DIAMOND HILL PARK

Forest Stewardship Plan

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Forest Management Plan

Title & Signature Page

Property Owner(s)

Town of Cumberland, Rhode Island

45 Broad Street, Cumberland, RI 02864

Plan Date: July 2024

Phone Number: (401)-728-2400 Ext. 146

Property Information:

Town: Cumberland	Plat: 59	Lot: 15, 45
Total Acres: 136.4	Excluded Acres: 46.4	Program Acres: 90

Property Location: West of the Diamond Hill Reservoir, and south of Miscoe Lake in the northeast corner of Cumberland, RI.

USGS Topo Quad: Pawtucket, Franklin, Wrentham, Attleboro

Signatures

I hereby attest that this plan was prepared according to the owners' management objectives, and that all information provided is as accurate as current forestry practices allow.

_____

Plan Preparer

I hereby certify that I have read this Forest Management plan, agree to the objectives statement set forth, and pledge to abide by the recommendations of the plan for a period of ten (10) years, or until a revised plan is submitted to the RI DEM, Division of Forest Environment, and approved.

_____ _____

Owner(s)

……

_____ Date: _____

RI DEM, Division of Forest Environment representative for Plan Approval

This forest management plan has been prepared to guide the long-term management of this wooded parcel. It is prepared according to the multiple-use management objectives of the property owner.

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Forest Management Plan

This Forest Management Plan, also known as a Forest Stewardship Plan, has been developed for the purposes of documenting the natural resources of the woodlands and associated water resource areas on the subject parcel. As well as, addressing resource concerns where forestry-related conservation activities or practices will be planned and applied, and to identify and recommend activities that maintain the traditional forest uses of these woodlands.

This management plan shall be considered to be current for a period of ten (10) years and may be amended and updated from time to time, in accordance with the provisions of funding agencies and through the RI DEM, Division of Forest Environment.

Goals & Objectives

The primary objective is the promotion of water quality, and riparian resilience of the Blackstone River Valley.

The secondary objective is to improve recreational opportunities and forest health.

Property Overview

This property totals 136.4 acres, with 90 forested acres being committed to the forest stewardship program. Situated just west of the Diamond Hill Reservoir, and south of Miscoe Lake, in the northeast corner in the town of Cumberland, RI. Frontages for the property are located on both Diamond Hill Road and Fisher Road, with several access points off of Diamond Hill Road and a gated entrance off of Fisher Road. Additionally, a service road for the cell tower site can be access from the Ski Valley condominium complex. (Appendix I).

The topography of the property is varied with the prominent feature being Diamond Hill which is the central high point of the property. From the low land areas of Sylvys Brook to the top of Diamond Hill, the change in elevation is approximately 260 feet. There are very abrupt changes in elevation in some locations, such as along the southeastern exposure where open cliff faces are present. Most of the property is easily accessed from roads, trails and adjacent properties with only a few areas where topography is extreme ruling out forest access. When accessing the wooded portions of the property, considerations should be taken of topographic features not exceeding the vehicles' recommended capabilities from the manufacturer. (Appendix V).

The surface water flow of Diamond Hill directs rainfall in two main directions. Rainfall on the eastern exposure is deposited into Diamond Hill Reservoir via surface flow. Surface water from the western exposure is deposited into Sylvys Brook which converges with Catamint Brook. Catamint Brook then flows into Arnold Mills Reservoir south of Diamond Hill Reservoir. These water bodies drain south via Abbott Run which flows through Rawson Pond, Howard Pond, Robin Hollow Pond, and Happy Hollow Pond. Abbott Run then joins the Blackstone River north of River Island Park. The Blackstone River crosses the Pawtucket Lower Dam and

becomes the Seekonk River, the Seekonk then converges with the Providence River at Bold Point. The Providence River then transitions into Narragansett Bay. On its way to Narragansett Bay, the groundwater and surface waters fed by this drainage are an important source of groundwater supply, wildlife habitat, recreational uses, and fishery resources. Additionally, most of these water ways sourced the hydro-powered energy to the first industrial mills in the US, initiating the industrial revolution. These historic mills, spill ways, and dams have drastically changed hydrology and ecology. Any improvement or preservation to this watershed will benefit the entire ecosystem.

There are a multitude of soils present on this property, the two most prominent forest soils are Canton-Charlton-Rock outcrop complex and Rock outcrop-Canton complex. These are shallow, well drained soils with limited productivity potential for tree growth. Areas that have full vegetative cover have the ability to produce more of an organic layer and retain mineral soils. Though these soils are well drained, they are easily eroded without vegetation and root systems. Particularly on steep slopes, these soils become a little more than gravel. Once the organic layer is lost it's incredibly hard to reestablish. Please refer to the soils map and report included in the plan, for more information on soil types and their relative productivity for trees.

The over story structure of this parcel is a story of simplicity, with oaks and white pine being the most common tree species present. This is consistent with the forest soils present. Quality of the standing timber varies based on its location. Areas of the property which are higher in elevation and have limited available soil moisture produce lower quality trees for the property. Low lying areas like stand two had the highest quality timber and greatest variety of tree species. While the goal for this property is not timber management, timber quality is a factor in determining overall forest health and can be an indicator of forest resilience. (Appendix VI)

Access to the parcel is currently established via forest roads, access roads, trails, and mountain bike paths. Virtually every part of the property is accessible on foot, with more developed access throughout. Around the park there are marked foot trails, several unmarked foot paths, and mountain biking trails that have been established by park visitors. (Appendix VII). Trails should avoid impacting any wetlands following Rhode Island Best Management Practices, BMPs. This includes current trails, especially once on extreme slopes in close proximity to wetlands.

Included in this plan are specific descriptions for each of the forest stands that are delineated on the forest stand map. These stands are determined through variations in soil types, tree species, and size or density class. The recommendations are based upon existing conditions and the landowners' objectives, and an activity summary is provided for the first ten (10) years of this management plan.

Management History

In 1937, the Civilian Conservation Corps created a trail and ski slope on the northwestern slope of Diamond Hill with no other accommodations. The park was opened in January 1938. The ski area was expanded in approximately 1962, with Ski Valley being established on the eastern slope. By 1985, all ski areas were closed. In 1998, the Town of Cumberland acquired what now consists of the park's boundaries. Since farm abandonment, this property appears to have been a recreational area with little evidence of timber harvesting in the last 90 years. Limited evidence of historical agricultural use is present with no stone walls, cellar holes or Virgina rail stone fencing foundations. It is likely that this property has always been used as woodlot managed for timber products, pre-acquisition by the state of Rhode Island in 1935. With limited coarse woody debris and the forest composition, this property does not host what some may call old growth forest.

Inventory Method

The preparation of this Forest Management Plan has included a forest resource inventory, the results of which are included in each of the stand descriptions that will follow. Forest stands are determined through a combination of forest cover, geographic features, and potential management considerations. Soil types, slope, and aspect also having a major influence on the delineation of these stands.

This forest inventory was conducted by the randomized distribution of variable radius sampling plots, with the use of a 10-factor prism and measuring the diameters of all "in" trees. Extrapolation of the recorded data provides average diameter and stocking level across the stand. Data recorded includes species, determination of acceptable or un-acceptable growing stock (AGS and UGS), understory vegetation, and any additional site factors that influences the health and viability of the stand.

INTRODUCTION to STEWARDSHIP PLANNING ISSUES

(Partially excerpted from MA Stewardship Program and Marc Tremblay, CF)

This is your Stewardship Plan

It is based on the goals that you have identified. The final success of your Stewardship Plan will be determined first by how well you are able to identify and define your goals, and second, by the support you find and the resources you commit to implement each step.

It can be helpful and enjoyable to visit other properties to sample the range of management activities and see the accomplishments of others. This may help you visualize the outcome of alternative management decisions and can either stimulate new ideas or confirm your own personal philosophies. Don't hesitate to express your thoughts, concerns, and ideas. Keep asking questions! Please be involved and enjoy the fact that you are the steward of a very special place.

Biodiversity

Biological diversity is, in part, a measure of the variety of plants and animals, the communities they form, and the ecological processes (such as water and nutrient cycling) that sustain them. With the recognition that each species has value, individually and as part of its natural community, maintaining biodiversity has become an important resource management goal.

While the biggest threat to biodiversity in southern New England is the loss of habitat to development, another threat is the introduction and spread of invasive non-native plants. Non-native invasives species, like European Buckthorn, Asiatic Bittersweet, Japanese Barberry, and Japanese Honeysuckle spread quickly, and crowd out or smother native species. This overcrowding upsets and dramatically alters the ecosystem structure and function. Once established, invasives are difficult to control and even harder to eradicate. Therefore, vigilance and early intervention to reducing the invasives are paramount.

Invasive plants often lack competitors and can out-compete both native understory vegetation and tree seedlings. This can negatively impact regeneration of tree species and cause drastic changes in native vegetation communities. Invasives species are associated with disturbance, open areas, and human activity. Disturbance aids the spread of invasive species, while open areas and forest edges are prime locations for these species to infiltrate native plant communities. Nearby residences, developments, and open areas may provide sources of invasive plants and increase the likelihood of invasive plants becoming established on this property.

Another factor influencing biodiversity in southern New England concerns the amount and distribution of forest growth stages. Wildlife biologists have recommended that for optimal wildlife habitat on a landscape scale, 5-15% of the forest should be in the seedling stage (less than 1” in diameter). Yet, there is currently no more than 2-3% early successional stage seedling forest across the state. There is also a shortage of forest with large diameter trees (greater than 20”).

Soil and Water Quality

One of the most important resources on your land are soils. Soils provide the most basic resource from which all vegetation grows. Soil properties vary widely, and often determine the types of ecosystems found in a certain place. During management activities, it is crucial to minimize negative impacts on the soil, such as compaction and erosion. Correctly implementing Best Management Practices (BMPs; see *Rhode Island Forestry Best Management Practices for Water Quality Protection*) will help maintain soil quality and preserve ecosystem health.

Maintaining soil quality also helps preserve water quality. Erosion can be caused by natural and manmade disturbances. Eroding soils are carried into streams and other waterways, causing declines in water quality. Forests with robust and healthy understories reduce erosion by holding soil in place and filtering any runoff as it moves toward waterbodies. Trees, shrubs,

herbaceous groundcover, grasses, and organic material on the forest floor all serve to reduce the area of bare soil vulnerable to the impacts of falling rain. This helps to prevent soil movement and runoff into nearby streams and other bodies of water.

In general, the healthier a forest is, the cleaner the water that runs through it will be. Healthy forests are often diverse, with a variety of tree species in multiple age and size classes and a robust understory community of native plants. Tree vigor is another important aspect of forest health and is influenced by stocking level (appropriate density) and stress factors. The more vigorous and diverse a forest is, the better it tends to cope with disturbance and stress factors, such as drought, disease, or mechanical damage.

Since human activities often cause severe soil disturbance, any management activities should adhere carefully to BMPs to avoid harming soil and water quality.

Wildlife Management

Enhancing the wildlife potential of a forested property is a common and important goal for many woodland owners. Some actions can be taken to benefit a particular species of interest, such as adding Wood Duck nesting boxes. In most cases, recommended management practices that can benefit many species, fall into one of three broad strategies. These strategies are managing for diversity, protecting existing habitat, and enhancing existing habitat.

Managing for Diversity

Many species of wildlife need a variety of plant communities to meet their lifecycle requirements. In general, a property that contains a diversity of habitats will support a more varied wildlife population. A thick area of brush and young trees might provide food and cover for grouse and cedar waxwing, a mature stand of oaks provides acorns for foraging deer and turkey, while an open field provides the right food and cover for cottontail rabbits and red fox. It is often possible to create these different habitats on your property through active management. The appropriate mix of habitat types will primarily depend on the composition of the surrounding landscape and your objectives. It may be a good idea to create a brushy area where early successional habitats are rare, but the same practice may be inappropriate in the area's last block of mature forest.

Protecting Existing Habitat

This strategy is commonly associated with managing rare species or those species that require unique habitat features. These habitat features include vernal pools, springs and seeps, forested wetlands, rock outcrops, snags, den trees, and large blocks of unbroken forest. Some of these features are rare, and they provide the right mixes of food, water, and shelter for a particular species or specialized community of wildlife. It is important to recognize their value and protect their function. This usually means not altering the feature and buffering the resource area from potential impacts.

Enhancing Existing Habitat

This strategy falls somewhere between the previous two. One way that the wildlife value of a forest can be enhanced is by modifying its structure (number of canopy layers, average tree size, density). Thinning out undesirable trees that are growing around large, crowned mast (nut and fruit) trees, will allow the desirable trees to grow faster and produce more food. The faster growth helps to accelerate the development of a more mature forest structure, which is important for some species. Creating small gaps or forest openings generates groups of seedlings and saplings that provide an additional layer of cover, food, and perch sites.

Each of these three strategies can be applied on a single property. For example, a landowner might want to increase the habitat diversity by reclaiming an old, abandoned field. Elsewhere on the property, a stand of young hardwoods might be thinned to reduce competition, while a "no cut" buffer is set up around a vernal pool or other habitat feature. The overview, stand description, and management practice sections of this plan will help you understand your woodland within the context of the surrounding landscape and the potential to diversify, protect or enhance wildlife habitat.

Cultural Resources

Cultural resources are the places containing evidence of people who once lived in the area. Whether a Native American village from 1,700 years ago or the remains of a farmstead from the 1800's, these features all tell important and interesting stories about the landscape and should be protected from damage or loss.

Southern New England has a long and diverse history of human habitation and use. Native American tribes first took advantage of the natural bounty of this area over 10,000 years ago. Many of these villages were located along the coasts and rivers of the state. The interior woodlands were also used for hunting, traveling, and temporary camps. Signs of these activities are difficult to find in today's forests. They were obscured by the dramatic landscape impacts brought by European settlers as they swept over the area in the 17th and 18th centuries.

By the mid-1800's, more than 70% of the forests of Rhode Island had been cleared for crops and pastureland. Houses, barns, wells, fences, mills, and roads were all constructed as woodlands were converted for agricultural production. When the Erie Canal connected the Midwest with the eastern cities, New England farms were abandoned for the more productive land in the Ohio River Valley, and the landscape began to revert to forest. Many of the abandoned buildings were disassembled and moved, however the supporting stonework and other changes to the landscape can be easily seen today.

One particularly ubiquitous legacy of this period is the stone walls. Most were constructed between 1810 and 1840 as stone fences (wooden fence rails had become scarce) to enclose sheep within pastures, or to exclude them from croplands and hayfields. Clues to their purpose are found in their construction. Walls that surrounded pasture areas were comprised

mostly of large stones, while walls abutting former cropland accumulated many small stones as farmers cleared rocks turned up by their plows. Other cultural features indicating early settlement include cellar holes, wells, old roads and even old trash dumps.

Recreation

Most landowners utilize their forests for a variety of recreational activities, including hunting, hiking, camping, and wildlife viewing. Management objectives that consider these recreational values can include building trail systems or enhancing habitat for particular species of plants or animals. Recreational values are often closely tied to aesthetic values.

Aesthetic Values

Aesthetics is often the most important aspect of forestland for landowners. This value is also the most difficult to define since personal tastes and aesthetic sense vary widely from person to person. The most beautiful qualities of a forest for one landowner may be aesthetically displeasing to another. If aesthetic quality is of your management goals, it is very important that your own tastes and concerns are considered.

For many landowners interested in maintaining aesthetic values of their forestland, certain management operations can be concerning. Timber harvests and any tree removal activities have unattractive associations, and any apprehension about these operations is understandable. However, with careful forest management, silvicultural objectives can be reached while also aiding aesthetic, recreational, wildlife, or ecosystem health goals. For example, timber may be harvested to clear a vista near a trail, thinning operations may provide slash for wildlife habitat improvement, or trees of particular educational interest or sentimental value to the landowner may be preserved and favored.

There are resources available if your goals include both aesthetic values and timber (ex: *A Guide to Logging Aesthetics: Practical Tips for Loggers, Foresters & Landowners*, by Geoffrey T. Jones, 1993). However, the best thing you can do is to be involved in the process and work with your consultant to ensure that your aesthetic considerations are included in management activities and stipulated in any contracts, and that those stipulations are adhered to during operations.

Stewardship Issues

Recreation

1 Detached Purple Trail marker. Bark has grown to the point where trail marker has been pushed off.

The property since its acquisition by the state in the early 1930s has had infrastructure developed specifically to accommodate recreational activities. Currently, the extensive trail network caters to hikers and trail runners on the marked and established trail network. Over time, off map trails have been created by end users not sticking to marked trails and mountain bikers creating new lines of traversing the landscape. Additionally, the Warner Trail connects Diamond Hill to Sharon Massachusetts a 30-mile journey and makes Diamond Hill the connection to more trail networks in the greater Boston area.

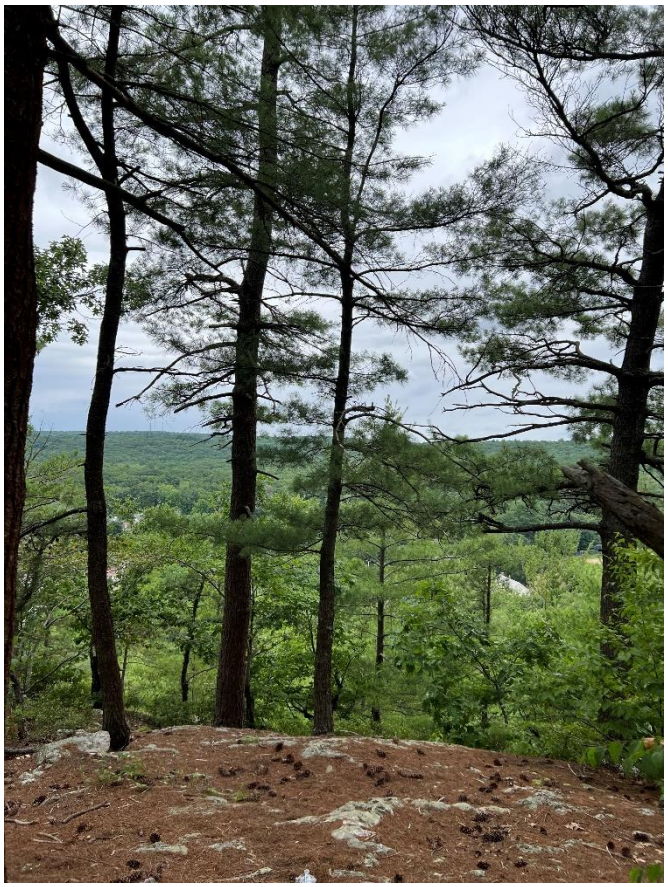
Diamond Hill's close proximity to several urban centers allows for residents from these urban centers to have access to outdoor experiences. The trails are excellent for nature walks, wildlife viewing, foraging and numerous other outdoor pursuits.

Issues with the existing trail network were noted while conducting the forest inventory. It appears that in the last five years the trail received new markers. These markers were attached using screws into trees, unfortunately no gap for future growth was allowed and now the trail markers are beginning to detach from their corresponding mount trees. Clear marking of trails is critical for recreational safety, mitigating furth soil compaction, and preservation of understory plant ecosystems.

If trail markers are to be reapplied there should be about inch to inch and a half of exposed screws or other fasteners so that markers can be displaced by future tree growth. Figures 1 and 2 demonstrate this issue, this issue was noted property wide, not just the purple trail.

2 Detached trail marker.

Aesthetics/Scenic values



3 Scenic Cliff face overlooking Diamond Hill Park

The property is located in a scenic, rural setting, and has value for its contribution to the aesthetic landscape. With no harvesting for over a century, areas of forested sections of the park with appropriate soils are engulfed with large timber stems, creating a full canopy and an open understory. This open understory is visually very pleasing while not being ecologically very productive. These conditions are mostly found along the low land flood plains and the shoulder elevations of the main hill.

Once passing to lower quality soils on the upper slopes, the rocky shallow soils create a brushy upland scrub and pine forest condition. The benefit of this is the rock cliff presenting excellent scenic overlooking opportunities on this property, where trees do not grow on the cliff faces. Some of these overlooks have infrastructure like benches so that end users may enjoy these points of interest. Something to consider when maintaining these overlooks is to vista prune the trees that may pose a visual obstruction. Removing or pruning trees that block these overlooks vistas will allow the end user to gain a great outdoor experience as a result.

With public accessibility, this property relies on its forest aesthetic to allow users to enjoy the resource. Any management needs to take aesthetic into consideration, prioritizing these values is paramount for maintaining a positive view of forestry with the general public.

Wildlife Habitat

From a landscape approach, this is located in a portion of Cumberland that is predominantly forested and is a component of the great forest patch work. This parcel directly filters and drains into larger adjacent waterbodies that are important components to the aquatic ecosystems. This parcel occupies space behind several roadside house lots with open yards and imported lawn grasses. This creates an ample edge habitat around this forest core. The close vicinity to the Arnold Mills and Diamond Hill Reservoir makes this property an important part of the ground water filtration for the public drinking supply for the reservoir system for the city of Pawtucket.

This property is fairly homogeneous with a well-developed overstory and minimal understory. The wetlands of the parcel include a stream that defuses into a wetland along the eastern boundary of the wooded portions of the park. This wetland was created by a beaver impoundment of the water flow leaving the park to the south. This now wetland swamp has swallowed up a former lowland forest stand. The trees in this section have all died and created habitat for kingfishers, osprey, wood ducks, turtles, and various amphibians.

Patches of witch hazel, low bush blue berry, scrub oak, sweet birch, and white pine regeneration make up the understory in the few areas where some sort of secondary stratum exists. While the visual appeal of this open understory is appreciated by humans, this condition limits the habitat usage to species that directly benefit from the mature overstory. In its current condition, this property best suits bird species such as Scarlet Tanagers, Rose-breasted Grosbeak, Pileated Woodpecker, and Pine Warbler. These birds specialize in occupying the forest canopy.

Ground nesting Gallinaceous birds like wild turkey were witnessed with a clutch of approximately 15 poults while conduction inventory work. This is a positive indication that areas of the park are being utilized as a breeding and nesting habitat for eastern wild turkey. Additional wildlife noted during the inventory process were white-tailed deer, eastern cotton tail, and wood frogs. Seeing these instances of wildlife on the ground reaffirms the need for having pets on leash when enjoying the park trail system.

The property level management that needs to take place to enhance this parcel's carrying capacity is the control of invasive plants found. The side effect of allowing additional sunlight to the forest floor is the opportunity for invasive plants to completely capture the available growing space that will be created. While many of the invasive plants create high quality habitat for forest birds that tend to utilize the understory, they reduce overall biodiversity and alter the native ecosystem. Controlling the invasives will allow for native plants to move in and occupy the previously occupied space. In taking a landscape-level management approach, it ensures the stewards of the land are maximizing the existing forest habitat to sustain a wider range of wildlife than its present populations.

Water Resources/Water Quality

This property is in the Blackstone River Watershed and drains directly into Diamond Hill and Arnold Mills Reservoir. According to a report published by the Rhode Island Department of Health and URI's Cooperative extension, "Protect your drinking water", 60% of the upper Cumberland/Lincoln reservoir watershed is forested with ample stream buffers and low amounts of impervious ground cover. These factors contribute to a reduction of the watershed susceptibility to water supply pollution. This doesn't mean it is free from instances of pollutants, only that this section of the watershed has a great capacity to handle these pollutants.

Diamond Hill Park is part of the forested buffer that helps to maintain the capability to filter the surface water entering the public water supply. At its closest point to the water's edge, this property is only 1000 feet from the banks of the aforementioned water body. The importance of water quality leaving this property is paramount since the downstream runoff will have visible

impacts on the public water supply. All forest management activities will take water quality into account to avoid conditions that may cause exposed soil in highly erodible areas.

The greatest threat to the water quality for Diamond hill is soil erosion, especially from its trail network. Currently several trails, especially on steep slopes, display characteristic of high velocity surface flow and gully erosion, in some cases feeding directly into wetland areas. This sort of surface erosion could likely be a characterized violation of Rhode Island Best Management Practices (BMP's) for water quality.

6 Washed out section of the blue trail due to surface flow.

5 Alternate view of the trail erosion.

4 Downhill Mountain bike trail with bank erosion with 50 feet of Sylvys Brook.

7 Section of the Warner Trail displaying need for soil stabilization.

8 Surface erosion on the old ski hill on the western side of the parcel.

9 Log across the purple trail acting as an improvised waterbar.

Figures 4-8 illustrate certain areas where these erosion conditions were noted. Solutions to these include, but are not limited, to vegetative bank stabilization, re directing trails to follow contours on the landscape, waterbars or similar method to slow surface water. Figure 9 demonstrates how even a log can arrest surface flow and stabilize soils from the trail system. This "accidental" waterbar could be implemented on other trails with similar conditions.

To best protect water quality in the public drinking water supply, action needs to be taken to ensure that the recreational use of the property doesn't further negatively impact Diamond Hill Park's ability to be an effective buffer to surface reservoirs.

Forestry practices can have an impact on water quality. Stream crossings can disturb the soil, and soil disturbance on the hillsides can lead to erosion. Sediment entering the riparian zones of the ponds can impact the ability of those wetland buffers to function properly. Implementation of Best Management Practices (BMP's) during logging operations and for road maintenance will help protect the quality of the water that flows off the property. Please refer to the Rhode Island Best Management Practices manual for more information on planning skid trails and working within and adjacent to wetlands. Providing buffers to steep slopes and stabilization of recreational trails on those slopes are important practices to consider.

Riparian & Wetlands

Best Management Practices should be followed for any management activity. Stabilization of any trails on the slopes will minimize any sedimentation runoff to the adjacent wetlands, and these trails should be properly maintained to minimize any impact to the soil and water flows.

Portions of Sylvys Brook have had its banks hardened to direct the brooks flow path. In 1933, the CCC also constructed the pond in front of the where the 1972 music pavilion now stands. On either side of the pavilion bridges were put in place which channelize the brook in those sections.

10 Phragmites off of Fisher Road.

A vernal pool is located south of the cell tower access road and still held water in mid-June. With relatively few sources of surface water on the eastern side of the property, this vernal pool is an important micro habitat for forest amphibians. Protecting this vernal pool from runoff on the access road, the Ski Valley development is crucial to protecting this delicate forest ecosystem. An additional threat to this vernal pool is the roadside invasive plants from the cell tower service road.

Along Fisher Road, a drainage ditch is present which likely collects storm water from the road and the neighboring development. The drainage ditch is heavily populated with various invasive plants. The soils were loaded with organic material and appeared to be retaining moisture, even during a relatively dry period of the summer. The presence of phragmites also supports a permanent wetland condition on the western most part of the drainage.

Soil Conservation

The presence of woods roads can result in soil erosion along the roads and trails, which can lead to sedimentation of the stream and wetlands. The use of Best Management Practices (BMP's) during timber harvesting operations will minimize these impacts.

The presence of logging slash and coarse woody debris throughout the woodlands is a benefit to soil quality. This organic material sustains the microbial health of the soil and is important in building up soil that may be depleted from past fires and agricultural uses.

Other than clearing trails of storm debris and coarse woody debris should be left in place to decay and incorporate into the soil. This CWD will eventually become soil and during its decomposition process stabilize existing soil. This along with trail stabilization gives this rocky shallow soiled parcel the best chance of retaining its organic soil layer.

Silvicultural practices included in this plan, when conducted according to acceptable BMP's, will have minimal impacts on soil conditions.

Forest Products

The yield of forest products from this property is not a primary objective of the landowner. The secondary effect of forest management is that forest products may be generated. With the heavy focus on recreation, alternative forest products are more likely to be utilized on this parcel. Activities such as foraging for wild edibles, basketry supplies, home décor and other small, assorted items may be collected by the end users. No plans for formal timber harvest exist for this property in its current condition.

These activities, carried out according to BMP's, can also be accomplished without impacting soil and water resources on the property.

Forest Health

The health of a forest is often confused with its productivity, if large fast-growing trees are not present on the landscape, then there must be poor forest health. This is not always true, to the untrained eye the stunted trees growing on this property's highest elevations and western slopes would be considered an unhealthy forest. This is not actually true; these trees are limited by the productivity of site soils and are achieving the best growth possible based on site conditions. These areas may not be the best at growing large trees but the overall health of the forest in its current condition is fine.

In the past these stands faced certain forest pests and the landscape still carries some signs of this past forest health concern. In 2016, spongy moth carried a defoliation event where their numbers exploded. Hardwood trees, especially in the Oak genius, were severely impacted from subsequent years of defoliation. The several years of defoliation combined with a drought condition for several years, contributed to considerable mortality of oak trees across the state.

This property shows some evidence of this defoliation with a moderate amount of dead standing oak timber.

Other forest health vectors noted on this property were evidence of beech leaf disease, emerald ash borer, and the presence of invasive plants on the landscape. These vectors all have the chance to impact this parcel in limited ways. The most concerning being the continued spread of invasive plants.

Overall, the forest health is comparable to other forest stands typically found in this region of the state. By maintaining the biodiversity and keeping invasives off the landscape, the forest will have the best possibility to maintain a healthy composition.

Carbon Cycle

Forests are considered carbon sinks which refers to the ecosystems ability to capture and store carbon from the atmosphere. Trees, shrubs, herbs, and grasses are all components of the forest ecosystem, capturing and converting atmospheric carbon dioxide into carbohydrates that they then utilize to carry out their normal functions of growth. Forest biomass (trunks, branches, foliage, and roots) and soils are the primary storage locations for this carbon, therefore anytime a long-term timber product is produced the carbon in that biomass is locked away for as long the product is utilized.

Management activities play a heavy role in carbon sequestration and should be a consideration when developing a forest management plan. Younger forest stands absorb atmospheric carbon more aggressively, as opposed to mature stands. Primary growth (this is the initial vertical growth of trees) of trees in the first few years is not as influenced by competition. Once stands mature further and start to reach a certain point of population they begin to become less efficient at absorbing carbon. Once trees die, they release a substantial amount of carbon back into the atmosphere while a smaller portion will be absorbed by the forest soils.

There are a multitude of incentives to being active in your forest management by way of thinning, and eventually harvest looking to usher in a new generation of primary growth. These activities help provide the diversity of forest species needed for a resilient healthy forest, while helping to improve forest soils and water quality. Regular thinning ensures that forest growth is optimized, improving overall forest vitality ultimately leading to a more efficient and productive carbon sink.

This property is acting as carbon storage currently with its mature overstory and little forest regeneration. While current carbon uptake has stagnated due to current stocking, overall forest health is good, and mortality is relatively low, excluding some oak mortality on the upland slopes in stand one, which are a result of the spongy moth outbreak in 2016. As part of the mortality related to defoliation stocking has been reduced across certain areas. These areas will repopulate with regeneration and begin the new aggressive cycle of carbon absorption. Any wood removed will be converted into long term timber products which will hold on to stored carbon as long as the timber product is in use.

In future assessments of forest health conditions, the identification of potential improvements to growing conditions for certain stands should be included with regard to opportunities for increased carbon uptake.

Invasive Plants

Invasive plants can have a negative impact on native plant communities and can interfere with any attempts at establishing regeneration of native tree species. Disturbed sites and exposed areas, adjacent to residential sites, and the disturbances created by timber harvesting, can often lead to problems with the spread of invasive plants. Although relatively isolated, there are some nearby residences, including the homestead, which provides opportunities for seeds from invasive plants to become established on the property.

Invasives that were noted on this property include, Japanese barberry (*Berberis thunbergii*), winged euonymus (*Euonymus alatus*), and multi-flora rose (*Rosa multiflora*), glossy buckthorn (*Frangula alnus*), Phragmites (*Phragmites australis*), Norway maple (*Acer platanoides*), Bitter sweet (*Celastrus orbiculatus*), Autumn olive (*Elaeagnus umbellata*), Japanese stilt grass (*Microstegium vimineum*), Tree of heaven (*Ailanthus altissima*), and White butter bur (*Petasites albus*). These are found either along the direct roadside or in areas that have saturated wetland soils. For a more detailed visualization please refer to Appendix IX.

Wildfire Risk Assessment

Generally, the current condition of Rhode Island's woodlands does not constitute a major fire risk. Maturing forest conditions, the presence of intervening wetlands, streams, and rivers, and the presence of many roads and the vigilance of local residents and fire districts keeps fire incidents at a minimum.

Central Rhode Island does have a history of fire events, with some large, catastrophic fires that burned in the 1940's and 1950's, following the Hurricane of 1938. The abandonment of many farms during the previous era, resulted in many acres of brushland and fallen timber from the hurricane.

With current understory conditions, the chance of a ground fire transitioning to a crown fire is relatively low. The minimal amounts of ladder fuels, course woody debris, and limited leaf litter present the probability of a damaging fire on this landscape as low. Other vectors for fire are the adjacent home sites and road frontages which could possibly be ignition sources for fire. Standard precautions should be taken in spring during leaf out when the fire risk is the highest for our region.

The RI DEM Division of Forest Environment is currently advising landowners to lay down trees through salvage harvesting and/or felling so that these oak crowns are in contact with the ground, which will speed up the decay process and minimize the fuel ladder conditions. The window for financially feasible salvage harvests is closing as the wood fiber quality of dead standing timber degrades. Fire breaks, cleared access roads, and cleared vegetation around structures will also improve the ability of fire departments to access and protect property when fires do break out.

The presence of public road frontage is where the risk of incendiary fires occurs, with passing vehicles, ATVs, and adjacent residential sites being the leading cause of wildland fire ignition. Fire breaks and access roads can be established, keeping these abutting land uses in mind, and salvage harvests will also result in improved access roads into currently inaccessible areas of the property

Rare and Endangered Species and Habitats

There were five species of state concern noted near the property. All species noted were of state concern Slender Gweardia (*Agalinis tenuifolia*), Ditch-stonecrop (*Penthorum sedoides*), Dusted Skipper (*Atrytonopsis hianna*), Red-bellied Tiger Beetle (*Cicindela rufiventris*), and Striped maple (*Acer pensylvanicum*). (Appendix VIII).

Recommendations to avoid impacting species and the habitats that are likely to support those of concern, involve the timing of forest management activity. This ensures there are no disturbances taking place during the spring breeding seasons. Current information regarding the Northern Long-Eared Bat and the Wood Turtle extends the no-disturbance recommendation for upland areas. To prevent disruption of the bat and turtle life cycles during the summer through October, the operations for habitat clearings and forest maintenance should halt until the Wood Turtle goes into hibernation. Please refer to the NRCS-provided fact sheet, as well as the natural heritage map for a highlighted buffer record of endangered species of concern, in relevance to the property

Boundaries

Boundary markings are ambiguous for this parcel and are not clearly delineated and no current survey is available. Additionally, an adjacent current or previous landowner appears to have developed part of the park's property as an extension of their back yard. The landowner at 16 Jason Grant Drive appears to have encroached on this land holding back to at least 1997 according to aerial imaging.

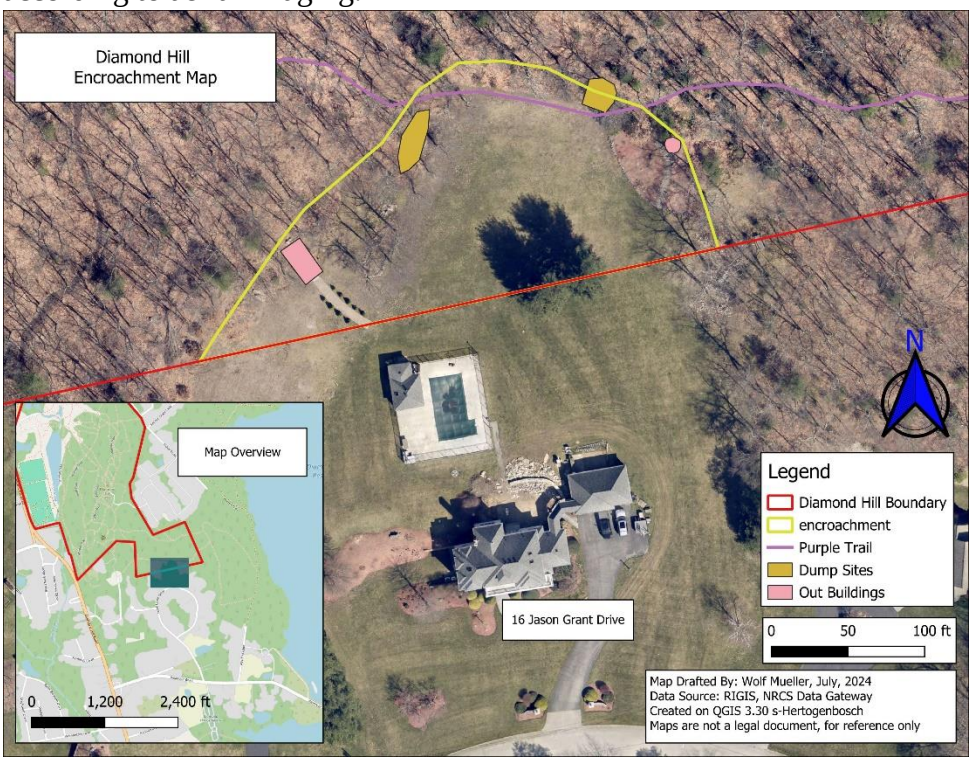


Figure 11 Map depicting the encroachment along the purple trail along the southern most boundary of the park.

As can be viewed in Figure 11, the current or previous landowner has established landscaping, a gazebo and pool shed, dumped yard waste and construction refuse all on what appears to be town property. The entire area of encroachment appears to be approximately 1 acre.

Figure 12 View from the purple trail toward the two pine trees that are approximately located at the park boundary line.

Figure 13 View of the purple trail path and the clearing coming right up to the trail.

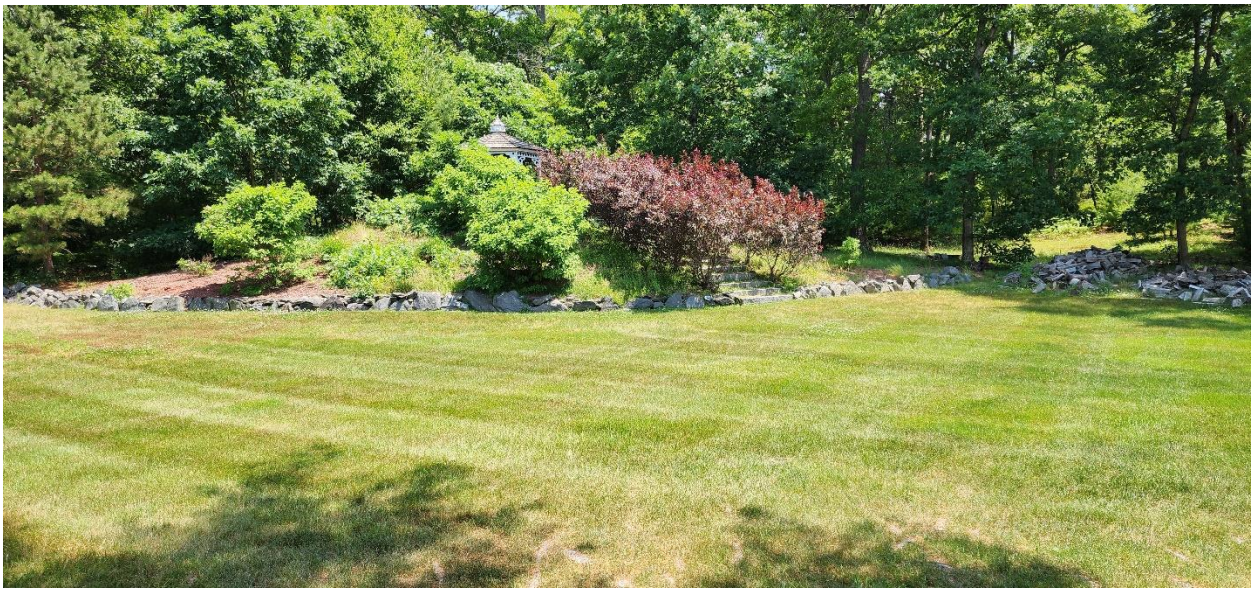


Figure 14 View of gazebo and hardscape from the pine trees from figure 12

Figure 15 View of the pool shed and walkway from pines in figure 12

Figure 16 View of yard waste dump site and the edge of the clearing marking the purple trail from figure 12 pines

Figure 17 Constrution waste dump site on the side of the purple trail.

While if this was a private land holding, the current landowners may have a claim of adverse possession. In cases of municipal landownership in the state of Rhode Island adverse possession cannot be applied to public land holdings. The town should conduct a survey of at least this southern boundary line to establish a know boundary line. Once a known boundary is established, it should be monumented and recorded to avoid further boundary encroachment issues.

If it is established that there has been encroachment, remediation of the area should be conducted with plantings to mirror the existing forest landscape, removal of any structures and return soil conditions to a natural state. More specific recommendations will be outlined in the forest stand description for stand one (Appendix VI).

All lines should be delineated with blazes and paint. These blazes should be refreshed every 5-7 years, or prior to any timber harvest or forest management activity.

The Future of the Land

This Stewardship Plan is being developed as part of a watershed protection initiative. Since the land holding is owned by the Town of Cumberland, it is reasonable to assume that the parcel will remain as a town asset in perpetuity. The future of this property will likely remain as it is now, a green space for recreation. As development continues to take place in this region this property will remain an important greenspace for future generations.

Cultural and Archeological Sites

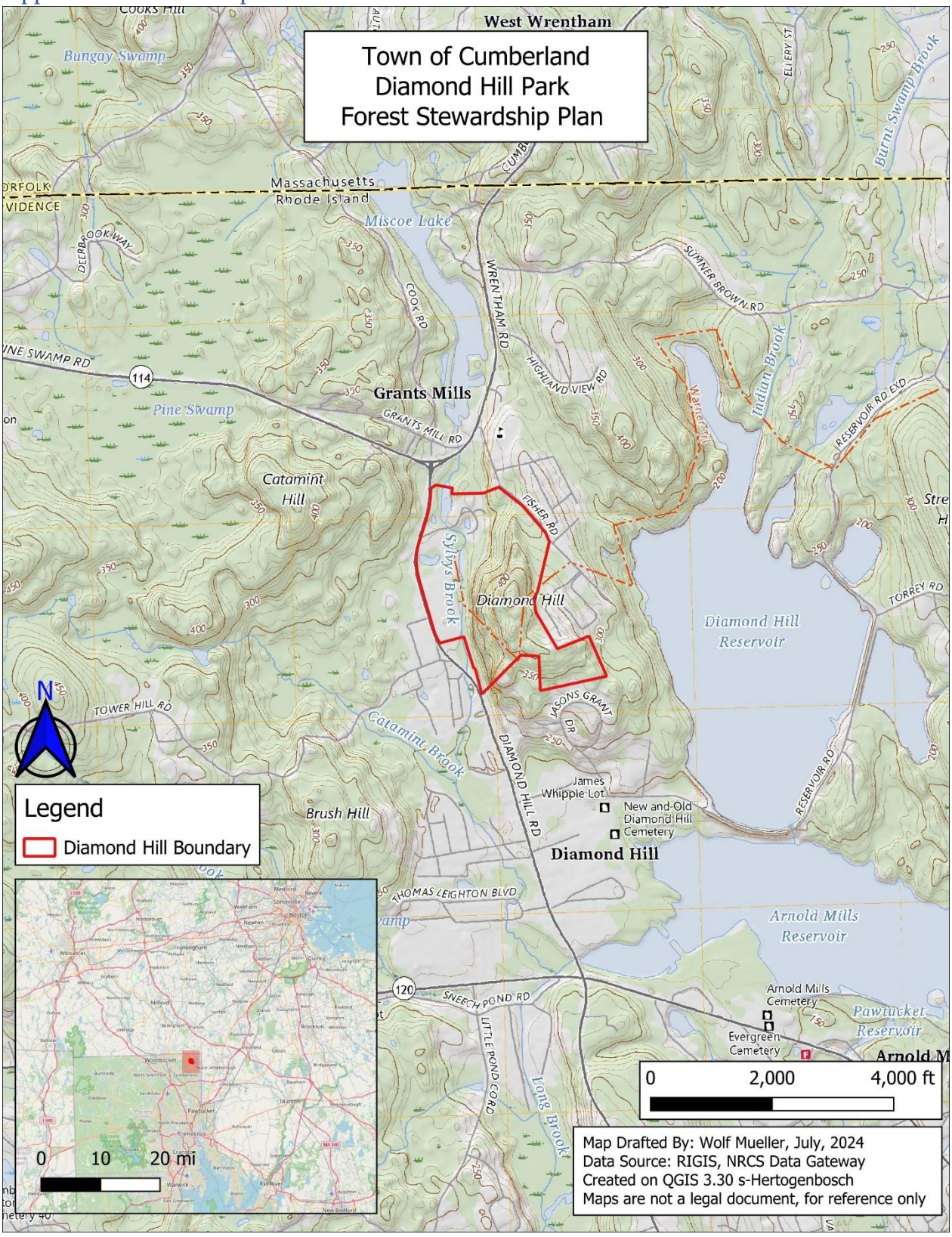
Little evidence of property use pre 1933 exists, the lowland areas of the park that are now sports fields and open space were likely used for agriculture in the past. The current forested portion of the property likely never was cultivated for crops or grazing due to the poor soils and steep hill exposures.

Included in this plan are specific descriptions for each of the forest stands that are delineated on the forest stand map. These stands were determined through variations in soils, species, and size or density classes. The recommendations are based upon existing conditions and the landowner's objectives, and an activity summary is provided for the first ten (10) years of this management plan.

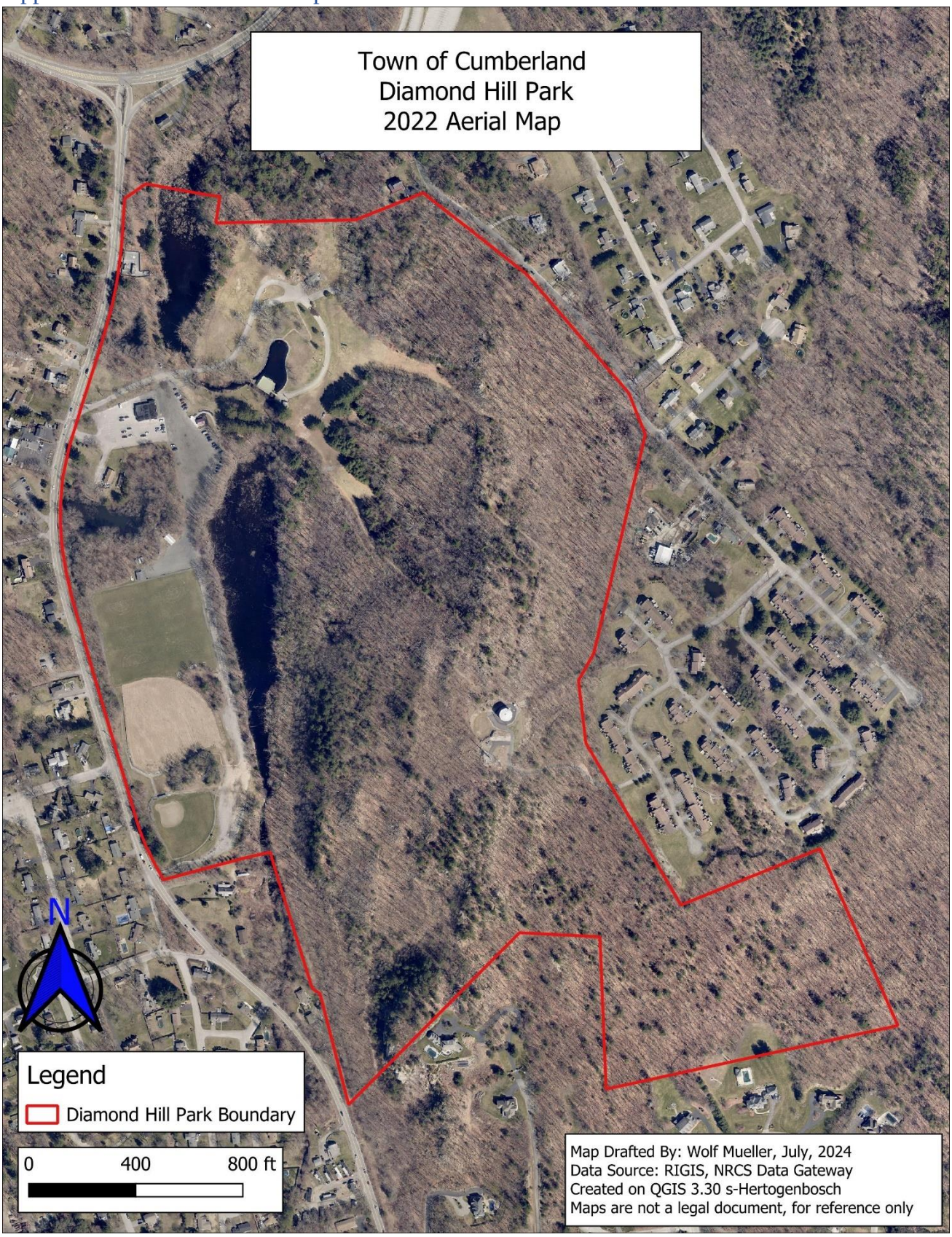
The balance of this plan consists of site maps and a forest stand map, along with specific descriptions for each of the forest stands that are delineated on the forest stand map. These stands were determined through variations in soils, species, and size or density classes. The management recommendations for each stand are based upon existing conditions, the landowner's objectives, and the future desired condition of the stand. An activity summary is provided for the first ten (10) years of this management plan.

Maps & Visuals

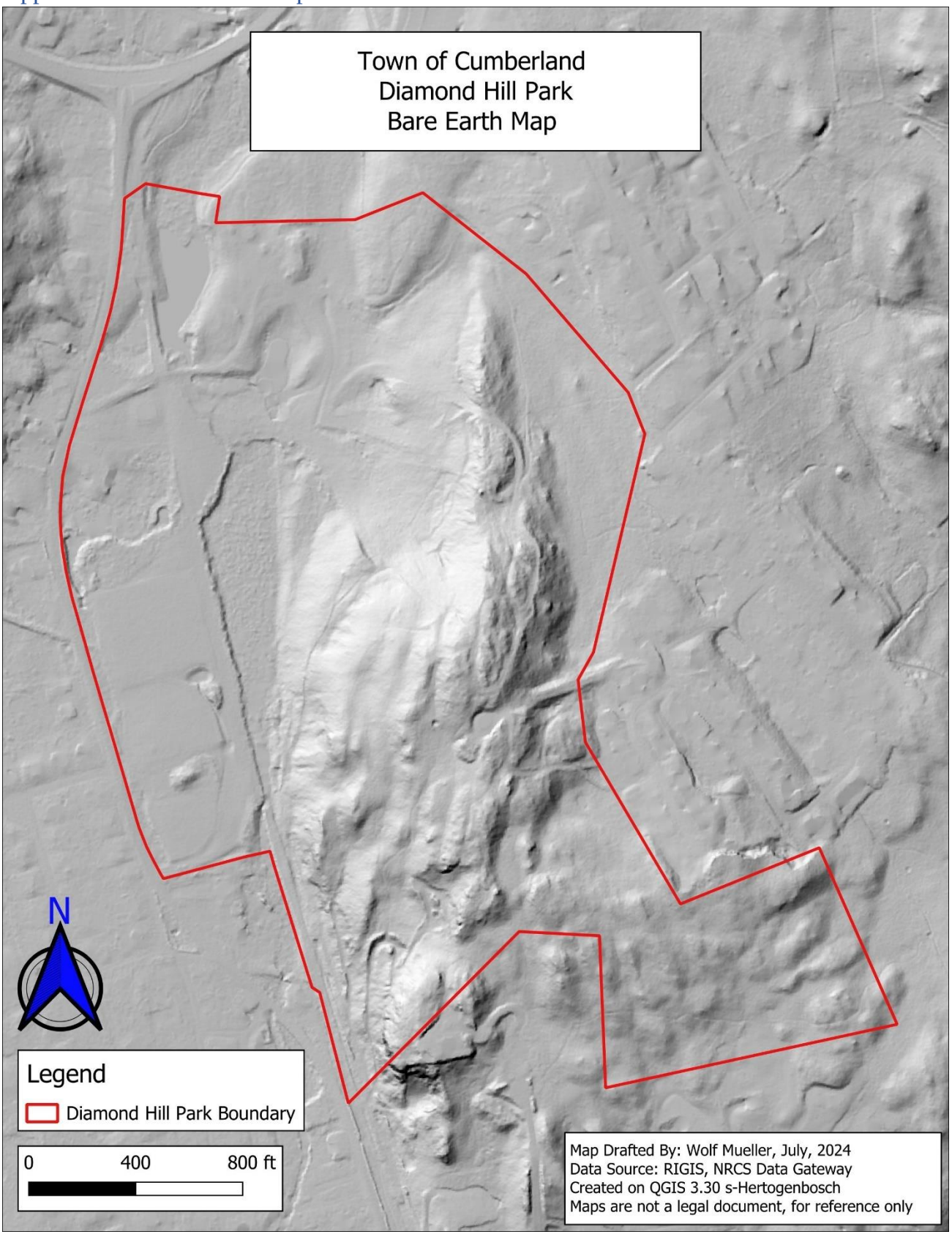
Appendix I: Locus Map



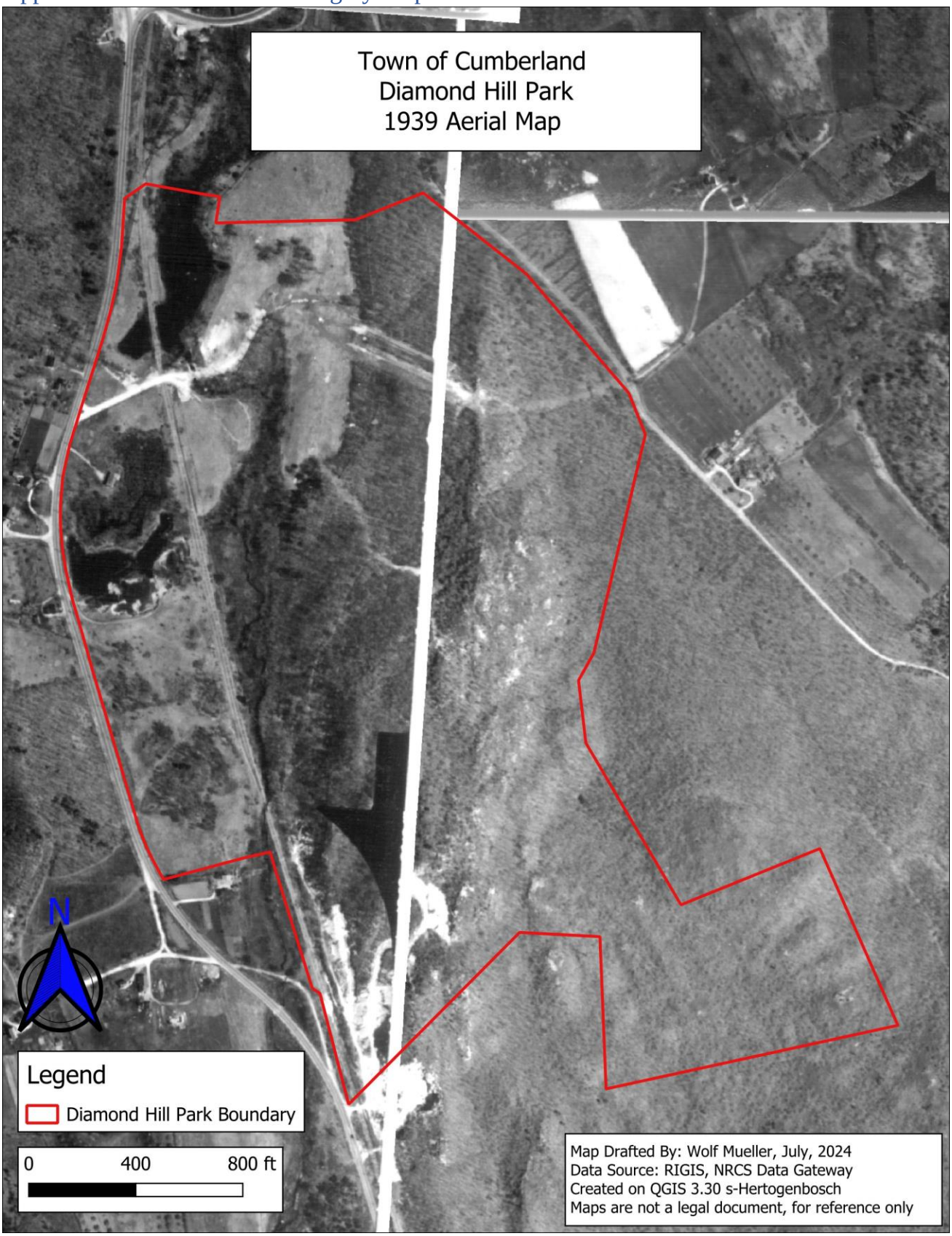
Appendix II: Aerial Visual Map



Appendix III: Bare Earth Map

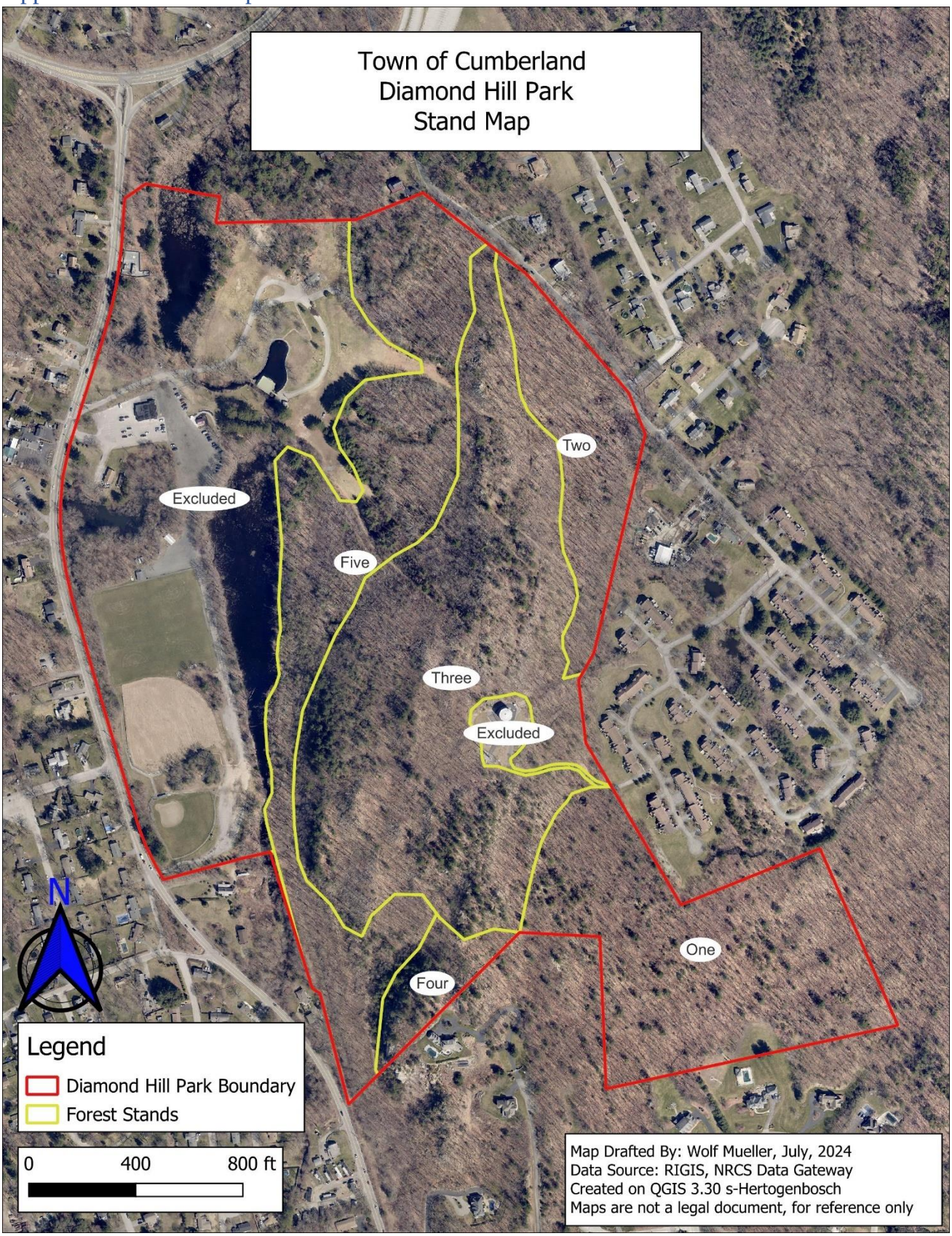


Appendix IV: 1939 Aircraft Imagery Map

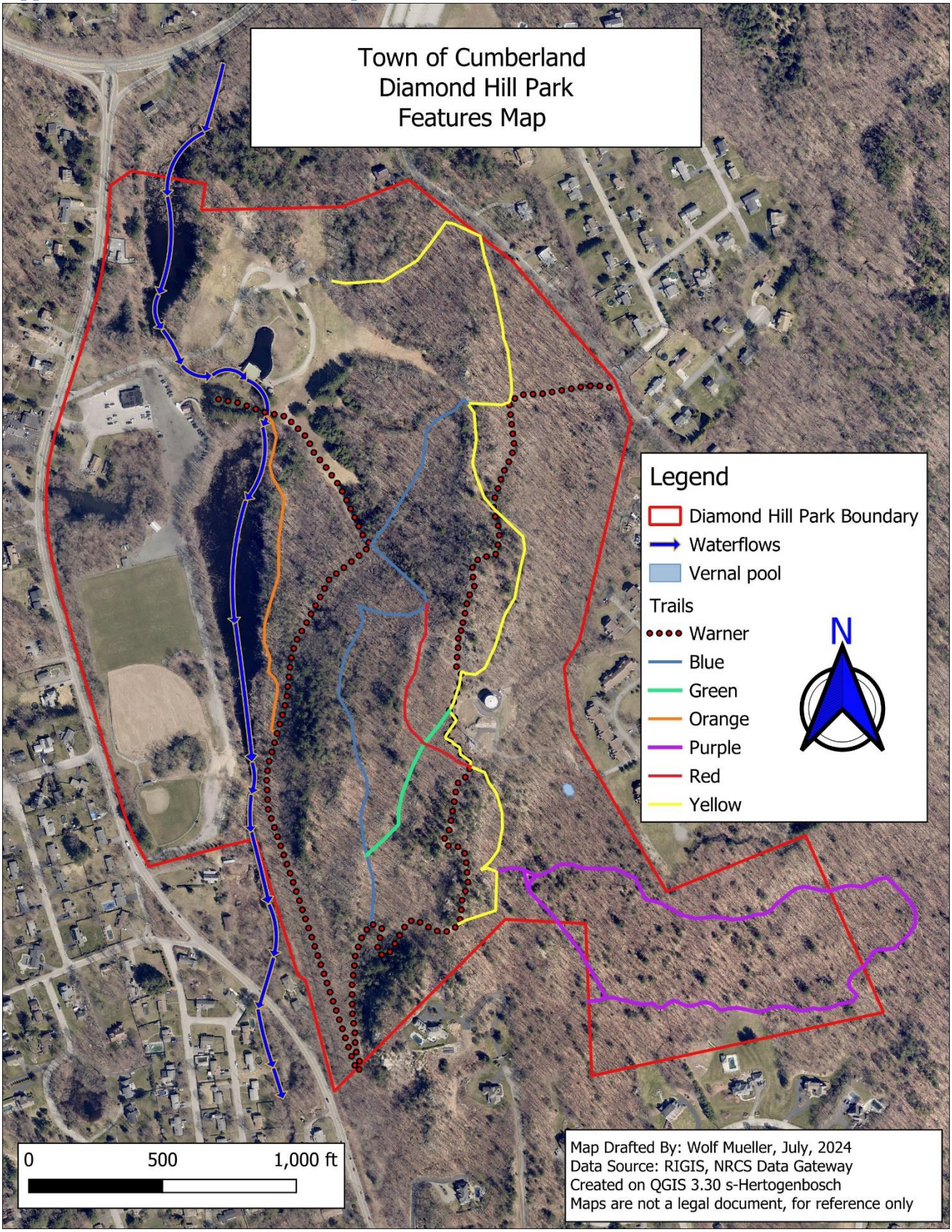


Appendix V: Topographic Map

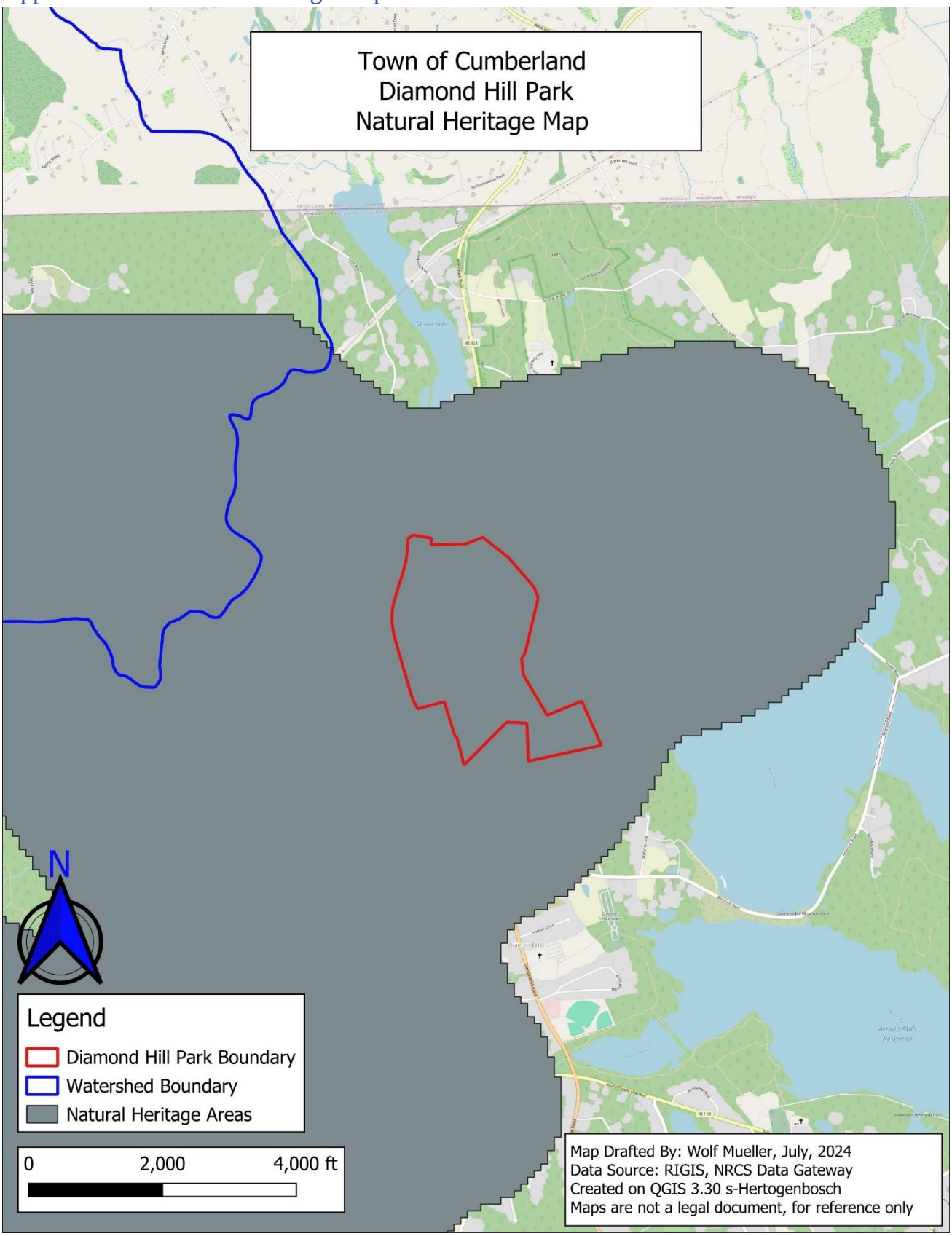
Appendix VI: Stand Map



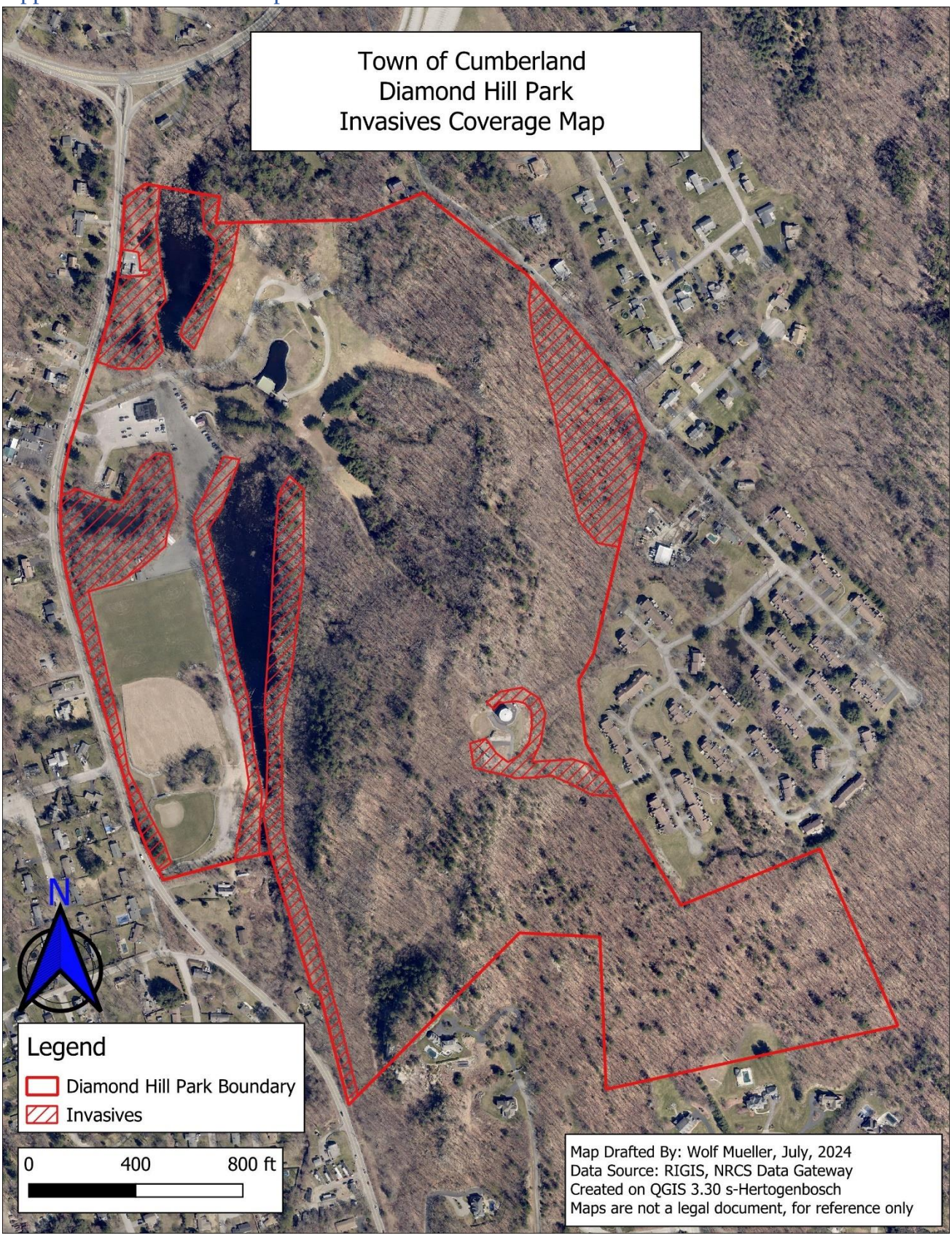
Appendix VII: Forest Features Map



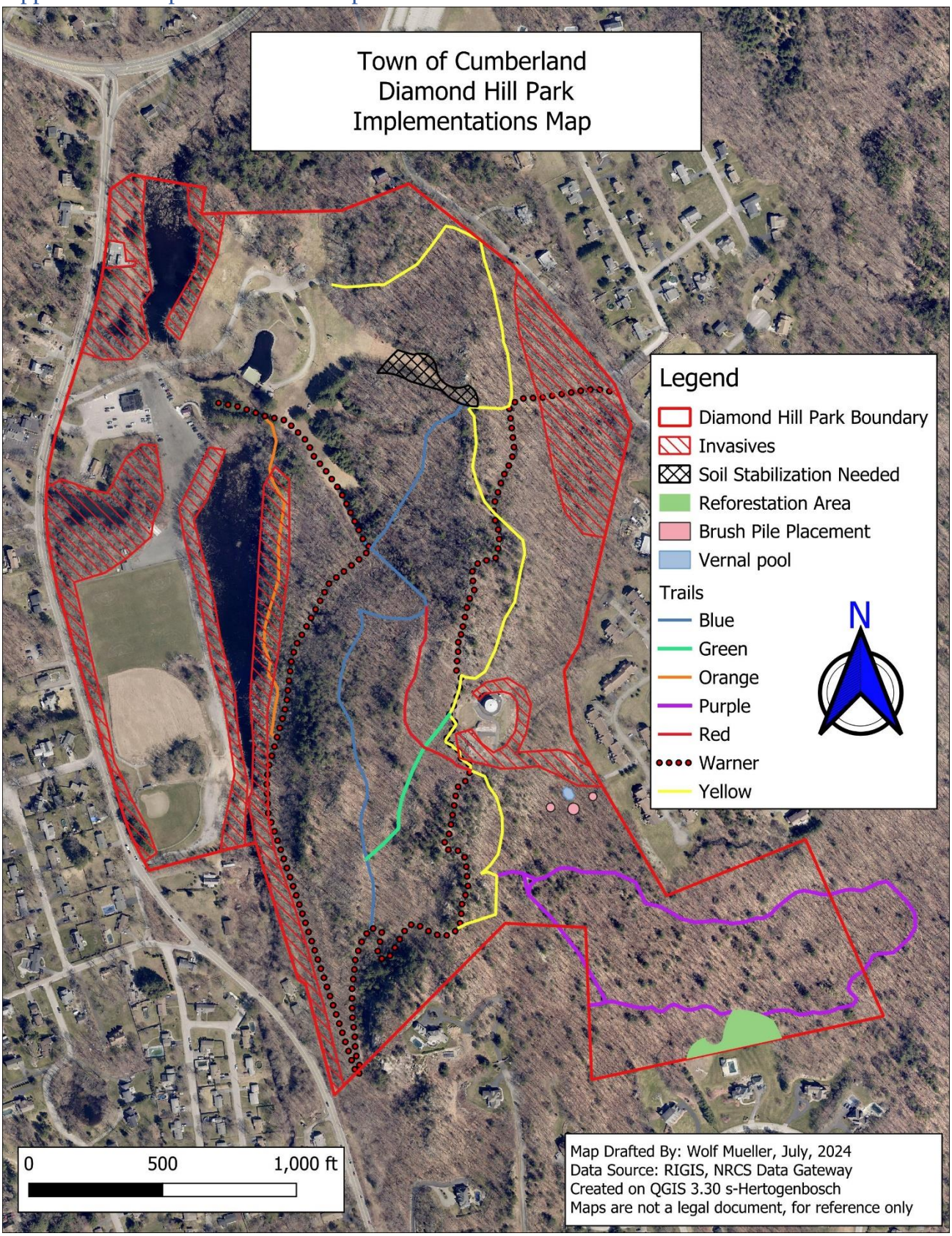
Appendix VIII: Natural Heritage Map



Appendix IX: Invasive Map



Appendix X: Implementations Map



Stand Descriptions

Landowners: Town of Cumberland RI Cumberland, RI

Stand One

Acres: 19.5 Type: Upland Hardwoods

MANAGEMENT OBJECTIVES: Protect water quality and provide opportunities for recreation.

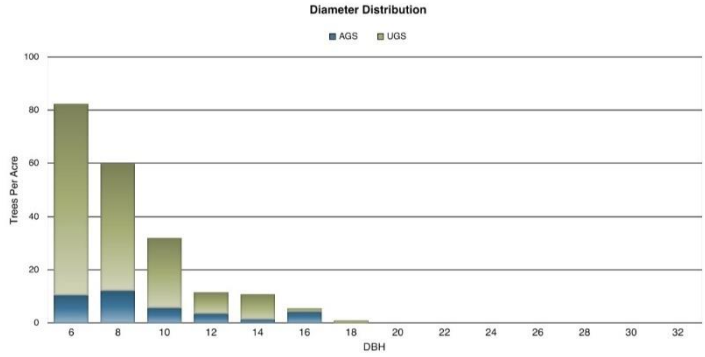
STOCKING DATA

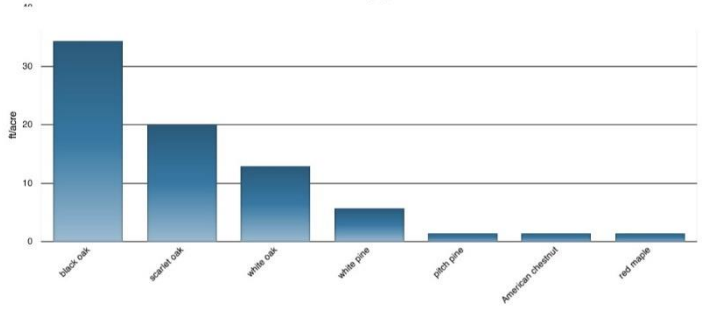
BASAL AREA/ACRE: 77.1 sqft #TREES/ACRE: 202.9 DBH: 8.3“

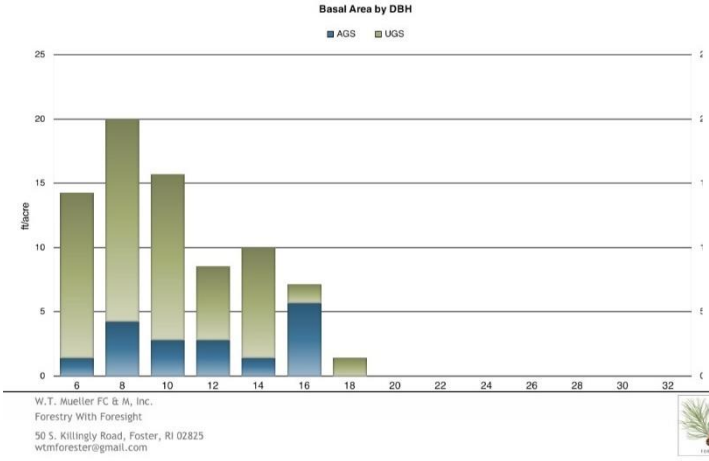
STOCKING LEVEL: 72% (b-level = 58)

SOIL TYPE: Canton-Charlton-Rock outcrop complex, Paxton fine sandy loam

SITE INDEX: Northern red oak = 52, 68







STAND DESCRIPTION:

This stand is situated on the southwest facing aspect of the property sandwiched between the Ski Valley housing development and Jason Grant Drive. The elevation of the stand shifts from its highest point on the western edge of the stand at 410 feet above MSL to 300 feet MSL on the eastern edge of the stand. Some portions of the stand have abrupt changes in elevation with trails. In some cases, trails do not follow contours of the hillsides, instead they traverse directly down the exposed slopes.

Generally, the soils of this stand are shallow dry and well drained with exposed rock. This soil condition combined with the southeastern aspect results in the driest soil conditions of the entire property. The lack of soil moisture is likely a contributing factor for this stands higher

mortality. Soil conditions also contribute to the abnormally high amounts of undesirable growing stock. The neighboring property has access right up to the eastern boundary of the stand via the continuation of the purple trail, road access from Jason Grant Drive and Ski Valley. These access points could all provide access in case of a wildfire event or search and rescue situations.

The overstory is comprised of upland hardwoods mainly black, scarlet, and white oak, red maple, white pine, and pitch pine.

Combined oaks account for 87 percent of stand composition. These stems are distributed across the 6-to-10-inch size classes with a wide range of stem size and quality. This stand resembles a fire dependent ecosystem that has had fire removed from the landscape, historically was a pine barren or savannah forest type is now dominated by pole-sized scrub oak.

Red maple, white pine, and pitch pine occupy the rest of the stands growing space. These stems are also generally all poorly formed trees covering the 10-to-15-inch size classes. Most of these stems are considered undesirable growing stock and hold little potential for productive future growth.

Accounting for less than one percent of stand composition was American chestnut saplings that were recorded acting as legacy trees for what at one point would have been a mature chestnut pre blight in 1901.

The proportion of Unacceptable Growing Stock (UGS, or trees that will never develop into sawtimber) is relatively high, at about 80% of the total growing stock, due to the amount of poorly formed and suppressed hardwoods in the stand. The recent in-growth of the white pine into the mid-story of the stand and the mortality from the spongy moth infestation has contributed to the proportion of UGS.

Patches of this stand's understory thickets of mountain laurel, white pine, and high bush and low bush blue berry which are all excellent wildlife cover especially ground nesting birds. Plenty of the stand still has a very open understory with minimal regeneration due to the heavy browsing from white-tailed deer.

Recreational Opportunities:

This stand is an excellent area for wildlife viewing, foraging, and woods walks. The purple trail loops through the entire stand providing the necessary access to enjoy this portion of the park. Camping would not be advised and the risk of fire in this stand is higher than the rest of the general property due to the soil and the scrubby understory.

Habitat & Wildlife:

The cavity trees and snags lend themselves as proverbial wildlife condominiums for everything from flying squirrels, woodpeckers, and birds of prey. Future regeneration relies on preventing the aggressive browsing of white-tailed deer. Near by edge habitat along residential yards also creates some habitat diversity which will be utilized by wildlife especially those generalist; such as foxes, coyotes, white-tailed deer, eastern cotton-tail, and fishers.

Important Natural Features:

The vernal pool located right next to the cell tower access road is this stand's only wetland feature and provides important habitat to forest amphibians which utilize ephemeral wetlands. These wetlands provide important breeding habitat, and this specific one was still holding water in June during a heat wave where air temperature was reaching 90 degrees Fahrenheit.

Desired future condition

Future conditions should mirror the current forest composition while stabilizing trails from erosion. With continued browse pressure from deer, it is likely more pine will be established in this stand over the coming decades.

This stand contains the possible area of encroachment, if there is an actual encroachment the area effected should be replanted and returned to a condition similar to the rest of the stand. Plantings should be protected to prevent browsing from wildlife and monitoring should take place to ensure the success of restoration work.

Stand Volumes

SPECIES COMPOSITION	BA		TPA	AVG DBH	AVG MHT	VOLUME PER ACRE MBF	VOLUME PER ACRE CORDS	TOTAL STAND VOLUME MBF	TOTAL STAND VOLUME CORDS
	77.1		202.9	8.3	14.9	0.77	8.20	15.06	159.83
black oak	34.3	44.5%	78.7	8.9	15.0	0.28	3.53	5.41	68.86
scarlet oak	20.0	25.9%	38.6	9.7	16.0	0.28	2.18	5.54	42.50
white oak	12.9	16.7%	57.2	6.4	14.2		1.55		30.30
white pine	5.7	7.4%	9.4	10.5	20.0	0.10	0.71	1.99	13.78
pitch pine	1.4	1.9%	1.2	15.0	16.0	0.11		2.11	
American chestnut	1.4	1.9%	7.3	6.0	16.0		0.23		4.40
red maple	1.4	1.9%	10.5	5.0	8.0				

MANAGEMENT ACTIVITY RECOMMENDATIONS:

Utilize waterbars to stabilize trails which are actively eroding on the steepest slopes in accordance with RIBMP's. Address the trail markers that are currently detaching themselves from trees, and work on discouraging use of goat paths that are not marked trails.

Enhance areas around the vernal pool with smaller 10x10 foot brush piles and leave coarse woody debris in contact with the ground for habitat.

Conduct a survey and monument property boundary lines, develop a plan to mark and maintain these boundaries every five to seven years.

Restore the area of encroachment with black and scarlet oak, and pitch pine. Plant native understory plants such as sweet fern, huckle berry and low bush blueberry. In the process of restoration monitor and address any invasive nonnative plants that become established in the restoration area.

A current community of nonnative invasive plants can be found on the disturbed edges of the access road and pad site for the cell tower at the northern edge of the stand. Efforts should be made to stop the spread and remove current invasive plants in this area from the landscape.

While dead standing timber can make high quality wildlife habitat, all trees that are dead and dying within striking distance of established trails should be felled and left in contact with the forest floor.

Stand Two

Acres: 8

Type: Northeast Hardwoods

MANAGEMENT OBJECTIVES: Protect water quality and provide opportunities for recreation.

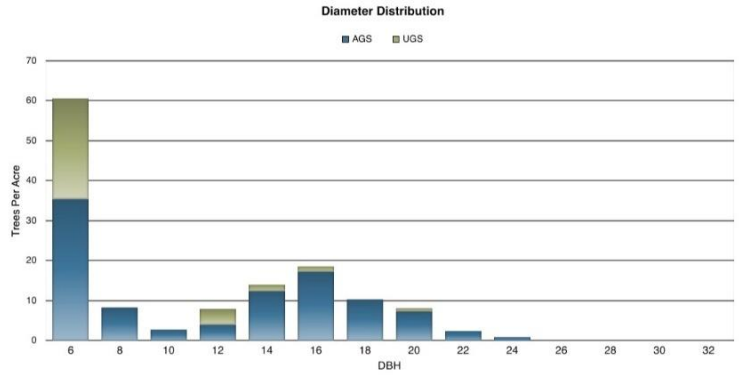
STOCKING DATA

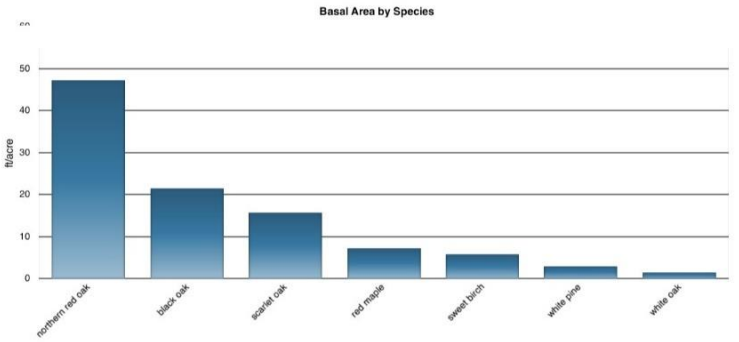
BASAL AREA/ACRE: 101.4 sqft #TREES/ACRE: 133.3 DBH: 11.8“

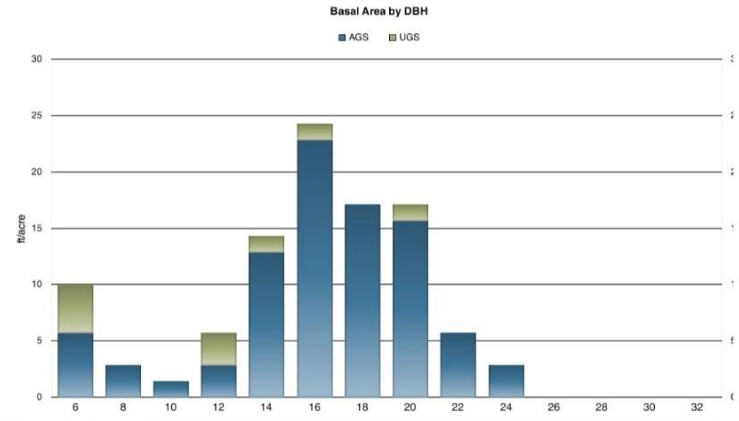
STOCKING LEVEL: 82% (b-level = 58)

SOIL TYPE: Sutton fine sandy loam, Canton and Charlton fine sandy loams

SITE INDEX: Northern red oak = 52, 62







STAND DESCRIPTION:

This is the easternmost stand of the park on the flat lowlands along Fisher Road. This stand creates a natural drainage ditch along the road and against the main hill which comprises stand three. Water drains in a northerly path and into the northern section of stand five. The forest composition is consistent across the stand with some of the highest quality trees in the entire park. The soils of the stand are higher quality compared to stand one with better soil moisture availability and a robust organic layer still intact. This is attributed to the lack of extreme slope within the stand.

The overstory is comprised of northeast hardwoods, mainly northern red oak, black oak, scarlet oak, red maple, sweet birch, white pine, and white oak.

Combined oaks account for 85 percent of stand composition. These stems are

distributed across the 14-to-18-inch size classes, with a range of high-quality stems. These stems are ideal for mast production for wildlife and seed source for regeneration in the future.

Red maple, white pine, and sweet birch are similarly represented in the stand filling most of the available growing space where oak mortality from the spongy moth defoliation occurred. These stems capture the remaining percentage of growing space and are found in the 4-8-inch size class. These stems represent a second age class of trees comprising the understory stratum. Given the opportunity these trees will become the second generation of forest if the overstory declines for any reason. The limited diversity of the dominate canopy means that if a forest pest that affects oak species moves into this stand it could have amplified effects on forest health.

The understory components included Indian pipe, maple leaf viburnum, witch hazel, princess pine, blue berry, sweet fern, and cool weather grasses. Tree regeneration present includes white pine, sassafras, red maple, white and red oak.

The proportion of Unacceptable Growing Stock (UGS, or those trees that will never develop into sawtimber) is acceptable, at about 5% of the total growing stock.

The most glaring issue within this stand is the presence of invasive plants in the wetland drainage with glossy buckthorn, phragmites, oriental bittersweet, Japanese bar berry, and multiflora rose all noted along the high-quality soils. The high-quality soil and pockets of mortality have allowed these invasive plants to establish a foot hold and spread through a considerable area of the stand.

Recreational Opportunities:

This stand would be an excellent area for wildlife viewing, foraging, and woods walks. Formal access is gained by both the yellow and warner trail. These trails connect to Fisher Road with different entry points along the roadway.

Habitat & Wildlife:

The open understory provides little cover for wildlife. The majority of this stand will used by wildlife browsing for food. Dead snags provide perching opportunities for birds of prey to hunt rodents and amphibians inhabiting the ephemeral stream. With the frequency of use by recreational hikers' wildlife may be hesitant to use this area as a bedding site favoring less trafficked areas in the general vicinity.

Important Natural Features:

The ephemeral streams edge remains the most sensitive ecological feature of this stand. Most potential botanical species of concern are most likely to be found along this corridor. Maintaining a shaded wetland corridor and controlling soil erosion from elevated areas are imperative to maintaining the health of the existing wetland.

Desired future condition

A reduction in the concentration of invasive plants over the next 10 years is the top priority for the future of this stand. Stabilization of trails if any erosion is occurring according to RIBMP's guidelines. Ideally the invasive plant will be removed from the landscape and soils will be stabilized ensuring the health of the riparian zone.

Stand Volumes

SPECIES COMPOSITION	BA		TPA	AVG DBH	AVG MHT	VOLUME PER ACRE MBF	VOLUME PER ACRE CORDS	TOTAL STAND VOLUME MBF	TOTAL STAND VOLUME CORDS
	101.4		133.3	11.8	19.6	7.58	2.99	60.60	23.89
northern red oak	47.1	46.5%	33.0	16.2	22.1	4.28	0.58	34.21	4.67
black oak	21.4	21.1%	14.9	16.2	19.7	1.92		15.38	
scarlet oak	15.7	15.5%	12.2	15.4	21.8	1.27	0.43	10.15	3.48
red maple	7.1	7.0%	46.0	5.3	16.0		0.45		3.61
sweet birch	5.7	5.6%	14.6	8.5	20.0		0.93		7.46
white pine	2.9	2.8%	11.4	6.8	24.0		0.58		4.68
white oak	1.4	1.4%	1.2	15.0	16.0	0.11		0.87	

MANAGEMENT ACTIVITY RECOMMENDATIONS:

Utilize waterbars to stabilize trails which are actively eroding on the steepest slopes in accordance with RIBMP's. Address the trail markers that are currently detaching themselves from trees, and work on discouraging use of goat paths that are not marked trails.

A current community of nonnative invasive plants can be found on the disturbed edges of the road and wetland drainage along the western edge of the stand. Efforts should be made to stop the spread and remove current invasive plants in this area from the landscape.

While dead standing timber can make high quality wildlife habitat, all trees that are dead and dying within striking distance of established trails should be felled and left in ground contact with the forest floor.

Locate property boundaries and maintain them every five to seven years.

Stand Three

Acres: 35

Type: Oak hardwoods

MANAGEMENT OBJECTIVES: Protect water quality and riparian habitat.

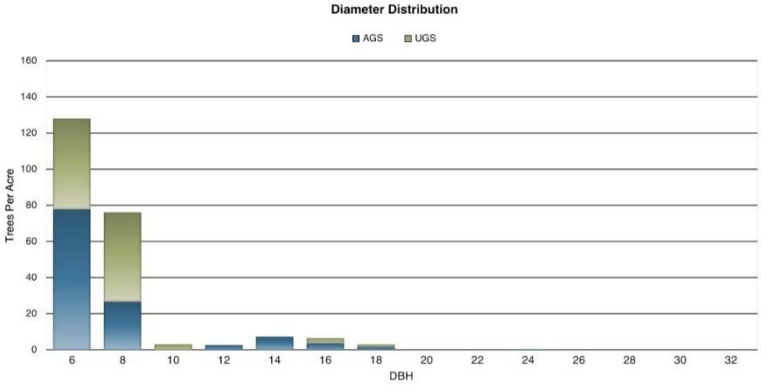
STOCKING DATA

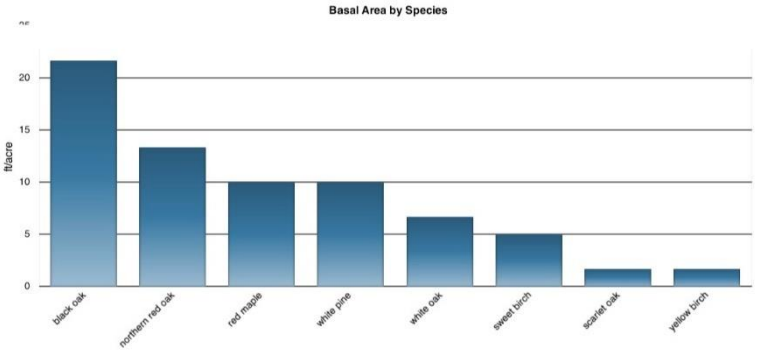
BASAL AREA/ACRE: 70 sqft #TREES/ACRE: 227 DBH: 7.5“

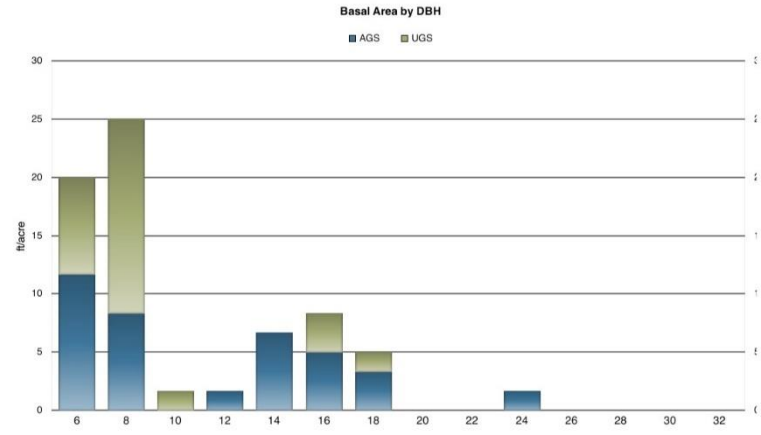
STOCKING LEVEL: 68% (B-level = 56%)

SOIL TYPE: Rock outcrop-Canton complex, Canton-Charlton-Rock outcrop complex

SITE INDEX: Northern red oak = 52, 65







STAND DESCRIPTION:

This section of the park spans the main comb of elevation that comprises the physical Diamond Hill. At 35 acres it is the largest forest stand with the most complex topography and soils. The base elevation of the stand is 220 feet above MSL and a maximum elevation of 470 feet plus MSL (the crest of Diamond Hill). Soils range from exposed rock outcroppings on the highest elevations and where slope is extreme. Limited retained organic layer is present across the stand, with most exposed soil being rocky exposed subsoil and gravel. Water from this stand is either distributed east or west depending on the aspect of the hill on which rain falls. The western aspect drains into Sylvys Brook while the eastern aspect drains into the Diamond Hill Reservoir.

The overstory is comprised of black, red, white, and scarlet oaks with components of red maple, white pine, sweet

and yellow birch, mostly growing in poor quality in extremely shallow soils.

All oaks account for 62 percent of stand stocking with mostly low-quality stems. The stems occupy the 6-to-16-inch size classes. The majority of these juvenile stems are considered UGS as this stand approaches a stocking level where competition begins to cause mortality. These stems will hopefully be some of the first stems to decline leaving a higher quality timber reserve.

Red maple is another species found in the 6-to-10-inch size class with similar quality to the aforementioned oak timber. These stems are found in parts of the stand with some organic layer. While many of the stems are poorly formed, they help in retaining the surface organic layer and are important to the stand's future in this capacity.

White pine is found around the rock out cropping and shallow sandy soils, often in conjunction with the oak timber. These stems are found in a range of diameters in the young pole stage with an average of 7.5 inches. These stems help provide species diversity that is lacking in stand one and increases the habitat carrying capacity of stand three. White pine accounts for roughly 15 percent of the stands stocking.

Yellow and sweet birch are the last component of the stands stocking accounting for just under 10 percent of stand stocking combined. These stems are in the mean size class of 6 inches and are mostly an understory component. Understory components not recorded in the inventory process were, huckleberry, witch hazel, maple leaf viburnum, and American chestnut.

The proportion of Unacceptable Growing Stock (UGS, or those trees that will never develop into sawtimber) is high, at about 37% of the total growing stock, due to the amount of poorly formed and suppressed hardwoods in the stand due to shallow poor soil.

The most glaring issue with this stand is the severely eroded recreational trails that create a patch work of access for the stand.

Recreational Opportunities:

This stand is an excellent area for wildlife viewing and for observing forestland features. With its several overlooks and recreational trails this stand experiences heavy foot and mountain bike traffic. Access in some areas may be challenging for those with limited physical capacity due to the condition of some trails and slope.

Habitat & Wildlife:

Being the core of this park's forest, this stand is used by a wide variety of wildlife for feeding, breeding and bedding. The topographic features like the rock cliff faces are ideal nesting habitat for peregrine falcons and other birds of prey.

Important Natural Features:

The rock cliff faces provide a habitat type that is not terribly common for the state of Rhode Island. These cliff faces provide an opportunity for wildlife, plants and other organisms that are most competitive in these specific environments.

Desired future condition

Future conditions should mirror the current forest composition while stabilizing trails from erosion. With continued browse pressure from deer, it is likely more pine will be established in this stand over the coming decades. Due to the slope mortality should be limited since soil stabilization is paramount in these environments. If possible, mark trails in this stand as clearly as possible and encourage end users to stick to trails to avoid further soil erosion.

Stand Volumes

SPECIES COMPOSITION	BA		TPA	AVG DBH	AVG MHT	VOLUME PER ACRE MBF	VOLUME PER ACRE CORDS	TOTAL STAND VOLUME MBF	TOTAL STAND VOLUME CORDS
	70.0		227.0	7.5	16.2	1.31	5.87	46.01	205.30
black oak	21.7	31.0%	75.1	7.3	16.6	0.37	1.41	12.96	49.34
northern red oak	13.3	19.0%	18.5	11.5	17.0	0.82	0.48	28.57	16.90
red maple	10.0	14.3%	48.7	6.1	16.0		0.98		34.23
white pine	10.0	14.3%	32.5	7.5	18.7	0.13	1.40	4.48	49.02
white oak	6.7	9.5%	19.1	8.0	10.0		0.65		22.74
sweet birch	5.0	7.1%	23.2	6.3	16.0		0.48		16.90
scarlet oak	1.7	2.4%	1.4	15.0	16.0		0.20		6.96
yellow birch	1.7	2.4%	8.5	6.0	16.0		0.26		9.21

MANAGEMENT ACTIVITY RECOMMENDATIONS:

Utilize waterbars to stabilize trails which are actively eroding on the steepest slopes in accordance with RIBMP's. Address the trail markers that are currently detaching themselves from trees, and work on discouraging use of goat paths that are not marked trails.

While dead standing timber can make high quality wildlife habitat, all trees that are dead and dying within striking distance of established trails should be felled and left in ground contact with the forest floor.

Locate property boundaries and maintain them every five to seven years.

Stand Four

Acres: 3 Type: Mixed Woods

MANAGEMENT OBJECTIVES: Maintain forest health and high-quality wildlife habitat.

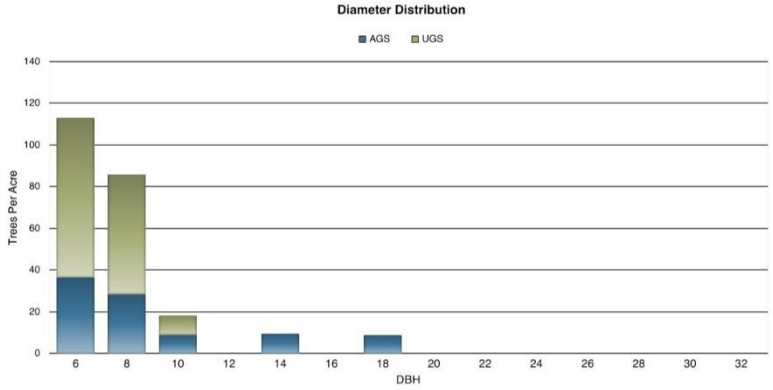
STOCKING DATA

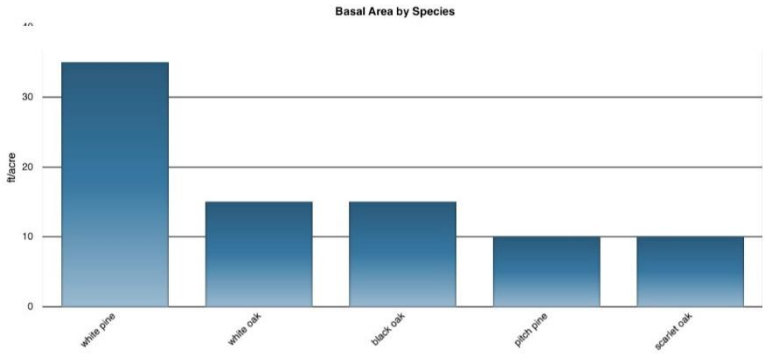
BASAL AREA/ACRE: 85 sqft #TREES/ACRE: 235.5 DBH: 8.1“

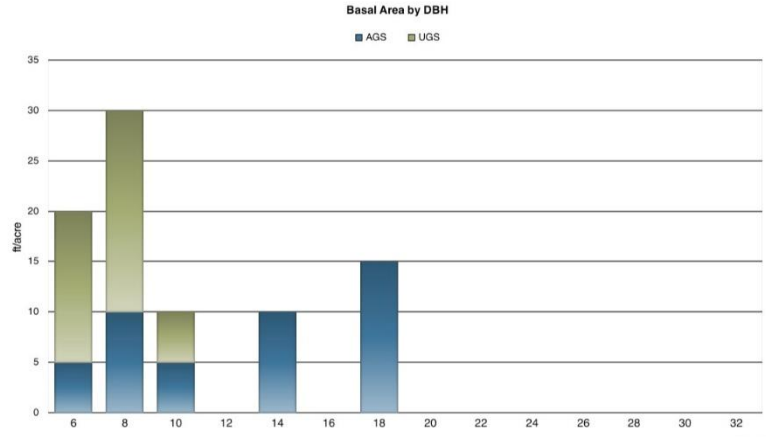
STOCKING LEVEL: 45% (B-level=52)

SOIL TYPE: Rock outcrop-Canton complex

SITE INDEX: Eastern white pine = Unavailable







STAND DESCRIPTION:

Stand four is the smallest stand of the property which covers a rock cliff face at the southwestern boundary. Access to the stand can be gained from an adjacent private residence of from a goat path that branches off the Warner Trail.

The overstory is comprised of Mixed woods mainly Eastern white and pitch pine, black, white, and scarlet oaks.

White pine is the most dominant single species on the stand level, accounting for 41 percent of the stands stocking. Most of these stems are found in the small saw log with a mean diameter of 11 inches with varying quality.

Combined oaks account for 46 percent of stand composition. These stems are distributed across the 6-to-8-inch size classes with a range quality. These stems are ideal

for mast production for wildlife and seed source for regeneration in the future.

The proportion of Unacceptable Growing Stock (UGS, or those trees that will never develop into sawtimber) is acceptable, at about 70% of the total growing stock, due to the amount of poorly formed and suppressed white pine in the stand.

The understory is comprised of white oak, pitch pine, low bush blueberry, sweet birch, and pink lady slipper.

Recreational Opportunities:

This stand would be an excellent area for wildlife viewing, foraging, and woods walks. The top of the stand has an open cliff which makes for an excellent overlook of the park and sports fields.

Habitat & Wildlife:

The cavity trees and snags lend themselves as proverbial wildlife condominiums for everything from flying squirrels, woodpeckers, and birds of prey. Future regeneration relies on preventing the aggressive browsing of white-tailed deer. Forest edge from the neighboring yard is also a component of this stands carrying capacity.

Important Natural Features:

This stand hosts pink lady slipper which is a species of orchid native to the northeastern US. The site requirements for growth of lady slipper is highly specific so presence of just one on the landscape is a significant indication for the area.

Desired future condition

This stand can remain as it is since it already hosts the appropriate conditions for sensitive plant communities and is a relatively small stand. Minimal inputs need to be made moving forward.

Stand Volumes

SPECIES COMPOSITION	BA		TPA	AVG DBH	AVG MHT	VOLUME PER ACRE MBF	VOLUME PER ACRE CORDS	TOTAL STAND VOLUME MBF	TOTAL STAND VOLUME CORDS
	85.0		235.5	8.1	15.7	2.32	7.04	6.95	21.11
white pine	35.0	41.2%	52.8	11.0	19.4	2.32	1.43	6.95	4.29
white oak	15.0	17.6%	65.3	6.5	16.0		1.39		4.18
black oak	15.0	17.6%	49.0	7.5	10.7		1.34		4.01
pitch pine	10.0	11.8%	39.8	6.8	16.0		1.49		4.46
scarlet oak	10.0	11.8%	28.6	8.0	16.0		1.39		4.18

MANAGEMENT ACTIVITY RECOMMENDATIONS:

Conduct a survey and monument property boundary lines, develop a plan to mark and maintain these boundaries every five to seven years.

Utilize waterbars to stabilize trails which are actively eroding on the steepest slopes in accordance with RIBMP's. Address the trail markers that are currently detaching themselves from trees, and work on discouraging use of goat paths that are not marked trails.

Stand Five

Acres: 22.5 Type: Mixed Woods

MANAGEMENT OBJECTIVES: Maintain forest health and high-quality wildlife habitat.

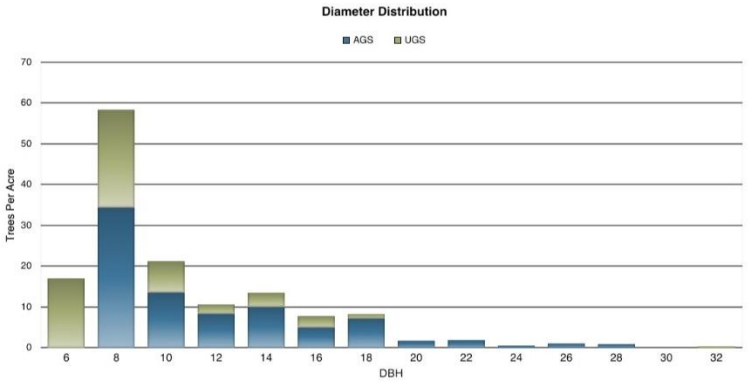
STOCKING DATA

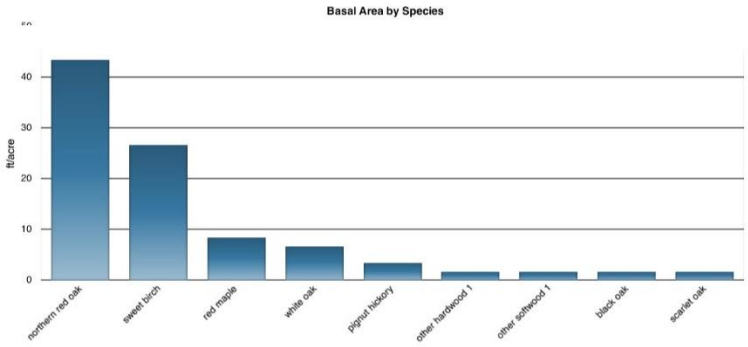
BASAL AREA/ACRE: 95 sqft #TREES/ACRE: 142.8 DBH: 11.0“

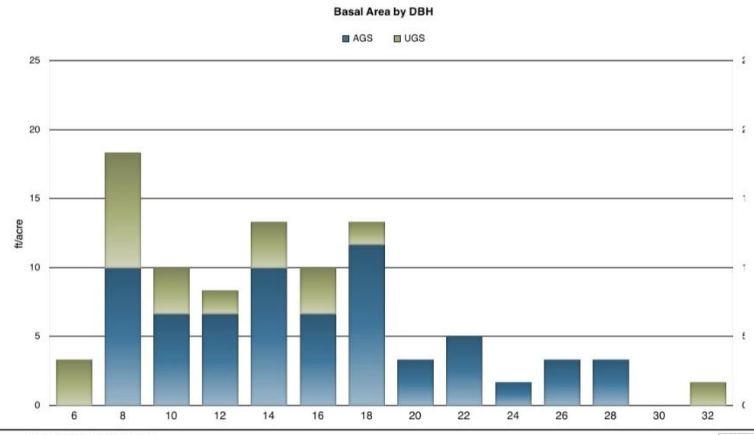
STOCKING LEVEL: 79% (B-level=58)

SOIL TYPE: Canton and Charlton fine sandy loams

SITE INDEX: Northern red oak = 65







STAND DESCRIPTION:

This stand occupies the lower western slopes of Diamond Hill and the forested flood plain of Sylvys Brook. Access to the stand is gained via the Orange, Yellow, and Warner Trail. This stand also encompasses the abandoned ski slopes, the open recreational fields around the amphitheater and, the new bike pump track. Boundaries of the stand are marked by either a transition in forest type, chain link fence or no monumentation in some cases. The soils of this stand are of higher productive and moderately well drained. This soil condition combined with the gentle western aspect result in productive growth conditions. The aspect with the favorable soils ensures less fluctuation in surface temperature and soil moisture resulting in a stand level mortality that was half of stand one.

The overstory is comprised of northeast hardwoods red oak, sweet birch, red maple, white oak, pignut hickory, black and scarlet oak, basswood, and Norway maple.

Northern red oak is the most dominant single species on the stand level, accounting for 46 percent of the stands stocking. Most of these stems are found in the intermediate saw log size class with a mean stand diameter of 15 inches at DBH with high quality stems. Sweet birch accounts for 28 percent of stand composition. These stems are 8.5 inches on average with varying quality. Red maple is another dominant component of the overstory in this stand with a 9 percent representation of stem stocking covering the 10-to-14-inch size class. Most of these stems are considered undesirable growing stock. All other species (white oak, pignut hickory, basswood, Norway maple, black and scarlet oak, gray birch.) account for less than 25 percent of stocking total covering a wide range of size classes.

The proportion of Unacceptable Growing Stock (UGS, or those trees that will never develop into sawtimber) is acceptable, at about 25% of the total growing stock.

The understory is comprised of maple leaf viburnum, low bush blueberry, wild sarsaparilla, white pine, sugar maple, sweet and gray birch. Various invasive plants are scattered in the understory. The most concerning is Japanese barberry, which is found along the wetland edge and Norway maple along parts of the Warner Trail.

Recreational Opportunities:

This stand is an excellent area for wildlife viewing, foraging, and woods walks. This stand serves as the gateway to the rest of the park trails and sees the heaviest foot traffic. The trails are fairly accessible for this stand and most end users can utilize these trails.

Habitat & Wildlife:

The proximity of this stand to the stream bed, the wetland, and the areas of understory cover makes this well suited to support populations of wetland ground nesting birds. This stand would likely host northern waterthrush, wood ducks, and woodcock. The cavity trees and snags lend themselves as proverbial wildlife condominiums for everything from flying squirrels, woodpeckers, wood ducks, and birds of prey.

Important Natural Features:

Wetlands adjacent to this stand are the most sensitive areas present in the landscape. Buffering these areas appropriately in accordance with RIBMP’s is critical to ensure the health of those microclimates.

Desired future condition:

The stabilization of the surface erosion from the abandoned ski hill needs to occur. In concert with the hillside stabilization the invasive plants along the wetlands edge need to be treated. Ideally this stand will have no actively eroding areas with a limited amount of invasive present in the understory.

Stand Volumes

SPECIES COMPOSITION	BA		TPA	AVG DBH	AVG MHT	VOLUME PER ACRE MBF	VOLUME PER ACRE CORDS	TOTAL STAND VOLUME MBF	TOTAL STAND VOLUME CORDS
	95.0		142.8	11.0	17.3	5.00	5.61	112.56	126.15
northern red oak	43.3	45.6%	34.4	15.2	20.9	3.61	0.86	81.30	19.28
sweet birch	26.7	28.1%	67.3	8.5	16.0	0.37	2.94	8.28	66.25
red maple	8.3	8.8%	13.8	10.5	16.0	0.25	0.67	5.59	14.97
white oak	6.7	7.0%	7.7	12.6	20.0	0.30	0.52	6.71	11.65
pignut hickory	3.3	3.5%	6.9	9.4	12.0	0.12	0.14	2.68	3.13
other hardwood 1	1.7	1.8%	6.2	7.0	16.0		0.25		5.64
other softwood 1	1.7	1.8%	4.8	8.0	16.0		0.23		5.23
black oak	1.7	1.8%	0.8	20.0	24.0	0.18		4.04	
scarlet oak	1.7	1.8%	0.9	18.0	24.0	0.18		3.96	

MANAGEMENT ACTIVITY RECOMMENDATIONS:

Utilize waterbars or establish soil with erosion mats to stabilize the ski hill which is actively eroding on the steepest slopes in accordance with RIBMP's. Address the trail markers that are currently detaching themselves from trees, and work on discouraging use of goat paths that are not marked trails.

A current community of nonnative invasive plants can be found on the disturbed edges and along the trail network of the stand. Efforts should be made to stop the spread and remove current invasive plants in this area from the landscape.

While dead standing timber can make high quality wildlife habitat, all trees that are dead and dying within striking distance of established trails should be felled and left in ground contact with the forest floor.

Summary of Recommendations & Activity Schedule

LANDOWNER: Town of Cumberland Cumberland, RI
Date: July 2024

General Recommendations:

1. Maintain visible boundary lines by blazing and painting trees along the boundary and maintain by repainting the blazes every 5 to 7 years.

2. Maintain access roads and trails for recreational use, firewood harvesting, fire control, and timber stand improvement access. Conduct aesthetic pruning along trail sides.

3. Avoid cutting all dead trees or removing all the coarse woody debris, unless they pose a safety hazard, and identify and protect den trees for wildlife use. Create brush piles from logging slash to improve structural habitat for wildlife. See fact sheets in appendix.

4. Protect wetland values by providing a buffer along the adjacent slopes to prevent soil erosion during forest management and trail maintenance activities.

5. Monitor for the presence of, and control, invasive plants that may become established (**glossy buckthorn**, **multi-flora rose**, **Japanese barberry**, **Japanese stiltgrass, oriental bittersweet**)

Specific Recommendations:

Stand	Treatment	Priority	Time
1,2,3,4,5	Erosion control measure need to be implemented on trails and exposed ski hill.	1	2024-2028
1	Restore encroached area with native plants and remove structures placed on park property.	1	2024-2033
1,4	Survey and monument property boundary line.	1	2024-2028
1	Develop wildlife brush piles near vernal pool.	1	2024-2033
2,3,5	Post property boundaries	2	2024-2028
1,2,5	Brush management for invasive understory plants	1	2024-2033
1,2,3,4,5	Remove trail side hazard trees for public safety	1	2024-2028
1,2,3,4,5	Supplement trail markers and use new fasteners on existing trail markers, try discouraging the use of goat paths.	2	2024-2033

Plan has been prepared for the Town of Cumberland, Rhode Island with funding assistance from the Blackstone Valley Resilient Riparian Forests Project grant program.

Stewardship plan prepared by: Wolf T. Mueller, CCF

Edited By: Olivia Pietruch