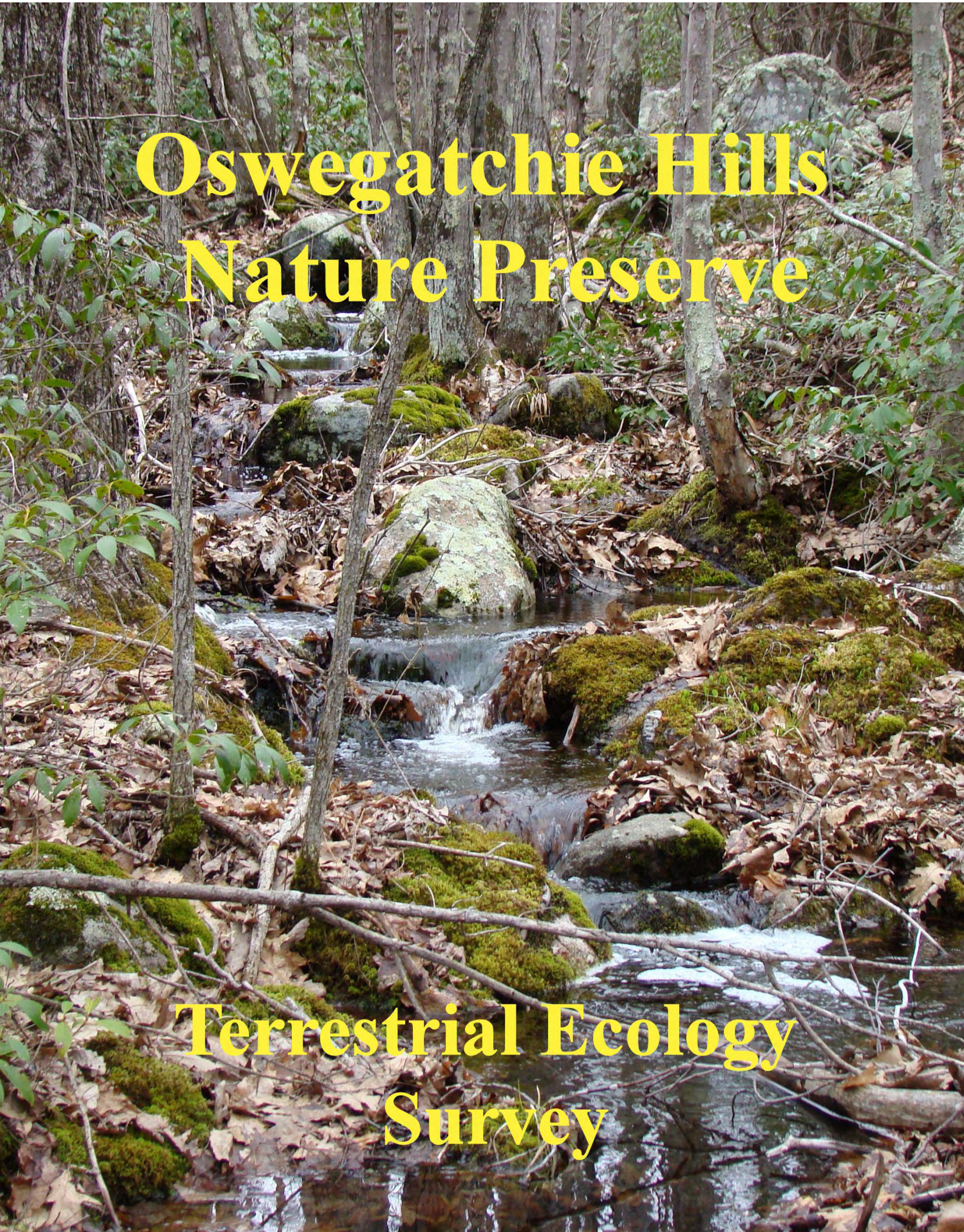


Oswegatchie Hills Nature Preserve

Terrestrial Ecology Survey

OSWEGATCHIE HILLS NATURE PRESERVE TERRESTRIAL ECOLOGY SURVEY

AN ASSESSMENT OF THE PRESERVE'S BIOLOGICAL ASSETS

NOVEMBER 2011

WRITTEN BY RICHARD GALLAGHER

OF THE

FRIENDS OF THE OSWEGATCHIE HILLS NATURE PRESERVE (FOHNP)

FOR THE TOWN OF EAST LYME

F O H N P
Friends of Oswegatchie Hills Nature Preserve
P.O. Box 163
Niantic, CT 06357

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 PURPOSE

A comprehensive terrestrial ecology survey of the Oswegatchie Hills Nature Preserve, located in the Town of East Lyme, Connecticut, was performed. The main objectives of this site survey were to:

- Ascertain terrestrial habitat types on the Preserve;
- Determine what plant and animal communities/species are present; and
- To the extent possible, determine the presence or absence of federally- and state-listed species.

An additional objective was to identify possible wetlands in the preserve.

This report covers: the Fall site survey, performed from September through November, 2010; the Winter survey, performed from December, 2010 through February, 2011; the Spring survey, performed from March through May, 2011; and the Summer survey, performed from June through August, 2010.

The individual performing this site survey is Richard J. Gallagher, B.A., Biology, and M.S., Natural Resource Administration and Management. Although the author is not a certified soil scientist and thus cannot confirm, via soil types, the presence or absence of wetlands, he is very familiar with wetlands, having served as a member of the East Lyme Inland Wetlands Agency from 2002 through 2009.

It is important to note that The Hills are “living, breathing” entities, which have changed through the eons, and will continue to change, long after those of us who read this report are gone. Similarly, this survey report is a living document, which will be revised as The Hills reveal new discoveries in the future.

It is also important to note that this report does not attempt to replace or duplicate the excellent work contained in The Oswegatchie Hills Natural Resource Inventory, prepared by the Eastern Connecticut Environmental Review Team of the Eastern Connecticut Resource Conservation and Development Area, Inc., in May of 2007 (see Reference 4 below). This survey was performed after reading the reference, and concentrated on supplementing the inventory with more detailed information on natural communities and species present, along with a detailed inventory of evident wetlands.

Numerous resources were used as identification aids and references during the survey. They include, among others:

1. National Audubon Society, Field Guide to North American Trees, Eastern Region, 1996, by Elbert L. Little

2. U. S. Forest Service, Important Trees of Eastern Forests, by R.W. Neelands, 1974

3. MIT Press, North American Trees, 1976, by Richard J. Preston, Jr.

4. The Oswegatchie Hills Natural Resource Inventory, prepared by the Eastern Connecticut Environmental Review Team of the Eastern Connecticut Resource Conservation and Development Area, Inc., May 2007

5. National Geographic Society, Field Guide to the Birds of North America, Third Edition, 1999; Mary B. Dickinson, Editor

6. The Peterson Field Guide Series, A Field Guide to the Mammals, Third Edition, 1976, by William H. Burt and Richard P. Grossenheider

7. The Peterson Field Guide Series, A Field Guide to Animal Tracks, Second Edition, 1975, by Olaus J. Murie

8. Snakes in Connecticut, by Jenny Dickson and Julie Victoria, CT Department of Environmental Protection

9. Wildflowers of Connecticut, by John E. Klimas, Jr., 1975

10. Newcomb's Wildflower Guide, 1977, by Lawrence Newcomb

11. Door County's Wildflowers, 2005, by Frances M. Burton and Aurelia M. Stampp

12. Smithsonian National Museum of Natural History, Field Guide to North American Mammals, undated, accessed on June 24, 2011 at

http://baird.si.edu/mammals_arcims/viewer.htm?Title=North%20American%20Mammals

1.1 ACKNOWLEDGEMENTS

Several individuals provided a great deal of assistance in the production of this report. FOHNP Vice President, Greg Decker, provided me with my introduction to the Nature Preserve, and was a constant source of information and assistance. Greg also provided photos for the report, as did Brian Lambert.

Former President, Mike Dunn, and current President, Kris Lambert, provided support and encouragement. Marvin Schutt provided me with the benefit of his years of dedication to, and knowledge of, The Preserve. Bruce Dasinger of the East Lyme Conservation Commission provided many years of bird observation data. Dave Hughes of WildBirds Unlimited not only provided The Preserve with two wood duck nesting boxes and two bluebird nesting boxes, but also his birding expertise.

Finally, the members of the Board of Directors of FOHNP reviewed the survey and provided valuable input.

2.0 BACKGROUND

The Oswegatchie Hills Nature Preserve (OHNP) is located in East Lyme, Connecticut, in the southeastern corner of the State. At the time of the survey, the Preserve consisted of approximately 420 acres of land. The Nature Preserve was officially opened in 2007; however, the area has always been an attraction for hikers and nature lovers, and the seeds for the preservation of The Hills spans several decades. A concerted effort to preserve The Hills began near the turn of the 21st century, when development of the area for residential housing began in earnest.

The Oswegatchie Hills consist mainly of two ridge lines, bisected by a valley that comprises the Clark Pond watershed. For the most part, as discussed later in a section on wetlands, water that falls to the west of the western ridgeline ultimately flows into the Pattagansett River. Water that falls to the east of the eastern ridgeline flows into the Niantic River. With one exception, water that falls between the two ridge lines flows into Clark Pond. The pond itself flows into Smith Cove, which is part of the Niantic River.

3.0 EXECUTIVE SUMMARY

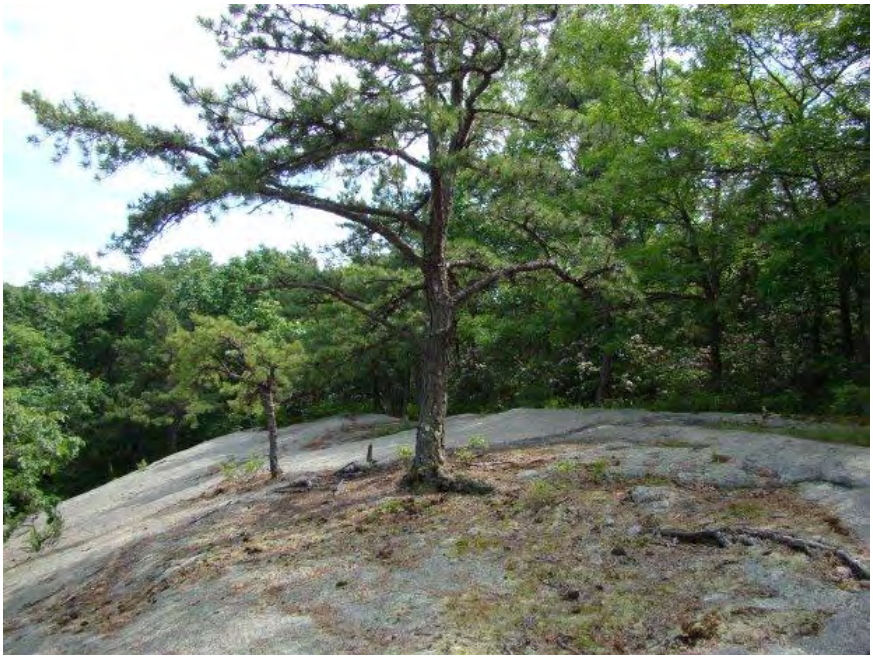
The Oswegatchie Hills Nature Preserve consists of an alluring mix of rocky outcroppings, maturing forest, large stands of Mountain Laurel (*Kalmia latifolia*), and beautiful wetlands. A center of attraction for visitors is Clark Pond, a centrally located body of water created in the early days of America as a supply of ice for the area's fishermen.

Ecologically, the Hills can best be summarized as healthy and stable, yet, paradoxically, potentially vulnerable. It is healthy and stable because, within the confines of the preserve, natural forces have been allowed to progress for many decades without significant human interference. As a result, the preserve is blessed with forested areas that are going through a natural maturing process. While there are not many extremely

old and large trees in The Preserve, there is a healthy canopy of mature, second-growth forest which provides good habitat for birds, small mammals and many other organisms. It is also healthy and stable because the wetlands found on the preserve are largely undisturbed, creating excellent habitat for a myriad of species, including numerous amphibian species.

Because these natural forces have been at work for so long, much of the preserve is largely untouched by invasive species that have otherwise permeated the area. The invasive species that are found in the preserve are generally confined to the disturbed areas, such as the edges of Clark Pond nearest the ball fields, the area near the Clark Pond Dam, and the open fields on the south end of the preserve. The paucity of invasive species elsewhere in the Preserve has enabled it to continue maturing in its natural state.

It is ecologically vulnerable because of its geologic history, superimposed on the recent pressure for development. The Hills consist of copious amounts of ledge and rocky outcroppings. The soils in the Hills are generally very thin. The end result, in general, is an area with limited water retention capability, and with the exception of Clark Pond and several large wetland areas, little permanent water. The area is riddled with small, intermittent streams, which fill up quickly during a storm and run off and dry up shortly after. Areas that do have sufficiently deep soils are vital to the retention of what water remains in The Hills during the dry season, and these areas are vulnerable to development if it is allowed to spread unchecked. The founders of The Preserve are to be commended for their foresight in protecting this resource.



The thin soils notwithstanding, the Hills are rife with examples of nature finding a way to support life where it might seem impossible: large trees taking a foothold in a crack in the ledge, and growing to maturity despite the lack of deep soil; small “oases” of bushes and trees in a thin layer of soil, surrounded on all sides by rock ledge that would be completely bare, were it not for the mosses and lichens taking a foothold themselves.

3.1 CLARK POND

The creation of Clark Pond, a very visible introduction to The Preserve from the main parking lot, was discussed in Section 3.0. The dam at the southern end of the pond was created by humans, with modern-day engineering assistance from a family of beavers (*Castor Canadensis*). This shallow pond is approximately one third of a mile long, and a hundred yards wide at its widest point. It is by far the most visible sign of permanent water in The Preserve, although not the only source, as discussed later.

Vegetation in the pond consists mainly of pond lilies and numerous forms of algae. It is clearly in a eutrophic state, having filled in with silt and nutrients since its creation.

Because this is a terrestrial ecology survey, the aquatic life of the pond has not been examined in detail; however, some mention of the life supported by the pond is appropriate.

Numerous important water birds make their home here. Visitors can very often see resident Great Blue Herons (*Ardea Herodias)*, which feed on the many frogs and fish found here. Based on past assessments, Common Sunfish (*Lepomis gibbosus*) and Brown Bullhead (*Ameiurus nebulosus)* are ubiquitous in this pond. Frogs are also plentiful here, including, at the least, bullfrogs, green frogs and pickerel frogs.

In addition to Great Blue Herons, the following water birds were also observed in the pond during this survey: Great Egret (*Ardea alba)*; Green Heron (*Butorides virescens)*; Black-crowned Night Heron (*Nycticorax nicticorax);* Double Crested Cormorant (*Phalacrocorax auritus)*; Wood Duck (*Aix sponsa)*; Mallard Duck (*Anas platyrhynchos)*; Hooded Merganser (*Lophodytes cucullatus)*; Ring-necked Duck (*Aythya collaris)*; Black Duck (*Anas rubripes*); Canada Goose (*Branta Canadensis*); and Belted Kingfisher (*Ceryle alcyon*).

The Wood Duck has nested here successfully beginning in 2008, with the help of two nesting boxes generously provided by WildBirds Unlimited, on Flanders Road. The two boxes have produced approximately 30 fledglings, and observant visitors can almost always see some of these beautiful birds during the nesting season and shortly after.

3.2 FLORA AND FAUNA

The Hills contain a healthy population of plants, ranging from the simplest of lichens to mature trees. It also contains a myriad of animals, ranging from tiny insects to large mammals. Because the number of species in the preserve would certainly range into the thousands, any attempt to identify all species present would be well beyond the scope of this survey. Attempts have been made to identify major plant habitats, as discussed below, and animals of interest are also discussed. An attempt was made to concentrate on the major vertebrates, although the list compiled to date is by no means a full species inventory.

3.3 FEDERALLY-AND STATE-LISTED SPECIES

No federally listed species were observed during this survey. State listed species included: Great Egret (*Ardea alba*)--Threatened; Peregrine Falcon (*Falco peregrinus*)—Threatened; American Kestrel (*Falco sparverius*)—Threatened; Bald Eagle (*Haliaeetus leucocephalus*)—Threatened; Brown Thrasher (*Toxostoma rufum*)—Special Concern; and Eastern Ribbon Snake (*Thamnophis sauritus*)—Special Concern.

Because The Preserve is primarily forest, this survey concentrates on the forest composition in various areas of The Hills.

3.4 FOREST COMPOSITION

While there are distinct areas in The Hills with unique compositions of trees, the forest in The Preserve is generally somewhat uniform. Oaks dominate most areas, particularly in the hilly areas away from wetlands, with four species providing the most cover, in the following order: Chestnut Oak (*Quercus prinus*), Red Oak (*Quercus rubra*), White Oak (*Quercus alba*) and Scarlet Oak (*Quercus coccinea*).

Lower areas still tend to contain oaks, but also are dominated by Red Maple (*Acer rubrum*), American Beech (*Fagus grandifolia*), Black, or Sweet, Birch (*Betula lenta*), and Witch Hazel (*Hamamelis virginiana*). The Preserve also contains vast stands of Mountain Laurel (*Kalmia latifolia*), both in lowland areas and on hillsides. Some of these stands of laurel are quite mature and classify more as trees than bushes. Others are low and would classify more as understory.

Other tree species present include: Chinkapin Oak (*Quercus muehlenbergii*), Sassafras (*Sassafras albidum*), Bigtooth Aspen (*Populus grandidentata*), Yellow Poplar [Tulip Tree] (*Liriodendron tulipifera*), Pignut Hickory (*Carya glabra*), Pitch Pine (*Pinus rigida*), Eastern White Pine (*Pinus strobus*), Eastern Redcedar (*Juniperus virginiana*), Green Ash (*Fraxinus pennsylvanica*), American Elm (*Ulmus Americana*), Yellow Birch (*Betula alleghaniensis*), and Downy Serviceberry (*Amelanchier* arborea).

Partially due to a healthy canopy, much of the preserve has limited ground cover. There are areas of small blueberry bushes, laurel, and other miscellaneous bushes, and some areas have a proliferation of ferns for ground cover. Much of the forest ground cover, however, consists of leaf litter.

It is unknown at this time if excess grazing by herbivores is stifling the growth of ground cover. There is ample evidence of deer in the area, and they may be contributing to the lack of ground cover in some areas; however, without further research, this question will not be answered. This is further discussed in the Management Options section.

Further details on forest composition in specific areas of the preserve are discussed in Section 9.0.

3.5 WETLANDS

Twenty-five distinct wetlands or wetland systems were identified during this survey. They are located in areas throughout The Preserve, and range in size from a twenty foot by forty foot pool to wetlands of several acres. The wetlands identified during this survey are by no means likely to be the only wetlands present. Soil surveys were not performed, and it is likely that less obvious wetlands exist. Many of the wetlands contained numerous amphibians and egg masses, and some are large enough to support duck populations.

The Preserve's wetlands are discussed in detail in Section 8.0.

4.0 MAMMALS

During this survey, mammals were identified either by direct observation or by other means, including tracks and scat. Because the majority of mammals are either nocturnal or protectively secretive, the number of mammal species observed was limited. However, mammal species of this area, and which could reasonably be expected to be found in the preserve, were identified through Reference 12, and are enumerated below. Certainly, ample habitat exists for these mammals. The Preserve's rock formations are rife with potential denning habitat. Additionally, although it is not listed by Reference 12 as inhabiting this area, the Black Bear (*Ursus americanus*) is periodically observed in East Lyme, and a single forepaw print was observed in The Preserve during this survey.

Species that were identified in The Preserve are highlighted in **bold, blue** print. By far the most commonly observed mammals were the Eastern Gray Squirrel and the Eastern Chipmunk. Other members of the FOHNP Board of Directors provided input into this list.

Table 4-1: Mammals of OHNP
Order: Artiodactyla (Even-toed Ungulates)
***Odocoileus virginianus* (White-tailed Deer)**
Order: Carnivora (Carnivores)
Family: Canidae (Dogs)
***Canis latrans* (Coyote)**
***Urocyon cinereoargenteus* (Common Gray Fox)**
***Vulpes vulpes* (Red Fox)**
Family: Mephitidae (Skunks)
***Mephitis mephitis* (Striped Skunk)**
Family: Mustelidae (Weasels, Badgers and Otters)
Lutra canadensis (Northern River Otter)
Mustela erminea (Ermine)
Mustela frenata (Long-tailed Weasel)
Mustela vison (American Mink)
***Martes pennant* (Fisher)**
Family: Procyonidae (Ringtail, Raccoon, and Coati)
***Procyon lotor* (Northern Raccoon)**
Order: Chiroptera (Bats)
Family: Vespertilionidae (Vesper Bats)
Eptesicus fuscus (Big Brown Bat)

Table 4-1: Mammals of OHNP
Lasionycteris noctivagans (Silver-haired Bat)
Lasiurus borealis (Red Bat)
Lasiurus cinereus (Hoary Bat)
Myotis leibii (Eastern Small-footed Myotis)
Myotis lucifugus (Little Brown Bat)
Myotis septentrionalis (Northern Long-eared Myotis)
Pipistrellus subflavus (Eastern Pipistrelle)
Order: Didelphimorphia (Opossums)
Family: Didelphidae (Opossums)
***Didelphis virginiana* (Virginia Opossum)**
Order: Insectivora (Shrews, Moles, Hedgehogs)
Family: Soricidae (Shrews)
***Blarina brevicauda* (Northern Short-tailed Shrew)**
Cryptotis parva (Least Shrew)
Sorex cinereus (Cinereus Shrew)
Sorex fumeus (Smoky Shrew)
Sorex palustris (Water Shrew)
Family: Talpidae (Moles)
***Condylura cristata* (Star-nosed Mole)**
Scalopus aquaticus (Eastern Mole)
Order: Lagomorpha (Rabbits, Hares, Pikas)
Family: Leporidae (Rabbits and Hares)
***Lepus americanus* (Snowshoe Hare)**
***Sylvilagus floridanus* (Eastern Cottontail)**
***Sylvilagus transitionalis* (New England Cottontail)**
Order: Rodentia (Rodents)
Family: Castoridae (Beaver)
***Castor canadensis* (American Beaver)**
Family: Dipodidae (Jumping Mice)
Napaeozapus insignis (Woodland Jumping Mouse)
Zapus hudsonius (Meadow Jumping Mouse)
Family: Muridae (Rats, Mice, Voles and Lemmings)
Clethrionomys gapperi (Southern Red-backed Vole)
Microtus pennsylvanicus (Meadow Vole)

Table 4-1: Mammals of OHNP
Microtus pinetorum (Woodland Vole)
***Ondatra zibethicus* (Muskrat)**
Peromyscus leucopus (White-footed Mouse)
Synaptomys cooperi (Southern Bog Lemming)
Family: Sciuridae (Squirrels, Chipmunks, Marmots, Prairie Dogs)
Glaucomys volans (Southern Flying Squirrel)
Marmota monax (Woodchuck)
***Sciurus carolinensis* (Eastern Gray Squirrel)**
***Tamias striatus* (Eastern Chipmunk)**
***Tamiasciurus hudsonicus* (Red Squirrel)**

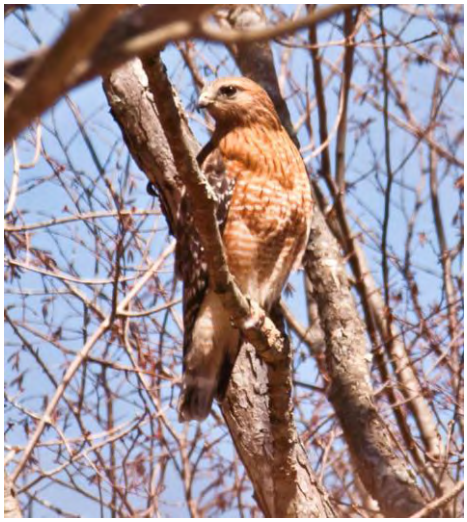
5.0 BIRDS

During the survey, birds were catalogued over the four seasons, to discern the difference between migratory and year-round species. Because of the ephemeral nature of some migratory birds, not all species passing through an area are going to be observed, and the list below will certainly expand in the future as additional species are discovered.

This Tulip Tree has evidently had a long-term relationship with Yellow-Bellied Sapsuckers

For purposes of this survey, Spring is defined as March through May; Summer as June through August; Fall as September through November; and Winter as December through February. A total of 61 species were observed during the survey. During each season, a species was classified by a subjective method of relative abundance. In the table below:

- "O" means the species was "Observed," but not frequently (perhaps less than 20 individual observations);
- "C" means the species was "Common," i.e., it was either observed frequently, or less frequently but in larger numbers (perhaps up to a total of 40 observations);
- "A" means "Abundant," either because the species was observed nearly every time observations were made, or they were often found in large numbers.



Red-shouldered Hawk
Photo provided by Brian Lambert

A conscious effort was made to avoid observations in areas containing bird feeders. The intent was to ascertain species naturally supported by The Preserve itself.

In addition to the four-season survey, other members of the FOHNP Board of Directors were solicited for their observations in the preserve during the past several years. This resulted in the addition of seven species. For those seven species, the abundance and seasonal index is not indicated.

Table 5-1: Birds of OHNP

Common Name	Scientific Name	Spring	Summer	Fall	Winter
American Crow	*Corvus brachyrhynchos*	C		C	C
American Goldfinch	*Carduelis tristus*	C	C	A	C
American Kestrel	*Falco sparverius*			O	
American Robin	*Turdus migratorius*	C	C	A	
Bald Eagle	*Haliaeetus leucocephalus*				
Baltimore Oriole	*Icterus galbula*	O			
Barn Swallow	*Hirundo rustica*	O			
Barred Owl	*Strix varia*			O	
Belted Kingfisher	*Ceryle alcyon*	O		O	
Black Duck	*Anas rubripes*	O		C	O
Black-and-White Warbler	*Mniotilta varia*	O		O	
Black-capped Chickadee	*Poecile atricapillus*	A	C	C	C
Black-crowned Night-Heron	*Nycticorax nicticorax*			O	
Blue Jay	*Cyanocitta cristata*	C	C	C	C
Blue-gray Gnatcatcher	*Polioptila caerulea*	O			O
Brown Thrasher	*Toxostoma rufum*				
Canada Goose	*Branta Canadensis*	O		C	O
Carolina Wren	*Thryothorus*	O	C	O	

Common Name	Scientific Name	Spring	Summer	Fall	Winter
	ludovicianus				
Cedar Waxwing	*Bombycilla cedrorum*	O			
Chipping Sparrow	*Spizella passerine*	O			
Cliff Swallow	*Petrochelidon pyrrhonota*	O			
Common Grackle	*Quiscalus quiscula*		O		
Cooper's Hawk	*Accipiter cooperii*	O		O	
Dark-eyed Junco	*Junco hyemalis*	O		O	O
Double-crested Cormorant	*Phalacrocorax auritus*	O			
Downy Woodpecker	*Picoides pubescens*	C	C	O	O
Eastern Bluebird	*Sialia sialis*				
Eastern Kingbird	*Tyrannus tyrannus*				
Eastern Phoebe	*Sayornis phoebe*	O		O	
Eastern Towhee	*Pipilo erythrophthalmus*	C	C	O	
Eastern Wood-Pewee	*Contopus cooperi*	O	O	O	
Golden-crowned Kinglet	*Regulus satrapa*			O	O
Gray Catbird	*Dumetella carolinensis*	O		O	
Great Blue Heron	*Ardea Herodias*	O		O	O
Great Egret	*Ardea alba*			O	
Great Horned Owl	*Bubo virginianus*	O			
Green Heron	*Butorides virescens*			O	O
Hairy Woodpecker	*Picoides villosus*	O	O	O	
Hermit Thrush	*Catharus guttatus*			O	
Herring Gull	*Larus argentatus*	O		O	
Hooded Merganser	*Lophodytes cucullatus*	C		C	C
House Finch	*Carpodacus mexicanus*	O			O
House Sparrow	*Passer domesticus*	O			
House Wren	*Troglodytes aedon*	O	O		
Mallard	*Anas platyrhynchos*	C		C	C
Mourning Dove	*Zenaida macroura*	O			
Northern Cardinal	*Cardinalis cardinalis*	C	C	O	
Northern Flicker	*Colaptes auratus*	O		O	O

Common Name	Scientific Name	Spring	Summer	Fall	Winter
Osprey	*Pandion haliaetus*	O		O	
Ovenbird	*Seiurus aurocapillus*	O		O	
Palm Warbler	*Dendroica palmarum*				
Peregrine Falcon	*Falco peregrinus*			O	
Purple Finch	*Carpodacus purpureus*	O			
Red Bellied Woodpecker	*Melanerpes Carolinas*	O	C	C	
Red-shouldered Hawk	*Buteo lineatus*	O			
Red-tailed Hawk	*Buteo jamaicensis*	O	O	O	
Red-winged Blackbird	*Agelaius phoeniceus*	O			
Ring-billed Gull	*Larus delawarensis*	O		O	O
Ring-necked Duck	*Aythya collaris*			O	
Scarlet Tanager	*Piranga olivacea*				
Song Sparrow	*Melospiza melodia*	O		O	
Tennessee Warbler	*Vermivora peregrina*	O			
Three-toed Woodpecker	*Picoides tridactylus*	O			
Tufted Titmouse	*Baeolophus inornatus*	A	A	A	A
Turkey Vulture	*Cathartes aura*	O		O	
Veery	*Catharus fuscescens*				
White-breasted Nuthatch	*Sitta carolinensis*	C	C	C	C
White-throated Sparrow	*Zonotrichia albicollis*	O			O
Wild Turkey	*Meleagris gallopavo*		O	O	
Wood Duck	*Aix sponsa*	C		O	
Yellow-bellied Sapsucker	*Sphyrapicus varius*	O			
Yellow-rumped Warbler	*Dendroica coronata*	O			

6.0 OTHER VERTEBRATES

In addition to the birds and mammals listed above, a number of poikilothermic (cold-blooded) vertebrates were observed. Because this is a terrestrial ecology study, fishes are not discussed here; however, reptiles and amphibians play an important role in the Oswegatchie Hills ecosystem, and are enumerated here as they were observed. Observations made by other members of the Board of Directors are also included here.

6.1 REPTILES

Garter Snakes

Eastern (Black) Rat Snake- Photo by Greg Decker

Reptiles observed consisted of snakes and turtles. Observations of snakes were limited, but four species were identified:

- Eastern Garter Snake (*Thamnophis sirtalis*)
- Eastern Ribbon Snake (*Thamnophis sauritus*), a State of Connecticut Species of Special Concern
- Eastern Rat Snake (*Pantherophis alleghaniensis*), also known as Black Rat Snake.
- Northern Water Snake (*Nerodia sipedon*)

Certainly, additional snake species inhabit The Preserve, and they will be added to this report as they are observed in the future.

Two species of turtles were seen, either during the survey or by other Board members in recent years:

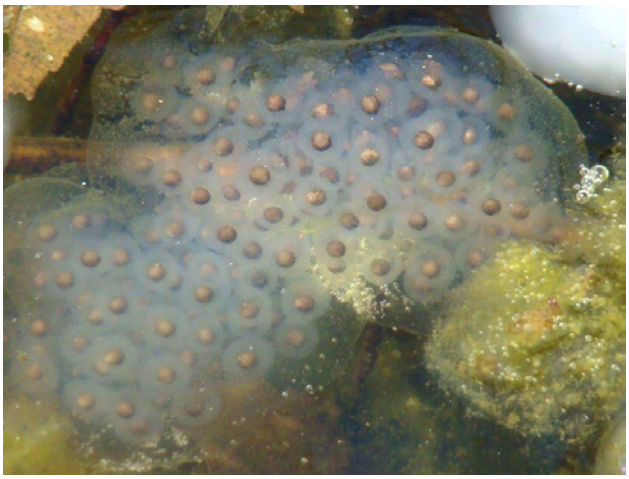
- Eastern Painted Turtle (*Chrysemys picta picta*)
- Snapping Turtle (*Chelydra serpentine*)

It is highly likely that several additional turtle species inhabit The Preserve, particularly in Clark Pond; however, observations were made at a distance that made it impossible to confirm any other species.

Snapping Turtle
Photo provided by Brian Lambert

6.2 AMPHIBIANS

Red Eft



Spotted Salamander egg mass

Numerous amphibians inhabit the Preserve, and many were observed during this survey, including:

- Spotted Salamander (*Ambystoma maculatum*)
- Red-spotted Newt (*Notophthalmus virdescens*), including the Red Eft, a terrestrial, juvenile stage of the aquatic adult.
- Eastern American Toad (*Bufo americanus*)
- Northern Spring Peeper (*Pseudacris crucifer*)
- Bullfrog (*Rana catesbeiana*)
- Green Frog (*Rana clamitans melanota*)
- Pickerel Frog (*Rana palustris*)
- Wood Frog (*Rana sylvatica*)

7.0 INVERTEBRATES

Due to the sheer numbers of invertebrate species found nearly everywhere, no concerted effort was made to inventory the invertebrates during this survey. When an interesting invertebrate was observed, it was noted. Butterflies and some other insects observed during the survey are listed below.

Butterflies:

- Dreamy Duskywing (*Erynnis ecelus*)
- Black Swallowtail (*Papilio polyxenes*)
- Tiger Swallowtail (*Papilio glaucus*)
- Cabbage White (*Pieris rapae*)
- Mourning Cloak (*Nymphalis antiopa*)

Dreamy Duskywing

Dragonflies and Damselflies

- Widow Skimmer (*Libellula luctuosa*)
- Twelve-spotted Skimmer (*Libellula pulchella*)
- Ebony Jewelwing (*Erynnis icelus*)
- Slaty Skimmer *(Libellula incesta)*

Female Widow Skimmer

Twelve-Spotted Skimmer

Ebony Jewelwing

Slaty Skimmer

Other insects:

- Yellowjacket nest
- Whirligig Beetles
- Water Striders

Yellowjacket nest

8.0 WETLANDS

As previously discussed, twenty-five evident wetlands were identified during the survey. These wetlands were identified visually, by an experienced former inland wetlands commissioner. Soil types were not examined during this survey; thus, it is highly possible that some existing wetlands were not identified as such. Most of these wetlands contained some standing water when observed. Some are apparently wet during all seasons. It is important to note that Clark Pond and an unnamed pond surrounded by the Green Trail are not included among the twenty-five wetlands discussed here.

The locations of the wetlands are shown in Figure 8-1, and are identified by red numbers, which correspond to the numbers below. The approximate coordinates are shown below for each wetland. Where more than one set of coordinates was taken for areas surrounding a wetland, they are included. For those streams that are either permanent or that run for most of the year, no attempt was made to delineate wetlands around the stream channels. Only prominent wetlands associated with streams—specifically, Wetlands #9, 14, 16, 17 and 25—are described here.

As previously discussed, the geologic history of the area has created extensive areas of ledge, with thin or no soil in large areas of The Preserve. As a result, the existing wetlands and adjacent areas of deeper soil play an important role in the hydrologic cycle of The Hills. During this survey, it became evident that there is a complex relationship between some of the wetlands, which play a key role in wetland health during dry periods. For example, for a substantial part of the year, Wetland #10 has water in it, even though there is no obvious source of water. In fact, Wetland #6 feeds into it via the groundwater, with no obvious surface link except during times of high rainfall. A similar relationship exists between Wetland #20 and Wetland #21 downstream; Wetland #13 and Wetland #19 downstream; and Wetlands #14 and 15, and Wetland #18 downstream. The significance of this is that disruption of these connective relationships could result in wetlands impacts.

In Figure 8-1, wetlands are designated by an indigo color. Approximate wetland size was duplicated with the help of a GPS; however, boundaries are only approximate, and the actual size of the wetland may be considerably larger than indicated, based on soil type.

Also in Figure 8-1, a thin line is used to denote the route of flow away from a wetland, based on known flow direction, and elevation features of a topographic map. It does not necessarily denote a continuously running stream.

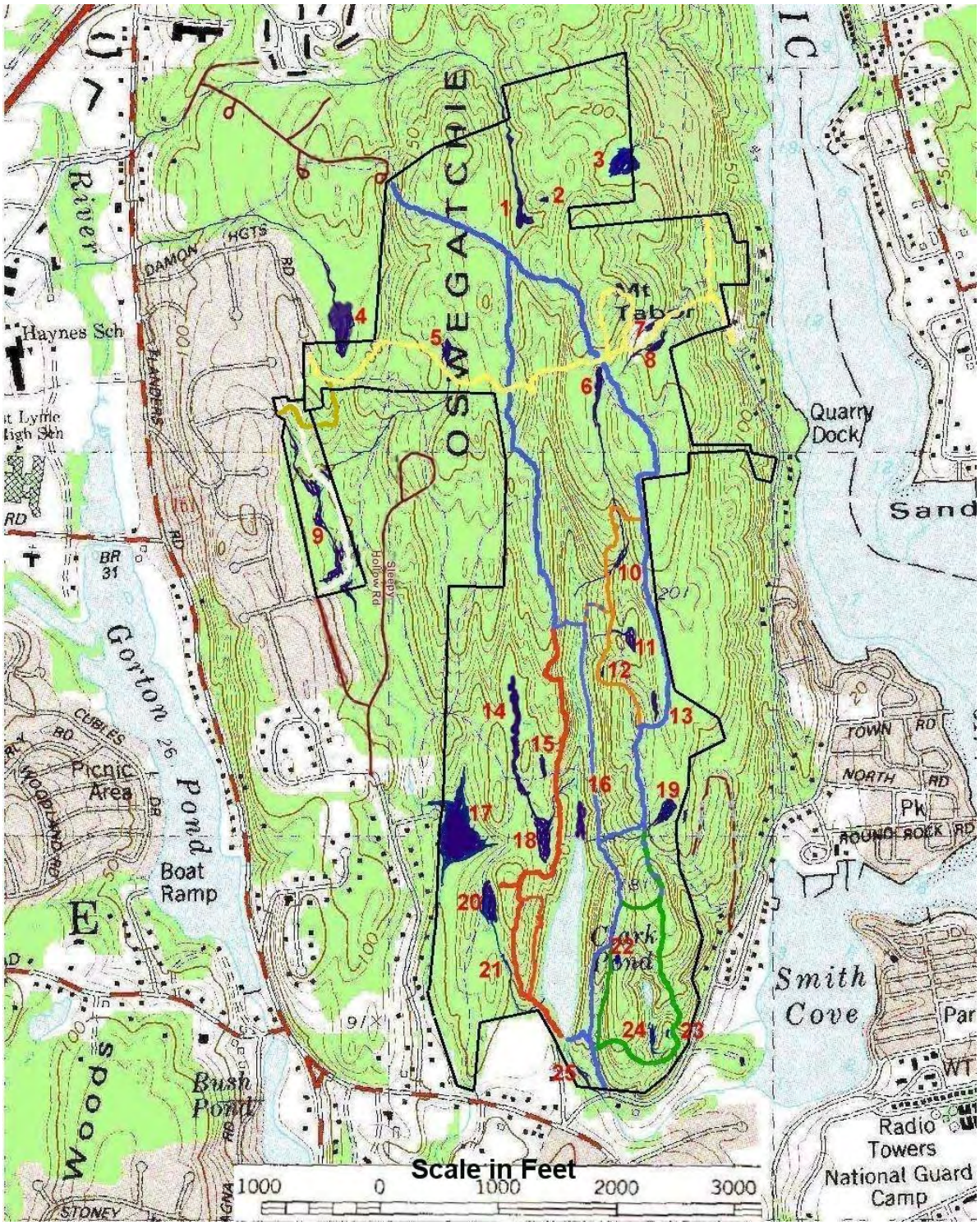


Figure 8-1: Wetlands of OHNP

8.1 WETLAND 1

41° 21.321' N, 72° 11.909 W

41° 21.254' N, 72° 11.898' W

41° 21.223' N, 72° 11.914' W

This wetland begins in a ravine just north of the three-way intersection on the Blue Trail in the northern section of The Preserve. It actually consists of a series of wetlands up to 40 yards wide that gently cascade northward, ultimately flowing to the west, where it feeds the Pattagansett River, crossing Flanders Road near Chapman Woods Road.

Before the leaves fall in Autumn, this wetland is richly covered with a verdant carpet of sphagnum moss, with ample evidence of water retention just below the surface during dry periods. Ferns, mosses and skunk cabbage are also present. During the spring, amphibian activity is readily apparent. This wetland extends northward approximately 300 yards within The Preserve, then appears to extend well beyond its borders.

8.2 WETLAND 2

41° 21.255' N, 72° 11.852' W

Wetland 2 is a relatively small depression in the hill to the east of Wetland 1. When it was observed in the late summer, it was approximately sixty feet long by thirty feet wide. No amphibians were observed at that time, but this wetland was not visited in the spring, during the most active time for amphibian observations. This wetland may drain via groundwater to Wetland 1.

8.3 WETLAND 3

41° 21.343' N, 72° 11.718' W

41° 21.321' N, 72° 11.708' W

41° 21.290' N, 72° 11.722' W

Wetland 3 is a very extensive area of year-round wetland, consisting of several acres. This healthy wetland retains a significant amount of water, which drains through land adjacent to The Preserve, ultimately finding its way to the Niantic River. It provides habitat for many wetland species, and amphibian activity is very evident.

8.4 WETLAND 4

41° 21.063' N, 72° 12.247' W

Wetland 4 is accessed via the Damon Heights Road entrance to the Yellow Trail. This is a very large wetland, which appears to extend far beyond the boundaries of The Preserve. It is located to the west of the western ridge of the preserve, and as one might expect, it ultimately drains to the Pattagansett River, via an intermittent stream that crosses Flanders Road just north of Damon Heights Road. The wetland extends far beyond the boundaries of The Preserve, and is likely much larger than indicated on Figure 8-1

This wetland supports a prolific population of wetland species, and evidence of amphibian activity is everywhere.

8.5 WETLAND 5

41° 21.024' N, 72,12.055' W

Wetland 5 is just north of the Yellow Trail, where a small "logging bridge" of crossways logs crosses the wetland drainage. The wetland is clearly a very healthy medium-sized wetland, with a proliferation of amphibians, egg masses and other wildlife. It ultimately drains down into Wetland 9, approximately 1200 feet away.

8.6 WETLAND 6

41° 21.015' N, 72° 11.765' W

41° 20.917' N, 72° 11.763' W

Wetland 6, at the eastern junction between the Blue and Yellow Trails, is approximately 200 yards long and up to 40 yards wide. It is a prolific, productive wetland, which provides habitat to amphibians, turtles and ducks, along with many other species. It is wet year-round, and ultimately feeds Wetland 10, approximately 1000 feet to the south. This hydrologic system ultimately drains into Clark Pond.

8.7 WETLAND 7

41° 21.080' N, 72° 11.659' W

Wetland 7 is a small depression associated with the old quarry. It does not contain water year-round, and some of it lies on bare rock, rather than soil. Nonetheless, it is indicative of potential wetland, and contains some sphagnum moss.

8.8 WETLAND 8

41° 21.075' N, 72° 11.626' W

Wetland 8 is actually a complex chain of small wetlands that drains a substantial area on the south side of the Yellow Trail, and appears to drain an area just to the east of the Blue Trail. Much of this chain of wetlands contains sphagnum moss, and in the spring, it contained a substantial population of breeding wood frogs. Deer sign is evident throughout this area. This wetland system ultimately drains to the Niantic River, via a fairly steep intermittent stream alongside the entrance to the yellow trail off Quarry Dock Road. The wetland contains at least a small amount of water nearly year-round.

8.9 WETLAND 9

41° 20.969' N, 72° 12.340' W

41° 20.737' N, 72° 12.275' W

Wetland 9 extends the entire length of the parcel of The Preserve which is accessed via North Ledge Rock Road. It is part of the stream system that runs southward to the west of The Preserve, empties into Little Dodge Pond, and ultimately feeds into the Pattagansett River. At this point, the stream appears to be intermittent, although there is some water in it for most of the year. This wetland contains ample evidence of a healthy deer population, including prolific fresh tracks and scat. There is also a fair amount of amphibian activity.

The wetland is scattered throughout the parcel, and when observed in June, there was a small amount of flow running through it. Vegetation in the wetland consists primarily of mosses, including sphagnum; skunk cabbage (*Symplocarpus foetidus*); Jack-in-the-Pulpit (*Arisaema triphyllum*); and various ferns. A small number of Indian Cucumber (*Medeola virginiana*) were also observed in this area.

Trees and other vegetation in this area are discussed in Section 9.1.

8.10 WETLAND 10

41° 20.737' N, 72° 12.275' W

41° 20.744' N, 72° 11.746' W

Wetland 10 is a somewhat small wetland just off the Orange Trail to the east. It consists of two small pools which are wet for a good portion of the year, with the help of drainage from Wetland 6 to the north. For part of the year, an intermittent stream immediately north of this wetland is filled with water. This wetland ultimately drains downhill into the main stream that feeds Clark Pond. Small wood frogs frequent this area.

8.11 WETLAND 11

41°20.633' N, 72 °11.727' W

Wetland 11 is another large wetland that can be seen east of the Orange Trail, just north of Wetland 12. It feeds across the trail, down to the creek that flows into Clark Pond. It contains a significant amount of amphibian activity, including the Red Eft seen below.

8.12 WETLAND 12

41° 20.597' N, 72° 11.768' W

Wetland 12 is a small, wet area that is contained by a small rock ridge that is part of the Orange Trail. Despite its size, it contains water for a good part of the year, and has a small amount of amphibian activity. It regularly contains wood frogs, and contained one spotted salamander egg mass during the Spring survey.

8.13 WETLAND 13

41° 20.560' N, 72° 11.701' W

41° 20.539' N, 72° 11.685' W

Wetland 13 is a fairly large wetland that varies in size considerably from season to season, although it appears to have some water in it year-round. It is visible from the Blue Trail, and can also be seen from the western side by walking just a few yards east of the Orange Trail. It contains a substantial amount of amphibian activity. During the extreme wet season it drains to Wetland 19 via a seasonal intermittent stream, and appears to continue feeding that wetland via groundwater during other periods of the year.

8.14 WETLAND 14

41° 20.432' N, 72° 11.925' W

41° 20.464' N, 72° 11.949' W

Wetland 14 is a very substantial, extensive wetland system, extending about 400 yards from north to south, and more than 50 yards wide in some areas. This is one of the most interesting (albeit difficult to access), beautiful wetlands in The Preserve, with substantial vegetation, including skunk cabbage, sphagnum moss and ferns, and abundant amphibian activity.

This wetland feeds into Wetland 18 via a steep and attractive intermittent stream that can be viewed on the cover of this survey report. In the dry season when the stream goes dry, this wetland continues to feed Wetland 18 via the groundwater.

8.15 WETLAND 15

41° 20.474'N, 72° 11.892' W

41° 20.453'N, 72° 11.894' W

Wetland 15 is located east of Wetland 14, and is separated from it by a small rock ridge. During extreme wet periods, it appears to drain into Wetland 18 via a small intermittent stream; however, when observed in early May, this wetland contained a body of water approximately 200 feet long and 50 feet wide, and was landlocked. It varies in size considerably from wet season to dry, but provides amphibian habitat during the breeding season.

8.16 WETLAND 16

41° 20.453' N, 72° 11.894' W

41° 20.418' N, 72° 11.836' W

Wetland 16 is associated with the main stream feeding into Clark Pond. It includes an extensive beaver dam, and a significant area of wetland both above and below the dam. Wetland vegetation present includes skunk cabbage, false hellebore, and ferns. This area is a prolific area for amphibians, including wood frogs, pickerel frogs, spotted salamanders and spring peepers, among others.

Spotted Salamander egg mass

At this point in this creek, water is generally flowing throughout the year, although the flow is merely a trickle during the dry season.

8.17 WETLAND 17

41° 20.468' N, 72° 12.038' W

41° 20.363' N, 72° 11.999' W

41° 20.320' N, 72° 12.086' W

Wetland 17, a part of the stream system that runs on the western side of The Preserve and into Little Dodge Pond, is a very large, mostly flat area that extends approximately 400 yards from north to south, and 200 yards from east to west at its widest point.

Easily accessible from the end of Ichabod Lane, it is a haven not only for amphibians, but for many bird species as well. Vegetation includes False Hellebore, Skunk Cabbage, ferns and mosses. The stream appears to have at least some water in it year-round, and just south of this wetland is a well-developed channel.

8.18 WETLAND 18

41° 20.378' N, 72° 11.911' W

41° 20.333' N, 72° 11.891' W

41° 20.384' N, 72° 11.887' W

Wetland 18 is very evident immediately to the north of the Red Trail, about 100 yards south of the foot bridge across an intermittent stream. It is approximately 125 yards long from north to south, and 50 yards wide. During the dry season, only a small portion of this wetland contains standing water. It is fed by both Wetlands 14 and 15, and in turn, flows down a small stream channel, under the footbridge, and ultimately to Wetland 16, which is part of the stream that feeds Clark Pond. Thanks to these three wetlands, this channel flows for most of the year. Amphibian activity is evident, and vegetation includes sphagnum, ferns and skunk cabbage.

8.19 WETLAND 19

41° 20.414' N, 72° 11.651' W

41° 20.371' N, 72° 11.693' W

Wetland 19 is just uphill from the junction between the Blue and Blue-Green Trails. This is a large, several acre wetland which is mostly dry during the dry season. It is carpeted with sphagnum moss, and contains various ferns. In the spring, it has a great deal of amphibian activity. This wetland ultimately drains down to Clark Pond, in an intermittent stream channel adjacent to the blue trail. Wetland 19 is fed by Wetland 13, during the extreme wet season via an intermittent stream, but primarily via groundwater.

8.20 WETLAND 20

41° 20.266' N, 72° 12.020' W

41° 20.220' N, 72° 12.000' W

Wetland 20 is a large wetland with permanent water, which is visible during all seasons from the Rocky Overlook off the Red Trail. This wetland varies considerably in size over the year. During the dry season, there is a considerable amount of wetland with no standing water, but ample evidence of its wetland nature, including sphagnum and other mosses, and some skunk cabbage. Deer tracks pervade the area. During the spring, there was ample evidence of amphibians, particularly wood frogs.

8.21 WETLAND 21

41° 20.188' N, 72° 11.973' W

Wetland 21 is a small area visible from the westernmost leg of the red trail. During times of high rainfall, this area includes an intermittent stream, which receives water from Wetland 20 and ultimately flows into Clark Pond near a small footbridge which is part of the Red Trail entrance to The Preserve. During the dry season, this small wetland continues to receive water, via the groundwater, from Wetland 20.

8.22 WETLAND 22

41° 20.187' N, 72° 11.766' W

Wetland 22 is a small wetland, accessible to the east of the western side of the Green Trail, that varies considerably in size of wet area over the course of the year. It appears to drain to Clark Pond, via the groundwater.

8.23 WETLAND 23

41° 20.089' N, 72° 11.668' W

Wetland 23 is another small wetland, which is dry for most of the year. It is easily accessible to the west of the eastern side of the Green Trail. During the wet season, it would drain into Smith Cove, via the same channel through which Wetland 24 flows.

8.24 WETLAND 24

41° 20.088' N, 72° 11.704' W

Wetland 24 is accessible from the southern end of the Green Trail loop. It lies directly south of a pond, which varies considerably in size from one season to the next. During the wet season, the pond is very large, and feeds directly into Wetland 24 through a gap in ledge directly south of it. At that time of year, Wetland 24 is filled with water up to one-half acre. It has some evidence of amphibian activity. Vegetation consists of skunk cabbage, mosses (including sphagnum), and ferns. Wetland 24 subsequently feeds into a small stream, which flows south steeply downhill for a short distance, then winds to the east, ultimately emptying into Smith Cove.

This pond empties into Wetland 24, via a channel in the wet season, and the groundwater during the rest of the year.

During the spring, the pond to the north is virtually covered with mating wood frogs, accompanied by the cacophony associated with wood frog reproduction. During other seasons, the pond shrinks, although for most of the year, it continues to provide water to Wetland 24 via groundwater.

8.25 WETLAND 25

41° 20.025' N, 72° 11.829' W

Wetland 25 is a broad area of the stream that flows out of Clark Pond. It is easily accessible via the road entering the ballpark. This is an area where the stream flattens out somewhat, creating a wide area that is normally wet. Skunk cabbage is the main vegetation. Deer tracks are pervasive. It is also worth noting that beavers have constructed a relatively new dam just upstream of this area.

9.0 AREA-SPECIFIC COMMUNITIES

During this survey, many areas of The Preserve were walked extensively, to characterize community types and main flora species. Fauna were also identified during these walks; however, because of the general uniformity of the habitat from one area to another, the vegetative communities are highlighted here.

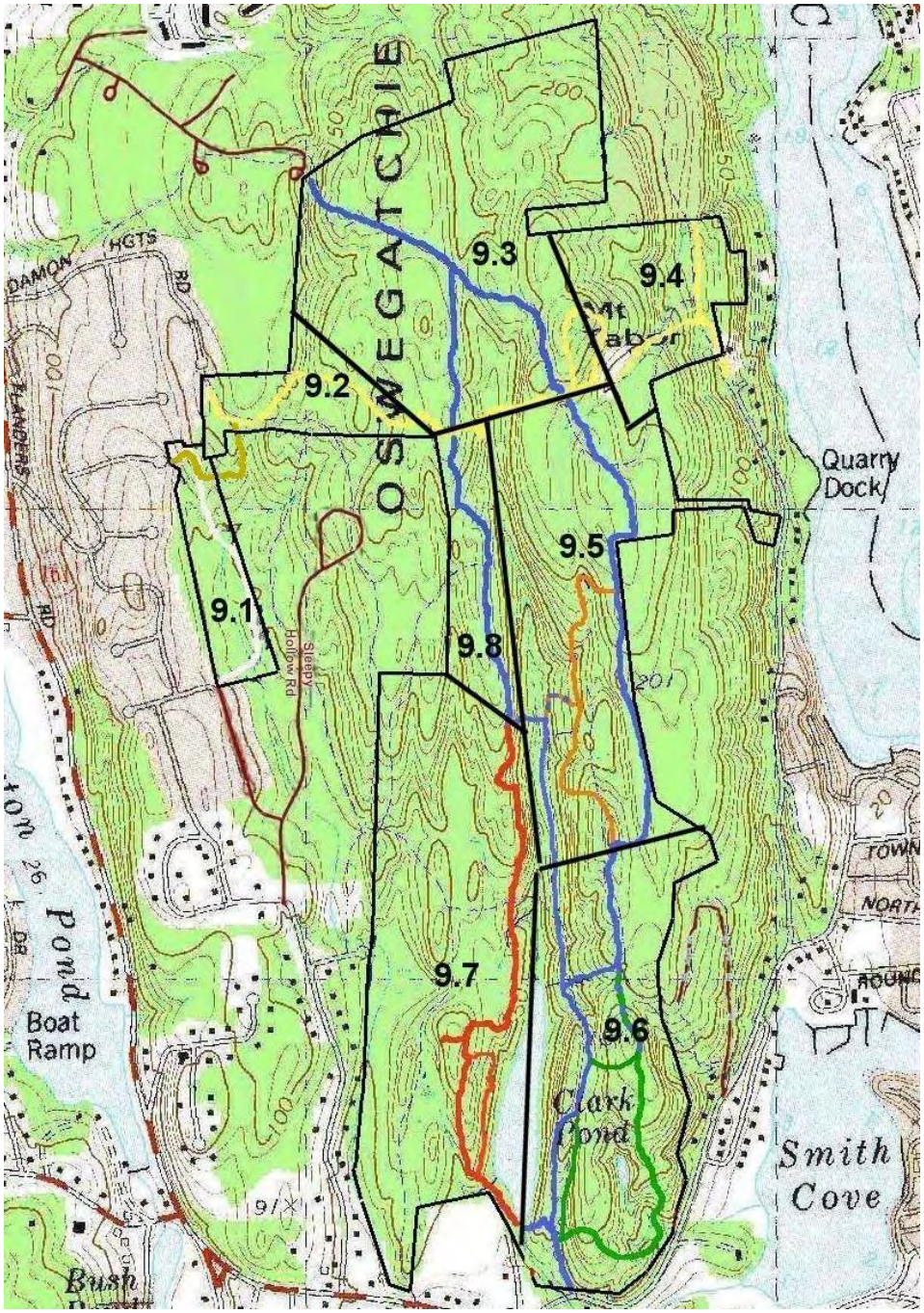


Figure 9-1: Area-Specific Map

Areas characterized in this section are indicated, by the **Section Number**, in the map to the left. For visual simplicity, wetlands are not shown on this map, but some are discussed in the text. Figure 8-1 shows the locations of the wetlands.

9.1 NORTH LEDGE ROCK ROAD TRACT

This area is accessed by taking Laurel Hill Drive east off of Flanders Road, and then taking North Ledge Rock Road to the cul de sac at the end. This tract contains the White Trail, which runs north to south, and the Gold Trail, which runs eastward and then north, to eventually join the Yellow Trail.

This area contains a significant amount of wetland (Wetland 9), which runs nearly throughout the tract. Near the entrance from the road, one gets a hint of what lies ahead: wetlands begin close to the road, with the associated mosses, ferns and Jack-in-the-Pulpit. Trees that are prevalent in this area include: red maples, black birch, an occasional white oak, and sassafras. No single tree species is predominant in this tract. Stands of mountain laurel are found throughout the area.

As one moves south, the trail climbs up a small (10-20 foot) north-south oriented rock ledge, which overlooks wetland on both east and west sides. Trees include a substantial amount of witch hazel, red maple, sassafras, red oak, white oak and black birch. In areas upland from wetland, ground cover consists mostly of leaf litter. The wetland and immediate surroundings contain a substantial amount of skunk cabbage, Jack-in-the-Pulpit, mosses and ferns, including Christmas ferns. Two large tulip trees were also found here.

This area appears to carry surface water for most, if not all, of the year. Deer sign is pervasive, and this area is quite rich in bird life.

9.2 DAMON HEIGHTS ROAD ENTRANCE

This tract is accessed via Damon Heights Road, east off of Flanders Road. It leads to the Yellow Trail, which runs from west to east across the entire Preserve. This area consists largely of relatively mature second growth forest, with a mixture of black birch, cherry, sassafras, red maple and red oak greeting the visitor on the way in. To the north of the trail are Wetlands 4 and 5, described in Sections 8.4 and 8.5, respectively.

Further along, black birch up to 20" in diameter, along with large red oak, white oak, sassafras and grey birch provide a healthy canopy. An occasional witch hazel is also found here. No single tree species appears to be predominant. There are also areas with a thick understory of laurel, particularly around the wetlands. The ground cover consists mainly of leaf litter, with occasional openings that contain goldenrod, raspberry, fleabane and Christmas ferns. One open area leading into the Sleepy Hollow development contains a variety of low-lying weeds, such as ragweed, common mullein and goldenrod, which will need to be watched for encroachment in the future.

There is a fair amount of exposed ledge in this area, but in contrast to much of The Preserve, it is mostly low-lying. The ledge is covered with the typical mixture of lichens, mosses and ferns.

9.3 NORTHERN BLUE TRAIL AREA/MOUNT TABOR

This area covers the Blue Trail area to the north of the Yellow Trail, including up to Chapman Woods, and over to Mount Tabor. The predominant tree in this general area is the chestnut oak. Other trees common in the area are red oak, white oak, black birch, red maple and witch hazel. On the eastern leg of the Blue Trail in this area, scarlet oak are also common. Large stands of mountain laurel are found, as are blueberry bushes.

Between the east and west segments of the Blue Trail in this area lies a ravine that defines the headwaters of the creek that flows into Clark Pond. In this ravine, a mix of red maple and beech tends to dominate the trees, with the following species also present: black birch, tulip tree, pignut hickory, red oak, and witch hazel. Large cliffs of ledge are found on either side of the ravine.

In the area of Mount Tabor and the quarry, chestnut oak are clearly predominant, with scarlet and red oaks mixing in. Blueberry bushes are also common in this area.

Just north of the point where the east and west legs of the Blue Trail meet, lies a picturesque little valley, which contains Wetland 1, described in section 8.1. South of this point, water drains south into Clark Pond. North of this point, the water drains northward, and ultimately westward to the Pattagansett River. Beech trees are predominant near the southern end of Wetland 1, followed by large red maples, and chestnut and scarlet oak. As one approaches the wetland itself, black birch are common. Deer tracks are prevalent in this area. On the east side of the wetland is a

small hill that is the beginning of the east ridge of The Hills. Red maples predominate, followed by scarlet and red oaks. Moving northward, the area between the wetland and the hill is very thick—almost impassable—with stands of laurel.

To the west of the wetland is a ridge approximately 30 feet high, with bare ledge facing the wetland. The top of the hill is covered with small witch hazel, a cluster of beeches, red maples and the four oaks. Moving southward on this ridge, chestnut oak again becomes the dominant tree species.

North of Mount Tabor, and east of Wetland 1, the eastern ridge continues northward, with generally the same mix of trees and blueberries found to the south. On the eastern side of this ridge, a thick cover of mountain laurel makes the trek east to Wetland 3 difficult. But once it is reached, it is worth the trouble, as described in Section 8.3.

9.4 QUARRY DOCK ROAD ENTRANCE

As the title implies, this section is accessed via Quarry Dock Road, which ends at the beginning of the Yellow Trail. Not far from the trail head, an intermittent stream channel parallels the trail to the west. This relatively steep channel flows strongly during the wet season with the water flowing out of Wetland 8. The hill from which it is flowing is substantially rock ledge, but also appears to contain hills of loose rock created by quarry operations. To the west, a tree riddled with woodpecker holes (right) lies near the trail. While the holes are indicative of a pileated woodpecker, the identification could not be confirmed. Trees found here are consistent with those elsewhere on this tract. Wetland 8, described in Section 8.8, is easily accessible to the south of the trail. Evidence of deer presence is pervasive.

In the area immediately north of the trail head, no single tree species predominates, with a mix of pignut hickory, red maple, white oak, red oak, black birch and sassafras. Many of these trees are quite large in this area.

A little further north, large white, scarlet and red oak become more dominant. To the east, the area flattens out, and a small footpath leads to a somewhat obscured view of the Niantic River. There are additional small intermittent streams in this area, but they appear to be strictly storm event related, as they were not observed flowing at all during this survey. An understory of laurel graces this area.

A short offshoot of the Yellow Trail branches northward to the end of The Preserve. A steep hill to the west separates this area from the quarry. The hill consists of bare ledge, with small stands of laurel at the bottom. Some of this area consists of a fairly open

canopy, which makes way for a carpet of ferns. To the east, a much smaller hump of ledge, less than 10 feet, is found. Further north, scarlet oaks are pervasive, followed by black birch, American beech, white oak and red maple.

9.5 EASTERN MID-SECTION OF THE PRESERVE

Section 9.5 is roughly bordered by: the main creek feeding into Clark Pond to the west; the Yellow Trail to the north; the Preserve boundary to the east; and the intersection of the Blue and Orange Trails to the south. It is characterized by the presence of five wetlands; small intermittent streams; impressive rock formations throughout the area; generally mature forest; and substantial stands of mountain laurel.

Vegetation generally follows the same pattern as in much of The Preserve: upland areas tend toward the oaks, with chestnut oak dominating; and lower areas, or areas surrounding wetlands, populated by red maple, beech, sassafras, and black birch. Witch hazel is also found along both the Blue and Orange trails. A ravine with impressive rock formations on both sides acts as a conduit between Wetland 6 and Wetland 10.

Downy Serviceberry blossom

Between Wetland 6 and the Blue Trail, a substantial stand of mountain laurel makes travel difficult. The area to the east of this stand contains shallow soil with limited trees, creating good habitat for blueberry and other low-lying bushes. A few Downy Serviceberry (*Amelanchier arborea*) trees in this area provide additional food for birds and other wildlife.

9.6 EAST OF CLARK POND

This section is bordered by Section 9.5 to the north, Clark Pond to the west, and the Preserve boundary to the east and south. It is characterized by the significant presence of water and wetland: Clark Pond itself; a small, but permanent pond encompassed by the Green Trail; and Wetlands 16, 19, 22, 23, 24 and 25, all described in Section 8. It is also characterized by the impressive rock formations associated with the eastern ridge of The Hills.

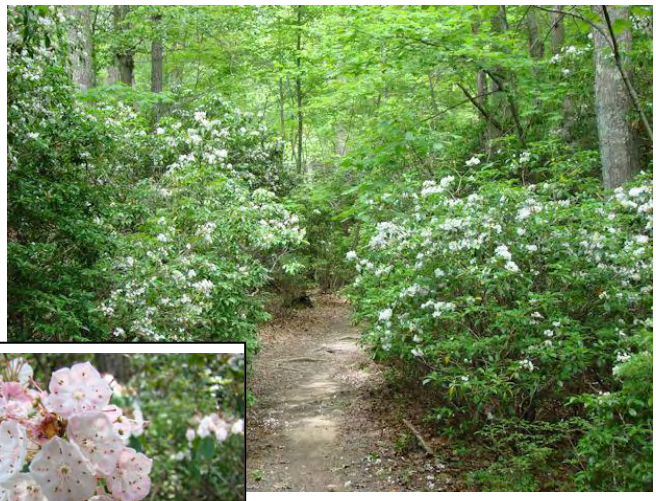
The vegetation in this section generally follows the pattern in the rest of The Preserve, as described in the previous section. Upland areas tend to favor the oaks, with chestnut oak dominant in some areas. There is one difference in this area, however: the obvious presence of Chinkapin Oak. In some areas, particularly the area around the small pond and Wetland 24, the Chinkapin is common, if not the predominant tree.

The Green Trail is an excellent way to get the full flavor of this area, in a relatively short hike. From the Clark Pond Dam, following the Blue Trail south will quickly get the visitor to an access to the Green Trail, off to the East. Following this trail quickly introduces the visitor to the impressive cliff ledge formations, as the trail climbs eastward. The mosses and lichens that cover the rock in this area show that life doesn't have to be as big as a tree to be interesting.

The little brown "spikes" standing up from this moss are the reproductive structures. When ready, the small cap on top lifts off, and spores are dispersed.

Wetland 24 is accessible via a small opening near the southern end of the Green Trail. As the visitor walks in toward the wetland, a small, steep intermittent stream to the right confirms that he or she is on the right path. Most of the oaks surrounding this wetland are chinkapins. By climbing up the small hill to the north of the wetland, the visitor can access the southern end of the small pond. At the right time of the spring, the cacophony of mating wood frogs will lead the way. Near the shore, this pond is ringed with beeches and red maples. The pond varies in size considerably from one season to another. Impressive rock formations encircle both the wetland and this pond.

On the eastern portion of the Green Trail, one can access a side trail that leads to an overlook of the Niantic River when the leaves are off the trees. This area is relatively flat and accessible, with thin stands of laurel, chinkapin, chestnut, red and scarlet oak, and some red maple. Blueberry bushes are also found in this area, perhaps one of the reasons why this is one of the more active birding areas in The Preserve.



Further north, the Green Trail intersects with the Blue-Green Trail. In this area, red and chestnut oaks are dominant. At the end of the Blue-Green Trail, where it meets the Blue trail, is the drainage area for Wetland 19. This wetland is an active amphibian habitat.

In addition to the chinkapin oak, other trees in this section include the other oaks, red maple, black birch, witch hazel, beech, and sawtooth aspen. The area has many stands of laurel, both next to the trail itself and far afield.

9.7 WEST OF CLARK POND

This section is bounded roughly by Clark Pond to the east, the intersection of the Red and Blue Trails to the north, and the Preserve boundary to the west and south. Much of it is to the west of the Red Trail, and is characterized by wetlands, a small stream near the western border, and relatively small ridges associated with the western ridge of the Hills.

Along the western edge of Clark Pond, red maples are the predominant tree, followed by a mix of black birch, beech, and a small number of red oak, witch hazel and sassafras. As one moves north along the shore, the vegetation changes to a fairly dense stand of mountain laurel.

Moving west, uphill from the shore, the chestnut oak again emerges as the predominant tree. Up on the hill in the area of the Red Trail, chestnut oak and red oak are predominant, accompanied by a mix of white oak and pignut hickory, and occasional mountain laurel. Mountain laurel becomes more prevalent in the northern section of the Red Trail. At the Rocky Overlook off the Red Trail, a clear view of Wetland 20 greets the visitor. The trees in the ravine below the overlook include red maple, black birch and witch hazel, as well as large stands of laurel.

Immediately west of the beginning of the Red Trail, the ravine that contains Wetland 20 narrows, with a small hill to the west. There is what appears to be an intermittent watercourse here, which flows from Wetland 20, into Wetland 21, and eventually to Clark Pond. This area contains a substantial amount of witch hazel, with some red maple, black birch, red oak, and ferns for ground cover. There is also some laurel on either side of the ravine.

On the top of the hill to the west, chestnut oak is again predominant. The area to the west of the ballfield has a healthy canopy, some large trees, and not much ground cover. Trees present include a mix of blackbirch, and red and white oak.

To the northwest of Wetland 20, lies Wetland 17, which is described in Section 8.17. This large wetland is ringed with laurel, red maple and black birch. To the northwest and east of this wetland, are two relatively small hills with a variety of oaks, with some blueberry.

The northern portion of this section is dominated by the wetland system made up of Wetlands 14, 15 and 18. This area is somewhat hilly and difficult to walk because of thick stands of laurel and other bushes and saplings. As described in Section 8, this wetland system feeds the creek that runs under the Red Trail footbridge, shown to the right.

9.8 WESTERN MID-SECTION OF THE PRESERVE

This section consists of high hills, culminating in a substantial area of bald ledge. This area is dominated primarily by chestnut oak, followed by red, white and scarlet oak. This area also contains a population of pitch pine, which does reasonably well in the shallow soils around the bald ledge.

To the west of the bald ledge, the land slopes down into a small ravine that is densely covered with laurel and small red maples. This area is likely a storm event-driven intermittent watercourse. On the other side of the ravine lie two consecutive small ridges with exposed ledge. In each case, the ridges are populated with chestnut, scarlet and red oaks and red maples.

East of the bald ledge, the land slopes down into the ravine that contains the main creek flowing into Clark Pond.

10.0 MANAGEMENT OPTIONS

Because the Oswegatchie Hills Nature Preserve has been able to go through several decades of natural succession, it is not recommended that any substantial, active management be initiated. Any disturbance has the potential to introduce invasive species, which The Hills have largely avoided to this point. The following are the only recommendations for management.

10.1 INVASIVE SPECIES

Because there has been development around The Preserve in recent years, it is recommended that attention be given periodically to certain areas, to determine if invasives are gaining a foothold. Although this issue could occur anywhere along The Preserve's borders, areas of particular concern are along the western boundaries, as this is where recent development is closest to The Preserve.

10.2 EDUCATION

As was recommended in The Oswegatchie Hills Natural Resource Inventory (Reference 4), an important role played by The Preserve is the education of the public about the beauty of nature. Options for enhancing public education should be explored. Some examples include:

- An educational brochure about the nature of The Preserve;
- Establishment of a small "Guided Trail." Features of the trail could either be labeled with educational signs, or could contain numbered signs, accompanied by an educational brochure.

10.3 CONTINUE TO BUILD ON THIS SURVEY

As previously stated, this survey should be considered a living document. It was performed over the period of one year, which is hardly enough to fully understand all the intricacies of the ecosystem in this land. Some specific recommendations:

- The FOHNP should continue to build on the inventory. When new discoveries are made, they should be documented;
- From the standpoint of a tree inventory, this survey was largely qualitative, rather than quantitative. The author of the survey made observational judgments about predominant species; however, no quadrats were mapped out to scientifically quantify the vegetation. If a scout troop approaches the FOHNP for a large environmental project, this should be considered;
- To better understand the effect of grazing on the vegetation of The Preserve, consideration should be given to establishing a small number of exclosures in remote areas. These exclosures may provide information that could result in refining plans to manage The Preserve.