ECOLOGICAL INVENTORY AND TRAILS ASSESSMENT

for the

CARRIAGE MANOR, UNIVERSITY HEIGHTS, TOWN POND, AND SCHOOL DISTRICT PROPTERIES

Prepared for:
Town of Hooksett, NH
Conservation Commission

Respectfully submitted by:

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Trail Design / Construction / Woodworking

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Cover photos (clockwise from top-left): Racket-tailed Emerald (S. Lamonde), Mourning Dove (S. Lamonde), Eastern Ribbon Snake (A. Jones), and American black bear (Moosewood Ecological LLC).

Introduction

Following completion of the stewardship plan for Carriage Manor, University Heights, Town Pond, and school district properties for the Hooksett Conservation Commission, Moosewood Ecological LLC conducted and ecological inventory for these same properties. This ecological inventory established a baseline snapshot of the ecological communities and their wildlife by thoroughly searching for and documenting wildlife and rare plants within the various habitats of these four parcels. This report provides the Town with a better sense of management opportunities to support biodiversity and species of conservation concern.

Site Description

Covering 438 acres in northern Hooksett, New Hampshire, the study area includes six parcels referred to as Carriage Manor, University Heights, School District, and Town Pond.

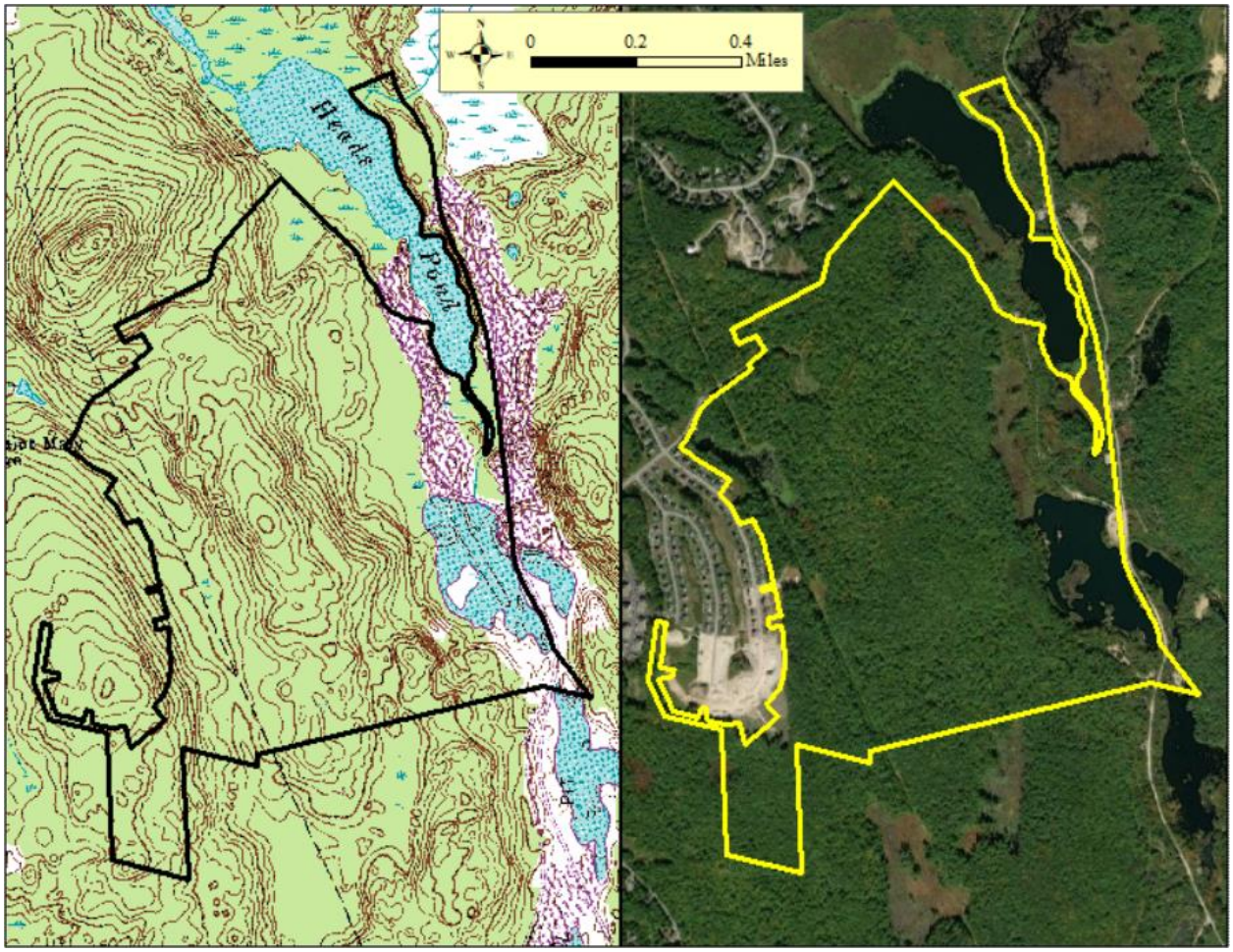

Figure 1. Topographic map (A) and aerial imagery (B) maps of the property with parcel lines dissolved. See Figures 4 and 5 for maps with parcel boundaries included.

Carriage Manor and University Heights are privately owned with conservation easements in place, while the School District land is owned by the Hooksett School District and the Town Pond property is owned by the Town of Hooksett. Mixed hardwood-softwood stands cover the largely forested study area, which contains several miles of trails that offer views of four bodies of water and two large wetlands (Figure 1).

Wildlife Inventory

Prior to field surveys a landscape analysis was conducted in ESRI ArcMap 10.7 to locate natural features of particular interest. Spatial datasets included USGS topographic quadrangles, 2015 high-resolution color infrared aerial photographs, National Wetlands Inventory, NH Wildlife Action Plan habitats (Figure 2), and NH hydrography datasets provided by NH GRANIT. The analysis of these data afforded the opportunity to better understand the ecological characteristics of the property prior to on-site investigations and to complement the efforts of our

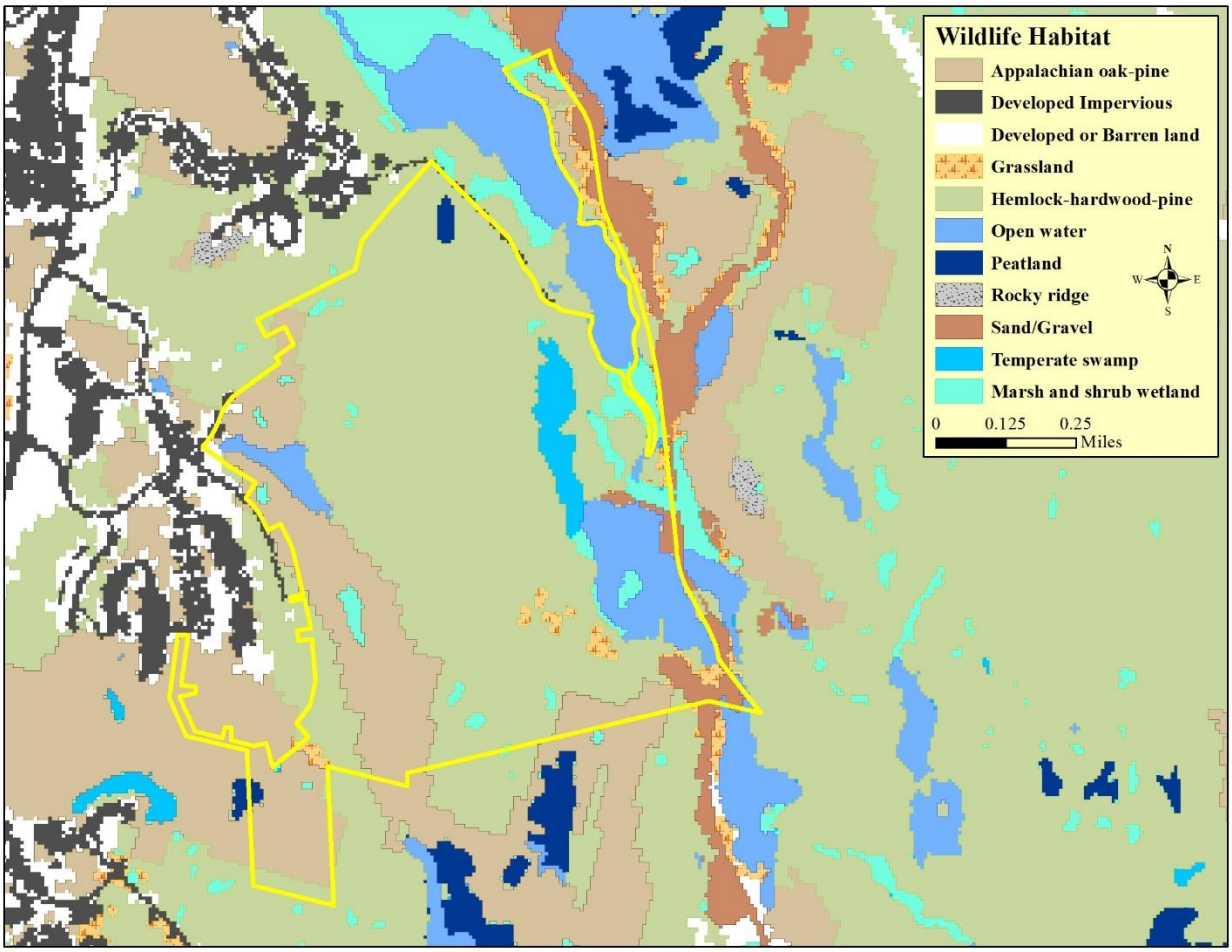

Figure 2. Map of Wildlife Action Plan habitat types.

systematic sampling described below. Rare species and exemplary natural communities from the NH Natural Heritage database were as reviewed for Heads Pond and the surrounding area.

Spring and summer months were emphasized for wildlife and plant surveys, with a particular emphasis on late summer and fall for small whorled pogonia, an endangered species. We recorded locations of significant observations with handheld GPS units while casual observations of non-focal plants, wildlife, and fungi were collected to establish a baseline species list for the property. The community-science database iNaturalist was also searched for both recent and historic sightings to complement the property species list.

Birds

Four breeding bird surveys took place during June 2021 (6/1, 6/2, 6/21, 6/23), when all local breeding bird species are expected to have returned from spring migration. Surveys took place on calm mornings with no precipitation and completed no later than three hours after sunrise to maximize detections during peak dawn chorus time. These surveys recorded all birds seen or heard during 10-minute observation windows at 19 point-count stations positioned in or adjacent to all representative habitats on the property and spaced more than 250 meters apart to minimize double-counting.

A male Baltimore Oriole after delivering food to hungry nestlings. Photo by S. Lamonde.

In total, 67 species were detected during breeding bird surveys, with an additional 20 observed incidentally between the survey's point count stations or during other site visits. Of these 87 species, various conservation plans list 35 of them as a species of conservation concern (Table 1). These range from the State-threatened Common Loon to species of greatest conservation need such as Eastern Whip-poor-will, Bank Swallow, Brown Thrasher, and Prairie Warbler. Due to the diverse habitats present, additional effort during winter months and spring

and fall migration can certainly increase the year-round property list of species to 120 species or more.

Table 1. Bird species of conservation concern.

Species	Status	Species	Status
Canada Goose	3	Gray Catbird	3
Wood Duck	3	Brown Thrasher	1; 2; 3
Wild Turkey	4	Veery	1
Eastern Whip-poor-will	1; 2; 3	Wood Thrush*	1; 2; 3
Killdeer	3; 6	Purple Finch	1
Spotted Sandpiper	3; 6	Field Sparrow	1; 3
Common Loon	1	White-throated Sparrow*	2
Broad-winged Hawk	3	Swamp Sparrow	2
Red-bellied Woodpecker	2	Eastern Towhee	1; 2; 3
Northern Flicker	3	Baltimore Oriole	3
American Kestrel*	1	Black-and-white Warbler	3
Olive-sided Flycatcher*	1	Chestnut-sided Warbler	2
Alder Flycatcher	2	Pine Warbler	2
Great Crested Flycatcher	3	Prairie Warbler	1; 2; 3
Eastern Kingbird	3	Black-throated Green Warbler	2
Yellow-throated Vireo	2; 3	Scarlet Tanager	1; 3
Blue-headed Vireo	2	Indigo Bunting	2
Bank Swallow	1		

* = Species observed in migration only

Conservation Status

1 = NH Fish and Game Wildlife Action Plan (species of conservation concern)

2 = Partners in Flight (Watch List and/or Stewardship List for Eastern and Northern Forest Biome)

3 = New England/Mid-Atlantic Coast Bird Conservation Region (BCR 30)

4 = NH Fish and Game - NH Game Management Plan 2016-2025

5 = North American Waterbird Conservation Plan

6 = North Atlantic Regional Shorebird Plan

Also of note is the Bald Eagle, a species of greatest conservation need within New Hampshire and one that is tracked by the NH Natural Heritage Bureau. While not detected on the property during any of our site visits, the NH Natural Heritage Bureau indicated that Bald Eagles have nested within one mile of the property. Bald eagles maintain large territories during the

breeding season, and it is quite possible that they occasionally utilize the property's waterbodies for food.

With modest habitat improvements, such as promoting more shrubland and early-successional forest, Ruffed Grouse, Black-billed Cuckoo, American Woodcock, American Kestrel, Blue-winged Warbler, and non-avian species of greatest conservation need could be attracted to breed the property.

Mammals

Starting in late April, motion-sensing camera traps were established at four locations to document wildlife, especially, mammals as they moved throughout the property. These photographic observations were complemented with incidental observations of mammals during additional site visits. To date, thirteen species of mammals or their sign (tracks, scat, scent stations, browse) have been recorded on the property: eastern chipmunk, American beaver, coyote, white-tailed deer, North American porcupine, North American river otter, red fox, meadow vole, eastern gray squirrel, American red squirrel, American black bear, bobcat, and common raccoon. While so far undetected, gray fox and several rodent and weasel species may also use the property.

A trio of eastern coyotes sniff the area where pair of raccoons had been the night before.

Reptiles and Amphibians

Targeted surveys for reptile and amphibian species are varied due to the diverse behaviors and life cycles among this taxonomic group. We focused heavily on direct searches for snakes, visual basking surveys for turtles, and vernal pool checks for salamanders and frogs. Later in the season, sandy, sunlit areas (e.g., pond shorelines and open-canopy trails) were checked for signs of turtle nest predation, which also alerts observers to the presence of turtles.

A musk turtle shows off its pointed nose and yellow facial stripes. Photo by A. Jones.

Our field crew conducted four visual basking surveys for turtles between April 27th and May 25th, 2021 as turtles emerged from hibernation to take advantage of the warm springtime sun and increase their body temperature. All reptiles are cold-blooded and depend on the sun for warmth. All waterbodies, wetlands, beaver ponds, and exposed sandy areas were checked with binoculars or a spotting scope from multiple angles to count and identify basking turtles. Direct visual surveys for snakes took place on six days from April 27th to July 14th, 2021 and focused along trails, sunlit areas, and wetlands. While each survey occurred between mid-morning and mid-afternoon on sunny or mostly-sunny days, count numbers varied and the following totals represent minimum, parcel-wide estimates (Table 2).

Table 2. Reptile count data for the study area.

Species	Count
Painted turtle	48
Snapping turtle	8
Musk turtle	1
Northern water snake	4
Common garter snake	9
Eastern ribbon snake	2

Most painted turtles, about 77%, were observed in the beaver pond just south of the Campus Drive cul-de-sac where dozens of partially submerged trees provided ample basking surfaces. All other reptile species were concentrated in or around the large waterbody and associated forested wetland in the southeastern corner of the study area. The sandy areas around this southeastern waterbody also yielded nine depredated turtle nests, which most likely belonged to snapping and painted turtles based on the size and texture of eggshell remnants.

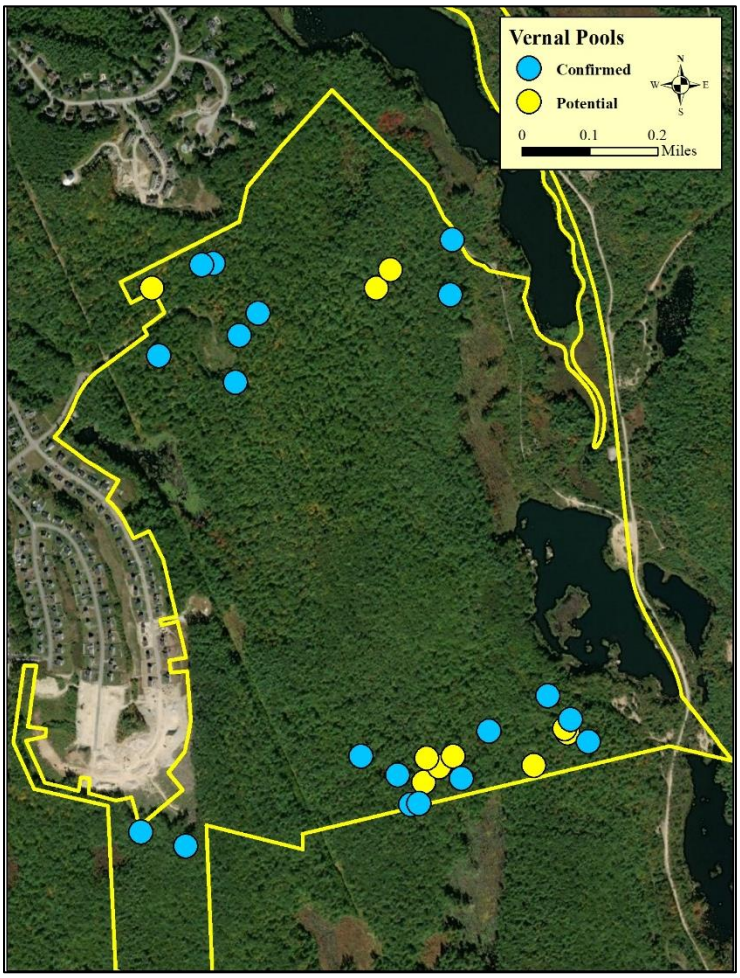

Figure 3. Map of potential and confirmed vernal pools.

Potential vernal pools were surveyed for obligate species, whose presence confirms a forest pool as a true vernal pool. Two site visits were made on 4/21 and 4/23 to check potential vernal pool locations that had been previously mapped by Moosewood Ecological in 2020 as part of the property's stewardship plan. Of 27 mapped potential vernal pools, 16 pools were confirmed by the presence of wood frog or spotted salamander egg masses, six pools had favorable characteristics but lacked egg masses, and five pools lacked enough water to be considered potential. An additional three confirmed vernal pools and four potential vernal pools were discovered on the property for a total of 19 confirmed vernal pools and 10 potential vernal pools. Within the confirmed vernal pools, 180 wood frog egg masses and 100 spotted salamander egg masses were counted.

No fairy shrimp or other obligate species were observed. One egg mole salamander (*Ambystoma*) egg mass appeared visually similar to those from the Jefferson/blue-spotted

salamander species complex, which is unexpected in Hooksett. A confident identification of either species could not be made.

One of Heads Pond's many vernal pools that contained spotted salamander eggs (inset). Photos by S. Lamonde.

Between the visual basking surveys, direct snake searches, and vernal pool work, six additional amphibians were noted: eastern newt, pickerel frog, American toad, green frog, American bullfrog, and spring peeper. A supplemental data search of the community-science iNaturalist database included one eastern milksnake found on the property, bringing the diversity of reptiles and amphibians to 15 species.

A data request from the NH Natural Heritage Bureau yielded two reptile observations in the area – Blanding's turtle and smooth green snake, both found within one mile of the study area. Blanding's turtles are endangered within New Hampshire and the uncommon smooth green snake is listed as a species of greatest conservation need.

Invertebrates

While no standardized surveys were implemented for invertebrates on the property, it was hard not to take notice of the many winged insects and other eye-catching invertebrates. During the course of surveying for birds, mammals, reptiles, and amphibians, our team identified over 80 species of invertebrates, including many insects, arachnids, and a segmented aquatic worm. Among this preliminary list of invertebrate species is a diverse array of 27 dragonfly and damselfly (Odonata) species, three of which are noteworthy.

The Skillet Clubtail is listed as a species of greatest conservation need within new Hampshire and has only been detected seven times prior statewide. In 2008, this species was detected within one mile of the property, and Moosewood Ecological confirmed it on the property in June 2021. The NH Natural Heritage Bureau also lists Martha's Pennant as an imperiled species, and two individuals were observed on the property after going eleven years

undetected at this location. Lastly, while not a listed species, the Banded Pennant has historically only been recorded in two towns within New Hampshire, Hooksett and Strafford. Two individuals of this species were also confirmed on the property.

A Skillet Clubtail (*Gomphus ventricosus*) soaks up the morning sunlight before taking flight. Photo by S. Lamonde.

Plant Inventory

Rare and Uncommon Plants

Moosewood Ecological LLC hired professional Botanist, Joann Hoy, to conduct rigorous surveys for rare, threatened, and uncommon plants. Two findings in particular are noteworthy. First, a single small whorled pogonia (*Isotria mdeoloides*) was located in a somewhat mesic spot within the dry upland oak forest. This globally rare plant is federally threatened and most of its world population exists in Maine and New Hampshire. There were no prior records on or within one mile of the property for this species in the NH Natural Heritage Bureau database.

Second, Joann also located a healthy population of red threeawn (*Aristida longespica var. geniculate*) in a small area near the rail trail. Another subpopulation of this species may have also been detected, although the specimens were too young to be identified with confidence. Red threeawn is listed as threatened in New Hampshire and was documented within one mile of the property in 2016. Additionally, several American chestnut trees were located within the dry Appalachian oak forest communities. One 30-ft specimen was particularly noteworthy as this species rarely grows tall due to widespread chestnut blight and mature trees have essentially disappeared from eastern American forests.

Invasive Plants

Due to the active past land-use history of this property, evidence of anthropogenic habitat degradation on the property is widespread yet not severe. One manifestation of humankind's

detrimental impact is the establishment and spread of invasive plants. Most detections of invasive plants were along the rail trail edges and in the cleared area 1,000 feet east of the Campus Drive cul-de-sac. Colt's-foot, Morrow's honeysuckle, purple loosestrife, and spotted knapweed were most abundant. Glossy buckthorn seemed to be concentrated in the powerline south of the beaver pond wetland near Campus Drive and along the rail trail ponds' edges. Small pockets of Japanese barberry, multiflora rose, and oriental bittersweet were found throughout area, often in or near sunny areas. Callery pear, often called Bradford pear for its most common cultivar, is widely used for landscaping within the United States and is gaining recognition as an invasive species. Several Callery pear trees were observed in the clearing east of the Campus Drive cul-de-sac.

Trails Inventory and Assessment

SnowHawk LLC was asked to assess the trail network on the Heads Pond property during the summer of 2021. This involved three site visits that were done in July and then again in September. The initial visit was done while riding a mountain bike to cover as many trails as possible in a short amount of time. This allowed for becoming familiar with the obvious trails as well as getting a better sense of the overall layout. The second and third trips were more extensive and involved mapping the trails using Gaia GPS on an Apple iPhone. An effort was also made to locate other trails that previously appeared on older maps but have grown in and in some cases disappeared altogether.

After the near drought conditions in some parts of the state during June, hiking the trails in July, after some rains, provided an opportunity to assess them when the significant issues with water and drainage were most recognizable. September was a bit drier again, but it still allowed for viewing the most problematic areas involving both standing and running water which is one of the biggest problems to solve on this property.

There are a number of trails, four of which I consider to be primary trails and the others are short reroutes, spurs, and shortcuts between the major trails. One of the trails is a well-developed, multi-use trail that has been built with machinery to accommodate many users. It also appears to have been built to accessible standards. In total, sixteen trails (or portions of trails) were assessed for this report. The maps provided here show each trail with an assigned number

(Figures 4 and 5). The following list provides a snapshot of each individual trail with general comments and recommendations for improvements.

Trail 1 – This trail is best accessed from the cul-de-sac off from University Drive. It rises up from the street and after going over a height of land, intersects with the two short connectors (Trail 2) and Trail 3. It then descends to pass the junction of Trails 6 and 7 and then intersects with Trail 8 (multi-purpose trail). There are several wet sections that would benefit from drainage, erosion control structures, or if necessary, short reroutes. Exposed rocks are prevalent but they are easily navigated and help to maintain the trail tread and minimize erosion.

Recommended uses include foot travel and biking. The steeper grades may not be best for skiing.

Trail 2 – This is actually two shortcuts off from Trail 1 on to Trail 3. They serve no real purpose otherwise, and do not need any work.

Recommended uses include all allowed forms of travel.

Trail 3 – A fine trail that starts at an intersection with Trail 1 near the meadow. It follows an old road, climbing gently for a while. After reaching the high point on the ridge it descends rather quickly, passes a side trail to an open-sided gazebo type structure, then turns sharply to the northeast and continues to descend to Trail 3. It crosses Trail 3 and continues to drop over some rolling terrain. Eventually it connects with Trail 1 just above Trail 2. This trail is one of the best on the property with only a few sections that would benefit from erosion control structures to prevent future damage. For the future, the possibility exists to connect between the gazebo and Trail 14 or 15, and even down to the pond by continuing further down Trail 13.

Recommended uses include all allowed forms of travel.

Trail 4 – This was discovered during the second full day. It appears to be an older trail or skid road that once connected Trail 3 to Trail 6. It becomes overgrown and hard to follow but has the potential to be reopened and continued northeast to join Trail 6.

With some planning to the design and layout, this trail could be used to connect to other trails (i.e., Trail #6) for all recommended uses.

Trail 5 – This is the short section of trail out to the gazebo off from Trail 3. It would benefit from a bit of tread definition and smoothing, but is fine for the use it currently receives.

Recommended uses include all allowed forms of travel.

Trail 6 – Between intersection with Trail 1 near the low end of Trail, running parallel to the uphill side of the pond, and down to the gate at the private gravel pit.

Recommended uses include all allowed forms of travel.

Trail 7 – This trail is another shortcut of sorts that cuts a corner from Trail 1 to the multipurpose Trail 8, It's a nice little variation and doesn't really need any real improvement.

Recommended uses include all allowed forms of travel.

Trail 8 – This multi-purpose trail is a constructed trail on what appears to be an old rail line with a hardened surface of imported materials. It is heavily used but holds up well to the traffic due to the design and materials used. It begins at Daniel Webster Highway (north and east of Pleasant St.) and ends at the pond. It appears to have been built to accessibility standards.

Recommended uses include foot travel, biking, skiing and barrier free travel such as wheelchairs.

Trail 9 – This is more of a road than a trail and technically it follows the eastern edge of the property but is not part of the property. It is wide, mostly good gravel and sand, but there are some areas where water is settling into the trail and there is even a stream that crosses where the road has washed out some. It is included here as part of what is shown on the maps as it continues beyond the intersection with Trail 8 to the end where it arrives at the gate to the privately owned gravel pit.

Recommended uses include foot travel, biking, skiing and barrier free travel such as wheelchairs. Some sections may contain loose sand and gravel or standing water so caution is advised.

Trail 10 – A short spur that travels from near the end of Trail 9 to the shores of the pond beyond. Some of it is mostly a sandy open area but it is used for travel. It is fine as is but it appears to be a popular area with OHRVs.

Recommended uses include all allowed forms of travel.

Trail 11 – This trail departs from the southern end of Trail 6 and climbs west and eventually goes off the property so it was not followed beyond the boundary.

With some planning to the design and layout, this trail could be used to connect to other trails (i.e., Trail #3) for all recommended uses.

Trail 12 – A shortcut that goes from the sandy area off from Trail 6 and eliminates the section of Trail 3 that is adjacent to the pond. It could use drainage and erosion control work, especially at the upper end where it reconnects with Trail 6.

Recommended uses include all allowed forms of travel.

Trail 13 – This short trail creates access from Trail 3 to the east side of the pond. It drops at a steeper grade then turns to follow the shore from a reasonable distance to prevent shoreline damage. There are signs of firepits and possible camping.

Recommended uses include all allowed forms of travel.

Trail 14 – A side trail that is above and connected to Trail 6 by Trail 15. Though it may have once served a purpose, there is no good reason for this to exist now.

Recommend closing and restoration unless it ever becomes part of an extension of Trail 3 from the gazebo.

Trail 15 – A direct route and somewhat or a continuation of Trail 13 that drops to the pond. It does access a rock outcropping that appears to be a party spot as is evidenced by the accumulation of trash there.

Recommend closing and restoration unless it ever becomes part of an extension of Trail 3 from the gazebo.

The following are some general thoughts about the overall trail system:

- A few shorter trails are used as shortcuts or reroutes around the wet areas. These reroutes are short and close to the existing trails so these were not mapped separately.
- Many of the trails are in decent shape with a few exceptions. Trail 1 has a few steeper sections that would benefit from erosion control structures, or if necessary, reroutes. The most serious problems are wet areas that range from mud and poor drainage to deep pools of water caused by wheeled vehicles driving through the mud. These are mostly found on Trail 6.
- Motorized vehicles have been using the trails and are likely causing the damage found. Many of the major mud pits and pools of water were found on Trail 6, with smaller areas of concern on Trail 1. Consideration should be given to restricting all motorized vehicles due to seeps and streams with soils that do not drain well. By monitoring use over time, it may be that non-motorized wheeled vehicles may also need some restrictions. Trail 3 may be the best trail on the property when it comes to overall good condition and the smallest need for improvements. There are signs of this trail starting to see OHRV use.

- Mountain bikes use these trails and can potentially cause damage, especially on organic soils and steep grades with poor drainage. For the most part there are few signs of significant concern related to their use but heavy use could add to the impacts. If trails will continue to be used by mountain bikes, special attention should be given to keeping trails drained and as dry as possible. Winter use of fat bikes should not be a problem but conditions will dictate whether closures are necessary.
- The trails were not assessed during the winter but it does not appear that passive winter recreation has a negative effect on the trails. Snowmobiles would not be recommended for this area due to the fact that the trails are not designed or groomed for that use.
- Access points need to be created and/or reinforced to limit unwanted uses. Consider gates or blockades that only allow entry for the allowed uses.
- Signage and trail markers are mostly non-existent and this should be improved. Color coding and/or numbering trails with maps at each access point would be beneficial. Kiosks at the main access points would provide a place to post pertinent information and maps of the trail network. Ideally these would be located at the cul-de-sac on University Drive and at both ends of the rail trail where it enters the forest as well as any other points of entry. Highlighting allowed and recommended uses for trails can also be posted at these locations.
- Tread surfaces are adequate on most trails but soils are a mix of organic matter and well drained mineral soils so proper drainage is not always suitable.
- Erosion control methods should be used in locations identified for needing work. In most cases these can be grade dips, grade reversals, ditching, etc. In only a few locations would culverts be required. Some of the wettest areas that cannot be drained may require significant fill. Still other locations may require short reroutes or upgrading the reroutes that are in place. Much of this would be best done with small trail machinery or hand work. More specific design details will be required for each problem area.
- Wildlife corridors and habitat should be considered as trails can have a negative impact on wildlife. That said, during the time spent assessing the trails there were sightings of deer, bear, and several smaller species. Birds are abundant and include waterfowl on the bodies of water within the forest. Much also depends on the amount of traffic and of

usage. Refer to the other sections of this report to assess the most sensitive areas of concern for flora and fauna.

- Monitoring the use and abuse of the trails will be an important ongoing consideration. Trail maintenance is critical to trails. Sustainable trail design minimizes the need for maintenance over time. Creating a network of volunteer trail maintainers is a good way to continue maintenance. Trails should be assessed after any major weather events and at least once a season. Regular monitoring will also aid in discovering any unwanted usage.
- Consideration could be given to seasonal closures of individual trails (or all trails) in the early spring (mud season) or during a heavy period of rain in the summer.
- It would be possible to include future trail building for expanding the existing network (see map). Areas to be considered for expansion are limited to portions of the property that are a suitable distance away from the adjacent housing development and any wetlands as well as the pond. Consideration should also be given to impacts on sensitive flora and fauna as well as any future forestry operations. The planning and layout for any new trail or extensions of existing trails should be done by an experienced trail contractor or someone with a solid knowledge of design and layout. The construction could be done using volunteers or a combination of a professional and volunteers.

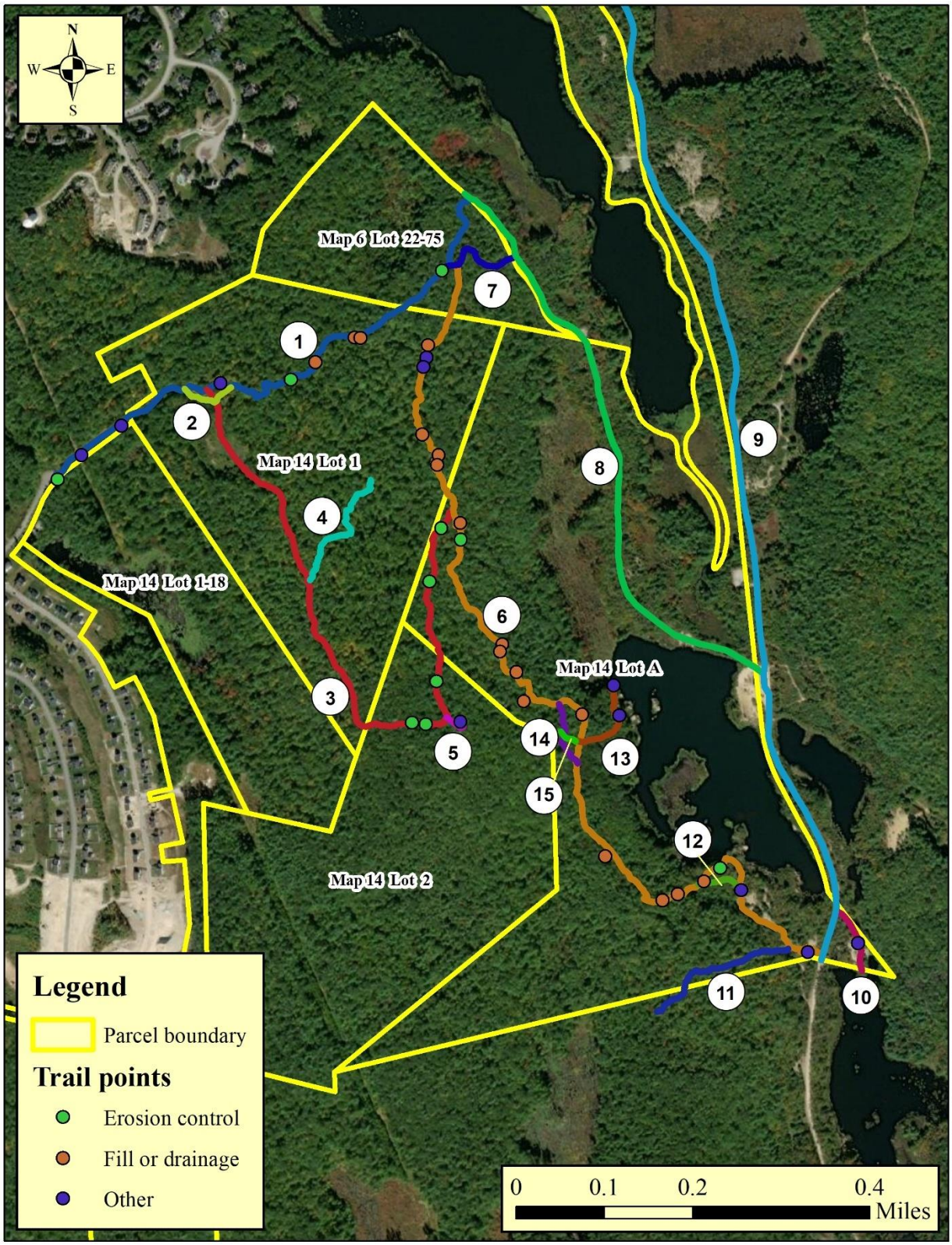

Figure 4. Trails map on a 2015 aerial photograph noting points of concern.

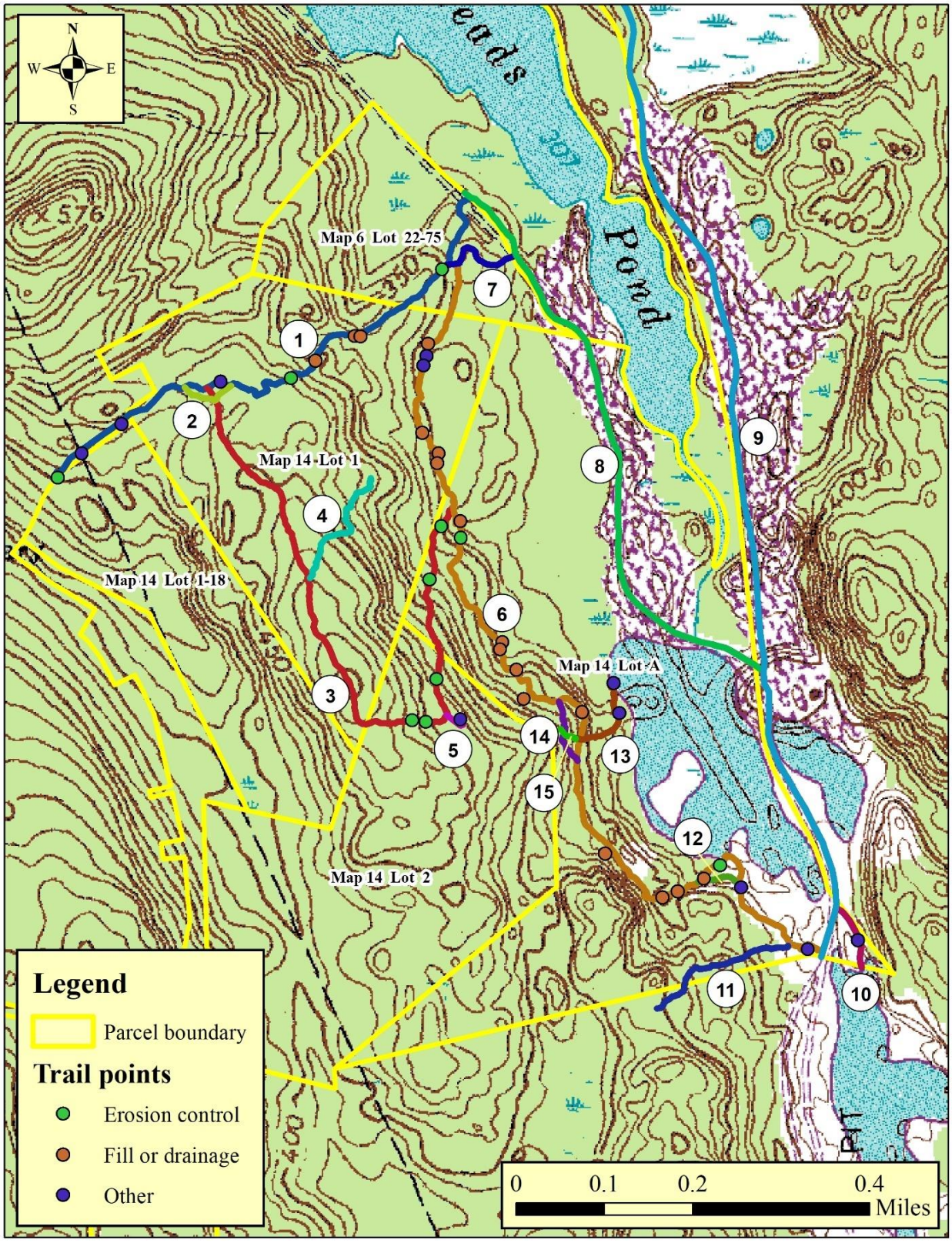

Figure 5. Trails map on a US Geological Survey topography noting points of concern.

Recommendations

Based on our findings, the following actions are recommended:

- Combining the Heads Pond Stewardship Plan with the Heads Pond Ecological Inventory and Trails Assessment to streamline conservation initiatives on the property.
- Conducting a detailed invasive species inventory, should the Hooksett Conservation Commission wish to target invasive species for removal or mitigation.

Literature Resources

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Appendix A. Property Species List

Combined list of species confirmed on the property by Moosewood Ecological or found community scientists who submitted observations to the iNaturalist database. Species were first categorized alphabetically by iconic taxon and then alphabetically sorted by scientific name.

Common name	Scientific name
Amphibians	
Spotted Salamander	*Ambystoma maculatum*
American Toad	*Anaxyrus americanus*
American Bullfrog	*Lithobates catesbeianus*
Green Frog	*Lithobates clamitans*
Pickerel Frog	*Lithobates palustris*
Wood Frog	*Lithobates sylvaticus*
Eastern Newt	*Notophthalmus viridescens*
Spring Peeper	*Pseudacris crucifer*
Arachnids	
Grass spiders	*Agelenopsis*
Bronze jumping spider	*Eris militaris*
Eastern black-legged tick	*Ixodes scapularis*
Tuft-legged orbweaver	*Mangora placida*
Filmy dome spider	*Neriene radiata*
maple bladdergall mite	*Vasates quadripedes*
Birds	
Spotted Sandpiper	*Actitis macularius*
Red-winged Blackbird	*Agelaius phoeniceus*
Wood Duck	*Aix sponsa*
Mallard	*Anas platyrhynchos*
Eastern Whip-poor-will	*Antrostomus vociferus*
Ruby-throated Hummingbird	*Archilochus colubris*
Great Blue Heron	*Ardea herodias*
Tufted Titmouse	*Baeolophus bicolor*
Cedar Waxwing	*Bombycilla cedrorum*
Canada Goose	*Branta canadensis*
Broad-winged Hawk	*Buteo platypterus*
Northern Cardinal	*Cardinalis cardinalis*
Turkey Vulture	*Cathartes aura*
Veery	*Catharus fuscescens*
Hermit Thrush	*Catharus guttatus*
Brown Creeper	*Certhia americana*
Killdeer	*Charadrius vociferus*
Northern Flicker	*Colaptes auratus*
Olive-sided Flycatcher	*Contopus cooperi*
Eastern Wood-Pewee	*Contopus virens*
Ruby-crowned Kinglet	*Corthylio calendula*
American Crow	*Corvus brachyrhynchos*
Common Raven	*Corvus corax*
Blue Jay	*Cyanocitta cristata*
Downy Woodpecker	*Dryobates pubescens*
Hairy Woodpecker	*Dryobates villosus*
Pileated Woodpecker	*Dryocopus pileatus*
Gray Catbird	*Dumetella carolinensis*
Alder Flycatcher	*Empidonax alnorum*
Least Flycatcher	*Empidonax minimus*
American Kestrel	*Falco sparverius*
Common Loon	*Gavia immer*
Common Yellowthroat	*Geothlypis trichas*
House Finch	*Haemorhous mexicanus*
Purple Finch	*Haemorphous purpureus*
Wood Thrush	*Hylocichla mustelina*
Yellow-breasted Chat	*Icteria virens*
Baltimore Oriole	*Icterus galbula*
Dark-eyed Junco	*Junco hyemalis*
Belted Kingfisher	*Megaceryle alcyon*
Red-bellied Woodpecker	*Melanerpes carolinus*
Wild Turkey	*Meleagris gallopavo*
Swamp Sparrow	*Melospiza georgiana*
Song Sparrow	*Melospiza melodia*
Northern Mockingbird	*Mimus polyglottos*
Black-and-white Warbler	*Mniotilta varia*
Brown-headed Cowbird	*Molothrus ater*

Common name	Scientific name
Great Crested Flycatcher	*Myiarchus crinitus*
Double-crested Cormorant	*Nannopterum auritum*
Indigo Bunting	*Passerina cyanea*
Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Eastern Towhee	*Pipilo erythrophthalmus*
Scarlet Tanager	*Piranga olivacea*
Black-capped Chickadee	*Poecile atricapillus*
Blue-gray Gnatcatcher	*Polioptila caerulea*
Common Grackle	*Quiscalus quiscula*
Golden-crowned Kinglet	*Regulus satrapa*
Bank Swallow	*Riparia riparia*
Eastern Phoebe	*Sayornis phoebe*
Ovenbird	*Seiurus aurocapilla*
Black-throated Blue Warbler	*Setophaga caerulescens*
Yellow-rumped Warbler	*Setophaga coronata*
Prairie Warbler	*Setophaga discolor*
Palm Warbler	*Setophaga palmarum*
Chestnut-sided Warbler	*Setophaga pensylvanica*
Yellow Warbler	*Setophaga petechia*
Pine Warbler	*Setophaga pinus*
American Redstart	*Setophaga ruticilla*
Black-throated Green Warbler	*Setophaga virens*
Eastern Bluebird	*Sialia sialis*
Red-breasted Nuthatch	*Sitta canadensis*
White-breasted Nuthatch	*Sitta carolinensis*
American Goldfinch	*Spinus tristis*
Chipping Sparrow	*Spizella passerina*
Field Sparrow	*Spizella pusilla*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Tree Swallow	*Tachycineta bicolor*
Brown Thrasher	*Toxostoma rufum*
Winter Wren	*Troglodytes hiemalis*
American Robin	*Turdus migratorius*
Eastern Kingbird	*Tyrannus tyrannus*
Yellow-throated Vireo	*Vireo flavifrons*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*Vireo olivaceus*
Blue-headed Vireo	*Vireo solitarius*
Mourning Dove	*Zenaida macroura*
White-throated Sparrow	*Zonotrichia albicollis*

Common name	Scientific name
Fish	
Chain Pickerel	*Esox niger*
Bluegill	*Lepomis macrochirus*
Fungi	
hygroscopic earthstar	*Astraeus hygrometricus*
dragon horn	*Cladonia squamosa*
thin-walled maze polypore	*Daedaleopsis confragosa*
pink earth lichen	*Dibaeis baeomyces*
cowberry redleaf	*Exobasidium vaccinii*
greenshield lichens	*Flavoparmelia*
birch polypore	*Fomitopsis betulina*
common script lichen	*Graphis scripta*
common toadskin lichen	*Lasallia papulosa*
shield lichens	*Parmelia*
oyster mushrooms	*Pleurotus*
smokey-eyed boulder lichen	*Porpidia albocaerulescens*
smooth rock tripe	*Umbilicaria mammulata*
beard lichens	*Usnea*
Insects	
Ocellate Gall Midge	*Acericecis ocellaris*
Small Flat Diving Beetles	*Acilius*
Canada Darner	*Aeshna canadensis*
Spongy Oak Apple Gall Wasp	*Amphibolips confluenta*
Least Skipper	*Ancyloxypha numitor*
Checkered Apogeshna Moth	*Apogeshna stenialis*
Variable Dancer	*Argia fumipennis*
Violet Dancer	*Argia fumipennis violacea*
Leaf-rolling Weevils	*Attelabidae*
Stilt Bugs	*Berytidae*
Eastern Phantom Crane Fly	*Bittacomorpha clavipes*
Common Eastern Bumble Bee	*Bombus impatiens*
Wool Sower Gall Wasp	*Callirhytis seminator*
Eastern Pine Elfin	*Callophrys niphon*
Reticulated Net-winged Beetle	*Calopteron reticulatum*
[no common name]	*Campopleginae*

Common name	Scientific name
Holarctic Azures	*Celastrina*
Calico Pennant	*Celithemis elisa*
Banded Pennant	*Celithemis fasciata*
Blacklets	*Cheilosia*
Green-striped Grasshopper	*Chortophaga viridifasciata*
Morbid Owlet	*Chytolita morbidalis*
Twelve-spotted Tiger Beetle	*Cicindela duodecimguttata*
Six-spotted Tiger Beetle	*Cicindela sexguttata*
Spotted Pink Ladybeetle	*Coleomegilla maculata*
American Emerald	*Cordulia shurtleffii*
Bog Glyph	*Deltote bellicula*
Racket-tailed Emerald	*Dorocordulia libera*
Succulent Oak Gall Wasp	*Dryocosmus quercuspalustris*
Pale-winged Midget	*Elaphria alapallida*
Turquoise Bluet	*Enallagma divagans*
Slender Bluet	*Enallagma traviatum*
Prince Baskettail	*Epitheca princeps*
Juvenal's Duskywing	*Erynnis juvenalis*
Eastern Pondhawk	*Erythemis simplicicollis*
Powder Moth	*Eufidonia notataria*
Oriental Beetle	*Exomala orientalis*
Water striders	*Gerris*
Asian Lady Beetle	*Harmonia axyridis*
Buck Moth	*Hemileuca maia*
Witch-hazel Cone Gall Aphid	*Hormaphis hamamelidis*
Giant Leopard Moth	*Hypercompe scribonia*
Lilypad Forktail	*Ischnura kellicotti*
Fragile Forktail	*Ischnura posita*
Eastern Forktail	*Ischnura verticalis*
White Corporal	*Ladona exusta*
Chalk-fronted Corporal	*Ladona julia*
[no common name]	*Laphria flavicollis*
Sweetflag Spreadwing	*Lestes forcipatus*
Elegant Spreadwing	*Lestes inaequalis*
Slender Spreadwing	*Lestes rectangularis*
Swamp Spreadwing	*Lestes vigilax*
Frosted Whiteface	*Leucorrhinia frigida*
Spangled Skimmer	*Libellula cyanea*
Slaty Skimmer	*Libellula incesta*
Widow Skimmer	*Libellula luctuosa*
Four-spotted Skimmer	*Libellula quadrimaculata*
Lesser Maple Spanworm Moth	*Macaria pustularia*
[no common name]	*Machimus*
Red-legged Grasshopper	*Melanoplus femurrubrum*
Plant Bugs	*Miridae*
Sawyer Beetles	*Monochamus*
Tumbling Flower Beetles	*Mordellidae*
Elfin Skimmer	*Nannothemis bella*
Sedge Sprite	*Nehalennia irene*
Banded Olethreutes Moth	*Olethreutes fasciatana*
Blue Dasher	*Pachydiplax longipennis*
Jeweled Tailed Slug Moth	*Packardia geminata*
Eastern Amberwing	*Perithemis tenera*
Lancet Clubtail	*Phanogomphus exilis*
Giant Casemaker Caddisflies	*Phryganeidae*
Crescents	*Phyciodes*
Common Whitetail	*Plathemis lydia*
[no common name]	*Polydrusus cervinus*
[no common name]	*Proctacanthus*
[no common name]	*Pseudexentera costomaculana*
Large Lace-border Moth	*Scopula limboundata*
Black Flies	*Simuliidae*
Meadowhawks	*Sympetrum*
Oak Leafrolling Weevil	*Synolabus bipustulatus*
[no common name]	*Tipula*
[no common name]	*Zanclognatha*
Mammals	
Coyote	*Canis latrans*
American Beaver	*Castor canadensis*
North American Porcupine	*Erethizon dorsatum*
North American River Otter	*Lontra canadensis*
Bobcat	*Lynx rufus*
Meadow Vole	*Microtus pennsylvanicus*
White-tailed Deer	*Odocoileus virginianus*
Common Raccoon	*Procyon lotor*
Eastern Gray Squirrel	*Sciurus carolinensis*
Eastern Chipmunk	*Tamias striatus*

Common name	Scientific name
American Red Squirrel	*Tamiasciurus hudsonicus*
American Black Bear	*Ursus americanus*
Red Fox	*Vulpes vulpes*
Plants	
striped maple	*Acer pensylvanicum*
red maple	*Acer rubrum*
common yarrow	*Achillea millefolium*
wild sarsaparilla	*Aralia nudicaulis*
red threeawn	*Aristida longespica var. geniculata*
common milkweed	*Asclepias syriaca*
greater whipwort	*Bazzania trilobata*
Japanese barberry	*Berberis thunbergii*
yellow birch	*Betula alleghaniensis*
sweet birch	*Betula lenta*
paper birch	*Betula papyrifera*
gray birch	*Betula populifolia*
brocade moss	*Callicladium imponens*
Pennsylvania sedge	*Carex pensylvanica*
American chestnut	*Castanea dentata*
oriental bittersweet	*Celastrus orbiculatus*
American bittersweet	*Celastrus scandens*
spotted knapweed	*Centaurea stoebe*
buttonbush	*Cephalanthus occidentalis*
leatherleaf	*Chamaedaphne calyculata*
striped wintergreen	*Chimaphila maculata*
sweet-fern	*Comptonia peregrina*
threeleaf goldthread	*Coptis trifolia*
pink lady's slipper	*Cypripedium acaule*
swamp loosestrife	*Decodon verticillatus*
flat-branched tree-clubmoss	*Dendrolycopodium obscurum*
fan clubmoss	*Diphasiastrum digitatum*
spoonleaf sundew	*Drosera intermedia*
round-leaved sundew	*Drosera rotundifolia*
trailing arbutus	*Epigaea repens*
common boneset	*Eupatorium perfoliatum*
Joe-Pye weeds	*Eutrochium*
glossy buckthorn	*Frangula alnus*
New York scalewort	*Frullania eboracensis*

Common name	Scientific name
eastern teaberry	*Gaultheria procumbens*
checkered rattlesnake plantain	*Goodyera tesselata*
common witch-hazel	*Hamamelis virginiana*
azure bluet	*Houstonia caerulea*
St. John's wort	*Hypericum*
winterberry holly	*Ilex verticillata*
small whorled pogonia	*Isotria medeoloides*
sheep laurel	*Kalmia angustifolia*
swamp laurel	*Kalmia polifolia*
narrow-leaved everlasting-pea	*Lathyrus sylvestris*
Morrow's honeysuckle	*Lonicera morrowii*
bird's-foot trefoil	*Lotus corniculatus*
stag's-horn clubmoss	*Lycopodium clavatum*
he-huckleberry	*Lyonia ligustrina*
starflower	*Lysimachia borealis*
whorled loosestrife	*Lysimachia quadrifolia*
swamp candles	*Lysimachia terrestris*
purple loosestrife	*Lythrum salicaria*
Canada mayflower	*Maianthemum canadense*
Indian cucumber root	*Medeola virginiana*
narrowleaf cow wheat	*Melampyrum lineare*
partridgeberry	*Mitchella repens*
American white waterlily	*Nymphaea odorata*
black gum	*Nyssa sylvatica*
evening-primrose	*Oenothera*
American royal fern	*Osmunda regalis*
cinnamon fern	*Osmundastrum cinnamomeum*
red pine	*Pinus resinosa*
pitch pine	*Pinus rigida*
eastern white pine	*Pinus strobus*
fringed polygala	*Polygaloides paucifolia*
coastal jointweed	*Polygonella articulata*
polypody ferns	*Polypodium*
haircap mosses	*Polytrichum*
bigtooth aspen	*Populus grandidentata*
trembling aspen	*Populus tremuloides*
common selfheal	*Prunella vulgaris*
common bracken	*Pteridium aquilinum*
Callery pear	*Pyrus calleryana*

Common name	Scientific name
white oak	*Quercus alba*
bear oak	*Quercus ilicifolia*
black oak	*Quercus velutina*
shining sumac	*Rhus copallinum*
willow	*Salix*
purple crownvetch	*Securigera varia*
silverrod	*Solidago bicolor*
bluestem goldenrod	*Solidago caesia*
American bur-reed	*Sparganium americanum*
sphagnum mosses	*Sphagnum*
white meadowsweet	*Spiraea alba*
ladies'-tresses	*Spiranthes*
eastern skunk cabbage	*Symplocarpus foetidus*
marsh fern	*Thelypteris palustris*
blue curls	*Trichostema dichotomum*
red clover	*Trifolium pratense*
eastern hemlock	*Tsuga canadensis*
colt's-foot	*Tussilago farfara*

Common name	Scientific name
sessile bellwort	*Uvularia sessilifolia*
Northern highbush blueberry	*Vaccinium corymbosum*
American cranberry	*Vaccinium macrocarpon*
great mullein	*Verbascum thapsus*
mapleleaf viburnum	*Viburnum acerifolium*
violets	*Viola*
Reptiles	
Common Snapping Turtle	*Chelydra serpentina*
Painted Turtle	*Chrysemys picta*
Eastern Milksnake	*Lampropeltis triangulum*
Northern Watersnake	*Nerodia sipedon sipedon*
Musk Turtle	*Sternotherus odoratus*
Ribbon Snake	*Thamnophis saurita*
Common Garter Snake	*Thamnophis sirtalis*
Segmented Worms	
Smooth Turtle Leech	*Placobdella parasitica*