Wildlife Habitat Evaluation of the Canoe River in Norton MA 2006-2008

Introduction

The purpose of the wildlife habitat evaluation is to provide the Town of Norton with a tool for obtaining grant funding to purchase land along the Canoe River as part of the Canoe River Aquifer Advisory Committee's (CRAAC) Greenbelt project. A secondary objective is to provide information that will be useful during permit review to encourage cluster development and conservation restrictions for projects within the proposed Greenbelt area. A third objective is to provide residents with educational opportunities to learn about local ecosystems. In 2004, CRAAC solicited bids for a wildlife habitat evaluation of the entire Canoe River through Sharon, Foxborough, Mansfield, Easton and Norton. CRAAC does not have an operating budget and attempts to obtain grant funding have been unsuccessful. The lack of funds to hire a consultant for the work is the main reason the Norton Open Space Committee is undertaking this project in Norton.

Methodology

Background data was collected from the previous biodiversity day events held at protected properties along the Canoe River. Additional information was compiled from rapid resource surveys done by staff at the Wildlands Trust for three of Norton's Self-Help Grant applications. On-line research was conducted on the MassGIS website, Manomet Center for Conservation Services ConservationMapper program and the DEP Wetland Loss project of 2004 (CD-Town of Norton). Site-specific information and maps were received from the Natural Heritage and Endangered Species Program (NHESP). Several field days were conducted in canoes/kayaks to investigate portions of the river. During the canoe trips, the committee collected information on the natural community type, significant wildlife habitat features, and stream quality. The Open Space Committee invited experts to lead site investigations of the river system as well as protected property owned by the Town of Norton (Conservation Commission and Water Department) and the Land Preservation Society of Norton.

For the written evaluation, the river was divided into six reaches (or areas with similar characteristics) based upon ease of access to the river by canoe or parking. These areas include a) Mansfield Town line to north of Red Mill Rd, b) South of Red Mill Rd to Newland St c) south of Newland Street to Route 495, d) Department of Fisheries and Wildlife (Care and Control Agreement) e) South of Route 495 to Plain Street and f) south of Plain Street to the mouth of Lake Winnecunnet. Lake Winnecunnet is the subject of a separate wildlife investigation conducted by ESS Consultants for the invasive plant survey and not included in this evaluation.

Additional in-field investigations were conducted on privately-owned and public conservation properties. These properties included a) the Canoe River Greenbelt and Recreation Area, b) the Bertha Smith Conservation Area, c) the Water Department property south of Newland Street, d) Johnson Acres, e) Department of Fisheries and Wildlife land under a care and control agreement with the Division of Capital Asset Management, f) Reinhard Pasture Land of the Land Preservation Society of Norton, g) the Town of Norton Plain Street Cemetery and conservation parcels, h) the Town Forest and Water Department property south of Plain Street, and i) Lincoln Woods.

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For each of the identified areas, the Open Space Committee investigated the natural community type, flora, fauna utilization of the area, significant wildlife habitat features, presence of State-listed species known to exist in the Canoe River Area of Critical Environmental Concern and/or the Town of Norton, and infestations of invasive species.

Natural Community types were identified using the Natural Heritage and Endangered Species Program (NHESP) publication Draft Classification of the Natural Communities of Massachusetts (Swain and Kearsley, 2001) and the Manomet Center for Conservation Services publication and workshop materials A Guide to the Natural Communities of Massachusetts (Manomet Center for Conservation Services, 2005). MassGIS and DEP wetland data was used to identify the wetland types. Unusual natural communities were identified by the NHESP and ground-truthed by Open Space Committee members during field investigations. Requested Natural Community forms 1 and 3 were submitted to NHESP for all Atlantic White Cedar Swamps.

The floristic inventory was completed by biodiversity results (quantitative list) as well as field verification of identified habitat types. Members stood within a typical section of a habitat type to record the canopy cover and saplings (within 30 feet), shrub layer and vines (within 15 feet) and the herbaceous layer (within 5 feet). We noted any large diameter tree or standing snag; the diameter of cavities was also recorded as a significant wildlife habitat feature. Aquatic plants were identified during the canoe trips. Searches for State-listed plant species known to occur in Norton and/or within the ACEC were done at this time. Copies of the NHESP fact sheets and available photographs were brought on-site and used during a sweep of the suitable habitat. State-listed species documented within the ACEC include Pygmy weed (Crassula aquatica), Lesser snakeroot (Eupatorium aromaticum), Gypsywort (Lycopus rubellus), Philadelphia panic-grass (Panicum philadelphicum), Pale green orchis (Platanthera flava), Lion's foot (Prenanthes serpentaria), Long's bulrush (Scirpus longii), Shining wedgegrass (Sphenopholis nitida), Grass-leaved ladies-tresses (Spiranthese vernalis), and Britton's violet (Viola brittoniana).

The inventory of fauna was conducted by several means within the appropriate season for a target group. Steve Hurley of DFW conducted the electroshocking of fish within the river system in May/June. Photographs were taken to record the inventory. A search was done for the State-listed Bridle shiner.

Lynn Harper of the NHESP conducted the odonate inventory in July. State-listed species previously documented in the ACEC include Aeshna mutata, Cordulegaster oblique, Gomphus abbreviatus, Gomphus descriptus, Lanthus vernalis, Neurocordulia obsolete, Somatochlora kennedyi, Somatochlora linearis, Stylurus scudderi, Williamsonia lintneri, Amphiagrion saucium, Argia apicalis, Calopteryx dimidiata, Enallagma daeckii, Enallagma laterale, Enallagma pictum, Enallagma recurvatum, and Hetaerina Americana. There were no State-listed species found during the 2006 field season.

The mussel survey was conducted by Jennifer Carlino. The mussel survey was done by direct observation by walking the river in hip/chest waders as well as identification of empty shells on the shoreline or found in middens. Empty shells were collected, cleaned, identified and preserved for a town inventory. Previously documented State-listed species include triangle floater

(Alasmidonta undulata), eastern Pondmussel (Ligumia nasuta), Creeper (Strophitus undulatus), dwarf wedgemussel (Alasmidonta heterodon) and tidewater mucket (Leptodea ochracea).

Amphibian and reptile searches were done during the vernal pool season, summer and fall. Vernal pools were identified by aerial photographs, MassGIS and NHESP data, and personal knowledge of the areas. Wheaton College students enrolled in the Vernal Pool Ecology class investigated 12 vernal pools in the study area. All of the map-identified pools were field located but did not contain adequate water to provide the necessary habitat. A scientific collection permit was issued to Jennifer Carlino to conduct a turtle trapping program at two certified vernal pools in Lincoln Woods. Turtles were identified by hand capture, direct observation and/or trapped using two 36" hoop traps baited with sardines. Wheaton College Fellows Shea Clarke assisted Ms. Carlino with the trapping, identification, documentation and release of all turtles. She also assisted with the statistical compilation of data. Turtle nest were documented when found. Snake skins were collected if found. State-listed species previously documented include Blue-spotted salamander (Ambystoma laterale), Four-toed salamander (Hemidactylium scutatum), marbled salamander (Ambystoma opacum), spotted turtle (Clemmys guttata), Eastern box turtle (Terrapene Carolina), wood turtle (Clemmys insculpta), and Blanding's turtle (Emydoidea blandingii).

Insects were photographed and/or identified by hand capture with Dave Small, President of the Athol Bird and Nature Club and Earl Baldwin. Several species of butterflies and dragonflies were identified during the nature walk of the Canoe River Greenbelt and Recreation Area.

The bird inventory was conducted by direct observation or photograph. John Kricher of Wheaton College investigated areas with the Spring 2006 Ornithology class. Students observed and identified birds along the river and on various protected land on Tuesdays in May. Mr. Kricher also conducted a bird walk in May. American bittern (Botaurus lentiginosus), sharp-shinned hawk (Accipiter stiatus), and northern harrier (Circus cyaneus) are the previously documented State-species species within the ACEC.

Mammal identification was done using track, scat and sign. Any direct observations were recorded. On February 11, 2006, several residents walked the Johnson Acres on North Washington Street with the Open Space Committee to conduct a track, scat, sign field trip. Fox/coyote scat, deer scat/track/sign/scrape/browse, nail marks on standing snag, dog scat/track, grey squirrel nest, vole/shrew/mouse nest found under tree, bird nest, nut cashe, and termite mounds were all observed on the trip. Observations of muskrat middens, potential dens and tracks were also made during the canoe trips and documented.

In 2006, the Committee received a $3,500.00 grant on behalf of the Canoe River Aquifer Advisory Committee from Norcross Wildlife Foundation in order to purchase equipment to assist in the habitat evaluation. A GPS unit, nets, traps, infrared wildlife cameras, laptop computer and projector for Powerpoint presentations have greatly added to the Committee's ability to perform the evaluation and conduct the public outreach program.

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Mapping methods

Since the Town of Norton does not have GIS capabilities, most created maps use the Town of Norton's Assessor Maps as a base. Clear overhead projector sheets were used to trace the assessor parcels and the approximate location of the river. A separate clear overhead projector sheet was used to trace copies of the DEP wetland loss maps from the CD at a 200% enlargement to match the scale of the assessor maps. The Manomet Center for Conservation Services ConservationMapper program was also used to trace the approximate locations of potential and certified vernal pools onto the overhead projector sheets. Overhead projector sheets were then placed on top of each other for the desired "layer" of data and photocopied with a plain sheet of white paper as the background. Additional maps were provided by NHESP. The information of those maps was interpolated to the overhead projector sheets once the information was verified in the field. For example, small discrepancies between shallow emergent marsh on one plan in the same location as a deep marsh on a second plan were corrected by field verification and shown on the final maps within this evaluation.

General Description of the Canoe River

The Canoe River consists primarily of alluvial red maple swamps mixed with Atlantic White Cedar Swamps in the portion of the river north of Route 495. Shrub-scrub wetlands and emergent marshes are dominant south of Route 495. The surrounding uplands are primarily eastern white pine and mixed oaks with either a residential or conservation/water protection land use. River substrate is generally sandy/gravelly. Portions of the river south of Route 495 have a greater meandering characteristic than the section of the river north of Route 495. Altered areas and channelization of the river for Route 495 show the greatest decline in water quality. The Ponds to Particles class at Wheaton College conducted water quality monitoring at several sites along the Canoe River. The 2005 field survey of dragonfly exuviea showed a noticeable decline in the quantity of exuviea collected along the southernmost bridge (RT. 495) as in other bridges throughout town.

Natural Communities

The types of wetland systems found in the Canoe River Aquifer include Alluvial Atlantic White Cedar Swamp, Red Maple Swamp, Alluvial Red Maple Swamp, Deep Emergent Marsh, Shallow Emergent Marsh, Coastal Plain Pondshore, Shrub-scrub Swamp, Woodland Vernal Pool, and Forest Seep Community. Each wetland habitat community is identified by environmental and vegetation descriptions in the Classification of the Natural Communities of Massachusetts by Patricia C. Swain and Jennifer B. Kearsley, Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife, Westboro, MA, DRAFT 2000. An excellent source of information on the types of wetlands and their interactions with wildlife is The Redington Field Guides to Biological Interactions: Plants in Wetlands, by Charles Redington, Kendall/Hunt Publishing Company, 1994. The following descriptions are taken directly from these two publications.

The ***Alluvial Atlantic White Cedar Swamp*** is a swamp dominated by Atlantic White Cedar and Red Maple located within the floodplain of rivers and steams. These areas are very rich in minerals due to the annual or semi-annual overtopping of the banks. Other vegetation found within this community type include high-bush blueberry, sweet pepperbush, silky dogwood,

sensitive fern, royal fern, bugleweed, marsh fern and marsh St. John's-wort. The Natural Heritage and Endangered Species Program lists the alluvial Atlantic white cedar swamps along the Canoe River as an important community type to protect. The smaller Atlantic White Cedar swamps along the Goose Brook Branch should be investigated.

Red Maple Swamp and Alluvial Red Maple Swamp occur in a variety of physical settings. They may occur at the foot of a hill, seasonally flooded depressions or natural drainage ways and sustain the wetland vegetation and soils with hydrology from surface waters, groundwater, or lake and stream overflows. The forest can only tolerate the flooded conditions for 3-4 months of the year. Often the trees grow on hummocks or raised mounds to protect the roots from being submerged or the trees have adapted to the flooded conditions by growing shallow fibrous roots to ensure adequate oxygen. The fibrous root system allows the trees to knit together and support each other from falling with heavy winds. Typical vegetation in these areas consists of Red Maple, yellow birch, black gum, white ash, eastern white pine, American elm, swamp white oak, pin oak, swamp azalea, sweet pepperbush, winterberry, high-bush blueberry, northern arrowwood, nannyberry, speckled alder, poison sumac, sensitive fern, skunk cabbage, marsh marigold, swamp dewberry, and jewelweed. European buckthorn is an exotic, invasive plant that may invade a red maple swamp and outcompete the native vegetation. Buckthorn should be tracked and removed before it infests a swamp. An example of this type of wetland community is the Hockomock Swamp, found at the northeastern corner of Norton abutting the City of Taunton line. It is the largest contiguous freshwater swamp in Massachusetts. The Hockomock Swamp was the first area in Norton to be officially designated an Area of Critical Environmental Concern by the Secretary of Environmental Affairs

Deep Emergent Marshes form very broad, flat areas near low-energy rivers and streams and along pond and lake margins. Marshes consist of a well decomposed layer of organic muck with standing water averaging 6 inches to three feet deep and typically remain permanently flooded. There is usually an open water area with floating and completely submerged plants as well as emergent vegetation along the edge of the water. Typical plants found within the deep emergent marsh include broad and narrow-leaved cattails, arrow-leaf tearthumb, swamp candles, beggar's ticks, common arrowhead, slender leaved goldenrod, marsh fern, river horsetail, sweet flag, bristly sedge, giant bur-reed and marsh cinquefoil. These marshes are scattered throughout Norton.

Shallow Emergent Marshes are found in broad, flat areas bordering low-energy rivers and streams, often in the backwaters. The marshes are composed of a very thick layer of organic muck, with standing or running water. Water depth does not usually exceed one foot during the growing season. Plants within the shallow emergent marsh usually have their roots and lower stems submerged in water while the upper portions of the plants extend above the water's surface. Tussock sedge, reed canary grass, rice cut-grass, water lilies, pondweeds, and duckweeds are commonly found within marshes. A very large shallow emergent marsh can be found behind the Rosewood Estates subdivision and in the Red Mill Pond on Red Mill Road.

Coastal Plain Pondshores are highly acidic ponds found in glacial outwash areas. Ponds are usually shallow and have a fluctuating water elevation directly related to the groundwater

elevation. Type of vegetation is coincident with the flooding regime and is characterized with zones of vegetation. The outer perimeter of the pond is usually an upland oak forest. A shrub layer of high-bush blueberry, sweet pepperbush, winterberry and greenbriar would dominate the next zone. The exposed pondshore contains emergent vegetation such as flat topped goldenrod, pondshore rush, rose coreopsis, golden pert and
dwarf St. John's-wort. The next zone contains semi-permanently inundated vegetation such as bayonet rush, spike-sedge and pipewort. Plants that prefer to be permanently inundated like the water lily and Robbins' spike-sedge characterize the final zone. It appears that any area in Norton that has been excavated for sands and gravels has evolved into a Coastal Plain Pond. Whether formed by the glacier or by man, the same hydrologic activity takes place and the same species of plants have populated the area. An excellent example of a coastal plain pondshore is found within Lincoln Woods. Some coastal plain ponds function as vernal pools. However, motorized vehicle use within the coastal plain pond at Lincoln Woods is severely disrupting the fragile ecosystem.

Shrub-scrub Swamps are reasonably widespread. The shrub swamp is found between the emergent marsh and the forested swamp. They can be found anywhere the water table is at or near the surface to one inch deep for most of the year. Shrubs and saplings can be found growing on hummocks or high spots where the roots will not be exposed to the low oxygen levels of prolonged flooding. The shrub swamp contains such shrub species as the smooth alder, buttonbush, high-bush blueberry, speckled alder, swamp azalea, northern arrowwood, spicebush, pussy willow, silky dogwood, poison sumac, winterberry, maleberry, swamp rose, jewelweed, swamp milkweed, cinnamon fern, sensitive fern, cardinal flower, jack in the pulpit, mint, marsh marigold, water hemlock, steeplebush, meadowsweet, shadbush, leatherleaf, sheep laurel, wild raisin, swamp loosestrife, goldthread, blackberry, meadow-rue and sphagnum moss. Portions of the Canoe River to the north and south side of Plain Street consist of shrub-scrub swamps.

The ***Woodland Vernal Pool*** is a common feature within the wetland community of Norton but typically contains little vegetation except for a ring of shrubs, overhanging tree branches and some grasses. One woodland vernal pool can be observed on the north side of Newland Street across from the White Street pits. Vernal pools are small depressions in the landscape that hold water for at least two months and provide the only breeding habitat for certain types of amphibians and reptiles. The pools are free of adult fish and typically dry completely in the fall. Vernal pools act as little nightclubs where males and females meet. They also act as fast-food restaurants providing ample macro-invertebrate populations to feed larger animals. Vernal pools are some of the most diversely populated habitats found within the landscape. Species that may be observed using vernal pools include wood frogs, spring peepers, American toads, green frogs, gray tree frogs (pictured above), bull frogs, spotted salamanders, blue-spotted salamanders, marble salamanders, fairy shrimp, whirligig beetles, predacious diving beetles, mayflies, many species of damselflies and dragonflies, amphipods, isopods, fishfly, fingernail clams, caddisflies and amphibious snails. Major threats to vernal pools are the habitat destruction caused by the filling of these wetland areas, and the clearing of all forested vegetation near the pools. Some studies are showing that vernal pool species only use the pools for two weeks a year and spend most of their time in the adjacent uplands. Some species will travel over 1000 meters to reach a vernal pool. Therefore, it is especially important to maintain the forested connection between

vernal pools and forested upland areas. Dead trees (snags) lying on the ground or standing should not be removed because they provide excellent cover and shelter for species migrating from the forested upland to the vernal pool.

A ***Forest Seep Community*** can be found near a headwater stream or where the groundwater reaches the surface and water emerges. These areas may look like the surrounding canopy but shrubs and herbaceous layers are typical of wetlands. Vegetation types include white ash, red maple, yellow birch, white birch, hemlock, spruce, white pines, cinnamon fern, silvery spleenwort, Christmas fern, scouring rush, false hellebore and water avens. Some of the headwater streams adjacent to eskers and moraines illustrate this community type. Some of the more adventurous residents may observe a forest seep along the Canoe River or Three-Mile River.

General types of upland vegetation found throughout Norton, not including the previously discussed wetland vegetation, include White Pine-Oak Forest, Successional White Pine Forest, Mixed Oak Forest, Pitch Pine-Oak and Cultural Grassland.

White Pine-Oak forest is a forest of mixed oaks and pines found on moraines or areas of till. Such areas are dry and have acidic soils. Vegetation includes eastern white pines, red oak, white oak, scarlet oak, black oak, chestnut oak, pitch pine, red maple, black and white birches, pignut hickory, sassafras, American chestnut, low-bush blueberries, huckleberries, mountain and sheep laurels, maple-leaf viburnum, wild sarsaparilla, Canada mayflower, wintergreen, partridgeberry, pink lady's slipper, and cow-wheat.

Successional White Pine forests can be found in old agricultural fields, pastures, old gravel pits and land that have been logged. It is similar to the white pine-oak forest but the forest floor is littered with needles and little other herbaceous vegetation. Vegetation typically found in these forests include eastern white pine, red oak, white oak red maple, elderberry, black cherry, maple-leaf viburnum, buckthorn, honeysuckle and multiflora rose, blackberry, poison ivy, low bush blueberry, black huckleberry, Canada mayflower, eastern starflower, partridgeberry, clubmosses, and bracken ferns.

Mixed Oak forests are common on dry, acidic slopes with shallow well-drained soils throughout Norton. White oak, chestnut oak, red oak, black birch, black cherry, red maple, hemlock and white pine make up the tree canopy. Beech and American chestnut are also common in smaller sections throughout the forest. The shrub layer contains witch-hazel, mountain laurel, lowbush blueberry, and maple-leaf viburnum. Groundcover includes Indian cucumber root, wintergreen, wild sarsaparilla, wild oats, eastern starflower and Canada mayflower.

Pitch Pine-Oak forest is found interspersed with the Mixed Oak forest of Lincoln Woods Conservation Area. This type of forest is typically on a moraine, till, outwash or rocky slope. This forest is found near the coastal plain pond community on the same property. This type of forest is fire dependent and many of the plants have adapted to regular fires. Pitch pine forests have pitch pine, black, scarlet, chestnut and white oaks, black huckleberry, scrub oak, greenbriar, bracken fern, wild sarsaparilla, wintergreen, and Pennsylvania sedges.

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Cultural Grassland is a human created and open type of community, usually mowed on a regular basis. They are found in sandy or dry, low nutrient soils. Pastures and hayfields are typical grasslands of this type. Blue stem grasses, Pennsylvania sedge and poverty grass are dominant with goldenrods and milkweeds.

For the purposes of this evaluation the Canoe River was broken up into six different reaches (areas 1, 2, 5, 7, 9, and 10 listed below). The Open Space Committee evaluated each reach and all permanently protected land within 500 feet of the river, also known as the Canoe River Greenbelt (areas 3, 4, 6, 8, and 11 below), a project of the Canoe River Aquifer Advisory Committee. Each area is described in detail with a description of the reach or property, description of field visits, canoe trips or nature walks, and any other documentation available for the reach/property. The excel sheet containing the species inventory lists the reaches/properties where each species was found by the area number listed below.

River Reach and Parcel Areas

1. Mansfield Town line to north of Red Mill Rd
2. South of Red Mill Rd to Newland St
3. Canoe River Greenbelt and Recreation Area
4. Bertha Smith Conservation Area
5. South of Newland Street to Route 495
6. Johnson Acres
7. Department of Fisheries and Wildlife (Care and Control Agreement)
8. Reinhardt Pasture Land
9. South of Route 495 to Plain Street
10. South of Plain Street to the mouth of Winnecunnet Pond
11. Lincoln Woods

The Open Space Committee and participants of the canoe trips observed over 459 species of plants and animals and nature walks. A very simplistic categorization of the species found is listed below with the number of species we were able to identify. Many other species were observed but not identified due to the complexity of the species (i.e. sedges).

Algae	1
Amphibians/Reptiles	19
Aquatic Plants	16
Birds	64
Butterflies/Moths	22
Dragonflies/Damselflies	40
Ferns and Allies	16
Fish	15
Grasses/Sedges/Rushes	10
Insects	41
Invasive Plants	10
Lichens and Moss	8

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Mammals	13
Mollusks	4
Mushroom	1
Shrubs	30
Trees	32
Vines	4
Wildflowers	111
Worms	2
Miscellaneous	2

The Open Space Committee held 30 public trips and volunteered more than 178.5 hours to the project.

Public Events

	Walks	Canoe Trips	Slides/Presentations
2006	7	5	1
2007	3	5	2
2008	2	2	3
Total	12	12	6
Total Events	30		

Volunteer Hours (estimated minimum number of hours)

	Public trips	Preparation	OSC field work
2006	29	9.5	10
2007	18.5	10	33
2008	18.5	10	40+
Total	66	29.5	83+
Total Hours	178.5		

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Recommendations

In order to maintain this level of biodiversity, it is recommended that Norton continue to preserve a substantial (more than 500 feet) forested buffer on either side of the Canoe River and be diligent in protecting water quality.

1. Maintain forested buffer on either side of the Canoe River (500 feet or more)

2. Require greater than 90% TSS removal rates and as much recharge and infiltration of storm water for all new developments and construction along the Canoe River.

3. Preserve a contiguous forested area along the Canoe River through purchase, donation, conservation restriction, or transfer of property to Conservation Commission management.

4. Encourage residents to recharge their own storm water generated by the impervious surfaces on their own property (i.e. house, driveway, garage) with drywells, rain gardens, or rain barrels and the planting of drought resistant, native plants.

5. Continue to investigate the wildlife and plant communities of Norton to gain better understanding of the ecosystem and encourage residents to attend nature walks.

6. Continue to bring conservation and watershed related issues to Town Meeting for resident's education and approval.