

Howard B. Field Forest

Forest Stewardship Plan

Connecticut Forest and Park Association

November 2014 Update



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Executive Summary

“Towering tulip poplars, shaded woodland trails, a vernal pool brimming with aquatic and amphibian life, streams harboring fish, wild turkeys, red-eyed vireos and pileated woodpeckers, views of the trap-rock ridge, magnificent specimen trees and more than a million board feet of sawtimber – all of these elements are present on the 152-acre Field Forest in Durham, Connecticut.”

This wonderfully descriptive statement is the opening line in Adam R. Moore’s 2004 Stewardship Plan for this remarkable forest. The sentiments expressed are equally valid today and convey the sense of wonder and appreciation that most people – and, without exception all the foresters who have visited the place – come away with. The Field Forest is an aesthetically impressive, maturing hardwood forest that is ideally suited to provide the public with passive recreation and forest management educational opportunities for generations to come.

The Field Forest is owned by the Connecticut Forest & Park Association, Inc. (CFPA), a private non-profit conservation organization founded in 1895. The Forest was generously given to the Association by Howard Brigham Field, Jr. in his will. Mr. Field died on January 11, 1999 and the property was formally conveyed to the Association via a Certificate of Devise from the Court of Probate, District of Middletown, dated October 24, 2001.

The 152 acres of the Field Forest are located almost directly in the center of the rural Connecticut town of Durham. The Forest has extensive frontage on Bear Rock and Higganum Roads and includes a deeded right-of-way over an old cart path on private land to Fowler Avenue. The land is also easily accessed at the end of Guire Road and at the northeastern corner of the parking lot for Coginchaug Regional High School. There are two points on Bear Rock Road where improved trailheads link up with a series of existing wood roads. The Field Forest abuts the Cockaponset State Forest, agricultural land that has been conserved through the State of Connecticut purchase-of-development-rights program, land of Regional School District 13, a commercial horse stable and residential land. The location of the property and its trail system make it a destination in and of itself for walkers and explorers.

Trees completely cover the Field Forest. Dominant species include tulip poplar, sugar maple, red maple, red oak, black oak, white ash, hickories, and American beech. A baseline forest inventory was conducted in 2002 and has recently been updated by a Connecticut certified forester and lifelong Durham resident. Nearly 2 million board feet of sawtimber are estimated to be present on the Field Forest. Immediate plans for the property include two thinnings that will generate

marketable sawtimber and fuelwood.

This management plan makes provision for the passive recreational use of the land as well. By the will of Mr. Field, his heirs are allowed to hunt on the property. Several members of the Field family hunt white-tailed deer each year and two members – grandsons of Howard – currently serve as property stewards. This plan calls for the improvement of existing trails, the establishment of new ones, and the closing of those that are unauthorized. The public is allowed to enter the property to walk, ski and observe nature on designated trails. Signs and maps are posted at property entrances. Certain trail projects and other management activities will require the approval of the Durham Inland Wetlands and Watercourses Commission. Except for management and emergency purposes, no access to the Field Forest by motorized vehicles will be permitted, and violators will be reported to the Resident State Trooper.

Natural resource education and forest management demonstration are important parts of the mission of CFPA and the Field Forest is an excellent place to conduct such programs. The educational value of the property is especially great due to its proximity to the high school, middle school, and an elementary school of Regional School District 13. CFPA plans to work closely with local schools to develop programming focused on forest education. For the demonstration forest CFPA will use the context of a small, privately owned woodlot so that the management practices and programs are relevant and transferrable to the private forest owners CFPA hopes to influence.

Implementation of this 10-year plan will begin following approval by the Association Board of Directors.

Acknowledgements

CFPA gratefully acknowledges the following volunteers for their assistance in the preparation of this plan:

Rob Butterworth, CFPA Director and Forest & Trail Conservation Committee member
Dan Donahue, Certified Forester and Forest & Trail Conservation Committee Chairman
Dan Evans, Certified Forester
Emery Gluck, Certified Forester and Forest & Trail Conservation Committee member
Josh Miller, Certified Forester

CFPA also thanks former Executive Director, Adam R. Moore, and current staff members Lindsay Suhr and Clare Cain, for their contributions to this updated plan.

Most of all, the Association thanks Howard Brigham Field, Jr. for his very generous donation of this beautiful 152-acre forest to the Association for permanent conservation. The Association also expresses its gratitude to Mr. Field's family, with special thanks to David Field and Howie Field for their assistance, and to Jonathan Field for his assistance with this aspect of his father's estate.

I. Introduction

The Field Forest is located on Bear Rock and Higganum Roads in the Town of Durham, Connecticut in Middlesex County. It consists of 152.3 acres of woodland found at roughly 41°28'30" N latitude and 71°40' W longitude. The property is Lot 1 on Durham tax assessor's parcel Map 50. (See Location Map, Appendix a).

The Field Forest is named after Howard Brigham Field, Jr., who willed the property to CFP. Mr. Field died on January 11, 1999, and the land was conveyed to the Association on October 24, 2001. The Association owns the Field Forest in fee simple.

This Forest Stewardship Plan includes information about the flora and fauna, geology, soils, geography, hydrology, ecological processes, etc., a number of associated maps portraying the natural features of the Forest in the Appendices, and a forest management strategy to maintain diversity and vigor and reduce tree hazards along the Blue Trails. Finally, the Schedule of Management Practices section provides a timeline of the stewardship work for the next ten years.

This plan was approved by the Forest & Trails Conservation Committee on _____ and the Board of Directors of the Connecticut Forest & Park Association on _____.

II. Landscape Context

The Field Forest grows in a geologic transition area between the granitic bedrock that predominates in the eastern Connecticut highlands and the rich, fertile sandstone soils of the central valley. Although the soils underlying the Field Forest were not quite good enough to remain in farm use to this day, they are among the best in the state for forest growth (See Soils Map, Appendix b).

This is also a transition area between two significantly different, underlying land covers – forest and farm. Field Forest abuts the west side of a large portion of the Cockaponset State Forest and the leading edge of the largely forested Eastern Connecticut Highlands. This east side of Durham is home to several tracts of the Cockaponset State Forest and Millers Pond State Park. These public woodlands and the Field Forest are the largest, least fragmented forests in the town of Durham. Examination of widely available satellite images shows how much of the privately owned woodland in Durham has been dissected by roads and perforated by development, representing a substantial increase in the amount of suburban edge habitat, which has come at the expense of shrinking forest interiors (See Aerial Map, Appendix c). In contrast, the central part of Durham, beginning at

the western edge of the Field Forest, is a mix of farms and woodlots with farmland being the predominant land-cover here for many years (see Open Space and NDDDB Map, Appendix d).

Field Forest is a short distance from Durham Center and the Rte. 17/77 commercial corridor that bisects the town from north to south. Durham is still a very rural town but it is becoming more suburbanized. The population numbers about 6,500 and has been increasing, especially in the past few decades. The proximity of the Field Forest to the center of town, to residential development, and to the schools enhances its potential as a public recreation resource (See Location Map, Appendix a).

Field Forest lies on a height of land that drains directly into three headwater streams - Herzig Brook, Allyn Brook and Fowler Brook. These coalesce into White's Brook that soon joins the Coginchaug River on its way to the Connecticut River and Long Island Sound (See Topographic and Hydrologic Map, Appendix e).

III. Management Objectives

1. Demonstrate uneven-aged silviculture in a maturing, late successional, mixed-hardwood forest.
2. Prevent the colonization of the property interior by invasive, non-native plants.
3. Improve the Blue Trail system to increase public enjoyment and introduce authorized use by local equestrians.
4. Improve programmatic outreach at trail heads and kiosks.
5. Engage with all potential stakeholders, especially the local schools, to initiate educational programming focused on multiple-use forest management.
6. Maintain and improve relations with neighboring property owners.

IV. Forest Resource Inventory

a. Physical Characteristics

1. Geology and Soils

The Field Forest consists of 16 types of soil which are depicted on the Soils Map (See Appendix b). Thorough descriptions of each soil type are included in the 2003 Environmental Review Team report on file at CFPA. The soil information was prepared by Richard Kszystyniak of the USDA Natural Resource Conservation Service. Below are listed the different soil types of the Field Forest. Generally the soils can be characterized as good or very good (Soil Conservation Service, 1979).

The vegetation present on the Field Forest – tulip and sugar maple and spicebush – attest to a fertile soil that retains moisture. Even black cherry, a tree that is not normally observed to grow well in Connecticut, has good form on the Field Forest (See Soils Map, Appendix b).

Branford Silt Loam, 3-8 percent slopes
Ellington Silt Loam, 0-5 percent slopes
Ludlow Silt Loam, 0-3 percent slopes
Ludlow Silt Loam, 2-15 percent slopes, extremely stony
Ludlow Silt Loam, 2-8 percent slopes, very stony
Ludlow Silt Loam, 3-8 percent slopes
Manchester Gravelly Sandy Loam, 15-45 percent slopes
Manchester Gravelly Sandy Loam, 3-15 percent slopes
Pootatuck Fine Sandy Loam
Walpole Sandy Loam
Wethersfield Loam, 15-25 percent slopes
Wethersfield Loam, 3-8 percent slopes
Wethersfield Loam, 8-15 percent slopes
Wethersfield Loam, 8-15 percent slopes, very stony
Wilbraham and Menlo Soils, Extremely Stony
Wilbraham Silt Loam

About 60% of the soils on the forest are either **Prime Farmland Soils** (37.56± acres) or **Statewide Important Farmland Soils** (54.38± acres). By definition farmland soils in Connecticut include land that is defined as prime, unique, or farmland of statewide or local importance based on soil type, in accordance with the Code of Federal Regulations, CFR title 7, part 657. *Prime Farmland* soils are soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oil seed crops, and are also available for these uses (the land could be cropland, pastureland, range-land, forestland, or other land, but not urban built-up land or water). It has the soil quality, growing season and moisture supply needed to economically produce sustained high yields or crops when treated and managed, including water management, according to acceptable farming practices. *Statewide Important Farmland Soils* fail to meet one or more of the requirements of prime farmland, but are important for the production of food, feed, fiber, or forage crops. They include those soils that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods.

2. Topography

The elevation of the Field Forest ranges from 460 feet above sea level, at the southeastern corner of the property, to 230 feet at the northwestern corner of the property. The eastern section of the property is a topographical feature known as a drumlin. A drumlin is a “spoon-shaped,” rounded hill with an orientation of north to south. As are so many features of the Connecticut landscape, drumlins are glacial features and are known as good agricultural land. The western peninsula of the Field Forest inserts itself between agricultural fields to the north and south, over which one enjoys good near-distance views of these open fields and good long-distance views to the western ridge containing Trimountain, Beseck Mountain and Mount Higby. The Forest features a number of valleys, some of them with rather steep sides, through which flow streams. Indeed, these streams often find their source in the creases and folds in the land of this Forest. Steep areas pose special considerations for trails and logging (See Topographic and Hydrologic Map, Appendix e).

3. Hydrology

The Topographic and Hydrologic Map and the Soils Map depict the location of wetlands and wetland soils on the Field Forest. These areas include several streams, a vernal pool, wooded wetland swamps and areas of wetland soils. Certain activities in these areas are subject to the jurisdiction of the Durham Inland Wetlands and Watercourses Commission. The property contains four significant streams – two that drain into Herzig Brook, a third that drains into Allyn Brook, and a fourth that drains into Fowler Brook. All of these ultimately flow into the White’s Brook, thence the Coginchaug River, and eventually the Connecticut. The property has at least one prominent vernal pool that is visible on aerial photographs. It is located roughly in the center of the property. It occupies a saddle in the landscape, and seems to be the headwater for streams that emerge some distance away and flow both north and south. There are a number of saddles in the land, from which water flows in either direction. There are also various wet areas, and areas of wetland soils, that form the headwaters for a number of streams. A review of the wetland resources and a set of recommendations were compiled by Wendy Goodfriend of the Middlesex County Soil & Water Conservation District, as part of the 2003 Environmental Review Team report.

A number of culverts empty into the property along Bear Rock and Higganum Roads. Some service storm drains, others allow streams to flow beneath these roads and onto the Field Forest. There is a large cracked, concrete culvert on one of the trails on the Field Forest itself. This culvert services the largest stream on the property, one that is a tributary to Herzig Brook.

The vernal pool on this forest lies in the north central portion of the property. Vernal pools are small bodies of standing fresh water that are most easily identified during the spring of the year; they are usually temporary in nature. Vernal pools derive their name from *vernalis*, the Latin word for spring because they result from various combinations of snowmelt, precipitation, and high water tables associated with the spring season. For a vernal pool to exist there must be a source of water and an enclosed basin which traps the water for some period of time. The depressions may be natural or of human origin, dry out most years and, most importantly, do not support populations of fish. In order to meet the strict definition of a vernal pool, a wetland must have the following physical characteristics: a) contain water for approximately two months during the growing season; b) occur within a confined depression or basin that is not part of a perennial watercourse; c) lack any fish population; and d) dry out most years, usually by late summer.

4. Scenic Qualities

The Field Forest offers several viewpoints to the visitor. The most impressive are the long-distance views of the traprock ridge to the west. These views are best enjoyed from the western peninsula of the Forest, and are somewhat expanded in winter when foliage is not present to block portions of the view. This peninsula also offers pleasant views of agricultural fields to the south and north. Other views on the property are all interior woodland views, many of them quite striking. Some paths lead the walker to the edge of steep valleys, others to the base of towering tulip poplars or red oaks, still others to vernal pools and streams. In autumn, the entire Forest is clad in the brilliant autumn colors of orange, scarlet and gold.

5. Ecological Processes

The dominant ecological process occurring at the Field Forest is that of forest succession. Stone walls, cedar posts and remnants of wire fencing indicate that the

property was once agricultural land. The land was abandoned as agricultural land, probably at the end of the 19th century, and subsequently grew into forest. The forest has had at least two commercial logging operations in the 20th century, one in 1942 and one in 1958 (Naples 2003). The forest can generally be described as a maturing, even-aged mixed-hardwood forest. It is possible that certain areas of forest were abandoned later than others. The presence of a few dying eastern red cedars leads to the conclusion that the western portion of the property was most recently abandoned as agricultural land.

b. Biological Characteristics

1. Vegetation

The Field Forest is a remarkable example of the capacity of the land to produce a species-rich, vibrant forest environment with outstanding habitat values and great aesthetic appeal. Rich soils, beneficial management history, and patience have resulted in a very well stocked forest with a diverse mixture of tree species and a variety of long-term management opportunities.

The forest is generally well-stratified, with several different height-classes of vegetation ranging from herbaceous plants and shrubs in the forest understory to the tallest canopy trees overhead. Evaluations of habitat for forest songbirds commonly assess vegetative density within these height categories to predict habitat utilization. Similarly, forest composition and structure are the result of the successional pathways dictated by human and natural disturbance. In general, sustaining multiple layers of live canopy will benefit wildlife habitat, aesthetic, and forest management objectives for this remarkable woodland.

The forest composition encompasses examples of unique natural communities. These forest communities support assemblages of species commonly found in different forest types. Oak-tulip poplar sawtimber occurs in the southern and central portions of the property on deep, loamy, well-drained soils which are very productive for forest growth. This type supports both northern red and black oaks along with tulip poplar, American beech, white ash, black birch and yellow birch. This tree species diversity is attributed to soil productivity, aspect, and a history of natural canopy-gap formation and replacement.

In northeastern sections of Field Forest, exposure is oriented to more of a north-northeast aspect, resulting in a cooler, moister micro-climate. This area produces more sugar maple, tulip-poplar, white ash, and red maple than the west-facing slopes described previously. Best described as a rich mesic forest community, sugar maple will constitute a long-term competitor in this multi-aged stand. A portion of this area is currently used as a sugar-bush by a local syrup producer. Christmas fern and trout lily are common herbs, further evidence of the moist, rich growing conditions.

The landscape is truncated with blocks of Wilbraham & Walpole soils which occur in low-lying perched depressions and support occurrences of red maple-white ash-tulip forest. These poorly drained forested wetlands meander through the valleys and between upland ridges with the most expansive wetland corridor consisting of about eight-acres.

2. Forest Stands

A forest stand is a contiguous area of forest vegetation sufficiently uniform in species composition, age, management history, site-quality, or accessibility to be reasonably managed as a unit. It is the basic unit of management in silviculture. Stands can vary widely in size occurring as small as a few acres to as large as several hundred acres. The boundaries of a forest stand can be gradual or quite abrupt. Transitions in forest composition attributed to soils or management history could constitute a gradual stand boundary, where streams, wetlands, or ledges would constitute one that is more abrupt. Management prescriptions are applied and carried out at the stand-level, although harvests commonly encompass more than one stand. Descriptions of the three main forest stands identified across the Field Forest were developed based on inventory information collected in 2014 and subsequent evaluations by several state-certified foresters.

Stand 1: Even-aged Mixed Hardwood Sawtimber

Occurring in the northeast corner of Field Forest, the canopy of this 27-acre stand is dominated by sugar maple, tulip-poplar, red maple, American beech and white ash. Other species occupying co-dominant to intermediate canopy positions include black birch, white oak, hickory, black oak and red oak. Black cherry and yellow birch are also present but at low frequencies. Twenty-two percent (22%) of basal area is sugar maple, which competes as part of at least two distinct age-classes. Red maple

and tulip poplar each make up 12% of the basal area, with tulip occurring as a super-dominant component of the upper canopy. A moist site sloping to the north-northeast, soil productivity and aspect dictate the rich-site composition which is further indicated by a presence of Christmas fern and trout lily in the understory. The overall prevalence and age-class diversity of sugar maple suggests it may play a significant role in stand development for decades to come. Although management may promote sugar maple due to its competitive advantage on this rich site, and a 6-acre portion is currently utilized by a local syrup producer, sap-production is not an overriding objective for this stand.

Eighty-two percent (82%) of the basal area is sawtimber, from 12" to 30" DBH. Merchantable sawtimber comes to 8,340 board feet per acre, or a total of about 225,180 BF. Using the Southern New England Stumpage Price Survey (2nd quarter 2014), an ongoing endeavor of the University of Massachusetts, the sawtimber in Stand 1 is valued conservatively at \$20,000. The significant difference in per-acre value between Stands 1 and 2 is attributed to the relatively low volume of oak sawtimber in Stand 1.

Stand 2: Even-aged Oak-Tulip Poplar Sawtimber

This stand occupies 120 acres of Field Forest. Although the overstory is dominated by red oak, black oak and tulip poplar sawtimber, it is well stratified and there are a variety of other native trees present that substantially increase the species richness of the forest. Red maple, American beech, black birch, hickory and white ash sawtimber and poletimber, with a few co-dominant exceptions, generally occupy intermediate and suppressed portions of the canopy. There are also low numbers of scarlet, chestnut and white oak, yellow birch, sugar maple, sassafras and black cherry. One third of the total 145 square feet of basal area is composed of red and black oak, much of it in larger sawtimber size classes > 19" DBH. As is typical when these two oak species compete for growing space, the red oaks have been noticeably more successful; occupying superior canopy positions, accumulating more wood volume, and possessing superior vigor.

Eighty-five percent (85%) of stand basal area is classified sawtimber, ranging from 12" to 36" DBH. The aggregate volume of merchantable sawlogs is a remarkable 13,743 board feet per acre. Of this total, forty-five percent (45%) - over 6MBF/acre - is either red or black oak. The total volume of sawtimber in Stand 2 is approximately 1,650,000 BF. A conservative estimate of the market value of this

timber has been derived from the Southern New England Stumpage Price Survey. Using the reported median prices paid for sawtimber stumpage west of the CT River during the second quarter of 2104 (the most recent figures available), the sawtimber in Stand 2 is valued at \$166,000. However the actual value is likely much higher because the median price reported for red oak is only \$200/MBF, with a range of \$200-\$700. The red oak on Field Forest is most definitely more valuable than the median price. Using a stumpage value of \$400/MBF for red oak, a reasonable assumption in this case, the estimated aggregate stumpage value of the stand increases to \$246,000.

Stand 2 has been divided into four sub-units to account for varying site conditions and management logistics. In particular, variation in site quality and the presence of wetlands and watercourses, as well as some areas of moderate to heavy invasive plant infestation, have led to the delineation and description of the following stands.

Stand 2A: This sub-unit occurs near the center of the property and is dissected by Stand 3 and the vernal pool, creating two distinct operational areas. Portions of 2A that lie between Stand 3/vernal pool and the western property boundary are less accessible for harvesting and may be maintained, in conjunction with the bordering wetlands, as an ecological reserve. Access to this area from Bear Rock Road is excellent. Several marked walking trails dissect the stand and will require special consideration during harvest operations. Black oak is more prevalent than red oak in this area, which is characterized by well-drained loams throughout and sandier loams near the top of the ridge. Moderately productive for a stand of this elevation, white ash, red maple, hickory, and beech are present in the mix of species. White ash occurs here at a higher density than elsewhere on the Field Forest. The understory and mid-canopy layers are moderately well-developed with added competition from native shrubs and saplings.

Stand 2B: This sub-unit occurs at the southeastern corner of the property. The terrain descends sharply to the west where the stand is bordered by two perennial watercourses. Red oak is dominant here with impressive individual trees measuring over 30" DBH. These loamy soils have relatively high moisture-holding capacity which, in conjunction with the steep slopes, results in difficult harvest operational conditions. Logging on this site could result in significant soil compaction with the potential for more severe impacts, depending on weather conditions, timing, type of logging equipment and the skill level of the personnel.

Stand 2C: This subunit occurs in the southernmost portion of the property along Higganum Road. Despite the road frontage, the stand is inaccessible from the town road due to the topography. The northern boundary of the stand is along Birch Mill Brook and characterized by the steep slopes which occur on either side of the brook, largely preventing a stream crossing. Forest characteristics are most similar to stand 2B with notably impressive red oak occurring in the large-sawtimber size-classes. Due to the sensitivity of this area, and the desire to protect water resources both on Field Forest and downstream, this stand will be maintained as an ecological reserve

Stand 2D: This subunit is geographically isolated in the northwestern corner of the Field Forest. It is established as a stand-alone management unit due to its location on the far side of an intermittent watercourse (Herzig Brook) and its relatively high density of invasive plants. Given the invasive plant populations and overall proximity to edge habitat, this area is currently a lower priority for timber management. This may change as efforts to control invasive plants are ramped up.

Stand 3: Deciduous Forested Wetland

Most of this stand is comprised of the 6-acre swamp that dissects Stand 2A. However there are also small occurrences of this wetland forest type that dot the topography of the Field Forest and defy conventional map-delineation. These topographical depressions have soils with higher percentages of silt textures and low relief resulting in poor drainage. They function by retaining excess surface waters, filtering and retaining sediment and providing wildlife habitat. Tree species composition is dominated by red maple and white ash, with lower occurrences of tulip poplar, black birch, sugar maple and American beech. When thinnings are conducted in adjacent stands, consideration will be made for preventing any significant impact to the physical or functional values of these wetlands.

3. Wetlands & Vernal Pool Wildlife

The vernal pool on this forest is considered an important ecological feature and educational resource that is worthy of careful stewardship. Vernal pools provide habitat that is critical to the survival of many species of amphibians and reptiles including frogs, toads, salamanders and turtles that use them for mating and breeding. Many aquatic insects and other invertebrates are also dependent upon them, especially fairy shrimp. Spotted turtles, spring peepers, green frogs and other

animals can also often be found in and around these unique wetlands. Turtles known to use vernal pools include the snapping turtle (*Chelydra s. serpentina*), painted turtle (*Chrysemys picta*), and spotted turtle (*Clemmys guttata*). They may use the pools to breed but lay their eggs on land. Pools may also provide seasonal foraging habitats for these turtles. The fauna that use vernal pools in turn may be preyed upon by other animals higher on the food chain. For example, during the peak amphibian breeding period it would not be unheard of to find a red-shouldered hawk or great blue heron attempting to take advantage of a vernal pool's seasonal bounty of specialized food.

The vernal pool involves a series of interactions between plants and animals from both terrestrial and aquatic habitats. Certain deciduous trees and shrubs adapted to seasonally flooded soils grow around the edges of the pool. Each fall their shed leaves collect on the bottom of the pool depression. Fungi and bacteria go to work consuming and breaking down this leaf litter. When the pool fills with water in the spring, this partially decomposed organic material becomes a principal source of nutrients for macro-invertebrates including mollusks, crustaceans, and a host of insects. These macro-invertebrates are in turn consumed by salamander larvae, reptiles, frogs, toads, some birds, and each other. Species such as fairy shrimp and mosquito larvae are especially important food sources for amphibians that depend entirely on vernal pools for breeding and early development. These amphibians then become sources of biomass throughout the surrounding forest ecosystem.

Some amphibian and invertebrate species rely entirely on vernal pools for breeding and early development. These are referred to as obligate vernal pool species. Among the obligate amphibians are three salamanders, a frog, and a toad. Several mole salamanders, so-called because they spend much of their lives underground except for a short breeding period, are the spotted salamander (*Ambystoma maculatum*), Jefferson salamander (*Ambystoma jeffersonianum*) – a Connecticut Special Concern species, and marbled salamander (*Ambystoma opacum*). The spotted and marbled salamanders are more common and evenly distributed throughout the state, while the Jefferson salamander is more limited in distribution. The wood frog (*Rana sylvatica*) and the Connecticut Endangered eastern spadefoot toad (*Scaphiopus h. holbrookii*) are also thought to be entirely dependent on vernal pools for successful breeding. The principal obligate macro-invertebrates of interest in Connecticut are the fairy shrimp. Crustaceans about an inch long and orange in color, they glide gracefully along while lying on their backs. They hatch when the

pond fills during early spring rains, grow, breed, and die. Fairy shrimp do not exist in permanent bodies of water.

Because vernal pools are often small and isolated from other wetlands, as well as, dry much of the year they can be easily overlooked and inadvertently damaged or destroyed. Efforts to identify and protect vernal pool wetlands in New England have increased substantially in recent decades. The Connecticut General Assembly passed legislation in 1995 (i.e. Public Act 95-313) which gives municipal inland wetland agencies explicit regulatory authority over “vernal and other intermittent watercourses” as part of Connecticut’s Inland Wetlands and Watercourses Law.

4. Other Wildlife Benefits

In general the Field Forest, by virtue of its existing species richness and stratified canopy, provides good wildlife habitat, especially for species that prefer forest interiors. The management goals presented here, and the silvicultural practices designed to achieve them, will tend to augment and sustain these desirable attributes by adjusting tree and shrub species composition, improving vigor and accelerating the variability of vertical structure.

The Field Forest has certain habitat attributes that are worthy of special consideration as harvesting practices are implemented. The quantity and quality of large snags and den trees is currently very good. Many of these can be attributed to the natural disturbances that have helped shape this forest. The ice storms, hurricanes, blizzards, insects and other events that have passed this way have caused severe structural damage to some trees. Although most trees recover from these events largely unscathed, some are killed and still others are so severely damaged that they retain the obvious signs of broken tops and limbs, abundant wood decay organisms, hollow trunks, decline and mortality. Other dead trees have simply been out-competed or have succumbed to insect or disease. These large snags and den trees provide important nesting, escape and winter cover, in part because they are large enough to suit some of the larger mammals and woodland birds, especially raptors.

Snags also provide an excellent source of insect protein for many birds, from the primary excavators like wood peckers to the other birds that derive some of their nutritional needs from the myriad of insects that occupy a declining, decaying tree.

These habitat values must be balanced with legitimate safety concerns for the public using the Blue Trails and for the people engaged in the harvest.

Also, a major source of wildlife food in an oak-dominated forest is acorns (e.g. hard mast). Three species that are well represented here are red, white, and black oak. Some of the superior oak phenotypes are capable of periodically producing significant crops of acorns. Collectively acorns and nuts (i.e. hickory, hazel, American beech) are among the most important sources of nutrition for many species of wildlife. Some species that depend on acorns and other hard mast include ruffed grouse, wild turkey, red-headed woodpecker, blue jay, squirrel, chipmunk, gray fox, black bear, striped skunk, and white-tailed deer.

Red oaks are significant for their ability to produce large quantities of acorns. The relatively large size of the acorns also contributes to their value. Moderate to good red oak acorn crops generally occur once every two to five years. It is worth noting that not all the red oak trees in any given area will produce acorns equally well. Dominant or co-dominant trees with large, un-crowded crowns seem to be most productive. However, some trees are always good producers while others are always poor producers.

White oaks, unlike the other oak species listed, require only one growing season for acorn maturation. This species is also unique because its acorns germinate in the fall, enhancing the tree's ability to reproduce itself despite the foraging of deer, turkey and other acorn-consuming animals (not to mention insects). White oak acorns are considered the most palatable to wildlife due to their relatively low concentration of tannin.

Black oaks can be consistent seed producers, bearing moderately good acorn crops as often as once every two to three years. As with the red oaks, some individual trees are always able to produce good crops when conditions are right, while other individuals are not. Black oaks are thought to reach their peak seed production between the ages of 40 and 75.

CFPA is collaborating with the National Audubon Society and its "Foresters for the Birds" program. Following the completion of a breeding bird survey, which the Association has requested, the findings will be incorporated into the plans for silvicultural treatments and public education.

5. Endangered Species

A review of the Field Forest conducted by the Eastern Connecticut RC&D Environmental Review Team in 2001 included a search of the Department of Energy & Environmental Protection Natural Diversity Database (NDDDB) to see if any species listed as endangered, threatened or of special concern have been observed on the property. No such species were listed in the database. In 2014, there are still no species listed on the property in the Natural Diversity Database, but nearby properties have species listed so it is possible that some do exist (See Open Space and NDDDB Map, Appendix d). If a listed species is found it should be reported to the State of Connecticut and a plan should be developed to protect and encourage the species.

6. Insects and Disease

Exit holes on certain oak trees attest to the presence of the two-lined chestnut borer (*Agrilus bilineatus*). This bark beetle generally does not harm healthy trees but does attack sick or weak trees, especially trees that have just suffered outbreaks of defoliating caterpillars (Johnson & Lyon 1991). It is the larvae of this species that tunnel beneath the bark of the tree, and thence into the phloem, where its zigzagging tunnels can girdle the tree. Infestation generally begins in the crown and proceeds downward (Johnson & Lyon 1991).

In late summer of 2003 the sugar maples on the Field Forest exhibited signs of anthracnose infection. Anthracnose is a fungus, likely *Kabatiella apocrypta*, that causes tan and brown lesions to develop on the leaves. The wet weather of that summer created favorable conditions for the fungus, and in August and September the understory shone with a brown glow.

The most urgent insect issue has to do with the arrival of the Emerald Ash Borer (EAB), an invasive insect pest first discovered in CT in 2012 and more recently identified in Durham in 2014. EAB is a highly destructive insect expected to kill the vast majority of ash trees. There are no treatment options for forest trees. Management options for Field Forest include harvesting many of the most valuable ash sawlogs while still retaining a sporadic ash component to serve as a temporary seed source and potential future source of coarse woody debris.

7. Invasive Plant Species

An inventory of the invasive plant species present on the Field Forest was started in the summer of 2014 with plans to finish by the spring of 2015. The work completed to date indicates that there is a relatively low level of interspersed invasive plant species spread throughout the forest. The density of the canopy helps shade out many species and has helped keep the growth and spread rate down as well.

Higher concentrations of species occur in high traffic areas along trails, especially areas where there has been unauthorized use by horses and ATVs. Seeds and fragments of invasive plants get caught in horse hooves, tire treads, and boots/shoes and are carried from outside sources into the forest. Additionally, property edges and water corridors also see higher concentrations of invasive plant species. The increase in light along roadsides perpetuates the growth of these species and the flow of the water from contaminated sources brings seeds into the property.

The invasive species identified thus far in the inventory are multiflora rose (*Rosa multiflora*), Japanese barberry (*Berberis thunbergii*), asiatic bittersweet (*Celastrus orbiculatus*), garlic mustard (*Alliaria petiolata*), Japanese knotweed (*Fallopia japonica*), and winged euonymus (*Euonymus alatus*). These species all damage habitats by monopolizing light, moisture, nutrients, soil, and space, which prevents native plant species from establishing or growing. Native plants are more nutritious food sources and contain natural predators that keep their populations in check, whereas, invasive plant species lack natural predators to keep their populations down. Typically high populations of deer also accentuate the spread of invasive species because they browse whatever native flora is available first, giving the invasive plants an advantage.

Some of these species contain other adaptations that cause further environmental issues. For instance, Japanese barberry alters soil PH, nitrogen levels, and biological activity in the soil which prevents other species from growing under and around barberry plants. Additionally, asiatic bittersweet strangles and smothers vegetation, including trees, that grow nearby. Often times the vines create extra weight in tree canopies making them more susceptible during wind and snowstorms.

Before any forestry work can commence on the forest, the area to be harvested needs to be thoroughly managed for invasive plant species. For this property, the

work will entail foliar spot spraying with a low concentration of an aquatic-use herbicide in a backpack sprayer. This is a necessary step to prevent the spread of these damaging species because once the canopy is thinned and more light reaches the forest floor, it will not take long for these species to spread to additional areas throughout the forest. Also, early eradication (before the harvest) is more time and cost effective because once the harvest is complete the slash makes the invasive plants harder to spot and the property much more difficult to traverse.

V. Land Use History & Current Use

The Field Forest was given to the Connecticut Forest and Park Association by Howard Brigham Field, Jr. Mr. Field died on January 11, 1999. He was a conservationist and a longtime resident of Durham. Mr. Field resided on Fowler Avenue near the center of Durham, on the right-of-way which leads directly to the Field Forest if one follows it east of Cherry Lane. Mr. Field gave the property to the Association in his will, a copy of which is on record with the Association. The Field Forest was formally transferred to Association ownership via Certificate of Devise dated October 24, 2001.

The Forest had been in the Field family for some generations. The land was conveyed to Howard Brigham Field, Jr. by Lylean Fowler Field on September 17, 1959, and to Lylean Fowler Field by William C. Fowler on March 3, 1928. Because of the strong family connection, a portion of the property is a memorial grove where the ashes of a member of the Field family have been placed.

The land was forested during the 70 year period that it was owned by the Field family, although not long before 1928 it was agricultural in nature. It is possible that this land was at one time pasture, but it seems more likely that the land was cultivated and tilled, owing to the productivity of the soils and the relative lack of rocks. The Field Forest contains an archaeological site, according to an Archaeological Review conducted by Retired State Archaeologist Nicholas Bellantoni as part of the 2003 Environmental Review Team Report of this site. According to the review, the site is a Native American encampment adjacent to a brook, likely the tributary to Herzig Brook that flows through the large, cracked concrete culvert running through the west central portion of the property. The areas that are most archaeologically sensitive are well drained-soils adjacent to wetlands. The property was not the location of an Indian village, but instead a fall and winter hunting and gathering grounds. Mr. Bellantoni indicates that a large village was located near the Coginchaug River. An archaeological reconnaissance is recommended if any subsurface disturbance is planned.

VI. Trail Recreation

a. Background

The Field Forest Trails were officially adopted into CFPA's statewide Blue-Blazed Hiking Trail System by its Trails Committee in 2000. With inclusion in the System also comes a State Greenway designation that all Blue-Blazed Hiking Trails enjoy.

The 2.2 miles of public hiking trails are a contained system within the Forest. They provide access to Bear Rock Road, Higganum Road, Guire Road, and the land of Regional School District 13. Passive recreation, including hiking, walking, trail running, birding, snowshoeing and cross-country skiing are all allowed uses on the trails. Rolling and of moderate difficulty, the trails have been routed to highlight many unique aspects of the Forest's interior, particularly the vernal pool.

These trails are maintained by volunteer Trail Managers who have been appointed by the CFPA Trails Committee. These volunteers perform seasonal maintenance and trail monitoring including, but not limited to, clipping brush, painting trail blazes, clearing downed trees on the trails, improving the treadway, addressing erosion, installing signage and documenting any trail issues for future repair and reporting.

b. Trail Management Concerns & Desired Future Conditions

The Field Forest Trails are in need of improvement to meet guidelines defined in the *Association's Trail Construction and Maintenance Packet*. Erosion is a problem on some of the trails, namely in steep, downhill areas, where a trail has become gullied. Erosion can be corrected by re-routing sections of trail to traverse slopes rather than travelling up and down the fall line. Additionally, erosion can be managed by installing drains and other-water diversion structures. Additional erosion control measures must also be installed during any logging operations that cross trails. Because of the many streams and other wetlands on the Field Forest, many activities contemplated for the Field Forest may come under the jurisdiction of the Durham Inland Wetlands and Watercourses Commission. While forestry and agriculture are permitted in wetlands as of right, permits must be obtained for associated activities, such as stream crossings.

Currently, the Forest roads and trails are being heavily used by neighboring commercial horse stables. Equestrians are using a self-created access trail on the west side of the property and have proceeded to develop many of their own trails. These bridle trails are not only having a

severe impact on the established trails, but their self-created trails have not been developed with sustainable trail concepts or best - practices in mind. All of this has been done without consultation or permission from CFPA.

Our recommendation for horse use is:

- The neighboring stable owners construct a trail on their own property specifically connecting their stables to the northeastern corner of their property and the Field Forest (See Trails Map 2, Appendix g);
- CFPA designs and builds an Equestrian Connector Trail (ECT) across the Field Forest at the expense of stable owners providing the riders a link to the logging roads and trails in Cockaponset State Forest;
- The ECT be signed consistently from beginning (the stables) to end (Bear Rock Road) so riders have no difficulty or confusion about where they are allowed to ride;
- Property lines are clearly marked showing areas where access is and is not allowed;
- The stable owners provide all boarders with a map showing equestrians where they are allowed to ride;
- Equestrian use be limited solely to the ECT on Field Forest;
- CFPA and the stable owners mutually agree to an annual, renewable lease outlining terms and conditions of equestrian use of the ECT (lease to be immediately revoked if equestrians branch from the ECT onto other parts of the Forest);
- Stable owners provide annual funding (amount TBD) for maintenance and improvements of the ECT on Field Forest as needed;
- Stable owners add CFPA as additional insured in liability insurance policy.

ATV's have also been encountered on the Forest and their impact is evident. New trails have been developed by these riders and specifically, watercourses have been negatively impacted. Steep trails are experiencing increased soil loss and erosion due to the impact of these vehicles.

A detailed plan outlining the current issues and the desired future condition of the trail system is attached (see Trails Maps, Appendix g).

VII. Education & Community Outreach

The proximity of the Field Forest to three schools in Regional School District # 13 make it ideally suited for use as a demonstration forest and outdoor classroom. Directly abutting the western boundary of the Field Forest is Coginchaug Regional High School, west of Coginchaug is Francis E. Korn Elementary School and even further west of that is Frank Ward Strong Middle School.

CFPA is perfectly suited to provide superior forest education to the general public and also to work with teachers in nearby schools to incorporate environmental education in their curricula. CFPA is the state co-coordinator of Project Learning Tree (PLT), an award-winning environmental education program for youth from preschool through grade 12. PLT curriculum correlates with state and national standards and helps bring environmental concepts into the classroom, as well as, bring students into nature. There will also be opportunities to incorporate the findings of the breeding bird survey that we have commissioned in collaboration with our friends at the National Audubon Society. Activities and open-ended exploration guided by PLT and Audubon should be incorporated into future educational signage along the trails to help children of all ages explore and learn about habitats within the forest and forestry work done within the forest.

Additionally, CFPA will develop community outreach events during each stage of forest management. Neighbors, forest landowners, community leaders and the general public will be invited to attend walks-in-the-woods to learn from foresters, loggers and wildlife experts. This will facilitate a broader dialogue among various stakeholders and help dispel some of the common misconceptions about forest conservation and management.

VIII. Forest Management Strategy

The Association should pay careful attention to aesthetics in the planning and oversight of timber harvesting operations and should expect and invite questions and comments from the public.

The Field Forest should be managed so as to preserve, for as long as possible, the magnificent deciduous forest that has grown and developed here over the past one hundred years.

Management should seek to maintain a place for nearly all of the long-lived, native tree species that have come to occupy the forest we see today. The oaks (red, black, white and scarlet) are important for their timber and wildlife food/cover values. Sugar maple and tulip poplar are aesthetically appealing and are easier to regenerate than the oaks because they are more tolerant of shade and disperse their wind-borne seeds more frequently and broadly. Beech, birch, maple, hickory, cherry, sassafras and even the threatened ash can play important ecological roles in a diverse, structurally complex forest. Further, encouraging native shrubs and discouraging invasive shrubs/vines will serve to enhance understory conditions for the myriad of plants and animals that make their living below the main forest canopy. By maintaining and, where possible, enhancing the species composition, age/size class diversity and structural complexity of the Field Forest, we may also be increasing the forest's resilience to future disturbances, including ice and wind storms, drought, insects, disease, deer herbivory and the unknown conditions we will face as the climate changes.

We will employ silvicultural practices that tend to facilitate greater overall complexity and lead to the development of uneven-aged forest structure. We acknowledge that uneven-aged silviculture may, over time, favor more shade-tolerant trees to the detriment of the oaks. However, the abutting Cockaponset State Forest is already being managed to facilitate the perpetuation of oaks and for the creation of early successional habitat. Additionally, the superior oak crop trees on the Field Forest have many productive years ahead of them, providing for long-term acorn production and opportunities to readjust silviculture in the future, if necessary.

The Field Forest naturally lends itself to silviculture. Growing in the Forest are nearly 2 million board feet of high-quality hardwood sawtimber. Leading timber species include red oak, tulip poplar, sugar maple, and black oak, although just about every species, even black cherry, grows straight and tall on this soil. The property should be managed to produce sawtimber and there are recommendations for each stand in the Forest Management sections that follow.

The sawtimber present on the Field Forest can produce revenue for the Association when harvested, and when growing on the stump can perform as an investment. Both the quality of the forest and the growth of the better trees can be improved by thinning the forest, cutting the sick trees and releasing the good ones. Certain stands have more value than others, and some should be avoided altogether owing to difficult topography and wetland obstacles.

Care should be taken, however, in just how the property is managed, what silvicultural prescriptions are applied, how work is done and where it is done. Special care is warranted here because many of the trees have grown to a stage where they are becoming truly grand,

magnificent specimens of their kind. Careful attention to aesthetics must be paid in selecting trees for harvest, selecting future crop trees and selecting specimen trees to be preserved.

Cruising and marking should be done by a contract forester who is willing to work closely with the Land Conservation Director and volunteer foresters. The Association must be clear on what it is looking for and closely supervise the project. Preparation of a stumpage or logging contract should be done by the Association's forestry consultant. The Association has two options when managing timber sales:

1. They can hire a logger directly. The Association could contract directly with a logger paid by volume, keep logs in Association ownership, and sell logs directly to sawmills either on the landing or at the mill. This will increase Association oversight but will also result in tighter control and likely greater revenues and income if done correctly.
2. Stumpage sale. This entails putting out to bid and selling the trees while they stand on the stump. This process is less involved and does not require the Association to market its logs. There is less risk with this approach, but also less opportunity.

a. Silvicultural Prescriptions

This land was still being farmed in the early 1900s and came to the Field family in 1928. Since then the forest has developed largely as a result of succession through natural selection punctuated by the occasional damaging weather event of significance (e.g. the ice storm of 1972). The last known harvest of timber was conducted in 1958.

Aside from the single-tree mortality that is normal in closed canopy forests, and some trees that suffered substantial crown damage in 1972, the Field Forest appears to be in very good condition. Comprehensive age and growth data that may shed additional light on forest vigor will be collected during the first series of prescribed thinnings. Until a future inventory indicates that an overall decline in forest vigor and condition is occurring, the Field Forest will be managed to sustain and improve the current main stand. Thus thinnings will be the chief silvicultural tool for the foreseeable future.

Having gone decades without any significant management, the forest has grown into an overcrowded condition with relatively high basal area and a great deal of wood volume. This initial phase of forest management will employ light crown thinnings intended to reduce competition in the canopy, increase growth on superior crop trees and facilitate the advancement of understory trees with the capacity to respond to release. This will involve the harvest of some co-dominant and many low-intermediate canopy-class trees, especially among the oaks and tulips, and red maples. Given the large range of sawtimber size

classes, some suppressed trees that are irreversibly in decline will have sufficient commercial value to justify their harvest. A more aggressive harvest of white ash timber, due to concerns about the emerald ash borer, may lead to some areas of more concentrated crown thinning.

Stand 1 – A light crown thinning will be applied (in conjunction with a thinning in the northern section of Stand 2A) to reduce crown density, increase residual stand vigor, and adjust species composition. The long-term goal is to establish an uneven-aged forest structure. With a total BA of 136 sq. feet/acre, there is plenty of varied growing stock to work with. Stand 1 should be managed conservatively by removing between 20% and 30% of current BA. This stand will be part of the second of two harvest operations. In general, the trees selected for harvest will be more likely to include sugar maple, red maple, tulip, black birch and white ash because they occur most frequently or (in the case of ash) are threatened by external factors. On the other hand superior examples of tree species occurring at low frequencies (oaks, hickories, cherry and yellow birch) should be retained to enhance composition and resiliency. Subsequent management cycles will strive to encourage the development of multiple age-classes and high levels of canopy stratification.

Stand 2A – A light crown thinning will reduce crown density, increase residual growth rates, release advanced tree reproduction and capture the value of at-risk trees prior to further decline from competition or insects. A BA of 145 square feet/acre places this stand toward the upper limits of optimal deciduous forest stocking. Basal area will be reduced by about 25% to 30%. The 43-acre southern portion of Stand 2A will be harvested as a single unit (in 2015-16) while the 25-acre northern section will be harvested concurrent with Stand 1. In general, the trees selected for harvest would be more likely to include red oak, black oak, tulip and red maple because they occur most frequently in this stand. Superior examples of tree species occurring at low frequencies (white oak, hickories, cherry and sassafras) should be retained to enhance composition and resiliency. As in Stand 1, subsequent tending will strive to encourage the development of multiple age-classes and high levels of canopy stratification.

Stand 2B – This subunit slopes relatively steeply to the west, which, when considered in combination with the moist soils, results in a difficult site to operate. The season of operation, operator proficiency, and forester oversight, will dictate the results on the ground. Although these conditions should not prohibit future management of the stand, the difficulties suggest a lower-priority treatment, or at least an operation best planned in the driest late-summer months. When conditions and operator availability warrant, the stand should be managed with a thinning treatment designed to favor the continued

growth of the most dominant trees. This area exhibits increased competition from northern red oak, a good competitor on these relatively rich, well-drained soils. Although stocking is currently very high, future management prescriptions should reduce the basal area slowly.

Stand 2C – Since this area is recommended for an ecological reserve, no silvicultural treatments are recommended.

Stand 2D - This subunit is in the northwestern corner of the Field Forest and will not be prescribed any silvicultural activities within this planning period. Invasive shrubs, increased recreational density, and additional stream crossings make this area a good choice as another reserve area, at least until the invasive plants are brought under control.

Stand 3 – This area is classified as a forested wetland and will not receive any silvicultural treatment. Additionally, it will be protected when any harvesting is taking place in adjacent stands.

b. Desired Future Condition

Silviculture aims to manipulate forest stands to achieve a future condition which may alter the type, density, pattern, or arrangement of vegetation. In the case of the Field Forest, the desired future condition is an un-fragmented, fully-stocked, uneven-aged, mixed-hardwood forest that is growing vigorously and possessing improved vertical structure. Tree species composition will remain largely unchanged in the short-term (with the possible exception of ash) and invasive plants will need to be reasonably under control prior to timber management activities.

IX. Harvest Operational Plan

CFPA will retain a private, independent forester to prepare and administer the two prescribed thinning practices. The proposals will specify the services provided and the associated costs. The managing forester will be responsible for administering the harvests as CFPA's agent. At each point in this process, CFPA's Land Conservation Director with guidance from the Association's volunteer foresters will review and approve the work of the consulting forester.

X. Schedule of Forest Management Practices

This section of the management plan establishes a set of goals for the Field Forest and lists strategies for achieving them. These goals and strategies are designed to fit within the social and ecological constraints defined previously. The plan addresses four areas of planning concern: forest management, recreation and aesthetics, education and community interaction, and land administration.

Forest Management

Goal: Provide long-term conservation of the native flora and fauna.

Objective 1: Commence biological inventories; 2015-2020.

Strategies:

- A. 2015 - Conduct breeding bird survey.
- B. 2015 - Conduct a springtime assessment of the vernal pool.
- C. 2015 - Inventory the 43-acre southerly portion of Stand 2A for invasive plants and formulate a plan, including estimated costs, for pre-harvest treatments.
- D. Conduct floral inventory to obtain better information about potential rare plants, understory vegetation, herbaceous vegetation, invasive plants, etc.
- E. 2015-16 - Conduct an invasive plant inventory and formulate a plan for Stand 2D.

Objective 2: Encourage the continued growth and development of this exemplary mixed hardwood forest.

Strategies:

- A. 2015 - Conduct the first prescribed commercial thinning of sawtimber and fuelwood in the 43-acre southerly portion of Stand 2A.
- B. 2016-17 - Conduct the second prescribed commercial thinning of sawtimber and fuelwood thinning in the 52-acres comprised of Stand 1 and northerly portions of Stand 2 A.

Objective 3: Protect rare and endangered species.

Strategies: A. If a rare species is found, develop a plan to protect and encourage its population.

Objective 4: Improve wildlife habitat values.

Strategies:

- A. Maintain as forest interior habitat.
- B. Maintain appropriate buffer areas around vernal pool.
- C. Consider removing non-functioning culvert to restore fisheries habitat in streams.
- D. Retain large snags and den trees where they do not pose a safety hazard.
- E. Develop further recommendations upon completion of a breeding bird survey.
- F. Implement plans to control invasive plants and prevent colonization of areas currently free of exotic invasives.

Objective 5: Seek opportunities to engage volunteers in the maintenance of the forest and trails.

- Strategies:**
- A. Invite proposals from student groups from the Yale School of Forestry and Environmental Studies, the University of Connecticut, Wesleyan University and Regional School District 13.
 - B. Host trail improvement work-parties and trail trainings to educate the community and trail enthusiasts in best practices for sustainable trail design, maintenance and construction.

Recreation and Public Outreach

Goal: Allow limited, low-impact recreational use of the Field Forest for pedestrian activities on designated trails provided that these uses do not preclude attainment of forest management objectives.

Objective 1: Utilize official entrances for information dissemination.

- Strategies:**
- A. Post updated maps of Field Forest Trail System, properly oriented, at each entrance, as well as rules of use and other pertinent information about the property.
 - B. Post hunting warning signs at entrances during applicable seasons.
 - C. Make available laminated, hand-held trail maps at property entrances.
 - D. Post informational signs prior to each phase of forest management activity.

Objective 2: Maintain and Improve Field Forest Trail System.

- Strategies:**
- A. Update blazing on trails to be consistent and in compliance with CFPA's universal blazing standards as outlined in the organization's *Trail Construction & Maintenance Packet*.
 - B. Close, improve or re-route gullied, eroded and wet sections of the trail system as needed, specifically sections of the Blue/ Red and Blue/Orange Trails.
 - C. If and when hiking trails must double as logging trails, close trails during logging operations, post appropriate signs and provide clear notice, and restore trails when logging is complete.
 - D. Close off all unauthorized trails and concentrate all trail use on designated blazed trails.
 - E. Explore options for a new hiking trail on southeast side of the Forest.
 - F. Monitor and document all unauthorized recreational uses on trails and roads.
 - G. Consider a trail link through the abutting Cockaponset State Forest, on Bear Rock Road, to the Mattabesett section of the New England Trail on Bare Rock Mountain, enabling one to walk from the Regional High School to Miller's Pond while crossing only one paved road.

H. Implement horse use recommendations

Education & Community Interaction

Goal: Provide useful information to visitors & facilitate educational uses.

Objective 1: Help people find the property and avoid trespassing.

Strategies:

- A. Post map of and directions to Field Forest on the CFPA website.
- B. Note the generosity of Howard Brigham Field, Jr., and his family, at all property entrances.
- C. Maintain CFPA logo markers at entrances and along roadsides.
- D. Post visible property boundaries with CFPA signs.
- E. Limit trespassing by marking all boundaries, especially where trails cross.
- F. Provide hand-held trail maps at trailhead kiosks.

Objective 2: Maintain good relations with the local community.

Strategies:

- A. Welcome members of the community to walk on the property.
- B. Share plans with neighbors and promptly address concerns.
- C. Post property news on sign stations.
- D. Submit important notices to local newspapers.
- E. Develop working relationship with resident State Trooper to address any problems promptly.

Objective 3: Make use of forest as demonstration forest and outdoor classroom.

Strategies:

- A. Develop relationships with teachers in each nearby Region # 13 school.
- B. Encourage use of PLT activities to incorporate forestry education in classrooms.
- C. Develop educational signage along trails.
- D. Encourage use of Field Forest for scientific studies

Land Administration

Goal: Oversee and police the Field Forest on a regular basis.

Objective 1: Limit use by maintaining set hours.

Strategies:

- A. Open property every day from one hour before sunrise to one hour after sunset.

Objective 2: Enforce prohibition against recreational use of motorized vehicles.

Strategies:

- A. Install and maintain gates at vehicle-accessible entrances.
- B. Post property with “no motorized vehicle” signs.
- C. Seek trespassing charges against those who trespass with motor vehicles.
- D. Install wildlife camera as necessary to monitor illegal use.

Objective 3: Keep well-maintained boundaries and monitor for encroachment.

- Strategies:**
- A. Locate corners and walk boundaries annually.
 - B. Keep photographic record of corners.
 - C. Work to correct any encroachments by means of fencing, planting, etc.

Objective 4: Keep good records of all land management activities and natural events.

- Strategies:**
- A. Complete an event record for all significant events, natural or otherwise.
 - B. Continue to update plant and animal inventories.
 - C. Maintain photographic record of landscape appearance.

Objective 5: Maintain right-of-way to Fowler Avenue.

- Strategies:**
- A. Work with co-owners and abutters to see if a footpath to Fowler Avenue can be developed and marked with small signs.
 - B. Cut brush and vines on right-of-way to allow passage.

Objective 6: Preserve significant cultural sites.

- Strategies:**
- A. Locate and document the Field family memorial grove, where the ashes of family members have been scattered. Engage the Field family and resolve any concerns regarding management practices that may occur on or near this site.
 - B. Avoid unnecessary subsurface disturbance.
 - C. Have an archaeological study done if subsurface disturbance must occur.
 - D. Encourage study of archaeological sites on the Field Forest.

Objective 7: Continue maple sugaring

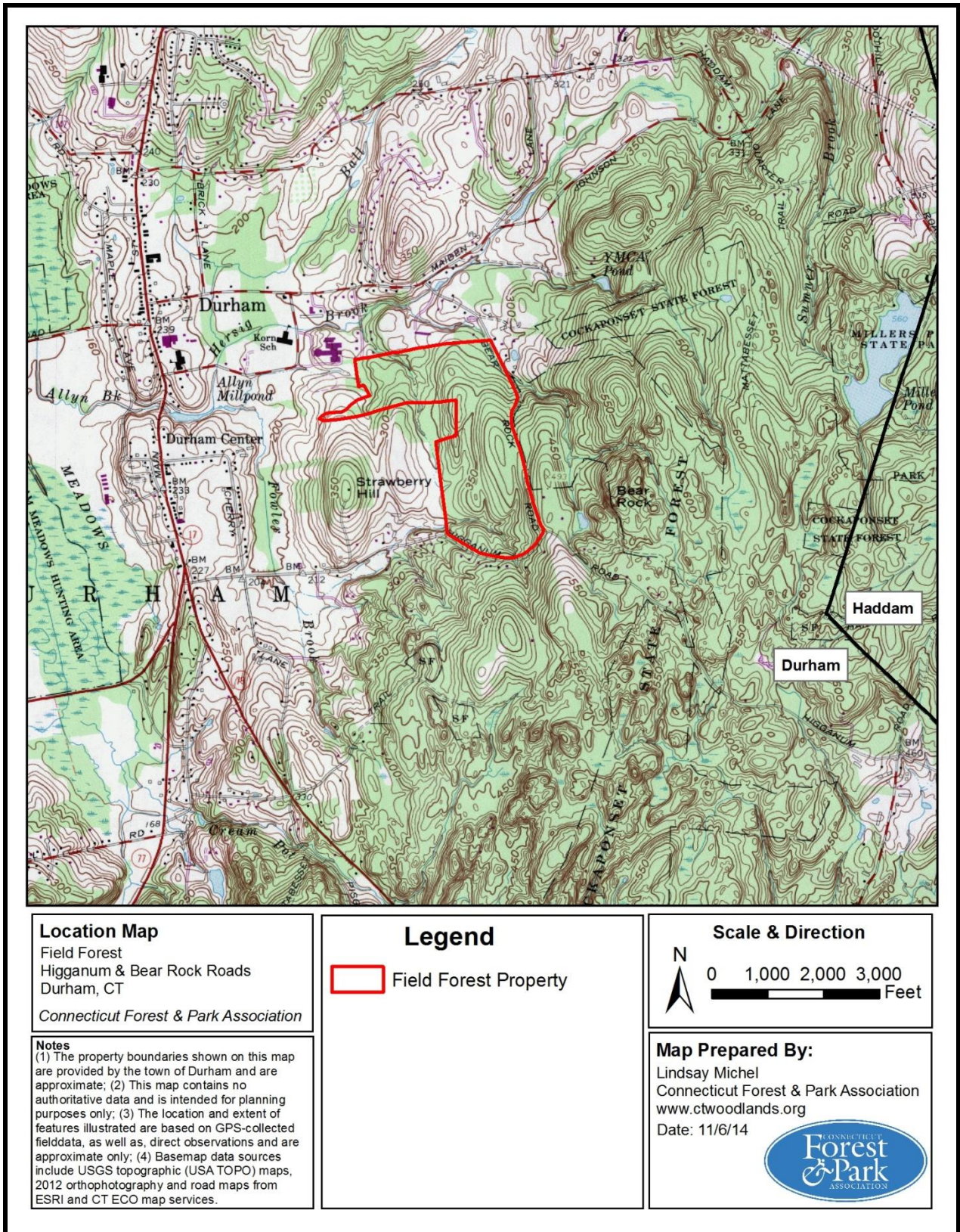
- Strategies:**
- A. Allow local syrup producer to tap maple trees on 6-acre section of forest.
 - B. Develop guidelines & contract to formalize relationship.

Objective 8: Prohibit fires and prohibit camping with certain exceptions.

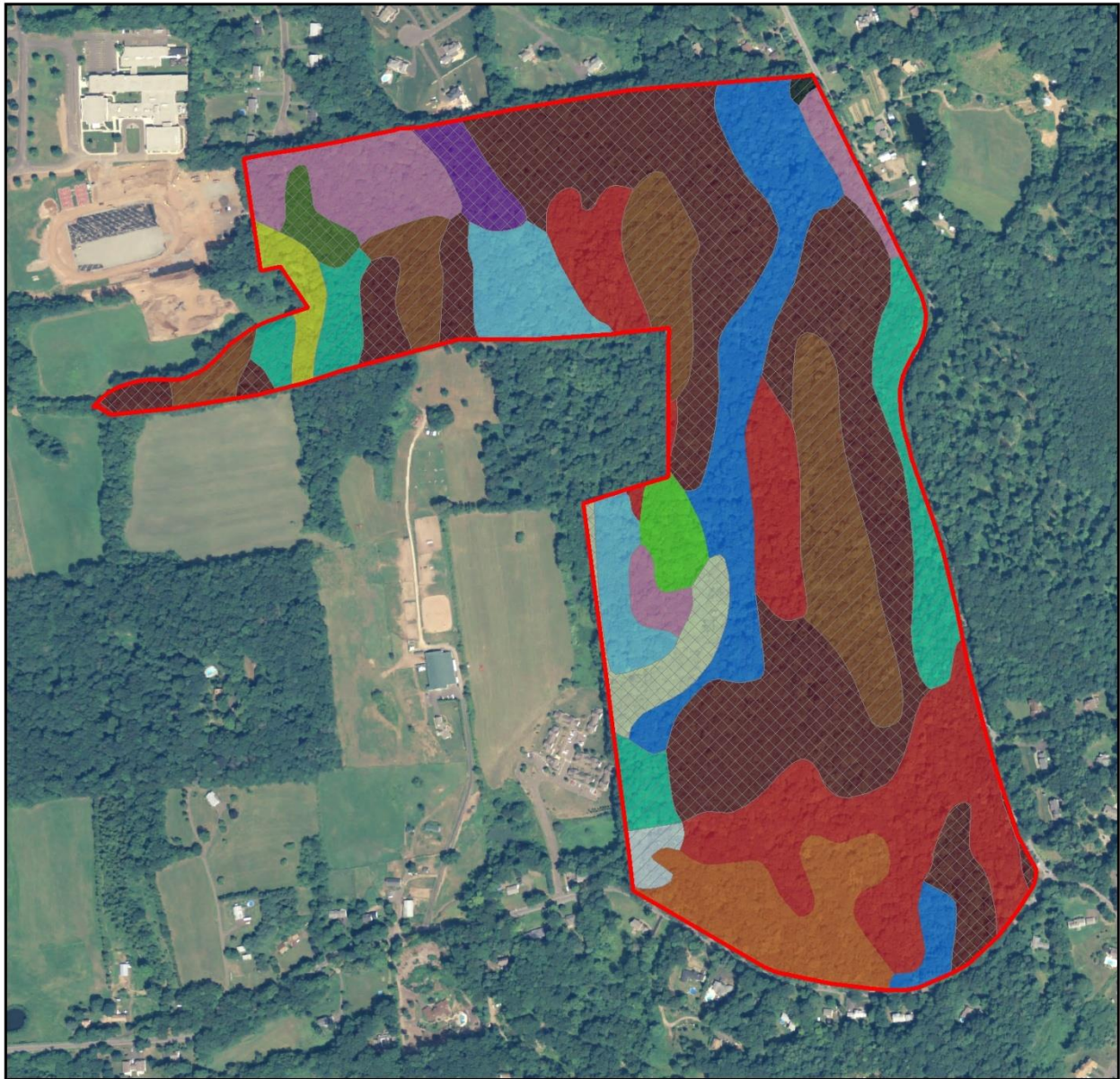
- Strategies:**
- A. Post property accordingly.
 - B. Consider developing a low-impact campsite (3-4 tent sites) for thru-hikers on the nearby Mattabesett section of the New England Trail.

XI. Appendices

a. Location Map



b. Soils Map



Soils Map

Field Forest
Higganum & Bear Rock Roads
Durham, CT

Connecticut Forest & Park Association

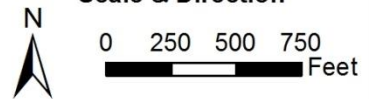
Notes

(1) The property boundaries shown on this map are provided by the town of Durham and are approximate; (2) This map contains no authoritative data and is intended for planning purposes only; (3) The location and extent of features illustrated are based on GPS-collected field data, as well as, direct observations and are approximate only; (4) Basemap data sources include USGS topographic (USA TOPO) maps, 2012 orthophotography and road maps from ESRI and CT ECO map services.

Legend

- Field Forest Property
- Branford silt loam, 3 to 8 percent slopes
- Ellington silt loam, 0 to 5 percent slopes
- Ludlow silt loam, 2 to 15 percent slopes, extremely stony
- Ludlow silt loam, 2 to 8 percent slopes, very stony
- Ludlow silt loam, 3 to 8 percent slopes
- Manchester gravely sandy loam, 15 to 45 percent slopes
- Manchester gravely sandy loam, 3 to 15 percent slopes
- Pootatuck fine sandy loam
- Walpole sandy loam
- Wethersfield loam, 15 to 25 percent slopes
- Wethersfield loam, 3 to 8 percent slopes
- Wethersfield loam, 8 to 15 percent slopes
- Wethersfield loam, 8 to 15 percent slopes, very stony
- Wilbraham and Menlo soils, extremely stony
- Wilbraham silt loam
- Prime Farmland Soils
- Statewide Important Farmland Soils

Scale & Direction



Map Prepared By:

Lindsay Suhr
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www.ctwoodlands.org
Date: 11/5/14



c. Aerial Map



Aerial Map

Field Forest
Higganum & Bear Rock Roads
Durham, CT

Connecticut Forest & Park Association

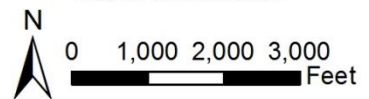
Notes

(1) The property boundaries shown on this map are provided by the town of Durham and are approximate; (2) This map contains no authoritative data and is intended for planning purposes only; (3) The location and extent of features illustrated are based on GPS-collected field data, as well as, direct observations and are approximate only; (4) Basemap data sources include USGS topographic (USA TOPO) maps, 2012 orthophotography and road maps from ESRI and CT ECO map services.

Legend

 Field Forest Property

Scale & Direction

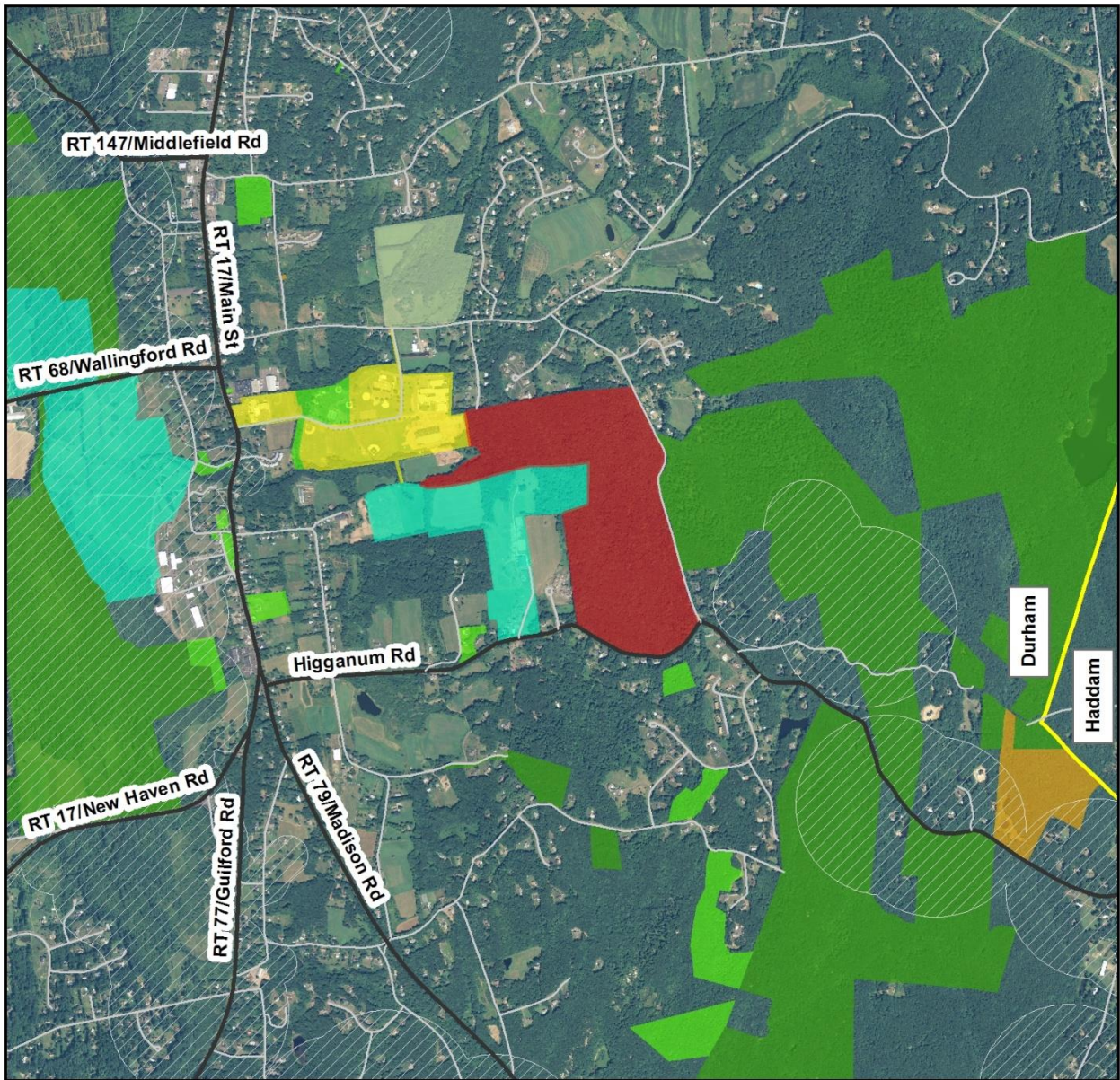


Map Prepared By:

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Date: 11/6/14



d. Open Space & NDDB Map



Open Space & NDDB Map

Field Forest
Higganum & Bear Rock Roads
Durham, CT

Connecticut Forest & Park Association

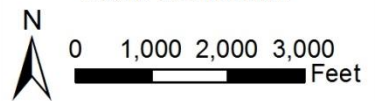
Notes

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Legend

- Field Forest Property
- State Property
- Utility Property
- School Properties
- Farm Properties
- Municipal Properties
- NDDB 6/2014
- Major Roads
- Minor Roads

Scale & Direction

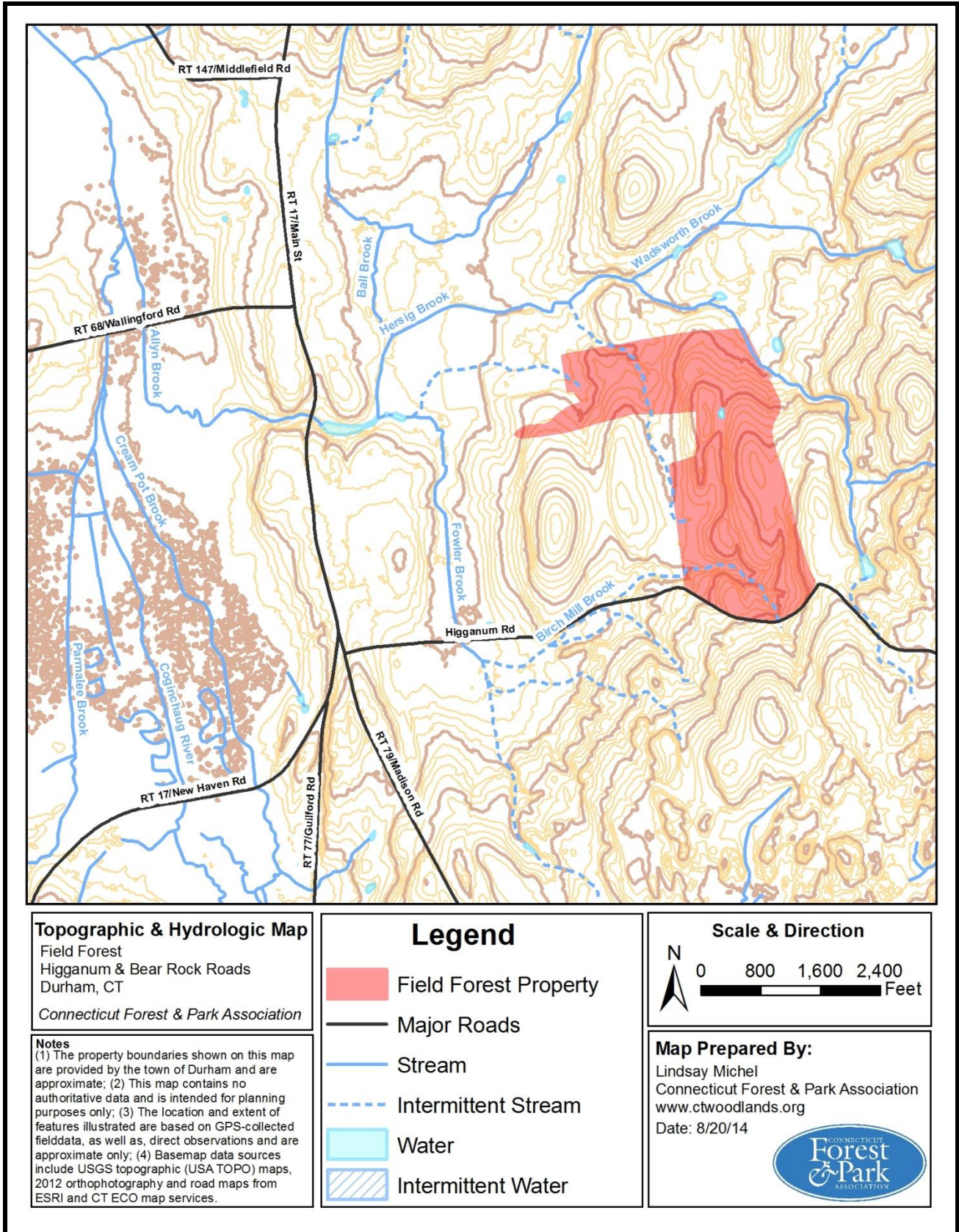


Map Prepared By:

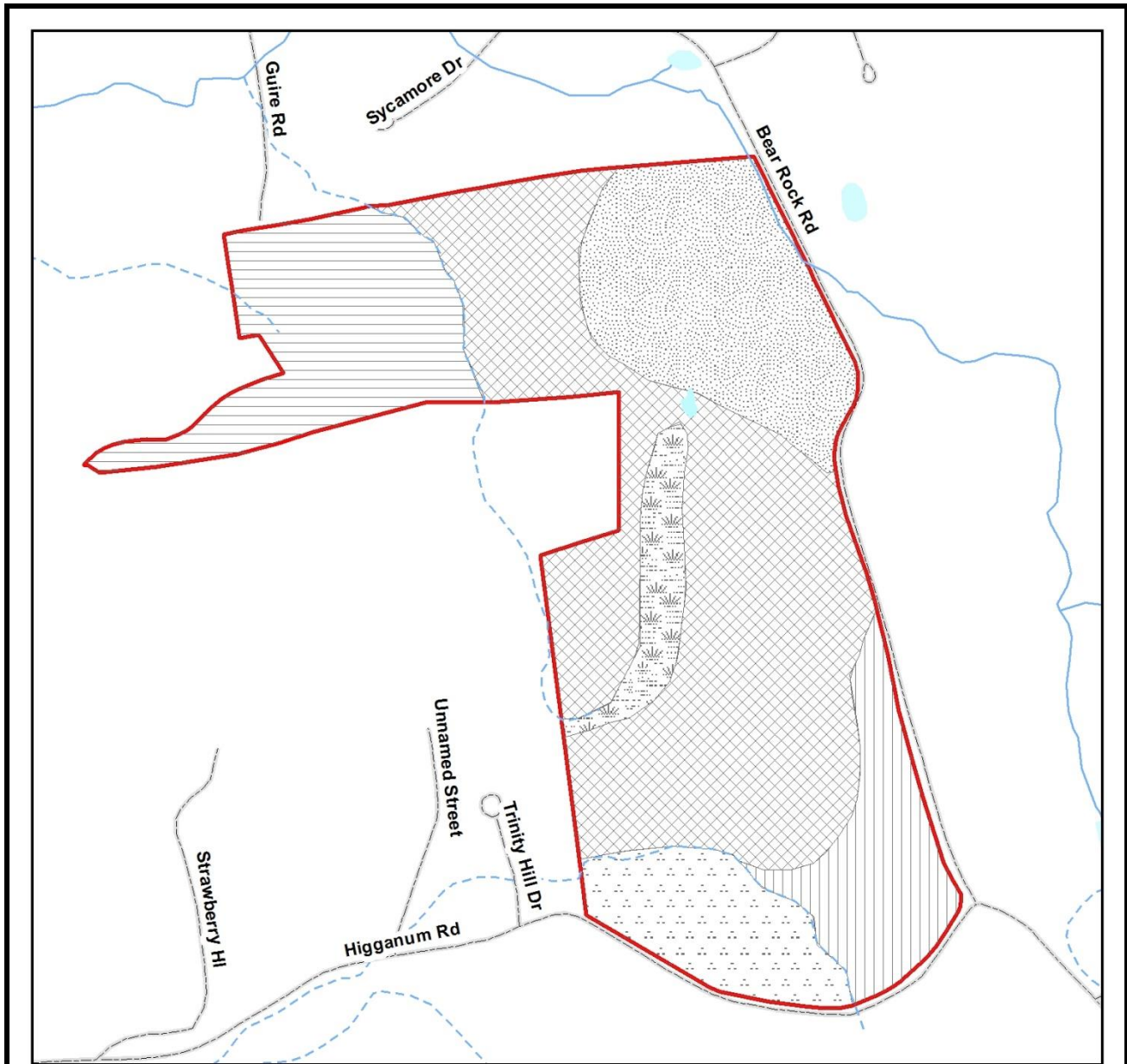
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Date: 8/20/14



e. Topographic & Hydrologic Map



f. Forest Stands Map



Forest Stands Map

Field Forest
Higganum & Bear Rock Roads
Durham, CT

Connecticut Forest & Park Association

Notes

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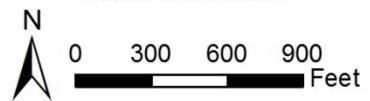
Legend

- Field Forest Property
- Stream
- Intermittent Stream
- Water
- Roads

Forest Stands

- 1
- 2A
- 2B
- 2C
- 2D
- 3

Scale & Direction



Map Prepared By:

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Date: 11/3/14



g. Trails Maps

i. Current Inventory/Assessment Map

Legend


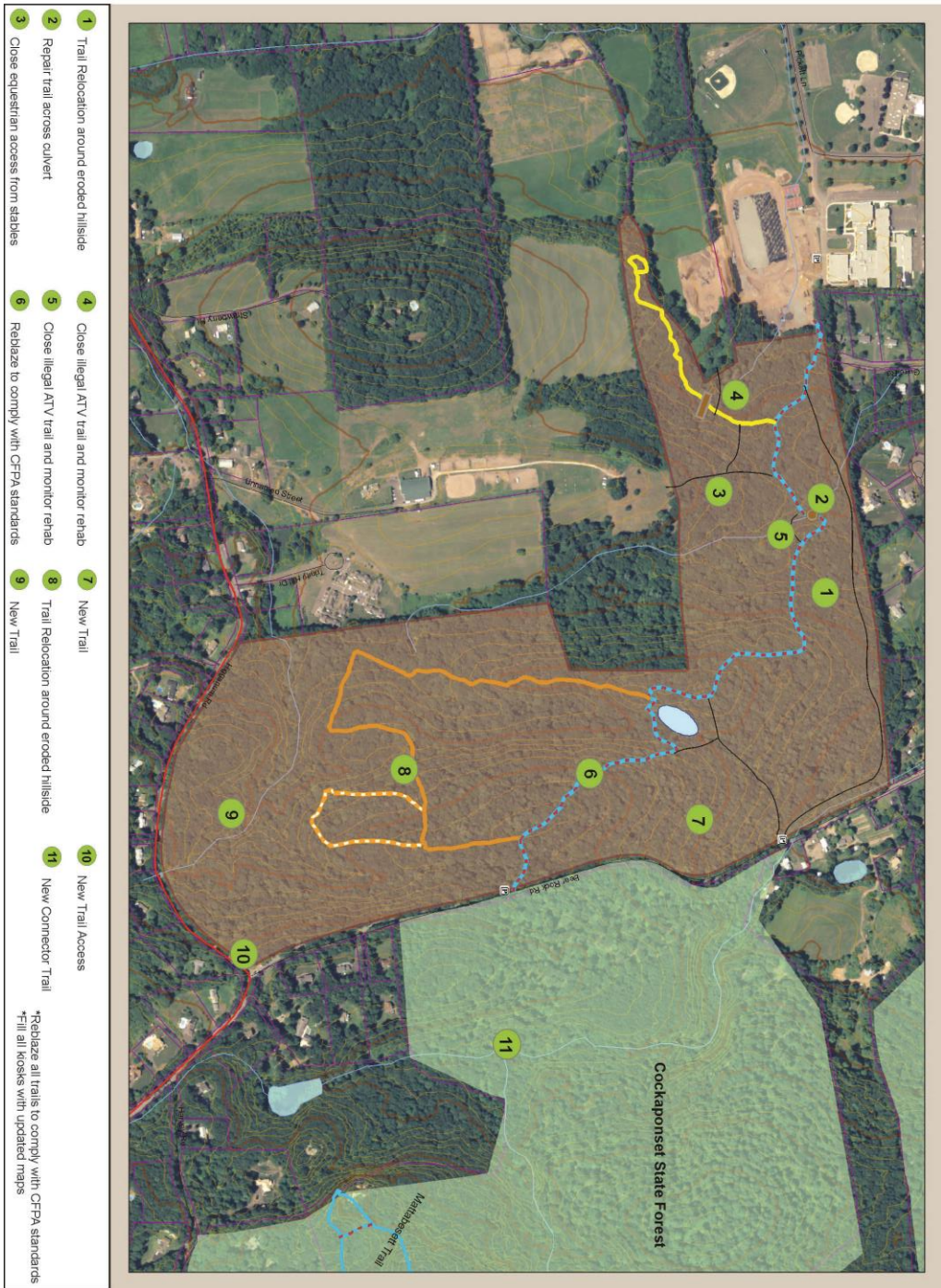
- Planned Improvements
- User-created Trail/Old Roads (Incomplete)

Field Forest Trails Map 2
Current Inventory/Assessment
 Field Forest
 Higganum & Bear Rock Roads
 Durham, CT
 Connecticut Forest & Park Association

Scale & Direction
 N
 0 170 340 Feet

Notes:
 1) The property boundaries shown on this map are based on a 2017 deed and are not intended to be a substitute for a professional survey. The information shown on this map is for informational purposes only and should not be used for any legal or financial purposes. The information shown on this map is not intended to be a substitute for a professional survey. The information shown on this map is not intended to be a substitute for a professional survey.

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 Date: 8/29/14

ii. Desired Future Conditions Map

<p>Legend</p> <p>Proposed Trail Names</p> <ul style="list-style-type: none"> Field Forest Trail Valley View Trail Oak Trail Vernal Pool Connector Beech Grove Trail <p>Proposed Trails</p> <ul style="list-style-type: none"> Poplar Trail Matthias Trail Connector Equestrian Connector Trail 	<p>Field Forest Trails Map 2: Desired Future Condition</p> <p>Field Forest, Highatum & Bear Road Roads, Durham, CT</p> <p>Connecticut Forest & Park Association</p>
<p>Scale & Direction</p> <p>N</p> <p>0 170 340 Feet</p>	<p>Notes</p> <p>Proposed boundaries shown on this map are provided by the Town of Durham and are not necessarily the same as those shown on other maps. The boundary data used in this map is intended for planning purposes only. The boundary data does not constitute a warranty of accuracy or completeness. The boundary data is provided as a reference only. The boundary data is not intended to be used for legal purposes. The boundary data is not intended to be used for legal purposes. The boundary data is not intended to be used for legal purposes.</p>
<p>Map Prepared By:</p> <p>Cire Cain</p> <p>Forest & Park Association</p> <p>www.ctforests.org</p> <p>Date: 8/29/14</p> 	

