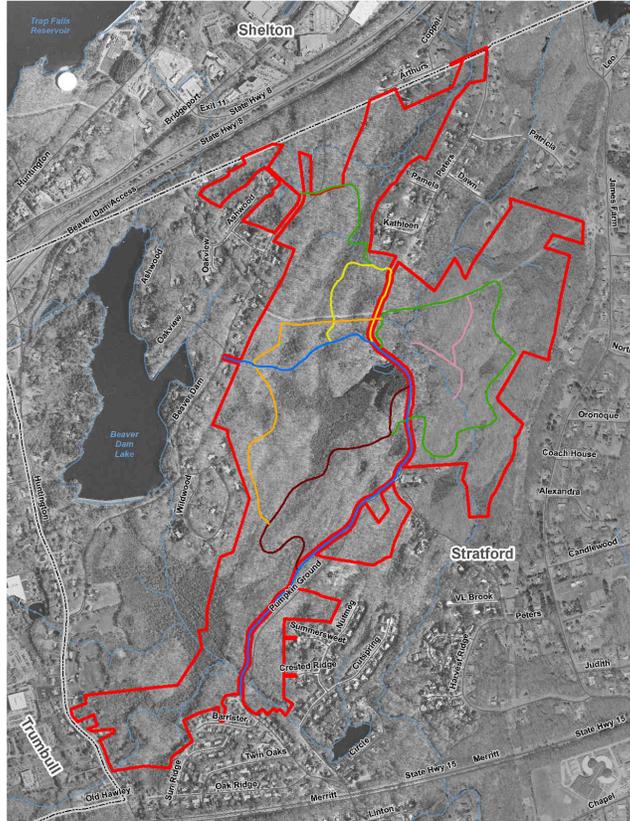


Forest Management Plan for The Town of Stratford's Roosevelt Forest



Prepared for:



The Town of
Stratford, Connecticut

Prepared by:



Ferrucci & Walicki, LLC
Middlefield, CT

Draft Date: May, 2011
Revised to August, 2011



EXECUTIVE SUMMARY

This Management Plan is intended to help guide the management of the Town of Stratford's Roosevelt Forest for the period of 2011-2020. Through a multiple-use approach, this property should be managed to maintain balanced and properly functioning ecosystems, maintain forest health and habitat conditions for native wildlife, protect threatened and endangered species, protect water quality, and provide recreational and educational opportunities for the general public.

As examined for this Management Plan, Roosevelt Forest contains 401 acres in the northern portion of Stratford, Connecticut. This is the first known comprehensive Management Plan prepared for the property. Based on field observations, most of the property has not received any active forest management in the recent past (40+ years).

The property was researched and field-investigated by Ferrucci & Walicki, LLC during the late winter and early spring of 2011. The results, along with multiple-use management recommendations for the next ten years, are included in this Management Plan. Overall, our investigation revealed that the property contains generally healthy forested ecosystems (mostly hardwood, with a small amount of softwoods), and possess varying levels of both existing and potential recreational opportunities. The property also contains and is adjacent to utility corridors that, together with the properties' forested portions, provide habitat management opportunities.

From a landscape perspective, Roosevelt Forest is the first upland forest of significant size on the western side of the Housatonic River, moving upstream from Long Island Sound.

Roosevelt Forest property currently has extraordinarily engrained multiple uses and functions - picnicking and other park-like activities, passive recreational trails for hiking & mountain biking, scout camping, a police firing range, and both complex wetlands/watercourses and extensive unmanaged forest areas that provide habitat refuges. These uses have developed and learned to coexist over the past 70 years and continuation of all activities seems possible moving into the future.

Roosevelt Forest is can be divided into three activity areas based on current recreational usage patterns: active areas such as the central pavilion and picnicking portion of the Forest, passive areas that include the Forest's hiking and camping components, and no activity areas containing a mix of wetlands and isolated uplands. These existing use areas provide an excellent framework for management.

The two major concepts proposed for managing Roosevelt Forest into the future include developing three somewhat distinct management areas based on current usage patterns, and emphasizing late-successional structure through most of the Forest's acreage with the goal of emulating structural old growth characteristics.



SUMMARY OF MAJOR RECOMMENDATIONS

Natural Resources

1. Given the size, location, current conditions, and current multiple uses of Roosevelt Forest, it is an excellent candidate, in part, for management techniques that allow for both timber harvesting and encouragement of late successional (or, “structural old growth”) conditions.
2. Most of Roosevelt Forest’s upland acreage is somewhat homogeneous mature hardwood forest. Special consideration should be give to the Forest’s relatively small white pine and hemlock stands, and to creating more uneven-aged structure.
3. Invasive species should be controlled/removed where possible to encourage native vegetation.
4. The property’s complex wetland systems and vernal pools should be properly protected, along with Eastern box turtle habitat areas (including the property’s maintained utility right-of-way).

Recreation

1. All boundaries should be signed and blazed, and signage throughout the forest should be made more consistent.
2. Improved trailheads should be developed at several entrances to the Forest
3. The 1975 trail guide should be updated and expanded.
4. Greater access to trail mapping should be considered - both paper and interactive digital versions.
5. A series of Town-sponsored geocaches and/or letterboxes should be installed throughout the property.
6. A cooperative arrangement with a local mountain biking club should be considered for trail upkeep & maintenance.

Other

1. A limited hunting program should be considered for the property.
2. Cooperative arrangements with an environmental organization should be sought for maintenance and operation of Roosevelt Forest’s currently unused nature center building.
3. Efforts should be made to increase overall public awareness of the Town of Stratford’s Roosevelt Forest and the property’s extensive recreational & educational opportunities.

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From Town of Stratford Website:

“The Town of Stratford is very fortunate indeed to be one of the few towns or cities in the nation to have its very own forest. Located at the end of Peters Lane, off James Farm Road, this beautiful 250 acre forest is part of our town's excellent park system.

Roosevelt Forest was set up during the depression in the 1930's from land purchased by then Stratford Town Manager, Donald D. Sammis. It was developed, in large part, through President Franklin D. Roosevelt's W.P.A. program, designed to provide jobs for legitimate public projects. The park was established to provide recreational opportunities for townspeople, and to protect the watershed, wildlife, and beauty of this fine example of mixed deciduous forest.

Included in the forest system is a lovely pond, various wetlands, and, for the user's benefit, there are playgrounds, picnic tables, picnic shelters, cooking pits, restrooms, and walking paths. Hiking, cross-country skiing, and snowshoeing are all enjoyed here.

Without a doubt, the outstanding feature of the forest is its natural flora and fauna. Roosevelt Forest is a wildlife sanctuary and it has most species one would expect to find in a typical Connecticut mixed deciduous forest, including both coniferous (pines, spruces, etc.) and deciduous broadleaf hardwoods (maples, oaks, etc.). Lovely trails, some marked, lead one to the wonders of nature. Deer, small mammals, reptiles, amphibians, and much of Connecticut's birdlife can be observed within the forest. Trees, ferns, and wildflowers abound.”

On What Legal Basis Can A Town Forest Be Established?

According to Connecticut General Statutes Chapter 97, Sec. 7-131(a), "the legislative body of any town, city or borough may vote to establish a municipal forest for the purpose of raising timber, protecting water supplies, providing opportunities for outdoor recreation or employment of relief labor. For such forest such town, city or borough may appropriate money and purchase land, accept land or money by gift or bequest and allocate any land to which it holds title and which is suitable for the production of timber."

Management Goals

Roosevelt Forest provides numerous benefits to the community that surrounds and uses it and to the wildlife that live within it. The following goals are recommended for management of Roosevelt Forest:

- Demonstrate sound, sustainable land stewardship
- Improve forest health
- Protect and enhance wildlife habitat
- Provide recreational and educational opportunities
- Conserve soil and water resources
- Help achieve stated open space goals of the Town

These goals, the conditions of the resources, and the inter-relationships between all of the elements of the forested ecosystem were considered while developing this plan. All recommended activities have been carefully considered and balanced within the general overall objectives of the Town of Stratford, and specifically, as stated within existing documents including the Town's 2003 Update to the Plan of Conservation & Development.

Property Description & Regional Context

The town of Stratford's Roosevelt Forest is a collection of parcels containing approximately 401 acres* in the northern portion of Stratford, CT, lying between the Merit Parkway (CT RT 15) and the Stratford-Shelton townline. The Forest is more specifically bounded to the west by the Beaver Dam Road neighborhood, to the north by the North Peters Court and Arthurs Court neighborhoods, to the east by properties along James Farm Road and Peters Lane, and to the south by Nutmeg Lane, Cutspring Road, Pumpkin Ground Road, Barrister Road, Sun Ridge Lane, and Huntington Street. Considering its location in the State, Roosevelt Forest is somewhat isolated between several unconnected neighborhoods, each with its own character.

Roosevelt Forest plays an important role within the open space context of the Town of Stratford. It is the largest single block of open space in the town, and provides an upland counterpart to the shoreline-oriented open spaces in the southern part of town. The Forest has a strong presence on the Town's website, and is even represented in the Town motto: "Offering more from forest to shore."

The Town's 2003 Update to the Plan of Conservation & Development makes several references to Roosevelt Forest, with the first on page 2 of that document.

Selected excerpts from the 2003 POCD Update *(emphasis added)*

- Part of Open Space Goal #5: "develop an assessment of existing open space by function (passive/active)..."
- From section vii – open space plan update (pg. 80):

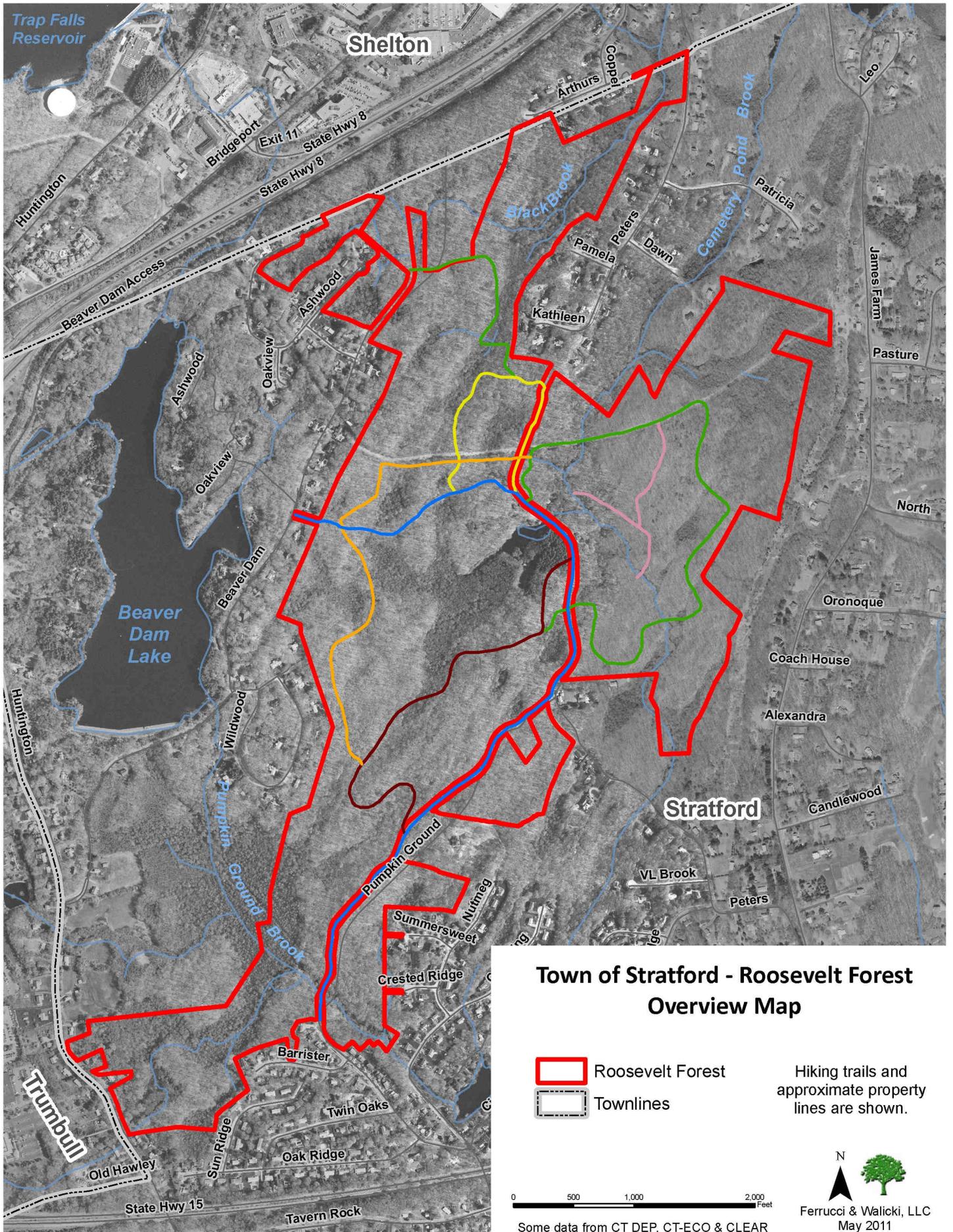
Roosevelt Forest

"The boundaries of Roosevelt Forest are currently unclear. There have been several acquisitions and donations adjacent to the Forest, which are now Town-owned. At this point, they are not recognized as specifically being part of the Forest. The Town should review each of its properties in the vicinity of the Forest to determine its appropriateness for inclusion within the boundaries of the Forest. Once the appropriate properties have been identified, the Town should formalize the revised boundaries of the Forest, as necessary."

Improve Maintenance of Open Space Areas

"There was considerable discussion regarding the maintenance of existing open space. Many participants voiced their opinion that the Town does not do enough to maintain its present open space network. Existing open space lands may be underutilized because of poor maintenance. The town should develop a comprehensive maintenance plan to keep its facilities clean, in good shape, and inviting to the public. Maintenance should be a consideration for future acquisition of additional open space lands."

* Note: The Roosevelt Forest is considered to be 401 acres, for purposes of this Plan.



Landcover and Forest Fragmentation Context

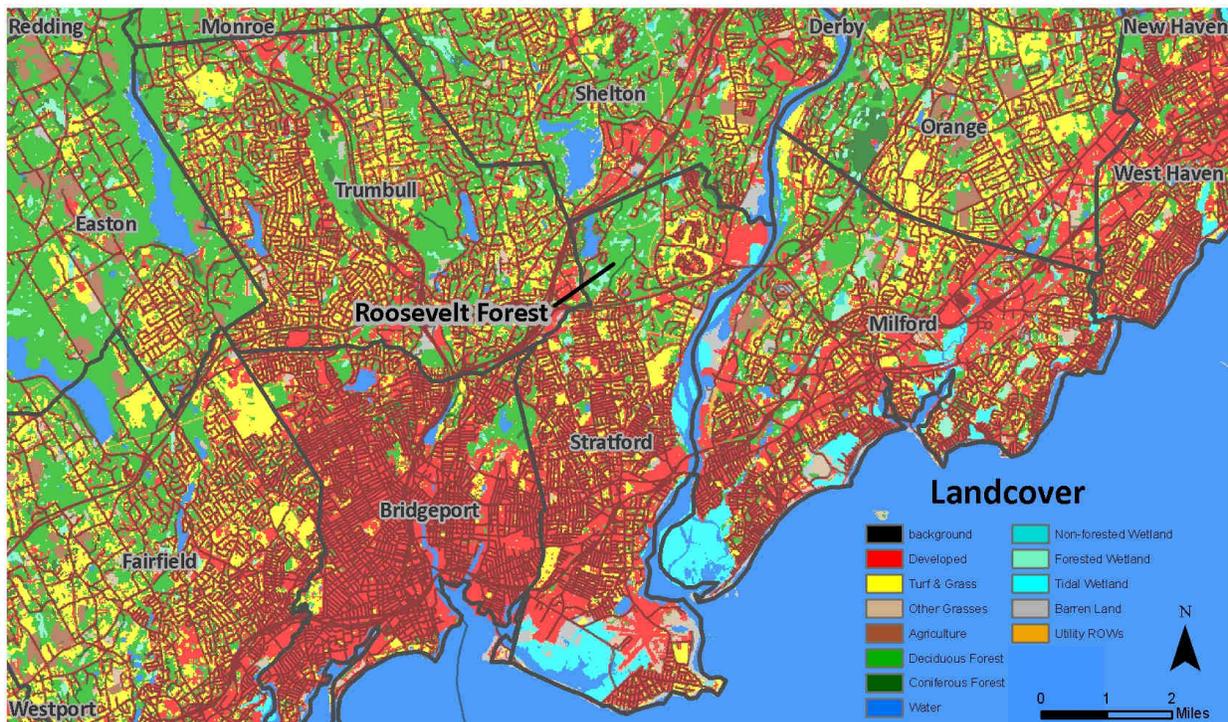
Landcover

Both the size of a forest and its arrangement can have significant impacts on the ways it acts as an ecosystem. Forest cover arrangements that contain a mixture of core, perforated, and edge forest types are generally desirable, as this provides forest structure diversity (which aids forest health) and continual habitat diversity. The process where large blocks of unbroken core forest are broken up by development or conversion to other land uses is referred to as fragmentation.

CORE FOREST: Contiguous forested areas at least 250 acre in size, and at least 300 feet in all directions from non-forested areas.

Core forest is the most quickly declining forest type in Connecticut. This loss is a concern because it is accompanied by a loss of the habitats and species that rely on it for survival, and because core forest best provides other forest functions such as water quality protection.

A recent study by the University of Connecticut's Center for Land Use Education and Research used satellite landcover data to examine forest fragmentation and the distribution of various forest types across the State. (www.clear.uconn.edu)



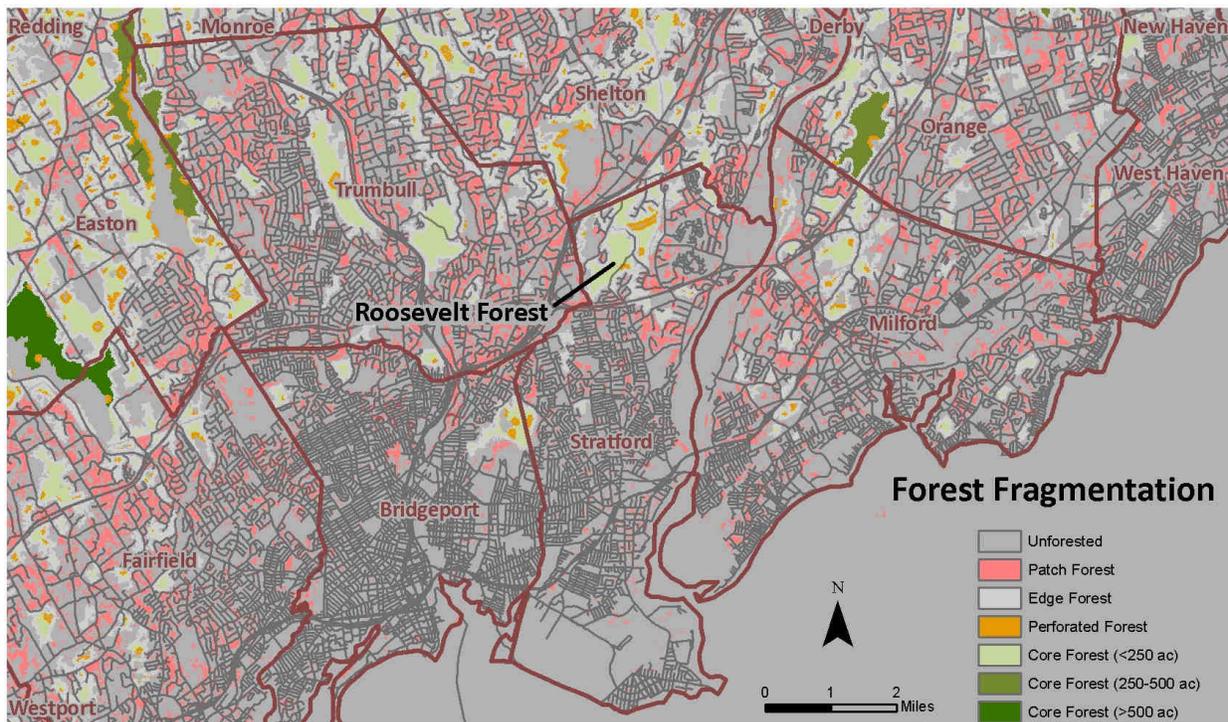
2006 data, 30m pixel grid. Source: CLEAR

Fragmentation

Based on the CLEAR study's data and definitions, *Roosevelt Forest contains the largest single piece of core forest within the Town of Stratford, and is one of the larger pieces of core forest within a 4-mile radius.* Other notable core forest areas in the vicinity include Remington Woods on the Stratford-Bridgeport line, land on the west side of Aquarion's Trap Falls Reservoir, Trumbull's Twin Brooks and Beach Memorial Parks, and open parcels in Shelton, Orange, and Milford.

Generally, Roosevelt Forest consists of core forest (<250ac), surrounded by a ring of edge forest type at its borders, with small amounts of perforated forest, especially along the AT&T right-of-way. (As mentioned elsewhere within this Management Plan, the areas classified as Utility ROW are important from a landcover standpoint because they are maintained in an early successional state through periodic vegetation removal programs. This essentially ensures habitat areas for early successional-dependent species.) The residential areas in the surrounding neighborhoods contain scattered amounts of patch forest.

Overall, the current arrangement of core, perforated, edge, and patch forest types provides many diverse forest function and habitat benefits, and should be generally maintained if possible.

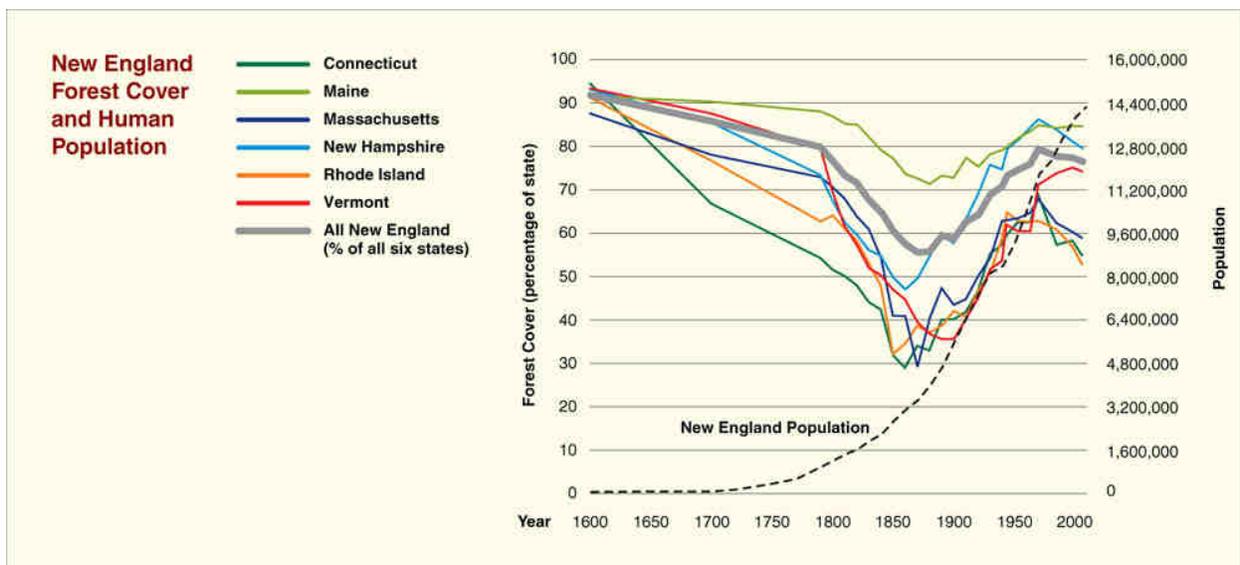


2006 data, 30m pixel grid. Source: CLEAR

Past Uses and Management

Native American people living in southern New England are known to have cleared land for agriculture and burned forests to open the understory and provide wildlife habitat. This is especially true in coastal areas, and was therefore likely done more extensively in the Stratford area than in more inland portions of Connecticut. Native Americans used trees for building shelter and tools that they used in their daily life. Later early settlers harvested timber, cut firewood and cleared the land for pasture and agriculture. Early accounts indicate that many forests were cleared for initial settlement, and then cleared again to run steam sawmills.

The deciduous forest cover on this property and surrounding properties has likely changed over the past 100 years. American Chestnut by all accounts was a dominant species in southern New England forests before European settlement. The introduction of chestnut blight in the late 1800's removed this species from the main canopy of the forest reducing it to an under story species that repeatedly sprouts, and then dies back before it can grow larger than about 1 to 6 inches in diameter. Today, white oak, red oak, black oak, and scarlet oak have gained dominant positions in the forest, along with an increasing amount of American Beech. In wetter areas species such as yellow poplar, white ash and red maple may also have increased in number to fill this space.



Dark green line indicates historical forest cover in Connecticut. Dotted line shows New England population.¹

In the mid to late 1900's the Dutch elm disease devastated American Elm trees throughout New England, especially in the greater New Haven area. This impact was greater in the cities where these species were planted for aesthetics than in the forests since the use of elm for timber is limited. Other species of elm not affected by Dutch elm disease have filled this niche. The stories of the American

The lessons of the American Chestnut and American Elm underscore a need for diverse and healthy forests.

¹ *Wildlands and Woodlands: A Vision for the New England Landscape*. Foster, D.R., B.M. Donahue, D.B. Kittredge, K.F. Lambert, M.L. Hunter, B.R. Hall, L.C. Irland, R.J. Lillieholm, D.A. Orwig, A.W. D'Amato, E.A. Colburn, J.R. Thompson, J.N. Levitt, A.M. Ellison, W.S. Keeton, J.D. Aber, C.V. Cogbill, C.T. Driscoll, T.J. Fahey, and C.M. Hart. 2010. Harvard Forest, dist. by Harvard University Press, Cambridge, Massachusetts.



Pre-Settlement New England Forest.² Simulating similar Late-successional or “structural old growth” characteristics is a recommendation of this Management Plan.



Above, a representative New England landscape at the height of agricultural clearing.³ At the height of clearing, about 60% of Connecticut was open.

No clear evidence of recent forest management activity is currently found in the forest. Quite notably, aerial photography from 1934 indicates that much what is now part of Roosevelt Forest was wooded at that time. Based on this evidence, it is safe to say that most of Roosevelt Forest has been in a wooded condition for at least 100 years.

Two previous forest management-related activities for Roosevelt Forest include a firewood management plan prepared by the Connecticut DEEP in the early 1970s, and a Christmas tree planting program referred to in a 1975 nature trail guide produced by the Stratford Conservation Commission. No evidence was seen in the field that the firewood program was implemented to much of a degree, if at all, and very little evidence remains of the planted Christmas trees.

Cultural Features & Resources

For a property of its size and location, Roosevelt Forest contains a rather small amount of cultural remains typically found in the Connecticut woods, such as stone walls, foundation holes, wire fence remains, etc. A small number of stonewalls do exist, concentrated near the Forest’s central area.

While constructed in a more recent era, the stone stair and wall structures south of the pine grove and the stone fireplaces within the picnic grove can be considered of having some cultural value. These were likely constructed during the 1930’s Civilian Conservation Corps era, and are excellent (albeit somewhat small) examples of recreational trail and park improvements done during that time.

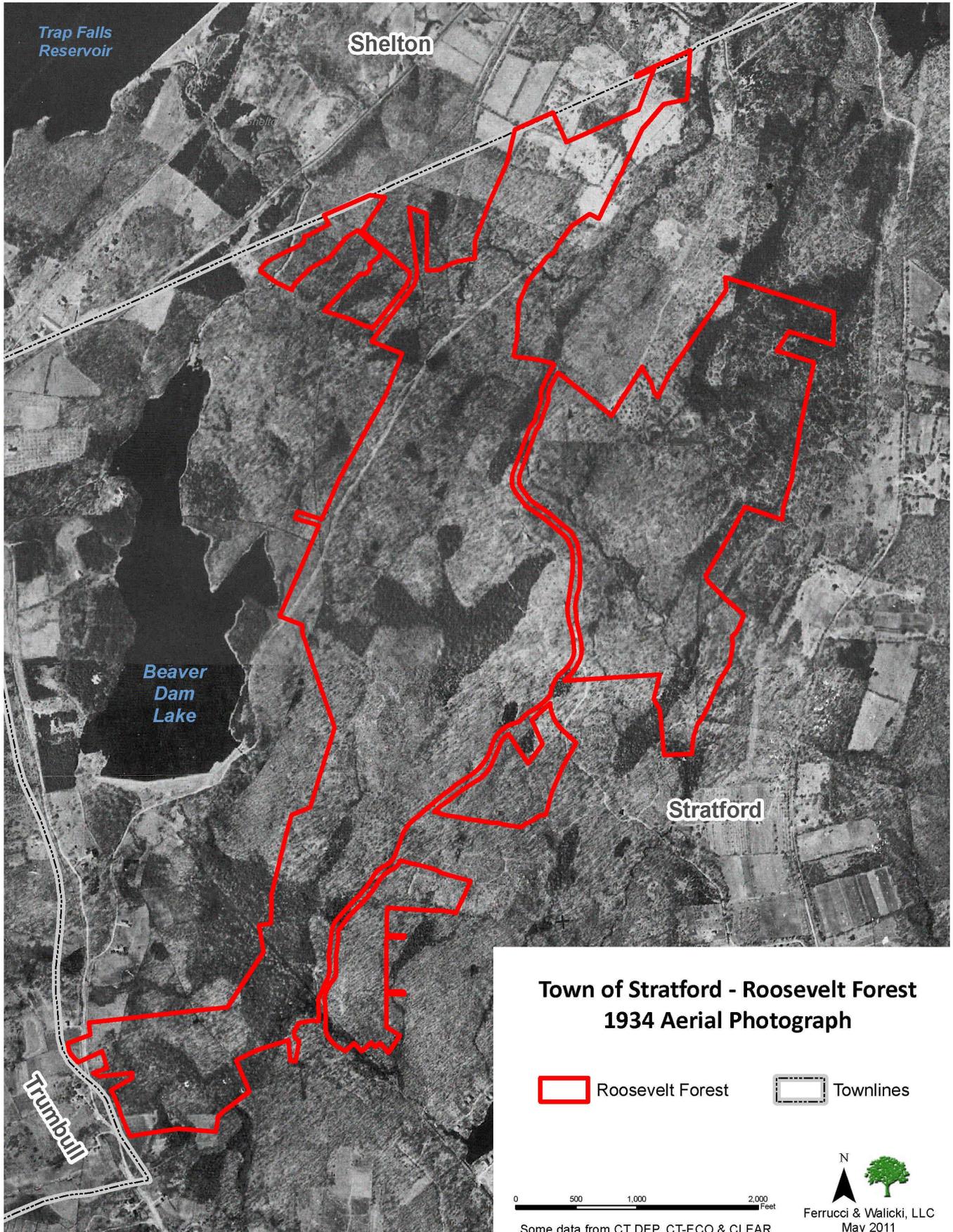
Cultural features should be clearly marked prior to any active management activities to ensure that they are avoided and preserved.

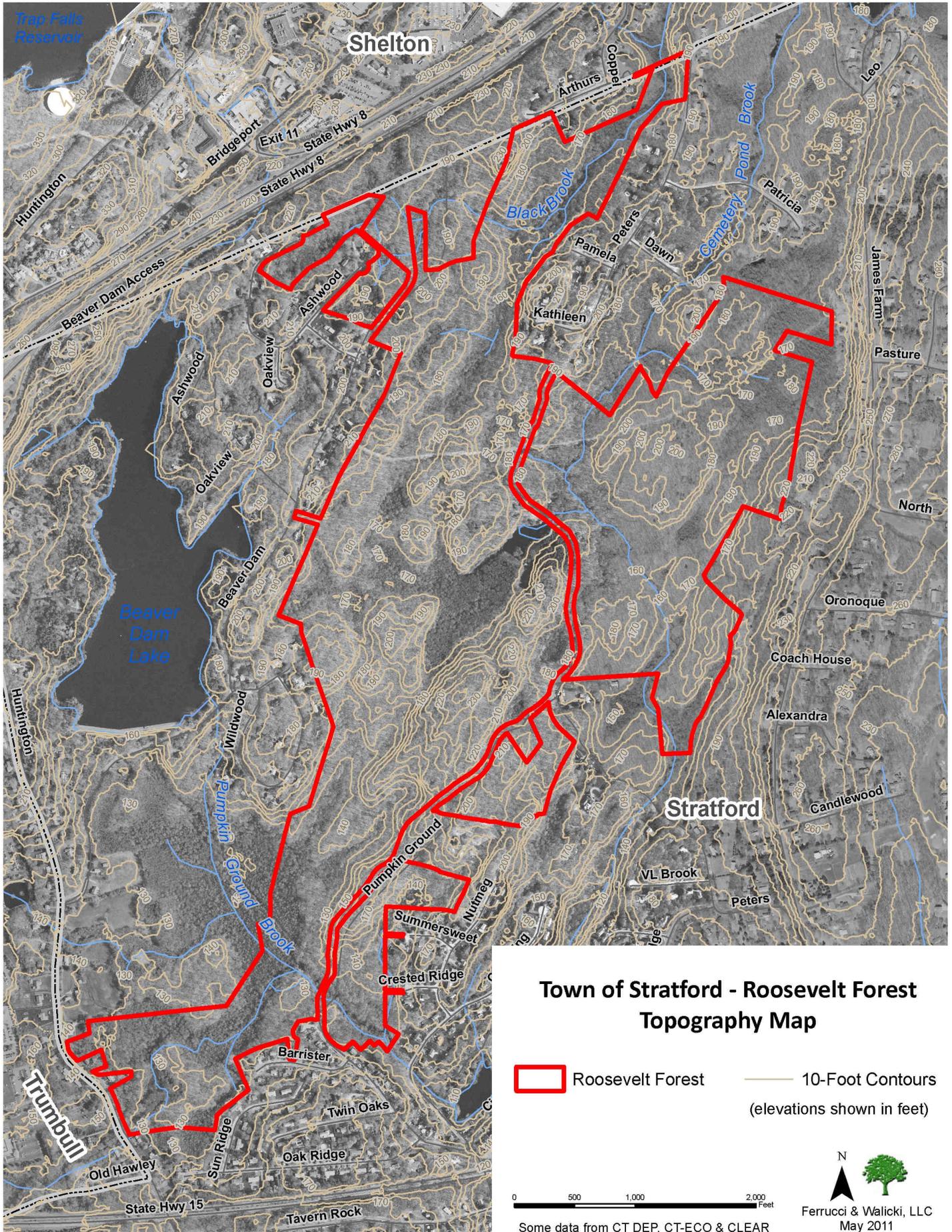


Stonewall remains, southern portion of Roosevelt Forest.

² Harvard Forest Dioramas.

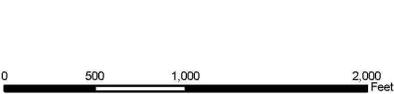
³ Harvard Forest Diagrams





Town of Stratford - Roosevelt Forest Topography Map

- Roosevelt Forest
- 10-Foot Contours
(elevations shown in feet)



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Ferrucci & Walicki, LLC
May 2011

Some data from CT DEP, CT-ECO & CLEAR

Topography

Other than the property's flat wetland areas, Roosevelt Forest contains consistently rolling topography across its acreage. Elevations range from approximately 130 - 240 feet above sea level, with most portions of the forest in the 170 - 200 foot range. Only small, localized areas (generally 1 acre or less) exceed 10% slopes. Because of the highly rolling nature of the property, localized hillsides with all aspects are present. Northwestern and southeastern aspects are most common, largely due to the southwest-northeast trending orientation of many hills on the property and in the region. Higher points within the forest (mostly hilltops) do tend to have drier conditions and slightly smaller trees on average. No strong correlation was noted between forest composition and aspect.

Soils

Roosevelt Forest contains an expectable amount of soil type variation over its 401 acres. A combination of upland and wetland soils are found across the property's rolling terrain, more-or-less matching with much of the topography. Other than the upland/wetland soil differentiation, soils across the property are currently having a somewhat minor influence on tree species and growth patterns, compared to some sites where there is an extremely strong correlation.

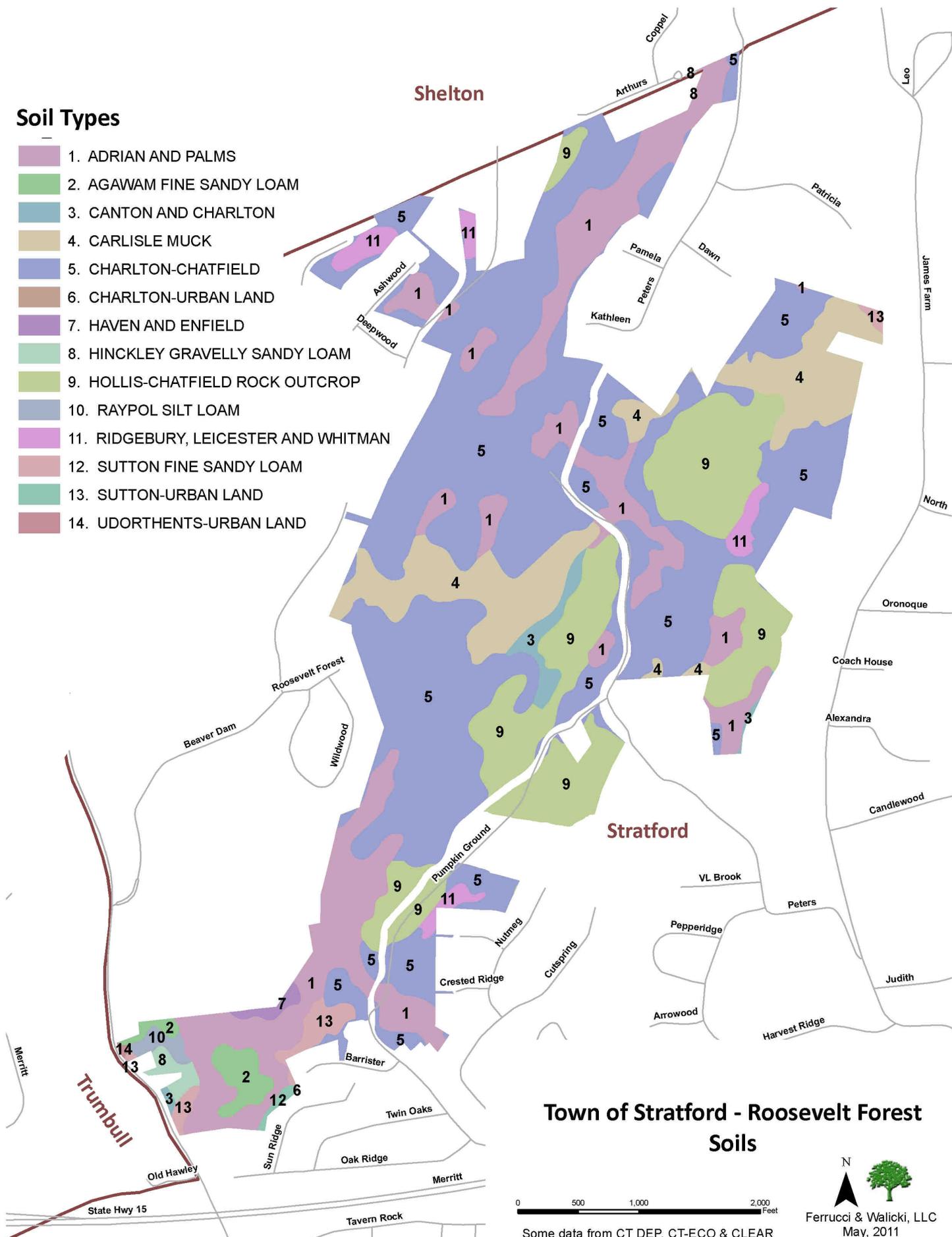
Based on available soils data, 14 soils types occur across Roosevelt Forest. These soils are summarized in the table below. In-depth discussions of these soils is beyond the scope of this Management Plan. In-depth information regarding the various soil types is available through the USDA Natural Resources Conservation Service website at: <http://websoilsurvey.nrcs.usda.gov>.

Approximately 124 acres (or 30%) of Roosevelt Forest contains wetlands or wetland soils. These areas should generally be both avoided and protected during any forest management activities. The remaining 70% (upland portion) of the forest is dominated by Charlton-Chatfield soils and the Hollis-Chatfield Rock Outcrop soil type. Charlton-Chatfield soils are good for growing trees. Areas with Hollis-Chatfield are generally rocky or shallow to bedrock. Trees will grow, but tend to grow slower and reach shorter overall heights in Hollis-Chatfield areas. The property's upland soils will generally not limit operability for management activities, but sloped areas should be properly protected to avoid rutting, erosion, and sedimentation problems.

<u>Roosevelt Forest Soil Type</u>	<u>Wetland?</u>	<u>Acreage</u>
1. Adrian & Palm	Y	75.9
2. Agawam Fine Sandy Loam	N	5.0
3. Canton & Charlton	N	4.5
4. Carlisle Muck	Y	40.0
5. Charlton-Chatfield Complex	N	190.2
6. Charlton Urban Land Complex	N	<0.1
7. Haven & Enfield Soils	N	1.3
8. Hinckley Gravelly Sandy Loam	N	1.9
9. Hollis-Chatfield Rock Outcrop Complex	N	68.0
10. Raypol Silt Loam	Y	1.7
11. Ridgebury, Leicester & Whitman	Y	6.9
12. Sutton-Urban Land Complex	N	0.6
13. Sutton Fine Sandy Loam	N	4.6
14. Udorthents-Urban Land Complex	N	0.2

Soil Types

- 1. ADRIAN AND PALMS
- 2. AGAWAM FINE SANDY LOAM
- 3. CANTON AND CHARLTON
- 4. CARLISLE MUCK
- 5. CHARLTON-CHATFIELD
- 6. CHARLTON-URBAN LAND
- 7. HAVEN AND ENFIELD
- 8. HINCKLEY GRAVELLY SANDY LOAM
- 9. HOLLIS-CHATFIELD ROCK OUTCROP
- 10. RAYPOL SILT LOAM
- 11. RIDGEBURY, LEICESTER AND WHITMAN
- 12. SUTTON FINE SANDY LOAM
- 13. SUTTON-URBAN LAND
- 14. UDORTHENTS-URBAN LAND



Town of Stratford - Roosevelt Forest Soils

0 500 1,000 2,000 Feet
 Some data from CT DEP, CT-ECO & CLEAR

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 Ferrucci & Walicki, LLC
 May, 2011

Hydrography

Major hydrologic features in the region include Trap Falls Reservoir and Beaver Dam Pond to the northwest, and the Housatonic River to the east. The entire Forest is within the Housatonic River watershed.

Approximately 1/3 of Roosevelt Forest is wet – either year-round or seasonal. Most of the wetlands are dominated by red maple poletimber or poletimber-sawtimber mix (see Stand 9). The most prominent open water wetland is the pond area adjacent to the central parking area. Small open water areas also exist (somewhat seasonally), within other parts of the Forest.



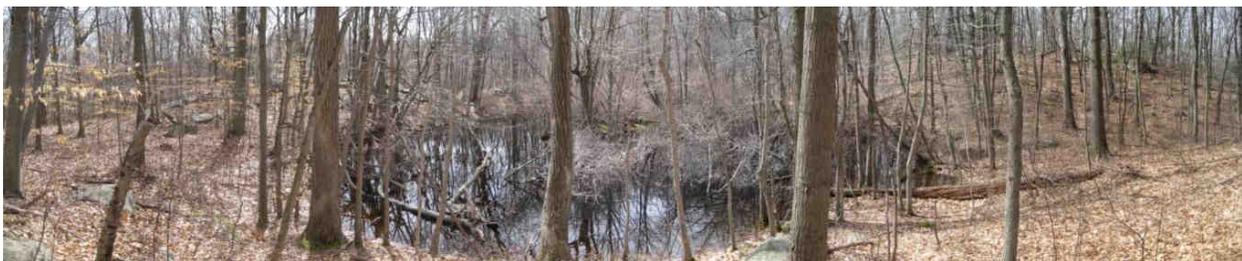
Pond adjacent to central parking area. An extensive wooded wetland lies to the west of this pond.

Major wetland corridors within Roosevelt Forest are associated with the Forest's three named watercourses: Cemetery Pond Brook, Pumpkin Ground Brook, and Black brook. These areas, along with smaller wetland areas, some isolated, create an upland/wetland complex that is common for many parts of Connecticut.

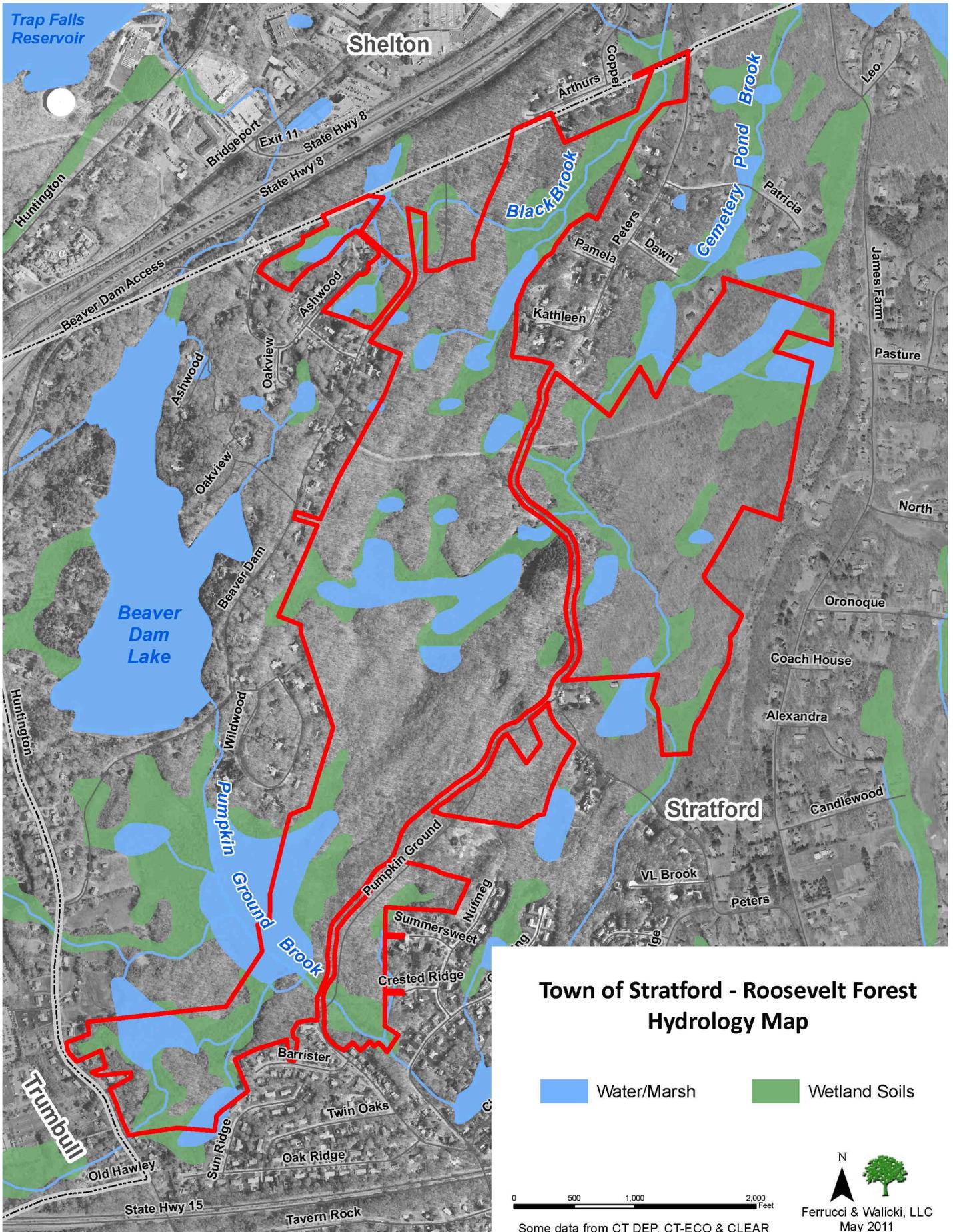
The three named streams within the Forest are all currently designated as "Class A" inland surface waters by the Connecticut DEEP. Class A inland surface waters are appropriate for potential drinking water supplies, fish and wildlife habitat, recreational use, agricultural and industrial supply, and "other legitimate uses including navigation." (Source: www.cteco.uconn.edu)

All of Roosevelt Forest and the immediately surrounding area is currently designated as having Class GA ground water. Such areas are designated by DEEP as appropriate for existing private and potential public or private supplies of water suitable for drinking water without treatment. The property is not within a delineated public water supply watershed or aquifer protection area.

Several potential vernal pool areas were noted during fieldwork for this Management Plan. The timing of fieldwork was too early to investigate for characteristic egg masses within these areas. Both verified and potential vernal pool areas should be clearly marked and protected during and forest management activities.



Isolated wetland pocket, potentially with vernal pool characteristics. Several such areas are within the Forest.



Wildlife

General Wildlife Considerations

Many species of wildlife need various types of habitat in order to survive. Such “life requisites” are necessary for successful survival and reproduction of a species and are often the limiting factors that determine whether or not a species will survive in a given area. Life requisites include shelter from predators, shelter from weather, places where they can find food, and areas where they can breed. Areas of potential habitat with particular vegetative characteristics satisfy these requisites.

The amount of habitat in adjacent areas can affect the carrying capacity for a given species. (The carrying capacity is the number of individuals of a given species that can live in a given area.) Carrying capacity can also be influenced by the overall size of an area, depending on the range of the species considered. For example, a given acreage with the right types of habitat for a given species can support more individuals of a species with a small home range, than a species with a large home range.

Viewed from a long-range ecological perspective, a forest is a highly dynamic place. As a forest develops and its character changes, its usefulness for satisfying the life requisites of any given species also changes. As a result, a mosaic of different habitat types is often necessary for most species of wildlife to be successful. For example, wild turkeys use mature forest with downed woody debris or shrubby areas for nesting habitat or breeding habitat. After the young have hatched they use open fields where soft-bodied insects are abundant for them to feed on. As the young turkeys develop they are able to use the mature forest for feeding on hard mast from oak and beech trees.

Use of different types of habitats can also be seasonal. For example, turkeys will often feed on insects and grasses in fields and other open areas during the spring and summer, and then return to the mature forest in fall and winter to feed on hard mast.⁴

Mature forests also offer **stratification**, which is a quality important to the survival of some species of wildlife. There can be many strata in a forest but generally there is the main or upper canopy, the mid canopy and the forest floor. These strata develop because trees with different tolerances to shade grow at different rates. As the forest matures, trees that are tolerant of shade begin to fall behind the fast growing shade intolerant species, creating a mid canopy strata. These trees also have the ability to regenerate under a dense canopy creating another vegetation stratum near the ground. This lower stratum may also contain shrubs, vines and herbs that are tolerant of shade. These strata contribute to the life requisites of different species in different ways. The wood thrush, for example, sings from the canopy, nests in the mid-story, and feeds on the ground. Therefore, a mosaic of different stands from open fields to mature forests will provide the best potential habitat for many different species of wildlife.

Coarse Woody Debris & Habitat

As a forest develops and trees become stressed by intense competition, drought, disease, insects or are damaged by severe weather, many begin to rot producing live trees with cavities in them that are useful

⁴ DeGraff, R. M.; Yamasaki, M. 2001. New England Wildlife Habitat, Natural History and Distribution. Hanover, N.H.: University Press of New England. 482 pp.

as shelter and feeding habitat for many small mammals and birds. As some of these trees die they remain standing and continue to rot or they fall down. These two types of trees are classified into standing dead woody debris and down woody debris respectively. As a whole they are known as coarse woody debris (CWD). Standing dead trees, often called snags, provide habitat and a source of insects that birds and other small mammals will eat. Down woody debris provides cavities for ground dwelling animals, cover for amphibians (salamanders) and reptiles (snakes), and good conditions for the germination of the seeds of some tree species.

CWD is considered to be any downed or suspended woody material that is 4 inches and larger in diameter. This definition for CWD would include such items as snags, fallen logs, wind blown trees and large branches. It is introduced into the management equation in numerous ways: logging debris, seedbeds, carbon pool, wildlife habitat, fuel, etc. Wildlife biologists, ecologists, mycologists, foresters, and fuels specialists are some of the people interested in CWD because it helps describe the quality and status of wildlife habitats, structural diversity within a forest, fuel loading and fire behavior, carbon sequestration, and the storage and cycling of nutrients and water. (Mount, J.R., 2002, Water, Wildlife, Recreation, Timber...Coarse Woody Debris, USDA Forest Service GTR, PSW-GTR 181, 2002)

As a forest matures and the trees become over mature large trees die and fall to the ground increasing CWD in the forest. Thus, barring any human influence such as timber harvesting, CWD will likely increase over time. This input can be reduced by periodic timber harvests, which remove the main stem of trees that may otherwise have died. Since few harvests in Connecticut also remove firewood or other top wood the tops of these trees are often left behind and increase CWD. Adding the tops of healthy trees and cull trees removed during a harvest would increase CWD even more. While harvesting generally results in a net increase in CWD, the increase is generally in small diameter material that has less value than large diameter material. Leaving **large snags and cavity trees** may counter this effect on wildlife species using large CWD for habitat by replacing large down material with live vertical stems.

Stone Walls & Habitat

Stone walls, of which there are many across the Southern New England landscape as a result of the intense, past agricultural uses throughout the region, also provide habitat for small animals such as chipmunks, and can hide the locations of the entrances for burrowing animals.

Wetlands & Habitat

Of particular habitat importance are wetlands, watercourses, and vernal pools. In addition to purifying and storing water, wetlands provide food and water for both upland animals and the resident aquatic animals. Watercourses and forested wetlands provide habitat requirements different from those in upland forest types. Many species that mainly inhabit upland areas also need water for drinking and thus may use the wetlands and watercourses periodically.⁵

Vernal pools are essential habitat for many species of amphibians and invertebrates. Some of these species breed only in these pools, and/or may be rare, threatened or endangered species, such as the wood frog. "The area in the immediate vicinity of these pools also provides these species with important non-breeding habitat functions, such as feeding, shelter and over-wintering sites. Therefore, the protection of vernal pool habitat and the area immediately surrounding the pool is vital for the continued survival of wildlife species that are dependent upon these unique habitats."⁶

⁵ Mount, J.R., 2002, Water, Wildlife, Recreation, Timber...Coarse Woody Debris, USDA Forest Service GTR, PSW-GTR 181, 2002

⁶ The Commonwealth of Massachusetts Division of Fisheries and Wildlife, Guidelines For Certification of Vernal Pool Habitat, May 1998.

Property-Specific Wildlife Considerations

Roosevelt Forest currently serves an important role for wildlife in the Stratford region. From a landscape perspective, it is the first upland forest of significant size on the western side of the Housatonic River, moving upstream from Long Island Sound. It is also of sufficient size to be classified as core forest, and also contains elements of maintained early-successional habitat with the Forest's utility right-of-way. From a societal standpoint, the Stratford community has a strong demonstrated interest in biodiversity in general, and specifically, in birding.

Threatened or Endangered Plants & Animals

The Connecticut Department of Energy & Environmental Protection (DEEP) maintains the Natural Diversity Database (NDDDB) as a resource for the general public to use to help make informed decisions regarding the presence of federally or state listed species. It is a compilation of data collected by the Environmental and Geographic Information Center's Geological and Natural History Survey and cooperating units of the DEEP, private conservation groups and the scientific community. This database includes species of flora and fauna that have limited or low populations, or have populations that are thought to be in danger of extirpation and extinction.

Based on a check of DEEP NDDDB review areas (December 2010 data update), there is a possibility of Eastern box turtle (*Terrapene Carolina*), a state species of special concern either on or in the vicinity of Roosevelt Forest property. A comment letter has been received from DEEP, as seen on the next page. Prior to any forest management activities within Roosevelt Forest, additional comments should be sought from DEEP regarding proper protective measures that should be utilized to protect this species and its habitat.

Biologists with the Connecticut Audubon Society have also documented evidence of Eastern box turtle activity within and in the vicinity of Roosevelt Forest. Locations are included on the NDDDB within this Management Plan. CAS's Eastern box turtle sightings in both Stratford and surrounding towns have generally clustered near cleared utility right-of-ways, including the underground gas pipeline that cuts through Roosevelt Forest (Stand 8), and the electric transmission corridor that runs along the eastern side of the Forest. CAS's biologists feel that the managed open habitat within these areas "provides valuable nesting and dispersal habitat and a critically important pathway to prevent genetic isolation."⁷

Forest Interior Birds

Forest interior birds have received considerable attention in terms of population decline due to loss of habitat. These birds are an ecologically distinct group of bird species that require large blocks of forestland (300+ acres) to successfully nest and breed. Several species of migratory forest interior birds (red-eyed vireo, black-throated green warbler, American redstart, ovenbird, and hooded warbler) have declined in numbers in several preserves located in Connecticut's suburban areas over the past 25-35 years. There are numerous explanations for such declines: increasing isolation of forestland blocks due to fragmentation by development and increased nest parasitism and predation by raccoons, feral cats, crows, blue jays, and brown headed cowbirds, all of which are more abundant near the forest edge. Isolation is more of a factor within larger forest preserves (larger than 180 acres), while nest parasitism and predation is more of a factor within smaller preserves.

⁷ Twan Lenders, Connecticut Audubon Society. Personal communication, July 2011

Another factor in the decline of migratory forest interior birds that may be affecting forests of all sizes, including those within or outside suburban areas, is the destruction of forest habitat in Central and South America where many of the forest interior bird species winter. As forests in these areas are further destroyed, this factor may prove to be far more important than habitat changes in the US. A third factor is the mortality caused by Caribbean storms that intersect with the migrating flocks.

Standing dead trees benefit the hairy and pileated woodpeckers, barred owl, and prothonotary warbler. Standing dead trees also provide nesting sites for cavity nesters and act as reservoirs for insects on which many forest interior birds feed.

Forest thinning has been shown to have minimal negative effect on most forest interior birds, provided about 70% of the canopy is retained. Thinning usually enhances the understory and thus benefits many bird species, including most forest interior birds.

Patch cutting as part of forest management activities (as recommended for a portion of the Roosevelt Forest) creates small temporary openings in the forest canopy. Patch cut openings will provide essential young forest habitat without significantly impacting forest interior birds. One study of patch cutting in New York showed that only one out of nine species of forest interior birds declined, while tree species increased in numbers. As patch cuts revegetate, the forest edge disappears and forest interior birds recolonize the openings, sometimes within three years. Patch cuts have the least impact on forest interior birds if they are kept small (less than 3 acres).



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRANKLIN WILDLIFE
391 ROUTE 32
N FRANKLIN CT 06254
860-642-7239



February 3, 2011

Mr. Mark Kasinskas
Ferrucci & Walicki, LLC
6 Way Road
Middlefield, CT 06455

re: Forest Management Plan, Roosevelt Forest, Stratford

Dear Mr. Kasinskas:

Your request was forwarded to me on 1/31/11 from the Department of Environmental Protection's (DEP) Natural Diversity Data Base. They have records of a state species of special concern; Eastern box turtle (*Terrapene carolina*). Impacts to this species are difficult to predict without project details.

Eastern box turtles require old field and deciduous forest habitats, which can include power lines and logged woodlands. They are often found near small streams and ponds, the adults are completely terrestrial but the young may be semiaquatic, and hibernate on land by digging down in the soil from October to April. They have an extremely small home range and can usually be found in the same area year after year.

If these habitats will be impacted by your project, the Wildlife Division recommends that a herpetologist familiar with the habitat requirements of this species conduct surveys between April and September to see if they are present. A report summarizing the results of such surveys should include habitat descriptions, reptile species list and a statement/resume giving the herpetologist's qualifications. The DEP doesn't maintain a list of qualified herpetologists. A DEP Wildlife Division permit may be required by the herpetologist to conduct survey work, you should ask if your herpetologist has one. The results of this investigation can be forwarded to the Wildlife Division and, after evaluation, recommendations for additional surveys, if any, will be made.

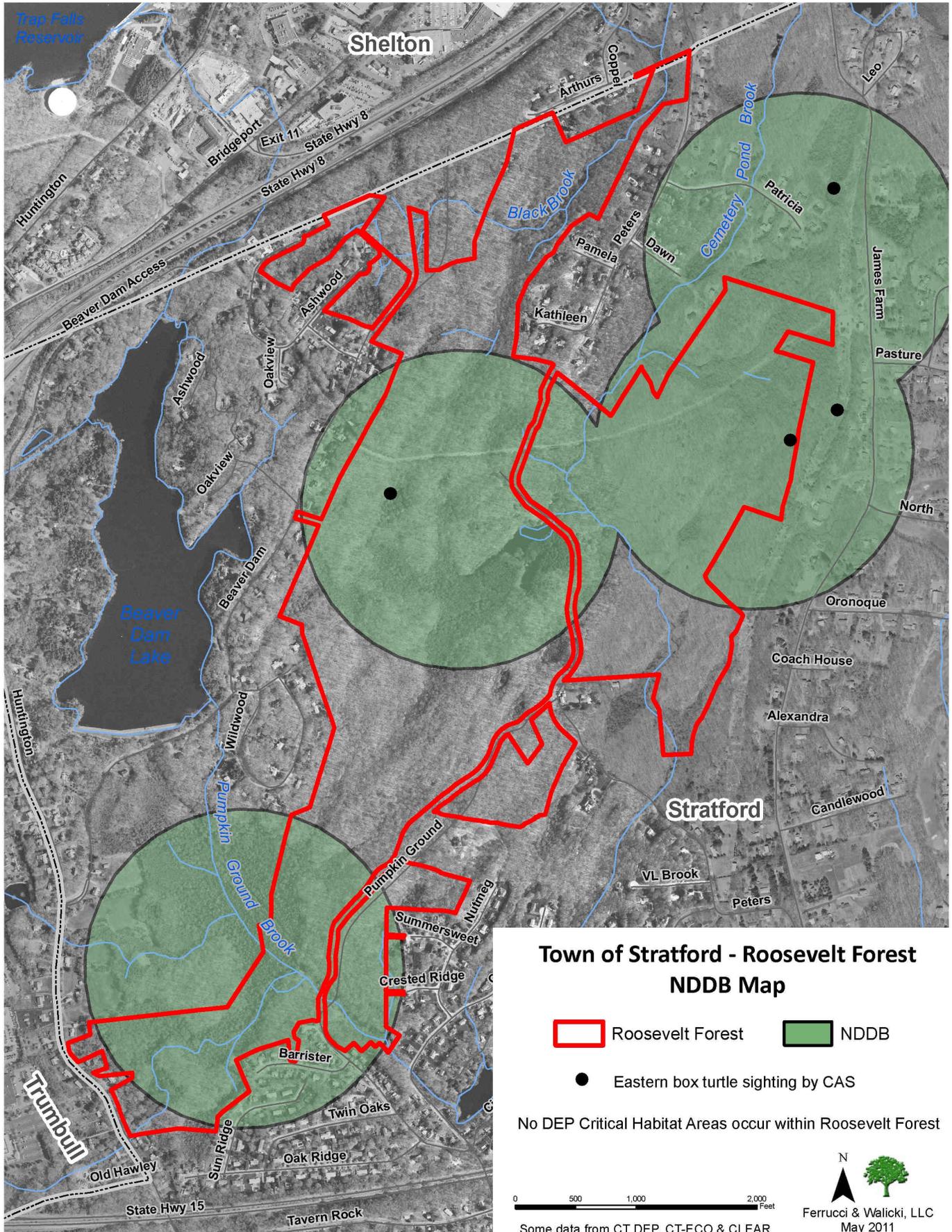
Standard protocols for the protection of wetlands should be followed and maintained during the course of the project. Additionally, all silt fencing should be removed after soils are stable so that reptile and amphibian movement between uplands and wetlands is not restricted. Please be advised that the Wildlife Division has not made a field inspection of the project nor have we seen detailed timetables for work to be done. Consultation with the Wildlife Division should not be substituted for site-specific surveys that may be required for environmental assessments. The time of year when this work will take place will affect this species if they are present on the site when the work is scheduled. Please be advised that should state permits be required or should state involvement occur in some other fashion, specific restrictions or conditions relating to the species discussed above may apply. In this situation, additional evaluation of the proposal by the DEP Wildlife Division should be requested. If the proposed project has not been initiated within 12 months of this review, contact the NDDB for an updated review. If you have any additional questions, please feel free to contact me at Julie.Victoria@ct.gov, please reference the NDDB # at the bottom of this letter when you e-mail. Thank you for the opportunity to comment.

Sincerely,

Julie Victoria
Wildlife Biologist

cc: NDDB – 201100516

<http://www.ct.gov/dep>
An Equal Opportunity Employer



Property Boundaries

The boundaries of Roosevelt Forest are generally not clearly marked. Some boundary signs exist, but these are mostly rusted and unreadable. In general, property boundaries have also not been marked or posted by adjacent landowners. Small amounts of debris (discarded Christmas trees, yard brush, etc.) were noted during the fieldwork for this Management Plan, but not large-scale encroachments were noted.

All boundaries should be clearly marked to help prevent unwanted encroachment and trespass onto the property, and to help users of the Forest to avoid accidentally wandering off of public land. Accurate and clear boundary marking must also be established before commencing any forest management activities to ensure that no activities cross any property lines. Painted blazes will generally need a fresh coat every ten years.



Old “ingrown” boundary sign.

Access

Roosevelt Forest contains several access points that serve a variety of users.

The main access into the forest is via an extension of Peters Lane, which enters from the southeast. A paved road leads to the forest’s main parking area, providing good access to a central location within the forest, along with good parking.

Additional public access points into Roosevelt Forest exist in several locations:

1. North Peters Lane
2. End of Roosevelt Forest Drive
3. Beaver Pond Road: unsigned access at cul-de-sac, gated trail at western “midpoint”
4. Pumpkin Ground Road (north end of unmaintained portion) from Peters Lane
5. Pumpkin Ground Road (south end of unmaintained portion) at cul-de-sac.

Other, possibly unauthorized access:

In addition to the established public access points listed above, informal, possibly unauthorized, accesses have been created in a handful of locations, mostly leading into the Forest from adjacent homeowners. Potential trespass areas will be provided to the Town in a separate document; investigation by Town Staff is recommended.

Recommended access improvements

An additional access point into Roosevelt Forest could be investigated at the end of Arthurs Lane???, along the Stratford-Shelton townline. Field conditions and existing mapping do not clearly indicate legal access, but the possibility could be investigated. The entrance from North Peters Lane may be underutilized, this is a possible location for enhancement. Other potential access points that extend to Roosevelt Forest, mostly from cul-de-sacs, would generally require wetland crossings or have other constraints that limit their usefulness.

Most of Roosevelt Forest’s access points contain some level of signage, but it is somewhat inconsistent and in various degrees of repair. More standardized signage is recommended at all public access points.

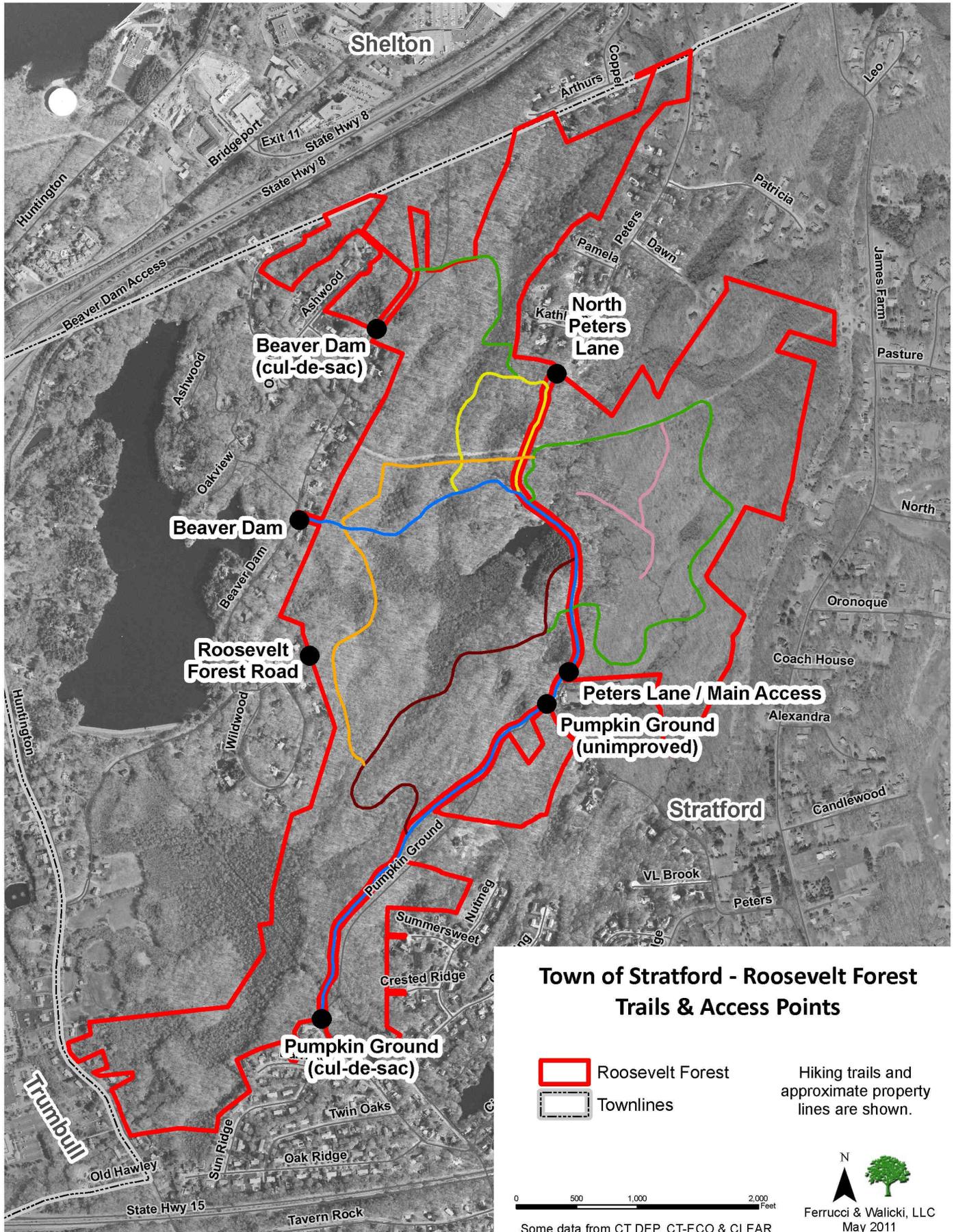
Some, or all, of the access points would also benefit from this installation of a trailhead kiosk of some form. An upgraded kiosk at the central parking area would also be beneficial. Trailhead kiosks provide a welcoming feel to hikers and bikers, especially those who may not be familiar with the property. They provide a secure location to post maps, general information, and notices about special events. In addition to these benefits, trailhead kiosks may allow for some consolidation and standardization of signage currently found at the various entrances.

Improved or upgraded parking facilities are not recommended at this time. Visitors arriving to the Forest by vehicle should be encouraged to use the main central parking area. Other access points should be kept somewhat more informal, geared toward neighborhood-level use.

At times, trailhead improvement projects can make excellent scout or civic group projects. Funding is sometimes available through the Connecticut DEEP’s Recreational Trails grant program.



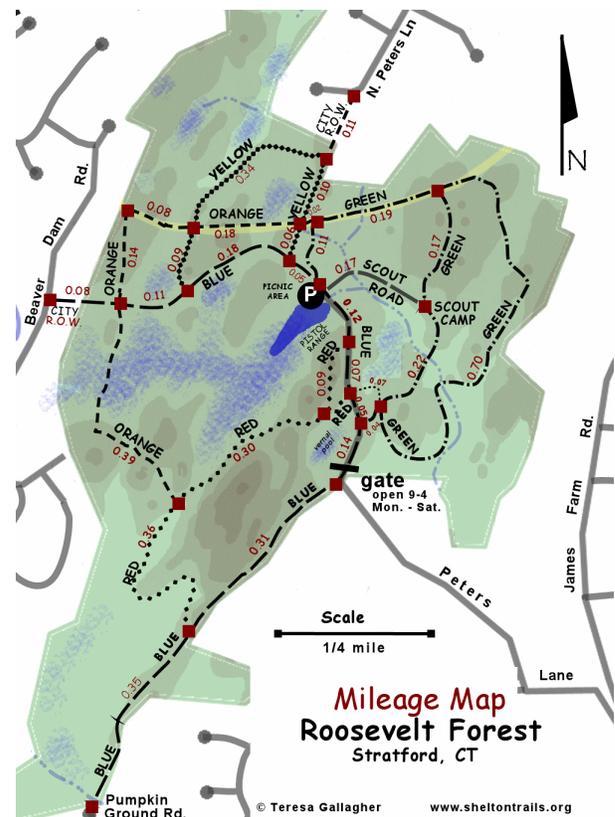
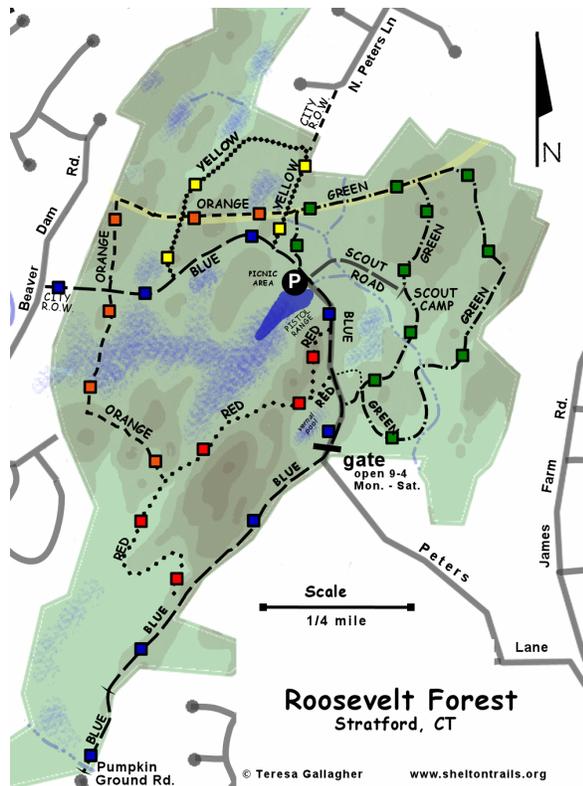
Possible model for Roosevelt Forest trailhead sign/kiosk
(DEEP - along Farmington River in Peoples State Forest, Riverton).



Recreation & Education

Hiking & Biking

Of the various recreational activities that occur at Roosevelt Forest, hiking & biking appear to likely be the most popular. A rather extensive network of trails covers a good portion of the property and links to several surrounding neighborhoods. In addition to Roosevelt Trail map available at the Town website and throughout the Forest (at the central parking area and on trail posts), several other groups have also created online maps. This is a testament to Roosevelt Forest's overall recreational popularity.



Examples of Roosevelt Forest "maps by others"

Source: sheltontrails.org" http://borntoexplore.org/trails/Roosevelt_Forest.htm

Trails across the Forest are mostly in good condition, without any serious amounts of rutting or erosion. Recent interest in trail upkeep is apparent through efforts such as the recent bridge reconstruction work on the blue trail just north of Pumpkin Ground Road, and the signposts located at many trail intersections. As with general signage around the Forest, there are currently many different varieties of trail blaze styles. A unified blaze style is recommended.

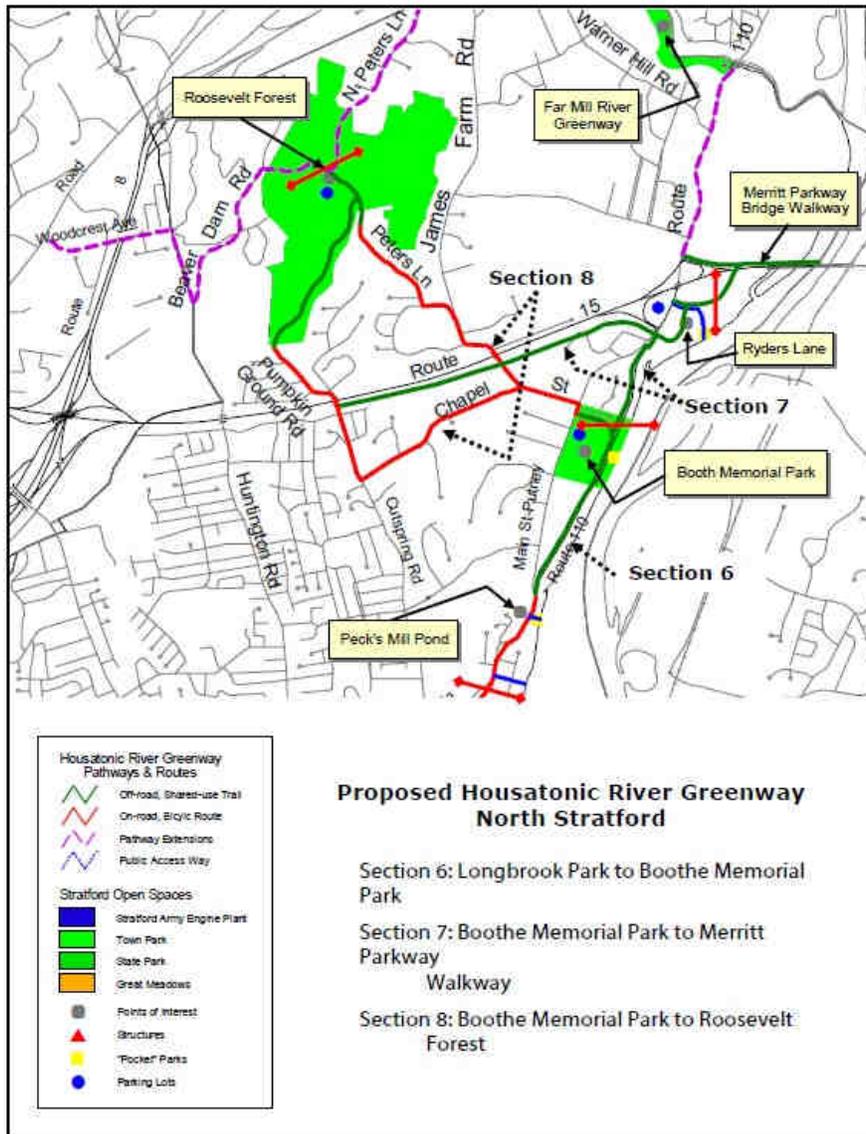
The current trail network provides a good amount of hiking and biking opportunities, and likely is quite useful for cross-country skiing during winter months. One currently unmarked trail that loops from the yellow trail to the cul-de-sac on Beaver Dam Road could potentially be blazed and added to the trail system.

There is no known policy covering the use of trails within Roosevelt Forest. Establishment of such a policy may be useful in addressing and enforcing trail use problems within the forest such as ATV use. This could potentially be accomplished through the Town's recreational-related ordinances.

Roosevelt Forest is mentioned both within the Town's 2003 Update to the Town Plan of Conservation and Development and within a 2008 Draft Stratford Pathways Study & Plan as having great potential value as an anchor point within a town wide or regional hiking/biking path network. One excerpt from the 2008 report is included here; additional relevant pages are included within the Appendix.

Housatonic River Greenway Vision

The overall vision for the Housatonic River Greenway is to designate a "greenway" from Stratford Point in the south end to Roosevelt Forest in the north end, with connections to Long Beach (south end) and the Merritt Parkway (north end).



Source: Draft Stratford Pathways Study and plan (Revised) – Housatonic River Greenway Project, February 2008, by the Greater Bridgeport Regional Planning Agency

Picnicking



Picnic pavilion area.

Adjacent to the central parking area is a pavilion and a somewhat extensive picnicking area with tables and stone fireplaces. This area provides an excellent level of opportunity for several groups to picnic at any given time. The tables and fireplaces are in various states of condition, but are mostly useable and appear to be regularly maintained. The pavilion could possibly use some repairs and maintenance, but is functional.



Picnic area - note mountain laurel serving as a visual buffer.

Camping

Two areas within Roosevelt Forest have been used for camping. A primary camping area (designated as “Boy Scout Camp” on old maps) lies to the east of the main parking lot. This area contains several camping shelters and picnic tables, and a main gathering area. A qualitative assessment of dead and downed trees immediately around this camp area indicated that deadwood is regularly gathered for firewood.

A second camp area (designated as “Girl Scout Camp” on old maps) lies to the west side of Peters Lane, just north of the unimproved portion of Pumpkin Ground Road. This area contains an old stone well structure, but no other facilities. A handful of tarps in the surrounding woods suggests that this area may be used for periodic camp tenting.



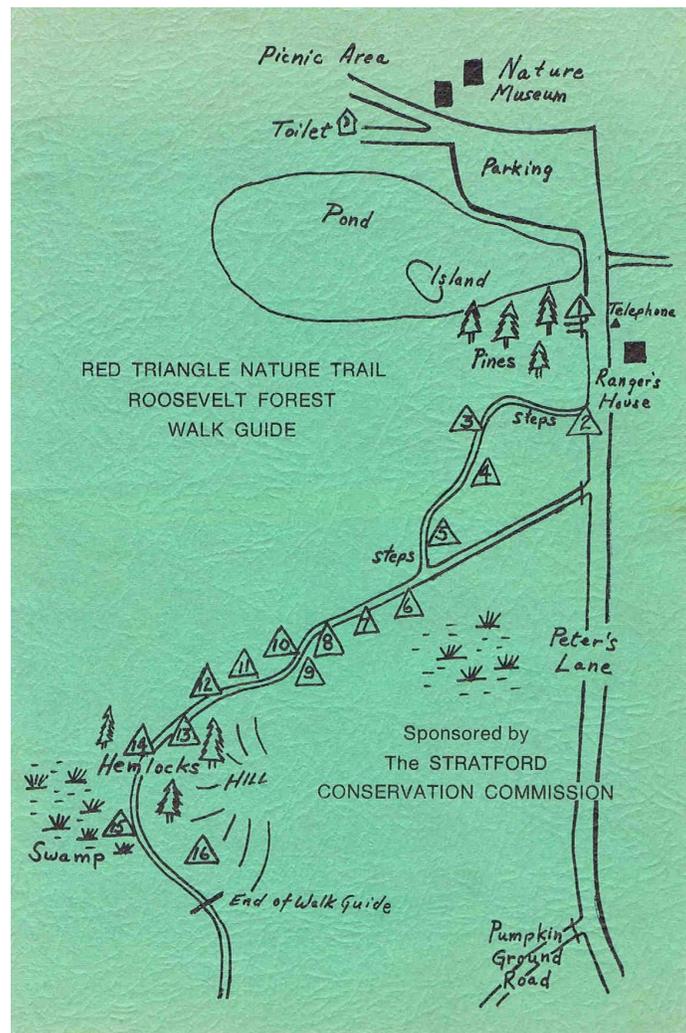
Panoramic view of scout camp area.

Education

The Stratford Conservation Commission prepared an excellent 10-page “Red Triangle Nature Trail Walk Guide” in 1975. All of the interpretive trail signs connected with this guide are now missing, but several items within the guide, including individually cited trees, are still present. This guide could be easily revised and expanded. In particular, a revised guide could explore changes that have occurred in the Forest since the 1970s.

Roosevelt Forest is also included with the Stratford Conservation Commission’s 1990 “Introductory Guide to Stratford’s Natural Environs”. This guide provides a nice overview of the property and species lists.

The on-site nature center building appears to have not been used or maintained for several years. This is the type of resource that many towns wish to establish but never achieve. Renovation and use of this building for natural resource and educational purposes is highly recommended. This could possibly be an excellent opportunity for the Town to partner with an environmentally oriented organization who is in need of office and/or program space.



Cover of 1975 trail guide.

Recommended recreation & education improvements

1. All boundaries should be signed and blazed.
2. Signage throughout the forest should be made more consistent.
3. Improved trailheads should be developed at, at least, the entrances at the Beaver Pond Road and Pumpkin Ground Road cul-de-sacs. Trailhead kiosks are recommended for these locations. Additional kiosks (or at least improved signage) should also be considered for the southern Beaver Ground Road, Roosevelt Forest Drive, and North Peters Lane Entrances.
4. No entrance into Roosevelt Forest current exists from Arthur's Court, possibly because of the proximity of the Stratford-Shelton townline. Possible access in this location should also be investigated.
5. The 1975 Stratford Conservation Commission trail guide should be updated and expanded. The 35 years that have passed since the original was printed would allow for comparisons between Roosevelt Forest then and now.
6. Greater access to trail mapping should be considered - both paper and interactive digital versions.
7. A cooperative arrangement with a local mountain biking club should be considered for trail upkeep & maintenance.
8. A series of Town-sponsored geocaches and/or letterboxes should be installed throughout the property. An excellent model is the Connecticut DEEP's letterbox series found throughout the State Forest system.
9. Cooperative arrangements with an environmental organization should be sought for maintenance and operation of Roosevelt Forest's currently unused nature center building. This is currently an underused resource.
10. Efforts should be made to increase overall public awareness of the Town of Stratford's Roosevelt Forest and the property's extensive recreational & educational opportunities.

Other Uses

Police Training

The Stratford Police Department uses a shooting range facility located to the southwest of the central pond area and west of the pine grove. This area is well signed and appears to be adequately secured for safety. Considering its use, the shooting range seems well buffered from other areas and appears to coexist relatively well with the many surrounding recreational activities.

Hunting

No hunting is currently permitted within Roosevelt Forest. Tree stands were observed on several private parcels close to the Forest boundary.

Recommended other use improvements

1. The feasibility of a limited deer hunting program should be discussed with the Connecticut DEEP. Few deer were observed during fieldwork for the Plan, but the general lack of tree regeneration suggests that many deer are in the area.

General Forest Management Recommendations

From a landscape perspective, this property is the first upland forest (of significant size) on the western side of the Housatonic River, moving upstream from Long Island Sound. As such, it has significant importance in the area, and deserves to be managed in somewhat special ways.

Roosevelt Forest contains many acres of good quality, saleable oak sawtimber. While the property could be simply considered a prime candidate for conventional forest management techniques involving periodic sawtimber thinnings in various portions of the Forest (designed to promote new tree growth and maintain a continuous supply of sawtimber), such a straightforward approach is not recommended. Rather, a subtler “working forest” model is recommended for the Town of Stratford’s Roosevelt Forest, where some portions of the forest are actively managed and others (including potentially manageable upland areas) are dedicated as forest reserves. Thus, the major concepts proposed for managing Roosevelt Forest into the future include developing three somewhat distinct management areas (zones) based on current recreational usage patterns, actively managing portions of the property, and establishing dedicated reserve areas where late-successional structure is encouraged.

Current Use / Activity Zones

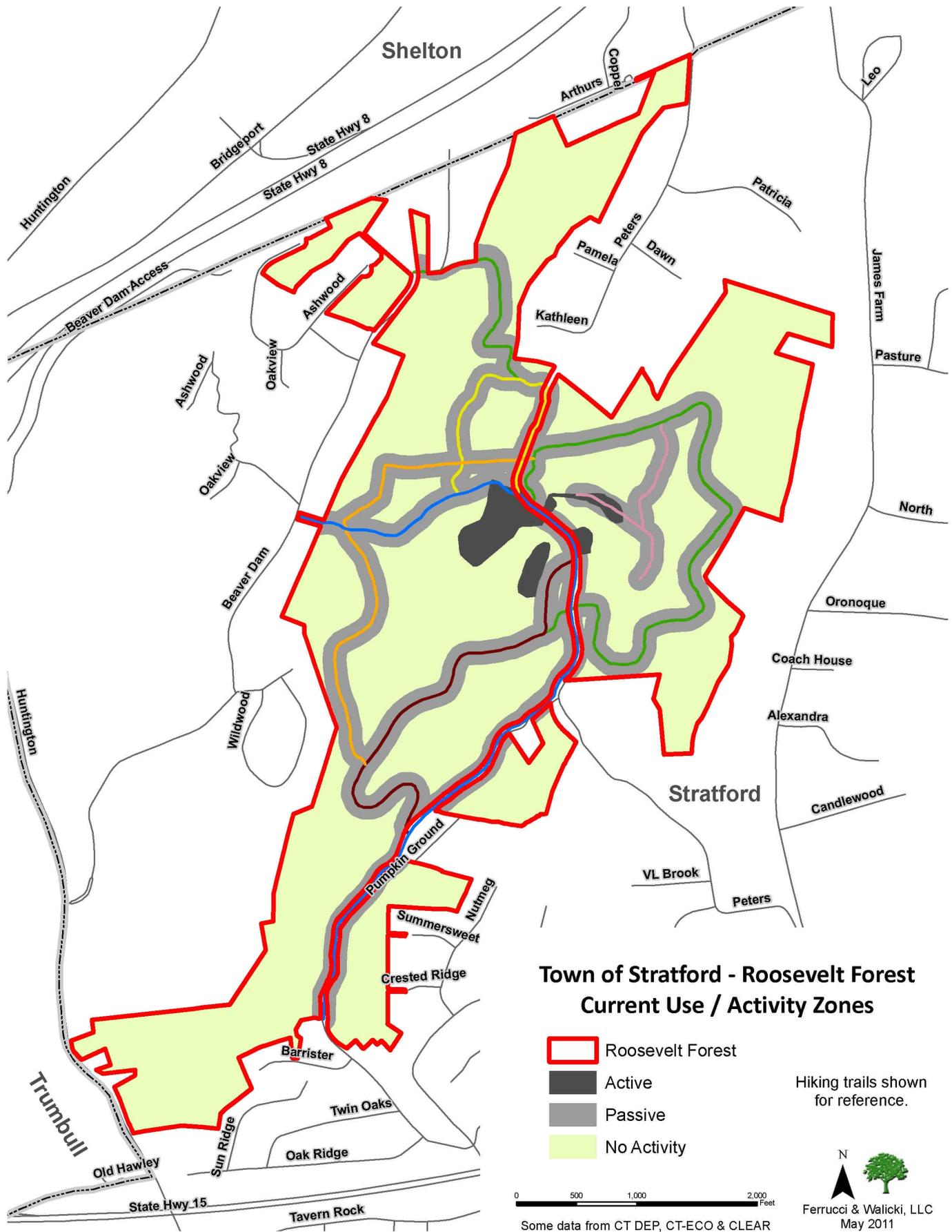
Roosevelt Forest is can be divided into three activity zones (or areas) based on current recreational usage patterns: active, passive, and no activity. These existing use zones provide an excellent framework for future forest management, with forest management activities focused on a portion of the “no activity areas”, a small to moderate amount of forest management activities (with a high emphasis on aesthetics) within the “passive areas”, and no forest management activities, per se, within the “active areas”.

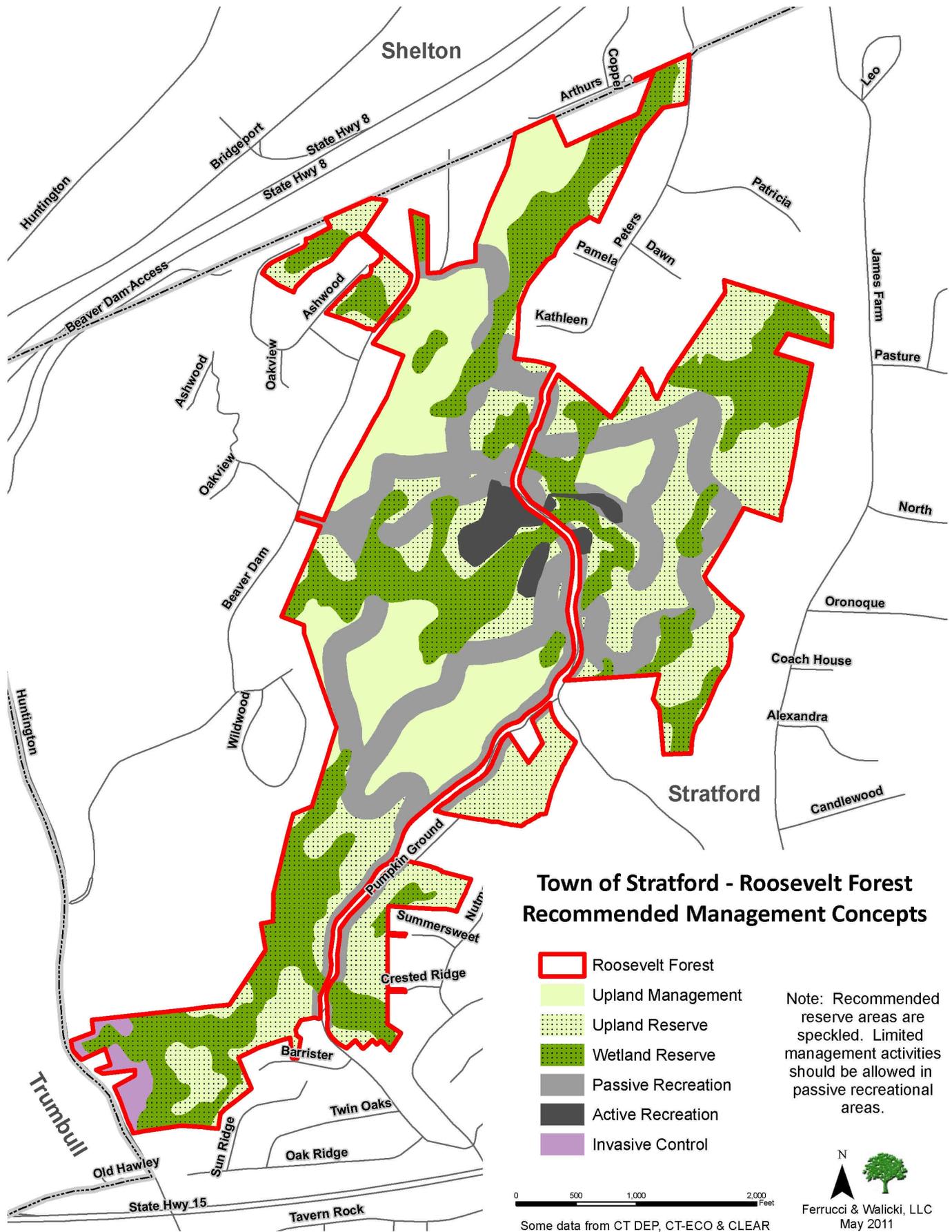
Active areas include the central parking lot, buildings, picnic area, campground, and shooting range. These are generally the portions of the forest that are most “park like”, and are clustered around the forest’s central core. These are the areas of Roosevelt Forest that receive the most active/intense use.

Active areas should be management to maintain park-like conditions. This involves a somewhat arboricultural approach, where specific focus is placed on the health and condition of individual trees. Aesthetics is also of high importance. Such management will help to both define the active areas and provide a lead-in to help draw the public into the Forest’s trails. Efforts to develop late-successional structure should not be a goal in these areas, due to the need for large amounts of both dead standing trees and coarse woody debris.

Passive areas generally include the hiking trails and areas immediately adjacent (approximately 50 feet to each side). While described as passive, the forests trails appear to receive a substantial amount of use by both foot traffic and mountain bikes. Small areas of ATV use were also noted. Most blazed trails are in good condition, but some areas would benefit from enhancement activities. Several unblazed trails are also present. Overall, the trail system provides excellent recreational access throughout the property, and provides windows into the “no activity” areas.

Management within passive areas should be somewhat transitional in nature, with a focus on the concept that the trails pass through a collection of forested rooms – each with its own character. This recommendation is inspired by the consistently, almost relentlessly, rolling topography across Roosevelt Forest. Efforts to develop late-successional structure should be a complementary goal in these areas.

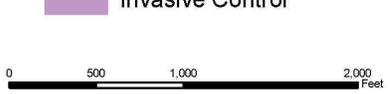




Town of Stratford - Roosevelt Forest Recommended Management Concepts

- Roosevelt Forest
- Upland Management
- Upland Reserve
- Wetland Reserve
- Passive Recreation
- Active Recreation
- Invasive Control

Note: Recommended reserve areas are speckled. Limited management activities should be allowed in passive recreational areas.



Ferrucci & Walicki, LLC
May 2011

Some data from CT DEP, CT-ECO & CLEAR

No activity areas include portions of the forest that do not receive any regular use or activity. These include the property's wetlands and watercourses, as well as several upland forest areas that are not adjacent to or easily accessed from any trails. While in a somewhat "unmanaged" state, these areas contain mostly good quality wetland and upland hardwood forests, and are mostly free of significant invasive species infestations. Some of these areas are of significant size, which is somewhat common for wetlands but is somewhat rare for upland forests in this portion of Connecticut.

Three forms of management are recommended within the no activity portions of Roosevelt Forest: group selection/patch cutting for a portion of the uplands, designation of upland and wetland reserves, and control of invasive species.

These management techniques are summarized and described below and within the individual forest stand descriptions that follow.

Summary of Recommended Management Concepts for Roosevelt Forest

<u>Concept</u>	<u>Acres</u>	<u>% of RF</u>
Upland Management areas should be managed through group selection and patch cutting.	68.4	17%
Upland Reserves should be managed to encourage late successional structure.	104.0	26%
Wetland Reserves should not be managed, except for invasives removal, as needed.	124.3	31%
Passive Use areas may be managed, but activities should be of a lower intensity and have aesthetics as a primary concern due to recreational trails.	90.5	23%
Active use areas should be managed similar to parkland (No formal forest management activities, per se.)	9.3	2%
Invasive areas are in need of extensive invasive species control/eradication work.	4.5	1%

Upland Management

A portion of Roosevelt Forest's upland "no activity" areas should be utilized for active forest management. The group selection/patch cutting method is recommended for this management, as described in the Connecticut "Forest Regeneration Handbook".⁸ This management technique will ensure age class diversity and hurricane resiliency in at least a portion of Roosevelt Forest, and allow for the generation of moderate profits to fund management activities.

Management activities should also be allowed to extend into adjacent "passive use" areas, but to a lesser intensity and with aesthetics as a significant concern.

Upland Reserves

All of Roosevelt Forest's wetland areas and a portion of the "no activity" upland areas should be designated as reserves. Given the size, location, current conditions, and current multiple uses of Roosevelt Forest, it is an excellent candidate, in part, for management techniques that encourage the development of late successional (or, "structural old growth") conditions. Such techniques have been studied and described for southern New England at Harvard Forest and by the University of Massachusetts.

While these techniques have not been used extensively in Connecticut, examples of the implementation of these techniques (or a portion thereof) can be found at, at least, Yale Meyers forest in northeastern CT and Great Mountain Forest in Norfolk, CT. Implementation of these techniques would allow Roosevelt Forest to potentially be a model for southwestern Connecticut.

Portions of Roosevelt Forest are well suited for promoting late-successional forest structure (also known as "structural old growth") for several reasons:

- Roosevelt Forest contains a significantly sized forest in a very urbanized portion of Connecticut. Moving inland from the coast, it is on the leading edge of several similarly-sized forest blocks that lead further inland.
- Being a publicly owned forest, land tenure is assumed to be stable.
- The majority of the Forest currently contains mature hardwood trees, and currently exhibits little evidence of past clearing.
- A combination of both upland and wetland areas are available, both with significant overall acreage (>100ac each).
- Roosevelt Forest is large enough to be considered "core forest" by the CT DEEP.
- Based on the current interests in biodiversity and birding that exist in Stratford, it is likely that the benefits of encouraging late-successional structure would be supported by the public.

⁸ Forest Regeneration Handbook, Jeffrey S. Ward & Thomas E. Worthley, ed. Available at www.canr.uconn.edu/ces/forest.

Group Selection/ Patch Cutting. Group selection is a hybrid incorporating some of features of both the selection and silvicultural clearcutting methods. This approach does not select individual trees, or distribute the intensity of the harvest evenly throughout the stand, but rather removes groups of trees within pre-defined areas scattered through the stand. It leaves undisturbed forest in between, much like the conditions one would find following a severe “microburst” wind event. This method is very suitable for certain habitat enhancement, and can also be used to create a multiple aged condition within a forested parcel. Note that proper management dictates that poorly formed and less valuable trees be cut or removed along with the commercially marketable ones.

A greater diversity of regeneration species can result if the patches created are large enough to permit full sunlight to reach the forest floor in part of the patch, so as to create conditions in which shade-intolerant species can compete. A good rule of thumb for shade-intolerant species is to make the minimum opening twice as wide as the surrounding trees are tall. This will result in openings that are at least half an acre in size. Smaller openings (1/4 acre) may be sufficient for midtolerant species or to release white pine saplings.

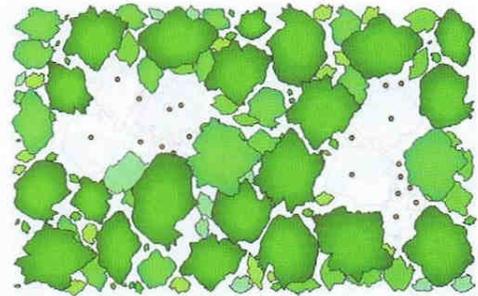
A forest managed using the group selection method will soon resemble a quilt of multi-aged and multi-sized trees. Crucial to the long-term success of group selection is careful placement of the skid trails and roads. A well-designed road system will not only lower harvesting costs, but provides the landowner with a trail system for recreational use.

Advantages

Allows regeneration of shade intolerant species without clearcutting; Provides landowner with periodic income; Provides a variety of habitats from early to late successional; Harvest schedules can be adjusted for market conditions

Disadvantages

Resulting patchwork forest increases management costs; Patches may be too small for midtolerant/intolerant species; Deer may concentrate feeding in recent patches; Residual trees near patch edges may be susceptible to damage



Group selection



Major concepts involved in encouraging or promoting late-successional structure include an increased number of large snags per acre (standing dead trees), an increase in the average total amount and size of coarse woody debris (downed dead trees), and an increase in the number of very large live trees (“legacy trees”). An additional concept is to strive for a wide, even distribution of tree sizes. Currently, most of Roosevelt Forest is weighed heavily on sawtimber-sized trees, and is rather lacking in both poletimber and seedling/sapling sized trees.

Main Concepts and benchmarks for late-successional structure within northern hardwood forests.

Structure	Benchmark	Suggested Approach
Snags	20 snags > 15" DBH per acre or 25 ft ² /acre	Target can be met through natural mortality of legacy trees. If stand is far below target, consider girdling trees > 15" DBH. Girdled trees can concentrate on unacceptable growing stock (UGS).
Downed Logs	Primary objective: 10–12 cords/acre or 40–45 trees > 15" DBH per acre Complementary objective: 5–10 cords/acre or 20–40 trees > 15" DBH per acre	Reach target through natural mortality of legacy trees and falling snags. If stand is far below target, consider increasing the number by felling trees > 15" DBH and leaving them on the ground. Felled trees can concentrate on UGS. Typical snag fall rates: ~30% of northern hardwood snags and ~40% of hemlock snags fall per decade. Snag fall rates may be higher for snags that have been created through girdling.
Live Trees	Live trees 20 trees > 20" DBH per acre 15 trees > 25" DBH per acre	Sizes can be attained through passive (i.e., letting them grow) or active (i.e., crown thinning around legacy trees) approaches. Removals from crown thinning can concentrate on unacceptable growing stock, where possible.

Source: D’Amato & Catanzaro, 2010

Implementation costs of these techniques is slightly higher (meaning reduced profits from timbersales), but the overall benefit is seen as worth consideration of this approach.

An additional description of this management technique as found in the Connecticut “Forest Regeneration Handbook”, including pros and cons, follows.

Forest Management

Forest Preserve/Unmanaged Forest. Forest preserves are not dioramas. Change happens. Where the vegetation remains unmanaged by any human intervention, slow changes accumulate gradually through the natural mortality of individual trees, or suddenly and catastrophically through the action of weather, fire, insect infestation or rampant disease. In the absence of natural catastrophic disturbances, these forest tracts progress in succession toward a more shade-tolerant and longer-life-span species mix that tends to perpetuate itself.

Responsible stewardship requires that all forests, including unharvested forest preserves, have a management plan with a detailed map. At a minimum, management plans for forest preserves include provisions for determining and permanently marking the preserve boundaries to prevent damage to the preserve by accidental encroachment of human activities in adjacent parcels. Where the property abuts a public road, or if hiking trails are present, provisions for hazard tree management should be included. The property map should indicate the location of other potential hazards (e.g., abandoned wells).

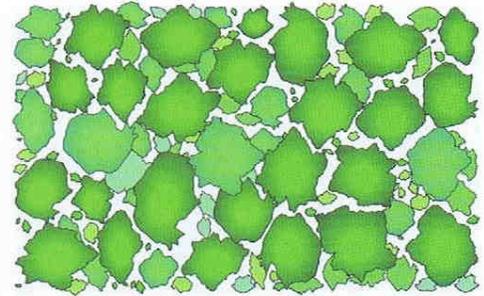
Prioritizing the relative importance of natural features will facilitate objective management decisions and allocation of limited resources. This is especially crucial when there is a potential conflict between priorities (protection of deer herd vs. maintenance of viable wildflower communities). The plan should also include strategies for monitoring and controlling invasive alien species, such as barberry and Norway maple, that could threaten the integrity of native populations.

Advantages

Easy to implement; Maintains continuous forest cover; Higher number of cavity and den trees; Favors shade tolerant species (hemlock, beech, maple); Increase in coarse woody debris (snags, dead logs); High watershed protection value

Disadvantages

No income for landowner; Change happens, unplanned and uncontrolled; More prone to some insect and disease infestations; Lower diversity over time; Shade intolerant species will disappear without severe natural disturbance



Unmanaged forest



Invasives

Because so much of Roosevelt Forest is currently free of invasive species and because the risk of invasives entering the Forest is high due to many surrounding residential properties, it is highly recommended that efforts be made to control and/or remove invasives populations where they currently exist, and that the Forest be periodically monitored to identify new populations in the future.

Forest Health Considerations

Threats to future forest health noted during fieldwork for this plan include the presence of invasive species (especially Japanese barberry and Asiatic bittersweet), a general lack of forest regeneration likely due to heavy deer browse, and an influx of American beech.

As a whole, Roosevelt Forest is remarkably free of invasive species. However, some trouble spots do exist, mostly close to the Forest's edges. In particular, portions of Stand 4 contain large amounts of bittersweet, and small amounts of barberry are scattered about portions of Stand 1. Also, the small former quarry just to the northwest of the picnic ground has a number of invasives, including a very large autumn olive, but these do not appear to have yet spread into surrounding areas. These species area a concern because they have the potential for disrupting future tree growth by preventing new seedlings from developing (e.g. barberry, euonymus) and/or impacting forest health by choking mature and developing trees (e.g. bittersweet, poison ivy).

When typically recommended for conventional "working forest" purposes, timber and/or firewood harvesting typically focuses first on removing unhealthy, poorly formed or low vigor trees and retaining healthy, well-formed, vigorous trees. For Roosevelt Forest, the measures for forest health must be modified due to the recommended focus on encouraging late successional structure.

Forest health goals for Roosevelt Forest should focus on removal of diseased trees that may eventually impact large portions of the Forest (e.g. birch nectria), and the general exclusion of invasive species to allow for primarily native species within both the upland and wetland portions of the property.

Forest Fire Prevention & Control

There is no known history of fires occurring within Roosevelt Forest.

It is recommended that the Town of Stratford make efforts to prevent fires on the property. An important aspect of fire prevention is reducing fire risk and fire hazard. Fire risk refers to things that cause fires to start, while fire hazard refers to the presence of materials that will burn.

The foremost potential cause of fire on the property is from accidental ignition related to campfires and the Forest's picnic firepits. The spring fire season (April 1 to May 15) is the most vulnerable period, depending on the weather. Reducing campfires and picnic fires during periods of high fire danger can reduce the risk of accidental fires.

In the event of a fire, the Forest's existing trail system provides good access for firefighting activities, based on the overall size of the Forest. Many trails are currently traversable by 4-wheel drive emergency vehicles. It is recommended that at least the blue trail be maintained in a drivable condition to allow access by emergency vehicles. Additionally, easy access to the Forest's central pond should be maintained to allow use of the pond as a firefighting water supply.

Forest Stand Descriptions & Prescriptions

Forest management activities impact the productivity, health and future condition of a forested property. Management recommendations are based upon a woodland examination and inventory, combined with identified habitat opportunities and recreational/other uses of Roosevelt Forest.

The prescriptions recommended here have the potential to generate very modest revenue from the property's hardwood and softwood resources in the short and long terms while also working to improve forest health and work toward the recommended goals, especially the goals of encouraging late-successional forest structure and managing for multiple uses. While modest, recommendations are estimated to have the potential of being self-sustaining or slightly profitable.

Forest Inventory

During March and April of 2011, an intensive forest inventory was conducted on the property to determine timber species composition, size, and stocking (density) of trees to evaluate what management activities may be needed to foster increased value growth and productivity on the property. This is the first known forest inventory that has been performed on the land.

The timber inventory is a sampling process where trees are measured at points located in a grid-like pattern across the property. At each point, information is collected about tree species, diameters, and heights. This is done to get a representation of the forest types on your land to be better able to make recommendations.

At each of 59 inventory points, quantitative forest structure information was collected including tree species, heights, and diameters. Tree diameters were measured at 4.5 feet above the ground. This height is known as diameter at breast height (dbh). More qualitative information was also collected about trees and shrubs in the understory (the smaller trees and shrubs growing in the forest), the presence or absence of invasive species, and the amount of nearby coarse woody debris and cavity trees or snags.

Basal area was measured at each sampling point. Basal area is a measure of the density (or "stocking") of trees in a forest. If a forest is overstocked, trees will grow slower and the growth will be distributed across more stems than if the forest is well stocked. If the forest is understocked, the land is not growing as much timber as it could be. A well-stocked stand will have a density of trees that will increase in volume and value more quickly than an overstocked or understocked stand.

Based on the information collected during the inventory, the forest is described in this report in terms of stands. Stands differ from each other in terms of tree size, species composition, density of stocking, access, and past management history.

Trees and stands are described according to the following size groups:

Seedlings:	less than 4.5 feet tall
Saplings:	1-4 inches at diameter at breast height (dbh)
Pole:	5-10 inches dbh
Small sawtimber:	10-14 inches dbh
Large sawtimber:	15+” dbh

dbh = “diameter at breast height”, measured 4.5 feet above the ground

Inventory information collected was used to map where various stands (unique forest types) were located on the property. Based on the inventory and field observations, ten stands were delineated on the property; the house, barn, and yard areas are collectively considered a fourth “stand” for purposes of mapping and discussion.

Individual stands are described in following sections of this Plan, with management recommendations given for each. Full inventory data can be found in the Appendix.

Recommended prescriptions should be implemented with the management concepts discussed above in mind!

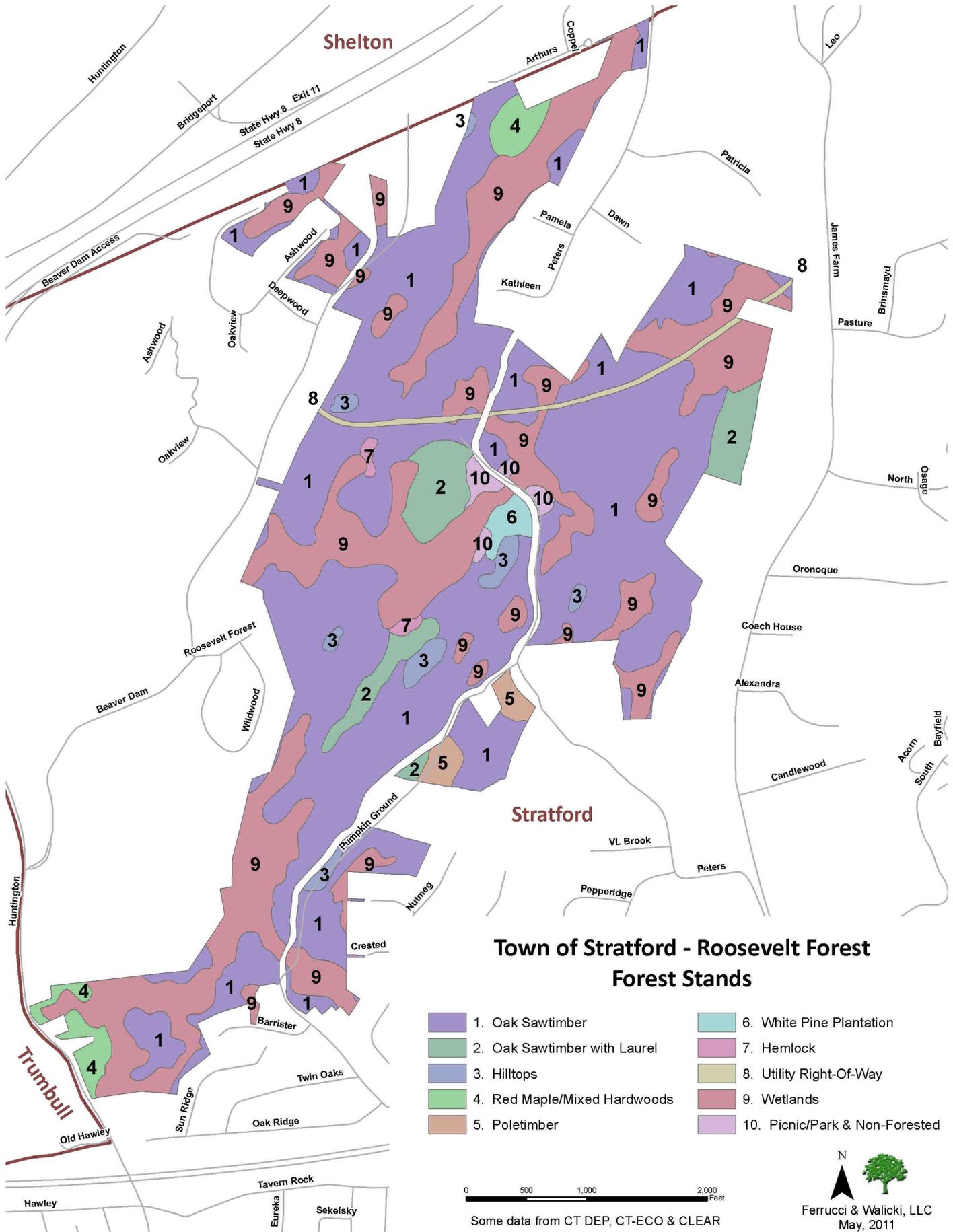
Forest Stands/Management Units for Roosevelt Forest

<u>Stand</u>	<u>Type</u>	<u>Acres</u>
1	Oak Sawtimber	225.5
2	Oak Sawtimber with Laurel	18.8
3	Hilltops	6.3
4	Red Maple/Mixed Hardwoods	8.3
5	Poletimber	4.1
6	White Pine Plantation	2.7
7	Hemlock	1.3
8	Utility Right-of-Way	3.9
9	Wetlands	127.2
10	Picnic/Park and Non-Forested	3.2

Notes:

1. Acreages are based on Town of Stratford Assessors Records, using Town-owned parcels assumed to be part of Roosevelt Forest for purposes of this Management Plan.

2. Acreage associated with the unimproved portions of Peters Lane and Pumpkin Ground Road is not included in these figures.



Future Management

Group selection and patch cutting should continue to move through the actively managed portion of this stand into the future.

Successful management for late-successional forest structure within the reserve areas will require a long-term commitment. Once legacy trees are designated, these should be documented for continued preservation during any future management activities. Treated areas should be regularly monitored for invasive species.

Stand 2: *Oak Sawtimber with Laurel - 18.8 acres*

White oak averages 37% of the basal area.

Total Basal Area:	126 ft ² /acre
Total Trees per Acre:	1,189
Total Merchantable Volume:	112,180 board feet (5,967 board feet/acre)

Description

Areas within Stand 2 are similar in many ways to Stand 1, but with a mountain laurel understory. Trees sizes and volumes tend to be slightly smaller, and fewer trees tend to be in the seedling or sapling size classes due to increased shading at the ground level. One notable difference is a general lack of beech.

Major sawtimber species within Stand 2 include scarlet oak, black oak, white oak, and red oak. Lesser amounts of hickory and red maple are present. Poletimber trees are mostly white oak, with some scarlet oak, black birch, hickory, and red maple.

Recommendations

Light sawtimber thinnings are possible within Stand 2, but the yield will be much less than in Stand 1. A removal of approximately 1,000 board feet/acre over the next ten years would provide additional growing space to residual trees. As with Stand 1, any thinning within this stand should be unevenly applied to allow for group reserve areas that can develop legacy trees. While recommendations are oftentimes made for attempts to control the spread of mountain laurel, its current distribution across Roosevelt Forest is such that it provides both visual breaks and habitat refuge & diversity.

Thinnings within Stand 2 should be timed to coincide with activities in adjacent or nearby portions of Stand 1 for operational efficiency purposes.

Future Management

Stand 2 should be managed in a similar fashion to Stand 1, but with a recognition that tree growth will be at a slower rate. Snag, cavity tree, and CWD targets should be slightly lower than in Stand 1.

Stand 3: Hilltops - 6.3 acres

Scarlet oak averaged 45% of the basal area.

Total Basal Area: 110 ft²/acre

Total Trees per Acre: 1,073

Total Merchantable Volume: 19,461 board feet
(3,089 board feet/acre)

Description

Areas within Stand 3 are located on various hilltops across Roosevelt Forest. This stand is similar in many ways to Stand 1, but the thinner and lower quality soils on the hilltops tend to grow smaller and fewer trees. These areas also tend to be drier than surrounding slopes and low points.

Sawtimber trees within Stand 3 include scarlet oak, black oak, white oak, and a small amount of red oak. Poletimber trees are largely scarlet oak, with some black birch, black oak, white oak, and red maple.



Typical portion of a hilltop – Roosevelt Forest

Recommendations

Light sawtimber thinnings are possible within Stand 3, but the yield will be much less than in Stand 1. Due to the low yield and locations of these areas, it is recommended that all of Stand 3 be designated as reserve areas and no timber harvesting take place. The stand should be periodically monitored for invasive species, and these should be controlled and/or removed (if possible) when identified.

Future Management

It is recommended that all of Stand 3 be designated as reserve areas and no timber harvesting take place.

A removal of approximately 1,000 board feet/acre would provide additional growing space to residual trees. As with Stand 1, any thinning within this stand should be unevenly applied to allow for group reserve areas that can develop legacy trees. While recommendations are oftentimes made for attempts to control the spread of mountain laurel, its current distribution across Roosevelt Forest is such that it provides both visual breaks and habitat refuge & diversity.

Thinnings within Stand 2 should be timed to coincide with activities in adjacent or nearby portions of Stand 1 for operational efficiency purposes.

Stand 4: Red Maple/Mixed Hardwood - 8.3 acres

Red maple averaged 59% of the basal area.

Total Basal Area: 147 ft²/acre

Total Trees per Acre: 885

Total Merchantable Volume: 65,545 board feet
(7,897 board feet/acre)

Description

Stand 4 includes small areas at the far northern and southern ends of Roosevelt Forest that contain red maple and other early successional (or “pioneer”) species. Trees within this stand are mostly of low to poor quality in terms of both form and volume. Invasive species are present in most parts of this stand, especially barberry and bittersweet. This is notable, as most of Roosevelt Forest is rather free of invasives. This stand contains areas that have likely reverted from cleared conditions more recently than Stands 1-3 (above), but before Stand 5 (below).

Sawtimber trees within Stand 4 include mostly red maple, with some black birch, black cherry, and ash. Poletimber trees include red maple, red cedar, and red oak.



Typical view in Stand 4 – note extensive invasive species.

Recommendations

Invasive species control/removal is the most important recommendation for this stand. Bittersweet and barberry that currently lie in portions of this stand have a high likelihood of moving into other portions of Roosevelt Forest in the future. The stand’s existing composition provides excellent forest species and habitat diversity opportunities within Roosevelt Forest’s overall context. No other forest management activities are recommended in this stand at this time.

Future Management

This stand should be allowed to progress through a natural, but monitored, forest development progression. Existing pioneer species will eventually give way to more shade-tolerant, late-successional species. Due to the adjacency to several open field areas and other land uses, this stand should be monitored regularly for invasive species.

Stand 5: Poletimber - 4.1 acres

Black birch averages 40% of the basal area.

Total Basal Area: 150 ft²/acre

Total Trees per Acre: 4,046

Total Merchantable Volume: 7,155 board feet
(1,745 board feet/acre)

Description

Stand 5 consists of two small areas of mostly poletimber-sized trees in the east-central portion of Roosevelt Forest, just south of the intersection of Peters Lane and the unimproved portion of Pumpkin Ground Road. This is the only portion of the Forest dominated by poletimber trees, but some sawtimber sized trees are also present.

The stand contains poletimber black birch and scarlet oak, with sapling black birch, white oak, and scarlet oak, and a small amount of sawtimber scarlet oak and red oak.

This is the only area within Roosevelt Forest where a definable forest area is dominated by poletimber, not sawtimber. As such, this area provides forest and habitat diversity, and also provides an example of a young forest type that would be the goal of potential patch cutting within other areas of the Forest, as recommended for some areas within Stand 1.

Recommendations

No activity is recommended within this stand at this time. The stand is currently in a “self-thinning” stage, which is unusual with the entire Roosevelt Forest, and therefore provides excellent habitat diversity. Long-range monitoring of this area would provide useful data on forest development rates for Roosevelt Forest area.

Future Management

This stand should be reviewed in approximately 10 years for a possible firewood thinning at that time. The stand should also be periodically monitored for invasive species.

Stand 6: White Pine Plantation - 2.7 acres

White pine averages 100% of the basal area.

Total Basal Area: 207 ft²/acre

Total Trees per Acre: 1,234

Total Merchantable Volume: 61,578 board feet
(22,808 board feet/acre)

Description

This stand contains 2.7 acres of sawtimber white pine trees in the in the central portion of the Forest, immediately south of the main parking area and immediately west of Peters Lane. While relatively small in size, this stand has a strong visual impact on the portion of Roosevelt Forest used by visitors of the central pond and picnic area. This is the only defined stand of pine trees within Roosevelt Forest, and together with Stand 7 (Eastern Hemlocks), makes up about 2/3rds of the softwood/conifer component with the Forest. The stand, which lies on a northern and eastern facing slope and contains scattered glacial erratics, is a plantation likely planted in the 1940s-1950s. A woods road with a chain gate at the Peters Lane end leads to the Forest's shooting range area.

Many of the trees within Stand 6 have been pruned to 8 or 16 feet, which adds value from a sawtimber standpoint. Some of the trees have multiple leaders (2 main stems), but trees within the stand are generally of moderately-good quality. Tree crowns within the stand are touching and the canopy is closed, but tree crowns have not yet begun to decline due overcrowding. It is possible that some decline will occur into the future. Black birch and American beech seedlings and saplings are scattered through portions of the stand, along with light amounts of multiflora rose.



View of Stand 6 – White Pine Plantation

Recommendations

Due to the scarcity of pine (and conifers in general) within Roosevelt Forest, maintaining this as a healthy stand is highly recommended. This stand provides important tree species and habitat diversity purposes within Roosevelt Forest, as well as providing a backdrop to the picnic area and a visual buffer to the shooting range.

While a pine sawtimber thinning could be performed in this stand based on the trees' size and quality, in order to make a viable pine-only timbersale possible, many trees would need to be cut and the aesthetic impacts would be high. Even a clearcut of the stand would yield only a small profit of perhaps a few thousand dollars. A light sawtimber thinning should be considered for this stand if forest harvesting activities are conducted in an adjacent stand, but not for financial purposes. Any thinning should be done with the goals of providing residual trees with additional growing space and encouraging white

pine regeneration to help maintain a healthy white pine stand. Coarse woody debris and standing snag/cavity trees should be maintained for habitat.

Future Management

Maintaining a softwood/conifer component should be a goal of forest management within Roosevelt Forest. If possible, efforts should be made to allow for expansion of this stand through activities in adjacent stands, such as creating small openings immediately adjacent openings that can possibly be seeded-in by pine. Maintaining this stand as white pine is important for forest and habitat diversity.

Stand 7: Hemlock - 1.3 acres

Due to this stand's small size, accurate inventory data collection was not possible.

Description

This is a small, 2-part stand dominated by eastern hemlock. The stand totals 1.3 acres, with parts located approximately 1,000 feet west and 1,400 feet south of the main parking area. Trees within the western portion are of sawtimber and poletimber size, and are generally of moderate-good health, although the presence of some wooly adelgid was noted. The southern portion of the stand (along the red trail) contains larger trees, several of which are dead or dying. Adelgid was noted in this area also.

Similar to Stand 6 (white pine), Stand 7 is important within Roosevelt Forest as it makes up about 1/3rd of the softwood/conifer component with the Forest. Outside of this stand, only individual hemlocks are found within Roosevelt Forest, widely scattered and usually of poletimber size. The stand is therefore valuable from tree species and habitat diversity standpoints. The two parts of this stand also likely serve as visual references/landmarks for trail users within the Forest.

Recommendations

Due to the scarcity of hemlock (and conifers in general) within Roosevelt Forest, efforts to maintain forest health within this stand highly recommended. This stand provides important tree species and habitat diversity purposes within Roosevelt Forest. Efforts should be made to protect hemlock trees within the stand if any forest management activities are conducted in adjacent stands. Coarse woody debris and standing snag/cavity trees should be maintained for habitat. Trees within this stand should be monitored for wooly adelgid spread.

Future Management

Maintaining a softwood/conifer component should be a goal of forest management within Roosevelt Forest. If possible, efforts should be made for preservation and possible expansion of this stand through activities in adjacent stands. Maintaining this stand as hemlock is important for forest and habitat diversity.

Stand 8: Utility ROW – 3.9 acres

Due to this stand's composition, no forest inventory data was collected.

Description

Stand 8 is a 3.9-acre underground telecommunications line right-of-way. The stand crosses the northern portion of Roosevelt Forest in an east-west orientation. Portions of the orange and green trails run along parts of the ROW, the easternmost 1,000 feet are within a wetland. The stand appears to be

periodically maintained to prevent the growth of woody vegetation, creating a narrow strip of grassland/early successional conditions.

The Connecticut Audubon Society has identified this right-of-way as an important area for Eastern Box Turtle habitat.

Recommendations

Due to the utility company ROW and vegetation maintenance, there are no forest management recommendations for this stand at this time. Continued maintenance of the area to keep it in a grassland/early successional state is valuable for habitat purposes, as very little of this habitat type is available within or in close proximity of Roosevelt Forest. Any activities related to forest management that utilize this right-of-way should take precautions to avoid any adverse impacts to box turtles and/or box turtle habitat.

Future Management

The ROW that makes up Stand 8 should continue to be maintained in a grassland/early successional state.

Stand 9: Wetlands – 127.2 acres

Red Maple averages 78% of the basal area.

Total Basal Area:	115 ft ² /acre
Total Trees per Acre:	158
Total Merchantable Volume:	515,112 board feet (4,056 board feet/acre)

Description

This stand contains Roosevelt Forest's extensive wetland and open water areas that total 32% of the Forest's overall acreage.

Most of the Forest's wetlands are associated with Pumpkin Ground Brook, Cemetery Pond Brook, or Black Brook, but a number of isolated wet pockets also lie throughout. The largest wetland areas lie in the northwest portion (associated with Black Brook), in the central portion and far northeast corner (associated with Cemetery Pond Brook), and in the southern end (associated with Pumpkin Ground Brook). Each of these areas contains pockets of standing open water, the most notable of which is the "pond" adjacent to the central parking and picnic area.

Most of Roosevelt Forest's wetlands are wooded, primarily with red maple poletimber or red maple sawtimber and poletimber. Collectively, these wetland areas are rather complex in their arrangement, and appear to provide numerous functional values including, at least, diverse habitat areas and stormwater/floodwater retention for the surrounding neighborhoods. These wetlands appear to have the potential for extensive research and educational opportunities due to their varied sizes, orientations, and relatively easy accessibility.

Recommendations

Due to the sensitivity of these areas, no forest management activities are recommended for the wetland areas within Roosevelt Forest at this time. Several seasonally wet areas and upland areas adjacent to this stand do contain good quality yellow poplar sawtimber that could be selectively thinned as part of

activities in adjacent upland stands. If such work is done, strict adherence to, at least, the Best Management Practices listed in the appendices of this Plan should be required. Control and/or removal of invasive species is recommended, where present.

While qualitative assessments for snags and cavity trees were done as part of this Plan's forest inventory, additional studies should be considered to determine if snag and cavity tree density is appropriate for a diversity of bird species.

Future Management

Long-range management of Roosevelt Forest's wetland areas should include periodic monitoring for invasive species, and control and/or removal of identified invasives. Additional studies of the property's wetland areas could be useful for townwide natural resource planning purposes.

Stand 10: Picnic/Park and Non-Forested Areas - 3.2 acres

Due to this stand's composition, no inventory data was collected.

Description

The central portion of Roosevelt Forest contains an approximately 3.2-acre area containing a handful of small buildings, a pavilion, and parking areas. This area appears to receive regular public use and is the most visible part of the Forest to visitors arriving by vehicle. (For purposes of this Management Plan, the scout camp area is included with Stand 1, but should be managed separately. A portion of the picnic area also falls within Stand 2.)

Buildings within this area include a former ranger house/station, a former nature center building, and a quonset hut presumably used for storage. Surrounding these buildings are several picnic tables. The largest concentration of sugar maple trees noted within Roosevelt Forest is immediately around the pavilion. The picnic area extends to the northwest into Stand 2, where several picnic tables and stone fireplaces are located. This area's existing understory and mountain laurel help to provide many private and semi-private, but not remote, picnicking locations.

Recommendations

Stand 10 should be viewed from less of a forest management perspective and more from a park perspective. The focus should be on maintenance of individual trees to maintain tree health and desirable aesthetics. This work would likely be best performed through cooperation with the Town's Public Works or Parks departments.

Mountain laurel in areas immediately surrounding the picnic tables should be regularly maintained, and possibly cut back more than currently exists. While some level of laurel is desirable for its visual buffering purposes, it is also highly flammable when ignited. The Stratford Fire Department or the Connecticut DEEP should be consulted regarding recommended vegetation maintenance guidelines around fire pits and outdoor fireplaces.

Future Management

Long-range management of Roosevelt Forest's park and picnic areas should include individual tree maintenance and periodic monitoring for invasive species.

Appraisal of Standing Timber

An appraised value of standing sawtimber was calculated for Stands 1 and 2 of the property, which together constitute the majority of the Forest's upland acreage. Other delineated stands within the Forest are not anticipated to potentially generate revenue from timber harvests.

Stand 1 (225.5 acres) currently contains a very high volume of sawtimber (9 mbf/ac, 144ft²/ac BA)⁹. Several trees can be expected to be veneer grade.

Stand 2 (18.8 acres) is somewhat similar to Stand 1, but any timber harvesting yields will be lower due to smaller existing timber volumes and, on average, smaller trees (6 mbf/ac, 126 ft²/ac).

(More detailed stand inventory data is included within the appendix of the Management Plan.)

*The total appraised value (as of 6/1/2011) for all standing sawtimber within the 244.3 acres of Roosevelt Forest's Stands 1 & 2 is estimated at **\$275,286**.*

Setting the amount of timber cut over a 10-year management cycle equal to the anticipated potential ingrowth creates a "sustainable" condition where the current timber volume is maintained.

Potential annual growth on Stands 1 & 2 is estimated at 150-200 bf/acre/year. This yields 1,500-2,000 bf/acre, or a total of 366-489mbf, for Stands 1 & 2 over the 10-year cycle.

Assuming a removal of 1/5 of the total volume (425 mbf) in the first 10 years of active management, a gross income of approximately \$55,000-60,000 is estimated based on current market prices. Patch cutting will raise the estimated amount.

A sawtimber thinning will remove a smaller number of trees over a larger area; patch cuts will generally remove a high volume of trees in a small area.

Patch cuts, while extremely valuable from tree regeneration, forest diversity, and habitat diversity standpoints, tend to be visually shocking to the public. It is very difficult to achieve "clean" conditions after a patch cut due to a large number of tree tops, slash, and unmerchantable stems. Ways to help lessen this impact include strict requirements for the removal of firewood and low lopping of slash.

⁹ Board foot = 12" x 12" x 1" piece of wood

mbf = 1,000 board feet

**Appraisal of Standing Timber in Stands 1 & 2
Roosevelt Forest – Stratford, CT**

Stand 1	grade (in board feet)			total board feet	\$/mbf	\$/ac
	1	2	3			
White oak	414	822	1162	2398	125	300
Red oak	541	913	578	2032	250	508
Black Birch	0	460	607	1067	90	96
Other oak	236	418	410	1064	75	80
Yellow Poplar	311	586	156	1053	50	53
Black oak	70	254	287	611	150	92
Beech	0	44	381	425	20	9
Red Maple	0	39	124	163	45	7
Hickory	0	39	71	110	45	5
TOTALS				8,923 bf/ac		\$1,150/ac
			x 225.5 ac	2,012 mbf		\$259,325

Stand 2	grade (in board feet)			total board feet	\$/mbf	\$/ac
	1	2	3			
Other oak	194	162	1274	1630	75	122
Red oak	177	868	396	1441	250	360
White oak	0	466	900	1366	125	171
Black oak	0	171	974	1145	150	172
Black Birch	0	0	157	157	90	14
Red Maple	0	0	140	140	45	6
Hickory	0	0	89	89	45	4
TOTALS				5,968 bf/ac		\$849/ac
			x 18.8 ac	112 Mbf		\$15,961

Total for Stands 1 & 2: 244.3 ac 2,124 mbf

Total standing timber value (as of 6/1/11): \$275, 286

APPENDICES

A1. Long-term Forest Management Goals & How to Achieve Them

Four generalized main goals for long-term forest management include:

1. Sustain Site Quality
2. Obtain Desirable Regeneration
3. Retain High Quality
4. Maintain High Growth Rates

Sustaining site quality requires preventing erosion to keep the soil and its nutrients in the forest and out of the streams. This means using erosion control methods during and after a harvest. Such methods include installing water bars, spreading mulch, and growing grass. It means controlling when, where, and how the timber is removed. Timber harvest contracts, harvest planning, and harvest inspections are the tools to ensure that site quality is sustained. Sustaining site quality especially means installing water bars on trail surfaces to divert water off hiking trails and logging trails. Water bars are made of bermed soil or logs and are placed at a 30-degree angle to the direction of slope. Trail use inevitably wears a slight depression in the center of the trail or in the wheel tracks. Running water that is caught in these grooves must be diverted off the trail before it reaches sufficient volume and velocity to erode the soil. Water bars do the diversion.

Obtaining desirable regeneration requires the use of various methods to encourage what new trees sprout and survive to take the place of the older forest as it reaches maturity. The methods include creating canopy openings and maintaining seed sources. Forest canopy openings shed sunlight on the ground. This fosters the growth of new trees and the young growth already present. The trees that are not cut are the seed source. They are the genetic source for future generations. Leaving healthy trees of desirable species fosters the reproduction of those species.

Retaining high quality requires focusing growth on the healthiest trees and the trees most likely to increase in value. The trees left after the harvest are the future and the beneficiaries of increased growing space and sunlight. Such trees are also the best genetic source for future generations of trees. They have the best genetic makeup for vigor, adaptation to the environment, and high tolerance to insect and disease attacks.

Maintaining high growth rates requires creating canopy openings for the residual trees to fill. These openings bring more sunlight to the healthiest crowns and allow these crowns to expand. This in turn produces a forest of extremely healthy and vigorous trees that are not competing fiercely for limited resources.

Guidelines for Tree Selection

Foresters apply knowledge of forest science and ecology, markets, and economics to the management of the forest to reach a landowner's objectives. Most forests are very heterogeneous, and even an area described as a "stand" varies in site quality, timber value, density, structure, and composition from acre to acre. Therefore, it is not possible to utilize traditional marking guidelines or cutting rules.

In applying this approach it must be understood that multiple, and sometimes conflicting, objectives and principles must be applied. A variety of factors must be considered for every cut-or-leave decision for each tree. Some of the factors are: economic maturity of the tree; seed producing ability and/or need; crown condition, health, and vigor of adjacent trees; ability of logger to fell the tree and skid it out; esthetics; wildlife impacts; density target, harvest value target, and many others. The importance or weight assigned to each factor will vary with the stand, with the silvicultural prescription, with stand development stage, with position regarding roads, skid trails, hiking trails, sensitive soils, slope and other site factors.

Health

The initial harvest in a stand often removes many unhealthy, poorly formed or low vigor trees and retains healthy, well-formed, vigorous trees. As harvesting continues the remaining trees in the forest are generally healthier due to their genetic make up and the fact that they have been given more room to grow. This leads to the creation of a forest that is healthier overall.

Non-timber values

Certain trees and groups of trees will be retained and fostered for non-timber values. These values include water quality protection, wildlife habitat, biodiversity, esthetics, and recreation. Some specific trees that could be retained for these values include stream shading trees, cavity trees, uncommon species, flowering trees and trees with historic value. Historic trees may be called “legacy trees” and may be old field trees or trees that grew as shade trees in old house lots.

Wildlife Management Considerations

The following summary of habitat management recommendations is based on the habitat conditions of the property and on a general list of wildlife management techniques recommended by wildlife biologists. All of these activities improve the food and cover opportunities for the native wildlife. In general, forest management can provide habitat elements that are lacking or in short supply, thus improving the overall density and diversity of wildlife within a forest. Most of these recommendations can be implemented through the timber management program without any additional expenditure of funds.

In general, almost any type of cutting done in the present forest will serve to improve its habitability for the wildlife by increasing the amount and diversity of food and cover vegetation. Cutting can purposely create a variety of vegetation types and ages that provide a wider variety of living sites for a wider variety of wildlife. Slash and cull sections of a tree left in the woods following a harvest can also increase the amount of coarse woody debris available for wildlife habitat.

1. At least 70% of the current tree canopy cover should be maintained on the property as a whole to prevent any negative effects to forest interior birds.
2. Approximately 3 to 7 snags and/or den trees should be maintained per acre. Such snags provide homes and food for many birds and insects
3. A conifer component should be maintained where possible. Conifers provide protection for wildlife against harsh winter weather.

4. After any harvesting operations are completed, all main skid trails and landings subject to erosion should be seeded with a conservation mix beneficial to wildlife.
5. A small portion of the brush from harvesting operations should be piled whenever possible and practical to provide additional wildlife cover for small mammals, birds and reptiles. Such piles are particularly beneficial if located near water.
6. Watercourses, wetlands, and their associated habitat should be protected by using practices designed to minimize soil disturbance, erosion, and sedimentation. This includes proper skid trail location, use of proper water crossing techniques, limiting harvesting to dry conditions, water bar installation, mulching eroding bare soil, and selective seeding of bare soil with a conservation grass seed mix.

A2. Best Management Practices

The handbook "Best Management Practices for Water Quality While Harvesting Forest Products - 2007 Connecticut Field Guide," published by the Connecticut RC&D Forestry Committee, provides good information about minimizing erosion on slopes and reducing negative impacts on streams and wet soils. Additional recommended BMPs are listed below.

A3. Wetland & Watercourse Management Zone Guidelines

The following guidelines should be utilized whenever forest management activities are proposed in the vicinity of surface water wetland features such as lakes, ponds, marshes, vernal pools, swamps, rivers, and streams. Exceptions to these guidelines are allowed for health, safety, or overriding management reasons which should be documented:

1. Guidelines for Buffer Zone Extending Fifty Feet:
In the management zone extending from 5 feet to 50 feet from any feature, no more than 30% of the trees should be removed, measured over areas of one-half acre or larger. There should be no skid roads or trails located in the buffer zone except as part of a necessary wetland crossing when there are no alternatives. Such crossings should be properly designed and permitted.
2. Best Management Practices:
Connecticut Best Management Practices designed to minimize soil disturbance, erosion, or sedimentation should be strictly applied. This includes proper skid trail location, use of proper water crossing techniques, limiting harvesting to dry conditions, water bar installation, mulching eroding bare soil, and selective seeding of bare soil with a conservation grass seed mix.
3. Wetland Delineation:
All sensitive wetlands and watercourses should be marked with pink flagging.

A4. Glossary of Forestry Terms

Basal Area: The area in square feet of the cross section of a tree or trees at DBH

Boardfoot: Wood used for lumber that measures 1"x 1"x 12" (MBF = 1000 boardfeet)

Canopy: Where the leaves and upper branches in a tree are located

Cord: Cut and stacked wood measuring 8'x 4'x 4' (includes the air in between logs)

DBH: Diameter at Breast Height: diameter of a tree 4.5 feet above the ground

Drainage: Ability of soil to shed excess water

Habitat: The food, water, cover, and living space wildlife needs for survival

Hardwood: Broad-leaved trees that usually shed their leaves in fall

Intermittent Stream: A small stream that does not flow year-around

Microtopography: Changes in elevation on a small scale; dips and bumps in the land

Overmature: Trees that have reached biological old age and have begun to decline in vigor

Overstory: Upper canopy of tree tops

Pole or Poletimber: Trees having a DBH of 6 to 12 inches

Regeneration: New young trees

Sapling: Trees having a DBH of 1 to 6 inches

Sawtimber or Sawlog: Trees having a DBH greater than 12 inches

Seedling: Trees having a DBH less than 1 inch

Silviculture: The art, science, and practice of producing and tending a forest

Site Index: A measure of actual or potential forest productivity at a defined age (expressed in ft.)

Skid Trail or Road: Corridor through the woods that logs are dragged or skidded down

Snag: a dead standing tree

Stand: Separate and distinct natural communities

Understory: Vegetation layer below the upper canopy of treetops

Water Bar: Ditches or logs placed at an angle to the slope to divert water from its downhill path

A5. Forest Inventory Data by Stand

Stand Number: 1

Area (acres): 225.5

Stand ID: Oak Sawtimber

Product Group

Product

Trees

Basal Area

Volume 1

Species--Volume Table 1/2

Saplings

#

Sqr Feet

Beech--/

24.8

0.54

0.0

Black Birch--/

54.4

2.70

0.0

Red Maple--/

91.5

4.86

0.0

Seedlings

#

Sqr Feet

Beech--/

216.2

0.00

0.0

Black Birch--/

135.1

0.00

0.0

Red Maple--/

405.4

0.00

0.0

Northern Red Oak--/

27.0

0.00

0.0

Scarlet Oak--/

27.0

0.00

0.0

White Oak--/

54.1

0.00

0.0

White Pine--/

27.0

0.00

0.0

Yellow-Poplar--/

54.1

0.00

0.0

Total

1,116.6

8.11

0.0

Stand Number: 1

Area (acres): 225.5

Stand ID: Oak Sawtimber

Product Group
Product

Species--Volume Table 1/2

Trees Basal Area Volume 1

Sawtimber

Grade One Saw	#	Sqr Feet	Board Feet
Black Oak--Inter 78/RGO Cords-Logs	0.4	1.08	69.9
Northern Red Oak--Inter 78/RGO Cords-Logs	4.7	11.35	541.3
Scarlet Oak--Inter 78/RGO Cords-Logs	1.8	4.32	235.9
White Oak--Inter 78/RGO Cords-Logs	3.9	9.19	414.3
Yellow-Poplar--Inter 78/RGO Cords-Logs	1.9	5.41	311.3
Grade Two Saw	#	Sqr Feet	Board Feet
Beech--Inter 78/RGO Cords-Logs	0.2	0.54	43.9
Black Birch--Inter 78/RGO Cords-Logs	4.4	6.22	460.4
Black Oak--Inter 78/RGO Cords-Logs	2.2	3.51	254.3
Chestnut Oak--Inter 78/RGO Cords-Logs	0.4	0.54	23.9
Hickory--Inter 78/RGO Cords-Logs	0.5	0.54	39.3
Red Maple--Inter 78/RGO Cords-Logs	0.4	0.54	39.7
Northern Red Oak--Inter 78/RGO Cords-Logs	2.5	4.32	913.4
Scarlet Oak--Inter 78/RGO Cords-Logs	2.3	3.24	393.8
White Oak--Inter 78/RGO Cords-Logs	4.0	6.76	822.2
Yellow-Poplar--Inter 78/RGO Cords-Logs	1.2	1.62	585.9
Grade Three Saw	#	Sqr Feet	Board Feet
Beech--Inter 78/RGO Cords-Logs	3.6	4.32	381.0
Black Birch--Inter 78/RGO Cords-Logs	4.7	5.14	606.9
Black Oak--Inter 78/RGO Cords-Logs	1.5	1.62	286.6
Hickory--Inter 78/RGO Cords-Logs	0.5	0.54	71.2
Red Maple--Inter 78/RGO Cords-Logs	1.5	1.89	123.9
Northern Red Oak--Inter 78/RGO Cords-Logs	1.8	1.89	578.5
Scarlet Oak--Inter 78/RGO Cords-Logs	1.7	2.16	410.5
White Oak--Inter 78/RGO Cords-Logs	7.7	7.30	1,162.1
Yellow-Poplar--Inter 78/RGO Cords-Logs	0.0	0.00	156.0
Total	53.9	84.05	8,926.3

Stand Number: 1

Area (acres): 225.5

Stand ID: Oak Sawtimber

Product Group

Product

Species--Volume Table 1/2

Trees

Basal Area

Volume 1

Poletimber

Premerchantable

	#	Sqr Feet	Cords
Beech--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	3.3	1.62	0.3
Black Birch--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	42.3	12.97	2.2
Black Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	11.0	2.97	0.4
Chestnut Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	2.4	1.08	0.2
Hickory--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	0.8	0.27	0.0
Red Maple--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	27.8	8.65	1.5
Northern Red Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	6.8	3.24	0.7
Sassafrass--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	0.8	0.54	0.1
Scarlet Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	5.8	2.97	0.5
Ash--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	2.4	1.08	0.2
White Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	9.3	4.32	0.8
Yellow Birch--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	2.8	0.54	0.1

Cull

	#	Sqr Feet	Cords
Beech--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	0.1	0.27	0.0
Black Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	0.3	0.54	0.1
Red Maple--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	2.3	1.62	0.3
Scarlet Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	0.3	0.54	0.1
White Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	1.6	1.89	0.4

Total

119.9 45.14 7.8

Snag

Snag

	#	Sqr Feet	Cords
Snag--/	7.3	3.78	0.0

Total

7.3 3.78 0.0

Stand Total

1,297.8 141.08

Stand Number: 2

Area (acres): 18.8

Stand ID: Oak Sawtimber with Laurel

Product Group
Product

Species--Volume Table 1/2

Trees Basal Area Volume 1

Saplings

	#	Sqr Feet	
Black Birch--/	733.4	4.00	0.0
Red Maple--/	264.8	8.00	0.0
White Oak--/	45.8	4.00	0.0
Total	1,044.1	16.00	0.0

Sawtimber

Grade One Saw

	#	Sqr Feet	Board Feet
Northern Red Oak--Inter 78/RGO Cords-Logs	2.3	4.00	177.3
White Oak--Inter 78/RGO Cords-Logs	1.2	4.00	193.9

Grade Two Saw

	#	Sqr Feet	Board Feet
Black Oak--Inter 78/RGO Cords-Logs	3.7	4.00	170.9
Northern Red Oak--Inter 78/RGO Cords-Logs	6.0	8.00	867.5
Scarlet Oak--Inter 78/RGO Cords-Logs	1.1	2.00	161.5
White Oak--Inter 78/RGO Cords-Logs	2.5	4.00	466.3

Grade Three Saw

	#	Sqr Feet	Board Feet
Black Birch--Inter 78/RGO Cords-Logs	2.5	2.00	157.3
Black Oak--Inter 78/RGO Cords-Logs	10.6	10.00	973.6
Hickory--Inter 78/RGO Cords-Logs	1.6	2.00	88.5
Red Maple--Inter 78/RGO Cords-Logs	2.5	2.00	140.3
Northern Red Oak--Inter 78/RGO Cords-Logs	0.0	0.00	395.7
Scarlet Oak--Inter 78/RGO Cords-Logs	12.2	18.00	1,273.9
White Oak--Inter 78/RGO Cords-Logs	9.5	10.00	900.1
Total	55.9	70.00	5,966.8

Poletimber

Premerchantable

	#	Sqr Feet	Cords
Black Birch--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	20.7	6.00	0.9
Hickory--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	3.0	2.00	0.4
Red Maple--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	16.5	6.00	0.8
Scarlet Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	3.7	2.00	0.4
White Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	41.1	18.00	2.9

Cull

	#	Sqr Feet	Cords
Scarlet Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	2.9	4.00	0.6
White Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	1.4	2.00	0.3
Total	89.3	40.00	6.3

Stand Total

1,189.3 126.00

Stand Number: 3

Area (acres): 6.3

Stand ID: Hilltops

Product Group Product Species--Volume Table 1/2	# Trees	Basal Area	Volume 1
Saplings			
	#	Sqr Feet	
White Oak--/	45.8	4.00	0.0
Seedlings			
	#	Sqr Feet	
Beech--/	200.0	0.00	0.0
Black Birch--/	400.0	0.00	0.0
White Oak--/	200.0	0.00	0.0
Total	845.8	4.00	0.0
Sawtimber			
Grade One Saw	#	Sqr Feet	Board Feet
White Oak--Inter 78/RGO Cords-Logs	2.3	4.00	172.5
Grade Two Saw	#	Sqr Feet	Board Feet
Northern Red Oak--Inter 78/RGO Cords-Logs	1.4	2.00	82.7
Scarlet Oak--Inter 78/RGO Cords-Logs	6.7	12.00	563.5
Grade Three Saw	#	Sqr Feet	Board Feet
Black Oak--Inter 78/RGO Cords-Logs	6.5	8.00	494.9
Northern Red Oak--Inter 78/RGO Cords-Logs	0.0	0.00	72.6
Scarlet Oak--Inter 78/RGO Cords-Logs	4.1	8.00	1,075.8
White Oak--Inter 78/RGO Cords-Logs	2.6	4.00	626.7
Total	23.7	38.00	3,088.7
Poletimber			
Premerchantable	#	Sqr Feet	Cords
Black Birch--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	45.3	10.00	1.5
Black Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	32.8	10.00	1.4
Red Maple--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	17.5	6.00	1.0
Scarlet Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	78.4	26.00	4.1
White Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	22.9	8.00	1.3
Cull	#	Sqr Feet	Cords
Scarlet Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	1.3	4.00	0.6
Total	198.2	64.00	9.8
Snag			
Snag	#	Sqr Feet	
Snag--/	5.1	4.00	0.0
Total	5.1	4.00	0.0
Stand Total	1,072.7	110.00	

Stand Number: 4

Area (acres): 8.3

Stand ID: Red Maple/Mixed Hardwood

Product Group	# Trees	Basal Area	Volume 1
Product			
Species--Volume Table 1/2			
Seedlings			
	#	Sqr Feet	
Beech--/	333.3	0.00	0.0
Red Maple--/	333.3	0.00	0.0
Total	666.7	0.00	0.0
Sawtimber			
Grade Two Saw			
	#	Sqr Feet	Board Feet
Black Birch--Inter 78/RGO Cords-Logs	9.6	13.33	1,015.6
Black Cherry--Inter 78/RGO Cords-Logs	3.8	6.67	302.8
Red Maple--Inter 78/RGO Cords-Logs	9.0	13.33	1,245.1
Ash--Inter 78/RGO Cords-Logs	3.8	6.67	526.2
Grade Three Saw			
	#	Sqr Feet	Board Feet
Black Birch--Inter 78/RGO Cords-Logs	0.0	0.00	357.8
Red Maple--Inter 78/RGO Cords-Logs	55.3	53.33	3,480.4
Ash--Inter 78/RGO Cords-Logs	6.2	6.67	969.0
Total	87.7	100.00	7,897.0
Poletimber			
Premerchantable			
	#	Sqr Feet	Cords
Eastern Red Cedar--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	10.1	6.67	1.2
Red Maple--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	40.0	13.33	1.9
Northern Red Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	48.9	6.67	1.0
Cull			
	#	Sqr Feet	Cords
Red Maple--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	3.8	6.67	1.0
Total	102.8	33.33	5.1
Snag			
Snag			
	#	Sqr Feet	
Snag--/	27.3	13.33	0.0
Total	27.3	13.33	0.0
Stand Total	884.5	146.67	

Stand Number: 5
 Stand ID: Poletimber

Area (acres): 4.1

Product Group
Product
 Species--Volume Table 1/2

Trees Basal Area Volume 1

Saplings	#	Sqr Feet	
Black Birch--/	2,495.5	30.00	0.0
Scarlet Oak--/	114.6	10.00	0.0
White Oak--/	662.1	20.00	0.0
Seedlings	#	Sqr Feet	
Beech--/	500.0	0.00	0.0
Total	3,772.2	60.00	0.0

Sawtimber

Grade Two Saw	#	Sqr Feet	Board Feet
Scarlet Oak--Inter 78/RGO Cords-Logs	4.2	10.00	448.1
Grade Three Saw	#	Sqr Feet	Board Feet
Northern Red Oak--Inter 78/RGO Cords-Logs	12.7	10.00	540.6
Scarlet Oak--Inter 78/RGO Cords-Logs	0.0	0.00	756.5
Total	16.9	20.00	1,745.2

Poletimber

Premerchantable	#	Sqr Feet	Cords
Black Birch--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	117.0	30.00	4.7
Scarlet Oak--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	37.8	20.00	3.2
Total	154.8	50.00	7.9

Snag

Snag	#	Sqr Feet	
Snag--/	101.9	20.00	0.0
Total	101.9	20.00	0.0

Stand Total 4,045.8 150.00

Stand Number: 6
 Stand ID: White Pine

Area (acres): 2.7

Product Group	# Trees	Basal Area	Volume 1
Product			
Species--Volume Table 1/2			
Saplings			
	#	Sqr Feet	
White Pine--/	76.4	6.67	0.0
Seedlings			
	#	Sqr Feet	
Beech--/	333.3	0.00	0.0
Black Birch--/	666.7	0.00	0.0
Total	1,076.4	6.67	0.0
Sawtimber			
Grade Three Saw			
	#	Sqr Feet	Board Feet
White Pine--Inter 78/RGO Cords-Logs	142.2	193.33	22,807.7
Total	142.2	193.33	22,807.7
Poletimber			
Premerchantable			
	#	Sqr Feet	Cords
White Pine--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	15.1	6.67	1.5
Total	15.1	6.67	1.5
Stand Total	1,233.7	206.67	

Stand Number: 7
 Stand ID: Hemlock

NO DATA

Area (acres): 1.3

Stand Number: 8
 Stand ID: Utility ROW

NO DATA

Area (acres): 3.9

Stand Number: 9
 Stand ID: Wetlands

Area (acres): 127.2

Product Group	# Trees	Basal Area	Volume 1
Product			
Species--Volume Table 1/2			
Sawtimber			
Grade Two Saw	#	Sqr Feet	Board Feet
Yellow-Poplar--Inter 78/RGO Cords-Logs	1.9	5.00	419.0
Grade Three Saw	#	Sqr Feet	Board Feet
Red Maple--Inter 78/RGO Cords-Logs	36.9	40.00	2,568.5
Ash--Inter 78/RGO Cords-Logs	13.7	15.00	946.7
Yellow-Poplar--Inter 78/RGO Cords-Logs	0.0	0.00	121.3
Total	52.5	60.00	4,055.5
Poletimber			
Premerchantable	#	Sqr Feet	Cords
Black Birch--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	9.2	5.00	0.9
Red Maple--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	63.5	25.00	4.5
Cull	#	Sqr Feet	Cords
Red Maple--RGO Cds, Feet to 4"/RGO Cds, Feet to 4"	33.2	25.00	4.3
Total	105.8	55.00	9.7
Stand Total	158.3	115.00	

Stand Number: 10
 Stand ID: Picnic/Park & Non-Forested

NO DATA

Area (acres): 3.2

A.6 Reported Stratford Bird Species in Stratford

Source: The Great Backyard BirdCount – <http://gbbc.birdsource.org>

2010 Results: Stratford, Connecticut

This town report includes all data submitted to the town and to all postal codes associated with the town.

Species [taxonomic] [alphabetic]	Number of Birds	Number of Checklists Reporting the Species			
Brant	352	3	Bald Eagle	2	2
Canada Goose	664	10	Northern Harrier	7	3
Mute Swan	18	3		1	1
Wood Duck	2	1	Cooper's Hawk		
Gadwall	68	4	Red-shouldered Hawk	2	2
American Wigeon	26	3	Red-tailed Hawk	20	12
American Black Duck	583	11	American Kestrel	1	1
Mallard	1,956	13	Peregrine Falcon	3	2
Northern Pintail	15	5	American Coot	17	3
Green-winged Teal	4	2	Killdeer	5	2
Canvasback	8	3	Willet	1	1
Ring-necked Duck	12	1	Ruddy Turnstone	5	1
Greater Scaup	2	1	Sanderling	101	3
Surf Scoter	7	2	Dunlin	92	2
White-winged Scoter	3	1	Wilson's Snipe	2	1
Long-tailed Duck	43	1	American Woodcock	3	1
Bufflehead	57	4	Ring-billed Gull	1,482	8
Common Goldeneye	177	3	Herring Gull	2,838	9
Hooded Merganser	56	6	Iceland Gull	1	1
Common Merganser	11	3	Great Black-backed Gull	304	7
Red-breasted Merganser	86	3	Rock Pigeon	128	7
Wild Turkey	18	2	Mourning Dove	70	12
Red-throated Loon	20	2	Monk Parakeet	84	9
Common Loon	1	1	Eastern Screech-Owl	1	1
Pied-billed Grebe	1	1	Great Horned Owl	1	1
Horned Grebe	2	1	Long-eared Owl	1	1
Double-crested Cormorant	1	1	Belted Kingfisher	3	3
Great Cormorant	12	4	Red-bellied Woodpecker	22	12
Great Blue Heron	2	2	Yellow-bellied Sapsucker	3	3
Black-crowned Night-Heron	1	1	Downy Woodpecker	21	13
Turkey Vulture	4	4	Hairy Woodpecker	8	7
			Northern Flicker	7	5

Pileated Woodpecker	2	2
Blue Jay	54	14
American Crow	52	13
Fish Crow	20	8
Common Raven	2	1
Black-capped Chickadee	56	14
Tufted Titmouse	71	14
Red-breasted Nuthatch	1	1
White-breasted Nuthatch	20	11
Brown Creeper	5	5
Carolina Wren	8	7
Winter Wren	2	2
Golden-crowned Kinglet	7	3
Eastern Bluebird	3	1
American Robin	60	11
Gray Catbird	1	1
Northern Mockingbird	12	5
European Starling	552	12
Cedar Waxwing	5	1
Orange-crowned Warbler	1	1
Yellow-rumped Warbler	1	1

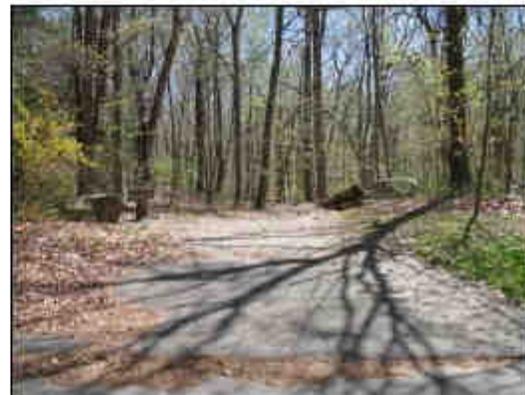
Eastern Towhee	5	4
American Tree Sparrow	60	8
Savannah Sparrow	26	3
Fox Sparrow	1	1
Song Sparrow	95	11
Swamp Sparrow	1	1
White-throated Sparrow	135	15
Dark-eyed Junco	90	11
Northern Cardinal	45	15
Red-winged Blackbird	43	4
Eastern Meadowlark	1	1
Rusty Blackbird	1	1
Common Grackle	35	7
Boat-tailed Grackle	31	1
Brown-headed Cowbird	4	1
Purple Finch	2	1
House Finch	17	7
American Goldfinch	32	10
House Sparrow	519	15
Total	11,526	

A7. Excerpts From Draft Stratford Pathways Study & Plan

- **Point of Interest - Roosevelt Forest:** Roosevelt Forest is a ±295-acre, town-owned forest preserve located in the north end of Stratford. The park was established during the depression era as a WPA project. In more recent years, the town has acquired adjacent properties or has received property via donations. The exact boundaries are currently unclear and the update of the town plan of development recommended that the town review its properties in the vicinity of the forest, determine which should be included and establish clear boundaries. The main access to the forest is from Peters Lane. This entrance leads to a parking lot and picnic area. There are three other secondary access points, located from North Peters Lane (north), Pumpkin Ground Road (south) and Beaver Dam Road (west). Although the trailheads are fairly obvious, they are not clearly marked as leading into Roosevelt Forest. Parking at these points is limited to on-street parking. The forest is crisscrossed by a network of hiking trails totaling about five miles. The trails are fairly wide and easy to follow. Mountain biking is also a popular activity.



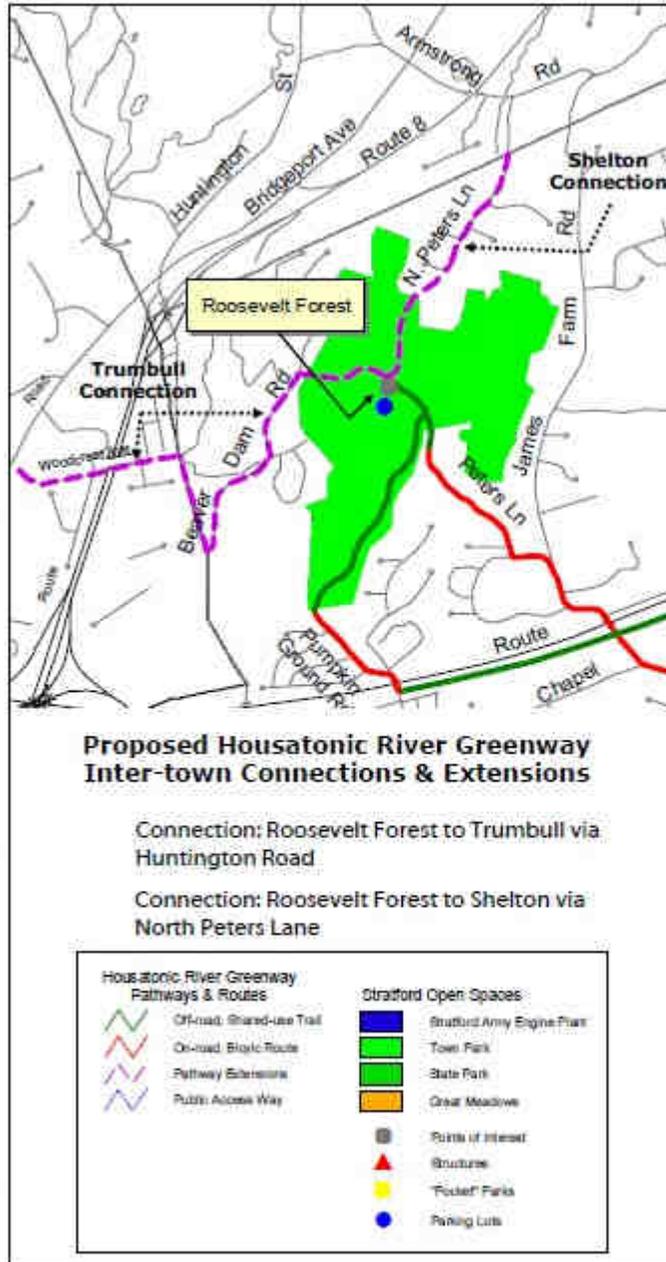
Main entrance to Roosevelt Forest along Peters Lane. The road is narrow & needs improvement.



The secondary access points to Roosevelt Forest are not clearly marked

- **Trumbull Connection:**

The regional long range transportation plan for the Greater Bridgeport planning region includes concepts for developing an on-road bicycle route network throughout the region and assessing the feasibility of a multi-use trail along the Merritt Parkway. Sections of the proposed on-road bicycle route system and the Merritt Parkway Greenway would be incorporated into and coincide with planned alignments for the Housatonic River Greenway. Because of the large, multi-level and complex set of ramps for the Route 8 and Route 15 interchange area, it is necessary to align the Merritt Parkway Greenway around the interchange via on-road routes in Trumbull. To connect the Merritt Parkway Greenway to proposed bicycle routes in Trumbull, the trail would be extended westward through Roosevelt Forest and along Beaver Dam Road to Huntington Road. The bicycle route would continue on Huntington Road and cross into Trumbull along Woodcrest Avenue and Wheeler Drive to Shelton Road.



- • **Trail Type:** Multi-use & On-Road Bicycle Routes
- • **Section Length:** ±5,400 feet (1.02 miles) - bicycle routes
±1,600 feet (0.28 miles) - multi-use trail sections
- • **Trail Surface:** Soft, compacted stone dust
- • **Bicycle Route Surface:** Paved, on-road shoulders with sidewalks
- • **Grade:** Level
- • **Safety Concern:** Moderate; traffic conflicts along bicyclist route sections & intersection crossings



Connections to Trumbull, via Beaver Dam Road and Huntington Road, and Shelton, via North Peters Lane, would be provided from Roosevelt Forest by upgrading existing trails.

- **Shelton Connection - Roosevelt Forest Extension:** As described above, the city of Shelton currently does not have any bicycle routes or multi-use trail sections that would connect conveniently with the Housatonic River Greenway; however, there are opportunities to extend sections of the greenway to the Shelton border for future connections. A possible connection would be to upgrade the trail in Roosevelt Forest that extends to North Peters Lane. It would then be aligned along North Peters Lane as a bicycle route to the Shelton town line in the vicinity of Armstrong Road. The north end of North Peters Lane near Armstrong Road (in Shelton) is very narrow and may need improvement. This extension would be about 4,500 feet (0.85 miles) in length.
 - • **Trail Type:** Multi-use & On-Road Bicycle Routes
 - • **Section Length:** ±2,100 feet (0.40 miles) - bicycle routes
±2,400 feet (0.45 miles) - multi-use trail sections
 - • **Trail Surface:** Soft; compacted stone dust
 - • **Bicycle Route Surface:** Paved, on-road shoulders with sidewalks
 - • **Grade:** Level
- • **Safety Concern:** Low; traffic conflicts would be minimal; north end of North Peters Lane is narrow.

A8. References & Other Recommended Reading

Natural Resource Management Plans

Connecticut's Forest Resource Assessment and Strategy, 2010. Prepared by Helene Hochholzer, Connecticut Forest Planner, Connecticut Department of Environmental Protection.

Plans of Conservation & Development

Conservation and Development Policies Plan for Connecticut 2005-2010. Office of Policy and Management Intergovernmental Policy Division.

Update to Town Plan of Conservation and Development. Stratford Planning Commission, December 2003.

Other Documents

A Forest Manager's Guide to Restoring Late-Successional Forest Structure. Anthony D'Amato (University of Minnesota) & Paul Catanzaro (University of Massachusetts), 2010.

Connecticut State of the Birds 2011 – Conserving Our Forest Birds. Connecticut Audubon Society, Fairfield, CT, 2011.

Disturbance History Community Organization and Vegetation Dynamics of the Old Growth Pisgah Forest, southwestern New Hampshire, USA, Foster, D.R., 1988, *Journal of Ecology* 76:105-134.

Draft Stratford Pathways Study and Plan (Revised) – Housatonic River Greenway Project. Greater Bridgeport Regional Planning Agency, February 2008.

Effects of Forest and Grassland Management on Drinking Water Quality for Public Water Supplies: (Chapter 5) A Review and Synthesis of the Scientific Literature, George E. Dissmeyer, 2000.

Forests in time: the environmental consequences of 1,000 years of change in New England, Foster, D. R., and J. Aber, editors. 2004. Yale University Press, New Haven, Connecticut.

Forest Regeneration Handbook. Edited by Jeffrey S. Ward & Thomas E. Worthley. Produced by the Connecticut Agricultural Experiment Station. Available online at: www.canr.uconn.edu/ces/forest.

Guidelines For Certification of Vernal Pool Habitat, The Commonwealth of Massachusetts Division of Fisheries and Wildlife, May 1998.

Harvard Forest Dioramas. Information available online on the Fisher Museum/Harvard Forest website at: <http://harvardforest.fas.harvard.edu/museum/dioramas.html>.

Harvesting effects on soil and water in the eastern hardwood forest, Patric, J.H. *Southern Journal of Applied Forestry.*

Introductory Guide to Stratford's Natural Environs. Stratford Conservation Commission, 1990.

New England Wildlife Habitat, Natural History and Distribution. Hanover, N.H., DeGraff, R. M.; Yamasaki, M. 2001. University Press of New England. 482 pp.

Processing of Pesticide and Nutrient Inputs by a Restored Riparian Forest, Vellidis Lowrance, Hubbard, 1995. In *Versatility of Wetlands in the Agricultural Landscape.* Kenneth L. Campbell, Ed. American Society of Agricultural Engineers.

Red Triangle Nature Trail Walk Guide. Stratford Conservation Commission, 1975.

Water, Wildlife, Recreation, Timber...Coarse Woody Debris, Mount, J.R., 2002, USDA Forest Service GTR, PSW-GTR 181, 2002

Water, Woods and People: A Primer. Some effects of human actions on water resources of the eastern forest. 1995. James H. Patric. Artistic Printers, Greeneville, TN. 80 pages.

Wildlands and Woodlands: A Vision for the New England Landscape. Foster, D.R., B.M. Donahue, D.B. Kittredge, K.F. Lambert, M.L. Hunter, B.R. Hall, L.C. Irland, R.J. Lillieholm, D.A. Orwig, A.W. D'Amato, E.A. Colburn, J.R. Thompson, J.N. Levitt, A.M. Ellison, W.S. Keeton, J.D. Aber, C.V. Cogbill, C.T. Driscoll, T.J. Fahey, and C.M. Hart. 2010. Harvard Forest, dist. by Harvard University Press, Cambridge, Massachusetts. 36pp.

Recommended Reading

A Sierra Club Naturalist's Guide to Southern New England by Neil Jorgensen

This is the most comprehensive guide to the natural history of southern New England. This book teaches you how to read the landscape by introducing the natural communities of southern New England.

Audubon Field Guide to New England

An excellent reference for identifying most natural features in New England. This includes rocks, mammals, reptiles, amphibians, birds, trees, plants, and much more.

Connecticut Woodlands by the Connecticut Forest and Park Association: cfpa.org

This is the periodical and organization for anything to do with forests in Connecticut. It is published quarterly for CFPA members.

Forest Trees of the Northeast by Lassoie, Luzadis, and Grover

This book provides complete descriptions of most of the tree species of the northeastern US. It covers identification, habitat, range, life history, insect and diseases, management, and products.

New England's Landscape by Neil Jorgensen

Concise overview of the geology and vegetation of New England.

New England Forests Through Time by Foster and O'Keefe

A wonderful coffee table book that will interest even the most cityfied among us. Vivid pictures and flowing prose about the history of New England's forests.

Northern Woodlands magazine: northernwoodlands.com

This quarterly has anything and everything to do with nature, conservation, forestry, and wildlife in New England. A professional magazine of the caliber of National Geographic.

Reading the Forested Landscape by Tom Wessels

A total description of how every acre of New England's forests became the way they are. Read this book before any others on this list!

Sermons in Stone by Susan Allport

The author presents a fascinating history of New England's stonewalls – who built them, when, why, and how. Almost by mistake, she presents a unique look at New England's natural history.

The Face of Connecticut

The complete story of Connecticut's geology, geography, and man's interaction with both.

The Trees in My Forest by Bernd Heinrich

This is a biological look at the forest. It is excellent for understanding how trees grow, how they interact with each other, and how they interact with the land.

Working with Your Woodland by Beattie, Thompson, and Levine

Anyone interested in taking an active role in forest management should read this book. It summarizes four years of forestry school into an easy to read book.

All photographs and maps within this Management Plan are by
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