

STATE OF CONNECTICUT

DEPARTMENT OF ENERGY AND ENVIRONMENTAL  
PROTECTION



Bureau of Natural Resources

Division of Forestry

FOREST MANAGEMENT PLAN  
2013 through 2023

Naugatuck State Forest  
Mount Sanford Block

Approvals:

 July 2, 2013

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 7/30/13

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## A. Executive Summary

- The Mt. Sanford Block of Naugatuck State Forest is approximately 712 acres, located primarily in Hamden and Cheshire.
- George Cromie, a former forester with the Connecticut Forest and Park Commission, sold most of the land to the State in 1944.
- The Forest has a long history of forest management, starting with Mr. Cromie. Since 1983, 1.2 million board feet have been sustainably harvested.
- The Forest is very popular for hunting, hiking, and mountain biking. About 3.6 miles of the Quinnipiac Trail run through the Block.
- Three hundred ninety seven (397) acres (56% of the total forested area) will eventually undergo active forest management.
- Two hundred seventeen (217) acres will be managed on an even-aged basis.
- One hundred eighty (180) acres will be managed on an uneven-aged basis.

## B. History

The Mount Sanford Block is located in central New Haven County, primarily in the towns of Hamden and Cheshire, with small portions in Bethany and Prospect. Mount Sanford rises over the western part of the Block to an elevation of almost 900 feet. It is part of the “Prospect Ridge”, a trap rock ridgeline that runs northward from New Haven to Southington.

### 1. Reason for acquisition and funding sources

Most of the Mt. Sanford Block was acquired by the State in 1944 for \$60,000, using money donated by Edward Carrington of West Haven. The owner, George Cromie, was a forester who graduated from the Yale School of Forestry in 1910. He was the first city forester for New Haven, and later worked for the State Park and Forest Commission. Throughout his career he lived frugally, saving money to buy a woodlot of his own, and gradually assembled 524 acres in the Mt. Sanford area. The forests he acquired had been heavily cut for charcoal and fuelwood, and to salvage the American chestnut, which had been practically eliminated by the chestnut blight in the early 1900s.

### 2. Development of resource before and after acquisition

George Cromie improved the condition of his woodlands by practicing forest management. Overcrowded stands were thinned by removing trees of low quality because of disease, injury, or poor form. He also experimented with plantings of various conifers. He felt the public should be allowed to enjoy the beauty of his forest, and in 1930, the Quinnipiac Trail, the first trail of the Blue Trail System, was created and passed through his property.

Mr. Cromie died in 1956. The evergreens he planted in what is now the Youth Group Camping Area was dedicated as the “Cromie Memorial Pine Grove” in 1958.

### 3. Changes in the last 10 years

Since the last management plan was written in 2002, there have been timber harvests on 182 acres, totaling 575,595 board feet of sawtimber and 278 cords of fuelwood. There have been thinnings on 61 acres, a shelterwood (release cut) on 51 acres, and selection harvests on 70 acres. Revenues from timber harvests for this period were \$128,810, plus improvements on

75% of the road system. In addition, roughly 100 cords of firewood have been sold through the [homeowner firewood program](#).

Since 2002, land acquisitions have included the Schwenk parcel in Hamden (a 14- acre inholding between the Forest and Brooksvale Park) and the Sablitz parcel (25 acres with frontage on Downes Road and Handy Road) in Hamden.

Over the last 10 years, the Forest has served as an outdoor classroom for graduate students from the [Yale School of Environmental Studies and Forestry](#) learning about the logistics of timber harvesting operations.

## C. Acres and Access

### 1. Acres

Route 42 cuts across the northernmost section of the Forest, dividing it into two parts (55 acres north of the highway and 657 acres to the south).

<b>Acres</b>	
<b>Total acreage</b>	<b>712</b>
Forested acreage	702
Gasline right-of-way	6
Fields	4

### 2. Access

The southern portion of the Forest is accessible through a locked metal gate at the end of Downes Road in Hamden. This access road goes through Camp Mountain Laurel, owned by the Hamden YMCA (203-248-6361). The gate was provided by DEEP and is double-locked with the YMCA. The road goes through the middle of the facility. As much as possible, forest management activities are scheduled when the camp is not in session. Only state-authorized vehicles are permitted to use this road in conjunction with forest management activities. The public is allowed to walk on the road through the YMCA camp to reach the State Forest. Parking is available for several cars at a cul-de-sac at the end of Downes Road. The acquisition of the Sablitz parcel in Hamden created new access from the west side of Downes Road and from the end of Handy Road. The northern portion of the Forest is accessible at the south side of Rt. 42, where there is a parking area for five vehicles at the trailhead for the Quinnipiac Trail.

Revenue from timber sales paid for roughly 1,060 tons of gravel that was applied on the roads over the last 10 years by either private contractors or DEEP crews.

<b>Road Name</b>	<b>Distance (ft)</b>	<b>Road Material</b>	<b>Condition</b>
Cromie Road	3,500	Gravel	Good
Brooksvale Road	3,600	Gravel	Good
Other roads	6,960	Native soil	Fair
<b>Total</b>	<b>14,060</b>		

The most significant drainage problems are the twin arched culverts in Brooksvale Stream. These pipes are undersized and are collapsing to less than half their capacity. Over the last few years, it has become more common during heavy rainstorms for these culverts to clog with woody debris, causing the brook to overtop the road and wash sediment downstream. This degrades the stream for fish habitat and cuts off access to the eastern 1/3 of the Forest.



Figure1. Collapsing culverts in Brooksvale Stream (left photo), clogged by woody debris (middle photo), causing the road to wash out (right photo). Photos by Gerard Milne.

DEEP Engineering has inspected the site, request has been made to correct, pending project approval. The Mt. Sanford Block falls within the Sleeping Giant State Park Management Unit, which is responsible for recreational issues and routine maintenance of gates, roads, culverts, hazardous trees, youth group camping areas, garbage pickup, etc. In addition, the Western District Operations Unit handles maintenance issues that require heavy equipment, such as roadside mowing, grading, and culvert installation.

### **3. Inaccessible areas and access potential**

Virtually all of the operable acreage is accessible either from State Route 42, town roads, or State Forest roads.

### **4. Rights-of-Way and Easements**

The Tennessee Gas Pipeline Company (TGPC) has a Right-of-Way that runs north-south for 4,000 feet through the southern portion of the Forest. TGPC mows it every few years. DEEP notifies TGPC when there is a timber harvest that requires equipment to cross the pipeline. Loggers have to sign a Logging Encroachment Agreement with TGPC before harvesting. The company's office is in Shelton (203-929-6378).

The Cheshire Land Trust has an easement to cross the former Clark parcel (now part of the State Forest) north of Route 42 to gain access to the Quinnipiac Trail. A conservation easement is held by the Town of Cheshire on the former Clark and Nettleton parcels adjacent to Route 42.

### **5. Boundary Conditions and total miles of boundary**

There are roughly 8 miles (44,000 feet) of boundaries. They have all been marked since 2005. There have been several significant encroachments in the last few years as homeowners expand their backyards and install patios and fences on state property, despite clearly marked boundary lines. These issues were investigated and corrective action taken.

## D. Special Use Areas

### 1. Lakes and ponds

There are no lakes or ponds in this Block.

### 2. Rivers and streams

Brooksvale and Sanford Streams are the only perennial watercourses (see map for locations).

### 3. Cultural sites

Charcoal mounds scattered throughout the Forest attest to the logging history of the area.

There is also a cellar hole off of Cromie Road.

### 4. Recreation and scenic sites , trails, and signs

#### Youth Group Camping Area

There is one Adirondack-style lean-to in the Youth Group Camping Area. There used to be three of these shelters, but two were burned down in 2010, presumably by arsonists. There are no sanitary facilities or drinking water pumps.

#### Trails

The Quinnipiac Trail (2.3 miles) and the Quinnipiac Trail connector (marked with red blazes, 1.3 miles, including the portion on Cromie Road) run through the Block. They are maintained by the Connecticut Forest and Park Association (CFPA). The Trail can be reached off of Route 42, or at the end of Downes Road. The trail includes a vista looking westward from the peak of Mount Sanford.

A Trail Plan for the Block was written by the Park and Recreation Supervisor and Forester in 1995 delineating appropriate uses of trails and roads. The Plan stated that the portions of the Quinnipiac Trail that are not on Cromie Road, including the connector trail, are limited to hiking. The forest roads, the white-marked Brooksvale Trail (starting from the end of Downes Road and leading toward Brooksvale Park), and the gasline ROW are multiple use, meaning mountain bikes, horses, and hiking are allowed. No motorized vehicles are permitted. However ATVs and dirt bikes routinely use the trails, causing significant damage.

The multiple use trails are badly eroded because no one is maintaining them. Occasionally, individuals or small groups of mountain bikers install water bars or armor wet crossings, but much more needs to be done. In 2012, an informal group of mountain bikers installed a pressure-treated bridge over Brooksvale Stream, north of the gasline crossing.

The Western Connecticut Orienteering Club has periodic events that include the adjacent Brooksvale Park property. They have created a detailed map of the area.

#### Signs

There are informational signs at the southern entrance into the Forest, just north of the YMCA Camp, and on Route 42 at the parking area next to the Quinnipiac Trail.

## **5. Critical Habitat (State listed rare or endangered plants and animals)**

A review by the DEEP Natural Diversity Database mentioned that there are plant communities considered uncommon or of critical value to Connecticut's fauna on the top of the trap rock ridge. Along the northwest border are areas of *sub-acidic rocky outcrops/summit*, containing species adapted to dry and exposed conditions. There is also a patch of *sub-acidic dry forest* along the western border with species adapted to low moisture conditions. All of these sites are in areas that will not be actively managed.

### **Trap Rock Ridge**

The western edge of the Block is dominated by Mt. Sanford. Trap rock ridges were formed by volcanoes 200 million years ago. The lava flows covered the floor of the Connecticut River valley. Eventually, they cooled and hardened into traprock (basalt). Over time, sediments from the surrounding hills covered the trap rock. Eventually, these sediments were cemented into brownstone. After the volcanic activity ended, the whole region was fractured and tilted to the east. Since then erosion has washed the brownstone off the bedrock basalt, leaving the traprock layers as long ridges standing out far above the surrounding landscape.

From east to west, most traprock ridges tend to have a distinctive profile, with a gentle slope rising along the tilted surface of the lava slab, an exposed summit with little or no soil, a steep rocky cliff with scattered small ledges and cracks, and a talus slope built up from boulders that have broken off the cliff.

At the base of the eastern slope grows a rich forest with tulip poplars, sugar maples, and white ash. Wildflowers such as jack-in-the-pulpit and trillium are often found here. Further up the slope the forest becomes drier, and oaks and hickories predominate. In the understory, mountain laurel and blueberries become more prevalent. At the summit, a few stunted trees of red cedar, chestnut oak, and hickory are most common. The cliff face, almost devoid of soil and stored water, is the harshest environment for plants. Occasionally, black oaks, red cedars, and hemlocks, cling to this surface.

The forested, west-facing talus slopes at the base of the cliffs support the most diverse and lush plant growth of the traprock habitats. Sugar maple, white ash, and basswood are common. Spring ephemerals such as Dutchman's breeches, wild ginger, bloodroot, jack-in-the-pulpit, red trillium, and spring beauty grow here.

## **6. Natural Area Preserves**

There are no State-designated Natural Area Preserves in the Block.

## **7. Old Forestland Management Sites**

There are no formal "old forestland management sites". However, the steep slopes of the traprock ridge will not have any active management, and will be left to the forces of nature.

## **8. Research Areas**

In the winter of 2003-2004, the Division of Forestry assisted the Connecticut Agricultural Experiment Station in establishing research plots in Stand 3-6A to study the effects of thinning and crop tree management on the growth of mature red oak trees. Initial results of this research were published in the Proceedings of the 17<sup>th</sup> Central Hardwood Forest Conference (USDA Forest Service, General Technical Report- Northern Research Station- P-78, 2011). The



research showed that compared to an unmanaged control, diameter growth increased by 54% for crop tree management and 29% for traditional thinning.

### 9. Potential Sources of Gravel

According to the Soils Survey of the Natural Resources Conservation Service, the recently acquired Sablitz parcel on Downes Road has a soil designated as “Manchester gravelly sandy loam” on the site. This may be a source of gravel for future road improvements in the Forest.

## E. Extensive Areas of Concern

### 1. Trails

Recreational pressure on a hodgepodge of unofficial trails and paths has made it almost impossible to rehabilitate skid trails after timber harvests. According to Best Management Practices, trails made by logging machinery should be stabilized by installing water bars, seeding with a conservation mix, and mulching. Unfortunately, these trails, intended to be used only temporarily by logging equipment, remain open permanently because of mountain bikes and off road vehicles, without erosion controls being allowed to stabilize the site.

Figure 2. Water running off the Quinnipiac Trail (left side of photo) is washing out Cromie Road. This problem was brought to the attention of the CFPA Trail Manager who promptly installed water bars to correct the situation. However, it is symptomatic of the many other unmaintained trails in the Forest. Photo by Gerard Milne.



### 2. Wetlands

There are no issues with wetlands such as beavers flooding roads.

### 3. Unauthorized or illegal activity

There is frequent Illegal off-road motor vehicle use in the Forest, often using the gasline as access, damaging the rest of the roads and trails. Sometimes ATV trails can be traced to the backyards of adjacent property owners. There is also occasional unauthorized use of the Youth Group camping area for paintball games. Paintballers defaced the sign honoring George Cromie at the Memorial Pine Grove.

As previously noted, two of the shelters were burned down in 2010.



## **F. Wildlife Habitat** (compiled with assistance from Peter Picone)

### **1. Habitat Improvement Work**

There has been no habitat improvement work such as mowing or prescribed burns. The Wildlife Division was approached by a neighbor about mowing the fields for hay but as of this writing an agricultural agreement has not been signed.

### **2. Existing diversity-wetlands, conifers, early successional habitat (ESS)**

Most of the Forest is in sawtimber stands; 2% of the acreage is in pole-sized stands, 5% in saplings, and <1% in fields.

All the wetlands are dominated by red maple, except for the vernal pool in Stand 3-13 which is unusual in that it has mature pin oaks. Wood frogs (a vernal pool dependent species) can be heard here in the spring. There are also vernal pools in the southern portion of the Forest (see attached maps).

There are two acres of conifer plantations established by George Cromie (mostly mature Norway spruce and White pine), and three acres of plantations on the recently acquired Sablitz parcel (mostly small sawtimber and pole-sized Scotch pine, white pine, and white spruce). The only natural stands of conifers are hemlocks that are declining from the woolly adelgid and elongate scale. Most of the hemlocks are in the Nettleton Ravine along Sanford Brook and along Brooksvale Stream.

The gasoline ROW provides roughly 6 acres of permanent ESS in a linear shape (40' wide by 4,000' long) or roughly 0.8% of the total acreage of the Block. The gasoline provides some core ESS, so past even-aged regeneration harvests in Stands 3-5 and 3-11 were concentrated around it. This provides the requirements of species that use herbaceous openings and young forests such as turkey, grouse, chestnut-sided warbler, blue-winged warbler and field sparrow. In addition, there are roughly 4 acres of grasslands on the recently acquired Sablitz parcel.

There are no shrub/scrub wetlands, beaver meadows, or bald peaks.

Unfragmented Area (defined as no permanent openings wider than 40 feet): The gasoline splits the forest south of Route 42 into two unfragmented sections; roughly 450 acres west of the gas line and 200 acres to the east.

### **3. Landscape Context**

The Mt. Sanford Block provides a moderate-sized area of woodland for a variety of forest dwelling species. The gasoline right-of-way fragments the Forest, but it still benefits species able to use relatively large areas of mature and ESS forest cover. The habitat provided by the gasoline is valuable to many species of wildlife such as rabbits, field sparrows, chipping sparrows, song sparrows, goldfinches, and various butterflies and other insects. Concentrating ESS habitat next to the gasoline through forestry cuts will maximize use by wildlife that require it.

#### 4. Wildlife Based Recreation

This Block is important for the hunting and trapping opportunities it provides in this area of New Haven County, where there are relatively few large DEEP-owned lands. All hunting and trapping is done in accordance with DEEP regulations.

The Block receives an allotment of stocked pheasants each year and is one of the few publicly owned lands available in the County for pheasant hunting. Stocking will continue subject to annual review by the DEEP Wildlife Division.

The New Haven Bird Club often has bird watching trips here.

The Block was one of the sites in central Connecticut where the most recent emergence (1996) of the 17-year periodical cicada emerged.

### G. Vegetative Condition

**Forest Types by Size Class on Entire Block (in acres)**  
 (does not include developed acreage)

Forest Type	Pole	Sapling	Sap-Pole-Sawtimber	Saw	Sawtimber-Pole	Saw-Sapling	Grassland	Total
Northern red oak				435	20	35		<b>490</b>
Mixed upland hardwoods	4	46	24	18	31	12		<b>135</b>
Yellow-poplar			22	10				<b>32</b>
Yellow-poplar/white oak/northern red oak				22				<b>22</b>
Eastern hemlock				20				<b>20</b>
grassland – fields and gasline							10	<b>10</b>
Conifer plantations				2	3			<b>5</b>
<b>Total</b>	<b>4</b>	<b>46</b>	<b>46</b>	<b>507</b>	<b>54</b>	<b>47</b>	<b>10</b>	<b>714</b>
% of total forested land	1	6	6	71	8	7	1	<b>100</b>

Figure 3. Forest Types are from the US Forest Service

As shown above, there is not a great deal of variety in the sizes and kinds of trees in the Block. Most of the Forest is dominated by sawtimber oaks, with shade tolerant hardwoods such as sugar maple, red maple, yellow birch, and black birch growing in the understory.

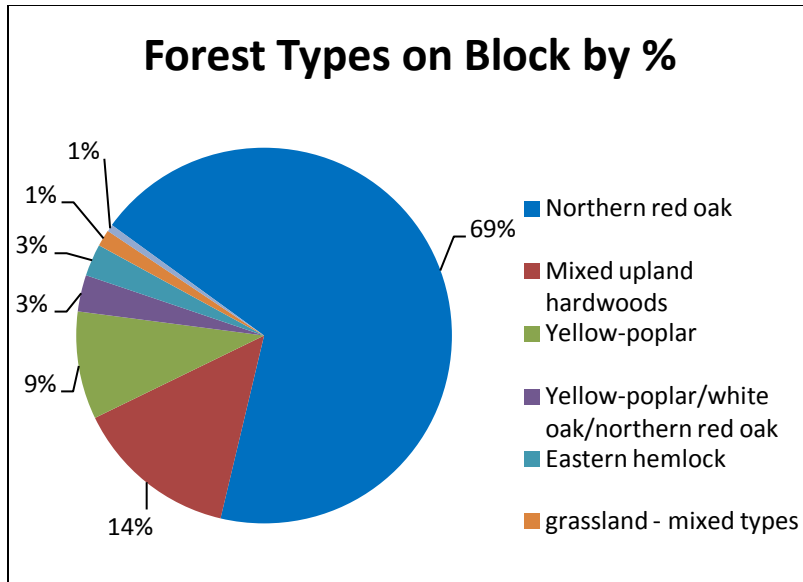


Figure 4. Forest Types on Block on a Percentage Basis

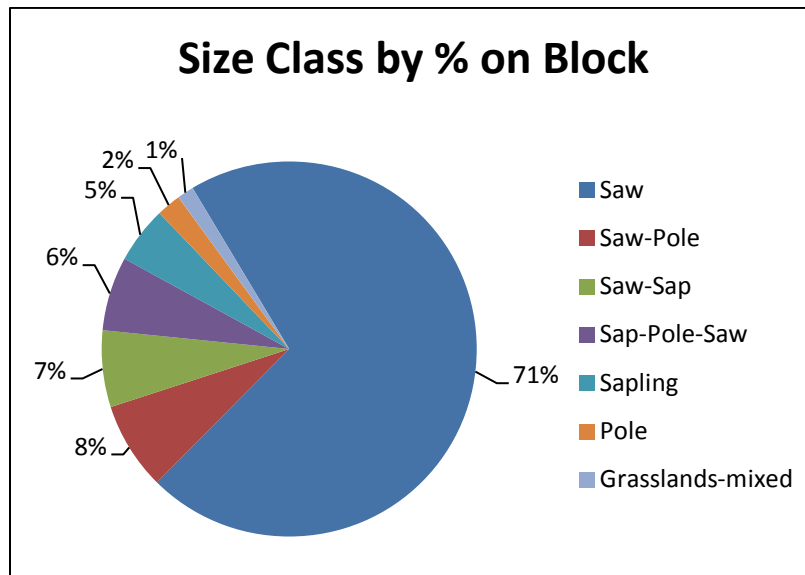


Figure 5. Size Class by Percent of Total Acreage

**Forest Cover Type, Size Class, and Silvicultural Treatment on forested areas to be actively managed (acres)**

Forest Cover Types	Regenerate clearcut	Regenerate selection	Thin-overstocked	OK at present	Total
<b>Mixed upland hardwoods</b>					
Pole				15	15
Sapling				0	0
Sap-Pole-Sawtimber				24	24
Sawtimber				18	18
Sawtimber-Pole				29	29
Sawtimber-Sapling				10	10
<b>Total</b>				<b>96</b>	<b>96</b>
<b>Northern red oak</b>					
Sawtimber		41	81	35	157
Sawtimber-Pole	18				18
Sawtimber-Sapling				35	35
<b>Total</b>	<b>18</b>	<b>41</b>	<b>81</b>	<b>70</b>	<b>210</b>
<b>Conifer plantations</b>					
Sawtimber			2		2
Sawtimber-Pole			3		3
<b>Total</b>			<b>5</b>		<b>5</b>
<b>Yellow-poplar</b>					
Sapling				32	32
Sapling-Pole-Sawtimber				22	22
Sawtimber				10	10
<b>Total</b>				<b>64</b>	<b>64</b>
<b>Yellow-poplar/white oak/northern red oak</b>					
Sawtimber				22	22
<b>Total</b>				<b>22</b>	<b>22</b>
<b>Total for Block</b>	<b>18</b>	<b>41</b>	<b>86</b>	<b>252</b>	<b>397</b>

Figure 6. The actual acreages to be managed will be somewhat less than shown because of small inoperable areas within stands such as wetlands and rock outcrops.

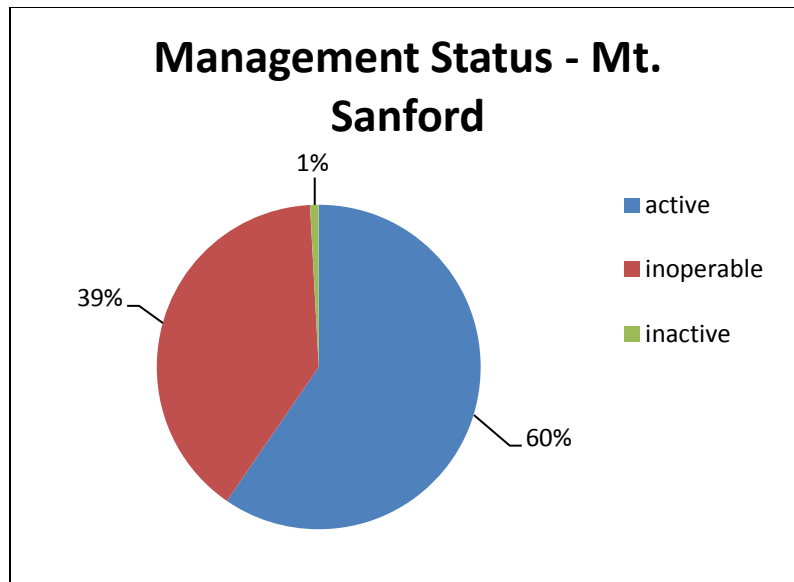


Figure 7. Management Status: Active, inactive (the gas line), and inoperable areas.

### 1. Forest Health

Hemlock woolly adelgid and elongate hemlock scale, both imported insects, are decimating the hemlocks. Where the trees are of sufficient size and volume, and are accessible, they have been salvaged for logs. Most of the time however, they have simply died. Hemlock survival in moister ravines is better than on drier upland sites.

Gypsy moth, which defoliated many of the oaks from 1980-81, has not done any significant damage since then.

Emerald Ash Borer, a nonnative insect that has killed millions of ash trees in the Midwest, was discovered in New Haven County in the summer of 2012. As of this writing, it has not been confirmed in this Block of the Forest. Fortunately, ash does not comprise a large portion of the Block, but in localized areas, particularly in moist areas, it can be abundant. Quarantines on the movement of firewood and ash sawlogs from New Haven County have been enacted. More information is available at [www.ct.gov/deep/forestry](http://www.ct.gov/deep/forestry).

The forest is susceptible to native insect outbreaks by Eastern tent caterpillar, Two-lined chestnut borer, and Orangestriped oakworm. By creating a forest with a diverse mix of species, the effects of these insects can be minimized.

Nectria canker, a fungus that disfigures birch stems, is a localized problem but does not seem to be a major deterrent to growing birch trees for timber. Beech bark disease is not prevalent in this Forest.

Because of its proximity to the shoreline, this Block may be more susceptible than others to the effects of hurricanes. This can be mitigated to some extent by creating younger stands of trees that can withstand high winds while also providing much needed young forest habitat.

## 2. Understory Concerns

Invasive exotic plants are spreading into the Forest, outcompeting native species. For example, winged euonymus has become more prevalent in stand 3-3 adjacent to the subdivision on Mountain Brook Road in Cheshire. After timber harvests in Stands 1-1 and 3-8, Tree-of-Heaven invaded. The saplings were cut and the stumps sprayed with an herbicide.

There is some Japanese barberry, Oriental bittersweet, and multiflora rose in a moist area south of the Youth Group Camping Area. Japanese stiltgrass has also been observed. These invasive plants should be eradicated before implementing forest operations on these sites. If the invasive species go unchecked, control will become cost-prohibitive and productive forestland will be lost.

Deer have impacted the amount and kinds of tree regeneration. Deer often feed on desirable species, such as oaks, but not yet to such an extent that regeneration has been drastically impacted. Techniques to reduce the effect of deer include regulated hunting and clustering harvests to produce enough regeneration to overwhelm the deer.



Figure 8. Red maple stump sprouts heavily browsed by deer, surrounded by an invasion of Japanese stiltgrass. Photo by Gerard Milne.

## H. Landscape Context

### Adjacent land uses

Roughly 500 acres of actively managed woodland owned by the Regional Water Authority adjoin the Forest on the west. To the east lies 205-acre Brooksvale Park, owned by the Town of Hamden. It is mostly forested and is primarily managed for recreation. Also east of the Forest is approximately 50 acres owned by the Cheshire Land Trust, and additional land with conservation easements owned by the Regional Water Authority. To the south is 90 acres owned by the YMCA. In total, there is almost 1,500 acres of permanent, wooded open space in

the immediate area. About ½ mile north of the Forest, in Prospect, is additional acreage owned by the Regional Water Authority. The rest of the surrounding land is made up of private woodlands, small Christmas tree farms, a nursery, and residential areas.

From the landscape perspective, the value of this Block of State Forest is enhanced because it is part of a larger area dominated by forest cover that will remain undeveloped. These woodlands will provide forest age class diversity for wildlife because of the active management on both state and water company lands.

## **I. Specific Land Acquisition Desires**

No specific parcels have been identified. However, any land that connects the Forest to Brooksvale Park or to the Regional Water Authority should be evaluated for acquisition if it becomes available.

## **J. Public Involvement**

A copy of this plan was sent to the appropriate commissions in the towns of Hamden, Cheshire, Bethany, and Prospect for their review. No comments were received.

## **K. Adaptive Management**

Connecticut's forests are dynamic ecosystems, adapted to respond to natural disturbances such as insect and disease infestations, fires, and severe weather events. Adding to the complexity of these disturbances are the effects of non-native insects and diseases for which our forests have not evolved any defense mechanisms. The Division of Forestry continually evaluates forest conditions, and practices adaptive management to address unforeseen circumstances during the course of this management plan.

## **L. 10-Year Goals**

The Mount Sanford Block of Naugatuck State Forest was acquired to serve as a demonstration area for sound forest management, to provide a source of timber for lumber and cordwood, to offer the public forest recreation, to provide wildlife habitat, and for watershed protection.

The recommendations of this plan will continue the legacy of George Cromie, while also recognizing that DEEP, as stewards of public land for present and future generations, must maintain soil productivity, keep streams free of sediments and pollutants, and maintain vegetative diversity and viable populations of wildlife.

Timber will be sustainably harvested to provide diverse wildlife habitat, revenue to the State of Connecticut, and provide a sustainable source of raw material to a locally-based forest products economy.



Over the long term, 397 acres (57% of the total forested area) will eventually undergo active forest management. Three hundred five (305) acres (43% of the total forested area) will not be actively managed because of poor access, operability, recreational considerations, or unique wildlife habitat, and will be left in a "natural" state.

One hundred eighty (180) acres will be managed on an uneven-aged basis (45% of the total area to be managed). In uneven-aged management, timber harvests will use single tree or group selection techniques, in which openings in the canopy will generally be less than 1 acre. This should provide enough sunlight for some shade intolerant species to regenerate, such as tulip poplar, although intermediate and shade tolerant species will eventually become most abundant (such as birch, maple, beech, and hemlock, if it survives the adelgid and elongate hemlock scale).

Roughly 1/3 of the timber volume on a given area will be removed with each harvest, to be repeated on a 20-year cutting cycle.

One hundred eighty (180) acres/20-year cutting cycle results in 9 acres per year (or 90 acres over 10 years on a sustainable basis).

**Over the next 10 years, 40 acres will be treated using the selection method.**

Two hundred seventeen (217) acres will be managed on an even-aged basis (55% of the total area to be managed). A 100-year rotation will be used. At the end of the rotation, the entire overstory is removed to provide full sunlight to the forest floor, stimulating the growth of shade-intolerant trees, such as oak, black cherry, and tulip poplar. Stands 3-5 and 3-11 are examples of this treatment. Because the stands to be managed as even-aged are already nearing 100 years old, some will be close to 200 years at the time of final regeneration.

Two hundred seventeen (217) acres/100-year rotation results in approximately 2.2 acres per year (22 acres every 10 years) being regenerated.

**Over the next 10 years, 18 acres will be regenerated.**

In even-aged management, during the course of the rotation, intermediate treatments such as thinnings are used to improve the composition and spacing of the trees. Thinnings in overstocked stands (relative density over 80%) will provide optimum growing space for the better quality trees.

**Over the next 10 years, 87 acres will be thinned.**

## **Long Term Forest Management Objectives For Wildlife**

### **Uneven-aged Management**

Uneven-aged silvicultural methods create favorable habitat conditions for existing wildlife, especially forest interior songbirds. Single tree and group selection harvests will create

temporary openings in the forest canopy, allowing more sunlight to penetrate to the forest floor. This improves understory growth, enhancing vertical stratification.

### **Even-aged Management**

Even-aged silvicultural methods create habitat for a variety of wildlife species that are disturbance-dependent and have evolved by using young forest habitat. These include some of the species of greatest conservation need such as blue-winged warblers, chestnut-sided warbler, American woodcock and New England cottontail (*Connecticut's Comprehensive Wildlife Strategy, DEEP 2005*).

Even-aged management creates young forest conditions in larger patch sizes (10 or more acres). Early successional forest (also known as young forest/seedling-sapling forest) is uncommon statewide (*US Forest Service, 2007*). Currently, about 5 percent of Connecticut's woodlands are seedling-sapling forest. Patch cuts or clear cuts that create young forest conditions are used by early successional species for about 20 years, after which the patch becomes pole-timber sized.

Additional young forest patches must be created in a timely fashion to replace the original ones as they mature. Creating additional seedling-sapling sized forest in this plan will help reach the long term goal of 10-20% of the acreage in young forest conditions and benefit disturbance-dependent wildlife.

### **Coarse Woody Material**

Keeping or leaving some coarse woody material on the forest floor provides micro-environments for salamanders, reptiles, and insects. It is important not to clear out all woody debris to create a "park-like" understory.

### **Snag and Den Trees**

Generally, the value of a snag increases as its size increases. Three snags of 12-inches in diameter at breast height (dbh) or greater should be available per acre. All snags should remain in clearcuts if possible and within 100 feet of wetland and riparian zones.

A minimum of one 15-inch dbh or greater den tree should remain per acre. Potential snag and den trees should be left where possible in stands being marked for even-aged and uneven-aged management.

### **Management Objectives for Fisheries**

The Inland Fisheries Division surveyed Brooksvale and Sanford Streams and found a fish population comprised primarily of a multiple-year population of native brook trout. To maintain or improve conditions for the trout, conserve or enhance riparian areas within 100 feet along both streams, and eliminate or mitigate ongoing or potential non-point and point sediment discharges. Replacing stream crossing structures should be in accordance with Inland Fisheries Division Guidelines (see Appendix).

## M. Work Plans

### **Road maintenance**

Brooksvale and Cromie Road will periodically need routine maintenance by the staff from the Sleeping Giant Park Unit , such as trimming overhanging branches, removing fallen trees, mowing roadsides to allow for road grading, cleaning out culverts after leaf fall, clearing drainage ditches, and maintaining water bars.

Investigate replacing the crushed, undersized culverts in Brooksvale Stream with a properly-sized, concrete arch culvert or a bridge. (Support Services)

Deliver and spread gravel as needed on eroded sections of all roads. Until the constricted stream passage mentioned in Section C from the undersized and collapsing culvert is fixed additional washouts and repairs are anticipated.

### **Road construction, gates, signs**

None planned.

### **Boundary marking**

Remark all boundaries by the end of 2015.

### **Stream improvements**

None planned.

### **Cultural site maintenance**

None planned.

### **Recreation or scenic site work**

Maintain signs at the parking areas with maps and information on recreational opportunities in the Forest. Post signs at all timber harvest sites explaining the reasons for the cutting. Opportunities to create views will be explored when timber harvests are planned.

### **Improvement of critical habitat**

None planned.

### **Trail maintenance**

Work with user groups to agree on an approved, sustainable trail network, stabilize eroded sections of trails, and block sections of trails that will no longer be used. (State Parks and Forestry Division)

### **Upland wildlife opening work or leasing**

Try to find an individual to sign an agricultural agreement to mow the fields for hay or cultivate appropriate crops in the fields on the former Sablitz parcel. (Wildlife Division)

### **Wildlife habitat improvement**

Enhance diversity of wildlife habitat through forestry operations.

**Wildlife population controls**

The Block will be open to hunting and trapping as per DEEP regulations.

**Forest stand thinning**

<b>Stand</b>	<b>Acres</b>
3-6B	32
3-9	50
3-16	5

**Forest stand conversion or regeneration**

<b>Stand</b>	<b>Acres</b>	
2-2	20	Selection harvest
3-15	20	Selection harvest

**Forest stand rotational cutting**

<b>Stand</b>	<b>Acres</b>	
3-4	18	Clearcut

**Pre-fire suppression work**

None planned.

## Appendix A - References

### References

Some of the references used in creating this plan:

- CT DEP, Division of Fisheries, Feb. 26, 2008. Stream Crossing Guidelines.
- CT DEP, Division of Forestry, rev. 2006. Standard Operating Procedures for State Forest Management.
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- US Forest Service, July 2000. Guidelines for Applying Group Selection Harvesting
- US Forest Service, 2007. The Forests of Southern New England, Resource Bulletin NRS-55.
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## Appendix B - Glossary

### Size Classes

**Sawtimber** - hardwood trees 12-inch dbh (diameter at breast height, or 4.5 feet off the ground) and larger, and softwood trees 10-inch dbh and larger, that contain at least one 8-foot sawlog.

**Poletimber**- hardwood trees between 5 and 11 inches dbh, and softwood trees 5 to 9 inches dbh. These trees are too small for sawlogs, but could be sold as pulpwood, fuelwood, or other small products where such markets exist.

**Saplings** - trees 1 to 5 inches dbh.

**Seedlings** - Trees less than 1 inch dbh.

**Stand** - an area of trees of a certain species composition (cover type), age class or size class distribution and condition (quality, vigor, risk), usually growing on a fairly homogeneous site. An **even-aged** stand contains trees in the main canopy that are within 20 years of being the same age. Even-aged stands sometimes are designated by age-class (e.g. a 40- year old stand) or broad size-class (e.g. seedling/sapling, poletimber, sawtimber). An **uneven-aged** stand contains trees of several 15-20 year age-classes. These stands generally contain trees of many sizes (seedlings through sawtimber) due to the range in ages and the differences in growth rates among species.

### Types of Silvicultural Treatments

**Clearcut**- Used in even-aged management to regenerate a new forest using seeds already in the soil, seeds brought in from adjacent areas by wind or animals, and/or sprouts from stumps. All stems are removed to provide maximum sunlight for the new forest. Trees such as black cherry, yellow poplar, aspen, and paper birch often regenerate after clearcuts. Often used to create early successional wildlife habitat.

**Selection harvest**- Used in uneven-aged management. Trees are removed singly or in small groups up to an acre in size, maintaining a fairly continuous canopy.

Selection harvests tend to favor trees that can grow in partial shade such as sugar and red maples, black and yellow birch, beech, and hemlock.

**Shelterwood**- Used in even-aged management. Understory and lower crown canopy trees are removed to allow the new stand to regenerate in partial sunlight. Trees to be retained are usually of the best quality to serve as a desirable source of seed. After adequate regeneration is established, the overstory is removed in one or two cuts. Shelterwoods are often used to regenerate species such as oak and white pine that have irregular crops of seed.

### Forest Types (from the U.S. Forest Service)

**Forest Type** is based on species composition of the overstory, with the overstory defined as all trees in the 1" dbh class and larger. Species composition is based on the proportion of total stand basal area represented by each species or species group. Forest type designations are not assigned to stands until they grow out of the seedling stage into the sapling class.

Forest Types mentioned in this plan are:

**Conifer plantation:** Can be made up of one or more of the following species- Norway spruce, Eastern white pine, Scotch pine, Douglas fir, and White spruce. Sites-usually found on former agricultural land.

**Eastern hemlock:** Associates – beech, sugar maple, yellow birch, basswood, red maple, black cherry, white ash, white pine, paper birch, sweet birch, northern red oak, and white oak. Sites--cool locations, moist ravines, and north slopes.

**Mixed upland hardwoods:** Associates – Any mixture of hardwood species typical of the upland central hardwood region, should include some oak. Sites--wide variety of upland sites.

**Northern red oak:** Associates – black oak, scarlet oak, chestnut oak, and yellow-poplar. Sites--spotty distribution on ridge crests and north slopes in mountains but also found on rolling land, slopes, and benches on loamy soil.

**Yellow-poplar:** Associates – red maple, sweet birch, and other moist-site hardwoods. Sites--lower slopes, northerly slopes, moist coves, flats, and old fields.

**Yellow-poplar/white oak/northern red oak:** Associates – black oak, hemlock, and hickory. Sites--northern slopes, coves, and moist flats.



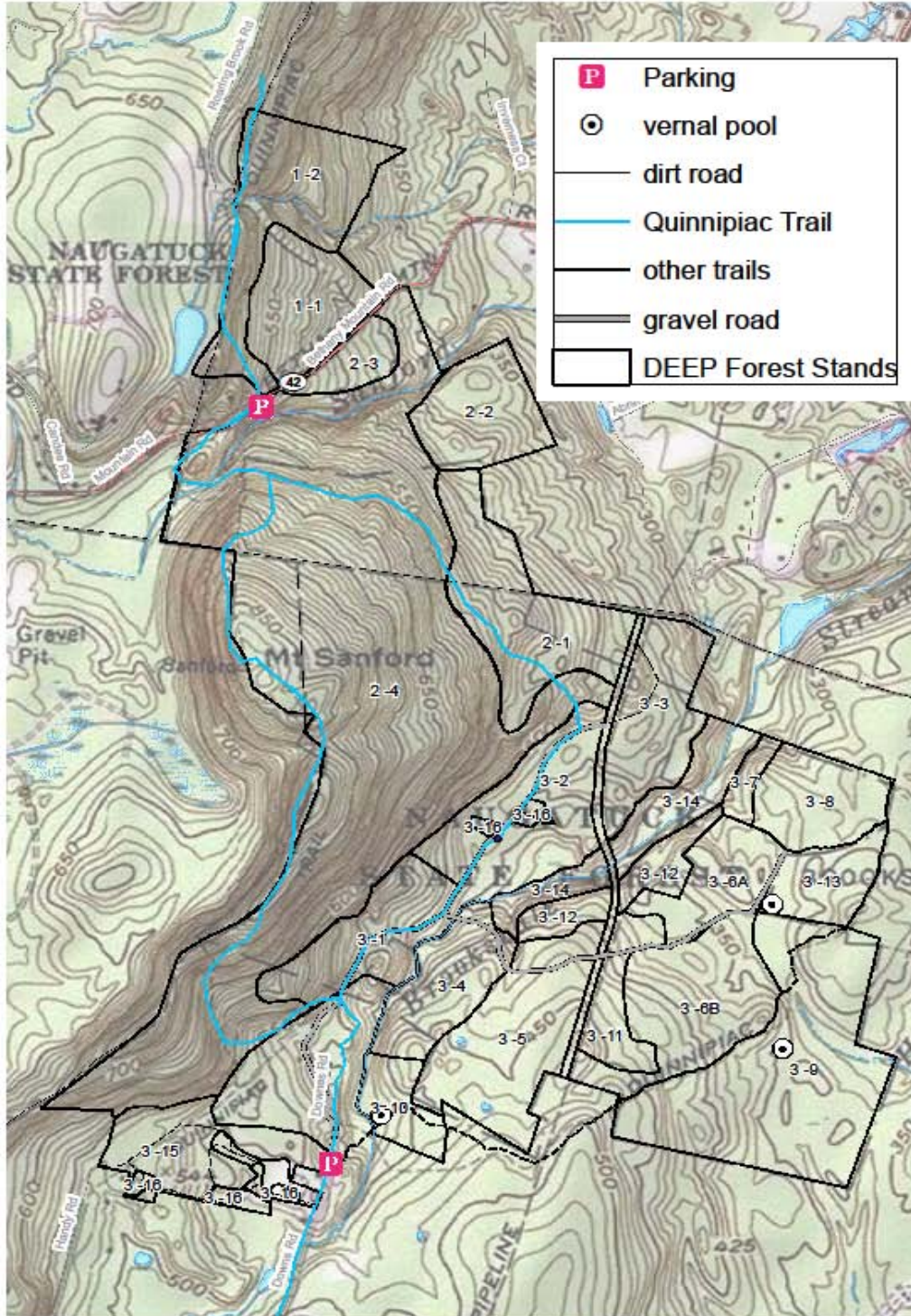
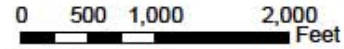
# Map A - Topographic Stand Map



## Naugatuck SF, Mt. Sanford Block Hamden, Cheshire, etc. 712 Acres Topography



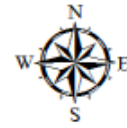
April 23, 2013



# Map B – Base Stand Map

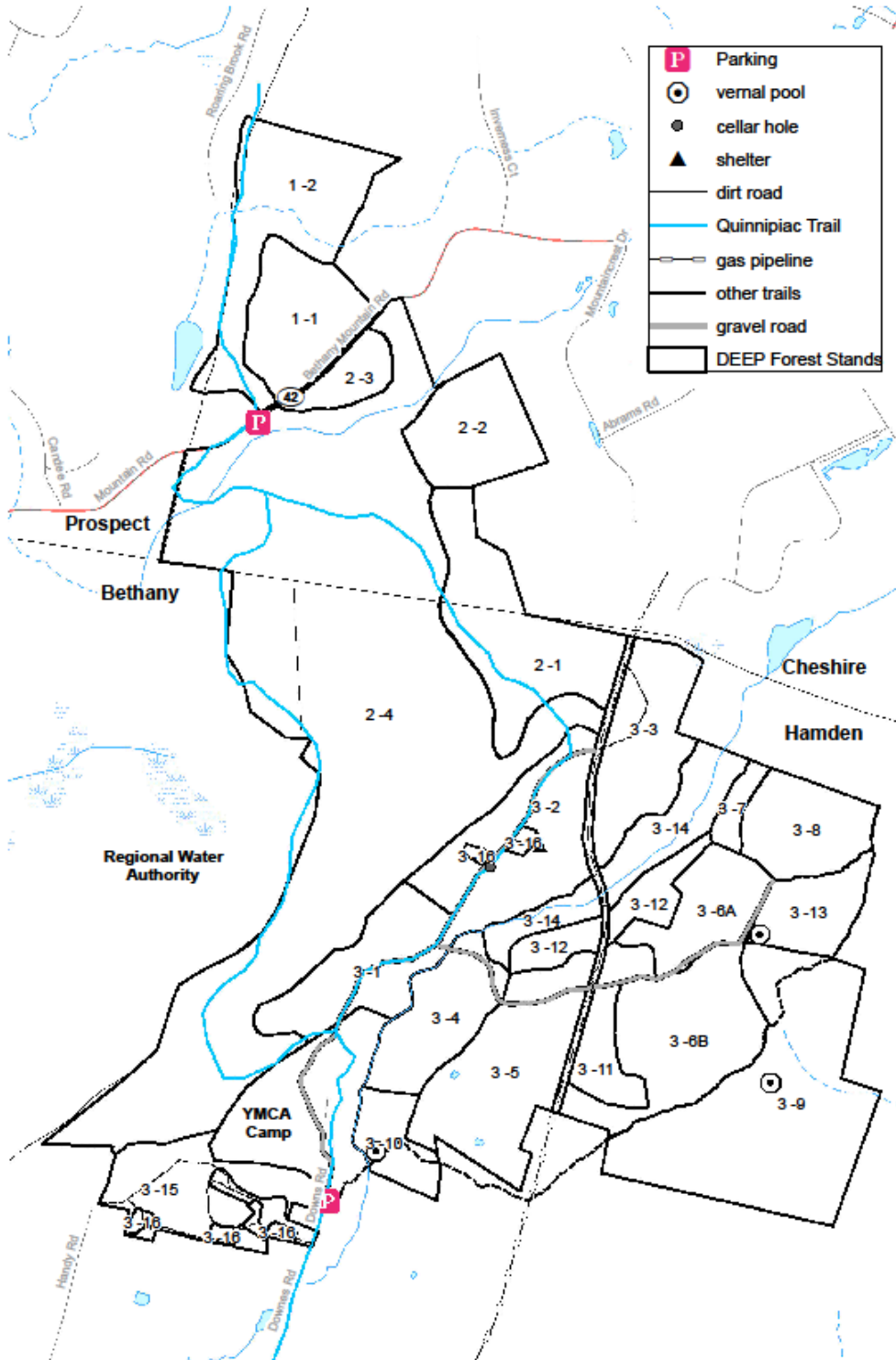


## Naugatuck SF, Mt. Sanford Block Hamden, Cheshire 712 acres Base Map



April 23, 2013

0 500 1,000 2,000  
Feet



# Map C - Site Quality Map



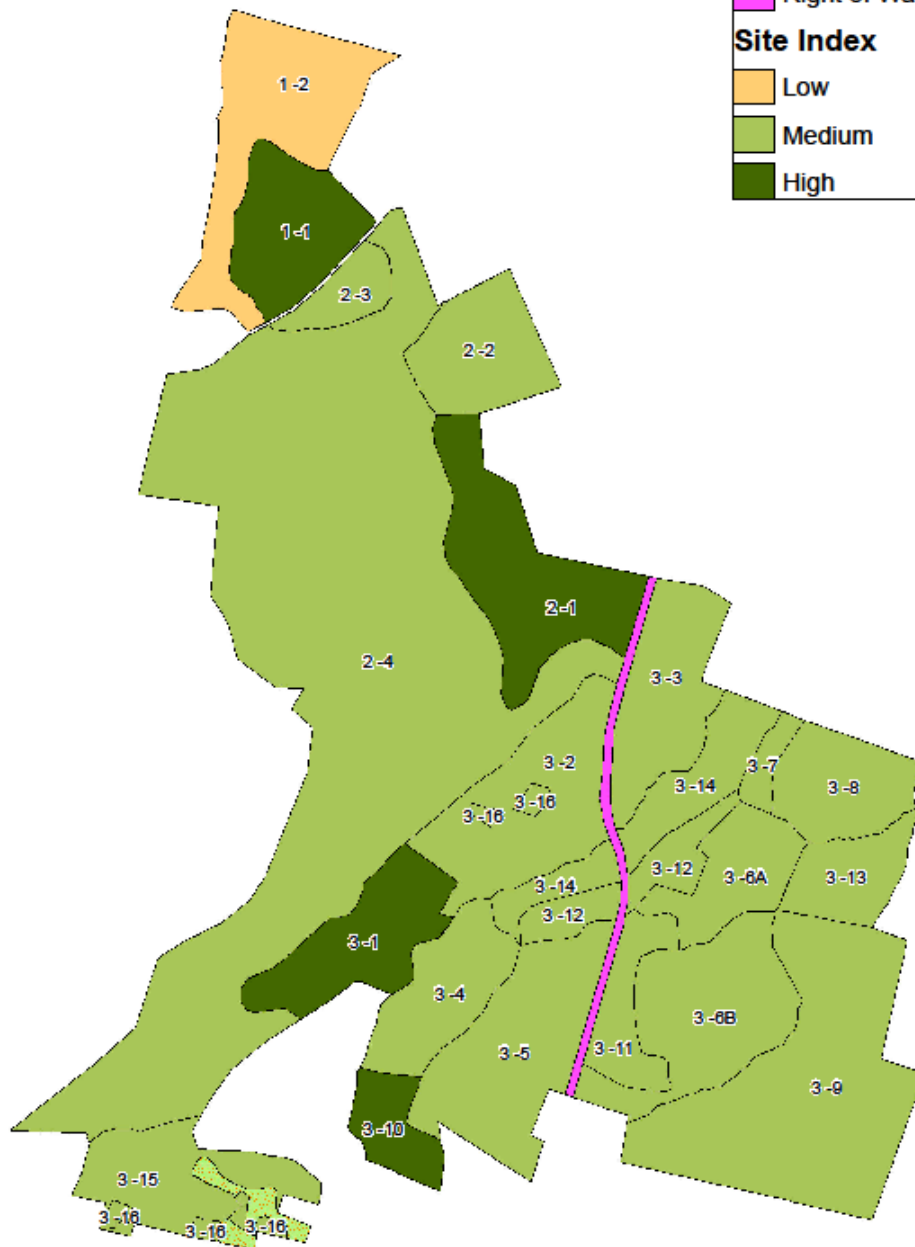
April 23, 2013

## Naugatuck SF, Mt. Sanford Block Hamden, Cheshire 712 acres Site Quality



0 500 1,000 2,000  
Feet

	Field
	Right of Way
<b>Site Index</b>	
	Low
	Medium
	High





# Map D – Forest Type and size Class Map

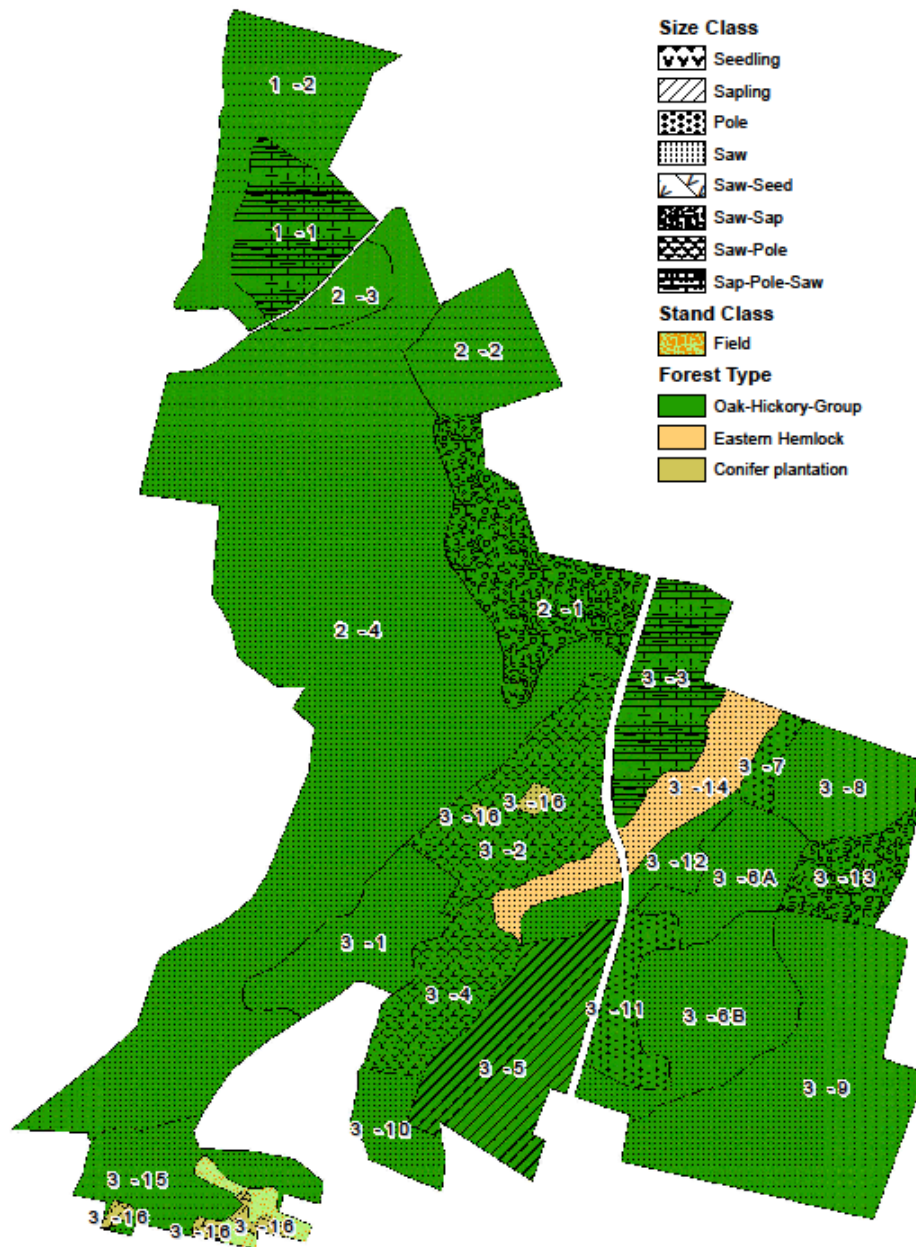


April 23, 2013

## Naugatuck SF, Mt. Sanford Block Hamden, Cheshire, etc. 712 acres Forest Type & Size Class



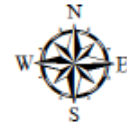
0 500 1,000 2,000 Feet



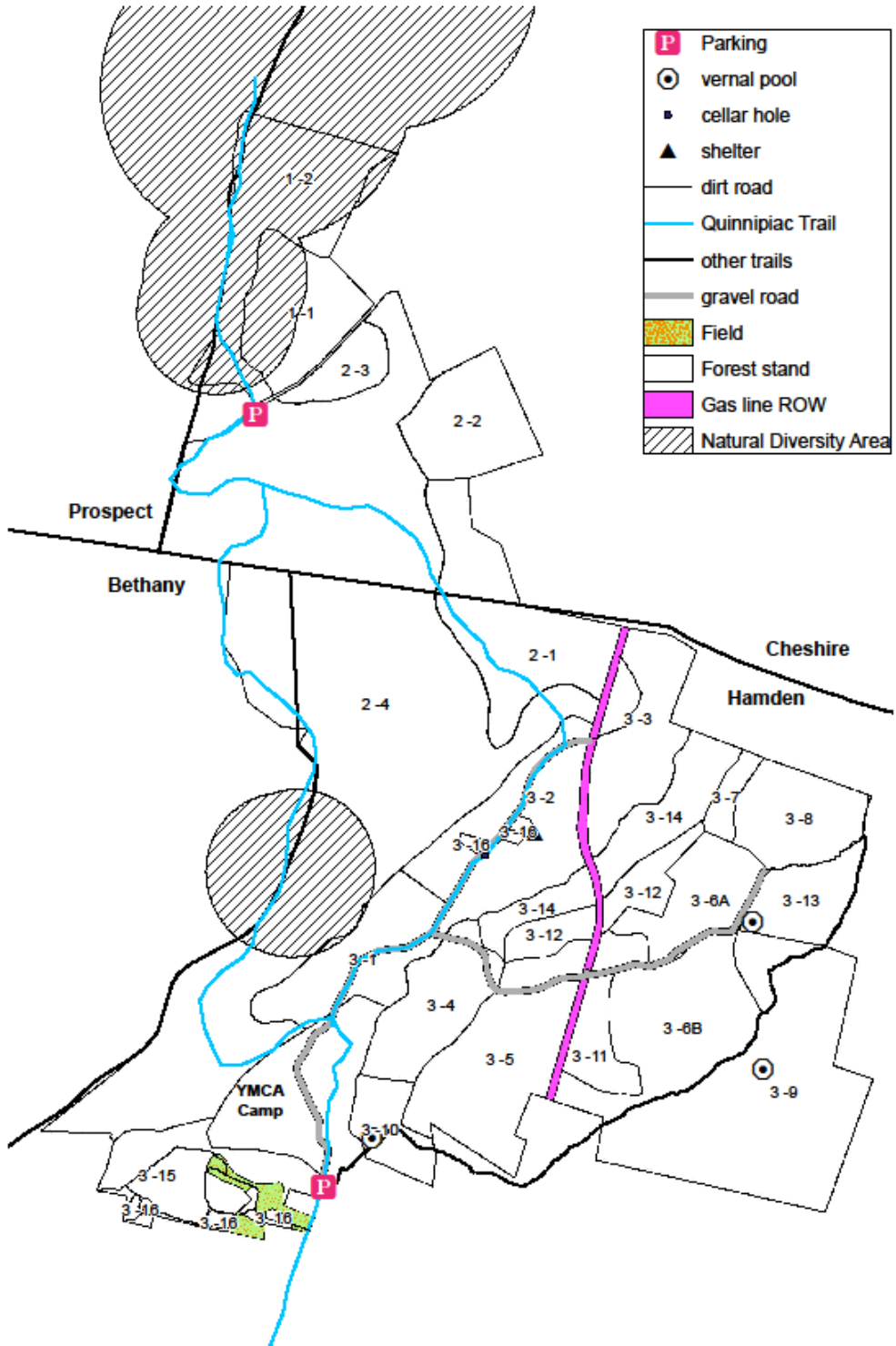
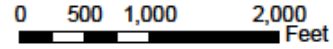
# Map E – Special Features Map



## Naugatuck SF, Mt. Sanford Block Hamden, Cheshire, etc. 712 acres Special Features



April 23, 2013



# Map F – Work Plan Map



April 23, 2013

## Naugatuck SF, Mt. Sanford Block Hamden, Cheshire, etc. 712 acres Silviculture Work Plan

