The Holt Pond Preserve
Field Guide
and
Interpretive Trail

A magical place to explore…..

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Acknowledgements

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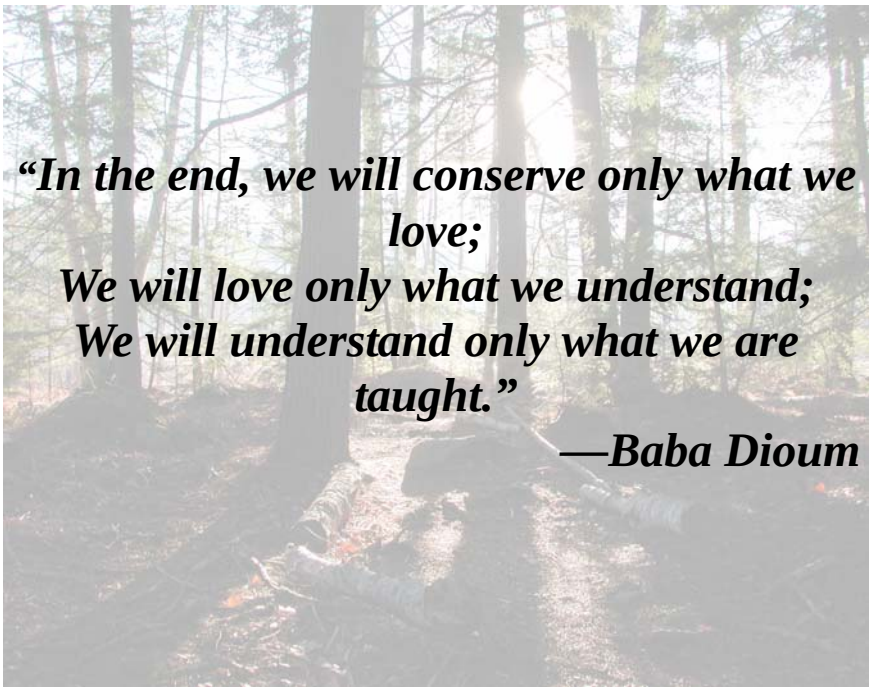


Introduction

The ice cracks beneath your feet as you carefully make your way over the boardwalk. The sound of the crisp snow is accentuated by the silence of the preserve in mid-January. A cold breeze makes your cheeks tingle. A rustle in the bare speckled alders catches your attention and you spot a fluffed chickadee shivering like you. Frozen tracks in the ice tell of a coyote's wanders through the preserve, and you notice the predator's path leading to the beaver lodge. Did he eat that day?

The sound of melting snow accompanies the fervent calls of songbirds returning from their winter vacation. Excited pitches from yellow warblers, common yellow throats, and scarlet tanagers welcome the new season at Holt Pond as the silence of winter becomes a memory. Bright green sphagnum moss pushes through the vanishing snow. You gingerly try to hop over a submerged section of boardwalk, and smile as one foot sinks into muck. Oh, to be a swamp-walker in the spring-time! Spring in the wetlands is a time of renewal, rebirth, and vibrant growth. You breathe in pure energy.

Tracks tell a story

The spring buds give way to summer leaves of brilliant green. Fragrant water lilies dot the pond and water vapor rises in waves from the quaking bog. Young moose take their first steps on their own, exploring the wilds of Holt Pond with their mothers. Young warblers, robins, crows, and hawks call to their parents from the protection of nests. Pitcher plants and orchids relish the saturated soils and sunlight, sending up beautiful flowers of red and pink. The preserve hums with life (and black flies!)

The greens slowly turn to reds, as the swamp maples feel the cold nights and decreasing sunlight first. Tussock sedge and leather leaf fade from green to reddish brown. Holt Pond celebrates the coming of a new season and says goodbye to summer with a festival of color: red, orange, pink, purple, brown, and yellow delight the eyes. Early morning frosts coat the landscape with crystal jewels and frogs move underground to escape the chill. Day by day, the silence of winter resumes, as the birds leave, the leaves drop, and the wind sails over brittle grasses and sedges. A visit to Holt Pond in each season illustrates how changing our landscape is, how dynamic and alive. Allow yourself to relish the beauty in this place called Holt Pond.

Kiosk

This guide is designed for use starting at the Kiosk.

The Holt Pond Preserve was created in 1971 when LEA purchased 30 acres of woodlands and stream. The preserve now contains over 450 acres and adjoins other preserves, such as the Loon Echo Land Trust's Bald Pate Preserve. The preservation of large tracts of land allows animals and birds ample habitat,

which protects bio-diversity. It also prevents runoff and pollutants from harming water quality and allows people to explore different ecosystems and learn about nature in its many forms. Holt Pond is a unique place to visit, as the boardwalk system allows exploration of places that are normally difficult to access. Although the Holt Pond Preserve was designed as a place for education, it is also valuable habitat for many of Maine's wild creatures. Please respect the following guidelines during your visit:

- No Dogs
- Carry in / Carry out trash
- Stay on marked trails and boardwalk
- Do not remove any plants or animals
- No fires or overnight camping
- No motorized vehicles or mountain bikes
- Please remain quiet and respect others' use of the preserve
- **Take only memories; leave only footprints** and enjoy your visit to the Holt Pond Nature Preserve.

Interpretive Trail Sites

1. Stonewall

You have just traveled through a mixed forest of beech, birch, red pines, and hemlocks. You are at a stonewall. Look around you for evidence of human use of the land. Why is this stonewall here? The size of the rocks in the wall tell a story, as does the age of the forest behind you. Roughly 100 years ago, you would have just walked through a pasture. The stones are mostly large, indicating that the land was not used for agriculture. Stonewalls next to agricultural land have large and small stones, as farmers removed both to prevent plow damage (Wessels, 1999). Most likely, this wall kept cattle from penetrating the swamp. As you walk through the Maine woods, look for these relics of a different time, and think about the ever-changing landscape.

2. Introduction to Wetlands

Frozen Sphagnum Moss

There are two primary categories of wetlands in New England, specifically coastal and inland. Coastal wetlands have salt water. Inland wetlands occur where fresh water collects, such as in isolated depressions, in ponds and lakes, and along the floodplains of rivers and streams. There are three different types of freshwater wetlands. Palustrine wetlands are marshes, swamps, bogs, fens, and ponds. Lacustrine wetlands are permanently flooded lakes and reservoirs. Riverine wetlands have deep-water areas with flowing water. Scientists classify different wetland types by looking at the vegetation, water levels, and soils. For example, you are standing in a palustrine forested wetland, or a wooded swamp. The soils are dark,

organic, and very wet; the dominant plants are trees; and the water is coming from Muddy River overflow and groundwater seepage. As you walk through the preserve, try to identify the different wetlands around you.

3. Red Maple Swamp

Looking to your right, notice the stand of trees that surrounds you. You are in a red maple swamp, a type of forested wetland. As mentioned above, wetlands are determined by looking at three different factors: 1) Hydrology: Where does the water come from? 2) Hydric soils: How wet and what type of soils are present? 3) Hydrophytic vegetation: What kind of plants live in the wetland? The basic definition of a wetland is land that is wet all or part of the year. Thirty-three percent of the Holt Pond Preserve is wetland and of the 25 natural communities we have here, 18 are different types of wetlands.

As you walk along, notice the plants that grow in different places and start to think about how the connections between the three wetland factors vary throughout the preserve. For example, areas with flowing water, such as the forested swamp next to Sawyer brook have mineral soils, whereas the quaking bog overlooking the pond has organic soils. How does the hydrology in these two places affect the accumulation of certain soil types? What types of plants grow in these different soils? Wetlands are a mystery waiting to be solved, so ask questions and try to discover the mosaic of connections around you.

Beaver, *Castor canadensis*

4. Beaver Chews

Notice the beaver chews to your right. The beavers chewed far enough into these trees to kill them. Beavers do not eat hemlock trees due to the tannic acid in their bark and trunk. So why would they use energy to chew them? Beavers "girdle" hemlocks, chewing into the cambium layer to cut off nutrient flow through the tree (Wessels, 1999). The hemlocks will eventually fall over, opening the canopy for first generation trees like red maples, birches, aspens, and their favorite: alders. Look at the bottom of the hemlock trunks and you will probably find red maple or aspen seedlings starting to sprout (if they aren't covered in snow!) Who knew beavers practice selective cutting!?

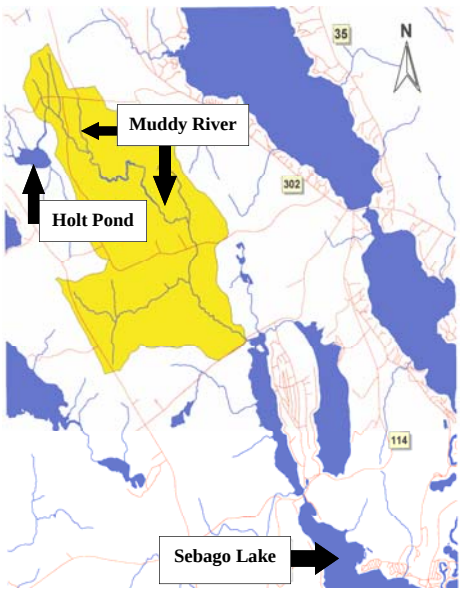
5. Upland Hummock

There is a dramatic change in vegetation here. Hemlocks have replaced the water loving red maples and the soil is relatively dry. You are standing on a 10,000 year old glacial deposit. The Laurentide ice sheet started to recede 13,000 years ago and melt water deposited nutrient rich pockets of soil. These

glacial deposits amidst the lower, wetter soils add to the ecological diversity at Holt Pond, as birds, insects, mammals and amphibians seek habitat on these "islands." Look around on this hummock and you may see evidence of blue jays, fishers, red squirrels and chipmunks, minks, and moose, among others. Turn over a log, and you may catch a glimpse of a red backed salamander, darting for cover. Remember to turn the log back to the original position when you are done investigating.

6. Muddy River

You are now overlooking the Muddy River, which flows out of the northeast corner of Holt Pond. The Muddy River is the only outlet from Holt Pond and eventually flows into Sebago Lake. Therefore, Holt Pond and the Muddy River are in the Sebago Lake watershed. A watershed is the land that water travels over and through to get to a water body, and is otherwise known as a drainage basin. Holt Pond will never be developed, therefore pollution resulting from shoreline disturbance does not threaten the water quality in the pond. The water leaving Holt Pond and flowing into Sebago Lake by way of the Muddy River is clean. Sebago Lake provides the city of Portland with drinking water and this drinking water is protected by the preservation of land in its headwaters. The connections in watersheds illustrate how we are all tied together through our environment. Even though Bridgton may seem a far distance from Portland, our water resources connect us. What we do to the land affects the quality of water we all have to drink, not only in our own backyards but within the state, country, and planet.



Muddy River Watershed

7. Beaver Lodge

The beaver is the largest rodent in North America. Interestingly, beavers share the distinction with humans as being the only species to create their own habitat. There are at least two families of active beavers in the preserve. Holt Pond is a perfect habitat for these animals, as there is an ample food source of speckled alders, red maples, poplars and birches. Beavers instinctively dam waterways because higher water levels give them a greater ability to escape predators. The higher water also helps kill the trees that they will then harvest for their dams, lodges, and food supply. Beavers are herbivores, feeding mainly on bark, sticks, and aquatic plants such as water lily stems. They are territorial and

will slap their tails on the water to warn other beavers of danger and attempt to scare away a trespasser. Beavers are primarily crepuscular, which means their high activity time occurs at dawn and dusk. So, if you want to catch sight of this mammal at Holt Pond, visit the Muddy River early and late in the day, and take time to sit quietly and wait. Eventually, you are guaranteed to see one of these busy creatures, working to maintain the wetlands at Holt Pond.

Note: The beaver dam is further down the river and can be accessed by taking the road in the parking area to the Muddy River and turning left onto the Tingley Brook trail.

8. Cattail Path - *Typha latifolia*

To your left is a colony of broad-leaved cattails. The flowering part of this plant resembles a corn dog on a stick and lower on the stem you will find pale green sword-like leaves. The cattail plays an interesting role in wetland succession. A single seed from the cattail flower can produce a network of rhizomes and one hundred shoots in a season. The rhizomes form a thick horizontal mat that traps decaying debris, allowing this debris to slowly decompose and form soil. As more soil accumulates, cattails are displaced by plants that need drier pockets of soil, such as tussock sedge. Beyond cattails' role in wetland succession, they are also known as "the supermarket of the swamp." Young cattail shoots, stems, roots, and flowers can be eaten cooked or raw. The rhizomes can be ground into flour and baked. Cattails have also been woven into mats and baskets, ground into pulp for paper, and the fluff from the seed heads have been used for things ranging from life preservers to wall insulation (Lyons and Jordan, 1989).

9. Heart of the Preserve

Pause here in the heart of the preserve for quiet reflection. Think about all you have seen so far and take a minute to appreciate the work that went into this preserve. From this spot, you have a good vantage point for observing the different areas of the preserve. It includes land to the south, along the opposite shore of the pond, around the western edge of the pond (connecting to Loon Echo's Bald Pate Preserve), behind you through the red maple swamp, and across Grist Mill Road to Byrons Hill. All of this land will forever be protected from development, offering a quiet spot in this increasingly busy world.

10. Second Hummock

Entering the shade of the hemlock canopy, look around to sense the age of this hummock. The natural community type on this hummock is Hemlock-Yellow Birch. The presence of yellow birches indicates that this is an older forest community, as yellow birches are the last of the birches to grow in forest succession. White birch grows up in disturbed sites first, followed by gray and then yellow. Notice the old dead trees, also known as snags. Snags are like all-you-can-eat buffets for a variety of creatures, from slime molds and insects to birds and small mammals like chipmunks and weasels. Old dead trees provide habitat and are also important for soils, for as they break down, they contribute nutrients, aiding the growth of new trees. Dead trees are an important part of

healthy forest ecosystems, so the next time one dies on your property, let it stand, and appreciate the value in both its life, and its death.

11. Beginning of Overlook Boardwalk

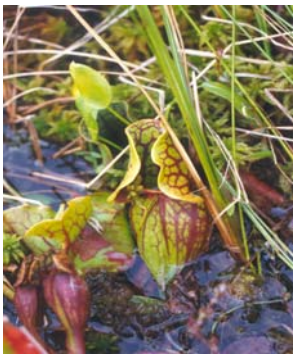
You are about to step into a world where plants eat insects, the ground beneath you moves, and snapping turtles, muskrats, and moose play in the mud. The Holt Pond overlook boardwalk was built to protect the fragile ecosystem of this quaking bog and visitors to this beautiful spot. The quaking bog is made up of a floating mat of sphagnum moss. Sphagnum moss is one of the first plants to colonize open water. It grows outward over the water, and as it dies, peat accumulates underneath it. The bog is not actually rooted into anything and can have open pockets where water shows through. When you reach the end of the boardwalk, bend your knees twice to see if you can actually feel the quaking effect, but don't rock the boardwalk too hard or you might fall off!

12. Bogs

The word bog comes from the Celtic word bocc, which means "soft." Wetlands are "soft" in terms of their plants, such as the willowy wool grass surrounding you here and the sphagnum moss that squishes underfoot. They are also soft because they are fragile delicate places where magical processes happen. This feeling of the magic in bogs has been celebrated throughout human history. Archeologists have found bodies from as early as 1500 B.C. in northern European bogs. The theory is that these early people made sacrifices to the goddess of fertility, Nerthus, through rituals focused on places of high fertility, specifically wetlands (Johnson, 1985). Generally, people refer to all wetlands as bogs but there are actually few true bogs in Maine. A true bog is a wetland that receives all of its water from precipitation. This means that true bogs do not get water from runoff or groundwater, making them highly nutrient poor and very acidic. Like bogs, a fen is an area dominated by sphagnum moss, but fens receive nutrients from groundwater and runoff, resulting in higher plant diversity than true bogs. So, as you look out over the quaking "bog" realize that it is a misnomer, because this mat of vegetation receives runoff and groundwater discharge, making most of this area technically a fen.

13. Pitcher plants

The cup shaped, red and green plants next to the boardwalk are pitcher plants. Pitcher plants are a good illustration of how wetland plants and animals have adapted to living in a harsh environment. Pitcher plants are carnivorous, which means they eat insects. Attracted to the plant's bright colors and scent, the insect lands on the hairy upper lip and is forced into the body of the plant by downward facing hairs. As it crawls down into the plant, the insect hits a slippery wall, forcing it towards inevitable doom: a pit of acid. If the insect tries to fly



Pitcher Plants, *Sarracenia purpurea*

away, the pitcher plant sloughs cells onto its feet, making take off difficult. When the insect hits the pool of acidic water in the cup of the plant, it drowns. The pitcher plant secretes enzymes that break down the insect and extract nutrients, such as nitrogen. In addition to pitcher plants, you can find two other carnivorous plants at Holt Pond: sundews and bladderwort. Many curious naturalists have asked if they can stick their finger into the mouth of the pitcher without losing it. Try it if you are brave.

14. Where the Boardwalk Ends

Take a moment and enjoy this spectacular view. To the southwest, Bald Pate sticks its head over the tree line. To the west, there is a heron rookery high on the dead pines emerging from the shrub swamp. Look for large stick masses on the top of the old dead trees. Across the pond, observe the beaver lodge and the extensive girdling these beavers have done to the hemlocks along the southern shore. Looking to the northwest, notice the transition zones between the many different natural communities here at Holt Pond. In the distance is the upland forest of pines, hemlocks, oaks, and beeches. Moving closer to the pond, red maples take over as the soils become more saturated. The red maples give way to tamaracks and alder shrubs, as sphagnum moss dominates the groundcover. The trees dwindle and an expanse of leatherleaf, sweet gale, sheep laurel, and sedges rise up from the quaking bog. And finally, turn your gaze to the pond. Enjoy this view through the seasons, when it is frozen and quiet in winter, scattered with migrating waterfowl in spring, bursting with yellow and white water lilies in summer, and blazing with the color of reflected leaves in fall.

15. Moose Alley

Moose, *Alces alces*

Walking down "tire highway," you are in the red maple swamp again. Moose travel through the red maple swamp all year long. In the summer, they seek the cool wet sphagnum and the shade of the trees. In late winter, when other food sources have been depleted, they turn to the bark of red maples to satisfy their hunger. You can see evidence of "moose browse" on several trees here. Look left and right at the red maple trees. Notice the long scars 1/4 to 1/3 of the way up the trunks. Moose use their lower incisors to scrape up on the bark of red maples. The scars can extend far up the trunk, as the moose strips the bark off. On fresher browse, you can often see the teeth marks and the shavings from where the moose scraped. And maybe, if you are lucky (and quiet) you will see the moose in action!

16. Ginseng Path

Dwarf Ginseng, *Panax trifolius*, is a small woodland plant that grows 4-8" tall in rich, moist soil. The plant has three whorled leaves, each divided into three leaflets. The flower is a small, delicate, white-cream umbel, rounded at the top,

with 5 narrow petals. The fruit is a greenish yellow berry. Dwarf Ginseng is only above ground for 6-8 weeks each year. Look for this plant here in April through June. Medicinally, the entire plant was used by many native New England tribes for increasing energy and endurance, healing rheumatism and general pain, relieving nervousness, colic and indigestion, and as a general overall body tonic. It does not have a contemporary commercial use. Plant populations in Maine and other New England states are low but are not threatened yet. This plant's relative, Wild American Ginseng, has been eliminated from the wild in Maine.

17. Hemlock Hill

Standing amongst hemlocks, *Tsuga Canadensis*, it is easy to feel like you are in an enchanted forest. The hemlock boughs filter sunlight and the forest floor is littered with needles and small cones, creating a cushion for the feet as you walk along. Throughout these woods, you will find signs of animals. In the winter, look for the tracks of deer and fisher, as both of these animals seek shelter and food amongst the hemlocks. Deer will often "yard up" or "bed down" in hemlock groves because the snow cover under the sheltered limbs is not as deep as in open areas. The thinner snow cover allows for energy conservation and shelter from winter elements. Predators, such as fishers and coyotes, also take advantage of the lighter snow cover, so watch for their paths as they look for their next meal. In other months, you may notice small branches and piles of needles scattered at the base of trees. Look at the ends of these sticks and you will notice that they have been chewed. If this is a large branch, then a porcupine was probably the chewer. If the branch is small, around five inches or so, with many scattered cones around, then a red squirrel was probably behind the act. Both forest creatures like the bark, and red squirrels will stash the cones in a food cache. Walking slowly through the hemlocks you are bound to discover some mystery in this mystical wood.

18. Sawyer Brook and the Tea Garden Bridge

Sawyer Brook flows out of Adams Pond. The land around this stream demonstrates how humans can alter a landscape in complex ways. This area of Bridgton, called Fosterville, supported a growing community in the early 1800's. Mills were an important part of the economy throughout Maine and these mills relied on hydropower. A canal was dug between Adams Pond and Foster Pond (also known as Ingalls Pond) to increase the flow to mills below Foster Pond. The canal diverted water from Sawyer Brook, creating much drier conditions in the area in which you now stand. There are many eastern white pines in this section of the preserve, a tree species that normally grows in dry, well-drained soils. You may have noticed in this last section of the trail that these trees have extensive shallow root systems. You probably tripped over one or two of them! Once the canal was abandoned, the water table rose again as water returned to Sawyer Brook, and inundated the soils. The pines that had sprouted during the drier period adapted by sending out shallow roots, seeking dry soil. This link to land use history leads to questions about how plant and animal species will have to adapt to the significant changes humans are making to the land and

climate in our time. Start looking for clues to ways in which they already have.

19. Windstorm Way

Put your naturalist skills to the test at this site as you try to figure out what happened here. Clue #1: The trees all fell in the same direction. Clue #2: These are all pine trees which normally send deep root systems into the soil for support. Clue #3: The trees fell towards the west. Here is the story. Thinking back to the last stop, remember that this area was once drier, due to the canal between Adams Pond and Foster Pond. During this dry period, white pines grew. The water table rose as the canal went dry and water returned to Sawyer Brook. As the water table rose, the pines sent out shallow root systems, seeking dry soil. The shallow root systems do not fully support the tall pines. Sometime in the early 1980's, a windstorm out of the northeast came through here. The combination of an abnormal wind direction and the shallow roots made these pines susceptible to wind throws, and down they came.

20. Vernal Pools

Unless it is early spring, it will be difficult to know that this area is a hot spot for vernal pools. Vernal pools are temporary wetlands that are essential breeding ground for wood frogs, spotted and blue spotted salamanders, and fairy shrimp. These species are considered obligate vernal pool species, meaning they only breed in vernal pools. There are other species who use vernal pools, such as spring peepers, eastern newts, and spotted turtles. These species are called facultative species, which means their presence does not necessarily mean that a body of water is a vernal pool. Vernal pools are defined by three criteria: they usually dry up in the summer (although not always); they are fishless environments; and they support a breeding population of at least one of the obligate species above. The best time to look for vernal pools is during the first warm night rains of spring. If you are lucky, you will experience "Big Night" when a massive migration of wood frogs and spotted salamanders takes place, as these creatures return to their natal vernal pool (Carroll, 2001). In our increasingly fragmented landscape, vernal pools are seriously threatened by development. Because they are dry most of the year, their presence in a site can go unnoticed, making them susceptible to destruction. The loss of vernal pools and the surrounding upland habitat is linked to the world-wide decline in amphibian species. So, next spring, take the time to look around your house and school to find these small jewels of the woods and document their presence. Listen for the unmistakable quacking of the wood frogs and look for the speckled beauty of the spotted salamanders. For more information about cataloging vernal pools, stop by LEA at 102 Main Street in Bridgton.

Wood Frog, *Rana sylvatica*

21. Mink Sign

Think back over your journeys. Have you seen any piles of scat on the boardwalk? Were these piles long, dark brown to black, twisted, containing fish scales or small rodent bones? If you answered yes to any of these questions, you were probably looking at mink scat. Minks mark their territory with scat piles and they have very obviously claimed Holt Pond as their home turf. It is estimated that there are five minks in the area surrounding Holt Pond, as minks prefer lakeshores, streams, rivers, and freshwater and saltwater marshes for habitat. They also look for log-strewn forested wetlands with ample cover and a dependable food supply. The Holt Pond Preserve meets all of these requirements! Minks are an important indicator of mercury pollution. Because fish, frogs, salamanders, crayfish, and clams make up a large part of their diet, minks accumulate mercury in their bodies. In areas with high levels of mercury in lakes, minks are often poisoned (DeGraaf and Yamasaki, 2001). Fortunately, all signs indicate that Holt Pond is a healthy ecosystem for these curious mammals.

Mink, *Mustela Vison*

22. Pileated Woodpecker - *Dryocopus pileatus*

Because pileated woodpeckers prefer mature, deciduous, mixed, and coniferous forests near water, you will see many signs of these birds in the upland sections of the preserve. They prefer areas with large dead trees for nesting and feeding and their favorite meal is a nice pile of carpenter ants. Leaving large, oval shaped holes, like the one here, pileated woodpeckers help other forest creatures meet their habitat needs. Owls, chipmunks, squirrels, and other small mammals seek shelter in these tree cavities. Due to extensive clearing in the eighteenth and nineteenth centuries, the pileated woodpecker was on its way to extinction by 1900. With the re-growth of forests and the subsequent regeneration of large tree species, this bird has made an impressive comeback and is now considered common in New England. So, watch for a flash of red through the trees as these birds dip and glide through the pine knoll forest.

23. Pine Knoll and Agriculture

The white pine knoll is the only place in the preserve that was once used for agriculture. Evidence of farming activities exist here, one being the presence of an almost pure stand of pines. Eastern white pines, *Pinus strobus*, are a common pioneer species on abandoned agricultural land in New England (DeGraaf and Yamasaki, 2001). The white pine forests that develop after agricultural use generally do not succeed themselves, and you can see in this forest that shade tolerant beech and birch will eventually replace these stately pines.

24. Shrub Swamp: Meeting Habitat Requirements

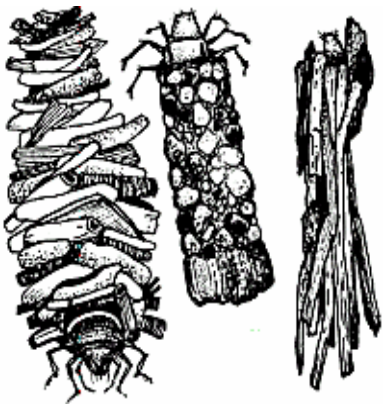
The word habitat refers to a specie's need for four components in an ecosys-

tem: food, water, shelter, and space. When these four requirements are met, a healthy habitat is the result. This shrub swamp is an important habitat for many creatures at Holt Pond, as it provides dense cover for shelter and nesting space, ample food, and access to water. Here are highlights on some of the species you might find here.

- **Common Yellowthroat -** *Geothlypis trichas*: The common yellowthroat is one of the most abundant breeding warblers in New England and they prefer dense brushy habitat in wet areas. Look for yellowish flashes and the unmistakable black mask of common yellowthroats as they dart from shrub to shrub. Listen for their high pitched "*witchity witchity witchity*" call during their mating season at the beginning of May. Other birds you are likely to see here are song and swamp sparrows; hooded, pal, and wilson's warblers; red shouldered hawks; and common snipes.
- **Green Frog -** *Rana clamitans melanota*: Walking slowly over the boardwalk, you might get the feeling you are being watched. Peer into the shallow water in the shrub swamp and you see bulging eyes set in a green face staring intently at you, sizing up this visitor to their home. Green frogs are common throughout New England and spend the cold winter months hibernating underwater or underground. During their active season, from April to September, they feed on insects, worms, small fish, crustaceans, newts, and spiders.
- **Raccoon -** *Procyon lotor*: Although raccoons are increasingly found in urban and residential areas, they are first and foremost mammals of wetlands. Finding a raccoon print in the mud is always a delight, as you can clearly see their fingers and palms, resembling a small human hand. Raccoons use these hands to poke and prod their food to remove any indigestible parts. Washing the food with water helps them mash it up before they eat it. Raccoons are busiest in the fall, packing on the pounds before the long winter months. If necessary, raccoons can survive all winter without eating by minimizing their activity and relying on stored fat supplies.

25. Grist Mill Brook

Biological monitoring of a stream can tell you a lot about water quality. This activity simply looks at different groups of living organisms, from fish to plants to insects, to determine how clean the water is. One type of biological monitoring looks at Benthic macro-invertebrates, or BMIs. BMIs are organisms that live on the bottom of rivers, lakes, and ponds. Examples include dragonfly, caddisfly, and mayfly nymphs; leeches; snails; and aquatic worms. Certain BMIs, like caddisflies and mayflies, need clean water, while others, such as leeches and snails are pollution tolerant. The kind



Caddisfly Nymph

and number of different organisms found in a water body can be an important part of any water quality study. Because BMIs cannot readily leave their habitats, they are directly affected by the surrounding upland environment. Problems such as erosion and sedimentation, agricultural runoff, and toxic discharge will have a direct impact on organisms that need high oxygen levels and clear, silt-free waters. Benthic macro-invertebrate sampling is as easy as taking a kitchen sieve to a local lake or river and digging around in the mud. Although formal scientific investigations require more advanced techniques, you can learn a lot about local water quality through this simple method. Looking at the waters in Grist Mill, you are likely to find caddisfly nymphs, mayfly nymphs, dobsonfly larvae, black fly nymphs, aquatic worms, and dragonfly nymphs. The diversity and abundance of these organisms shows that water flowing into Holt Pond through the Grist Mill Brook is clean.

End of the first section of trail

Southern Shore Trail

26. Groundwater Spring

Groundwater is water that is stored underground. Where water exits the groundwater system is called a discharge area, or groundwater spring. Pockets of groundwater discharge like this one exist throughout the preserve, creating varied hydrological conditions that promote the growth of a variety of plants such as sheep laurel, maleberry, tamarack, and broadleaf cattail in close proximity to one another. The basin-like nature of the Holt Pond watershed indicates that ample groundwater discharges into Holt Pond, bringing with it nutrients, colder temperatures, and oxygen. Even in dry periods, open water channels can be observed throughout the shrub swamps due to ample groundwater discharge in the wetlands surrounding the pond.

27. Sweet Fern

Take a deep breath here and try to smell the sweetness in the air. You are standing among sweet ferns, a shrub that grows in sandy, exposed soils, usually in disturbed areas. Medicinally, sweet fern was used by some native tribes for insect bites and stings. The fragrant leaves were crushed and rubbed on the skin to ward off biting insects. A poultice or bath of the leaves was used to relieve poison ivy rashes. And, the astringent leaves were drunk in teas for indigestion and diarrhea.

28. Ice Push Ridge

The berm upon which you are standing is a glacial ice push ridge. When the Laurentide ice sheet receded, it deposited a bouldery till along the edge of the pond. This till was then reshaped by the movement of ice in the pond. Ice push ridges are common along pond and lake edges where lake ice plows up rocks and soil into low ridges that run parallel to the shore.

29. Great Blue Herons on the South Shore

In planning the trail, the Holt Pond Steering Committee decided to let the southern shore remain natural, as many animals seem to travel the ice push

ridge and seek shelter along the shoreline. On one trail planning visit, we came upon two great blue herons, *Ardea herodias*, silently stalking frogs next to the beaver lodge. Even though we were quiet, the herons noticed our presence and took off into the air, giving us a loud squawking good-bye. We realized that although we may have the best intentions when we go into the natural world, a balance must be struck between our interests and wildlife needs. This is why we did not put trail along the southern shore and have limited access to vantage points. After all, we do not want to permanently scare away the creatures who truly call Holt Pond home.

30. Fire Evidence

Looking around you, try to find clues to the history of this forest. Many of the trees in this area are young and even aged. There are several multiple trunked trees, mostly red maple. Many of the older trees have basal scars. The soils here are dry, sandy, and well drained. All of these clues lead to the discovery that this site was disturbed by fire in the 1960's.

31. Beaver Lodge, Southern Shore

Beavers start building their lodge on an elevation at the pond's edge. As water levels rise from damming activity, they further build up the lodge. The floor is just above water level, and the interior is kept hollow as the lodge is built. Beavers access their inner sanctum through one or more underwater tunnels. Beavers form monogamous pairs and their family size ranges from 3 to 8 individuals, producing one litter each year, with usually 2-4 kits (baby beavers). Beavers stay with their parents until they reach sexual maturity at age two, then they leave the colony in search of their own territory. In a country that has lost 50% of its wetlands in the last 300 years, beavers play an important part in creating new wetlands and habitat. Many of the endangered species in Maine rely on wetlands for all or part of their habitat needs, such as the Blanding's turtle, the ringed bog-hunter (dragonfly), and the roseate tern. The disappearance of wetlands is connected to the decline of many species in this country.

32. Beaver Clearing

Beavers have been hard at work in this area, cutting down trees for their lodges and dam.

33. Snowshoe Hare - *Lepus americanus*

Snowshoe hares favor second growth aspen-birch stands that are also in the vicinity of conifers, like this stand of hemlocks. They tend to live in deciduous forests in the summer and coniferous forests in the winter. They need areas with a dense understory for browse and cover, as many predators favor snowshoe hare. The predator-prey relationship between snowshoe hare and Canada lynx has created a striking symmetry in their body types. If you ignored the size and skull of the skeletons from these two animals, you would notice that they look almost identical in form and shape. This parallel illustrates how these animals have adapted to life together over thousands of years.

34. Red Maple Swamp

You are at the eastern end of the pond, where two small streams converge,

creating conditions that favor the growth of a palustrine wetland, or red maple swamp. In pre-settlement times, red maples were a species limited to mostly poorly drained areas, such as this swamp. Since the settlement of the South Bridgton area, the "super generalist" red maple has become a common tree in forests. At the Holt Pond Preserve, it is the most common tree species.

Conclusion

Take a moment to pause here and listen to the sounds of the forest and wetland. Breathe in deeply, feel the ground beneath your feet and the gentle air against your face and know this place will always be here, forever "wild" and beautiful for generations to come.

Afterthoughts…..

The Tingley Brook Trail and Beaver Dam

You can follow the Tingley Brook Trail from the parking lot at Holt Pond to Lake Region High School. To access the trail, follow the road in the parking area that leads to the Muddy River. At the river, turn left onto the trail. This trail meanders along the Muddy River for roughly 1/2 mile. Look for evidence of beaver activity and most importantly, stop and examine the large dam the beavers have constructed on the river. This dam helps maintain water levels in Holt Pond. In mid-summer, prepare yourself for the shocking reds of cardinal flowers which grow near the dam.

Porcupine Den

The porcupine den is near the top of Byrons Hill. Follow the Tingley Brook trail from Grist Mill Road, heading north. When the Tingley Brook Trail veers to the right, continue on Byrons Hill Trail until you see a trail marker pointing in the direction of the den. Notice the porcupine quills and scat around the den and smell the air for the musty fragrance that wafts from this animal's home. On one trip to this site, quills were found scattered in large clumps around the den and the ground was tinged with blood. The scene told of an encounter between a porcupine and one of their only predators: the fisher. Porcupines, *Erethizon dorsatum,* are mainly nocturnal and are active year-round. Their den sites are usually in rocky ledges, hollow logs, abandoned buildings, or abandoned beaver and fox dens. Porcupine dens are easily recognized by the large pile of scat that will accumulate after long-term use.

Medicinal Plants in New England

Maine and other New England states are rich in wild medicinal plants. These plants contain chemical compounds that trigger or alter certain biological activities and enhance healing. Medicinal herbs may occur as herbaceous plants, shrubs, trees, fungi, lichens, carnivorous plants, grasses, reeds, or other forms of growth. Useful plant parts include leaves, flowers, seeds, roots, tubers, bark,

the fruit of flowering plants, and the whole body of non-flowering plants. Native American tribes routinely used medicinal plants for healing. These were extracted in water and taken internally as teas or broths, boiled in water and used as a steam or sweat, ground or pulverized and applied externally, chewed raw, or added to foods. Early settlers, physicians and midwives also employed medicinal herbs in healing. With increased contemporary use of botanical remedies in health care, wild populations of some important healing plants are being threatened, and cultivation of medicinal plants is increasing. These plants are a living natural history of our region. Identification of wild medicinal plants is important for preserving our threatened native species, and cultivation and use of common healing herbs offers a way in which we may participate in our landscape, deepening our ties with nature.

Sensory Activities

Here are some activities that you can do alone or with a group to heighten your experience in the natural world.

- **Nature Journals**: A nature journal is an great tool in the environment. The journal can be as simple as a few pieces of paper stapled together where you record your ideas, observations, and impressions of the natural world. The entries can range from written lists, stories, poems, and reflections to drawings, paintings, collages, rubbings, and more. You can focus big, like on the landscape, or small, like on a seed. However you start and wherever you go, nature journaling is sure to be a rewarding and enriching experience for all ages.
- **Sounds:** *Close your eyes for 1 minute and count with your fingers the number of sounds you hear. * Sit and draw a sound map, orienting the sounds around you on a piece of paper. * Listen for birds, frogs, crickets, trees, water, wind, worms, bugs, and falling snow and rain.
- **Smells**: *Breathe deeply. *Track an animal using your nose. Where did they leave scent marks? How recently were these marks made? Why would the animal mark its territory in this way?* Smell each season and relish the richness in the air.
- **Sights**: *Working with a partner, close your eyes while they lead you to a spot. When they tap your shoulder, open your eyes for ten seconds, like a camera. Then turn around and try to describe everything you saw. *Bring color samples from a paint store and try to match the different colors with natural objects.
- **Textures:** * Hug a tree. * Find something that is wet, soft, rough, smooth, hard, slimy, grainy, or sticky.
- Lay down, with your face and belly facing the earth and rest. Breathe deeply, feel the ground below you and the sky above you and take a minute to appreciate this moment.
- Remember in all of your explorations to take only memories and leave only footprints.

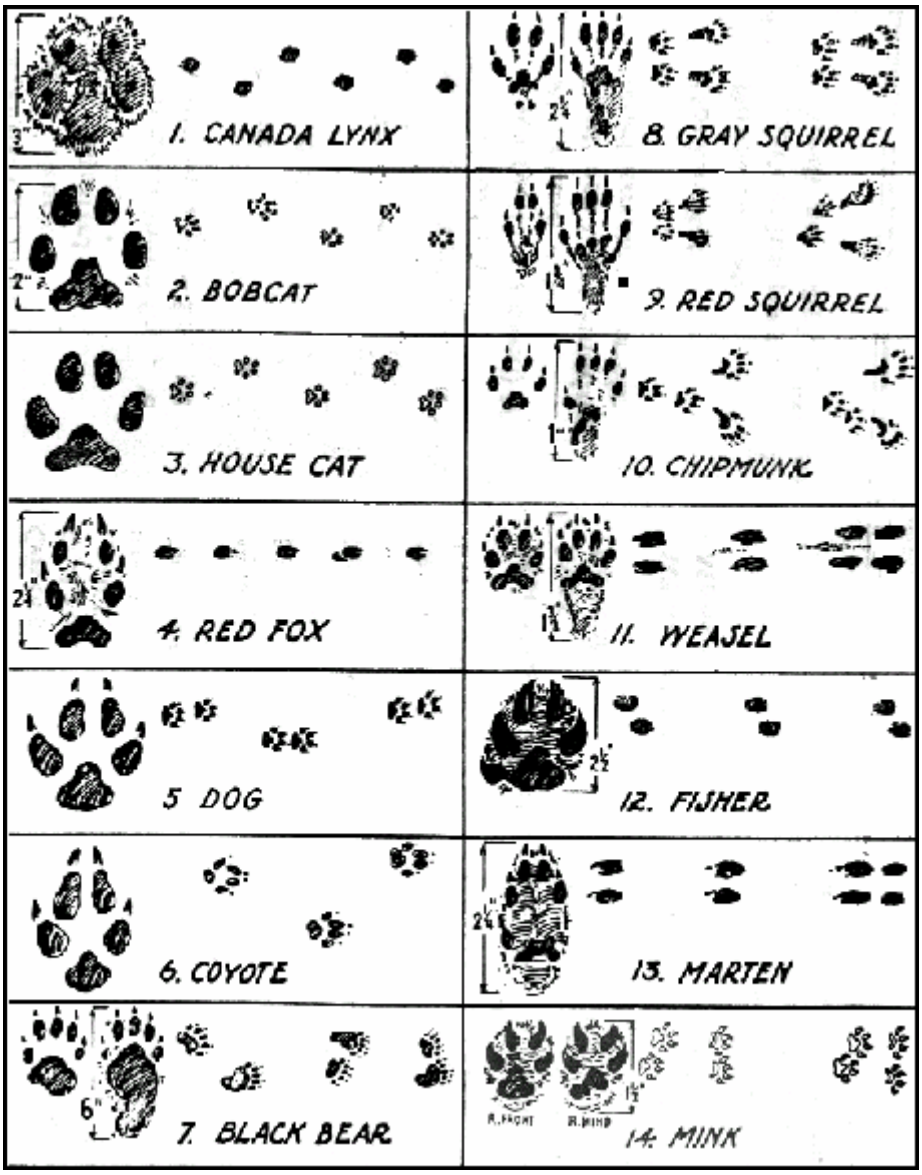
Lakes Environmental Association

The Lakes Environmental Association is a non-profit organization in the Lake Region of Western Maine. LEA was founded in 1970 with the goal of protecting one of our most important natural resources: lakes. From these early beginnings, LEA has developed a "watershed" approach to lake protection. We currently run a testing program during the summer on 37 local lakes and ponds; conduct a comprehensive milfoil courtesy inspection program on lakes throughout Western Maine; offer a year-long watershed education unit in thirteen sixth grade and three high school classes; and we work with local municipal officials and land owners to develop comprehensive water quality protection programs. Our watershed approach to the environment recognizes that effective protection needs to focus on monitoring, education, prevention, and enforcement.

The Holt Pond Preserve is another effort LEA has put forth to educate people about the importance of watershed protection. Holt Pond is one of the last undeveloped water bodies in the Lake Region and is home to many Maine wildlife species, from frogs, fish and turtles to moose, foxes, and minks. It is a truly unique place with its boardwalk system and the diversity of ecosystems that exists in a relatively small area. We offer programs, like guided hikes, at Holt Pond all year. Our activities are posted on our website at www.mainelakes.org.

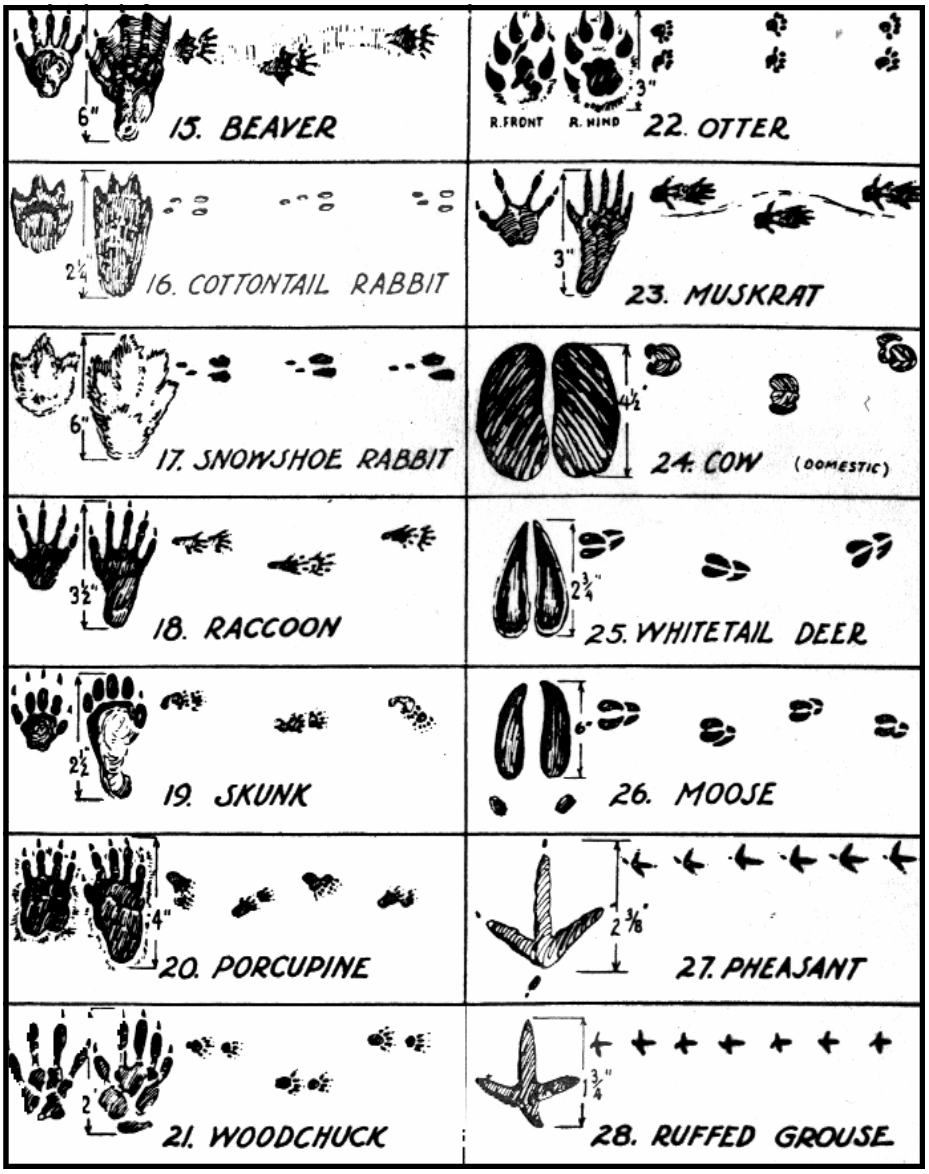
All of our programs are made possible by membership support. As a non-profit organization, we rely on the generosity of people who join as members to keep our programs funded. So, if you frequent the Holt Pond Preserve, attend any of our education programs, or simply enjoy the health and beauty of local lakes, consider becoming an LEA member to contribute to the environment and community in the Lake Region. To learn more about LEA, we encourage you to stop by our office at 102 Main Street or visit our website.

MAINE ANIMAL TRACKS



Direction of travel is to the right.

MAINE ANIMAL TRACKS

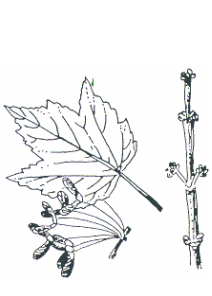


Maine Animal Tracks courtesy of Maine Department of Inland Fisheries and Wildlife

Common Trees and Plants at Holt Pond

American Beech

Yellow Birch



Red Maple

Balsam Fir

Speckled Alder

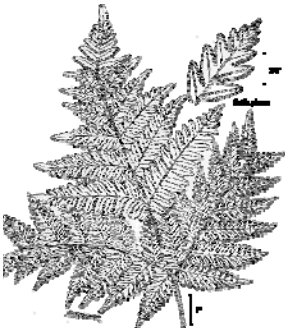
Leatherleaf*

Swamp Beggar Ticks

Sheep Laurel

Blue-joint Grass*

Tussock Sedge*

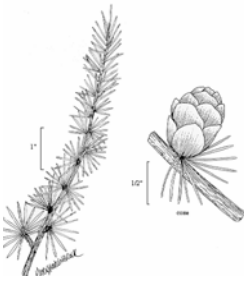


Bracken

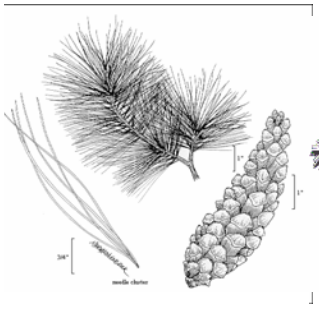
Sensitive Fern

Drawings are not to scale.

Common Trees and Plants at Holt Pond

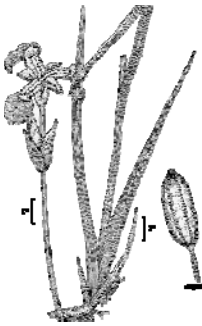


Tamarack



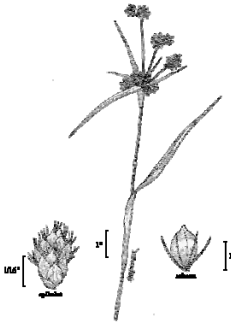
Eastern White Pine

Eastern Hemlock



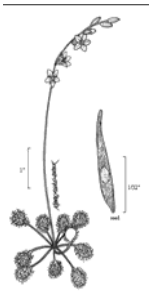
Blue Flag Iris

Cotton Grass

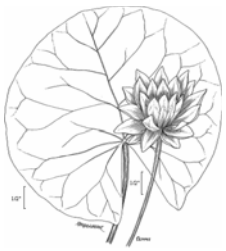


Bulrush

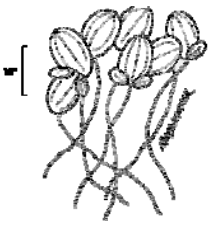
Swamp Aster



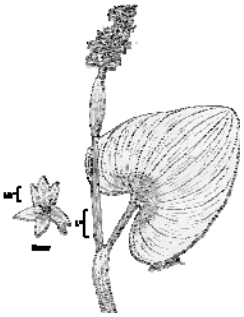
Round Leaf Sundew



White Water Lily



Duck Weed



Pickerelweed

Drawings courtesy of U.S. Geological Survey
** Drawings courtesy of Dennis Magee, Freshwater Wetlands*

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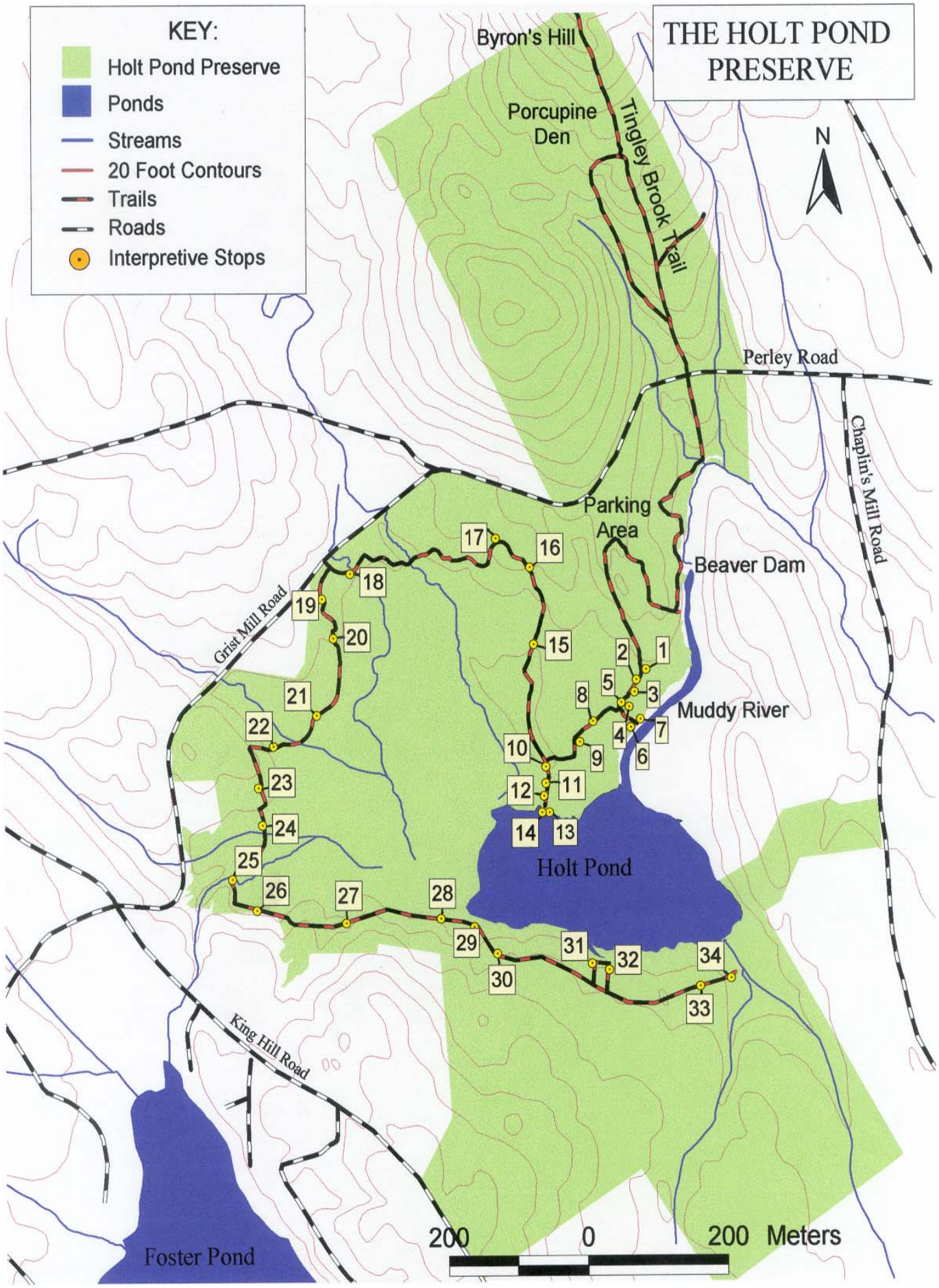
THE HOLT POND PRESERVE
KEY:
Holt Pond Preserve
Ponds
Streams
20 Foot Contours
Trails
Roads
Interpretive Stops
N
Byron's Hill
Porcupine Den
Tingley Brook Trail
Perley Road
Chaplin's Mill Road
Parking Area
Beaver Dam
Muddy River
Grist Mill Road
Holt Pond
King Hill Road
Foster Pond
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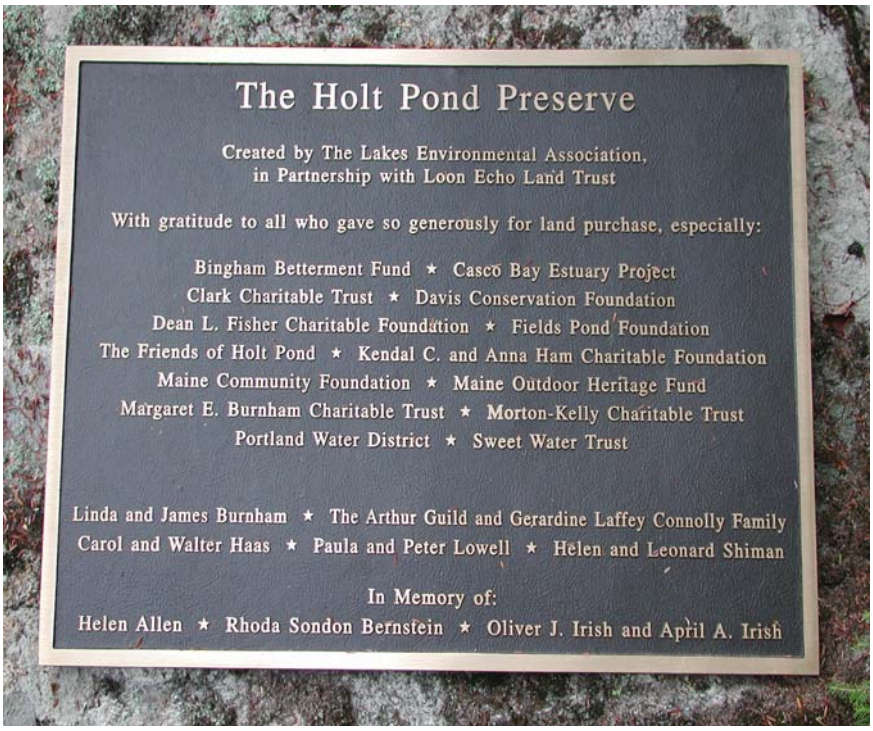

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