiring multiple treatments. The budget below assumes that volunteer effort, and possibly grants, will help defray costs. Projected expenses include the cost of establishing strategy and organizing/training volunteers, hiring contractors for difficult removals, and project supervision/quality control/management.

Boundary location and demarcation are important property maintenance projects. The entire property was surveyed in 1989. Sections of the boundary line were recently demarcated. Projected costs for additional boundary location and blazing/painting are estimated below (this assumes that all corner monumentation is still present).

The installation of a stream ford on one of the property's secondary trails is a priority. A simple wooden bridge, using pressure-treated lumber, is the least expensive method. Material costs are estimated below, with installation relying on volunteer labor.

Periodic maintenance of the early-successional habitat pocket for wildlife requires occasional re-clearing (once every 12-15± years) of young growth with a Brontosaurus or skid steer. Timber harvesting while minimize the initial clearing cost, but re-clearing will cost approximately \$1,000± per entry thereafter (starting 12± years hence).

Projected income:

28± acre forest improvement cut, net	\$ 10,000±
--------------------------------------	------------

Estimated costs for conservation projects:

Invasive control	(\$5,000)±
Boundary location, blazing, painting	(\$1,500)±
Stream ford, materials	(\$ 500)±
Early-successional establishment	<u>(\$0,000)±</u> presently

PROJECTED NET REVENUE	\$ 3,000± rounded
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## **FOREST ACCESS and PUBLIC USE**

### ***Forest Management Areas and Reserve Areas***

Upland forest covers 63% of the Carolyn Orr Conservation Land; wetlands, including forested swamps, ponds, and extensive marshland, overlay much of the rest of the property. In order to avoid disturbing these latter sensitive areas, 50% of the property's area, including 13± acres of upland forest and 19± acres of wetlands, are recommended as reserves. Reserve areas are sections of the property with minimal human-caused disturbance and intervention. The one exception to management intervention in the reserve areas is high priority control of the burgeoning population of exotic, invasive plants that are found in many wetland areas. These plants include glossy buckthorn, Japanese barberry, and multiflora rose in wetland edges and forested wetlands, and *Phragmites* and purple loosestrife in very poorly drained areas.

The property's remaining upland forestland and the field are to be systematically managed for forestry and/or wildlife purposes. The forestland is the parcel's *productive forest area*—the area accessible to silvicultural management—covering approximately 28± acres, 0.7± of which are for early-successional management.

### ***Forest/Wildlife Management Access***

A gravel road entrance at the end of Robie Lane provides the only needed access to stage forest improvement work in the property's forest management area. The interior field provides an excellent landing site, though a curve on the woods road to the field may need minor widening.

The interior of the Orr Lot is readily accessed from the centrally-located field. Interior access for forest thinning involves both close and moderate skidding distances from the landing site (up to 1,500± feet). Due to the location of the recommended reserve areas, all stone wall passages are avoided, while stream crossings are minimized to two. On the ground reconnaissance is necessary to optimize the location of the crossings; both streams narrow-channeled and are seasonal. DES notification permitting for installing the crossings is required for the logger. Appropriate temporary fords according NH BMP guidelines must be installed, and then removed, by the logging contractor upon project completion.

The Robie Lane access point also provides access to mowing and brush clearing machinery for field maintenance and future early-successional wildlife management projects. A staging area is not required for these activities. The early-successional management site is located adjacent to the southeastern edge of the field.

### ***Public Use and Access***

Recreational use of the Orr Lot is largely trail-based, with the Community Center parking lot serving as the main access point. Trail access, along with parking for a small number of vehicles, is also available at the end of Robie Lane.

The interior trail system in the Orr Lot extends about one mile, and includes short and medium length loops throughout the property.



The property's trails, especially the trail leading from the Community Center, are widely used by local residents for walking, often with dogs. Other low-impact uses are snowshoeing, cross-country skiing, geo-caching, and nature study—activities that also range off-trail. ATV travel is prohibited, yet difficult to control; minor rutting has occurred on moist segments in a few areas due to off-road vehicle use.

A community trail network comes at a cost: Potential disruption of wildlife habitat, permanent stream crossings and possible water pollution, more challenging forest management access, and potential soil degradation. Negative effects may be mitigated by steering usage towards responsible, non-ATV, low-impact activities. Public education about litter and pet waste disposal are also factors.

Expansion of the existing trail network is not recommended. Additional trails will invariably wander near sensitive wetlands, streams, or wildlife features. Furthermore, adequate maintenance of the existing network is a priority, without further expanding the area. The current trail loop system provides extensive forest access, while retaining some trail-less areas for wildlife. One stream ford is needed, as previously described.

The Atkinson Conservation Commission may consider developing an interpretive guide of the Conservation Area, coupled with a trail map and numbered trail stations. The guide may highlight historical aspects of the land, natural features, and/or wildlife and forestry management work.





## **NATURAL RESOURCES**

## NATURAL RESOURCE SUMMARY

### SOILS PROFILE

#### *Upland Soils*

**Canton (42)** gravelly fine sandy loam – This deep and well-drained glacial till covers a few small pockets on the lot. The surface layer of *Canton* is gravelly fine sandy loam, with a substratum, below 2½ feet, of loamy sand with varying amounts of silt. While seasonal high water table is below 6 feet, the soil is wet during spring thaw or after extended rainy periods. Soil productivity is average to above average for pine and oak. Though mostly gently sloped, a few slopes up to 15% were noted.

**Windsor (26)** loamy sand – This soil, underlying nearly half of the property, has rapid permeability qualities and is also highly productive for pine and hardwood growth in forested settings.

#### *Wetland Soils*

**Scio (531)** very fine sandy loam - This poorly-drained very fine sandy loam underlies a few pockets of forested wetlands. Wetland hardwood trees and shrubs—species whose root systems can endure periods of water saturation—are associated with this soil, including, red maple, highbush blueberry, and winterberry holly.

**Raynham (533)** silt loam– This moist, poorly-drained soil underlies the forested wetland in the property's southwestern section. Despite a seasonally high water table, particularly in the spring, this soil may be productive for both pine and hardwoods. Logging equipment can easily rut this soil during wet seasons.

**Chocorua (395)** mucky peat – Found in the northern tip of the property, this very poorly-drained soil, typically containing wetland hardwoods—species whose root systems can endure periods of water saturation, such as red maple—is saturated throughout the year.

**Greenwood (295)** mucky peat – This very poorly drained peatland soil underlies the property's saturated and seasonally flooded pools and swamps along Bryant Brook. Due to the high water table—if not flooded, the water table is often within ½ foot of the ground surface—Greenwood soils support little or no tree growth. Greenwood's peat layer is deep, with bedrock more than 5 feet below the soil surface.





## SURFACE WATER RESOURCES

The Orr Lot lies within the Merrimac River watershed. Several minor seasonal streams emanate from, or flow across, the property, eventually draining off-site into the Little River which flows directly to the Merrimac.

Bryant Brook is the most prominent stream, delineating the northeasterly property boundary. Remnants of an old mill site and stone dam are found along the southeasterly section of the brook. The dam was breeched at an earlier date, but in recent years, beaver have erected a stick-dam across the old dam's wall. A large ponded/marsh area has resulted, roughly covering the same footprint of the meadow and pond from the old dam. Thus, most of Bryant Brook is inundated and located within the new pond. In addition to an extensive shallow-pond area, the meadow contains emergent vegetation including floating hydrophytes and cattail edges. Dense shrubs line the forest/meadow edge including highbush blueberry and maleberry.

The Orr Lot also contains several forested wetlands mostly associated with a network of seasonal streams. Red maple dominates, with highbush blueberry, winterberry holly, northern arrowwood, and spicebush in the understory. Japanese barberry has heavily invaded the southwesterly forested wetland.

The property contains three small ponds. The two southerly ponds are linked by a larger stream located just behind the Community Center. The Orr Lot also contains two vernal pools, both of which are forested and appear to have only moderate hydroperiods. Vernal pools are small, shallow depressions that inundate in early spring and, sometimes, after autumn rains. These ephemeral pools are fish-free, and therefore provide potential breeding habitat to several salamander and frog species, as well as fairy shrimp and other invertebrates.

## WILDLIFE HABITAT

### *Open Space*

The Orr Lot is part of a 150± acre undeveloped open space block that overlaps into the Westville area of Plaistow. The Atkinson-Plaistow-Haverhill area has undergone heavy development for the last half century, with open space lands largely reduced to separate islands. While heavily traveled roads and residential areas interrupt habitat connectivity and wildlife travel, the remaining open space islands are increasingly critical harbors for wildlife. Maintaining trail-less areas and a diversity of habitats are important wildlife considerations for these open space areas.

### *Core Habitats*

Core habitats on the Orr Lot are: a) One field; b) A small early-successional/young forest growth area; c) The extensive, established mast hardwood forest; d) Open water and emergent wetlands; f) Forested wetlands and stream riparian areas; and g) Vernal pools.

The property's 2.2± acre field is maintained as short-grass habitat the Atkinson Conservation Commission. The Commission mows the field at least once annually. Deferred mowing—until late summer, after nesting season—has been considered, however, the field's relatively small area precludes successful breeding of many species. Species that may use the short-grass habitat include snow bunting, killdeer, chipping sparrow, mourning dove, and Canada Goose.





precludes successful breeding of many species. Species that may use the short-grass habitat include snow bunting, killdeer, chipping sparrow, mourning dove, and Canada Goose.

The potential early –successional area is recently abandoned field containing 25 to 30± year old mixed hardwoods. If this area were cleared and allowed to sprout and re-grow, early-successional forest species such as quaking aspen, gray birch, and black cherry will be encouraged, adding to the parcel's species diversity. Fruit-bearing brambles, shrubs, and vines, including blackberry, hawthorn, and grapevine may also grow. The abundance of food sources and available cover—both for escape, resting, and nesting—is attractive to wildlife. Though small in area, it adds a nice transitional edge from the field to the adjacent established forest. The area can be further expanded by including the adjacent Scotch pine section. Additional re-clearings, on a 12 to 15± year basis in sync with the forest thinning schedule, will help develop and perpetuate the early successional forest type.

The Orr Lot contains outstanding mast forest—established forest with acorn and nut producing trees including red oak, black oak, white oak, and shagbark hickory. Acorns are a staple food for a diversity of wildlife. Many of the trees are broad-crowned, capable of producing tens of thousands of seeds during good acorn/nut years. Management to insure the regeneration of these species is a critical step at present, as this forest continues to mature. Over time, vigorous replacement trees are needed as the older trees succumb or have reduced mast production. Silvicultural management also insures that oaks and hickories naturally seed and regenerate for the future.

Exotic, invasive plants are an increasing concern for the Orr Lot. While areas of the property have serious infestation, the plants have not yet overrun the entire tract. Aggressive control of the invaded areas is strongly advised, to prevent the continued spread of the plants to new areas. In addition to limiting the diversity of native plants, non-native invasive plants prevent the natural regeneration of native trees, such as oak and hickory, which are a critical mast source.

“Pasture pine”—white pines that are heavily limbed and contain multiple trunks—in the established forest areas provide good vertical structure. These trees are typically retained, as they provide nesting sites for small mammals, and perches for hawks and owls.

### ***Species of Concern/Natural Communities***

The New Hampshire Natural Heritage Bureau was consulted in February 2012 about the potential presence of rare species (plant or animal) or exemplary natural communities on the subject property. A database check did not indicate the presence of any species or natural communities of concern. While no rare species or rare natural communities were noted during field examinations (Moreno Forestry Associates) of the property in October/November 2012 and September 2013, potential habitat may exist for rare amphibians and reptiles in wetland areas.

### ***Silvicultural Management for Wildlife***

Habitat in the Orr Lot will benefit from silvicultural management. Carefully planned, periodic harvesting (as specified in the Forest Type Prescriptions) will promote a complex forest structure over time: multi-aged, stratified forest canopy, increased herbaceous layer, and greater diversity of tree and shrub species adapted to site conditions. Complexity and diversity generally concur with habitat richness.





### ***Wildlife Habitat Recommendations***

- Continue late-season, annual mowing maintenance of the field.
- Maintain at least 1± acres of the property as early-successional, i.e., under 20± years of age. Re-clearing of the site is necessary to perpetuate young growth conditions. Re-clearing should occur every 12- to 15 years in conjunction with improvement cutting in the surrounding forest. Utilize a Brontosaurus or skid steer mulcher to re-clear the sapling growth.
- In mid-successional areas, continue the development of multi-generational forest through silvicultural management. Forest age differentiation should occur both as groups or small pockets of trees, and as dispersed individual trees. Existing older growth should be retained.
- Designate and maintain wetland and remote areas as reserves, covering about 50% of the property area (32± acres). These should also be mostly trail-less, with the intent of providing expanses of undisturbed wildlife habitat for breeding, nesting, and denning.
- Leave a minimal harvest and minimal activity buffer around Bryant Brook Meadow (100 feet), and the property's vernal pools and ponds (75± feet).
- Manage for large-crowned oaks and hickories, particularly in upland hardwood stands.
- Retain cavity trees, snags, and forest floor woody debris for wildlife. Large dead tree trunks provide excellent habitat.
- Retain trees that provide good vertical structure, such as large pasture pine.
- Encourage the growth of native fruit-bearing shrubs including highbush blueberry, winterberry holly, spicebush, silky dogwood, maple-leaf viburnum, northern arrowwood, and nannyberry.
- Control exotic, invasive plants.

## **FOREST RESOURCES**

### ***SPECIES COMPOSITION***

The Orr Lot contains a large variety of species. White pine and oak dominate upland areas, while red maple predominates in wetland areas. A qualitative approximation of the property's forest overstory tree species abundance is:

Abundant	– White pine, red oak.
Common	– Red maple, white oak, black oak.
Less Common	– Scarlet oak, red pine, sugar maple, shagbark hickory, Scotch pine, black cherry, American elm, pignut hickory.
Scarce	– White birch, basswood, hemlock, white ash.

Interestingly, both hemlock and white ash, species that face imminent threat from non-native, invasive insect pests, are not common on the property.

### ***FOREST STRUCTURE***

The Orr Lot contains generally well-established forest ranging from 60 to 100± years of age, with the exception of a small patch of much younger forest (30 to 40± years old) along the eastern field edge, including the Scotch pine plantation. The property was once entirely field. Field



abandonment probably began in the late 1800's, and peaked around World War I; the resulting forest is now maturing on what was once a substantially larger pasture.

Forest stands on the tract tend to be even- to two-aged, indicating only mild past disturbance. Disturbances may have included damage (blowdowns) from Hurricane Carol (1954) along with other localized storm events.

While nearly 70% of forest growth is between 5 and 14 inches in diameter, there are significant numbers of trees (21%) between 15 and 20 inches in diameter. Trees greater than 20 inches, with pines and scattered open-grown hardwoods ranging to 3 feet in diameter, represent the remaining forest stocking.





# **TIMBER RESOURCE DATA**

## **FINDINGS**

### **Timber Volume and Value:**

- The Carolyn Orr Conservation Land contains standing timber volumes as follows:

**392,841± board feet of sawtimber**

Softwood – 228,322± BF

Hardwood – 164,519± BF

**2,297± tons of chipwood/softwood pulp**

**622± cords of firewood/hardwood pulp**

- The total timber stumpage value is currently \$74,259.
- On a per acre basis, including all forest acreage (109.7± acres), timber value averages **\$1,506±/acre**. This is a low value relative to the full productive capacity of the land. With careful management, including judicious harvesting, timber value can increase substantially.
- White pine sawtimber accounts for one-half (51%) of the property's timber value.
- Red oak sawtimber accounts for over one-quarter (29%) of the property's timber value.
- Cumulatively, all other sawtimber, pulp, firewood, and chipwood on the Orr Lot accounts for the remaining 20% of timber value.

### **Tree Species Composition**

- White pine, red maple, and red oak are the property's dominant species, accounting for 28%, 24%, and 22% of tree species composition (by basal area), respectively.
- Oak – red, white, black, and scarlet – accounts for nearly half (45%) of the property's forest composition.
- A diversity of regeneration is found in the woodlot including white pine, red oak, red maple, black cherry, sugar maple, and ironwood. Regeneration is not always ample, however. Overhead shading and competition from other vegetation (witch-hazel, invasive plants) hinders the establishment of forest regeneration.

### **Tree Quality and Density**

- White pine quality is generally average to above average– most pines have at least some branches, and thus are not premium quality.
- Red oak quality is very good, including veneer quality trees. Estimated hardwood sawtimber volumes include pallet and grade logs as well.
- The soils on the Orr Lot are capable of growing high-quality white pine and hardwood sawtimber. Forest management should focus on optimizing forest growth. The ideal condition is a large inventory of valuable white pine and hardwood sawtimber, with an abundance of promising mid-aged growth, and excellent forest regeneration (especially pine, oak, birch, and maple).





## **TIMBER VALUATION**

### **VALUATION OF STANDING TIMBER – TOTAL MERCHANTABLE VOLUME**

### **Carolyn Orr Conservation Land Atkinson, New Hampshire**

**Total Forest Area: 49.3± acres**

**October 2013**

<u>PRODUCT/ SPECIES</u>	<u>TOTAL VOLUME</u>	<u>% of VOLUME<sup>1</sup></u>	<u>UNIT PRICE<sup>2</sup></u>	<u>TOTAL VALUE</u>	<u>% of VALUE<sup>3</sup></u>
<b>Sawtimber</b>					
White Pine	216.7 MBF	55.2%	@ \$165/MBF	\$37,755	50.8%
Red Pine	11.6	3.0	\$ 30	348	<1
Black Oak	30.8	7.8	\$100	3,080	4.1
Red Oak	93.7	23.8	\$230	21,551	29.0
Scarlet Oak	3.3	0.8	\$ 30	99	<1
White Oak	23.1	5.9	\$ 50	1,155	1.6
Red Maple	11.8	3.0	\$ 40	472	<1
Shagbark Hickory	1.9	0.5	\$ 20	38	<1
<b>TOTALS</b>	<b>392.9± MBF<sup>4</sup></b>			<b>\$64,498</b>	
<b>Chipwood/Softwood Pulp</b>	<b>2,297± Tons</b>		<b>@ \$ 1.00/Ton</b>	<b>\$ 2,297</b>	<b>3.1%</b>
<b>Firewood/Hardwood Pulp</b>	<b>622± Cords<sup>5</sup></b>		<b>@ \$ 12/Cord</b>	<b>\$ 7,464</b>	<b>10.1</b>
			<b>GRAND TOTAL</b>	<b>\$74,259</b>	<b>100%</b>
			<b>ROUNDED</b>	<b>\$75,000</b>	

<sup>1</sup>% of total sawtimber volume.

<sup>2</sup> Sawtimber prices adjusted to include pallet grade logs.

<sup>3</sup>% of overall value, including logs, pulp, chipwood, and firewood.

<sup>4</sup>Standard Error of the Mean: 69,414 board feet; 90% Confidence Interval ±119,225 board feet.

<sup>5</sup>Standard Error of the Mean: 74 cords; 90% Confidence Interval ±125 cords.

#### **TIMBER VOLUME ESTIMATE NOTES:**

- 1) MBF = One thousand board feet.
- 2) Sawtimber estimate may not include a small volume (5± MBF) of other species – including sugar maple, white birch, and hemlock – that are present on the property but were not sampled in the forest inventory.
- 3) Softwood pulp conversion is 2.2 tons per cord, and it includes white pine, red pine, Scotch pine, and hemlock. Estimate assumes approximately 1 ton of top wood pulp per MBF of softwood sawtimber. Furthermore, all other potential pulp either from full trees or tree top wood tips, is accounted for as chipwood.
- 4) Chipwood estimate assumes 110 tons of total biomass per acre (110 tons/acre – 31.9 tons/acre sawtimber – 31.5 tons/acre firewood = 46.6 tons/acre chipwood/pulp. Therefore, 46.6 tons/acre chipwood x 49.3 forested acres = 2,297± tons).
- 5) As of October 2013, the Orr Lot averages **121.3 trees per acre ≥ 5" diameter at breast height** (90% Confidence Interval: ±21.1 trees per acre) and **129.6 ft<sup>2</sup> of basal area per acre** (90% Confidence Interval: ±19.4 ft<sup>2</sup> of basal area per acre).

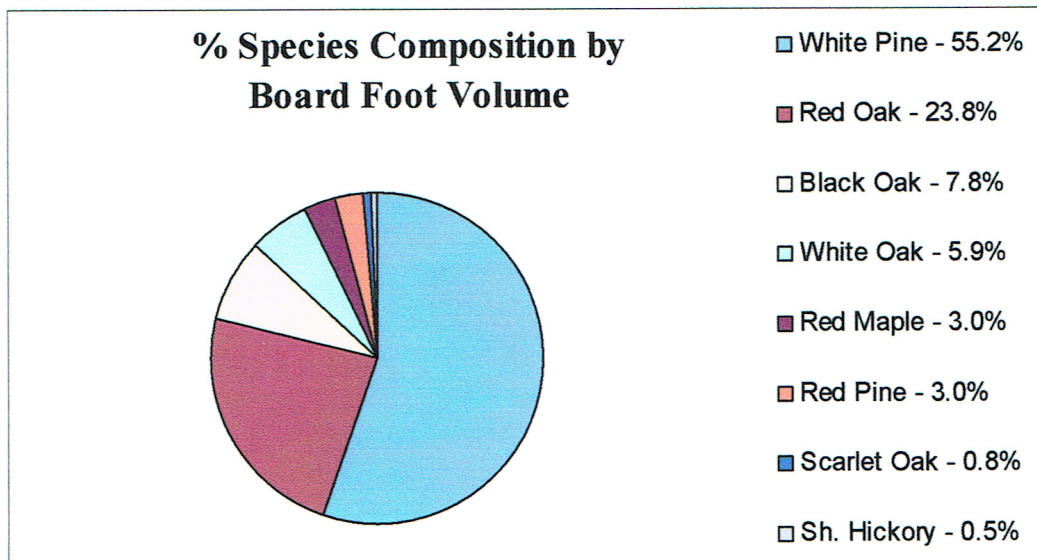
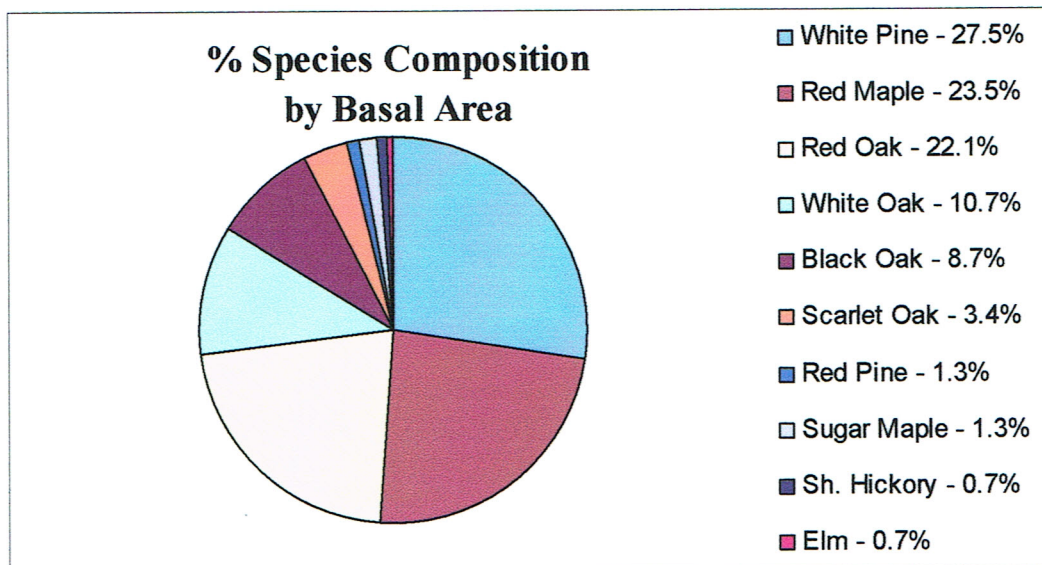


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## SPECIES COMPOSITION

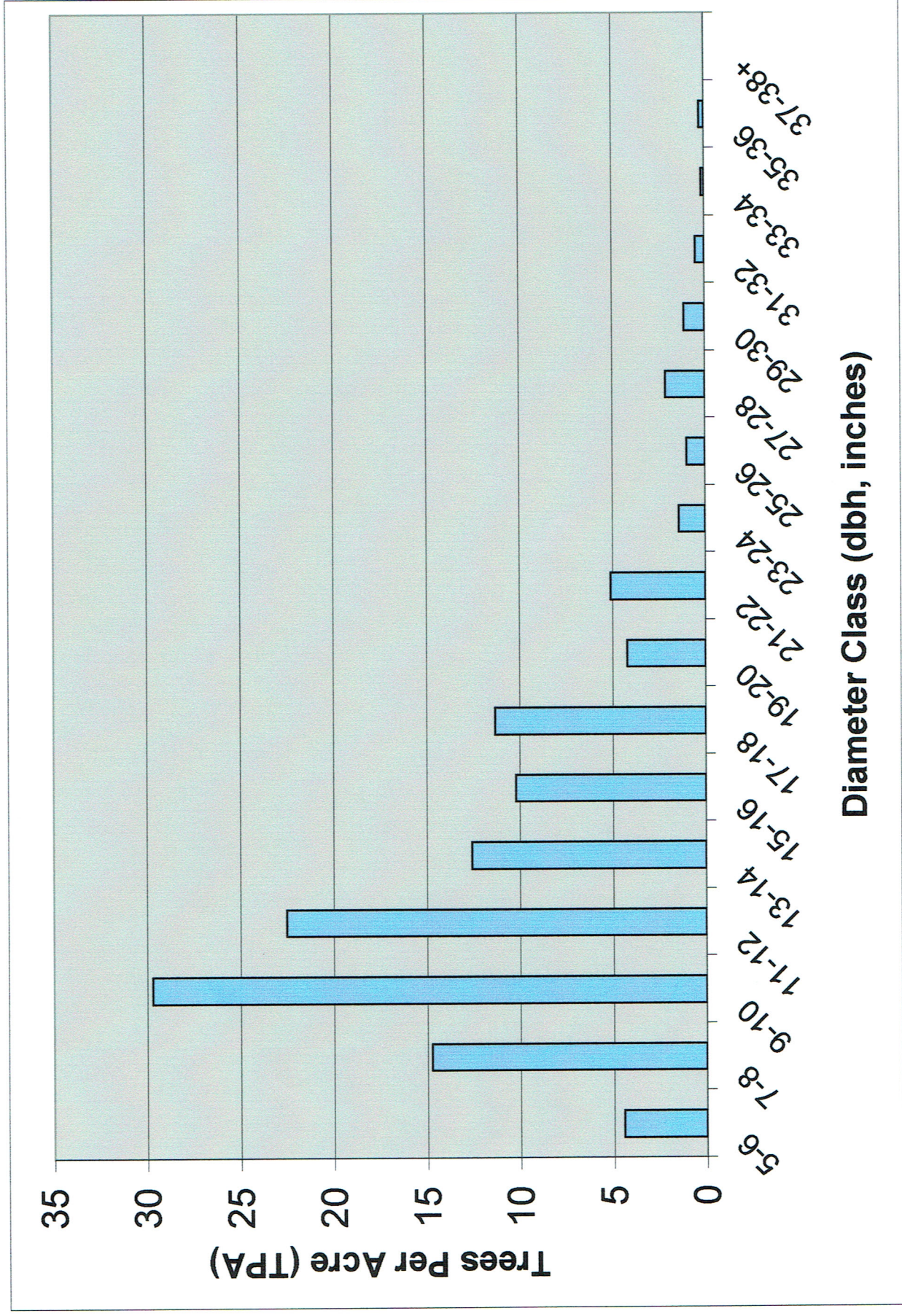
### % Species Composition by Basal Area and Board Foot Volume

#### Carolyn Orr Conservation Land Atkinson, New Hampshire





**Tree Diameter Distribution**  
**Carolyn Orr Conservation Land, Atkinson, New Hampshire**



# **FOREST TYPES & PRESCRIPTIONS**



## FOREST TYPES – INTRODUCTION

The Carolyn Orr Conservation Land varies considerably in forest structure and species composition. Forest types define the distinctive character of various forested areas: A *forest type* represents a homogeneous forest area that results from similar soils, hydrology, land uses, and disturbance history.

Four broad forest types were defined and delineated on the property, some with variants, as part of the forest assessment phase of this management plan. These are illustrated in the “Forest Type Map”, and described in detail in the upcoming pages of this chapter. Descriptions of each forest type explain their distinctive characteristics and natural history. Wildlife values, and ecological and timber attributes for each forest type are also specified. The plan also specifies silvicultural goals for each forest type, with corresponding prescriptions for wildlife and forest management.

Several of the forest types have *variant* areas. Though these areas are broadly similar in species composition or the type of site they occupy, there are differences in the proportions of species, and/or the age and structure of the forest type. Some explanation is made of these variations.

A *stand* is a pocket of a particular forest type, which is located separately from other pockets of the same forest type. In the Forest Type Map, the forest types are delineated as stands with cumulative acreage calculated for each forest type. Silvicultural prescriptions are generally the same for all areas of one forest type, though there are exceptions for inaccessible or variant areas. Though prescriptions vary between different forest types, all forest types/stands within one management area are usually treated concurrently during a harvest, each to their own specification.

Please refer to the “Forest Type Map” for the locations of each forest type.



## **A. White Pine – 3.6± acres**

**Description** – This scenic forest type is distinct because white pine constitutes at least 75% of overstory stocking. The main variant area, primarily white pine, is found as only one small pocket. Many of the pines, having escaped harvesting and major natural disturbance since stand establishment around World War I, are over two-feet in diameter (a few three-feet) and 100± feet in height. A minor “pine” variant, a 40± year old Scotch pine plantation or windbreak, is found along the eastern field edge.



A1) Large diameter white pines are found in the main variant area.



A2) Scotch pine plantation established in the 1960's or 1970's.

### ***Species Composition –***

Primary – White pine.

Secondary – White oak, shagbark hickory, red maple. Scotch pine.

Regeneration (seedlings/saplings) – White pine, red oak, black cherry, sugar maple, ironwood.

***-Continued-***





**Forest Structure – A1) White Pine Main Variant**

<b>Composition</b>	
<b>Stand Structure</b>	Even-aged
<b>Silvicultural Stage</b>	Late-intermediate to mature
<b>Stand Age</b>	90 – 100± years
<b>Tree Size</b>	
<b>DBH range</b>	14 – 48± inches
<b>Mean DBH</b>	20± inches
<b>Avg. Maximum Height</b>	110± feet
<b>Stand Density</b>	
<b>Relative Stocking</b>	Considerable/Dense
<b>Basal Area/Acre</b>	210± sq. ft./acre
<b>Trees per Acre</b>	100± trees
<b>Canopy Closure</b>	90-100± %
<b>Wildlife/Ecological</b>	
<b>Wildlife Features</b>	Pasture pines provide vertical structure. Softwood shade moderates summer temperature extremes. Pine seed are a food sources for squirrels and birds.
<b>Canopy Stratification</b>	Low – well-established overstory with low understory and herbaceous layer.
<b>Woody Debris</b>	Moderate accumulation.
<b>Invasive Plants</b>	Serious invasion of honeysuckle and Japanese barberry

**Forest Type A – White Pine**  
**SILVICULTURAL PRESCRIPTION**

**Objectives** – Favor finest quality, healthiest pines. Create small regeneration openings to initiate the growth of new tree generations, with ultimate goal of developing a multi-aged stand. Over the long-term, convert the Scotch pine plantation to a more diverse species, natural forest.

**Silvicultural Sequence:** Even-aged (present) → Two/Three-aged (2045)

**Harvest Cycle:** 12 – 15± years

**Silvicultural Treatments:**

2014-2015±: A1) *Single-tree/micro-group selection*. A2) *Small group selection* (remove groups of 6+ trees to allow hardwood/pine regeneration).

2026-2030±: A1) *Expanded micro-group selection*. A2) *Expanded groups/Liberation* (of regeneration)

2041-2045±: A1) *Single-tree/ micro-group selection/liberation cut*.  
*TSI: Inter-sapling release /Weeding and thinning* of sapling and pole growth.



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## B. White Pine/Hardwood – 4.7± acres

**Description** – This forest type is characterized as a white pine-hardwood mix, with oak (red, black and white) and hickory as the primary hardwood associate species. Much of the stand has experienced little disturbance over the past 60± years; however, a second age class exists inconspicuously, probably resulting from light disturbance due to past storm events.

### **Species Composition** –

Primary – White pine, red oak, and black oak.  
 Secondary – White oak and shagbark hickory.  
 Regeneration (seedlings/saplings) – Sparse.  
 Shrubs – Witch-hazel.



### **Forest Structure** –

<b>Composition</b>	
<b>Stand Structure</b>	Even-aged w/ scattered two-aged pockets
<b>Silvicultural Stage</b>	Late-intermediate to mature
<b>Stand Age</b>	60±/90–100± years
<b>Tree Size</b>	
<b>DBH range</b>	8 – 34± inches
<b>Mean DBH</b>	16± inches
<b>Avg. Maximum Height</b>	110± feet
<b>Stand Density</b>	
<b>Relative Stocking</b>	Considerable
<b>Basal Area/Acre</b>	120± sq. ft./acre
<b>Trees per Acre</b>	80± trees
<b>Canopy Closure</b>	80–100± %
<b>Wildlife/Ecological</b>	
<b>Wildlife Features</b>	Oaks and hickories provide an excellent mast source. Stands contain substantial snags, cavity trees and woody debris.
<b>Canopy Stratification</b>	Moderate – Dense pockets of witch-hazel shrubs provide some high understory. Well-established overstory w/ occasional supercanopy tree.
<b>Woody Debris</b>	Good accumulation.
<b>Invasive Plants</b>	Low incidence.

**-Continued-**





*Forest Type B – White Pine/Hardwood*  
**SILVICULTURAL PRESCRIPTION**

**Objectives** – Improve pine and oak growth. Initiate natural regeneration of these species, as well as structural development towards a multi-aged stand. Maintain vigilance for invasive plants and remove immediately if found.

**Silvicultural Sequence:** Even/Two-aged (present)→Three-aged/multi-aged(2050)

**Harvest Cycle:** 12 – 15± years

***Silvicultural Treatments:***

2014-2015±: *Improvement cut/Crown thinning.*

2026-2030±: *Single-tree/micro group selection*

2041-2045±: *Single-tree selection/Expanded micro group selection/Liberation cut.*  
*TSI: Inter-sapling release.*



## C. Hardwood – 31.6± acres

**Description** – This forest type represents all stands that are primarily hardwood and has two main variants: C1) covering much of the central/northern portions of the property, underlain by well-drained *Windsor* soils, is dominated upland hardwoods, especially oak. C2) Contains mesic (*moist, well-drained*) hardwoods, typically dominated by red maple. A small area is found in the southeast portion of the property along the railroad tracks, as well as pockets in the northern section along Bryant Pond Meadow.



C1) White oak and red oak dominate composition in this widespread variant.



C2) Red maple typically dominates hardwood stand composition in moist sites.

<i>Species Composition</i>	<b>C1) Upland Variant</b>	<b>C2) Mesic Variant</b>
Primary	Red oak, black oak, white oak.	Red maple.
Secondary	Red maple, sugar maple, shagbark hickory, white pine.	White oak, shagbark hickory, red oak, black oak, white pine.
Regeneration (saplings)	Ironwood, white pine, red oak.	





## Forest Structure –

	C1) Upland Variant	C2) Mesic Variant
<b>Composition</b>		
<b>Stand Structure</b>	Even-aged	Even-aged
<b>Silvicultural Stage</b>	Late-intermediate to mature	Late-intermediate
<b>Stand Age</b>	90-100+years	60 – 100± years
<b>Tree Size</b>		
<b>DBH range</b>	7– 22± inches	6 – 20± inches
<b>Mean DBH (overstory)</b>	15± inches	12± inches
<b>Avg. Maximum Height</b>	80± feet	70± feet
<b>Stand Density</b>		
<b>Relative Stocking</b>	Dense	Considerable
<b>Basal Area/Acre</b>	140 sq. ft./acre	110± sq. ft./acre
<b>Trees per Acre</b>	115± trees	145± trees
<b>Canopy Closure</b>	90 - 100%	90 - 100%
<b>Wildlife/Ecological</b>		
<b>Wildlife Features</b>		
<b>Canopy Stratification</b>	Excellent – understory, midstory, overstory, and supercanopy layers all represented.	Good/excellent
<b>Woody Debris</b>	Moderate/Good.	Good
<b>Invasive Plants</b>	Low incidence of honeysuckle noted.	Incipient infestation of glossy buckthorn.

## Forest Type C –Hardwood SILVICULTURAL PRESCRIPTION

**Objectives** – Develop valuable oak sawtimber. Strongly promote oak and pine regeneration. Improve species mix of saplings, emphasizing valuable hardwoods that are suited to the site, especially oak and hickory, as well as white pine. Retain, enhance wildlife features (cavity trees, mast production).

**Silvicultural Sequence:** Even-aged →Two-/three-aged (2050)

**Harvest Cycle:** 12 – 15± years

### Silvicultural Treatments:

2014-2015±: *Single-tree Selection* to initiate stand regeneration, using elements of *Improvement cut/Crown thinning*.

2026-2030±: *Single-tree/micro group selection /Liberation cut.*  
*TSI: Inter-sapling release, as needed.*

2041-2045±: *Single-tree selection /expanded micro groups/Liberation cut.*  
*TSI: Inter-sapling release /Weeding and thinning of sapling and pole growth.*



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## **D. Forested Wetlands – 8.3± acres**

**Description** – This forest type encompasses the forested, poorly- and very poorly-drained soil areas on the property. These wetland sites tend to be dynamic. Tree roots are generally confined to the soil surface; trees are thus exposed to tip-ups or full blowdown during storms. Young forest growth and/or dense wetland shrubs then fill the openings.

In general, the high water table soils preclude the use of equipment, thus the wetland interiors are recommended for reserve status without active management. Wildlife openings or thinnings can be created on the wetland edges, if accessible, however.

Serious incursion of exotic, invasive plants is found in areas, especially in southern sections of the lot. Invasives include: Japanese barberry, multiflora rose, Oriental bittersweet and glossy buckthorn. Attention should be paid to controlling pockets of invasive plants while plants are still in manageable numbers.



### ***Species Composition –***

Primary – Red maple, American elm.

Secondary – White pine, yellow birch.

Shrubs – Highbush blueberry, spicebush, winterberry holly,

## ***Forest Type E – Forested Wetland*** **SILVICULTURAL PRESCRIPTION**

**Objectives** – Harvest along forested wetland edges, if accessible to salvage valuable timber and enhance habitat. Small openings will promote the growth of wetland shrubs with good wildlife attributes. Control/eradicate invasive plants. Designate wetland interiors and sensitive areas as reserves.

**Silvicultural Sequence:** Even-aged to multi-aged (present condition)→Multi-aged (2045±)

**Harvest Cycle:** 12– 15± years

### ***Silvicultural Treatments:***

2014-2015±: *Single-tree selection and micro/small group openings* along wetland edges, where accessible without ground impact. The objective of thinning is to increase sunlight to understory shrub cover, thereby improving fruit production of blueberries, winterberry holly, and viburnums. *No treatment* on remaining areas.

2026-2030±: *Similar treatment.*

2041-2045±: *Similar treatment.*





## **APPENDICES**

## Photo Log: Carolyn Orr Conservation Land



*The Conservation Commission might consider installing a “pet waste station” – like this one in the Town of Exeter.*



*The property’s field will serve as the staging area for the upcoming forest improvement harvest.*



*The old mill site along Bryant Brook should be protected.*



*The property’s vernal pools (pictured dry in September 2013) provide important habitat for amphibians & reptiles.*





## FOREST INVENTORY SPECIFICATIONS

### Carolyn Orr Conservation Land Atkinson, New Hampshire

The Carolyn Orr Conservation Land, comprising 64.3± acres (**49.3± total productive, forested acres**), was cruised using the variable-radius plot sampling technique in November 2012. Data were collected from 23 prism points arranged in a grid pattern covering the forest. The average sampling intensity was 1 sample point per 2.14± forested acres. Aerial photos and reconnaissance of the property were employed to delineate forest types into 1 stratum for statistical purposes.

A summary of inventory and statistical specifications follows:

- 1) Statistical error around the total sawtimber volume estimate: 69,414 BF  
(Total sawtimber includes grade logs, veneer, and pallet logs of all species).  
392,841 Board Feet ± 119,225 BF (90% Confidence Interval)
- 2) Statistical error around the total firewood volume estimate: 74 cords  
622 cords ± 125 cords (90% Confidence Interval)
- 3) Confidence level: 90%
- 4) Sample plot layout
  - a. Systematic sample
  - b. Spacing: 300' x 300' grid
- 5) Plot type and number: 23 prism plots
- 6) Number of strata: 1
- 7) Angle-gauge: 20-factor prism
- 8) Tree scaling/grading specifications:
  - a. Diameter: All merchantable trees > 5 inches DBH measured
  - b. Stem DBH measurements: 1 inch increments
  - c. Top diameters (merchantable heights)
    - Firewood – 4", straight stem
    - Sawtimber: White pine: 8 inches  
Other softwoods: 10"  
Hardwoods: 10"
  - d. Grades:
    - Veneer (ash, birch, maple, and oak)
    - Grade sawlogs (Hardwood and softwood)
    - Pallet logs (Hardwood and softwood)





## 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:** 2013-03-01

**Re:** Review by NH Natural Heritage Bureau of request dated 2013-02-22

**NHB File ID:** 1451

**Town:** Atkinson

**Project type:** Landowner Request

**Location:** Westville (Tax Map 5, Lots 35, 48 & 67)

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): **None**

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

	Last Reported	Listing Status		Conservation Rank	
		Federal	NH	Global	State
<b>Vertebrate species (For more information, contact Kim Tuttle, NH F&amp;G at 271-6544)</b>	1984	--	SC	T5	S3
Redfin Pickerel ( <i>Esox americanus americanus</i> )					

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.

A negative result (no record in our database) does not mean that no rare species are present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

**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.**



**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-three 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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