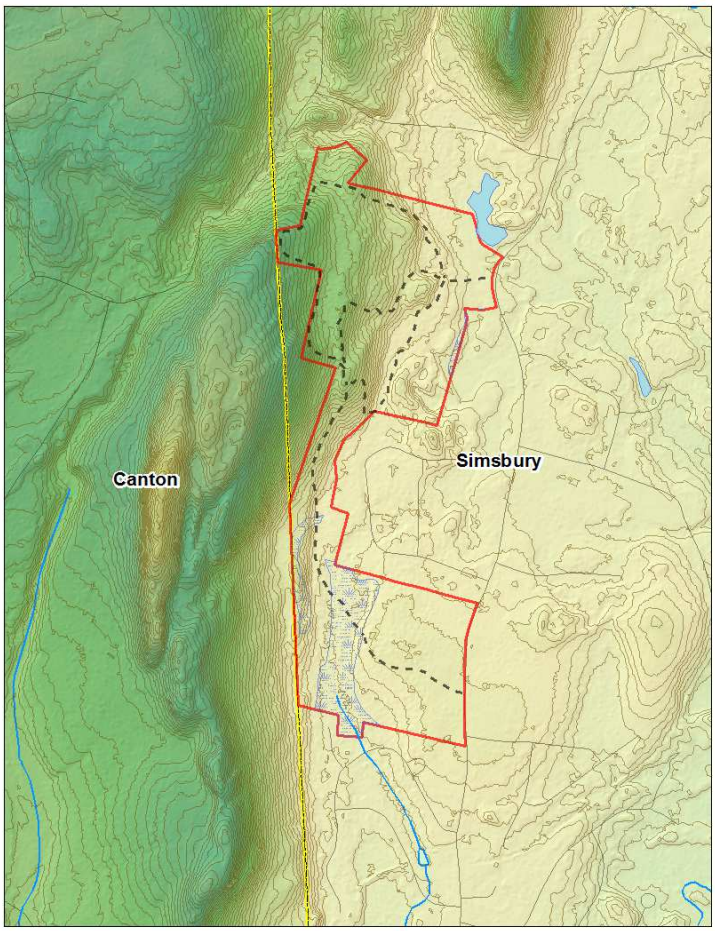
Management Plan for
Onion Mountain Park
Town of Simsbury
179 acres; 2014-2023
Simsbury, CT – Hartford County



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Executive Summary

This Management Plan is intended to guide the management of Onion Mountain Park, a property owned by the Town of Simsbury located in Simsbury, Connecticut for the period of 2014-2023. This property is to be managed to maintain and enhance forest health, wildlife habitat for a variety of species, improve timber quality, help maintain balanced and properly functioning ecosystems, improve recreational experiences, and maintain aesthetic qualities, all while keeping the protection of water quality and soil integrity paramount.

This property is approximately 179 acres. This property was researched and field-investigated by Ferrucci & Walicki, LLC during summer 2014. The results, along with multiple-use management recommendations for the next ten years, are included in this management plan.

Overall, the investigation revealed that the property contains generally even-aged and two-aged forested, healthy upland, wetland, and riparian ecosystems. This property possesses varying levels of both existing and potential opportunities for future forest and wildlife management. The property also contains existing road and trail systems that provide good access to many parts of the property.

This property is well-suited for a multiple-use land management program. All recommendations have been carefully considered and balanced within the general overall objectives of the Town's forestland management goals and other interests.

Goals for the Onion Mountain Park
Multiple-Use Management Program

1. Engage in sound, sustainable land stewardship
2. Provide suitable recreational opportunities
3. Conserve soil & water resources
4. Maintain sensitive or special areas as reserves
5. Protect cultural resources
6. Maintain & improve forest and ecosystem health
7. Protect & enhance diverse wildlife habitat
8. Generate periodic income from the sale of forest products to help fund land management projects on the property

Summary of Major Recommendations

Further details on these major recommendations are contained within the body of this plan.

Natural Resources

1. A forest management program, including periodic timber harvests and wildlife habitat work, should be continued on this property. Efforts to maintain and enhance wildlife habitat, improve forest health, personal safety, and maintain water quality and soil stability, should be the focus of management activities.

2. Engage in a series of timber harvests to improve forest health and species, age class and size class diversity.

3. Invasive plant species, where found, should be controlled/removed where possible to encourage regeneration of native vegetation.

Recreation

1. Continue the maintenance of the road and trail system providing safe access throughout the property. Convert log roads to usable trails following completion of forest management activities in certain areas.

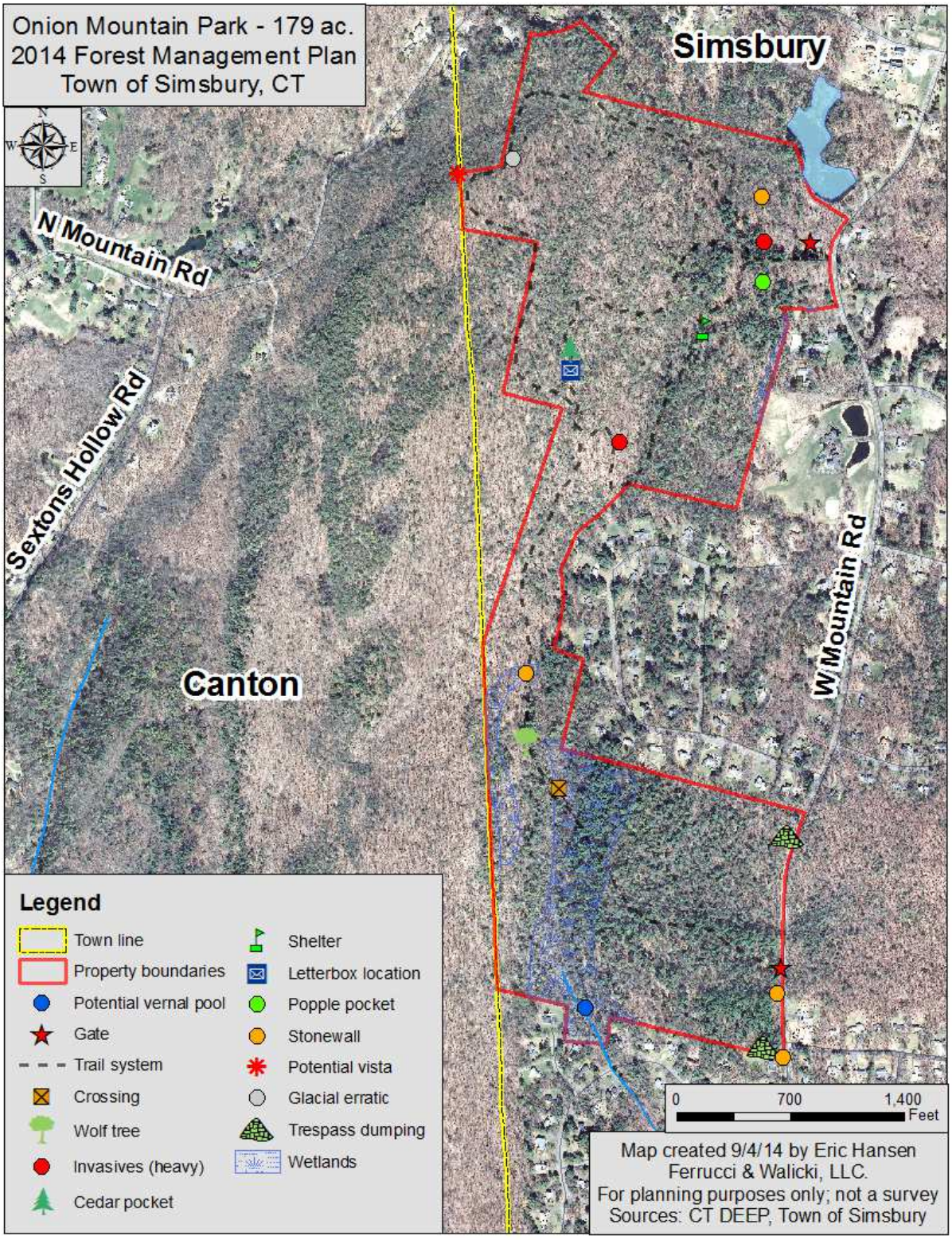
2. Consider developing educational signage to explain management activities undertaken and/or natural features to recreational users of the property.

3. Ensure the preservation of historical features on the property (i.e. stone walls).

Contents

All photos included in this plan were taken by Ferrucci & Walicki, LLC

Onion Mountain Park Items of Interest Map



PROPERTY DESCRIPTION

General Property Description and Inventory Methods

Onion Mountain Park is a 179-acre property owned by the Town of Simsbury. The property is cared for and maintained by the Town, volunteers, and other users of the property. A history of agricultural uses as evidenced by stone walls, and previous timber harvests have helped shape the property that is visible today. Vegetation and other physical attributes including old roads and, potentially, drainage patterns may all be partially a product of past land use history.

Above left: This stonewall at the near the toe of the slope in Stand 6 is one of many that are found on the property. Its presence indicates the fact that this area was once likely open farmland.

Above right: The stumps from the last timber harvest shown here in Stand 5 in the northwest portion of the property give us a clue of some of the past management that has happened on the property.

The property is located on the western side of the town along the boundary with Canton. Currently, the best access to the property is from West Mountain Road where there is a parking area and kiosk with information about the trail system (see picture of entrance to the Park at the top of page 2). The majority of the use of the property appears to be for hiking and dog walking. Current trail conditions indicate that the use is concentrated on the trails near the center of the northern half of the property.

Left: This kiosk is located near the parking area at the northern end of the property.

This property contains a mix of forest types and tree species. Most of the area is well-drained upland forestland, but there are also wetlands, riparian areas, and dry ridgetop forests. An inventory of the forest resources on the property was completed in summer of 2014. A series of inventory points were laid out throughout the property. At each point a 20 Basal Area Factor (BAF) angle gauge was used to determine basal areas[1] and a Biltmore stick and/or diameter tape were used to determine diameters and merchantable heights of trees. Additionally, a qualitative visual inspection of invasive

[1] Basal area is a relative measure of density of trees in a given area. Usually described on an average per acre basis it is the cross-sectional surface area (in square feet) of wood that would be found in all trees at breast height which is 4.5 feet above the ground on any given acre.

plant species, as well as individual tree and stand health, and understory prevalence and species composition was conducted at each point.

Tree size varies throughout the property, but trees in the overstory (i.e. main canopy) are generally in the medium-sized sawtimber size class (14-18 inches in diameter at breast height (dbh, which is measured at 4.5 feet above the ground)), with poletimber (5-11 inches dbh) and some large diameter sawtimber-sized trees. It appears as though competition from adjacent trees is the limiting factor for tree growth and vigor as basal areas (i.e. density/amount of trees in any given area) are relatively high in many places on the property. Trees are tall in most places on the property – with the exception of the dry ridgetop forests on the west end of the property – which is an indication that the site conditions are appropriate for growing trees.

The understory consists a mix of woody and herbaceous species. The most prevalent tree species found in the understory are black birch, American beech, white pine, and eastern hemlock. White pine and black birch seedlings and saplings are particularly dense where natural disturbance or harvesting of trees has recently occurred. In places, sugar maple, red maple, yellow-poplar, and some oak seedlings and saplings can be found. These last four species are less prevalent than black birch, beech or white pine, and are mostly found in areas with limited overstory competition.

Above: This picture taken in Stand 3 shows how well portions of the property with gaps in the canopy can regenerate. The area toward the left has a relatively closed canopy and a lack of regeneration and associated structure. The area on the right is adjacent to a canopy gap and has a significant amount of desirable regeneration and provides both vertical and horizontal structural diversity. This area was part of a timber harvest that occurred in the early 1990s.

Ferns and maple-leaf viburnum are found throughout the property. Mountain laurel dominates the understory in small pockets. The presence of mountain laurel makes seedling germination in and human travel through these pockets difficult, but their dense vegetation is beneficial for some species of wildlife including songbirds such as the black throated blue warbler. Throughout the property, tree regeneration, understory and midstory species (0-15 feet from the forest floor) are present in varying densities. Again, the densest regeneration is occurring in areas with a limited overstory canopy due to recent harvesting or other disturbances.

Deer browse may prove to be an issue for regeneration at some point as there are deer in the area as evidenced by the heavy browse on some seedlings (see photo on next page).

The topography is undulating throughout the property. East of the wetland that bisects the southern half of the property, the land is mostly flat, but there are steep, rocky sections in portions of the entire

western side of the property. Soils are rocky throughout the property and soil drainage ranges from excessively well-drained near the western boundary to very poorly drained with standing water in the wetlands.

Left: The stunted twigs on this winged euonymus shrub were browsed by deer. Unfortunately, deer don't just browse on the non-native invasive plant species. Frequently, their preferred browse species are the same native species that we would like to have in our forests.

There are some areas where there is exposed ledge and others with glacial erratics, giving us more clues about the longer-term history of the property. Glacial erratics are large pieces of rock that were broken off and transported then deposited on top of existing soil or ledge by advancing or retreating glaciers. Elevation ranges from approximately 330 feet above sea level near the southern end of the property in the wetland to over 660 feet toward the northwest corner of the property close to the Canton boundary along the property line.

Left: Glacial erractics such as this one found in the northwestern corner of Stand 7 are rare on this property but tell a story of the longer geologic history of the region.

As stated above, some of the cultural features found on the property include stone walls and old barbed wire fence. Portions of boundary lines are marked by some of these features though most of the boundaries are delineated by signs as opposed to fences or walls. The signs are relatively widely spaced, and sometimes face the wrong direction (into the property as opposed to outward).

Location and Access

This property is located in the central-west portion of Simsbury. There is only one practical entrance for access to the property currently which is off of West Mountain Road where the parking lot is located.

The parking area is generally well-maintained, and it is surrounded by forest, some of which contains invasive plant species and some poison ivy. There is a kiosk at the western end of the parking lot near the trailhead, which was built and installed as a part of an Eagle Scout project by Carl Johnson in May 2007, and is in good structural condition. There is a map of the property on the kiosk that shows the locations of the color-coded trails, as well as some other information about the park.

Right: These poison ivy vines cover a tree in the parking area. While the oils in poison ivy can be poisonous to people, the berries are an important food source for wildlife including songbirds.

Most of the trails in the north half of the property are well-maintained. The condition of the paint indicating trail color varies, but is better in the northern half of the property. In one location, a pole bridge was installed during or following the last timber harvest and is still in place. This bridge is rotting and is not suitable for use for another timber sale or for regular recreational use.

There are two gates that restrict access to the property. One of these is located at the western end of the parking area near the kiosk. The other is near the southern end of the property adjacent to West Mountain Road. The area adjacent to the southern gate was used as a landing during the last timber harvest.

The property has some road frontage (approximately 2,000 feet) in two separate sections along West Mountain Road.

The Town of Simsbury owns and manages several properties within the Town. There are several adjacent conserved properties – of which Simsbury's Onion Mountain Park and Ethel Walker property are a significant part – that form a corridor that covers approximately 1,200 acres. This includes land owned by the Canton Land Conservation Trust, the State, the Simsbury Coon Club, and other town-owned land. In an increasingly developed landscape these large blocks of undeveloped land continue to increase in importance. See the map on page 44 to understand how this property fits into the larger landscape of conserved properties.

Water Features

There are no perennial streams that are found at Onion Mountain Park, though Nod Brook appears to have its headwaters on or near the wetland at the south end of the park and continues flowing south from there. Stoddard Reservoir, a water body located just north of the property adjacent to West Mountain Road is owned by the Town of Simsbury and leased to the Simsbury Fish and Game Club who stewards the land and holds annually fishing derbies for children. The public is welcome at the Reservoir, but fishing is allowed by permit only. There are several small intermittent drainages that were completely dry during the time when the inventory for this property was completed (August 2014). These small drainages likely carry water during part of the year, or at least when significant precipitation events occur.

Right: This drainage on the boundary of Stand 6 and Stand 8 (the wetland) in the south end of the property was dry during late summer 2014, but clearly contains water at certain times of year.

The major water feature on the property is a wetland complex found in the southern half of the property. The wetland is generally oriented north-south and encompasses over 10 acres. Vegetation types vary within the wetland and there are pockets of other wet areas throughout the property, but this southern wetland is the largest and likely the most important. In general, wetlands are important for wildlife as they frequently provide shrubby habitats that are not often found elsewhere. Additionally, wetlands function as filters for sediment and pollutants upstream and upslope, helping to maintain water quality.

There may be a vernal pool near the southern property boundary. At the time of the inventory, there was no water in the depression, however it may serve as a vernal pool during the spring and early summer.

Above: This depression near the southern end of Stand 8 may serve as a vernal pool during the spring and early summer months of the year.

No fish species were noted in the property's water features during the forest inventory, but they likely exist in the nearby pond.

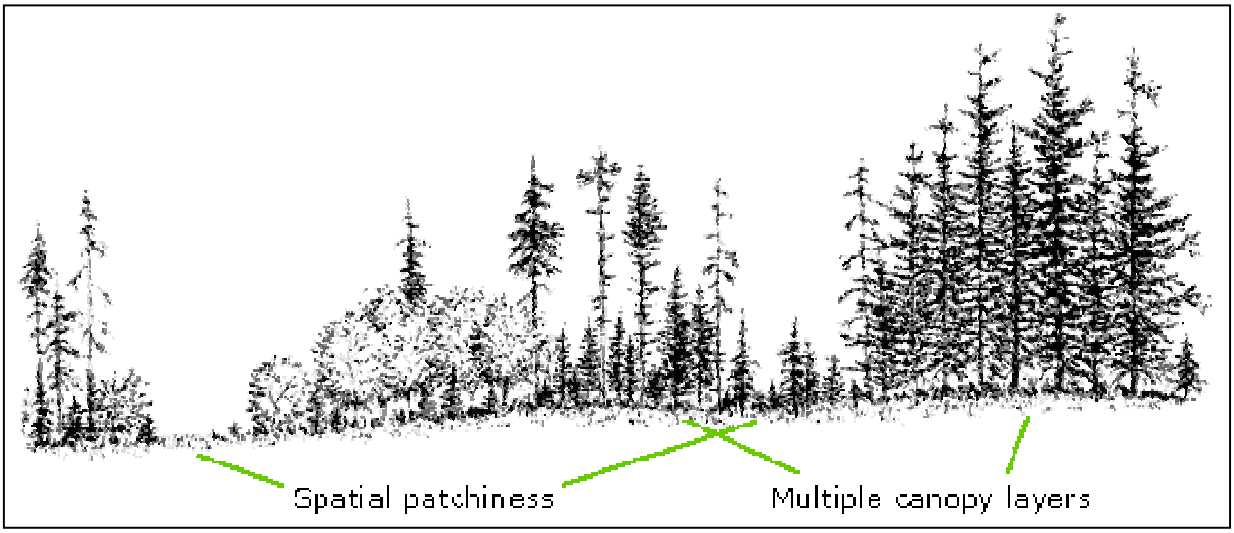
Insect, Disease and Other Forest Health Issues

In general, forest health throughout this property is fair to good. The major issues are:

- a lack of structural diversity in places;
- some small and relatively isolated, but very dense populations of invasive plant species;
- a lack (in places) of desirable species of tree regeneration;
- hemlock woolly adelgid and hemlock scale;
- ash mortality due to a variety of factors;
- windthrow;
- nectria on black birch;
- beech bark disease; and
- a potential near-term future infestation and subsequent defoliation by the gypsy moth.

Each of these issues will be addressed briefly below. Forest structure and structural diversity is described in both vertical and horizontal contexts. Vertical diversity is the presence of vegetation of various heights (also called strata) in a relatively small observable area. Horizontal diversity is a description of how vegetation heights vary over a larger landscape level. In some places on the property tree regeneration is completely or nearly completely absent from the 0-5 foot size class. Though it may be aesthetically pleasing and may facilitate some kinds of recreation, this lack of vegetation negatively affects the ability of the area to serve as habitat for many species of wildlife that use this stage of vegetative development

for cover and feeding. Increasing vertical and horizontal structural diversity improves habitat for deer, ruffed grouse, woodcock, rabbits, turkeys, songbirds and other species that use a combination of habitat types for their life requirements.



The figure above shows the multiple canopy layers in one spot representing vertical structure and the spatial patchiness of horizontal structure over a wider area. Diagram courtesy of the British Columbian Ministry of Forests.

Left and above: These pictures are examples of good and poor structural diversity. The photo at left (Stand 6) shows vegetation in the understory (+/- 0-5 ft.), midstory (+/- 5-30 ft.) and a canopy in the overstory (30 ft.+). The photo above (Stand 6) has a lack of regeneration and associated diversity in the understory and midstory levels in places.

One additional element of diversity that will be discussed later is tree species diversity. In particular, there is a good mix of softwood species (a.k.a. conifers or evergreens) that compliment or even dominate the hardwoods in certain parts of the property.

There are some pockets of non-native invasive plants found on the property. Winged euonymus (a.k.a. burning bush) is the primary invasive plant here, though autumn olive, Norway maple, Japanese barberry,

and privet are also located in places. Most of the populations of invasives are in the north end of the property near the parking area or adjacent to the trail. For a spatial representation of some of the invasive plant locations, see the Items of Interest Map on Page 5.

Left: This autumn olive and honeysuckle thicket found in Stand 7 adjacent to a trail is overrun with invasive plants. Though there are some pockets that contain heavy infestations of invasive plants, the majority of the vegetation on the property is native species.

Not all non-native species are considered invasive. In fact, some non-native plants such as apple and some clovers have become naturalized in our region and are considered beneficial for a variety of reasons, including their values for wildlife and aesthetics. Invasive plant species on the other hand have qualities that make them detrimental to the overall ecological health of the area. These features can give invasive plants a competitive advantage over native species and can lead to the development of monocultures of invasives, reducing species diversity. Such features include:

- vigorous sprouting when above ground portions of the plant are cut;
- prolific seed production;
- rapid growth rates;
- ability to colonize disturbed areas;
- long periods of seed bank viability;
- extended growing seasons due to early leaf out and ability to photosynthesize later in the season; and
- a lack of wildlife species that browse on buds (except for burning bush)

The reduction in species diversity described above is important because a diverse ecosystem helps to provide diverse habitat for wildlife and insect populations including pollinators. Wildlife and insect species have adapted to be able to utilize the pollen, seeds etc. produced by native species in an area. Because significant populations of invasive plant species can have a negative effect on ecosystem health, it is best to treat known infestations while they are small and manageable. For more information on how to identify and control invasive plant species in Connecticut visit: http://www.hort.uconn.edu/cipwg/art_pubs/GUIDE/guideframe.htm.

There were some insect and disease issues observed during field visits to the property that are currently affecting individual tree and forest health. Primary among these are the invasive insects found on hemlock trees in this area including the hemlock woolly adelgid and the hemlock scale. Both of these insects are non-native and can lead to mortality of the trees that they infest. Some young hemlock trees exhibiting vigorous growth had a lack of invasives present on their needles. Others were significantly affected, and showed a typical lack of vigor. In a forest setting, there is no effective or efficient method of treatment. Hemlock occupies an important role in Connecticut's forests for a variety of reasons. Periodic thinning to maintain individual tree vigor is the most effective treatment strategy in a forest setting.

Left: A healthy, vigorous hemlock adjacent to the blue trail north of the parking area. No evidence of decline, insect or disease infestation was found on this individual, which was in mostly full sunlight.

Right: This individual in Stand 7 shows significant decline as well as the presence of hemlock woolly adelgid and elongate hemlock scale, both non-native invasive insects.

For many decades ash trees have slowly been declining in health and numbers due to ash yellows and ash decline. The ash on this property are affected by these disease complexes. Many of the ash appeared to be in decline and some had died. Based on a visual inspection of some of the dead ash trees at Onion Mountain Park, there was no obvious indication that the emerald ash borer was to blame.

Left: The small opening in the canopy is created by a white ash declining then dying has been a common occurrence for decades in this region due to ash yellows and ash decline. The presence of emerald ash borer (EAB) – a non-native invasive insect pest – will likely hasten the demise of ash.

The emerald ash borer (EAB) is a non-native insect that has killed millions of ash trees in the United States and Canada over the last 10-15 years. It was initially discovered near Detroit in 2002 and has since spread rapidly through the Midwest and the northeast. Most new infestations are caused by people moving firewood that is infested with the insect. Mortality in infested trees is near 100%. EAB was first detected in Connecticut in July of 2012 and is not found in all four western counties of the state as well as Middlesex County. As of the writing of this plan, EAB has not been found in Simsbury, nor in any of the surrounding towns.

Over the last several years, severe storm events have affected many trees in Connecticut. Hurricane Irene, Superstorm Sandy and the October 2011 snowstorm have all had significant impacts in different ways in different areas of the state. On this property, there are some instances in which tree tops, and in some cases, entire trees have recently been lost. Where tops have been lost, they are likely attributable to one or more of these events.

Nectria – a fungal infection – is common in black birch on the property. This fungus creates visible cankers, frequently referred to as “target” cankers, which tend to expand over time. The cankers in turn

create points of entry for other diseases and insects as well as reducing the structural integrity of the wood.

Beech bark disease is another complex of issues that are affecting trees on this property. This disease is begun by the non-native beech scale, a small, woolly covered insect that colonizes and feeds through the thin bark of beech trees. A nectria fungus then invades through the wound created by the feeding of the scale insect and infects the vascular system. Over time infected trees begin to lose the typical smooth, light grey appearance of beech and the bark becomes pock marked with dark colored wounds. In a forest setting there is no effective control, besides cutting and removing some of the more severely affected individuals.

Another non-native insect that was found during the inventory in August of 2014 is the gypsy moth. The gypsy moth is an early- to mid-season defoliator of different species of trees, but it focuses primarily on oak and aspen, both of which are found on this property. There were a significant number of egg masses noted during the inventory, which may indicate a building of population for future years and may lead to some defoliation. One method of helping to curb the effect the gypsy moth has on forests is to keep individual trees healthy through periodic thinning, and to maintain species diversity, including managing for tree species that it finds less palatable. For information about this insect and its potential control see this website: http://www.na.fs.fed.us/fhp/gm/online_info/gm/gmhb.htm

Above: This gypsy moth is laying eggs that will overwinter on the bark of this black birch in Stand 5. In spring the eggs will hatch and in early summer significant amounts of defoliation can occur during heavy infestations of the insect.

Although it is important to attempt to ensure tree health and vigor through active management, not all trees that appear to be poorer quality should be removed. Having some trees (some standing and some on the ground) that show signs of rot etc. helps provide an element of ecological diversity that is important for a variety of species of insects, fungi, bacteria and wildlife.

There are some snags (standing dead trees) that are well-scattered throughout the property, but populations of cavity trees (larger diameter standing trees with cavities) are limited. Coarse and fine woody material is found in places. Coarse woody material is woody material on the ground that is greater than 4 inches in diameter, fine woody material is less than 4 inches in diameter. Both coarse and fine woody material play a role in providing different kinds of habitat for a variety of vertebrate and invertebrate wildlife species.

Snags and cavity trees are also important ecologically for a variety of fungi, bacteria, insect and wildlife species as well as for nutrient cycling, and, in some cases, tree seedling germination. The recruitment of these features may be appropriate in certain areas on the property, where and if personal safety and infrastructure integrity would not be compromised by doing so.

Wildfire risk on the property is relatively low due to typical climate conditions, a lack of significant ladder fuels and fine woody material, as well as wetlands and otherwise soggy soils in places.

Left: Snags such as these found in Stand 3 can provide valuable wildlife habitat in the form of a source of insects and fungi for food as well as potential cavities for nesting.

Above: This oak top in Stand 1 likely came down during a recent storm. The fine woody material (FWM) of the branches can provide nesting, cover and forage opportunities for a variety of wildlife. As the larger coarse woody material (CWM) decomposes, it can provide forage and habitat for species such as amphibians, birds and mammals.

Property History

Due to relatively uniform forest structure and physical evidence including the stone walls that are found on the property, it appears as though many parts of this area were once used for agriculture and subsequently abandoned, perhaps at the turn of the last century. Evidence of prior logging (i.e. stumps) and what appear to have been skid roads exist on the property as well.

Over the past few decades, timber harvests have been undertaken to increase forest health, to encourage the development of regeneration on the property, and to produce forest products. Evidence of previous harvests in the form of old stumps can be found in many places throughout the property. The last harvests appear to have taken place in the early to mid-1990s and occurred throughout the property. The varying stages of decay of stumps indicate that there was another harvest that occurred perhaps 15 to 20 years prior to that.

Above left: A decomposing stump in Stand 1 is beginning to act as a nursery for new growth including moss, hemlock and black birch seedlings (shown in detail above right).

In addition to the commercial timber sales that took place in 1990 and 1993 (in the northern and southern portions of the property respectively) there was non-commercial timber stand improvement work done as well. In the northeastern portion of the property some crop tree release work was completed in 1992. There is still evidence of some of the trees that were girdled (successfully and

Above: This double girdle in Stand 4 successfully created a snag which has subsequently fallen. Other trees in this stand were girdled but are still alive.

Right: This large white oak in Stand 6 has the form of a "wolf tree" and may have been alive for longer than many of the trees surrounding it.

"Wolf trees" can be found scattered throughout the property. Wolf trees are those that have grown in a relatively open condition, with little competition from adjacent trees. They can give us clues to past land use history because they likely were remnants from old fields, probably pasture. Wolf trees can be identified by the many large, low branches they possess, which is frequently different from the less limby structure visible in nearby trees. Competition from adjacent trees shades lower branches, which frequently leads to mortality and subsequent shedding of those branches. This creates relatively straight, branch free lower trunks, which is in stark contrast to the large, low limbs on wolf trees.

One potential explanation for the name of the wolf tree comes from the amount of space that their large crowns occupy. Early foresters would say that those trees were like wolves that were chewing up all the

growing space that could be available for younger trees that may have had more value for timber.[2] Similar to wolf trees, "legacy trees" is a term for large trees that may or may not have that typical wolf tree form that are scattered throughout the property.

Wildlife

Providing quality habitat for a variety of wildlife species is a goal for the management of this property. Some focus species to manage for include deer, turkey, songbirds, birds of prey, small mammals, reptiles, and amphibians.

Some wildlife (primarily deer) was observed during field visits to the property, and there is good potential for a variety of species to exist here due to the variety of habitats present. Throughout the property there are hard mast producing species of trees in the overstory. Black, red, chestnut, scarlet and white oaks, American beech and hickory play a significant role in upland hardwood stands which constitute a good portion of the non-wetland portions of the property.

Some recently dropped acorns were observed during summer 2014 field visits. Having a variety of different kinds of mast producing species is beneficial because oftentimes different species will have good mast years (i.e. produce significant amounts of seeds, nuts or acorns) in different years. Staggered production of seed sources can aid in the dispersal of mast over time and help wildlife prepare for winter. The hard mast produced by the tree species mentioned above is used as food for a variety of wildlife.

Above: Acorns like this one dropped in late summer near the Yellow Trail may germinate into oak seedlings if the conditions are right.

Additional tree species found on the property that are beneficial to wildlife include eastern hophornbeam (a.k.a. ironwood or hardhack). This species produces seeds which stay on the trees until later in the fall and into early winter. The seeds from these trees as well as the catkins which can be found on the trees in winter, can be an important food source for turkey and grouse.

Soft mast in the form of black cherry trees as well as blueberry and huckleberry in the understory is also found in places on the property, but is not as well distributed as the hard mast producing species described above. Frequently where the overstory canopy is not closed and mountain laurel and witch hazel do not occupy the mid- and understory, blueberry and huckleberry have colonized the area. It is beneficial for many species of wildlife to have a combination of hard and soft mast in their diet as each mast source provides different dietary elements. Hard mast often has more protein and fats, whereas soft mast tends to be higher in sugars.

Some areas on the property contain either single individuals or small groups of aspen trees. In different life stages, these trees can be an important source of food and cover for a variety of wildlife including

[2] Gaige, Michael. "A Place for Wolf Trees." *Northern Woodlands Magazine*. 25 February, 2011. 28-32. Print.

grouse, woodcock, songbirds and deer. Aspen – also known as popple – sprouts very vigorously from roots and stumps when the above ground portion of the trees are cut. (See observed populations of popple on the Items of Interest map.) Aspen are very shade intolerant trees so in order to successfully regenerate, they need a significant amount of direct sunlight. Successfully regenerating aspen can create dense thickets which can provide cover, feeding, nesting and courtship habitat for the wildlife species mentioned above. Additionally, flower buds of male aspen[3] trees can be a valuable food source for grouse in winter.)

As mentioned earlier, there are some stands where softwood trees dominate the overstory in places on the property. In particular hemlock and cedar, but also white pine to a certain extent can act as a sheltering area for wildlife. In heavy snows, dense softwood cover can limit snow depths allowing for easier travel for deer and other large animals. Additionally, wild turkeys frequently roost in white pine. Many other species including non-game species of wildlife such as songbirds utilize the dense cover of softwood foliage.

Left: This white pine in Stand 4 was unsuccessfully girdled many years ago. It was likely selected against due to its poor form. Softwoods such as these can provide an element of diversity which can benefit a variety of wildlife.

Snags and cavity trees are two elements of a forest that are frequently overlooked. As described earlier snags are standing dead trees. As these trees decompose, they provide a variety of habitat for many species including insects, fungi, bacteria, birds, and mammals. Cavity trees are standing trees with holes in them that may provide habitat. Where feasible, attempt to retain and recruit snags and cavity trees. At any given time, the presence of at least six (6) snags and/or cavity trees per acre of various sizes is ideal. If possible, attempt to retain one (1) tree/acre that is greater than 18 inches in diameter at breast height (dbh)[4] and three (3) trees that are greater than 12 inches dbh.[5]

Providing quality fish habitat is another potential goal for this property. Though no perennial streams were located on the property during the inventory, management activities can still affect water quality and associated aquatic habitats. Making sure BMPs are followed during timber harvesting and limiting the amount of sunlight that is allowed on perennial streams to help keep them cool are ways in which the management of this property can help maintain quality fish habitat.

A check of Connecticut's Natural Diversity Database (NDDB) indicates that there are some areas on the property that may contain rare or threatened species or species of special concern. A request for more

[3] Aspen trees are dioecious, which means that male and female flowers are housed on different trees. Male aspen buds are considered to be larger than females.

[4] Diameter at breast height (dbh) is diameter outside bark as measured at 4.5 feet above the ground on the high side of the slope (if there is slope).

[5]Hagenbuch, Steve, Katherine Manaras, Jim Shallow, Kristen Sharpless, and Michael Snyder. *Silviculture with Birds in Mind.* Huntington & Waterbury, VT: Audubon Vermont & VT FPR, 2011. Printed guide.

information from Connecticut's NDDB would be helpful to determine which species may exist there and how they may be protected when managing the property. (See NDDB Map near the end of this document on page 43.)

Recreation

This property is an important part of the recreational portfolio for the Town of Simsbury. There is a significant amount of recreational infrastructure on the property including a parking area, kiosk, gates, a color-coded trail system, and a map of the area (available on-line). The majority of the recreational use appears be hiking and dog walking. Recreation appears to occur primarily in the northern half of the property on the yellow, blue, white, and portions of the red and orange trails. The western and northwestern portions of the red trail and the southern half of the blue trail are less traveled than the other trails and appear to receive less maintenance. There is a self-guided tour with periodic stations set up thorough the northern portion of the property.

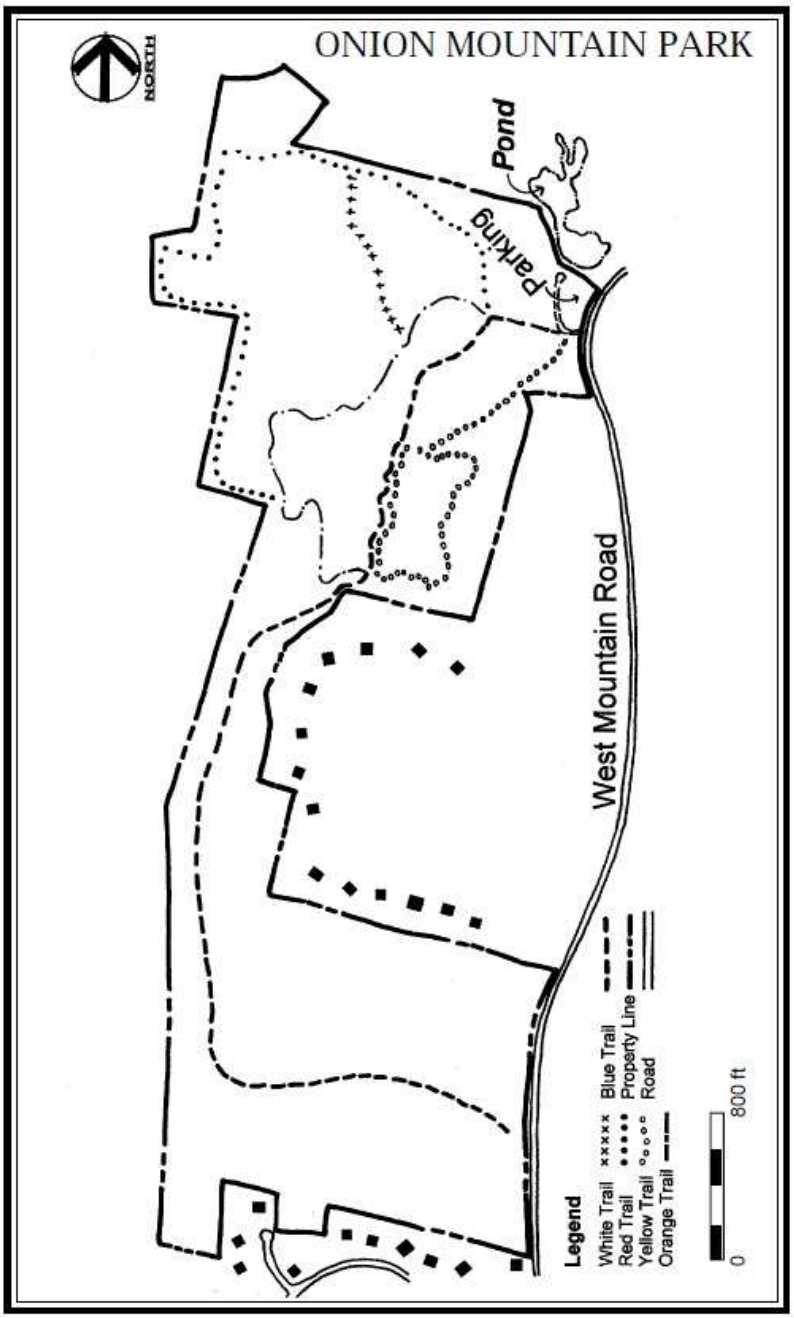
Above left and center: The color coded trail system on the property is best maintained close to the parking area. Further from the parking lot, the trails become less open, though there was some work done in late fall 2014 to the blue trail in the southeast corner of the property.

Above right: The self-guided tour provides information about the natural world at several stations throughout the northern portion of the property.

In addition to hiking and dog walking at least one letterbox location was found on the property. Letterboxing is an interactive experience where people use clues about the natural world or other landscape features to help guide them to an area where they will find a sealed box. The box generally contains a sign in sheet and a special stamp with which people can stamp their own books.

Education

As this park is part of the public land offerings the Town of Simsbury provides, there is an opportunity to use it to further people's understanding of the natural world and the roles Onion Mountain Park can play. The self-guided tour described above is a great tool to help with this. In addition, when future management activities are to take place, signage and guided tours before, during, and after the activities would help keep people informed about what is happening and why.



Left: This map of Onion Mountain Park is available on-line and is also posted at the kiosk near the parking area shows the property boundaries and the color-coded trail system.

Trespass

There is some minor trespass activity that was noted during field visits in summer 2014. This is mostly dumping of yard debris or other garbage. Two locations of such trespass were observed, but there may be more.

Summary of Recommendations

- Continue the active forest management program with periodic timber sales to maintain and enhance tree vigor and diversity (Stand specific recommendations in next section and at end of the plan)
- Retain and recruit snags, cavity trees, and coarse and fine woody material
- Continue to work with local volunteer groups to help with the maintenance of the trail system
- Develop additional educational material to be installed at the kiosk and potentially in the woods
- Consider development of a Braille trail on flat areas adjacent to the parking area
- Consider entering into discussions regarding cross boundary forest management with adjacent landowners
- Attempt to control invasive plant species where they exist in pockets
- Monitor health of hemlock trees and consider salvage if adelgid and/or scale damage appears to be leading to mortality
- Attempt to harvest trees during times of the year when migratory songbirds are not breeding (i.e. avoid logging during May-late July).
- Consider developing a secondary parking area at the southern gate along West Mountain Road. Redevelop the blue trail so that it is obvious and connected to the rest of the trail network in the north.
- Consider developing a vista facing west near the height of land on the red trail adjacent to the western boundary. This would include working with the adjacent landowner as most of the trees that would need to be cut in order to open the vista are not on the Town's property.
- Periodically walk boundaries to ensure signage is still up and facing the correct direction
- Work with adjacent landowners to discourage illegal dumping of yard debris etc. on Town property.

Landowner Goals

The Town is interested in continuing a sustainable forest management program that will strive to maintain and enhance diverse wildlife habitat, recreational access and opportunities, improve forest health and diversity, and maintain water quality and soil integrity. Additional goals include preserving historical features such as stone walls and ensuring that the property remain aesthetically pleasing to the general public. Generating revenue through the periodic sale of forest products to help fund continued forest, wildlife, education, and recreation management efforts is also important.

OVERVIEW

This property is a mix of upland and riparian forests, and open, shrubby wetlands. Stonewalls are found in places throughout the property. The forested portions of the property contain a mix of species including oaks (black, red, white, scarlet and chestnut), white pine, and hemlock that dominate the overstory in many places. They frequently associate with other hardwoods including black birch, hickory, red maple, American beech, yellow poplar and sugar maple. There was also a very small pocket of cedar located near the higher elevations on the west side of the property as well as some Norway spruce that were planted near the parking area at the northern end of the property.

Regeneration is mostly white pine and black birch with some hemlock. In the north and northwestern portions of the property regeneration resulting from previous timber harvests and storm damage has encouraged the regeneration of more diverse species mix that includes sugar maple and yellow poplar in addition to the other species listed above.

Right: Regeneration in canopy gaps such as these in Stand 3 adjacent to the red trail provide species and structural diversity to the forest.

This plan addresses all 179 acres of the Town of Simsbury's Onion Mountain Park property. There are seven (7) different forested stand types and a wetland described in this plan.

Stand Descriptions

For the purposes of this management plan, the property has been divided into 8 management units called stands. Stands are areas uniform enough in species composition, age class, size class, density etc. to be able to group together as relatively homogenous. Other elements that are examined to help classify stands include location, accessibility, and size of area. That is not to say, however, that stands are completely uniform. There will almost always be some variability due to the fact that we are attempting to quantify and qualify natural systems, which inherently trend towards entropy.

There is a set of recommended actions provided for each stand. Significant activities are provided with a date to help guide the management of the property over the next 10 years. Some of the dates may be

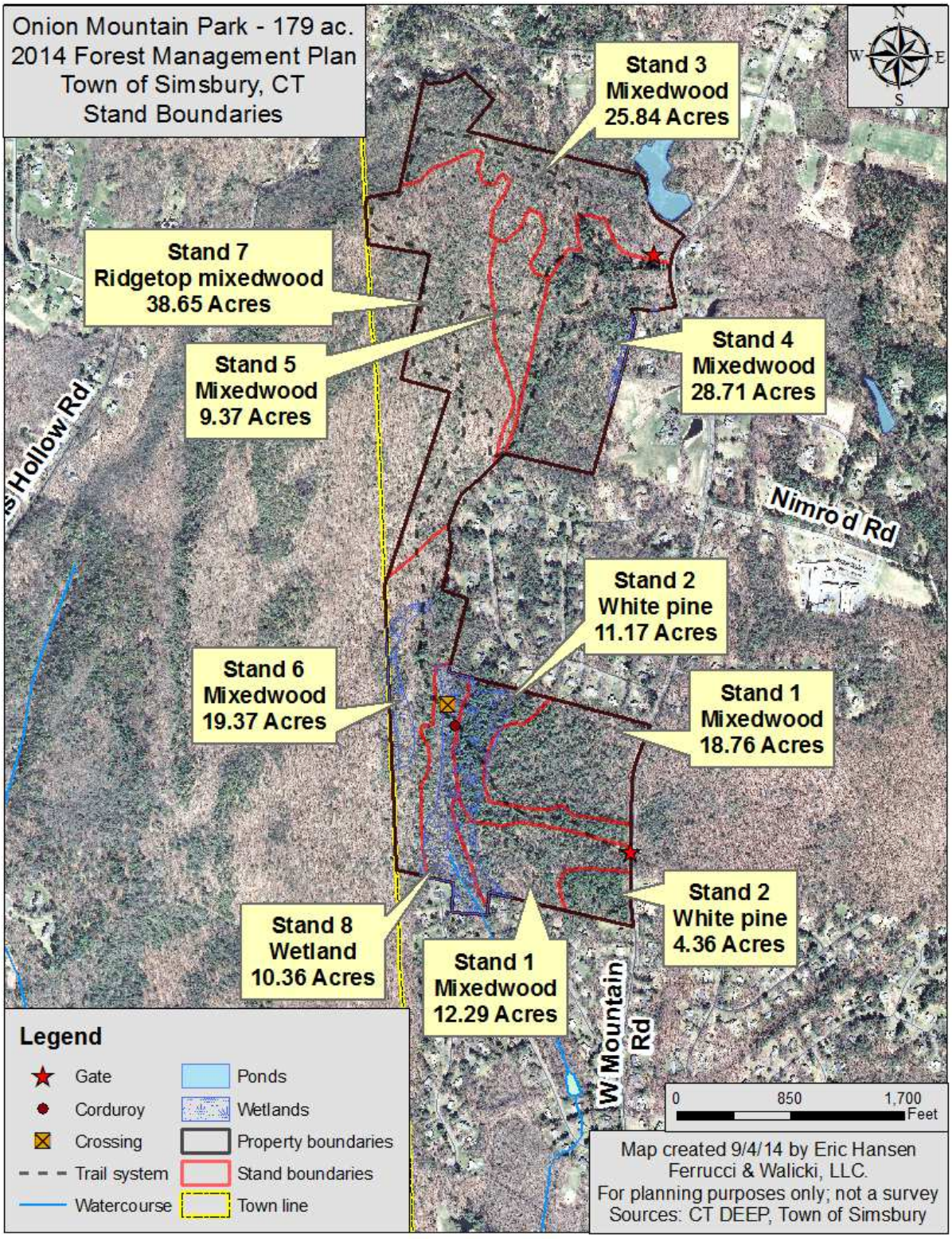
interchangeable and should remain flexible to be able to respond to changing conditions (i.e. storm, insect or disease damage/infestation, changing goals on the part of the Town, etc.). Additionally, there may be opportunities to work with adjacent landowners such as the Canton Land Conservation Trust or the Connecticut Department of Energy and Environmental Protection (DEEP) to conduct simultaneous operations, which may increase economic feasibility and/or increase the effectiveness of a treatment across boundaries. As wildlife likely use many of the adjacent properties in addition to the land the Town owns and manages, conducting operations in tandem with adjacent landowners may have the capacity to have a greater impact than managing for one property.

Onion Mountain Park Stand Information

ONION MOUNTAIN PARK STAND INFORMATION

Stand	Stand Type	Acreage
1	Mixedwood sawtimber and poletimber	31.05
2	White pine sawtimber and poletimber	15.53
3	Mixedwood sawtimber and poletimber	25.84
4	Mixedwood, white pine sawtimber and poletimber	28.71
5	Mixedwood, hardwood sawtimber and poletimber	9.37
6	Mixedwood sawtimber and poletimber	19.37
7	Ridgetop mixedwood	38.65
8	Wetland	10.36
	TOTAL ACREAGE	**178.89**

Onion Mountain Park Stand Map



Stand 1: Mixedwood sawtimber and poletimber (31.05 Acres)

Description:

This is the largest accessible forested stand on the property and is located in the southeastern portion of the property adjacent to West Mountain Road. The topography is flat to very gently rolling and is mostly well-drained.

Prevalent overstory species include white pine, scarlet oak, hemlock, black oak, white oak, and red oak. Other less common associates include beech, hickory and red maple. Medium diameter sawtimber (14-18 inches dbh) and large poletimber are the predominant size-classes, though there are also many trees (around 20% of the stocking in the stand) that are 20 inches or greater in dbh.

The stand is two-aged to uneven-aged[6]. There are approximately 744 trees/acre with 400 of these found in the seedling and sapling size classes and approximately 155 trees/acre are snags. Total basal area for this stand is approximately 147 square ft/acre. This number is perhaps higher than optimal for a mixedwood stand such as this that is approximately 60% hardwoods (i.e. deciduous trees). There is approximately 10,800 board feet and 8 cords of wood per acre. Many of the trees in this stand are hard mast producers (i.e. oaks).

Above: The structure in Stand 1 is lacking in diversity in places. In this picture we see a variety of species and size classes represented but very few trees are successfully regenerating due to a relatively closed canopy. The woody material on the forest floor provides diversity, but in many places is scarce in this stand.

In places this stand lacks a significant presence of desirable tree regeneration in the understory. White pine, white oak, black oak, hemlock and red maple dominate the seedling size class while white pine, red maple, black birch and hemlock are the most predominately found saplings. In small openings where trees don't completely occupy the growing space in the overstory, white pine and occasional scarlet, white and black oak seedlings are present. Maple-leaf viburnum is found throughout this stand in the understory as well as witch hazel. Mountain laurel can be found in pockets near the northern and central portions of the stand.

[6] Two aged stands are those that contain trees of two distinct age classes generally separated by at least fifteen years. Uneven-aged stands are those that contain at least three distinct age classes. In this case there is a medium to large sawtimber overstory, a poletimber midstory, and a recently developed seedling and sapling size class in the understory.

Tree health appears to be generally good aside from limited growth rates in places. There was occasional damage to some of the oak tops from recent storms, but is fairly minimal compared to many of the other areas that were hit much harder nearby.

Left: A lack of understory and regeneration is common in this stand.

One of the more desirable species currently found in the overstory (i.e. main canopy) of this stand and indeed throughout the property is a variety of oak trees. In general oak regeneration is lacking on this property and in this stand. Oak is mid-tolerant to shade intolerant which means that in order for it to regenerate successfully, it needs significant amounts of sunlight.

This stand is located in two blocks in the southeastern corner of the property, both of which are bounded by West Mountain Road on the east. Occasional Japanese barberry plants were noted during the inventory (none fell within any of the inventory plots), but the majority of the vegetation present in all strata is native.

Access is good throughout this stand due to the well-drained soils, flat topography, and infrastructure from previous forest management activities.

Stump evidence of previous harvests was observed during data collection.

Recommendations:

Some of the Town's primary goals for this property are to continue to promote forest and ecosystem health, to provide diverse wildlife habitat and to offer safe, quality recreational experiences on this property. To this end, where possible and desirable, reopen trails that have grown in to ensure continued access throughout.

Current basal area levels and a relative lack of desirable regeneration in places indicate that the stand may benefit from a treatment that increases sunlight to residual stems and to the forest floor.

Where patches of barberry are found, treat them prior to cutting trees in the overstory. Also, when managing near wetlands, extra care must be taken with placement of roads and cutting patterns so that management does not create adverse effects.

Annually – Maintain roads and trails

2015 – Use single tree and small group selection with crop/mast tree release to treat this stand. Focus removals in overstocked areas and remove mature and poorly formed individuals, as well as those exhibiting rot or other defects. Remove hemlock that appears to be declining. Retain good quality stems of a variety of species from all size classes. Reduce basal areas to around 85-95. Crop trees

should be healthy, vigorous individuals of desirable species, particularly oak and pine. Red and white oaks should be retained where possible if they are not mature or poor quality.

Where pockets of poor quality or mature trees exist consider removing them in groups from ½ -1 acre. Retain snags and cavity trees (6 per acre) where possible and where doing so will not be a safety concern. Retain some mature individuals for a seed source, structural diversity and for aesthetics. Where possible and desirable, retain and release "wolf trees" (if found) from competition. Maintain a component of hemlock where healthy individuals are found. Release pockets of quality, desirable, established regeneration where it exists. Use group selection when the overstory is mostly poor quality or heavy thinning where there are better quality trees to work around. Entries for commercial timber sales should be done every 15-20 years.

Opportunities may exist to create openings using small clearcuts or other regeneration techniques. Where these opportunities exist, attempt to make the openings large enough so that shade intolerant species may be able to take advantage of the opening and regenerate there. Attempt to create imperfect geometric shapes to increase edge effect. If openings are more linear, attempt to orient them north-south to increase the amount of sunlight they may receive.

Where mountain laurel exists, attempt to regenerate some of it at the time when the rest of the stand is treated so it remains vigorous. This can be accomplished by cutting it or running it over with machinery. If possible, attempt to limit its spread so other native species can become established in the understory where mountain laurel doesn't currently exist.

Following the treatment, consider converting the landing into a small parking area, and transitioning a portion of the skid road system into a trail system that can be integrated with the trails that currently exist elsewhere on the property. These areas should continue to be able to serve multiple purposes including for use during future forest management activities.

When treatments are to occur in this stand ensure personal safety by temporarily keeping hikers out of the area being harvested while harvesting is occurring. Also, it will be very important to keep an open line of communication between adjacent landowners and homeowners when activities in Stands 1 and 2 are occurring as they are in such close proximity to houses.

Attempt to treat any invasive plant species that may be found within or adjacent to areas being treated prior to cutting trees in the overstory.

Stand 2: White pine sawtimber and poletimber (15.53 Acres)

Description:

This stand is also located in the southeastern corner of the property and is also in two blocks. The northern block is bounded on the west by the wetland, on the north by houses on Quorn Hunt Road and there is a narrow finger that reaches to the eastern boundary along West Mountain Road. The southern block is at the very southeastern corner of the property bounded on the south by a stone wall which is the southern boundary and on the east by West Mountain Road. The topography is flat and the soils are generally well-drained though some of the western part of the northern block of the stand is mapped as having wetland soils.

This stand contains approximately 564 trees/acre, 352 of which are seedlings and saplings. The reminder of the trees are relatively equally split between sawtimber, poletimber and snags (60, 74 and 79 trees/acre respectively). Though this is a relatively high number of trees per acre of snags, they are mostly small in diameter and therefore neither serve a very functional purpose for wildlife nor do they negatively affect the available growing space or health of the residual stand. Sawtimber (trees $\geq$ 12 inches dbh) constitute almost 80% of the basal area in the stand. Nearly 2/3 of the sawtimber in the stand is in the large sawtimber size class ($\geq$ 20 inches dbh), which indicates the stand's relative maturity.

Total basal area is approximately 165 square feet per acre, which is slightly higher than optimal for maximizing productivity for this forest type. There is approximately 17,500 board feet of sawtimber volume per acre, the majority of which is white pine. There are approximately 6 cords/acre which are also mostly white pine poletimber trees. There are small amounts of hemlock, scarlet oak, red oak, yellow poplar, and black birch sawtimber and poletimber in this stand.

Tree regeneration is patchy throughout the stand, though it is thick in pockets. It consists of white pine, red maple, sugar maple, hickory, American chestnut, white ash, and hemlock seedlings and white pine, black birch, red maple, hickory, hemlock and occasional American chestnut saplings. American hornbeam, mountain laurel and huckleberry were also present in places in the stand. No invasive species were noted at the inventory plots for this stand.

Left: This shows some of the vertical diversity this stand offers in places with herbaceous species including mast producing blueberry in the understory with white pine seedlings and saplings as well as a well-developed overstory. The midstory is somewhat lacking, but can be improved with further development of the saplings via increased sunlight and occasional canopy gaps.

Tree health appears to be generally good, aside from areas that appear to be overstocked. There were no obvious insect or disease infestations. Some minimal evidence of previous harvests (stumps) is visible in portions of the stand.

Recommendations:

2015 – Thin from all diameter classes to a residual basal area of approximatetly 120 square feet/acre. Release quality crop and mast trees (i.e. oaks) where feasible. Crop trees should be healthy, vigorous individuals of desirable species, particularly white pine and oak. Red and white oaks should be retained where possible if they are not mature or poor quality. Where pockets of poor quality or mature trees exist consider removing them in small groups up to ½ acre. Release pockets of quality, desirable, established regeneration where it exists. Retain snags and cavity trees (6 per acre) where possible and where doing so will not be a safety concern. Retain some mature individuals for a seed source,

structural diversity and for aesthetics. Where possible and desirable, retain and release "wolf trees" (if found) from competition. Entries for commercial timber sales should be done every 15-20 years.

Following the treatment, consider converting a portion of the skid road system into a trail system that can be integrated with the trails that currently exist elsewhere on the property.

When treatments are to occur in this stand ensure personal safety by temporarily keeping hikers out of the area being harvested while harvesting is occurring. Also, it will be very important to keep an open line of communication between adjacent landowners and homeowners when activities in Stands 1 and 2 are occurring as they are in such close proximity to houses.

Attempt to treat any invasive plant species that may be found within or adjacent to areas being treated prior to cutting trees in the overstory.

Stand 3: Mixedwood sawtimber and poletimber (25.84 Acres)

Description:

This stand can be found along the northern boundary of the property and has road frontage along West Mountain Road north of the main parking area. Access to the stand is gained from the main parking area then via the trail system. There was a harvest done in this stand in 1990 removing some mature trees, poor quality trees, and creating some canopy gaps which have resulted in diverse structural conditions and regeneration. Generally the soils are well drained, but there are pockets of moist soils. Bird activity noted in this stand includes winter wren, scarlet tanager, both of which may be attracted to the gaps described above.

Right: This area shows quality structural attributes including desirable regeneration of a variety of species in a small canopy gap created during the last harvest. This area is right along the red trail as indicated by the red blaze at the right of the picture.

The topography in this stand is undulating and can be moderately steep at times. Old skid roads have been converted into trails in areas of this stand. This stand has approximately 1,055 trees/acre, 1,000 of which are seedlings and saplings. Regeneration in this stand is a mixture of sugar maple, white pine, black birch, yellow poplar, red maple and beech. There are approximately 44 sawtimber-sized trees/acre and about 12 poletimber-sized trees/acre. Total basal area is approximately 120, about 2/3 of which is sawtimber. The stand contains approximately 9,300 board feet of sawtimber and only about 4 cords/acre. Over half of the stand is composed of trees that are $\geq$ 20 inches dbh.

The numerical data in this stand indicate that the area is slightly overstocked. Red oak, white pine, hemlock, sugar maple and black birch are the primary species found in the overstory of this stand with associates of hickory, red maple, and yellow poplar. There were no snags detected statistically during the inventory process, but there are examples of snags as well as coarse and fine woody material throughout the stand.

The majority of the trees in this stand are medium sized sawtimber. Many of the white pine are large to very large in diameter (>30 inches dbh) and are of relatively poor quality. The stand is generally two aged, with some pockets nearing an uneven-aged condition.

Above: This oak was tipped over by wind in recent storms. Based on tree heights and the size and depth of the root ball, this appears to be a good site with quality soils.

Some invasive plant species including burning bush, barberry, olive, and bittersweet were found on the southern edge of this stand and may exist in other places throughout.

Recommendations:

Attempt to continue to diversify the structure in this stand. Continue to maintain trails.

2019 – Using a combination of silvicultural methods including thinning (in areas that do not appear ready for regeneration), crop tree release, seed tree and shelterwood, continue to regenerate portions of this stand. Where thinning is to occur, reduce basal areas to approximately 90 square feet/acre. Retain quality individuals of a variety of species, focusing on good quality oak, pine, sugar maple and yellow poplar. Crop trees should be healthy, vigorous individuals of desirable species. Red and white oaks and smaller diameter (i.e. +/- 16 inch) yellow poplar should be favored where possible if they are not mature or poor quality. Retain some mature individuals for a seed source, structural diversity, and for aesthetics.

Ideally, regeneration cuts should be done during the time of year where soil scarification[7] is possible during a good seed year (i.e. acorn crop).

Prior to treating the overstory, attempt to treat the invasive plant species populations in this stand.

[7] Soil scarification means exposing mineral soil by disturbing the duff layer. Acorns, hickory and other nuts have more successful germination rates when they do not have to grow through duff to reach bare soil. Scarification is most likely during dry summer and early fall months.

Before and during this activity, post educational materials explaining what is being done and why. Consider incorporating a guided tour for interested individuals before, during, and/or following the completion of the activity.

When treatments are to occur in this stand ensure personal safety by temporarily keeping hikers out of the area being harvested while harvesting is occurring. Also, it will be very important to keep an open line of communication between adjacent landowners and homeowners when activities in Stands 1 and 2 are occurring as they are in such close proximity to houses.

Attempt to treat any invasive plant species that may be found within or adjacent to areas being treated prior to cutting trees in the overstory.

Stand 4: Mixedwood, white pine sawtimber and poletimber (28.71 Acres)

Description:

This stand is located in the northeastern corner of the property and has some road frontage along West Mountain Road south of the main parking area. Topography is generally flat and soils are generally well-drained. Some timber stand improvement activities including girdling of trees (sometimes unsuccessfully) was undertaken in the early 1990s.

This stand contains approximately 615 trees/acre, 469 of which are seedlings and saplings. The seedlings and saplings in this stand are primarily hemlock and black birch with lesser associates of striped maple, red and white oak, and American hornbeam. Overstory species include white pine, hemlock, black and red oak, hickory, and sugar maple. There are also a couple of small pockets aspen that exist in this stand, but were not detected numerically in the inventory because their populations are small and their locations are relatively isolated. Additionally, there is a small strip of Norway spruce that lines the parking area and the beginning of the trail system west of the parking area that currently exists but was also not numerically included in the inventory because of how infrequently it occurs. There has been some damage to some of the spruce adjacent to the trails from recent storms.

Above right: This pocket of aspen (a.k.a. popple) is found along the trail in the central portion of this stand.

Right: Storm-damaged Norway spruce near the trailhead at the parking area.

Basal areas average just around 140 square feet/acre, which is higher than optimal for maximizing tree growth and productivity in this forest type. There are approximately 15,500 board feet of timber and a little less than 2 cords/acre. 90% of the trees in this stand are sawtimber-sized (≥ 12 inches dbh) and 1/3 of the basal area is found in individuals ≥ 20 inches dbh.

Some of the oak in this stand was damaged by recent storms.

There are some areas in this stand where invasive plant species have significant populations (see Items of Interest map).

Left: Burning bush (a non-native invasive plant species) dominates the understory in small pockets in portions of this stand.

Recommendations:

2015 – Attempt to treat areas heavily infested by invasive plants. Follow up treatments in subsequent years may be necessary.

2019 – Perform a light thinning/crop tree release in areas of higher tree densities. Crop trees should be healthy, vigorous individuals of desirable species. Quality individuals of red oak and white pine as well as healthy hemlock in particular should be retained. Attempt to release 20-30 stems/acre where this activity is undertaken. Remove some storm damaged oak that may still have economic value.

In conjunction with the crop tree release, attempt to release desirable advance regeneration using group selection and overstory removal methods.

Where pockets of aspen exist, consider attempting to regenerate that species using a small patch cut. Remove much of the overstory so the shade intolerant aspen sprouts can successfully regenerate. Retain some of the trunks of the trees on site as coarse woody material. Dense thickets of regenerating aspen can act as quality habitat for ruffed grouse, which due to lack of suitable habitat has been experiencing population declines in Connecticut. If a patch cut to regenerate aspen is completed, consider including an education sign along the trail to describe what was done and why.

When treatments are to occur in this stand ensure personal safety by temporarily keeping hikers out of the area being harvested while harvesting is occurring. Also, it will be very important to keep an open line of communication between adjacent landowners and homeowners when activities are occurring as they are in such close proximity to houses.

Attempt to treat any invasive plant species that may be found within or adjacent to areas being treated prior to cutting trees in the overstory.

Stand 5: Mixedwood, hardwood sawtimber and poletimber (9.37 Acres)

Description:

This is a relatively small, narrow, north-south oriented stand located at the toe of the rocky western slope. It is located near the center of the northern half of the property. Topography is generally flat with relatively well-drained soils. Access to this stand is via trails that begin at the main parking area. Evidence of harvesting in the stand includes stumps, canopy gaps, and in places, quality regeneration.

Right: Regeneration in Stand 5 below a gap in the canopy. This pocket of regeneration includes white pine, black birch and hemlock.

Species in this stand vary but are generally a mix of hardwoods including black birch, red oak, yellow poplar, chestnut oak and sugar maple. Other less common associated species include hemlock and aspen. There are approximately 2,160 trees/acre 2,000 of which are seedlings (primarily red maple, black birch, and white pine). Though sawtimber sized trees make up about 40% of the total trees in the featured stand, they account for approximately ¾ of the basal area. There are approximately 95 trees/acre in the poletimber size class and a little over 3 snags/acre.

Total basal area is approximately 130 square feet/acre, which is overstocked for a hardwood dominated mixedwood stand. There is approximately 10,155 board feet of timber and 4.4 cords of wood/acre. For a hardwood dominated stand, this is a very high volume of wood/acre.

Red maple, black birch, white pine, sugar maple, and white ash are all present as seedlings in the understory along with Christmas fern. Black birch, sugar maple, hemlock and white pine can also be found as saplings along with witch hazel and the occasional pocket of mountain laurel.

Recommendations:

2019 – Conduct a light thinning to maintain stand vigor and continue development of structural diversity. Reduce basal areas to approximately 80 square feet/acre. Focus removals on less vigorous, poorer quality trees as well as some mature individuals. Retain healthy trees of a variety of species including healthy hemlock and white pine where found. Release desirable regeneration where it occurs. Treat invasive plant species if found in the stand prior to cutting trees in the overstory. Retain some snags (+/- 6/acre) for wildlife and nutrient cycling.

When treatments are to occur in this stand ensure personal safety by temporarily keeping hikers out of the area being harvested while harvesting is occurring. Also, it will be very important to keep an open line of communication between adjacent landowners and homeowners when activities are occurring as they are in such close proximity to houses.

Attempt to treat any invasive plant species that may be found within or adjacent to areas being treated prior to cutting trees in the overstory.

Stand 6: Mixedwood sawtimber and poletimber (19.37 Acres)

Description:

This narrow, north-south oriented stand is located in the southwest corner of the property west of the wetland complex. The terrain ranges from relatively flat adjacent to the wetland to moderately steep and somewhat rocky near the western boundary. Soils are operable for forest management purposes and, where not directly adjacent to the wetland, are generally well-drained.

The featured stand[8] contains approximately 115 square feet of basal area, about 70% of which is in sawlog size trees (80 sf/acre), which is relatively low for a mixedwood stand. There are 960 total live trees/acre, 750 of which are seedlings, primarily white ash with associates of black birch, white pine, red maple, sugar maple and hemlock. Hemlock saplings dominate the midstory with associates of American hornbeam, striped maple, black birch and witch hazel. Also present in the understory are ferns.

Sawtimber makes up about 25% (50 trees/acre) of the remaining stocking, with the rest being poletimber. Additionally, there are approximately 25 snags/acre. These are mostly smaller diameter trees that have been outcompeted by the larger trees and succumbed to mortality. There is approximately 10,000 board feet of sawtimber/acre and 5.7 cords/acre in this stand currently.

Primary species found in this stand in the overstory include red oak, yellow poplar, hickory, hemlock, white pine, white oak, and red maple. There is an old skid road that runs parallel to the west side of the wetland about mid-way through the stand which affords access to the majority of the stand. Some barberry was noted near the southern end of this stand. Bird activity noted in this stand includes American goldfinch, Carolina wren, and cedar waxwings.

Left: Eastern edge of Stand 6 adjacent to the wetland showing coarse woody material from fallen hemlock. Structure and regeneration in this stand improves somewhat toward the western portions of the stand near the toe of the slope.

Recommendations:

Attempt to maintain and/or enhance stand vigor and diversity.

2015 – Reduce overall stand density to approximately 90 square feet of residual basal area using a combination of single tree, group selections and even age treatments including shelterwood. Retain good quality individuals of a variety of species. In particular focus on retaining quality white pine, hemlock, and vigorous mast producing individuals as well as good quality sugar maple and yellow poplar. Perform a 3-4 sided crown touching release on mast trees. Attempt to ensure good live crown ratios on residual pine trees (goal should be 1/3).

[8] "Featured stand" is considered to be the live trees that constitute the overstory and midstory. Trees in the main canopy are described in the featured stand. Generally it does not take into account seedlings, saplings, or snags.

Where pockets of desirable advance regeneration exists, remove the overstory. This should not be done everywhere, especially if it would remove trees in the overstory that are not yet mature or if it would remove more desirable species (i.e. oak, pine, yellow poplar) in favor of black birch saplings and/or small poles. Where pine regeneration exists, consider the value of continuing to grow the trees in the overstory. Remove the overstory if trees appear to be mature and/or poor quality and regeneration is well-established.

When treatments are to occur in this stand ensure personal safety by temporarily keeping hikers out of the area being harvested while harvesting is occurring. Also, it will be very important to keep an open line of communication between adjacent landowners and homeowners when activities are occurring as they are in such close proximity to houses.

Prior to treatment, attempt to treat invasive plant populations established in this stand.

Stand 7: Ridgetop mixedwood (38.65 Acres)

Description:

This area is located in the northeastern portion of the property and includes the heights of land along the red and orange trails. It is oriented north-south and is set on generally well-drained to excessively dry soils. Topography is undulating, to frequently moderately steep and rocky. Site conditions in this stand appear to be poorer than most other stands on the property. This assertion is based on the poorer form and the fact that the trees are generally shorter in this stand. Species composition, size and appearance of trees here indicate that the area has less potential for growing quality timber than other places on the property, however due to natural disturbances (i.e. storms) and other recent mortality, the stand has begun to develop quality structural characteristics.

Above: Stand 7 contains mostly shallow soils, which limits height growth on most trees, however in places there are a diversity of species regenerating in the stand. Here we see black birch, striped maple, white pine and hemlock as well as some ironwood.

Total basal area in this stand for trees in the live overstory and midstory is approximately 105 sf/acre. Almost 60% of the stocking in the stand is in the poletimber size class. In total, there are approximately 554 live trees/acre (365 seedlings/saplings, 150 poletimber sized-trees and 40 sawtimber-sized trees). Approximately 4,200 board feet of sawtimber and 11 cords/acre are currently growing in this stand. Additionally, there are approximately 24 snags/acre.

The species found in this overstory of this stand include white, red, chestnut and black oak, hemlock, white pine, sugar maple and hickory. Seedlings and saplings include hickory, white pine, chestnut oak, red maple, hemlock, sugar maple, ironwood and white oak. Shrubby species include maple leaf viburnum, lowbush blueberry, witch hazel, and, occasionally hobblebush. Bird activity in this stand included eastern wood peewee, wood thrush, red shouldered hawk, and downy woodpeckers. Some invasive species were noted in this stand including burning bush, Japanese barberry, bittersweet and multiflora rose.

There is a small pocket of cedar adjacent to the orange trail near the central part of the stand. These trees are unique on this property, because there are few cedars that are still alive. The cedars are declining due to competition from hardwood trees that are beginning to overtop them. The hemlock in the stand is also declining.

Little evidence of recent harvests were observed during the inventory, however it appears as though the orange trail may have been converted from an old skid road, indicating that some forest management likely occurred in this stand at some point.

Recommendations:

This stand will likely not produce high quality forest products. Access is difficult and soils on slopes may be sensitive. Large scale forest management operations may not be feasible for these reasons, however monitoring the area for forest health and diversity issues is still important. Trails that run through this stand should be monitored and maintained.

2015 – Attempt to eliminate pockets of invasive plant species where they currently exist

2015 – Consider releasing the pocket of cedar trees from hardwood competition

Any time – Consider working with adjacent landowner to open a vista near the height of land on the red trail at the western boundary. If possible and desirable, combine this with work being done in adjacent stands to improve efficiency.

Area 8: Wetlands (10.36 Acres)

Description:

This relatively narrow, north-south oriented area is located in the south-central portion of the property. The best access to this area is from the southern gate adjacent to West Mountain Road and the old skid road that leads west from there. The water table varies in this area but is consistently near the surface of the soil and sometimes is high enough to create standing water. Relatively few invasive plant species were noted during field visits to this area. In places, high mortality of trees was noted. Many of these trees are ash, the mortality of which may not be associated directly with the fluctuating water table.

Above: Wetland near the southern end of the property in Area 8.

Recommendations:

Ensure that activities on portions of the property adjacent to these areas do not negatively affect the quality of the area. Follow Connecticut's Field Guide for Best Management Practices for Water Quality while Harvesting Forest Products during any forest management operations. Where appropriate, set buffers when conducting forest management operations near water features.

Monitor for the development of invasive plant species. If populations are discovered, attempt to eradicate them while the populations are small.

If a trail system connecting the blue trail over the wetland using the existing crossing is re-established, ensure that the crossing meets BMP standards, and is periodically monitored and maintained for effectiveness and safety.

Above: The corduroy crossing of an area with standing water in the wetland.

GENERAL PROPERTY RECOMMENDATIONS

- With any activity undertaken on the property, attempt to:
  1. Improve forest health and species diversity
  2. Improve vertical and horizontal structural diversity, including retaining and recruiting snags and cavity trees where doing so is not counter-productive to the goal of the activity
  3. Ensure water quality and soil stability
  4. Increase accessibility
  5. Limit spread of invasive plant species. Treat populations of invasives prior to forest management activities.
  6. Ensure the public and neighbors are aware of and understand the activities being completed.

- Attempt to limit populations of invasive plant and insect species. Keep abreast of information regarding invasive insects, especially the emerald ash borer and Asian long-horned beetle. Amend plan to salvage imminently infested stems if necessary.

- Attempt to treat most areas on a +/- 20 year cutting cycle.

- If aspen trees are encountered during treatments, attempt to regenerate those areas to encourage dense sprouting.

- Attempt to maintain and enhance populations of softwood tree species on the property.

- Attempt to recruit some large trees scattered throughout the property, even if these trees are not "wolf trees" to increase structural diversity. These large trees could become "legacy trees" and be allowed to mature and die naturally.

- Continue to maintain all boundary lines.

- Continue to maintain all roads, trails, and other infrastructure to ensure continued and improved access throughout the property.

- Where and when appropriate consider working with adjacent landowners (i.e. Canton Land Conservation Trust, Inc., State of Connecticut, etc.) to "manage across boundaries".

- Follow Connecticut's Field Guide for Best Management Practices for Water Quality while Harvesting Forest Products during any forest management operations.

STAND SPECIFIC PROPERTY RECOMMENDATIONS

1. 2015 – All Stands: Treat invasive species where located

2. 2015 – Stand 1: Use single tree and small group selection with crop/mast tree release to treat this stand. Focus removals in overstocked areas and remove mature and poorly formed individuals, as well as those exhibiting rot or other defects. Remove hemlock that appears to be declining. Retain good quality stems of a variety of species from all size classes. Reduce basal areas to around 85-95. Crop trees should be healthy, vigorous individuals of desirable species, particularly oak and pine. Red and white oaks should be retained where possible if they are not mature or poor quality.

3. 2015+ – Stand 1: Following the completion of the prescribed treatment, consider converting the landing into a small parking area, and transitioning a portion of the skid road system into a trail system that can be integrated with the trails that currently exist elsewhere on the property. These areas should continue to be able to serve multiple purposes including for use during future forest management activities.

4. 2015 – Stand 2: Thin from all diameter classes to a residual basal area of approximatetly 120 square feet/acre. Release quality crop and mast trees (i.e. oaks) where feasible. Crop trees should be healthy, vigorous individuals of desirable species, particularly white pine and oak. Red and white oaks should be retained where possible if they are not mature or poor quality. Where pockets of poor quality or mature trees exist consider removing them in small groups up to ½ acre. Release pockets of quality, desirable, established regeneration where it exists. Retain snags and cavity trees (6 per acre) where possible and where doing so will not be a safety concern. Retain some mature individuals for a seed source, structural diversity and for aesthetics. Where possible and desirable, retain and release “wolf trees” (if found) from competition. Entries for commercial timber sales should be done every 15-20 years.

   Following the treatment, consider converting a portion of the skid road system into a trail system that can be integrated with the trails that currently exist elsewhere on the property.

5. 2019 – Stand 3: Using a combination of silvicultural methods including thinning (in areas that do not appear ready for regeneration), crop tree release, seed tree and shelterwood, continue to regenerate portions of this stand. Where thinning is to occur, reduce basal areas to approximately 90 square feet/acre. Retain quality individuals of a variety of species, focusing on good quality oak, pine, sugar maple and yellow poplar. Crop trees should be healthy, vigorous individuals of desirable species. Red and white oaks and smaller diameter (i.e. +/- 16 inch) yellow poplar should be favored where possible if they are not mature or poor quality. Retain some mature individuals for a seed source, structural diversity, and for aesthetics.

   Prior to treating the overstory, attempt to treat the invasive plant species populations in this stand.

6. 2019 – Stand 4: Perform a light thinning/crop tree release in areas of higher tree densities. Crop trees should be healthy, vigorous individuals of desirable species. Quality individuals of red oak and white pine as well as healthy hemlock in particular should be retained. Attempt to release 20-30

stems/acre where this activity is undertaken. Remove some storm damaged oak that may still have economic value. Consider patch cutting in aspen areas to regenerate aspen.

7. 2019 – Stand 5: Conduct a light thinning to maintain stand vigor and continue development of structural diversity. Reduce basal areas to approximately 80 square feet/acre. Focus removals on less vigorous, poorer quality trees as well as some mature individuals. Retain healthy trees of a variety of species including healthy hemlock and white pine where found. Release desirable regeneration where it occurs. Treat invasive plant species if found in the stand prior to cutting trees in the overstory. Retain some snags (+/- 6/acre) for wildlife and nutrient cycling.

8. 2015 – Stand 6: Reduce overall stand density to approximately 90 square feet of residual basal area using a combination of single tree, group selections and even age treatments including shelterwood. Retain good quality individuals of a variety of species. In particular focus on retaining quality white pine, hemlock, and vigorous mast producing individuals as well as good quality sugar maple and yellow poplar. Perform a 3-4 sided crown touching release on mast trees. Attempt to ensure good live crown ratios on residual pine trees (goal should be 1/3). Release quality advance regeneration where appropriate.

9. 2015 – Stand 7: Consider releasing the pocket of cedar trees from hardwood competition

10. 2015+ – Stand 7: Consider working with adjacent landowner to create a vista near the height of land on the red trail at the western boundary. If possible and desirable, combine this with work being done in adjacent stands to improve efficiency.

11. 2023 – Re-inventory property and develop management plan for next 10-year plan period.

12. Annually – Maintain property boundaries

13. Annually –Maintain parking lot, gates, kiosk, roads and trails

SUMMARY OF SCHEDULED ACTIVITIES 2014-2023

Town of Simsbury - Onion Mountain Park Summary of Scheduled Activities 2014-2023		
Year	**Stand**	**Treatment**
2015	All	Treat invasive plant species where they exist
2015	7	Consider working with adjacent landowner to create a vista near the height of land on the red trail
2015	1	Single tree/small group selection with crop/mast tree release
2015	1, 2	Upon completion of harvest, consider temporary conversion of infrastructure to parking area and trails for recreational access
2015	2	Thinning with crop/mast tree release
2015	6	Single tree/small group selection with crop/mast tree release and shelterwood
2015	7	Release cedars from hardwood competition
2019	3	Thinning with crop/mast tree release and limited shelterwood
2019	4	Light thinning/crop tree release. Consider patch cut in aspen
2019	5	Light thinning/crop tree release
2023	All	Re-inventory and develop new 10 year management plan
Annually	All	Maintain boundaries, roads and trails
Annually	All	Treat invasive plant species where located if resources are available to do so
Annually	All	Maintain parking lot, gates, kiosk, roads and trails

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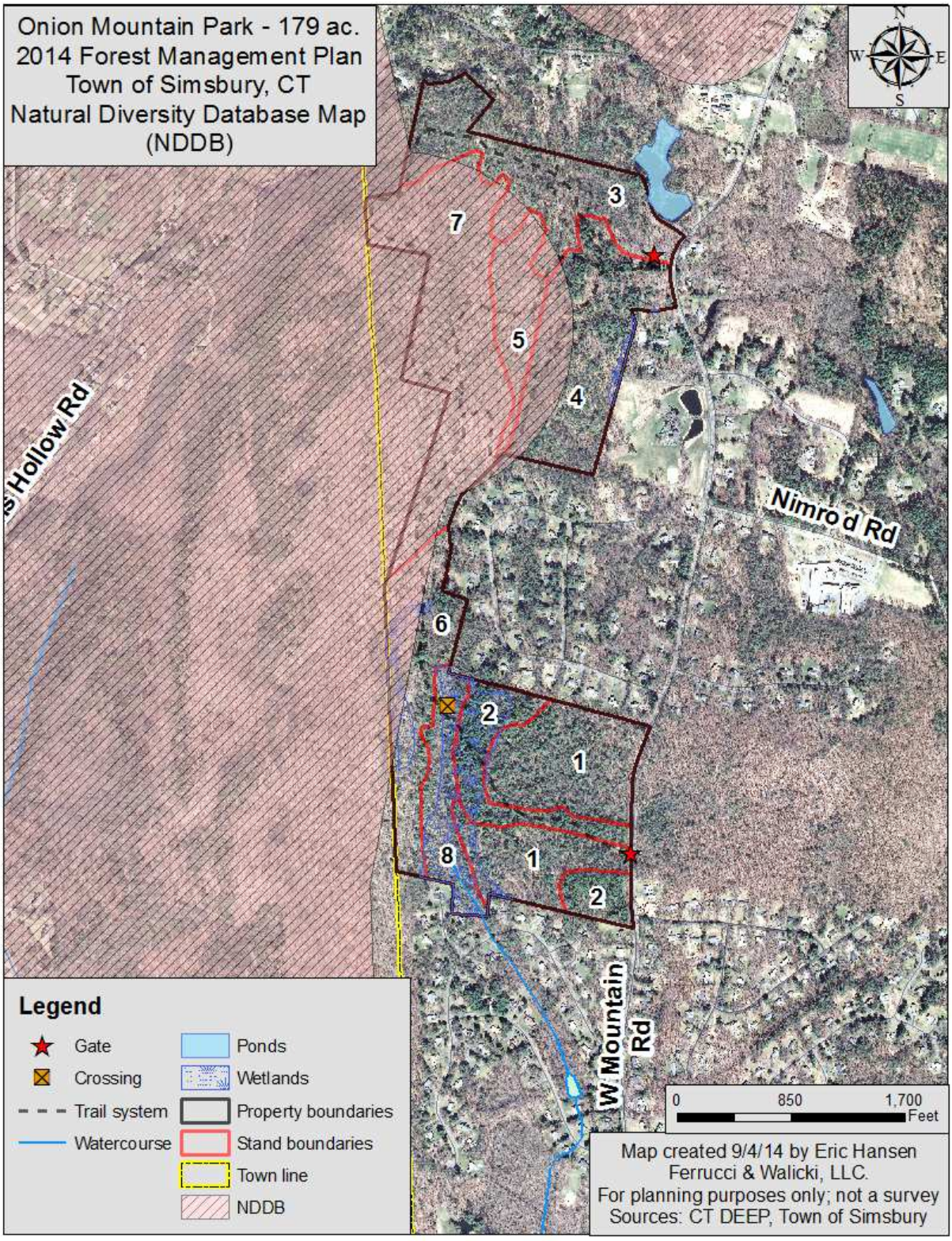
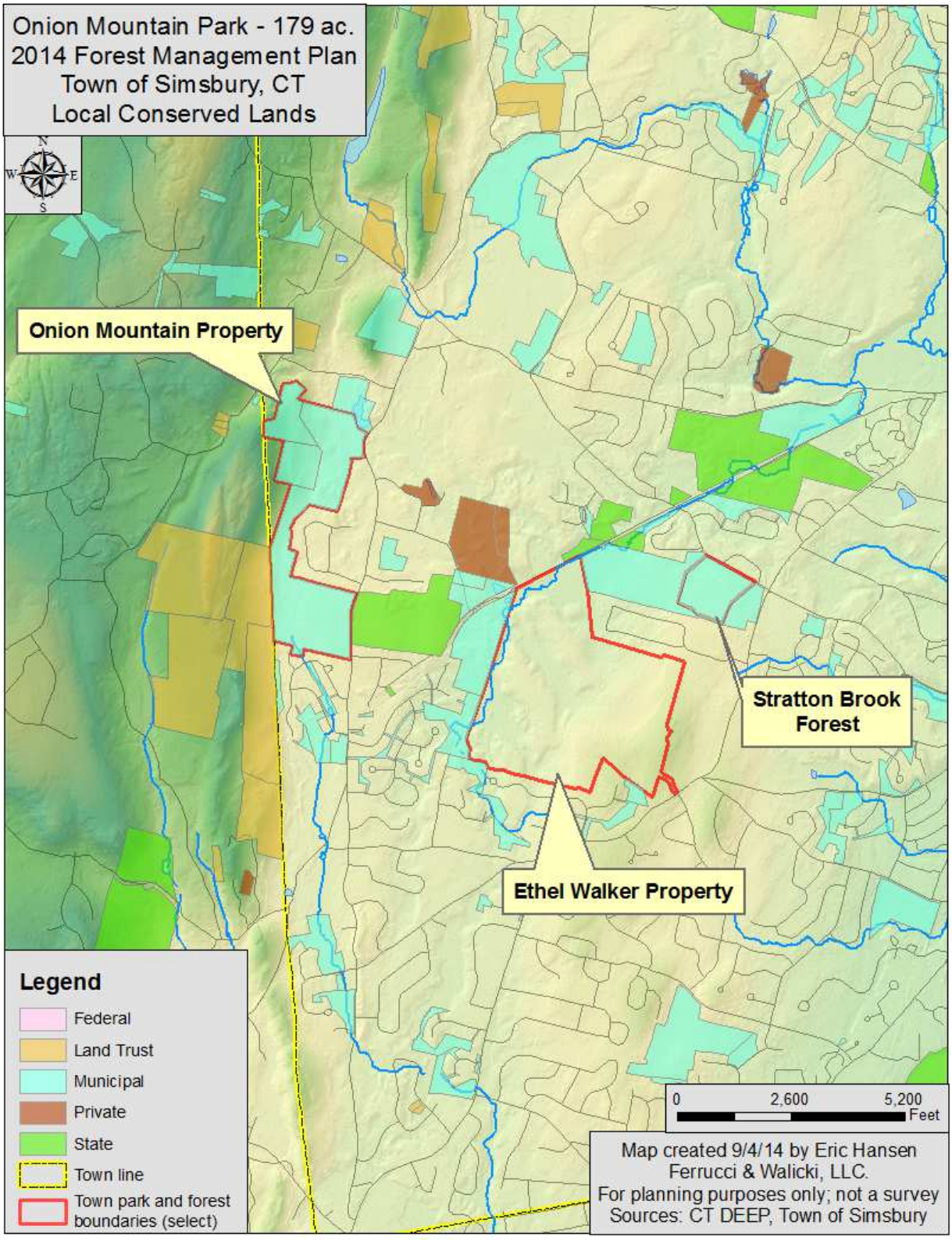
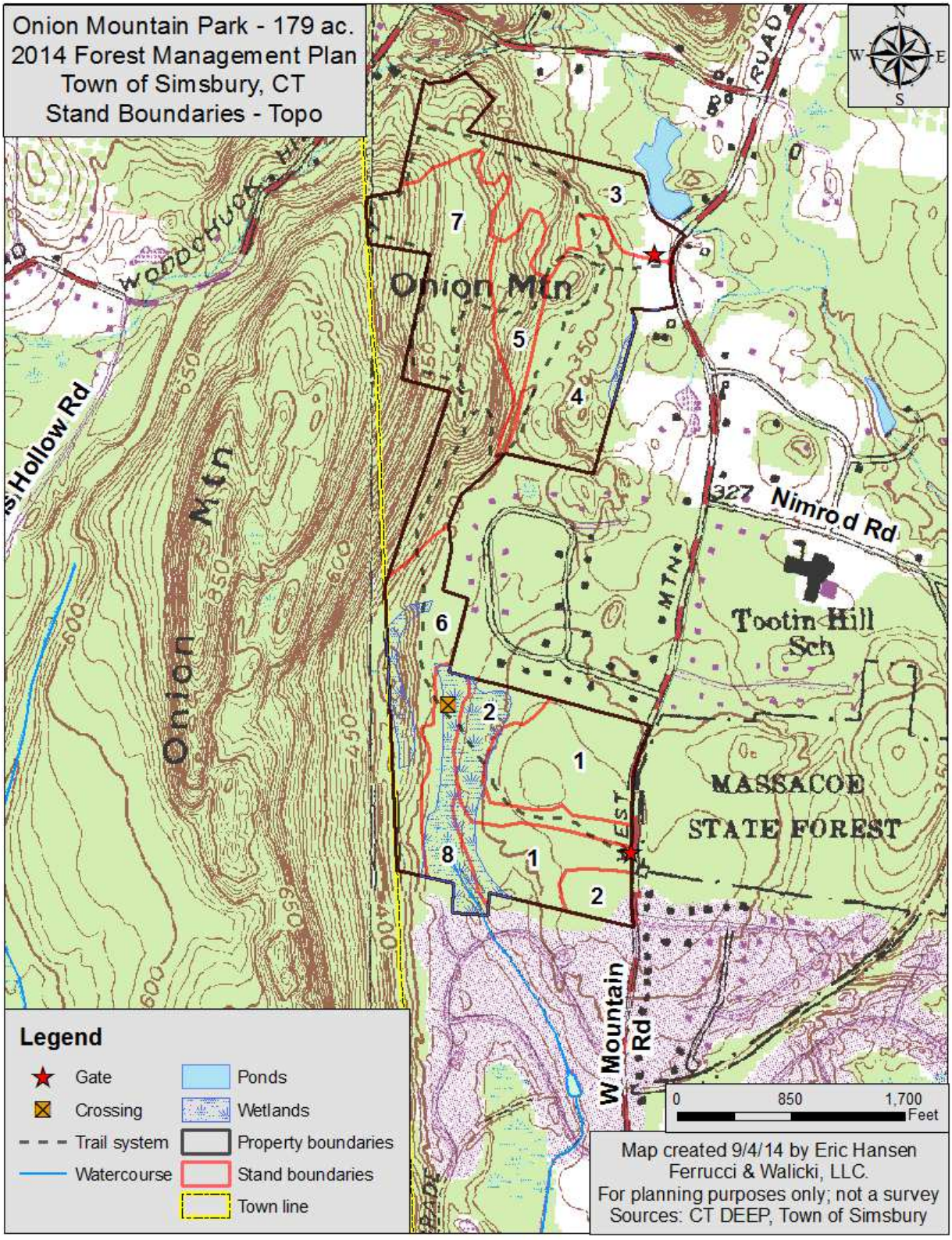
MAPS
Simsbury – Onion Mountain Park Natural Diversity Database Map



Conserved Properties Surrounding Onion Mountain Park



Onion Mountain Park Topo Map



GLOSSARY

aspect
The general direction in which land slopes

basal area
A commonly used measure of forest density or stocking. It is measured as the cross sectional area of a tree in square feet at 4.5 feet above ground.

B-level
The stocking level considered optimal for sawtimber growth.

board foot
A measurement unit for lumber volume. One board foot is a piece of wood 1 foot long by 1 foot wide by 1 inch thick (Abbreviated b.f.)

breast height
Measurement at which diameter is generally measured for inventory and timber tally purposes. Breast height is measured at 4.5 feet above the ground. Where there is any slope, breast height is always measured from the highest part of the slope where the ground intersects the tree.

clearcut
An even-age silvicultural technique in which all the trees in an area are severed and – typically – removed. Silvicultural clearcuts generally remove all trees above 2 inches dbh. Commercial clearcuts or "high-grades" remove all the trees of value leaving poorer quality trees of a variety of diameters.

clearcut with reserves
A modified clearcut in which the majority of the trees in an area are cut, but some minimal trees are left standing. Typically reserve trees will allow to mature and will not be cut. This differs from a shelterwood or seed tree harvest in that residual trees following the initial regeneration cut are intended for removal.

clear log
A length of tree stem or cut log that has no horizontal (i.e. side) branches.

coppice
A sprout from roots or stumps. Or a practice of cutting a tree or group of trees to cause them to resprout from the stump or roots.

cord
A measurement unit for firewood. One cord of stacked wood measures 4 feet by 4 feet by 8 feet. 1 cord contains 85 cubic feet of solid wood. (Abbreviated cd)

crown
The top of the tree, including the live branches and the leaves.

cruise
An inventory of standing trees during which information about species, size and other characteristics is gathered.

cull
A tree of such poor quality that it is not suitable for sawtimber. Culls are sometimes sold for firewood.

dbh
Diameter of a tree outside the bark measured at breast height

den tree
A tree with a hollow or cavity large enough to potentially be used by wildlife (a.k.a. cavity tree)

even-age management
Managing trees in such a way that it creates a single or two age classes in a stand.

girdle
To attempt to kill a tree by cutting through the outer bark and cambium around its entire circumference.

hardwood
A deciduous, broadleaf tree. Angiosperm.

high-grade
A logging practice in which only the best trees are removed leaving poorer quality and/or damaged trees.

International Rule
A type of log (measuring) rule. The International Rule is the legal standard for measuring sawtimber in Connecticut.

live crown ratio
The ratio of live crown length to total tree height.

mast
Seeds and nuts produced by trees and shrubs. Mast is often discussed in terms of hard and soft and is crucial to providing food for wildlife.

mbf
One thousand board feet (of sawtimber) or "a thousand".

overstory
The portion of trees in a stand which form the upper canopy.

overstory removal
An even age silvicultural treatment type in which most or all of the overstory trees are removed in order to release established regeneration.

poletimber
Trees from 5 to 11 inches diameter at breast height (4.5 feet above ground). Also pole or pole tree.

regeneration
New trees, generally seedlings, saplings and sprouts. Regenerating a forest involves replacing existing trees with new ones.

release
To free a desirable tree from competition by cutting or otherwise killing one or more adjacent competing trees or shrubs.

sapling
A tree from 1 to 5 inches diameter.

sawlog
A log that is straight, large and sound enough to be sawn into boards. Sawlogs are usually at least 8 feet long and ten inches or larger in diameter.

sawtimber tree
A tree large enough to contain at least one sawlog. (Saw)timber trees are usually twelve inches or larger in diameter outside the bark at breast height.

seedling
A tree from newly germinated up to 1 inch diameter.

Selection System
A silvicultural system involving the removal of individual trees or groups of trees at regular intervals. This system tends to promote the development of uneven aged forests.

Shelterwood System
A silvicultural system whereby new trees are regenerated under the partial shelter of other trees. This system is one of the options available to regenerate a stand or part of a stand to create an even aged or two-aged forest. (The latter occurs when the overstory trees are not removed following the successful regeneration of trees in the understory).

silvicultural system
A planned program of silvicultural treatments during the entire life of a stand. The main focus is on the methods used to obtain desirable regeneration.

silviculture
The science and the art of growing and tending trees for a variety of purposes.

slash
The debris left after logging, pruning or thinning. Slash can include tree tops and unused or unusable portions of the main stems of trees.

stand type
A group or community of trees sufficiently uniform with respect to size, species composition, spatial arrangement, age or condition to be distinguished from other groups of trees.

stocking
An indication of the amount or density of trees in a stand.

stumpage
Standing trees, usually associated with volume information and intended for sale.

thinning
A cutting done in immature stands in order to maintain tree health and vigor, stimulate the growth of the trees that remain and increase the total yield of useful material from the stand.

tolerance
The relative ability of a tree species to survive and/or grow in shade.

timber stand improvement
Improving a stand of trees, usually by pruning, cull-tree removal or pre-commercial thinning. (Abbreviated TSI)

uneven-age management
Managing trees in such a way that it creates three or more age classes in a stand. The selection system is most often used to develop uneven-age stands.

Onion Mountain Park – Addendum to forest management plan
12/10/14

After meeting with the Simsbury Conservation Commission on 12/9/14, the following recommendations are being added to the management plan for this property:

- Following any treatments, annually monitor treated areas for presence of invasive plant species. If invasive species are detected, spot treat invasives to prohibit their establishment.

- Following treatments in which there is harvesting in the overstory, consider the installation of a deer exclosure. If this is done, include the construction of a spur trail to the exclosure (if it is not already adjacent to an existing part of the trail network) along with educational signage.