

# **RIDGE HILL RESERVATION**

## **ECOLOGICAL MANAGEMENT PLAN**

### **1 INTRODUCTION**

Ridge Hill Reservation, originally established in 1972 through the purchase of 232 acres using Federal Land and Water Conservation Funds and Needham Town funds, is a dedicated nature preserve that extends from the Charles River north to the Wellesley town line.

The goal for ecological management is to preserve, restore, or enhance the ecological integrity and natural diversity of the Ridge Hill Reservation in a way that protects the values of this important conservation land and that is consistent with the reasons that the Town acquired and protected the land.

This Ecological Management Plan has been prepared by the Needham Conservation Commission, and contains information on the history of the Reservation, its uses and natural history (vegetation, plant species diversity, animal species diversity), threats to the ecological health of Ridge Hill, and a plan for the management of Ridge Hill that will protect its habitats and biodiversity.

### **2 OVERVIEW**

Ridge Hill Reservation has been incrementally expanded since the initial land purchase, both through additional land purchases and gifts. It currently totals 352 acres and includes the former Foster property south of Charles River Street, a portion of the former Beard property on Grove Street, the former McIntosh, Hueg and Stare properties to the north (33 acres, added in 1989), and the former Wiswall property extending to Cartwright Road (18 acres, added 2000).<sup>1</sup> Ridge Hill is crossed by a natural gas pipeline, which extends along the west side of the Reservation from Charles River Street to Cartwright Road, and then crosses from west to east along the hill at the north edge of Ridge Hill to a substation on Mary Chilton Road.

The southern portion of Ridge Hill Reservation extends from the Charles River to Charles River Street, and is bordered by two large undeveloped parcels in private ownership. There is currently one privately-held parcel with frontage on Charles River Street that is surrounded on the other three sides by Ridge Hill Reservation. The main portion of Ridge Hill Reservation extends from Charles River Street to the Wellesley town line at the Wellesley Transfer Station (on Central Avenue). Access points from public streets are located on Beard Way, Cartwright Road, and Pine Street in addition to the main entrance from Charles River Street. This section is bordered by private single-family residences on Charles River Street, Pheasant Landing, Grove Street, Beard Way, Lehigh Road, and Cartwright Road on the south and west, and by private single-family residences on Mary Chilton Road and Pine Street on the east. Other sections of the east side of Ridge Hill Reservation are bordered by undeveloped lands, including

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<sup>1</sup> In 2007, control over a 3-acre developed area within the reservation containing buildings that were part of the former Bradley Estate was transferred to the Board of Selectmen to be used for a Senior Center.

extensive wetlands owned by, or protected by easements held by, the U.S. Army Corps of Engineers under the Natural Valley Storage program, the radio tower land, and farmland owned by the Volante Farm. The former Nike missile site is an undeveloped property embedded within the eastern portion of Ridge Hill Reservation and accessed by a road easement from Pine Street. Part of the Nike property is currently being used as a community farm. Wetlands within the Ridge Hill Reservation are also protected by easements held by the Corps of Engineers.

Much of Ridge Hill Reservation and its bordering lands are wetlands and floodplains. The southern section includes a wetland system consisting of an intermittent stream and vegetated wetlands that border the stream. This stream flows into the Charles River and originates in a small wetland just south of Charles River Street. The extensive wetlands along the east side of Ridge Hill are associated with Fuller Brook, which drains to the north through Wellesley and eventually into the Charles River. The large central wetland, located between the Esker Trail and the Chestnut Trail (see the Ridge Hill Trail Map, available on the Town website [www.needhamma.gov](http://www.needhamma.gov)), is tributary to the Fuller Brook system, which flows north under Cartwright Road. The large wetland system in the western portion of Ridge Hill, south of Beard Way, appears to be isolated. Two additional small ponds are between the access road and Pheasant Landing. The southernmost, near the intersection of the driveway with Charles River Street, is a fen containing plant species that grow nowhere else in Needham.

The geomorphology of Ridge Hill Reservation is a result of the last Pleistocene glaciation (Ice Age) that ended 10,000 years ago, and of more recent alluvial deposits from the Charles River and Fuller Brook. Ridge Hill has rolling uplands with gentle relief, and is underlain by glacial sand and gravel deposits. The north-south spine of Ridge Hill Reservation is an esker, a narrow serpentine glacial deposit of riverine gravel. During the Pleistocene, this feature was a streambed within the ice sheet. The hill at the north end of Ridge Hill resembles a drumlin (a large spoon-shaped mound of glacial till) although it has never been formally described as a drumlin. Ridge Hill Reservation is outside of the mapped Zone 2 wellhead protection zone, but is within the contributory aquifer to the Town's water supply wells on Charles River Street near the Dover town line.

Ridge Hill Reservation together with surrounding undeveloped lands (the Nike Site, the WGBH Towers, the Tennis Club, the Eastman Conservation Area at the Newman School, the Ann Volante Conservation Area, the former town Landfill, and the Jacob Wildlife Sanctuary) is the largest contiguous unfragmented, undeveloped land (forested, meadow, wetland) in Needham west of I-95, comprising nearly 1,000 acres of wildlife habitat. The size of this largely intact natural area provides many significant values to the town – flood storage and flood damage protection, water quality protection, groundwater recharge of the town's aquifer, wildlife habitat, and educational values.

## **2.1 History**

The Pleistocene glaciation shaped the terrain of Ridge Hill Reservation, and the settlement of southwest Needham by a handful of farmers from Dedham 300 years ago kept the land sparsely populated and rural. But it was the creation of William Emerson Baker's fantastical playground estate less than 150 years ago – Ridge Hill Farms—that indirectly conserved the 352 acres of Ridge Hill Reservation.

In 1660, the Dedham Proprietors granted “a parcel of corn land” called the Natick Divident (now part of Natick, Wellesley and Needham) to several farmers, including Lieutenant Andrew Dewing. Each farmer had rights to 17-18 acres, two-thirds of which were upland and one-third meadow, but could acquire two or more cow commons “according to his means and size of his family.” (George K. Clarke, History of Needham, 1912). By the time Lieutenant Dewing died in 1677, he had become quite prosperous. He bequeathed to his sons several hundred acres of land west of Grove Street to the Charles River (now Wellesley), and east of Grove Street to Ridge Hill Reservation, including land in “Pine Swamp,” the wetlands between Grove Street and “Pine Hill,” the esker otherwise known as the Ridge Hill. [In 1912, Needham historian George K. Clarke noted that Pine Hill was “now covered with a growth largely chestnut, but little pine.” Today, oak forest covers the esker, due to the chestnut blight.]

By 1771, three Dewing families lived in the Grove Street - Charles River Street area, which also included farms owned by the Chamberlain, Gay, and William Pierce families. Farming must have been difficult there, with its deposits of glacial till and hardpan as opposed to the rich, floodplain soils of the “Great Plaine” of Needham’s southern and eastern borders of the Charles River. A hundred years later when William Emerson Baker arrived in the southwest corner of Needham, it hadn’t changed significantly.

Baker, a Bostonian who made his fortune in the sewing machine business, retired to Needham in 1868 when he purchased the 255-acre property of Samuel Payson, which included the old Dewing farmhouse on Grove Street. He subsequently bought ten other farms, bringing his total land holdings to approximately 755 acres by his death in 1888.<sup>2</sup> The flamboyant, idiosyncratic Baker built a lavish amusement park on his property, which he name Ridge Hill Farms after the Ridge Hill esker. Baker’s gardens, pavilions, conservatories, stables, towers, fountains, bear pits, and grottos attracted so many sightseers that Baker gave the public access to his estate two days a week. In 1878, he opened the short-lived Hotel Wellesley at the corner of Charles River Street and Grove Street; it burned down in 1891. Nothing of his fantastic estate remains today except for two ponds that he had dug where he discovered springs in parts of some swamp land: Sabrina Lake off of Grove Street, and the pond along Charles River Street that Baker named “The Artificial Fish Pond.”

After Baker’s death in 1890, Ridge Hill Farms was purchased by George Alden, Arthur Pope and Irving Evans who attempted to run the estate as a commercial venture. Without Baker’s vision, it failed. Evans died, Pope sold most of his interest to Alden and subsequently most of the property was divided and sold off between the 1890s and 1950s. Many of these parcels were large, and much of Baker’s property remained privately held by a small number of individuals. Other tracts were undevelopable wetlands. Consequently, much of Ridge Hill Farms’ 755-acres were not developed as rapidly or as heavily as the rest of Needham, enabling the town to acquire just about half of it for conservation land.

William Emerson Baker’s Ridge Hill Farms was the largest “summer estate” in Needham, but not the only one. From the 1850s to the 1920s, many other wealthy Bostonians built estate-like “summer cottages” in Needham near and along the Charles River to escape the heat of the city. Needham became

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<sup>2</sup> When Wellesley was incorporated as a separate town in 1881, Baker’s Needham estate lost 125 acres to Wellesley.

a summer resort for Bostonians because it was out far enough in the country where the water and air were pure but conveniently accessible from Boston via the Charles River or Boston and Worcester Railroads. After Ridge Hill Farms was sold and split up, one of the buyers was John Torrey Morse III, whose father's summer home was at the south end of Webster Street. Morse bought a large tract east of Pine Swamp for his summer estate and in 1906 built the stucco house that is currently on the Ridge Hill Reservation. John Torrey Morse III died in 1928 and J. Gardner Bradley bought the property in 1929. Bradley resided in Clay County, West Virginia, and also owned property on Arlington Street in Boston's Back Bay.

J. Gardner Bradley was a wealthy man with a distinguished pedigree. One of his great-grandfathers was President Lincoln's Secretary of War, one grandfather was President Grant's Secretary of War, and his other grandfather was an Associate Justice of the Supreme Court. Upon graduating from Harvard Law School in 1904 at age twenty-two, Bradley was hired as CEO of the Elk River Coal & Lumber Company in West Virginia, owned in part by his uncle and grandfather. Bradley was president of the ERC&L Co. for almost 55 years. He was strongly anti-union and kept his company non-union the entire time he managed it, successfully fighting several attempts by the United Mine Workers (UMW) to organize his miners in the 1930s and 40s. In 1958, when Bradley was 77 years old and the operations were facing losses, the Board of Directors sold all the properties of the ERC&L. Bradley returned to Massachusetts, summering at his Needham estate until his death in 1971. Needham's local State Senator, Leslie B. Cutler, was a member of the Bradley family.

In his will, Bradley gave the Town of Needham the right of first refusal to purchase his house and 222 acres of land, the largest privately-held property in town. When the Town purchased the Bradley Estate in 1972, the property became the first and largest tract purchased for conservation land for Needham's Ridge Hill Reservation.

## **2.2 How Ridge Hill Is Used Today**

Ridge Hill Reservation contains more than 8 miles of trails, in three primary systems: south of Charles River Street, west of the Access Road and buildings (connecting to Beard Way and Cartwright Road), and east of the access road (connecting to the Nike Site and northern portion of the Reservation). The Swamp Trail connects the east and west trail systems. A fitness trail, maintained by the Park and Recreation Department, is east of the Access Road and is entered from the Esker Trailhead. Parking is provided at two small pull-offs along the Access Road and at a larger parking lot at the Esker Trailhead. The trails are used year-round by hikers, joggers and dog-walkers, and in winter for cross-country skiing and snowshoeing.

The Park and Recreation Department uses the buildings and trails at Ridge Hill for the summer Outdoor Living Adventure Program. The current program has 8 one-week sessions for up to 40 children ranging in age from 8 to 13.

Unauthorized uses of the trails and property also occur, despite the addition of clear signage at the trailhead kiosks along the Access Road and Cartwright Road. Although bicycles are not allowed on the trails, mountain bikers are frequently observed. Dogs are allowed only on-leash, to protect wildlife and

to comply with the Town's Leash law. However many dog owners continue to walk their dogs off-leash at Ridge Hill. The small pond north of the Field Trail has been subjected to unauthorized use by some neighbors as a skating pond, including unauthorized cutting of trees and shrubs within and adjacent to the pond. Also, in 2011, neighbors reported unauthorized deer hunters on the eastern part of Ridge Hill Reservation.

### **3 NATURAL HISTORY**

The natural history of Ridge Hill Reservation includes its vegetation, plant species diversity, animal species diversity, and its role in the biological diversity of Needham.

#### **3.1 Vegetation**

Our knowledge of the flora of Needham begins with the flora of the late 19<sup>th</sup> century as documented in an unpublished handwritten manuscript found in the New England Botanical Club (NEBC) archives, "A list of the Manual Plants That I have Collected In Needham", December 1885, by T. O. Fuller. Timothy Otis Fuller (1845-1916) was a lifelong resident of Needham. Son of Ezra Fuller, Jr., he was born in the Ezra Fuller House, which still stands at 1435 Great Plain Avenue. T.O. Fuller is remembered as a botanist and bird lover, "a man of many accomplishments who excels as a botanist".<sup>3</sup> With members of his in-laws, the Mills family, he entered into a glue-making business in 1872, which soon failed. He was apparently home-schooled, as no records of his education or botanical training have been located. In addition to his botanical work, Fuller wrote and illustrated a field guide to local birds<sup>4</sup> and a local newspaper series. Fuller's herbarium was one of the largest private collections in New England, with more than 2900 sheets representing 1535 species. After his death, his widow, Mrs. Ella Fuller, donated his herbarium to NEBC. The sheets, distinctly labeled in Fuller's hand and light blue ink, generally cite only "Needham" as the locality, although a few sheets provide specific locality names. The Needham Flora was updated in 2000<sup>5</sup> and is available on the Conservation Commission website.<sup>6</sup>

Vegetation at the Ridge Hill Reservation is typical of the Northeastern Coastal Zone, Boston Basin subunit, dominated by low rolling topography, acidic soils, and suburban land uses. Plant community types include rock outcrops, hemlock ravine, various oak-dominated forests, red maple swamp, and several wetland community types, which are described below.

**Cultural grassland** – Grassland communities occur in former pastures dominated by native plants (Pennsylvania sedge, poverty grass, and little bluestem) or by introduced grasses (sweet vernal grass, orchard grass, fescue grasses, timothy, and bluegrasses) depending on moisture regime, soil fertility, and past agricultural practices. Forbs such as milkweed, hawkweeds, blue toadflax, blackberries, and

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<sup>4</sup> Needham Historical Society, [www.needhamhistory.org](http://www.needhamhistory.org).

<sup>5</sup> Standley, L.A. 2003. Flora of Needham, Massachusetts – 100 Years of Floristic Change. *Rhodora* 924:354-378.

<sup>6</sup> See, e.g., [www.needhamma.gov](http://www.needhamma.gov).

goldenrods also are frequent in this community. Cultural grassland occurs in meadows at Ridge Hill, on either side of the Access Road.

**White pine-oak forest** – These forests of mixed dominance on moderately dry moraine or till deposits and are dominated by white pine and species of oaks, also including black birch, sassafras, hickories, chestnut, lowbush blueberry, huckleberry, and maple-leaved viburnum. Characteristic herbaceous species include Canada mayflower, pink lady's slipper, cow wheat, whorled loosestrife, wintergreen, hayscented fern, and bracken fern.

**Successional white pine forest** – This is a transitional community of old fields and pastures, dominated by white pine with scattered oaks and red maples. Exotic or weedy shrub and vine species such as glossy buckthorn, honeysuckles, multiflora rose, oriental bittersweet, and poison ivy are common. The herbaceous layer is often dominated by Canada mayflower and tree clubmoss. This is the dominant forest community throughout Needham, found in several areas at Ridge Hill Reservation.

**Oak forest** – Oak forests occupy a broad ecological continuum across a range of mesic to xeric soils. Depending on slope, soil type, fire frequency, and other disturbance factors, these forests may be classified as mixed oak forest, black oak-scarlet oak forest woodland, or oak-hickory forest. These communities have canopies dominated by white oak, scarlet oak, red oak, and black oak, with hickories, black birch, red maple, sassafras, and white ash. The understory and shrub layers are typically dominated by hop hornbeam, chestnut, witch hazel, flowering dogwood, hazelnut, maple-leaved viburnum, lowbush blueberry, and huckleberry. The generally sparse herbaceous layer includes hayscented fern, Canada mayflower, Pennsylvania sedge, Swan's sedge, poverty grass, tree clubmoss, and pink lady's slipper. Oak forests occur on the esker in Ridge Hill Reservation.

**Red maple swamp** – These forested wetland communities are dominated by red maple in the canopy, with occasional tupelo and swamp white oak. The dense shrub layer contains sweet pepperbush, highbush blueberry, swamp azalea, winterberry, and arrowwood. The herbaceous layer characteristically contains skunk cabbage, cinnamon fern, royal fern, marsh fern, dewberry, tussock sedge, and manna grass. Red maple swamps are the dominant wetland type in the Fuller Brook watershed.

**Shallow emergent marsh** – This marsh community is characterized by water depths only seasonally above the surface. Dominant species include tussock sedge, Canada bluejoint, canary reed grass, and purple loosestrife. The diverse community often includes other sedges, rushes, ferns, and herbaceous species. Shallow emergent marshes occur in extensive areas along the Charles River, where they are dominated by canary reed grass. Silky dogwood, common nettle, red maple, swamp mallow, and buttonbush occur in higher hummocks within this marsh system.

**Wet meadow** – Wet meadow communities are similar to the shallow emergent marsh, but soils are seasonally saturated and rarely inundated. Dominant species include a wide range of sedges, Canada bluejoint, wool grass, knotweeds, soft rush, manna grass, fowl meadow grass, meadow rue, joe pye-weed, sensitive fern, and flat-topped aster. Wet meadows in Ridge Hill Reservation occur along the gas pipeline.

**Shrub swamp** – These are communities of permanently or seasonally saturated soils, often at the transition between emergent marshes and swamp forests, and are likely a successional stage in the transition from wet meadow to forested wetland. Shrub swamps are dominated by alder, silky dogwood, winterberry, willows, meadowsweet, steeplebush, highbush blueberry, arrowwood, and red maple saplings. Herbaceous species typical of swamps or wet meadows may also occur.

**Acidic graminoid fen** – This is an acidic peatland community dominated by sedges and sphagnum, including bottlebrush sedge, beakrush, twig rush, cranberry, and a sparse shrub and tree community including red maple, poison sumac, swamp azalea, and highbush blueberry. Spatterdock and white water lily occur in deeper pools. This fen community occurs in several locations in the Ridge Hill Reservation, where the town’s only population of sundew occurs.

**Acidic shrub fen** – This community is similar to the graminoid fen, but dominated by shrubs and sphagnum mosses. Dominant species include water willow, leatherleaf, steeplebush, swamp St. Johnswort, and Virginia chain fern. Good examples of this habitat type occur in the fen in Ridge Hill.

### 3.2 Plant Species Diversity

Floristic surveys of Ridge Hill Reservation conducted in the year 2000 found a total of 300 vascular plant species (excluding mosses, liverworts and lichens), nearly half of the total species found in Needham. However, several of these species are found nowhere else in Needham. The land along the gas pipeline is particularly rich in unique species (*Bartonia virginica*, *Carex utriculata*, *Carex vestita*, *Desmodium paniculatum*), as is the small fen near the Charles River Street entrance (*Carex comosa*, *Dryopteris cristata*, *Glyceria septentrionalis*, *Salix pedicellaris*) and the wetland west of the power line (*Utricularia minor*, *Drosera rotundifolia*). One state-listed plant species, *Spiranthes vernalis* (threatened), formerly occurred at Ridge Hill Reservation but has not been found since 1985.

Ridge Hill Reservation has a substantial number of invasive species<sup>7</sup> that pose a threat to the ecological health of the Reservation, including goutweed, Japanese barberry, Oriental bittersweet, purple loosestrife, shrub honeysuckle, common reed, Japanese knotweed, white poplar, glossy buckthorn, multiflora rose, and black swallowwort.

### 3.3 Animal Species Diversity

No definitive studies of animal species have been done at Ridge Hill Reservation. Our knowledge of animal species is based on occasional observations. We can predict the species likely to occur at Ridge Hill Reservation based on the types of plant communities and habitats, and other sources such as the Massachusetts Audubon Society’s Breeding Bird Atlas.

**Insects** – little is known about insects at Ridge Hill. The wetlands are likely to support a reasonable diversity of odonate (dragonfly and damselfly) species, and the meadows are likely to support butterfly species.

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<sup>7</sup> Invasive species are defined as “non-native species whose introduction causes or is likely to cause economic or environmental harm” by the USDA National Invasive Species Information Center.

**Reptiles and Amphibians** – reptiles and amphibians known to occur at Ridge Hill include species that require vernal pools in order to breed (wood frog and spotted salamander)<sup>8</sup>, as well as other common species such as spring peepers, gray tree frog, red-backed salamander, painted turtle, and garter snake. The habitats at Ridge Hill could support other species, potentially including newts, leopard or pickerel frog, spotted turtle, box turtle, snapping turtle, DeKay’s snake, or water snake. The vernal pool species use Ridge Hill’s vernal pools for breeding habitat, and occupy upland forest during the rest of their life cycle, while painted turtles occupy ponds and flooded wetlands but nest in sandy open uplands along the power line or meadows. Garter snakes also use both upland and wetland habitats, while other species are restricted to either wetland or upland (meadows or forests).

**Birds** – because of the range of habitats, Ridge Hill has the potential to support a reasonable diversity of breeding, migratory, or overwintering bird species. It is within a Mass Audubon Breeding Bird Atlas Block (Framingham 12), which has 59 confirmed breeding species, the majority of which could occur at Ridge Hill. Based on observations, Ridge Hill Reservation provides habitat at some point during the year for 40-50 species of birds. Many are songbirds that are attracted to its pine and oak forests and red maple swamps. Common year-round breeding birds include many of the species that are also regularly seen at neighborhood birdfeeders: black-capped chickadees, tufted titmice, white-breasted nuthatches, blue jays, northern cardinals, goldfinches, song sparrows, and downy woodpeckers. Less abundant residents include Carolina wrens, brown creepers, northern flickers, red-bellied woodpeckers, and pileated woodpeckers.

Several songbirds are summer migrants that return in spring to breed: Eastern phoebes, gray catbirds, scarlet tanagers, red-eyed vireos, wood thrushes, American robins, chipping sparrows, Eastern towhees, and Baltimore orioles. Other migrating songbirds are possible breeders or pass through Ridge Hill Reservation to feed on their way to more northerly breeding grounds: black-throated green warblers, Myrtle (yellow-rumped) warblers, palm warblers, pine warblers. In the meadows along either side of the Access Road, American woodcocks have been heard and seen in courtship displays in early spring.

During winter months, golden-crowned kinglets have been seen in the white pines along the Access Road and in conifers along various woodland trails. Dark-eyed juncos and robins that breed in more northerly places are winter migrants that arrive at Ridge Hill in October and stay through March.

Larger birds of Ridge Hill include wild turkeys, American crows, and several species of hawks and owls. Red-tailed hawks breed within the Reservation and are its most common raptor; broad-winged hawks, Cooper’s and sharp-shinned hawks have also been sighted. Great-horned owls, screech owls, and barred owls also occur at Ridge Hill. Mallards visit the stream in the Cartwright Road wetlands and the open waters of Ridge Hill’s shrub swamps, fens, and vernal pools. At some time in the past, wood ducks frequented some of the wetlands, as evidenced by an old wood duck box nailed to a dead tree. Deep in the open shrub swamp, great blue herons and green herons will sometimes stop to fish.

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<sup>8</sup> Although ecological vernal pools (shallow seasonal depressions that hold water and support breeding amphibians) occur at Ridge Hill, none have been officially certified by the Natural Heritage and Endangered Species Program.



**Mammals** – Ridge Hill Reservation provides habitat that supports white-tailed deer, coyote, beaver, gray and red squirrel, chipmunk, meadow voles, and deer mice. Other species that are likely to occur at Ridge Hill include mink, otter, fisher, weasel, skunk, raccoon, red fox, shrews, and moles.

### **3.4 Biological Diversity**

Ridge Hill Reservation is of critical importance to the biological diversity (biodiversity) of Needham. Ridge Hill's 352 acres of protected open space is part of a significantly larger (over 700 acres) unfragmented natural habitat that extends from Great Plain Avenue to the Charles River, bounded on the east by Central Avenue. This area includes open space provided by the Volante Farm, Newman School, the Anna Volante Conservation Area, the Carol-Brewster Road open space land, the former Town Landfill, the Jacobs Wildlife Preserve, and Wellesley's Beebe Meadows. The Ridge Hill ecosystem connects with other town open space across Central Avenue, to the High Rock Town Forest and Farley Pond Conservation Area. The Charles River corridor connects Ridge Hill with the Elm Bank open space, Waban Brook, and the Trustees of Reservations' Charles River Peninsula property, as well as large undeveloped areas in Dover.

This large area of diverse, interconnected upland and wetland habitats has exceptional ecological importance. Scientific research has shown that large areas of unfragmented forest interior habitat are key to maintaining populations of migratory bird species as well as mammals, amphibians, and reptiles. In contrast, small, fragmented or unconnected habitats can only support small populations and a limited number of species. Over time, the small populations are susceptible to localized extinction – and cannot be re-established by colonization because of barriers to movement between habitat patches. Other species, particularly birds, will not nest near the edges of forest patches and are only found in large forest blocks.

The diversity of habitat types that are directly connected in large, unfragmented natural areas is also of critical importance to wildlife species that require different habitat types for different functions, such as for breeding, feeding, or overwintering. The presence of several habitat types, and large areas of these habitats, is necessary to support sustainable populations of wildlife at all trophic levels, from tiny herbivores to larger carnivores. Ridge Hill not only provides the central keystone in this larger habitat complex, but it also provides critical corridors that connect other habitats and allow wildlife to disperse in search of food, mates, or unoccupied habitat.

## **4 THREATS**

Threats to the ecological health and biodiversity at Ridge Hill Reservation result from several human and natural processes, described below.

Invasive plant species may take over natural plant communities, replacing native plant species with introduced species. These invasive plants reduce natural biodiversity not only through the loss of native plants, but also by unfavorable alteration of the physical structure of the plant community and the food resources that the native plants provide to local insects, birds, and mammals. Although several invasive species occur at Ridge Hill, the primary species of concern at this time (2011) are oriental bittersweet and glossy buckthorn. Oriental bittersweet has established a large population along Charles River Street

(between Trail Junction 22 and 24), particularly in a glade between Junction 23 and 24, and along the gas easement between Trail Junction 22 and 12. Glossy buckthorn is found along most of the trails at Ridge Hill, although at low densities. It forms a very dense, dominant fringe to the red maple swamp east of the Hornbeam Trail (Trail Junction 10) and may extend throughout this open wetland.

The hemlock wooly adelgid is an introduced insect pest of hemlocks that has recently spread through southern New England. Infestations of this insect generally result in the death of the tree. The wooly adelgid is present at Ridge Hill, and is a concern particularly with the stands of mature hemlocks near the southern portion of the reservation (Trail Junction 26). If these large trees die, it is likely that they would be replaced by invasive shrubs that typically and rapidly colonize canopy gaps.

Unleashed dogs have adverse effects on wildlife ranging from harassment to mortality. Dogs may chase small mammals (or deer) and cause them to expend energy or ultimately reduce the size of their habitat to avoid areas where dogs are frequent. In fields and wetlands, dogs may damage the nests of ground-nesting birds or mammals (mice, rabbits), and may kill small mammals, reptiles (snakes, turtles), or birds. This is just one example of the threats that unleashed dogs pose to the Ridge Hill Reservation.

People on bicycles, motorized dirt bikes, and ATVs have been seen using the trails at Ridge Hill. These vehicles damage trails, cause erosion, and generate noise that can frighten wildlife (causing wildlife to leave areas near the trails).

Ridge Hill Reservation (and the larger complex of wetland and upland open space) is bordered by several residential areas. Some local residents have cats that are allowed to roam loose. These domestic (and potentially also feral cats) may enter Ridge Hill and prey on small mammals and ground-nesting birds. There are many scientific studies that document that cats constitute the single largest cause of mortality for small vertebrates in suburban settings.

Mowing meadows during the spring and early summer nesting season (for birds and small mammals) disrupts reproduction, kills young, and eliminates favorable habitat.

Vehicles operating in the meadows at any time of year damages vegetation, and during spring and early summer nesting season disrupts the breeding activities of small birds and mammals. Human activities, including playing Frisbee or other games, also adversely affect wildlife during the breeding season.

Unauthorized cutting of trees or shrubs (as has occurred in one vernal pool used for skating) eliminates important habitat for wildlife that may provide feeding, foraging, or nesting resources. The unauthorized dumping of landscape debris and yard waste along the borders of Ridge Hill similarly damages habitat, and may introduce new invasive plant species to the Reservation.

More intensive development of areas adjacent to Ridge Hill, or within Ridge Hill, also threatens the ecological integrity of the Reservation by reducing the overall effective size of the contiguous natural habitat, or fragmenting habitat. Future development at locations such as the Nike Site, the large properties on Cartwright Road, or at the Volante fields, could introduce more human activity, change the hydrology of wetlands by altering stormwater runoff or introducing urban runoff contaminants, and could accelerate the spread of invasive plants by creating openings and disturbed soil where these

plants could become established. All of these things pose a threat to the ecology of Ridge Hill Reservation.

## **5 MANAGEMENT PLAN**

Limited ecological or habitat management activities are currently conducted at Ridge Hill. Current management activities authorized by the Conservation Commission include periodically mowing the fields along the entrance driveway and mowing a field behind 426 Grove Street (by the owner) to control invasive shrubs. Vegetation management along the gas pipeline is conducted by the Algonquin Gas Transmission Company (AGT). Trail maintenance is limited to clearing small saplings and shrubs that have overgrown trails. DPW (Forestry) removes large fallen trees on request. The fields have been mowed by DPW on a regular basis, as part of summer camp activities at Ridge Hill or for aesthetic reasons. Wholesale mowing of the fields was discontinued in 2011, because it was incompatible with habitat protection.

### **5.1 Invasive Species Control**

The objective of the invasive species control plan is to preserve the ecological health of Ridge Hill by controlling those invasive species that have the potential to dominate native communities. Invasive species present a current threat to the natural communities only in a few locations:

- The pine grove along Charles River Street between the entrance driveway and the gas pipeline (oriental bittersweet, glossy buckthorn, winged euonymus, Japanese barberry);
- Edge of the gas pipeline between Charles River Street and the large wetland (oriental bittersweet);
- South edge of Charles River Street near the trail entrance (Japanese knotweed); and,
- The northeastern wetland edges (glossy buckthorn).

The control or eradication of invasive species is expensive, requires a significant time commitment, and typically requires the application of herbicides, which should be done only by a licensed pesticide applicator. Mechanical removal (digging, weed wrench, cutting and treating stumps) is effective in small areas. However, where invasive species have become established in large areas and are the dominant species, control or eradication is not feasible. This is the case in several areas at Ridge Hill, particularly in wetlands where herbicide use is not recommended. In light of these concerns, specific management actions recommended at Ridge Hill include:

- Cutting oriental bittersweet vines which are climbing trees, and painting the cut stumps with herbicide (spring);
- Removing as much winged euonymus as possible by cutting and painting stumps, and/or physical removal of small shrubs (using a weed wrench);
- Removing as much Japanese barberry as possible by cutting and painting stumps, and/or physical removal of small shrubs (using a weed wrench); and,

- Cutting the large stands of Japanese knotweed at the trail entrance (monthly in summer), or cutting combined with an herbicide program.

These management actions should be undertaken annually. In addition, annual invasive species monitoring should be undertaken to guard against new infestations of problematic species in sensitive areas, particularly for *Phragmites* (common reed) in the fen near the entrance, oriental bittersweet and glossy buckthorn in the meadows, and garlic mustard in the woods.

## 5.2 Meadow Management

The objective of the meadow management plan is to maintain the large meadows east and west of the access driveway as grassland habitat, which supports a diverse natural plant community and provides a unique wildlife habitat. The Massachusetts Audubon Society's webpage<sup>9</sup> provides information on the importance of small grasslands, and recommendations for management. The website states, "Grasslands in the Northeast have provided home and sanctuary to grassland birds and other wildlife for many hundreds of years. In hayfields, pastures and natural grasslands, birds such as bobolinks and eastern meadowlarks have raised their young, hunted for food, and returned each spring to continue this cycle. We are rapidly losing these and other grassland birds that were once a common and integral part of our countryside. As land use and agricultural practices have changed dramatically since the turn of the century, remaining grasslands have become smaller and isolated. With proper management, these small grasslands provide important habitat for some species of grassland birds."

Specific management actions recommended at Ridge Hill include:

- Mowing the meadows to prevent shrub growth. Although mowing during nesting season is detrimental to wildlife, a careful mowing regime is an effective means of preventing shrubs (whether native or introduced) from becoming established and taking over the meadows. The Massachusetts Audubon Society recommends that small grasslands be mowed every one to three years, as needed to remove shrubs. Mowing should not be done until August 1 to protect nests and young. Since the meadows currently do not have any shrubs, mowing every 2 or 3 years may be sufficient and should be used for the initial period. Annual monitoring should be done to determine whether mowing is needed. If mowing is needed to control shrubs, it should be done in early fall (August or September) to avoid peak wildlife season.
- Reducing human disturbance of the meadows. The objectives of this management strategy are to prevent vehicles from driving across the meadows, and to prohibit off-trail human and dog usage, especially during important and active wildlife periods (April through August).
  - Install wooden guard rail or fencing of a similar aesthetically pleasing material along both sides of the entrance driveway, with small gaps (large enough to allow a mower to access) at the four trailheads;

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<sup>9</sup> See, e.g., [www.massaudubon.org/birds\\_and\\_birding/grassland/small.php](http://www.massaudubon.org/birds_and_birding/grassland/small.php)

- Posting new signage requiring humans and dogs to remain on the trails, and reminding humans that Needham’s Leash Law requires that dogs be on-leash at all times; and,
- Prohibit activities that disturb the turf or soil, such as bike riding or other sports.
- Encourage AGT to continue mowing the gas easement to maintain meadow-like vegetation.

### **5.3 Wildlife and Vegetation Protection**

The protection of wildlife and vegetation at Ridge Hill Reservation requires additional management efforts, including:

- Enhanced efforts to ensure that dogs are leashed when walking on trails, and that unleashed dogs are not allowed on the meadows. This may require additional signage at trailheads, and periodic patrolling by the Town’s animal control officer.
- Communicate with residents of adjacent neighborhoods (Pheasant Landing, Charles River Street, Whitman Road) about the importance of Ridge Hill’s natural habitats, and reiterate that cutting vegetation for skating is harmful and not allowed.
- Deer hunting – while deer hunting may be allowed on properties near Ridge Hill, and may sometimes be necessary to control the deer population, hunting is not allowed on Ridge Hill. Additional efforts are needed (signage, information on the Town website, articles in the Needham Times or Needham Patch) to inform hunters of these restrictions. Increased safety patrols by the Needham Police Department may be necessary to guard against illegal deer hunting, as it is both a safety hazard (for residents walking the trails) and a wildlife management concern.

### **5.4 Trails Management**

Trails at Ridge Hill should continue to be managed and maintained in accordance with the Trails Master Plan<sup>10</sup>. Recommended trail maintenance activities include removing intruding or overhanging branches, removing fallen limbs, and fixing minor erosion problems. Trails crossing the meadows should be mowed at least twice during the growing season to clearly indicate where the trail is, and to reduce encounters between walkers and ticks.

### **5.5 Monitoring Plan**

Monitoring the ecological health of Ridge Hill is an important part of long-term ecological management, as this element of the plan allows the Conservation Commission to identify changes in plant or animal communities, identify or anticipate management problems, and modify the ecological management strategies to respond to changing baseline conditions. In addition, monitoring has the potential to increase our understanding of the diversity and ecological health of the Ridge Hill ecosystem. Specific monitoring strategies should be developed by the Conservation Commission that can be implemented

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<sup>10</sup> Available on the Town’s website, [www.needhamma.gov](http://www.needhamma.gov).

under the Commission's direction by volunteers or undertaken as student research projects. Potential monitoring efforts include:

- Invasive plant species;
- Invasive insect species (Asian longhorned beetle);
- Breeding bird surveys;
- Vernal pool or amphibian surveys;
- Insect surveys (dragonflies, butterflies); and,
- Inventory of moss and lichen species.

### **5.6 Reporting**

The Conservation Director should prepare an annual report to the Conservation Commission documenting the ecological management and trail management activities undertaken during each calendar year, with recommendations for management actions to be undertaken in the subsequent year. The annual report should document volunteer participation, and should identify any projects requiring funding through the Town's capital budget or special grant funding.

ADOPTED BY THE CONSERVATION COMMISSION ON JANUARY 26, 2012