Mass Audubon
Protecting the Nature of Massachusetts

AN ECOLOGICAL SITE ASSESSMENT OF

John's Woods

IN

HAVERHILL, MASSACHUSETTS

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Mass Audubon Ecological Extension Service
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Mass Audubon works to protect the nature of Massachusetts for people and wildlife. Together with more than 100,000 members, we care for 35,000 acres of conservation land, provide school, camp, and other educational programs for 225,000 children and adults annually, and advocate for sound environmental policies at local, state, and federal levels. Founded in 1896 by two inspirational women who were committed to the protection of birds, Mass Audubon is now one of the largest and most prominent conservation organizations in New England. Today we are respected for our sound science, successful advocacy, and innovative approaches to connecting people and nature. Each year, our statewide network of wildlife sanctuaries welcomes nearly half a million visitors of all ages, abilities, and backgrounds and serves as the base for our work.

Mass Audubon's Ecological Extension Service (EES) assists cities and towns, land trusts, state and federal agencies, and other conservation partners with natural resource inventories, habitat restoration and management planning, and conservation planning. Through EES we can share the experience we have gained in managing our own network of wildlife sanctuaries across the commonwealth. For more information on EES, contact 781-259-2159 or jcollins@massaudubon.org.

Introduction

The City of Haverhill's Tattersall land consists of 151 acres in two parcels on North Broadway in Haverhill, Massachusetts. The 84-acre parcel south of the road, known in documents and in general usage as "Tattersall Farm", includes a farm house, gravel parking lot, hay fields and forest, and a network of walking trails (Figure 1a). A 67-acre parcel on the north side of North Broadway, known in Trust documents at the "Chase Place" and on the town walking maps as "John's Woods", is primarily forested with a small parking lot and simple loop trail and (Figure 1b). Mass Audubon has been engaged by the City of Haverhill to contribute to planning for improvements to the property, particularly Tattersall Farm, with particular attention to minimizing impacts on existing wildlife habitat and making existing and new uses of the property compatible with wildlife habitat.

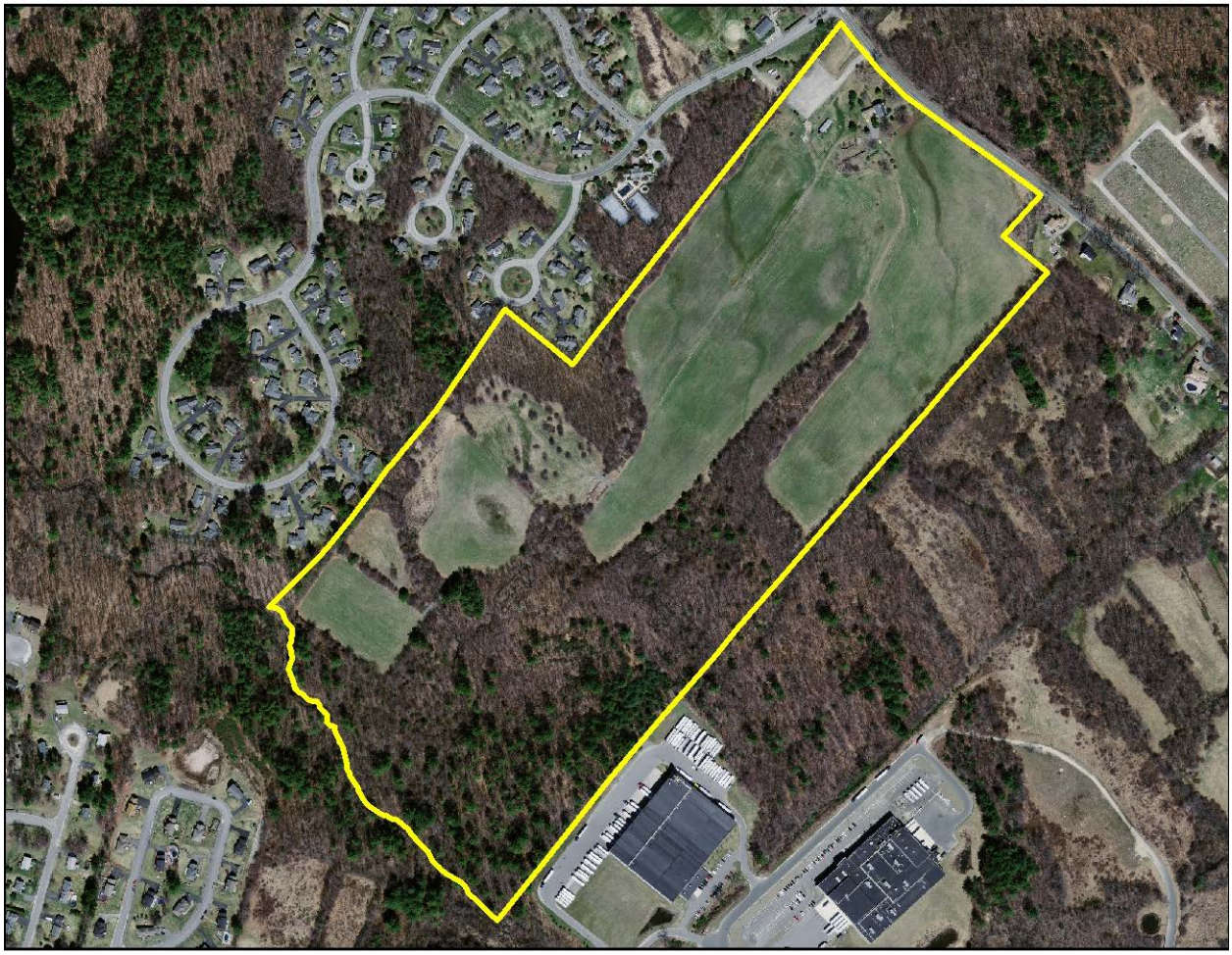

Figure 1a. Tattersall Farm parcel.

Aerial photograph from 2008; boundary approximate.

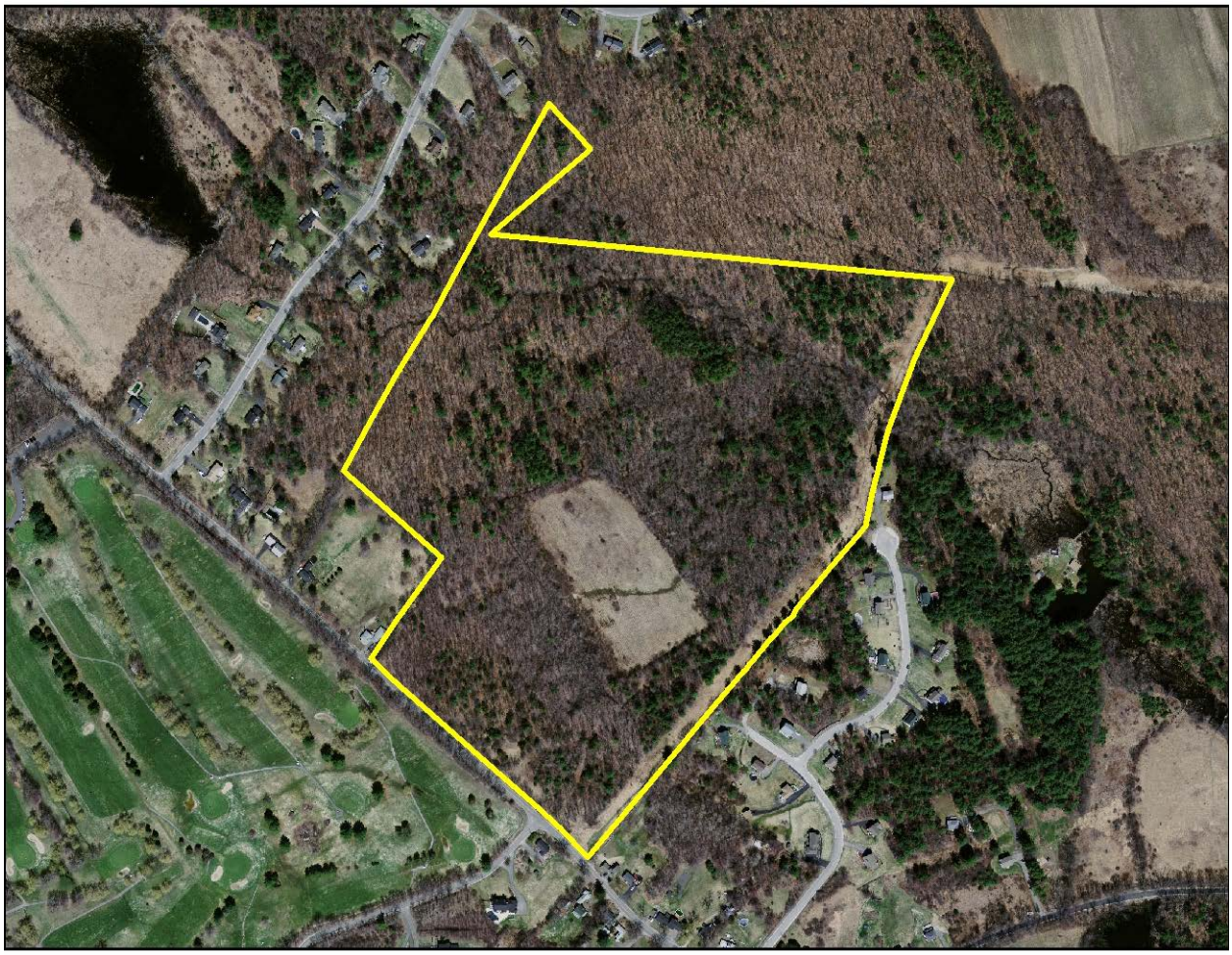

Figure 1b. John's Woods parcel.
Aerial photograph from 2008; boundary approximate.

Tattersall Farm and John's Woods were bequeathed to the City of Haverhill by the will of Mary Tattersall in 1999, for the purposes, according to the Trust documents:

> of preserving the land and farmhouse and the other building, foundations, and structures appurtenant thereto at the Tattersall Farm, and the vacant land at the Chase Place in as close to its present state of condition as possible, preventing construction or development of the land so that its predominant open and natural condition remains intact; protecting environmental ecosystems on the premises and related wildlife and conservation interests; preserving woodland, agricultural horticultural, and animal husbandry practices in accordance with prudent forestry and agricultural management practices; restricting the type of activities to be conducted on the premises for the purposes of conservation and preservation; and improving the general welfare of the residents of the city of Haverhill through informing and educating them on matters relating to environmental conservation, and such other subjects relating to history of framing in the Haverhill Area, and in the Unites States in general.

The properties are managed by a Board of Trustees which currently includes community volunteers and the heads of the City's Conservation Department and Recreation Department. Fields on the two lots are currently hayed under a lease agreement which expires in 2013. The farm house on the Tattersall Farm lot has been occupied by a property caretaker. The current caretaker is leaving the property in 2013 and the Trustees will be looking for a new caretaker.

In 2013, the City received funding from the Massachusetts Department of Conservation Services PARC program to design a community garden and nature play space, and to improve access to the property and interpretation of the landscape.

John's Woods can be divided into four major areas:

1) Parking area and young forest – 6.5 acres of formerly open land along North Broadway including a small gravel parking lot.
2) Field – A 6-acre field currently managed for hay under a lease which is currently held by Tyler Kimball of Kimball Farm of Haverhill.
3) Forest – 31 acres of forest largely characterized by mature mixed hardwood with a component of white pine.
4) Wet Forest – 19 acres of red maple-dominated forest on moist soils.
5) Gas line – over 4 acres of shrubby meadow, including some small cattail-dominated wet meadow, in a gas line easement.

This attractive forested lot serves as a quieter recreational alternative to the Tattersall Farm site and gives the visitor the feel of truly escaping into the woods.

Existing Conditions

Site Setting and Context

Tattersall Farm and Johns' Woods are located in northwest Haverhill, in an area of relative low-density development. As seen in Figure 2, the two parcels lie outside of the most densely developed sections of Haverhill and are adjacent to other blocks of undeveloped land. To the east of Tattersall Farm are roughly 85 acres of forest, field, and shrubland, while north of North Broadway lie an additional 80 forested acres. A narrow strip at the southwest corner connects to another 60 acres of forest and wetland. John's Woods is part of an 800-acre block of forest, field, and wetland stretching northwest into New Hampshire and interrupted only by the houses of Parsonage Hill Road. Sitting as they do within blocks of undeveloped land, these parcels act as important corridors for wildlife among these various parcels.

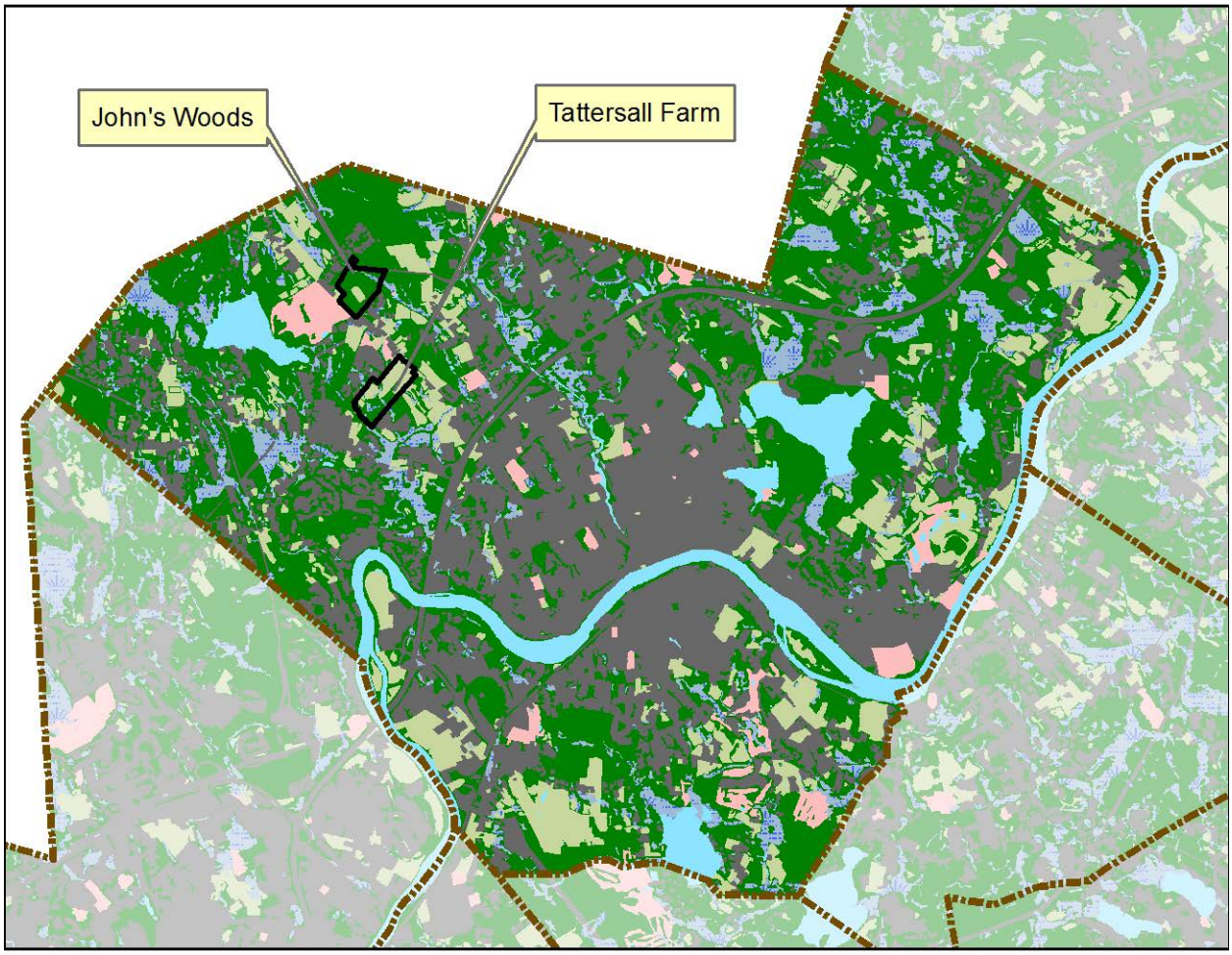

Figure 2. Land Use in vicinity of Tattersall Farm & John's Woods

Topography

As seen in Figure 3a and 3b, the John's Woods parcel has a northern aspect, sloping downhill as one travels northeast away from North Broadway until reaching Fishin Brook where the land begins to ascend Parsonage Hill. The slopes are gentle throughout the property, allowing for easy walking a routing of new trails if desired.

Figure 3a. View of John's Woods in Google Earth. View is looking northwest, relief is exaggerated x3.

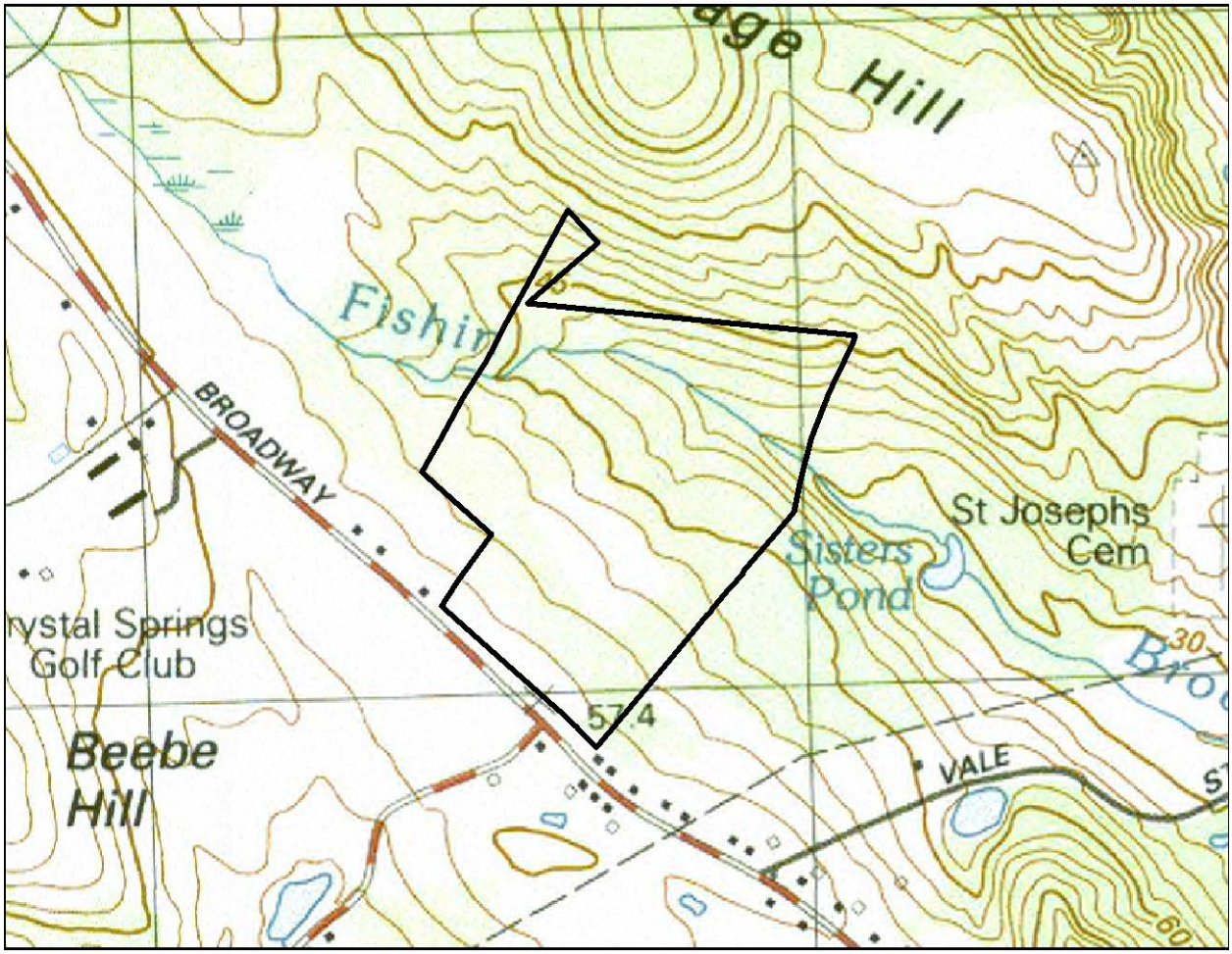

Figure 3b. Topography of John's Woods

Soils

Soils on John's Woods are entirely fine sandy loams derived from glacial till (Figure 4). In soil classification, "loam" refers to a soil with a mix of sand, silt, and clay particles. The "fine sandy" prefix indicates that these loams are a bit weighted to sand and that the sand particles are small. The fine sandy loams at John's Woods range from low in stones to extremely stony, with the more stony soils found generally lower on the slope near Fishin Brook. The only variation from fine sandy loam is the small area of mucky fine sandy loam where Fishin Brook leaves John's Woods and begins to widen into Sisters Pond. Mucky soils have a higher content of partially decomposed organic material, caused here by permanent or seasonal inundation.

Fine sandy loams are generally moderately permeable to water movement, however drainage may be restricted by the presence of a dense, low permeability layer or hardpan inches to feet beneath the surface. At John's Woods, the Ridgebury and Leicester fine sandy loam and Montauk fine sandy loam cutting across the hay fields and downslope to Fishin Brook holds water close to the soil surface and creates some moist patches in the hay fields and muddy soil in the forest.

Fine sandy loams are slightly acidic and moderate in nutrient availability. The Montauk and Woodbridge units are identified as important agricultural soils by the USDA and Massachusetts Department of Agricultural Resources. The stone-free units are categorized as Prime Agricultural Soils, or "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses." The very stony sections are categorized as Farmland of Statewide Importance, or "land, [other than Prime Agricultural Soils], that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops, as determined by the appropriate state agency or agencies. Generally, these include lands that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods."

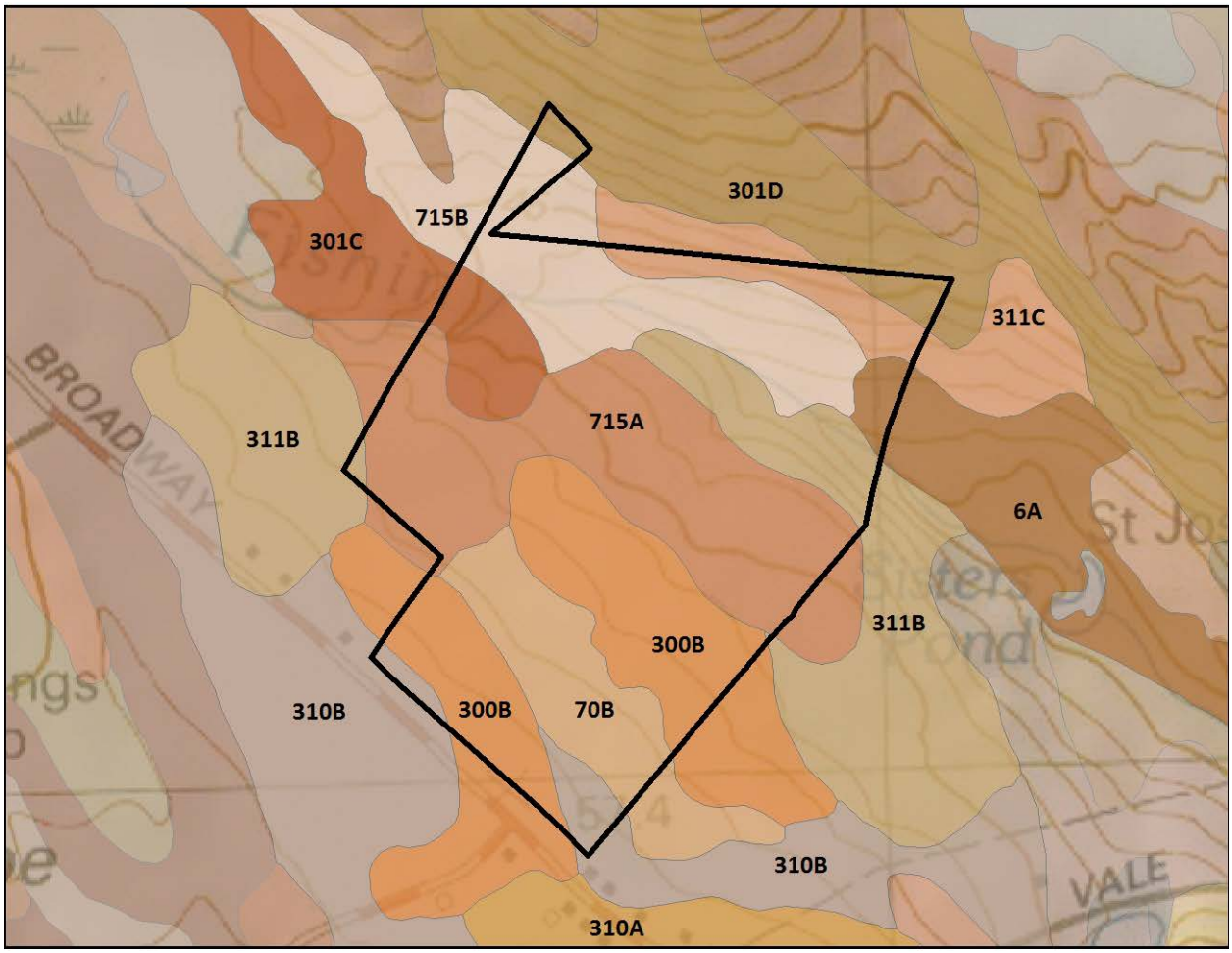

Figure 4. Soils at John's Woods

- 6A - SCARBORO MUCKY FINE SANDY LOAM, 0 TO 3 PERCENT SLOPES
- 70B - RIDGEBURY FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
- 300B - MONTAUK FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
- 301C - MONTAUK FINE SANDY LOAM, 8 TO 15 PERCENT SLOPES, VERY STONY
- 301D - MONTAUK FINE SANDY LOAM, 15 TO 25 PERCENT SLOPES, VERY STONY
- 310A - WOODBRIDGE FINE SANDY LOAM, 0 TO 3 PERCENT SLOPES
- 310B - WOODBRIDGE FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
- 311B - WOODBRIDGE FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES, VERY STONY
- 311C - WOODBRIDGE FINE SANDY LOAM, 8 TO 15 PERCENT SLOPES, VERY STONY
- 715A - RIDGEBURY AND LEICESTER FINE SANDY LOAMS, 0 TO 3 PERCENT SLOPES, EXTREMELY STONY
- 715B - RIDGEBURY AND LEICESTER FINE SANDY LOAMS, 3 TO 8 PERCENT SLOPES, EXTREMELY STONY

The very stony sections include many boulders at or near the surface. Where our New England soils in general, and sandy soils in particular, tend to be acidic due to chemistry of the parent material and naturally acidic rain water, compounds weathering from these boulders will tend to buffer that acidity and maintain a higher nutrient availability in the soils. This creates conditions favorable for less

common forest communities made up of species that require these conditions, such as the shagbark hickory stand found on the extremely stone Ridgebury and Leicester fine sandy loam and the very stony Montauk fine sandy loam in the northwest corner of the John's Woods lot.

Hydrology

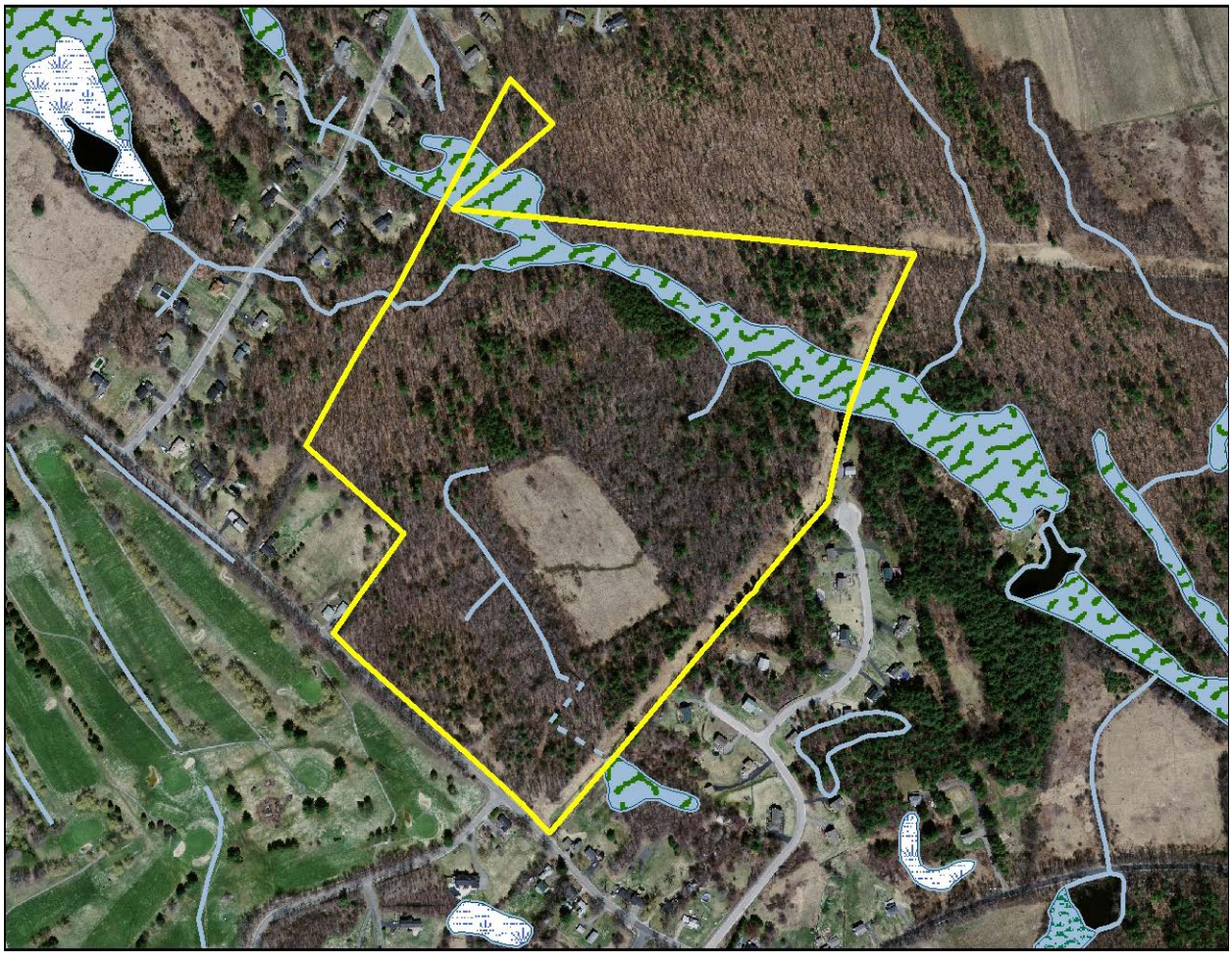

Figure 7b. John's Woods parcel.

Shallow Marsh Meadow
Shrub Swamp
Deciduous Wooded Swamp
Streams
Seasonal Drainage

0 500
Feet

Aerial photograph from 2008; wetlands from MassDEP; boundary approximate.

Water on the John's Woods generally flows to the north with the slope. Groundwater from the area between North Broadway and the hayfield is intercepted by what appears to be a very old manmade channel on the southern, uphill side of the hayfield and directed southeast, presumably to keep this hayfield dry. This channel is now heavily vegetated and functions as a small swampy area with some floodplain characteristics in the directly adjacent forest. Seasonal flow through this channel exits the property at the southeast corner, entering a swampy area adjacent to Diana Drive. Water to the north of the hayfield flows downslope to the north through areas of seepy forest characterized by red maples

and muddy ground, eventually reaching Fishin Brook. The brook flows off of the property near the northeast corner. Fishin Brook continues east another mile to its confluence with the Little River in the Rosemont section of Haverhill. The Little River flows south to downtown Haverhill, last seen near Haffners Service Station before flowing in culverts to the Merrimack River.

Natural Communities

Natural communities are assemblages of plants that tend to occur together based on landscape conditions such as soil type, soil moisture, slope, aspect, and elevation as well as historical factors such as disturbance. Where the same conditions occur within an ecoregion, the same or similar natural communities will tend to occur. The natural communities of Tattersall Farm and John's Woods reflect both the underlying landscape and the land use history of each site. Environmental factors influencing the distribution of natural communities on the property are primarily related to soil moisture and soil nutrient content. While the most obvious land use influence is the historic and continued disturbance of the fields by farming and mowing, the forested areas of the property also reflect periodic clearing of the land, logging operations, and the former presence of apple orchards.

The natural communities are described below. Descriptions of dominant species are based on visits in early spring 2013, before the emergence of all identifying characteristics, and many plants are identified to genus only.

Field

The 6 acre field at John Woods is similar to the fields of Tattersall Farm in that it is managed for hay production and is mown twice annually. Dominant plants are sweet vernal grass and orchard grass with clovers and other hayfield species such as Queen Anne's lace, goldenrods, and bedstraws. As in the fields at Tattersall Farm, the edges of the John's Woods field are being encroached upon by shrubs such as gray dogwood and glossy buckthorn. Over time, these shrubs will continue to grow into the field, further reducing its size and usefulness as a hayfield.

Gas Line Easement

An 80-foot wide gas line easement runs down the east side of the John's Woods parcel, totaling just over 4 acres that is maintained in grasses and shrubby cover by periodic mowing. Common shrubs are red-osier dogwood, gray dogwood, and arrowwood. Wetter areas are dominated by cattails and sedges.

Forests

Forest covers 57 acres of John's Woods and ranges from young, even-aged red maple forest on moist soils to mature, uneven-aged, mixed hardwood-white pine forest on dry, rocky soils.

- Dry Forest – These 31 acres are dominated by a stately canopy of black oaks with white pine, black birch, white ash, black cherry, sugar maple, and shagbark hickory. Beech and yellow birch, two species with a more northerly range, are present lower on the slope, near Fishin Brook, suggesting that cool air drains down the Fishin Brook 'valley'. American chestnut is present at very low density, including at least one medium-sized individual that appears quite healthy and

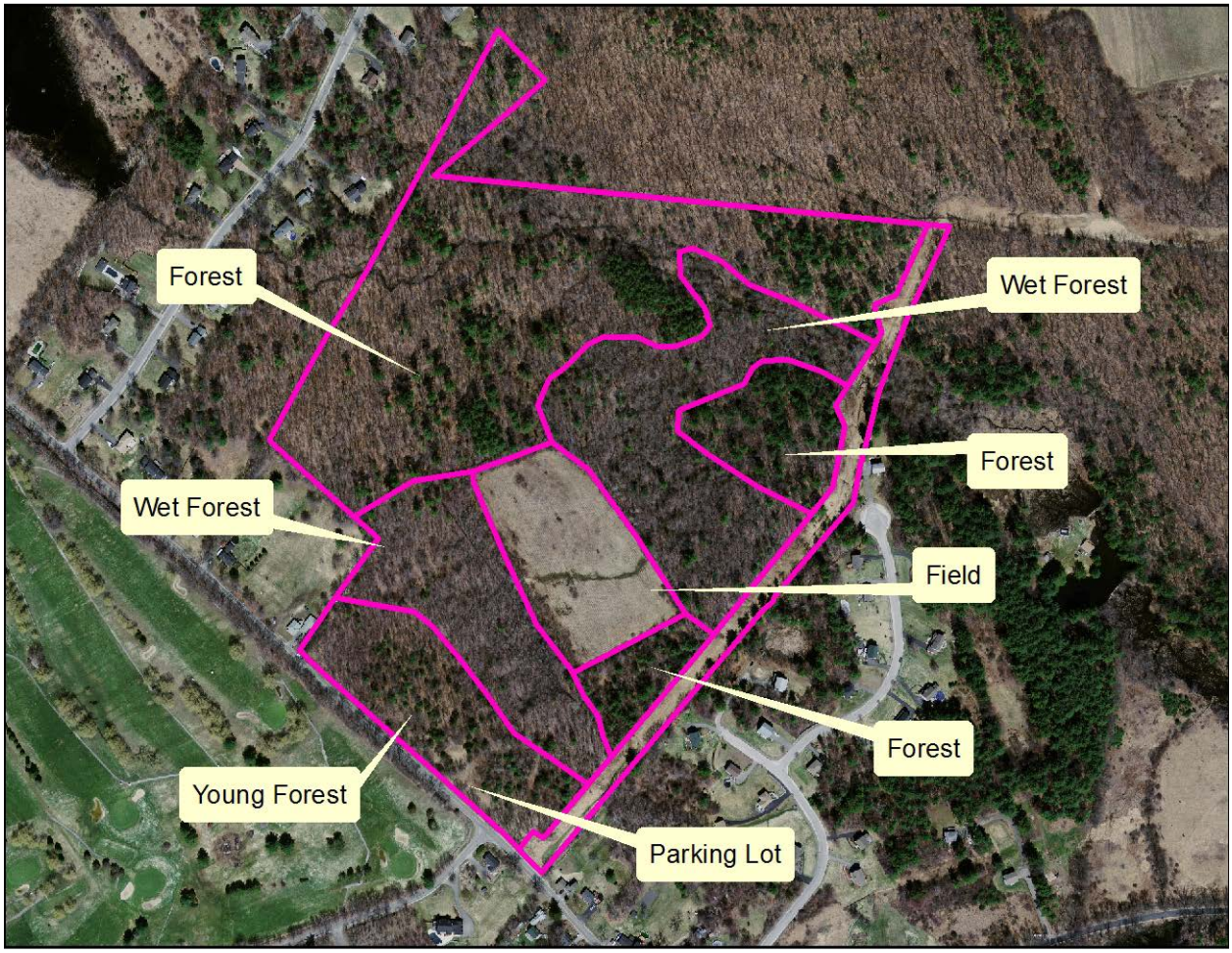

Figure 8. Natural Communities of John's Woods

should be monitored for fruiting. Hophornbeam is present in the western corner of the property, along with wildflowers such as red trillium and wild geranium that indicate richer soil conditions with higher pH and nutrient availability. The shrub layer varies from dense in some places – with saplings of the canopy species, American hazelnut, maple-leaved viburnum, and arrowwood – to very open with a dense ground layer of ferns.

- Wet Forest – Red maple dominates in the 25- to 35-foot tall canopy of these 19 acres with white ash also common. Silver maple, American elm, river birch, and musclewood, while present at much lower density, indicate persistent wet soil conditions that almost suggest floodplain conditions. Highbush blueberry and winterberry are the most common shrubs with witch hazel and American hazelnut also present. The invasives common buckthorn and Japanese barberry are quite common in places. The ground layer is characterized by a dense cover of ferns including cinnamon fern, New York fern, royal fern, and sensitive fern along with tall rue and jack-in-the-pulpit. The banks of Fishin Brook are dense in places with winged euonymus, a non-native invasive shrub.

- Young Forest – The 6.5 acres nearest North Broadway is characterized by a young forest reflecting abandonment of open fields 20 to 30 years ago. The canopy here is generally shorter than in the more mature forested areas and is composed of white pine, white birch, cherries, and red maple, with red cedar reaching the canopy in places. The shrub layer includes the invasive multiflora rose, honeysuckles, and glossy buckthorn. More open areas, closer to the parking area, have no canopy and include small patches of goldenrod meadow (west of the parking area) and thickets of staghorn sumac overgrown with oriental bittersweet (north of the parking area). Several red cedars have been overtopped by taller growing species and shaded to the point that they are dead or nearly dead while a few large red cedars persist in the canopy. The red cedars (and the extent of invasives here) indicate that this area was used as pasture or was otherwise maintained in an open state that allowed the red cedars to grow while other woody vegetation was not allowed to grow. When the field was abandoned, other, faster-growing woody vegetation took over.

  The parking area takes up a fraction of an acre within this young forest. It is a small lot surfaced with crushed pavement and delineated with large boulders. A ragged line of white ash trees separate the lot from North Broadway, and two trees constrict the lot in the middle, giving it something of a 'figure-8' aspect as seen from the air. In my opinion, none of vegetation directly adjacent to the parking area is of tremendous habitat value other than a single red mulberry tree. I would recommend altering vegetation here as needed to improve the visibility and arrival experience for a visitor. For example, the white ash trees currently found between the lot and North Broadway are in decline, as are many white ashes in our area; the white pines near the lot are generally poorly formed; the red maple constricting the parking area on the north side does not provide any unique habitat functions. All of these trees could be removed, if necessary, to redesign and improve the lot. The mulberry on the south side of the lot, on the other hand, which I believe to be native red mulberry as opposed to non-native white mulberry, should be retained as the only example of that species I found on the property and as a good source of fruit for birds and other animals.

Wildlife

As the timeline for this report was compressed, we did not have the opportunity to view the property over multiple visits and through more than one season. The following information is based on our assessment of wildlife habitats on the property and inferences of which species may make use of those habitats.

The Massachusetts Natural Heritage & Endangered Species Program (NHESP) produces maps of Priority Habitat for Rare Wildlife and Estimated Habitat for Rare Wildlife. NHESP also recently produced BioMap2, a report that identifies lands most critical for ensuring the long-term persistence of rare and other native species and their habitats, exemplary natural communities, and a diversity of ecosystems. Neither Tattersall Farm nor John's Woods is identified in any of these NHESP products. This doesn't imply that the properties are not good wildlife habitat, but only indicates that no species listed for protection in Massachusetts or rare or unique natural communities have been identified on the property. In fact, the combination of fields, forest, and edge create an ideal landscape for many of our

habitat generalists such as coyote and white-tailed deer, and offer specialized habitat for some of our less common species that require large tracts of specific habitat such as mature forest or grassland.

Mammals	Status	Notes
Virginia opossum	Likely	
Eastern Gray Squirrel	Likely	Along roadside and near abutting houses
Red Squirrel	Likely	Especially where white pine is more dense
Southern flying squirrel		
Woodchuck	Likely	Possibly near residential abutters
Eastern chipmunk	Likely	On forest edges and stone walls
Meadow jumping mouse	Likely	In field
Meadow vole	Observed tunnels	Likely extensive in field
White-footed deermouse	Likely	In fields
Eastern cottontail	Likely	In gasline easement
Northern short-tailed shrew	Likely	In field and easement
Star-nosed mole	Likely	In open forest areas and edges
Hairy-tailed mole	Likely	In forest edge
Little brown myotis	Likely	Hunting over field and easement
Coyote	Likely	likely uses the entire property.
Red fox	Likely	In gasline easement and possibly field
North American river otter	Possible	May occasionally visit Fishin Brook
Fisher	Likely	Would use forests and edges for hunting, possibly use the few large trees for denning.
Ermine	Possible	
Long-tailed weasel	Possible	
Striped skunk	Likely	At least occasional visitor, especially near abutting houses
White-tailed Deer	Observed tracks	Most likely utilize entire property

Wildlife and Farming Activities

The only current farming activity at John's Woods is mowing of the field for hay production. The field is accessed via a trail leading from the southern corner of the field southeast to the gasline easement and along the easement to North Broadway. This farm road is blocked by a locked gate at North Broadway. Farmer Tyler Kimball reports that typical practice for many years has involved an annual mow in late June and a second mow later in the season. Actual mowing dates vary based on annual weather conditions, primarily the amount of spring rain, which drives development of the grasses. The actual haying operation then requires several rain-free days in a row for optimal harvesting. Delaying mowing

too long in the season lets the grasses mature so that protein content of the inflorescence decreases, reducing the value of the hay for protein-intensive feeds such as for dairy cows.

Larger hayfields provide breeding habitat for a number of grassland birds and provide primary or supporting habitat for a wide range of mammals and invertebrates; however I did not observe any grassland specialist birds using the small field at John's Woods for nesting habitat. A defining characteristic of grasslands is periodic disturbance, that is any process that suppresses the growth of woody species. Without periodic disturbance, be it mowing, grazing, fire, or chemical control of woody plants, woody species will eventually grow throughout a grassland, overtop and shade out the grasses, and succeed through a shrubland stage to a forested condition. Grassland habitat is becoming less common in Massachusetts and many of the species that rely on grassland for at least one stage of life are at risk due to this loss. At Tattersall Farm, mowing is the disturbance that maintains the fields in their open condition. If mowing was discontinued in the fields, they would eventually succeed to shrubland and forest.

Trail Recommendations

The existing one-mile loop trail at John's Woods allows the visitor to experience the full range of habitat types on the property. Very nice wooden bridges have been installed to cross Fishin Brook in two places and the forested sections of the trail appear to be well-maintained. Sections of the trail are outlined below, with comments keyed to Figure 9:

1) The trail leading out of the east side of the existing parking area is overgrown with herbaceous vegetation and has quite a bit of poison ivy in the path itself. The length of trail leading from the parking area through the section of open-canopy vegetation, approximately 200 feet to a stone wall, should be surfaced or continually mown to suppress vegetation. Poison ivy should be regularly treated with a broadleaf herbicide to eliminate it from the trail itself.
2) The trail running though this section of wet forest is seepy and appears to hold water at some times of year. This section may need bog bridging or trail work to direct water to a low point on the trail where it can cross to the southeast. Approximately 150 feet of trail appears at least seasonally wet.
3) The trail through the field is not well-delineated when the grass is not mown, during winter or early spring when field vegetation is the same height as trail vegetation, or soon after mowing. The trail should be better marked on the side of the field, should be surfaced, or the grass trail should be mown weekly from April to October.
4) ATVs and dirt bikes access the property from the gasline easement and a small spur trail meeting the main trail near the eastern corner of the field. This trail should be blocked with gates and signage placed at the north and south end of the easement to indicate that motorized vehicles are not permitted.

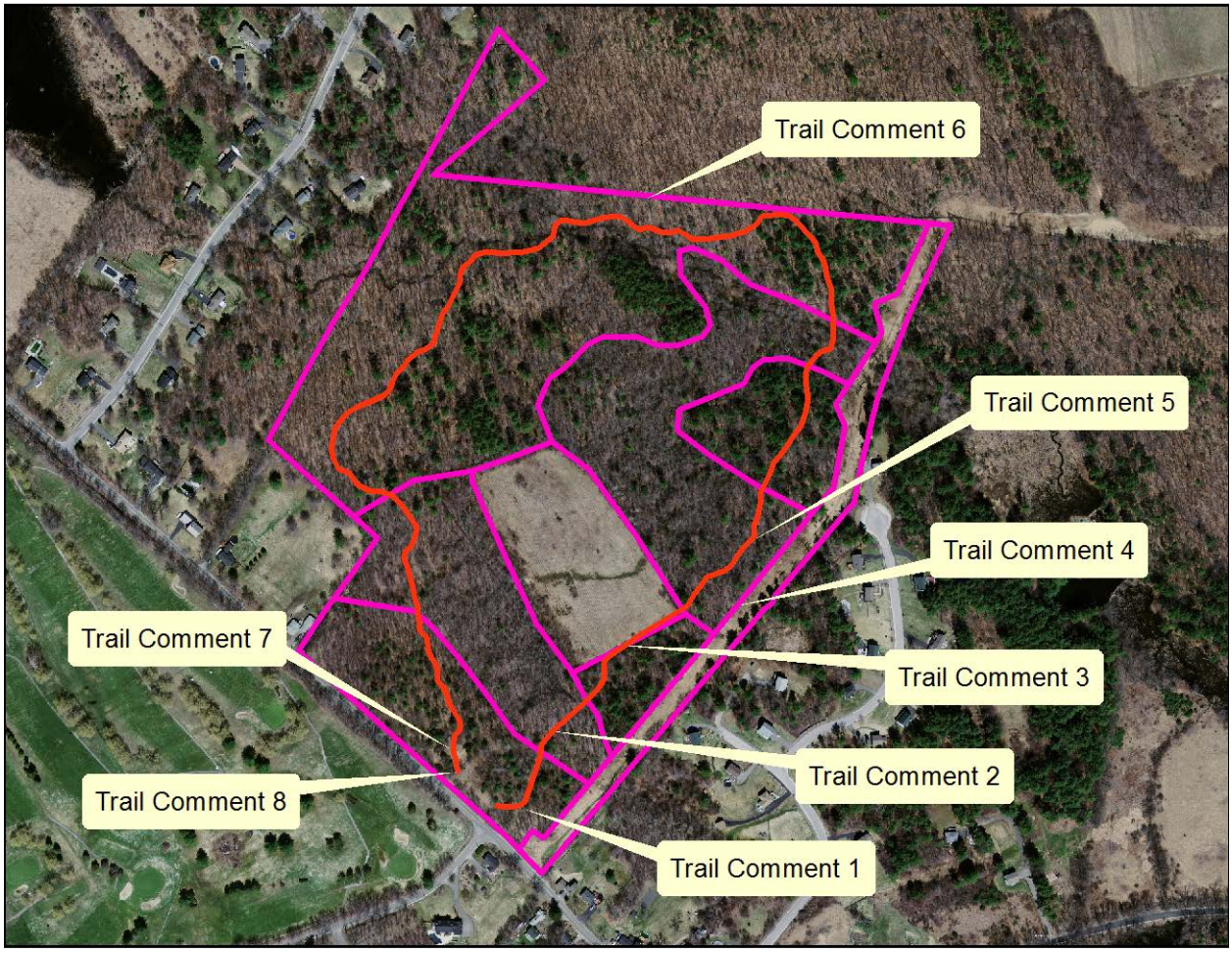

Figure 9. Comments on Trails at John's Woods

5) The trail through the Wet Forest includes some areas of seepy and muddy soil along the trail bed. Bog bridging has been installed in places, but is needed to cross this entire area in the wettest conditions. Trustees and trail volunteers should inventory the site more precisely to establish the amount of bog bridging required.
6) ATVs and dirt bikes access John's Woods from the property to the north, crossing a stone wall and using the northern-most section of the trail. Riders appear to stay north of Fishin Brook. ATVs have been used to create new trails by plowing over existing vegetation and tearing up soil. Boulders could be replaced in the stone wall to dissuade access at this point, although they will likely be removed again. Signage should be installed to indicate that motorized vehicles are not permitted on the property.
7) The trail on the west side of the parking area is overgrown with grasses and goldenrods. The trail should be widened and regularly mown or surfaced so that it is visible and appealing.
8) A foundation hole on the west side of the parking lot, labeled the "Chase House Foundation" on the online John's Woods trail map, is quite close to the trail as it meets the parking lot, yet is overgrown and presents a hazard should anyone take a step or two off of the main trail. The

foundation should be revealed by clearing vegetation, or the trail should meet the parking lot further to the north so that trail users do not risk stepping into the foundation.

Given the drainage patterns of the property, there are limited opportunities for expansion of the trail network. A trail could be added through the field, leading west to the main trail to create a shorter loop; however the middle of the field is wet and would present problems in terms of trail building and maintenance. I recommend working to improve the existing trail network to create a more welcoming trailhead area and dryer footing in the areas of seepy forest.

Conclusion

John's Woods serves as a quieter, more forested complement to the more intensive, agricultural operations of Tattersall Farm. The visitor to John's Woods can experience an open field, moist woods, mature oak-hickory forest, a stream, and the young forest colonizing and abandoned field, all along a level, one-mile path. Improvements to the arrival and parking area will increase visibility and a visitor's sense that this is a safe, well-cared for part of the city's conservation portfolio and surely bring more residents to experience this lovely lot.

Appendix – SOILS USDA General Descriptions of Soil Types ADD FORESTRY AND WILDLIFE CAPABILITIES

70A - Ridgebury fine sandy loam

The map unit is poorly drained; water is removed so slowly that the soil is saturated or remains wet for long periods. Agronomic capability class is 3W indicating moderate to severe limitations on agricultural use due to wetness. Depth to bedrock is greater than 60 inches. A firm layer at about 18 inches impedes the vertical movement of water. A seasonal high water table is normally between 0 and 0.5 feet below the surface from November through May.

300B - Montauk fine sandy loam

The map unit is well drained; water is removed readily, but not rapidly. Agronomic capability class is 2E indicating some limitations on agricultural use due to erodibility. Depth to bedrock is greater than 60 inches. A firm layer at about 2 inches impedes the vertical movement of water. A seasonal high water table is normally between 2.0 and 2.5 feet below the surface from February through May.

310A - Woodbridge fine sandy loam, 0 to 3 percent slopes

The map unit is moderately well drained; water is removed somewhat slowly during some periods. Agronomic capability class is 2W indicating some limitations on agricultural use due to wetness. Depth to bedrock is greater than 60 inches. A firm layer at about 26 inches impedes the vertical movement of water. A seasonal high water table is normally between 1.5 and 2.5 feet below the surface from November through May.

715A - Ridgebury and Leicester fine sandy loams, 0 to 3 percent slopes, extremely stony

The RIDGEBURY component is poorly drained; water is removed so slowly that the soil is saturated or remains wet for long periods. Surface stones limit cultivation or use of equipment. Agronomic capability class is 7S. Depth to bedrock is greater than 60 inches. A firm layer at about 18 inches impedes the vertical movement of water. A seasonal high water table is normally between 0 and 0.5 feet below the surface from

The LEICESTER component is poorly drained; water is removed so slowly that the soil is saturated or remains wet for long periods. Surface stones limit cultivation or use of equipment. Agronomic capability class is 7S. Depth to bedrock is greater than 60 inches. A seasonal high water table is normally between 0 and 1.5 feet below the surface from NOV thro

6A - Scarboro mucky fine sandy loam, 0 to 1 percent slopes

The map unit is very poorly drained; water is removed from the soil so slowly that free water remains near the surface. Agronomic capability class is 5W. Depth to bedrock is greater than 60 inches.