

A black and white photograph of a misty lake. On the right side, there is a small wooden building, possibly a cabin or shed, situated on a grassy bank. The building has a gabled roof and a small porch. The lake is calm, and the mist is thick, obscuring the background. The sky is overcast and grey.

NORWELL OPEN SPACE & RECREATION PLAN 2005 - 2010 APPENDICES

**Prepared by the Norwell Open Space and Recreation Committee
for the Norwell Conservation Commission
August 2005**

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Norwell Open Space Questionnaire

Norwell's Open Space Committee is updating our Open Space plan at the request of the state. Massachusetts requires that towns have approved open space plans before they can receive state funds for acquisition of land. Please help us update the plan by completing this questionnaire.

You may drop off or mail this form to the Norwell Conservation Commission, Town Offices, 345 Main Street, Norwell, MA.

How many in your household? _____ adults _____ children

How many years have you lived in Norwell? _____

Was there an ambiance about Norwell that made you decide to move here? _____

Have you noticed much physical change since you moved here? _____

Do you approve or disapprove? _____

Do you think that open space in Norwell is in danger from development? _____

What factors are important to your perception of Norwell's character?

(1= very important, 5= not important)

___ Open fields and farmlands	___ Woods	___ Marshes, bogs and other wetlands
___ Street trees	___ Views across water	
___ Lawns and landscaping	___ Housing styles	

How do you use town-owned open space? (check any or all):

<input type="checkbox"/> Walks	<input type="checkbox"/> Sports & games	<input type="checkbox"/> Bicycling	<input type="checkbox"/> Nature appreciation/education
<input type="checkbox"/> Skiing	<input type="checkbox"/> Fishing	<input type="checkbox"/> Power boating	<input type="checkbox"/> Trysts
<input type="checkbox"/> Jogging	<input type="checkbox"/> Swimming	<input type="checkbox"/> Sailing	<input type="checkbox"/> Bird watching
<input type="checkbox"/> Photography	<input type="checkbox"/> Skating	<input type="checkbox"/> Canoeing	<input type="checkbox"/> Horseback riding
<input type="checkbox"/> Other _____			

Would you use open space more if we had the following? (check any or all):

- | | | |
|---|---|---|
| <input type="checkbox"/> More foot and bridle paths | <input type="checkbox"/> Detailed maps | <input type="checkbox"/> Boardwalks along the North River |
| <input type="checkbox"/> Marked nature trails | <input type="checkbox"/> Bicycle paths | <input type="checkbox"/> More playing fields |
| <input type="checkbox"/> Marked historic trails | <input type="checkbox"/> Swimming areas | <input type="checkbox"/> Other _____ |

Should Norwell actively try to acquire more open space? _____

What kinds of open space should Norwell acquire (check any or all):

- | | | |
|--|---------------------------------------|---|
| <input type="checkbox"/> Agricultural fields | <input type="checkbox"/> Wetlands | <input type="checkbox"/> Easements across private land |
| <input type="checkbox"/> Woods | <input type="checkbox"/> Salt marshes | <input type="checkbox"/> Parcels that connect other Conservation land |
| <input type="checkbox"/> Other | | |

What factors should determine what open space should be acquired?

(1= very important, 5= not important)

- | | |
|--|--------------------------------------|
| ___ Protection of visual quality | ___ Resource protection |
| ___ Recreational opportunities | ___ Cultural/historical preservation |
| ___ Preservation of drinking water quality | ___ Other _____ |

Are you aware of the different TAX BENEFITS that accompany giving land or granting conservation easements to the town? _____

If you were planning to sell your land, would you consider including conservation restrictions that protect open space as a condition of the sale? _____

Is there property in town you would like the town to acquire as open space?

Further comments? We would like to have them:

Questionnaire Results

Number of Questionnaires

269 (Including 21 6th Grade and 33 high school students)

Was there an ambiance about Norwell that made you decide to move here?

	No.	Percent
Yes	191	74
No	21	8
Undecided	12	4

Have you noticed much physical change since you moved here?

Yes	223	86
No	32	12
Undecided	3	1

Do you approve or disapprove?

Approve	44	16
Disapprove	148	55
Undecided	36	13

Do you think that open space in Norwell is in danger from development?

Yes	215	80
No	26	9
Undecided	7	2

How do you use town-owned open space?

	No.	Percent	Rank
Walks	246	91	1
Nature appreciation/education	160	59	2
Bicycling	145	53	3
Sports and games	114	42	4
Jogging	112	41	5
Bird watching	78	29	6
Skating	79	29	6
Canoeing	74	28	7
Fishing	68	25	8
Photography	60	22	9
Swimming	42	15	10
Skiing	35	13	11
Power boating	19	7	12
Trysts	17	6	13
Horseback riding	16	6	13
Sailing	7	2	14

Other uses added to survey:

Kayaking, Mountain Biking, Snowshoeing, Studying Maps, Exercising Dogs and Ballet

Would you use open space more if we had the following?

	No.	Percent	Rank
Bicycle paths	156	57	1
Boardwalks along North River	150	56	2
Marked nature trails	150	56	3
More foot and bridle paths	146	54	4
Marked historic trails	114	42	5
Swimming areas	99	36	6
More playing fields	88	32	7
Detailed maps	83	31	8
Side walks*	13	5	9

Other uses added to survey by residents:

Picnic tables, Parking at Trails, Playgrounds , Planned Activities for adults, Cross country ski trails and Basketball Courts

What kinds of open space should Norwell acquire?

	No.	Percent	Rank
Woods	188	70	1
Agricultural fields	155	57	2
Parcels to Conservation land	153	57	3
Wetlands	123	45	4
Salt marshes	97	36	5
Easements across private land	66	24	6

Other open space added to survey:

Playing fields, Development rights, Watershed, Land in danger of 40B projects, Along the North River, Historical/Cultural areas/homes, Ponds and Fields

What factors should determine what open space should be acquired?

1= very important, 5= not important

Preservation of drinking water quality

	No.	Percent
1	196	73
2	17	6 2
3	9	3 3
4	1	-
5	12	4

Resource protection

1	164	61
2	18	6
3	15	5
4	10	3
5	7	2

--	--	--

Protection of visual quality

1	150	56
2	33	12
3	25	9
4	9	3
5	10	3

Cultural/historical preservation

1	105	39
2	56	21
3	34	12
4	10	3
5	11	4

Recreational opportunities

1	87	32
2	53	20
3	42	15
4	11	4
5	11	4

Are you aware of the different TAX BENEFITS that accompany giving land or granting conservation easements to the town?

Yes	116	42
No	104	39
Undecided	4	1

If you were planning to sell your land, would you consider including conservation restrictions that protect open space as a condition of the sale?

Yes	131	49
No	69	8
Undecided	13	5
Not Applicable	16	6



NORWELL COMMUNITY PROFILE

Prepared by the Data Center of the Metropolitan Area Planning Council
60 Temple Place, Boston, MA 02111 (617) 451-2770
March 2004



Transportation

Journey to Work

Top 10 Locations Where Residents Worked, 1990

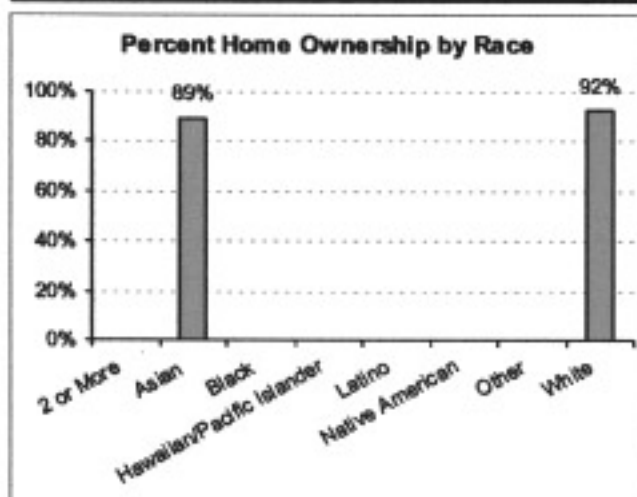
Town	Number of Workers	Percent of Workers
Norwell	927	19.04%
Boston	868	17.83%
Hanover	461	9.47%
Hingham	280	5.75%
Weymouth	276	5.67%
Quincy	211	4.33%
Braintree	203	4.17%
Rockland	113	2.32%
Pembroke	97	1.99%
Scituate	92	1.89%

Top 10 Locations Where Residents Worked, 2000

Town	Number of Workers	Percent of Workers
Boston	988	20.48%
Norwell	934	19.36%
Hanover	332	6.88%
Quincy	289	5.99%
Weymouth	260	5.39%
Hingham	213	4.41%
Braintree	156	3.23%
Rockland	137	2.84%
Cambridge	99	2.05%
Brockton	95	1.97%

Source: US Census

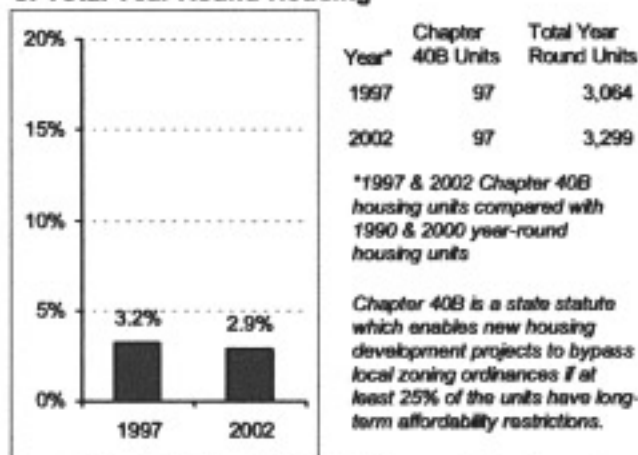
Housing



Source: 2000 US Census, SF2

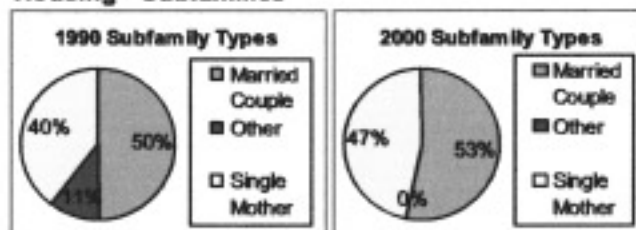
Housing

Chapter 40B Units as Percent of Total Year Round Housing



Source: Mass. Department of Housing & Community Development

Housing - Subfamilies



Total Number of Subfamilies:

1990: 101

2000: 53

A subfamily is a married couple (with or without children) or a single parent with one or more never-married children under the age of 18, residing with and related to the householder, but not including the householder or the householder's spouse.

When grown children move back to the parental home with their own children or spouse, they are considered a subfamily.

Source: 2000 US Census, SF3



Source: Banker & Tradesman



NORWELL COMMUNITY PROFILE

Prepared by the Data Center of the Metropolitan Area Planning Council
60 Temple Place, Boston, MA 02111 (617) 451-2770
March 2004



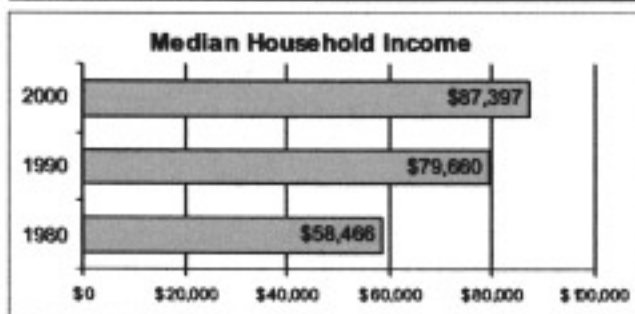
Subregion:
SSC

Form of Government:
Board of Selectmen -
Open Town Meeting

Total Area:
21.17 Square Miles

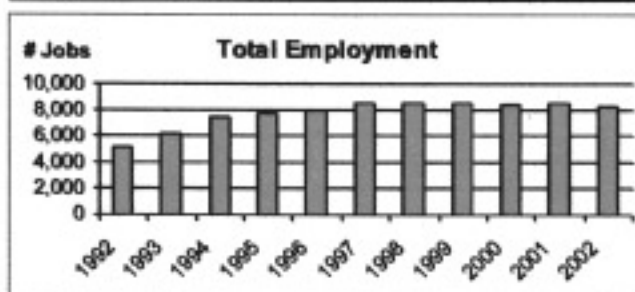
2000 Population:
9,765

Demographics



Source: 2000 US Census, SF3
Numbers adjusted for inflation.

Employment



Source: Massachusetts Division of Employment & Training

Environment

Water

Millions of Gallons Used per Day,
1999-2001 Average: 1.02

Water Source:

Local Sources

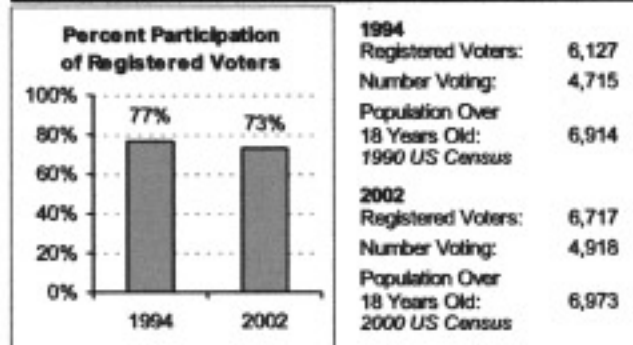
Source: Massachusetts Department of Environmental Protection

Open Space

Protected Acres: 2,736

Source: Massachusetts Executive Office of Environmental Affairs

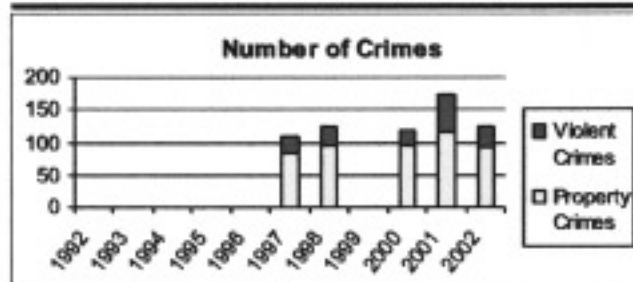
Community Vitality



1994
Registered Voters: 6,127
Number Voting: 4,715
Population Over 18 Years Old: 6,914
1990 US Census

2002
Registered Voters: 6,717
Number Voting: 4,918
Population Over 18 Years Old: 6,973
2000 US Census

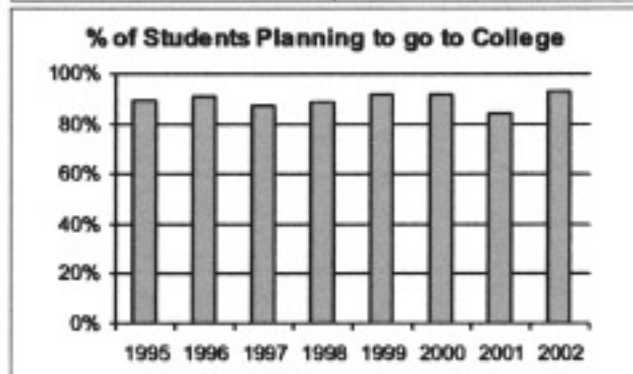
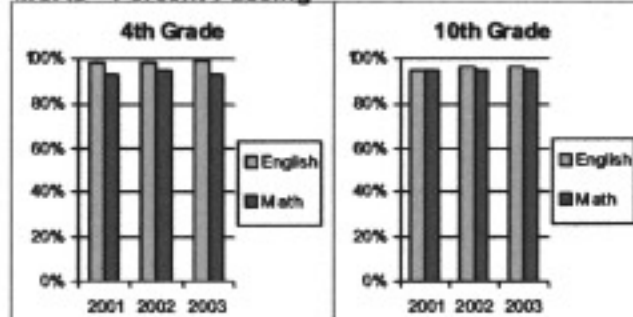
Source: Massachusetts Secretary of the Commonwealth



Blank years indicate missing/incomplete data
Source: Massachusetts State Police

Education

MCAS - Percent Passing



Source: Massachusetts Department of Education

Appendix C: Natural Resources Information

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Natural Heritage & Endangered Species Program (NHESP) Documentation

1. Cover Letter of July 14, 2003
2. Rare Species Documented in Norwell as of July 11, 2003
3. State-Listed Species Documented in Estimated Habitats in Norwell as of July 1, 2003
4. State-Listed Species Documented in Priority Habitats in Norwell as of July 1, 2003
5. Map of Estimated and Priority Habitats and Potential and Certified Vernal Pools -Norwell 2003
6. Map of BioMap Core Area and Supporting Natural Landscape - Norwell 2003

NHESP Fact Sheets

1. Spotted Turtle
2. Eastern Box Turtle
3. Elderberry Long-horned Beetle
4. Gypsywort
5. Pale Green Orchis
6. Estuary Pipewort

Vernal Pool Information

1. Vernal Pool Fact Sheet
2. Certification Criteria - Vernal Pool Habitat
3. Vernal Pool Observation Form

Rare and Unique Natural Communities Found in Norwell - Fact Sheets

1. Non-Forested Acidic Peatlands
2. Freshwater Tidal Marshes
3. Hemlock-Hardwood Swamp
4. Estuarine Intertidal: Freshwater Tidal Marsh
5. Acidic Shrub Fen
6. Level Bog

Freshwater Fish Species of Norwell - Summarized by Steve Hurley, MassWildlife

Fish Species -Theoretical and Confirmed in Norwell

Breeding Birds in Norwell, Adapted from Massachusetts Audubon Breeding Bird Atlas

South Shore Natural Science Center Biodiversity List 2000-2003

Butterflies of Plymouth County - Theoretical and Confirmed in Norwell

Amphibian and Reptiles of Massachusetts

Aquatic Macro-invertebrates of First Herring Brook

Prepared by Fred Saint Ours, pages 85-89 of the report "First Herring Brook Watershed Report", June 2003, First Herring Brook Watershed Initiative

Norwell Ponds

Norwell Soils (Locations)

Detailed General Soil Map Units

Norwell Swamps

Wildlife Inventory (Stetson Meadows Management Plan)

Living with Wildlife: Fishers in Massachusetts



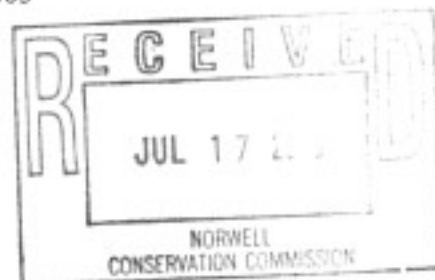
Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

July 14, 2003

Michele Simoneaux, Conservation Agent
Town of Norwell, Conservation Commission
PO Box 295
Norwell, MA 02061

Re: Open Space Plan; 03 - 12335
Town of Norwell



Dear Ms Simoneaux:

Thank you for contacting the Natural Heritage and Endangered Species Program regarding the Open Space Plan for the Town of Norwell. We would like to offer the following information on the rare species and ecologically significant natural communities that we have documented in Norwell.

We have prepared and enclosed a printout from our database of all rare species currently known to occur in Norwell. Two rare turtles occur in Norwell, in several different locations. Eastern Box Turtles and Spotted Turtles are species of a variety of types of wetlands that also use uplands as part of their habitat, especially for nesting. The two known rare invertebrates of Norwell are species of wetlands: the watch listed pitcher plant moth found in bogs and the Elderberry Long-horned beetle found on elderberry, a shrubby plant of wetland edges and openings. The record of the Wild Senna from Norwell has incomplete information on actual date and location (a specimen that says collected in Norwell): the species is considered to be rare throughout New England. Records of Wild Senna's occurrences are often of edges of floodplains in openings of wet woods and thickets. Pale Green Orchis has not been seen recently in Norwell despite much searching of appropriate habitats in recent years. Several natural communities are known in Norwell, of these the Freshwater Tidal Marsh along the North River and Third Herring Brook, is a very uncommon community statewide that provides habitat for several rare species as well as more common ones. The occurrence in Norwell is fairly large and in good condition. Part of the community is on town protected land, but it extends into private land that would make a good target for conservation protection. Surrounding towns also have parts of the community, and have protected various parcels of it. Non-profit conservation groups have also targeted this good occurrence of the community for protection. A good quality level bog, fortunately in conservation protection, is known in Norwell. Occurrences of other wetland natural communities have been reported from Norwell, a good quality example of the fairly common type, Hemlock - Hardwood Swamp, and an example of an Acidic Shrub Fen, a peatland with shrubs rather than trees.

Norwell has six certified vernal pools (CVPs) and many probable vernal pools (Potential Vernal Pools, PVPs, identified through interpreting aerial photographs, available as a datalayer from MassGIS at <http://www.state.ma.us/mgis/pvp.htm>). There are several clusters of CVPs and PVPs, which indicate particularly good habitat for species that depend on vernal pools for habitat. The clusters mean that there are alternate habitats if something happens to one pool, and slightly different conditions in each may provide different habitats for pool dependent species. Your request letter noted that you don't have access to GIS so I am including a map with that shows the CVPs and PVPs. All the maps should reproduce clearly in B&W photocopies, and we encourage their inclusion in the Open Space Plan.



Natural Heritage & Endangered Species Program

Route 135, Westborough, MA 01581 Tel: (508) 792-7270, ext 200 Fax: (508) 792-7821

An Agency of the Department of Fisheries, Wildlife & Environmental Law Enforcement

<http://www.state.ma.us/dfwele/dfw/nhesp>

Also enclosed is a preliminary copy of the new BioMap for Norwell. Norwell has several BioMap areas – the areas of most importance to protect in order to maintain the biodiversity of the town, region, and state. There are also areas of Supporting Natural Landscape the protection of which will enhance the viability of the BioMap areas. The northwestern part of Norwell, around but not limited to Wompatuck State Park, is included in the BioMap areas. That area also includes town water department land and some conservation land, but some land in that BioMap core is still unprotected and would make good targets for land acquisition. The BioMap core along the North River and the Third Herring Brook already has a lot of town conservation land, but more protection of the particularly uncommon natural community there, Freshwater Tidal Marsh, would help keep it in good condition. Land that abuts currently protected open space, especially with the vernal pools or other good habitat, should be targeted for acquisition. Areas of Supporting Natural Landscape that connect the two areas of BioMap core would make good targets for conservation acquisition. Large unfragmented conservation land will provide the best opportunities to limit further species loss from the town and protect the biodiversity of Norwell.

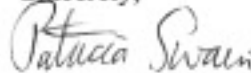
The NHESP produces maps for use under the Wetlands Protection Act (Estimated Habitat maps, provided to the Conservation Commission and shown in reduced form in the *Natural Heritage Atlas*, reduced versions of which are enclosed, and the Massachusetts Endangered Species Act (also in the *Natural Heritage Atlas*, and enclosed with this letter). These data layers are also available from MassGIS, requiring access to some form of GIS to view them, at <http://www.state.ma.us/mgis/> and do a search on "Natural Heritage". (As of July 14, 2003, these sites still have the 1999 polygons. Updates have been submitted.) These two sets of maps are created for regulatory use. Early planning and review of development projects under the Wetlands Protection Act regulations and Endangered Species Act does play a very positive role in protecting rare species habitats and ecologically significant natural communities. Town commissions and boards are encouraged to request the assistance of the Natural Heritage and Endangered Species Program in reviewing any project proposed in the habitat areas of the regulatory areas of the maps in the *Natural Heritage Atlas*.

Management and monitoring of conservation lands become important as acquisition and protection are accomplished. All wetlands particularly need to maintain their natural water regime, including normal fluctuations and connections with the uplands and other wetlands. Water quantity and quality are ongoing issues for wetlands. Another aspect of managing conservation lands that is important in many areas is controlling invasive non-native species that alter the habitat and occupy space that native species would otherwise use. We strongly recommend monitoring conservation land, and removing non-native species before they become a problem and impact native species.

Please note that this evaluation is based on the most recent information available in the Natural Heritage database, which is constantly being expanded and updated through ongoing research and inventory. Should new rare species information become available, this evaluation may need to be reconsidered.

Please do not hesitate to call me at (508)792-7270 Ext. 160 if you have any questions.

Sincerely,



Patricia C. Swain, Ph.D.

Ecologist

Natural Heritage & Endangered Species Program

cc: Joel Lerner, Director, EOE, Division of Conservation Services

This response to your request for rare species information has been prepared for you as a free service. However, the Natural Heritage and Endangered Species Program's new annual operating budget (and thus funding for this service) comes from voluntary contributions. Those wishing to help support the program's work, including the preparation of responses to requests for rare species information such as this, can do so by making out a check to the "Natural Heritage and Endangered Species Fund" and sending it to: NHESP, Division of Fisheries & Wildlife, Rte 135, Westboro, MA 01581. Contributions are tax deductible on federal and state income tax returns. Thank you for your support.



Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

RARE SPECIES DOCUMENTED IN THE TOWN OF NORWELL AS OF July 11, 2003

<u>Scientific Name</u>	<u>Common Name</u>	<u>Status</u>	<u>Most recent Year</u>
VERTEBRATES			
CLEMMYS GUTTATA	SPOTTED TURTLE	SC	2001
TERRAPENE CAROLINA	EASTERN BOX TURTLE	SC	1999
INVERTEBRATES			
DESMOCERUS PALLIATUS	ELDERBERRY LONG-HORNED BEETLE	SC	2002
EXYRA ROLANDIANA	PITCHER PLANT MOTH	WL	1987
VASCULAR PLANTS			
SENNA HEBECARPA	WILD SENNA	E	No Date
LYCOPUS RUBELLUS	GYPSYWORT	E	2000
PLATANThERA FLAVA VAR			
HERBIOLA	PALE GREEN ORCHIS	T	1981
ERIOCAULON PARKERI	ESTUARY PIPEWORT	E	1997
NATURAL COMMUNITIES			
HEMLOCK-HARDWOOD SWAMP	HEMLOCK-HARDWOOD SWAMP	S4	2000
ACIDIC SHRUB FEN	ACIDIC SHRUB FEN	S3	1998
LEVEL BOG	LEVEL BOG	S3	1998
ESTUARINE INTERTIDAL:			
FRESHWATER TIDAL MARSH	FRESHWATER TIDAL MARSH	S1	1997
CERTIFIED VERNAL POOLS			
CVP1285	CERTIFIED VERNAL POOL		1994
CVP1286	CERTIFIED VERNAL POOL		1994
CVP1702	CERTIFIED VERNAL POOL		1998
CVP2057	CERTIFIED VERNAL POOL		2001
CVP2506	CERTIFIED VERNAL POOL		2001
CVP2648	CERTIFIED VERNAL POOL		2001

This list does not include data sensitive species.
No date given means an old record with no date attached.

KEY TO STATUS - DFW RANK: E = Endangered. T = Threatened. SC = Special Concern. -WL = unofficial Watch List



Natural Heritage & Endangered Species Program

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<http://www.state.ma.us/dfwele/dfw/nhesp>



Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

Estimated Habitats in NORWELL

From the 2003 Atlas (current as of July 1, 2003)

<u>Estimated Habitat</u>	<u>Scientific Name</u>	<u>Common Name</u>	<u>Status</u>	<u>Most Recent Year Seen</u>
WH 330	CLEMMYS GUTTATA	SPOTTED TURTLE	SC	1997
WH 346	TERRAPENE CAROLINA	EASTERN BOX TURTLE	SC	1985
WH 392	TERRAPENE CAROLINA	EASTERN BOX TURTLE	SC	1993
WH 6049	CLEMMYS GUTTATA	SPOTTED TURTLE	SC	1993
WH 7124	CLEMMYS GUTTATA	SPOTTED TURTLE	SC	1992
	DESMOCERUS PALLIATUS	ELDERBERRY LONG- HORNED BEETLE	SC	2002

This list does not include data sensitive species.

KEY TO STATUS - DFW RANK: E = Endangered. T = Threatened. SC = Special Concern.



Natural Heritage & Endangered Species Program

Field Headquarters, Westborough, MA 01581 Tel: (508) 792-7270, ext 200 Fax: (508) 792-

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<http://www.state.ma.us/dfwele/dfw/nhesp>



Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

Priority Habitats in NORWELL

From the 2003 Atlas (current as of July 1, 2003)

<u>Priority Habitat</u>	<u>Scientific Name</u>	<u>Common Name</u>	<u>Status</u>	<u>Most Recent Year Seen</u>
PH 932	CLEMMYS GUTTATA	SPOTTED TURTLE	SC	1997
PH 939	CLEMMYS GUTTATA	SPOTTED TURTLE	SC	2001
	DESMOCERUS PALLIATUS	ELDERBERRY LONG-HORNED BEETLE	SC	2002
	PLATANATHERA FLAVA VAR HERBIOLA	PALE GREEN ORCHIS	T	1981
	LYCOPUS RUBELLUS	GYPSYWORT	E	2000
PH 948	CLEMMYS GUTTATA	SPOTTED TURTLE	SC	1994
PH 981	CLEMMYS GUTTATA	SPOTTED TURTLE	SC	1997
PH 1087	TERRAPENE CAROLINA	EASTERN BOX TURTLE	SC	1993
	ERIOCAULON PARKERI	ESTUARY PIPEWORT	E	1997

This list does not include data sensitive species.

KEY TO STATUS - DFW RANK: E = Endangered. T = Threatened. SC = Special Concern.



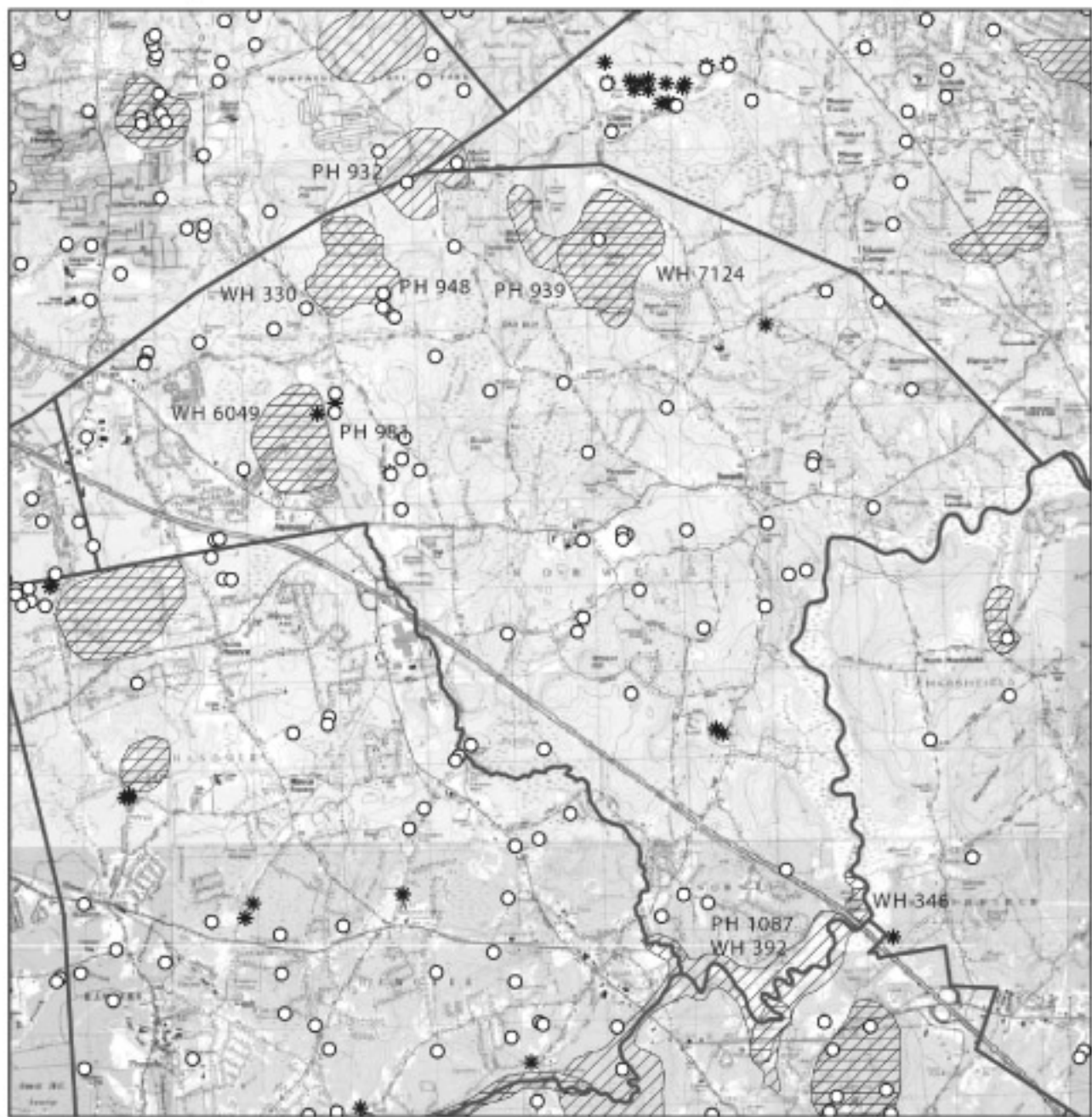
Natural Heritage & Endangered Species Program

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An Agency of the Department of Fisheries, Wildlife & Environmental Law Enforcement

<http://www.state.ma.us/dfwele/dfw/nhesp>

Estimated & Priority Habitats Certified & Potential Vernal Pools Norwell - 2003



Legend

- Potential Vernal Pools
- ★ Certified Vernal Pools
- MA Town Boundaries
-  Priority Habitats
-  Estimated Habitats



Sources:

MassGIS Topographic Images (*.sid)
NHESP 2001 Potential Vernal Pools (pvp01.exe)
NHESP 2003 Certified Vernal Pools (cvp03.exe)
NHESP 2003 Priority Habitats of State-Listed Rare Species (phab03.exe)
NHESP 2003 Estimated Habitats of Rare Wildlife (whab03.exe)
MassGIS Town Boundaries (towns.exe)

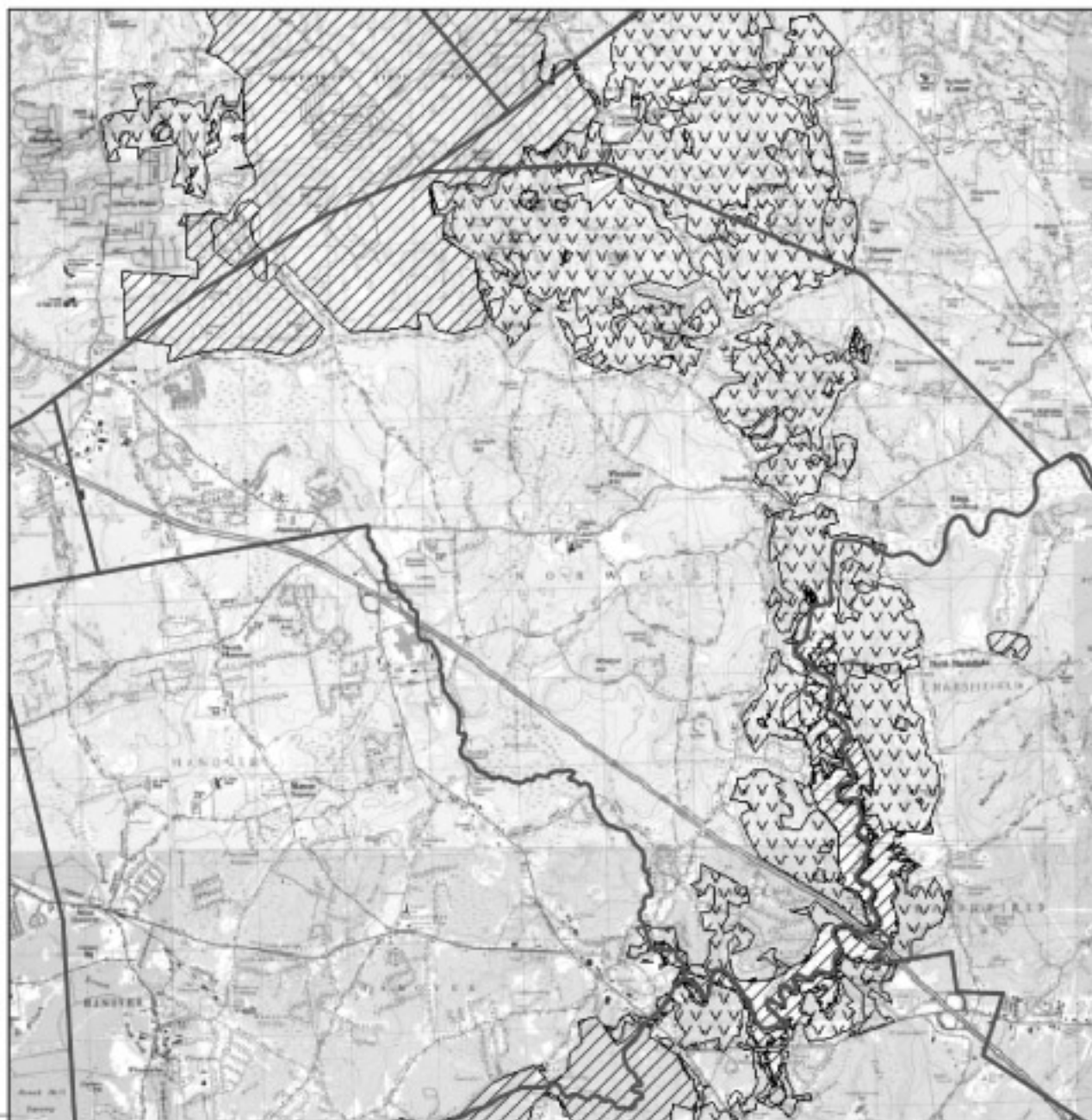
Projection: Massachusetts State Plane NAD83 M

IE: 27 Jan 05



Scale: 1:70,000

BioMap Core Area and Supporting Natural Landscape Norwell - 2003



Legend

- MA Town Boundaries
- vvv Supporting Natural Landscape
- /// BioCores



Sources:

MassGIS Topographic Images (*.sid)
NHESP BioMap Cores (biocor.exe)
NHESP Supporting Natural Landscapes (biosnl.exe)
MassGIS Town Boundaries (towns.exe)

Projection: Massachusetts State Plane NAD83 M

IE, 28 Jan 05

0 625 1,250 2,500 3,750 5,000
Meters

Scale: 1:70,000



Natural Heritage & Endangered Species Program

Commonwealth of Massachusetts
Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581
(508) 792-7270 ext. 200

MASSACHUSETTS SPECIES OF SPECIAL CONCERN

Spotted Turtle (*Clemmys guttata*)

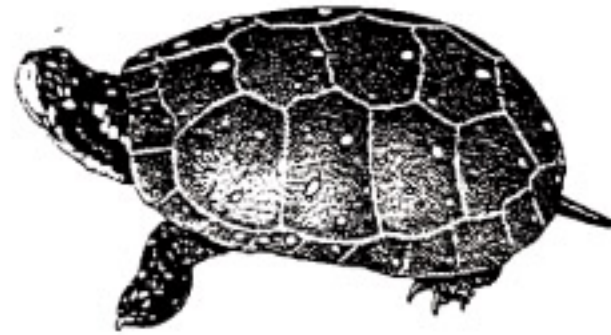
DESCRIPTION: The Spotted Turtle (also known as the polka-dot turtle) is in the genus *Clemmys* (pond turtles) and is a member of the largest turtle family, *Emyidae*. It is a relatively small turtle 8.0 -12.5 cm (3-5 in), which gets its name from the bright yellow circular spots that dot its smooth, black carapace (upper shell). The number of spots varies considerably among individuals; and their uniqueness can be used to differentiate among individuals. Hatchlings usually have one spot per scute (one of the bony, external scales that comprise the carapace). The shells of adult turtles however, may have many spots per scute or may lack spots entirely. The hinged plastron (bottom shell) is creamy yellow with large black blotches along the border. In older individuals, these blotches cover the entire plastron. The skin is gray to black with occasional yellow or orange spotting on the head, neck, and limbs. The lower surfaces of the limbs and the fleshy parts are pale salmon.

Hatchlings are blue-black and, as noted above, usually have one yellow spot on each carapacial scute; some hatchlings, however, lack spots entirely. The yellow plastron has a black central figure. The head is spotted and in some individuals the neck is spotted as well.

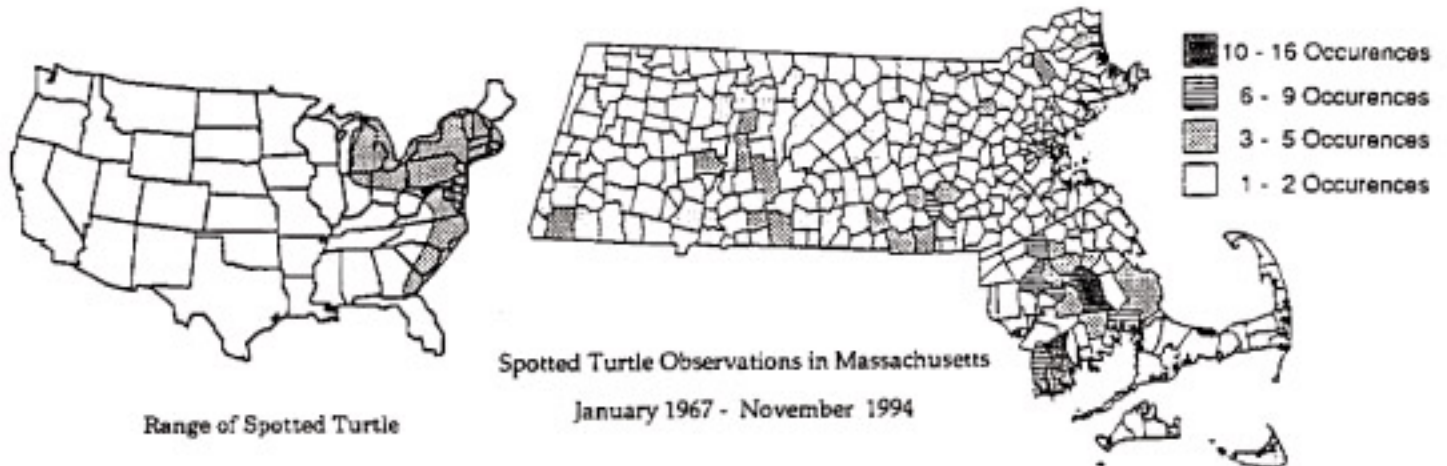
Sexual variation is similar to that of other turtle species, in that male characteristics include concave plastrons and longer, thicker tails. Spotted Turtle males have a black or dark-colored lower jaw and brown eyes while the females usually have a yellowish unmarked lower jaw and orange-red eyes.

SIMILAR SPECIES IN MASSACHUSETTS: The Blanding's Turtle (*Emydoidea blandingi*) has, in contrast, small yellow flecks, not dots, on its carapace, is much larger (up to 10 inches), has a hinged plastron, and has a bright yellow throat and neck. Old, spotless Spotted Turtles may be confused with Bog Turtle (*Clemmys muhlenbergii*), but the latter has a slightly keeled carapace and a large orange blotch on each side of its face. Newly hatched Eastern Box Turtles (*Terrapene carolina*) have a single yellow spot on each scute on the carapace, but they have a granular shell texture and few markings on their face.

RANGE: Spotted Turtles are most commonly found in the Northeastern United States. Their range extends from Southern Maine and Quebec westward to Illinois and southeast to northern Florida.



DeGraaf, Richard M. and Rudis, Deborah D. *Amphibians and Reptiles of New England*. Amherst, MA: The University of Massachusetts, 1983.



HABITAT: Spotted Turtles inhabit a variety of wetland habitats in Massachusetts, including both forested and nonforested types. They dwell in marshy meadows, bogs, small ponds and brooks, ditches, and other shallow unpolluted bodies of water. They are also found in Red Maple and Atlantic White Cedar swamps and woodland vernal pools. This species requires a soft substrate and prefers

areas with aquatic vegetation. They often cryptically bask along the water's edge, in brush piles, overhanging vegetation and sphagnum mats, and hide in mud and detritus when disturbed.

LIFECYCLE / BEHAVIOR: In the early spring, both males and females spend a great deal of time basking. This is done both singly or in groups and takes place either on partially submerged logs, rocks, or tussocks of sedge, or on the shore line. If disturbed, they dive directly to the bottom and bury themselves in the mud. Individuals have favorite basking sites to which they return regularly throughout the season. It is also common during this time to find individuals of either sex on upland areas adjacent to wetlands. They are usually solitary while wandering on land; if disturbed they quickly withdraw into their shells, to remain so until all is quiet.

Individuals of this species alternate sitting in the sun with feeding. Generally, Spotted Turtles will bask more on cold, sunny days than on warm, cloudy one, when they feed more often. They disappear underwater late in the afternoon and spend the night at the bottom of the pond. Spotted Turtles prefer cool temperatures. During the warm summer days they are not easily found; apparently they aestivate in the mud bottom of some waterway or in a muskrat burrow or lodge.

Spotted Turtles mature at about 8 to 10 years of age. Mating occurs from March to May and generally takes place in the water. Copulation follows what is often a long (up to one hour) and frantic chase of the female by the male. Several males may pursue a single female at the same time, biting each other and sometimes the female in the process. Nesting occurs in June, with from 2 to 8 (3 to 4 on average) smooth, white, elliptical eggs laid in sunny, well-drained soil in open meadows, fields, or along roadsides. Typically, the nest-building process begins in the early evening, and as is true of all turtles, involves the hind legs and feet- usually alternately. This species digs a 2 - 2.5 in. deep hole, taking up to one hour or more to finish the task. Once finished, the female takes a short rest before depositing her eggs. During the egg laying process, the female positions each egg in the nest with her hind feet. When finished laying, she will scoop the excavated earth back onto the eggs and smooth over the covered nest by dragging her plastron over the site to minimize nest predation. The eggs incubate for 10 to 12 weeks. Hatchlings emerge from the nest in August or September in search of food and shelter in the edges of grassy, wet meadow areas and bogs. They may overwinter in the nest. Hatchlings are particularly carnivorous, hunting small land and water insects, worms, and snails. The adult Spotted Turtle is omnivorous, with a varied diet ranging from aquatic vegetation to larval amphibians, slugs, snails, insects, and worms, all of which are consumed only while the turtle is submerged in water.

POPULATION STATUS IN MASSACHUSETTS: At the turn of the century, the Spotted Turtle was considered one of the most common turtles in Massachusetts, if not the most common. Today, it is classified as a Species of Special Concern in Massachusetts. Spotted Turtles have been found in 139 Massachusetts towns. The majority of documented occurrences are in the southeast portion of the state; roughly 40% of all Massachusetts occurrences are from Bristol and Plymouth counties. There have been no recent Spotted Turtle sightings reported from Suffolk County or from the towns in the northwest corner of the state. Most (71%) of the records are of sightings of single turtles; therefore, it is yet to be determined if these individuals are part of healthy, growing populations.

MANAGEMENT RECOMMENDATIONS: Threats to the Spotted Turtle are numerous. This species is highly prized by the pet trade where they regularly command prices as high as \$400 in Japan and Europe. Illicit commercial exploitation of the species is depleting populations in many parts of their range and may be contributing to the demise of already declining populations in New England. Development and habitat fragmentation are likely the greatest threat to the Spotted Turtle. Increased residential development and construction of many new roads, altering of wetlands, and destruction of upland habitats - all severely impact the Spotted Turtle. Another factor is nest predation by skunks, raccoons, and foxes where populations have increased in recent years. Mortality as a result of road kills also takes a heavy toll on egg-laying females as they travel to their preferred nesting sites such as roadsides, sand pits, yard and foundation excavations.

Specific management recommendations to protect the habitat of this species include the following:

Timber Harvesting—In forested wetlands known to be inhabited by Spotted Turtles, harvesting should be restricted to frozen winter conditions. Regulations under the Forest Cutting Practices Act (304 CMR 11.04 8G) that limits cutting to 50% of the basal area should be strictly observed. When timber harvesting near a vernal pool, precautions should be taken in both wet and dry seasons to preserve the local environment around the pool. These precautions include not allowing heavy equipment in vernal pool depressions, not operating machinery within 50 feet of a vernal pool during mud season, and preventing any extra woody material from falling into vernal pool depressions. However, because many amphibians attach their eggs to downed woody material, any existing woody material should not be removed from the depression.

Other—In general, there should not be any alteration of the area surrounding a vernal pool, and any impact to the pool depression area should be avoided. Of particular concern is the possibility of impairing the water-retaining capability of the depression area, or altering bottom sediments which contain the eggs or other drought-resistant stages of the invertebrates which form the base of the vernal pool food chains. The area around a vernal pool should not be cleared, as leaves, twigs, and other woody materials provide many reptiles and amphibians with protection from high temperatures and from predators. As mentioned above, no woody material should be either added to or taken from the pool depression.

Conservation of Spotted Turtles likely depends first on locating viable populations and obtaining a better idea of the species' habitat needs, population dynamics, and natural history. Protecting wetland, upland corridors between wetlands, and potential nesting areas will be vital to the continued existence of one of Massachusetts's most charming reptiles.



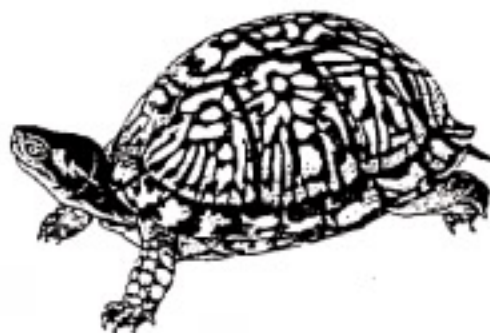
Natural Heritage &
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Commonwealth of Massachusetts
Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581
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MASSACHUSETTS SPECIES OF SPECIAL CONCERN

Eastern Box Turtle
(*Terrapene carolina carolina*)

DESCRIPTION: The Eastern Box Turtle is a small, terrestrial turtle ranging from 11.4–20.3 cm (4.5–8 in.) in length. It is so named because it is the only North American turtle that when threatened is able to enclose head, legs, and tail completely within the protective armor of its upper (carapace) and lower (plastron) shells. The adult box turtle has a short, broadly oval, high dome shell with variable markings and coloration. The carapace is usually dark brown or black with numerous irregular yellow, orange, or reddish spots, blotches, or stripes in each carapace shield. The plastron may be tan to dark-brown or black, patternless or variably patterned light and dark—almost a mottled pattern of dark brown/black or tan/yellow; its surface either concentrically ridged or smooth; and divided into two movable portions by a strong hinge. The head, neck, and legs also vary in color and markings but are generally dark with orange or yellow mottling. The Eastern Box Turtle has four toes on its hind feet; a short tail; and an upper jaw ending in a down-turned beak.



DeGraaf, Richard M. and Rudis, Deborah D.
Amphibians and Reptiles of New England,
Amherst, Massachusetts: The University of
Massachusetts, 1983.

Although there are no striking sexual differences between the male and female Eastern Box Turtles, there are, however, external features that generally distinguish between the male and female. The male box turtle usually has bright-red to red-orange eyes, with those of the female being gray-brown, yellowish-brown or very dark-red. The rear lobe of the male plastron is concave, and that of the female is flat or slightly convex. The hind legs of the male are heavier and the claws stouter, shorter and more curved than the female. Males have longer, thicker tails, with the vent located farther from the shell and closer to the tip of the tail than the female. Both sexes are generally mild-mannered.



Range of the Eastern Box Turtle



Distribution in Massachusetts
Since 1978

Hatchlings have a flat, brownish-gray carapace with a yellow spot on each large scute; and yellow along the outer rim of the carapace, the mid-dorsal keel, and the lower mandible. The plastron is yellow to cream-colored with a black central blotch and yellow margining along the outside edge. The plastral hinge is not functional and poorly developed. The tail is long in comparison with that of the adult. Hatchlings, if molested, emit a strong odor to repel predators; an adaptation that is lost later on.

SPECIES SIMILAR IN MASSACHUSETTS: The Blanding's Turtle (*Emydoidea blandingi*) is the only species of turtle in Massachusetts that resembles the Eastern Box. Often referred to as the "semi-box turtle," the Blanding's Turtle has a hinged plastron enabling the turtle to pull its exposed part upwards towards its carapace but with less closure than in the Eastern Box Turtle. Outside of this specific adaptation, there is little or no similarity either in appearance or behavior between the two species. The Blanding's Turtle is essentially aquatic whereas the Eastern Box Turtle is terrestrial.

RANGE: The range of the Eastern Box Turtle is from southeastern Maine; south to northern Florida; and west to Michigan, Illinois, and Tennessee. Although the Eastern Box Turtle occurs almost statewide in Massachusetts, the majority of the population occurs in the southeastern section of the Bay State, just west of Cape Cod.

HABITAT IN MASSACHUSETTS: The Eastern Box Turtle is a woodland species, although in the northeast it also occurs in pastures and marshy meadows. It is found in both dry and moist woodlands, brushy fields, thickets, marshes, bogs, stream banks, and well-drained bottomland. It prefers open deciduous forests but has also been found on mountain slopes in Massachusetts. In optimal habitats in Cape Cod pine barrens and oak thickets, the species is generally associated with cranberry dominated swales interspersed with bearberry ground cover, low bush blueberries, and thickets of bracken fern.

LIFECYCLE/BEHAVIOR: The Eastern Box Turtle usually hibernates in the northern parts of its range from late October or November until sometime in April. In the deep south, it may remain semiactive throughout the winter. Hibernation generally begins at the time of the first killing frost. As many as four box turtles may share the same winter quarters, which range in type from loose soil, sand, vegetable debris and mud bottoms of ponds or streams to animal burrows or stump holes. As soil temperatures drop, the turtles burrow into the soft ground for a depth of from three inches to two feet. Females tend to hibernate first, with the males lingering to ensure that all females have been fertilized. They normally emerge from hibernation in April, but some individuals may emerge prematurely during warm spells in winter and early spring and perish from exposure.

Mating may take place as soon as the turtles emerge from hibernation or at any time until they enter hibernation again. Courtship begins with the male circling the female and biting at her shell, head, and legs, before mounting. Females nest from May to July and can lay fertile eggs up to four years after a single mating. Nesting areas may be in hay fields, roadsides, cultivated gardens, lawns, beach dunes, and woodland, and around house foundations. The eggs are deposited in a flask-shaped nest dug by the female's hind feet in loose soil at an elevated site, usually in an open area in close proximity to the previous years' nest. Egg laying occurs during the late afternoon-early evening and continues for up to five hours. Three to eight (usually four or five) thin, white, elliptical eggs are deposited by the female at intervals of one to six minutes; arranged in the nest by the hind feet; and then covered with soil by the hind legs and plastron. After the eggs are covered, the female crawls away, leaving the eggs unattended to incubate. The incubation period depends on soil temperature but generally the hatchlings emerge about 87-89 days after laying, usually in September. They may overwinter in the natal nest and emerge the following spring.

During the first four or five years of life, box turtles may grow at a rate of from half an inch to about three-quarters of an inch a year. Sexual maturity is thought to occur later in New England than in its southern range and may take up to 10 years to attain. It is believed that full growth is reached in about 20 years. The average life expectancy of a box turtle is between 40 and 50 years, but evidence shows that they can live as long as 80 to 123 years.

The Eastern Box Turtle is omnivorous, showing marked changes in food preferences from youth to maturity and from season to season. When young, it is chiefly carnivorous, feeding on insect larvae, slugs, earthworms, snails, spiders, crayfish, millipedes, fish, frogs, salamanders, a small percentage of vegetable material, and even carrion. At

approximately six years of age, box turtles develop a fondness for fungi (primarily mushrooms), berries, fruits, leafy vegetables, roots, stems, leaves and seeds. The adults take animal food with less frequency than young turtles.

In summer, adult box turtles are most often encountered in open woodlands in morning or evening, particularly after a rainfall. To avoid the heat of the day, they often seek shelter under rotting logs or masses of decaying leaves, in mammal burrows, or in mud. Though known as "land turtles", in hottest weather they frequently enter shaded shallow pools and puddles and remain there for periods varying from a few hours to a few days. In the cooler temperatures of spring and fall, box turtles forage at any daylight hour. They are diurnal, and scoop out a "form" (a small domelike space) in leaf litter, grasses, ferns, or mosses where they spend the night. These forms are often used on more than one occasion over a period of weeks. Juvenile box turtles are rarely seen. Immediately after hatching they seek a swamp or pond and immerse themselves in sphagnum moss or mud, remaining well hidden.

The home ranges of box turtles of all ages and both sexes overlap. The turtles frequently occur together and show no antagonism over territorial domain. Movements within the home range vary from random meanderings to fairly direct traverses. Occasional trips outside the range are made by some individuals; these trips include searches for nesting sites. Most adults show some homing tendency over short distances, such as a kilometer or two, but long distances as a result of human interference usually kills them. They orient themselves by the sun and rely on their vision for guidance and mobility. They have very defined home ranges averaging about 100 to 225 meters (100 to 750 ft.) in diameter. Some individual are transient and do not establish home ranges.

POPULATION STATUS: The Eastern Box Turtle has been declining in numbers throughout its range in Massachusetts and is presently listed as a "Species of Special Concern" in this state. Since 1978, only 187 sightings have been reported to the Natural Heritage and Endangered Species Program, with heaviest concentrations in the southeastern part of the state and Cape Cod. Many of the sightings are road crossings or single individuals making it difficult to estimate the size of the population. There are several reasons for this decline: habitat destruction resulting from residential and industrial development and concurrent dissection of the landscape with roads; deliberate and inadvertent highway mortality; collection by individuals for pets; destruction of nests and young by skunks, coyotes, foxes, crows, dogs, and raccoons; and genetic degradation of the native stock by imported captives that escape or are released.

MANAGEMENT RECOMMENDATION: The greatest threat to the survival of the Eastern Box Turtle in Massachusetts is the fragmentation and destruction of its habitat. The bisection of its habitat by roads can reduce or destroy populations. Due to the decline of farming in Massachusetts, agricultural land is being returned to woodland. A mixture of regeneration, selective cutting and even selective burning of woodland may be beneficial to the Eastern Box Turtle. Large roadless areas of optimal habitat need to be preserved, especially in the Box Turtle's stronghold of Cape Cod. Though a law exists to protect against the importation, transportation, and release of wild animals in Massachusetts, this law, and the biological reasoning behind it, need exposure and publicity in the community at large, as well as enforcement. To ensure the long term survival of the Eastern Box Turtle, protection of its habitat is needed, as is education of the public about the detrimental affects of removing turtles from their natural habitats and keeping them as pets. Enforcement of the Massachusetts Endangered Species Act prohibiting the killing, molestation, and possession of the Eastern Box Turtle must also be improved. People should be encouraged to help box turtles across roads (always in the direction the animal is heading), and should be made aware that box turtles should never be transported or captured as pets. Finally, the practice of releasing non-native box turtles must be discouraged to protect the genetic integrity of native populations.

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Natural Heritage &
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MASSACHUSETTS SPECIES OF SPECIAL CONCERN

Elderberry Long-horned Beetle (*Desmocerus palliatus*)

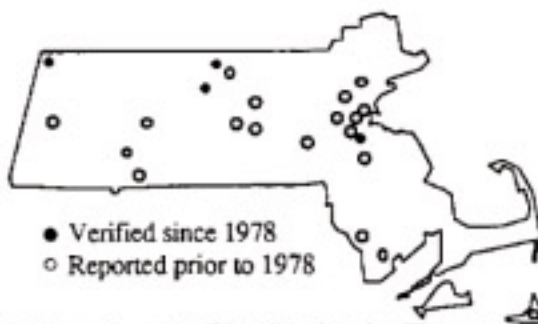
DESCRIPTION: The Elderberry Long-horned Beetle is one of the most striking beetles found in Massachusetts. It is a member of the family Cerambycidae, or long-horned beetles. The entire body is a dark metallic blue except for the anterior third of its outer wing, which is bright gold or orange in color. It is approximately 25 mm. (1 in.) long and 7 mm. (0.3 in.) wide. The antennae of the male extend to the hind third of the wing. Those of the female extend to the middle of the wing. The antennae of both sexes are characterized by a thickening at the end of the middle segments earning the species its alternate name "Cloaked Knotty-Horn Beetle".

SIMILAR SPECIES: The Elderberry Long-horned Beetle is not easily confused with any other beetle species in Massachusetts. Its relatively large size and distinctive bright coloration are excellent field marks.

RANGE: The Elderberry Long-horned Beetle is found throughout the northeastern half of the United States and parts of eastern Canada. It is known from Massachusetts and Connecticut south to Virginia and North Carolina and west to Indiana and Kansas. In Canada it has been found in Ontario.



Dillon and Dillon. The Common Beetles
of Eastern North America. 1972.



Massachusetts Distribution by Town

ECOLOGY/LIFE HISTORY: The flight period of adult Elderberry Long-horned Beetles in Massachusetts is known to extend from at least June 5 to August 9. Most observations of adults have been made between mid-June and mid-July. Adults nearly always occur in close association with elderberry bushes (*Sambucus* spp.), where they are usually found on the leaves or flowers. The eggs are laid on the leaves or stems of elderberry. After hatching, the larvae bore into the stems of the host plant and create long burrows running along the axis of the stem. The larvae of the Elderberry Long-horned Beetle are a creamy white color with a brown head and black mandibles. When full grown, the larvae are approximately the same length as the adults. It should be noted that larvae of the Elder Shoot Borer Moth (*Achatodes zeae*) also bore into the stems of elderberry bushes. Larvae of both the beetle and the moth may kill individual shoots of the elderberry by their feeding activities.

POPULATION STATUS IN MASSACHUSETTS: The Elderberry Long-horned Beetle was formerly widespread in Massachusetts but there are only a few recent records confirming its continued existence in the state. It was documented historically from at least 22 towns, but has been reported from only 4 towns since 1978. The reasons for its apparent decline are unknown. The Elderberry Long-horned Beetle is currently listed as a "Species of Special Concern" in the state.

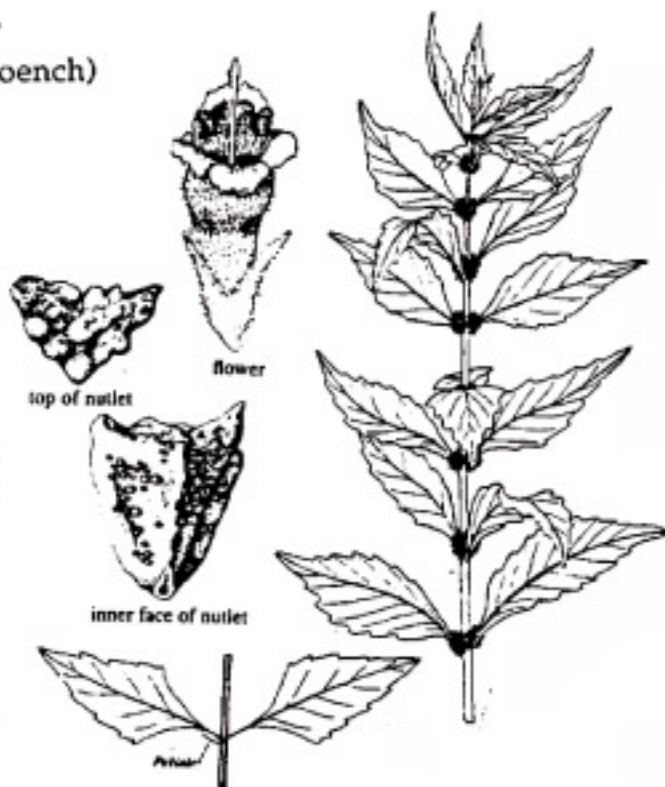
MASSACHUSETTS THREATENED PLANTS

GYPSYWORT (*Lycopus rubellus* Moench)

Description

The perennial herb Gypsywort is a nonaromatic member of the mint family reaching a height of 18 in. (1/2 meter) but more often only 1 ft. high in Massachusetts. The slender, erect, sparsely branching stems bear simple, opposite leaves arranged in vertical ranks of pairs which are relatively widely spaced on the stem. The stem bases send out many slender and long, freely branching runners that form tubers at their ends. The broadly lance-shaped to oval leaves are 4-12 cm long and 1-4 cm wide and the basal part of each leaf is distinctly straight or slightly concave as it tapers to the petiole. The leaf margins are coarsely shallow-toothed above the elongated bases and smooth below. The small, white, faintly purple-spotted flowers are densely clustered at the junction of the stem and leaves and form doughnut-shaped whorls around the stem. The five-lobed tubular corolla is composed of petals which flare abruptly outwards and extend 2-3 mm beyond (twice as long as) the surrounding calyx tube (united sepals).

The lobes of the calyx tube are narrowly triangular and long pointed. The mature fruits of Gypsywort consist of a set of four nutlets per flower, each roughly triangular-shaped with narrow bases and broad tops. The shape and surface of the nutlets, apparent with a hand lens, are useful characters for separating species of *Lycopus*. In *L. rubellus* the top of the nutlet is jagged with tuberculate (bumpy), thickened edges called crests. Flowering and fruiting occurs from mid July through mid September.



R. Godfrey & J. Wooten. Aquatic & Wetland Plants of S. E. U. S. Univ. of Georgia Press.



Range of Gypsywort



● Verified since 1978
○ Historical occurrence

Distribution in Massachusetts by Town
1990

Range

Gypsywort is distributed from eastern Massachusetts southward to Florida and eastern Texas on the Coastal Plain, and northwards through the Mississippi River basin to southern Michigan. It is only sporadically found in the area between the Mississippi and the Atlantic Coast.

Similar Species

All five native species of Lycopus are much alike in habit and general leaf shape. Virginian Water-Horehound (Lycopus virginicus) most closely resembles Gypsywort; the leaves taper in the same manner. The calyx teeth differ, however, being ovate or acute and not long-pointed and the four-lobed corolla is non-flaring. It usually inhabits floodplain forests; occasionally Red Maple swamps. American Water-Horehound (Lycopus americanus), also known as Cut-leaved Water-Horehound, normally has deeply lobed middle and lower leaves, but when these are merely toothed it can be distinguished by very long, sharp tipped or needle-like calyx lobes, a shorter and four-lobed corolla (about equal to the calyx) and smooth nutlets with rounded tops. It inhabits a variety of wetland types. Common Water-Horehound (Lycopus uniflorus) has narrower, shorter leaves with only a few small teeth. Its calyx lobes are acute, not long-pointed. The underground base of the stem is enlarged to form a short thick tuber or rootstalk. It inhabits pond shores as well as various wetlands. Claspig Water-Horehound (Lycopus amplexans) is our only species with sessile leaves (no stalks) and it is restricted to the shores of coastal plain ponds.

Habitat in Massachusetts

Gypsywort is most abundant on damp soils of the Atlantic Coastal Plain and Mississippi River basin where it is found along streams in maple swamps, marshy shores of ponds and lakes, seepage areas, and floodplain forests. In Massachusetts, its habitat is only now beginning to be known with certainty. Both current populations are found along small streams in Red Maple swamps, in association with Sweet Pepperbush, Smooth Arrowwood, and Netted Chain-fern. Historically it also was known from borders of ponds in Fall River and Westport.

Population Status

There are currently two known populations of Gypsywort, with a total of only a few hundred individual plants, resulting in its designation as a Threatened species in Massachusetts. The status of Gypsywort is only now being understood, due to past misidentification and confusion with other species. It is likely that it will be found to inhabit much of southeastern Massachusetts. West Roxbury (Boston) marks the northern verified limit of the species' range.



Natural Heritage & Endangered Species Program

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THREATENED SPECIES OF MASSACHUSETTS

Pale Green Orchis

(*Platanthera flava* (L.) Lindl. var. *herbiola* (R. Br.) Luer)

DESCRIPTION: Pale green orchis is a leafy, single-stemmed terrestrial orchid arising 15 - 60 cm (6 - 24 in.) from fleshy, tuber-like roots which slowly spread into small clumps or colonies. The stem bears 2 - 5 broad, shining dark green, clasping leaves 7-20 cm, (3-8 in.) long decreasing in size as they ascend the stem. The upper stalk carries a dense to loosely cylindrical spike of 10-40 small, greenish or greenish-yellow flowers interspersed with many elongated leafy bracts, extending well beyond the flowers. The flowers are highly asymmetrical with the upper petals and sepal forming a broad hood, and the lower petal shaped into an oblong, strongly undercurved lip. The two remaining lateral sepals bend behind the flower. At the back of the lip there is also a downward-projecting tubular spur, the nectar-bearing organ of the flower. Several details of the lip structure distinguish this species: the end of the lip is wavy or irregularly few-toothed, as opposed to fringed; both sides of the base of the lip margin widen into two small lobes (auricles); and, a small but conspicuous outgrowth called the tubercle lies about midway down the inside of the lip which distinguishes the species from all others. Flowering normally occurs from mid-June through mid-July. Shortly afterward, the petals, lip, and spur rapidly blacken, while the ovary and sepals remain green throughout the summer. This characteristic can extend the time period for identifying the species.

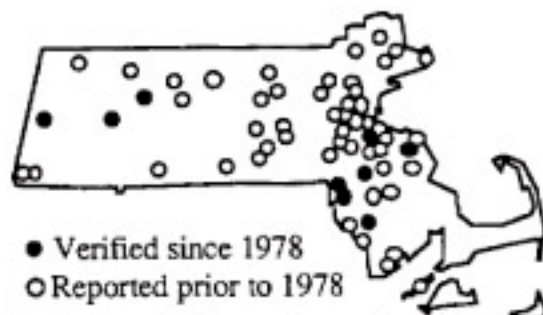
SIMILAR SPECIES: The typical *Platanthera flava* var. *flava* is a smaller, shorter-bracted and less leafy plant whose range is mostly southern and does occur in Massachusetts. Pale green orchis is very similar to and often confused with the long-bracted orchis (*Coeloglossum viride*) which is sometimes in the same habitat as the pale green orchis,



Adapted from *Minnesota's Endangered Flora & Fauna*, Coffin & Pfannmuller, eds. State of Minnesota, Dept. of Nat. Res. 1988.



Documented Range of
Pale Green Orchis



● Verified since 1978
○ Reported prior to 1978
Distribution in Massachusetts by Town

although it is more commonly on rich, wooded slopes. Long-bracted orchis has no odor whereas the flower of the pale green orchis is sweetly fragrant. The lip of long-bracted orchis flowers has two short teeth on the tip, and that of the pale green orchis is blunt.

RANGE: Pale green orchis is distributed from New Brunswick and Nova Scotia south to Maryland and the high Appalachians, west to Missouri and Minnesota. This relatively widespread species occurs only sporadically throughout most of its range.

HABITAT IN MASSACHUSETTS: This orchid prefers sunny to semi-shaded habitats where soils are generally rich, moderately acidic and wet, and where periodic flooding or water level fluctuations are common. These habitats range from lowland forested streamside swamps and floodplains with a sparse shrub-herb understory and moderate tree canopy dominated by red maple, American elm, and white ash, to open river shores with alder, willow, smooth rose, purple loosestrife, and occasionally ragged fringed orchis (*Platanthera lacera*). It is also found in open, wet situations under powerlines where meadow-sweet, ferns, and sedges are the dominant vegetation. Historically, pale green orchis occurred on pondshores and more commonly in wet meadows; habitats, which like river shores and floodplains, favor species that tolerate disturbance in exchange for reduced competition from other species and increased sunlight. Pondshores are periodically exposed and inundated, whereas meadows are commonly kept open by grazing or mowing.

POPULATION STATUS: Pale green orchis is relatively widespread in the northeastern United States, and yet it appears to be rare or threatened throughout most of its range. This orchid is currently listed by Massachusetts as a "Threatened" species. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing...) and sale under the Massachusetts Endangered Species Act. Since 1978, only 11 stations in eight towns have been discovered and verified. The populations are mostly small and only two sites have over 100 plants. Prior to 1978, 58 stations in fifty-two towns were vouchered, many of them from wet meadows, habitats once prevalent throughout Massachusetts.

MANAGEMENT RECOMMENDATIONS:

As with most rare plants, exact needs for management of pale green orchis are not known. The following advice comes from observations of the populations in Massachusetts. While pale green orchis grows in swamps, floodplain forests, and more open habitats, it is not able to grow in shade, requiring either full or partial sun. In order to assure the continued presence of this species in Massachusetts, the prevention of ecological succession, such as annually mowed meadows, is critical. Forest succession of its open habitats is thought to be a major cause for its decline. The continual urbanization of eastern Massachusetts has also undoubtedly been a principal cause of the severe decline of this orchid.

Because of the desirability of the plant to gardeners, protection of the pale green orchis against vandalism and illicit removal by collectors is also critical in maintaining its present sites in the state. Precise location information should not be generally disseminated.



Natural Heritage &
Endangered Species
Program

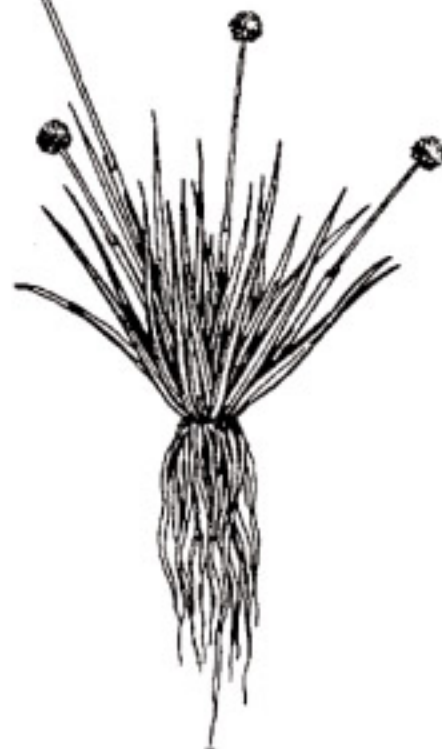
Commonwealth of Massachusetts
Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581
(508) 792-7270 ext. 200

MASSACHUSETTS ENDANGERED PLANTS

ESTUARY PIPEWORT
(*Eriocaulon parkeri* B.L.Robins.)

Description

Estuary pipewort is a small, delicate, erect perennial in the Pipewort family (Eriocaulaceae). Its thin, green to purple, basal leaves are grass-like in appearance and grow 2 - 6 cm (0.8 - 2.4 in.) in length. These linear leaves are only 1-2 mm (0.04 - 0.08 in.) wide at their mid-points and taper to a fine end. Estuary pipewort generally has from two to four unbranched scapes (leafless flower stalks). These scapes are straight, obscurely four- or five-angled in cross-section, and 2.5 - 10 cm (1 - 4 in.) long. The small, unisexual, hairless or minutely hairy flowers are clustered in hemispheric or button-like terminal heads, 3 - 6 mm (0.12 - 0.24 in.) in diameter. Each of the two, whitish to yellowish-white petals has a nectar-producing gland just below its tip. Estuary pipewort blooms from late July to late September.



Tiner, R.W. Coastal Wetland Plants of the Northeastern United States. University of Massachusetts Press, 1987.



Documented Range of
Estuary Pipewort



Massachusetts Distribution by Town

Range

The range of estuary pipewort has been documented as extending from New Brunswick and Quebec to Maine, Massachusetts and central New York, and south near the coast to North Carolina.

Similar Species

Hatpins (*Eriocaulon aquaticum*) strongly resembles estuary pipewort. Nevertheless, its scape is five- to seven-sided and usually solitary, and its leaves are longer than those of estuary pipewort--up to 10 cm (4 in.).

Habitat in Massachusetts

Estuary pipewort grows in shallow, tidal freshwater and on the tidal mud flats of rivers. In Massachusetts, habitats include a sandy, mucky, exposed flat of freshwater tidal marsh; a sunny, gravelly, constantly wet, sloping river shore; an exposed, muddy area in a freshwater marsh, where seepage enters; and a cold, boggy, sandy edge of a river, with many cold seeps. Among the plant species associated with estuary pipewort are sweetflag (*Acorus calamus*), wild rice (*Zizania aquatica*), water-smartweed (*Polygonum punctatum*), water-purslane (*Ludwigia palustris*), hedge-hyssop (*Lindernia dubia* var. *inundata*), and various waterworts (*Elatine* spp.), arrow-heads (*Sagittaria* spp.) and cordgrasses (*Spartina* spp.). Rare Massachusetts plants that have been found with estuary pipewort include estuary beggar-ticks (*Bidens hyperborea*).

Population Status

Estuary pipewort is presently listed as "Endangered" in Massachusetts. There are four current stations (discovered or relocated since 1978) and three historical stations (unverified since 1978) in the state. (Two current stations occur in one town, and one historical station is unmappable and does not appear on the state range map.) The species is also considered rare in Connecticut, Maryland, Maine, North Carolina, New Jersey, and Virginia. It was present historically in New York and Pennsylvania.



Vernal Pool Fact Sheet

WHAT ARE VERNAL POOLS?

Vernal pools are temporary bodies of fresh water that provide critical habitat for many vertebrate and invertebrate wildlife species. "Vernal" means spring, and indeed, many vernal pools are filled by spring rains and snowmelt, only to dry up during the hot, dry months of summer. However, many vernal pools are filled by the rains of autumn and may persist throughout the winter. Vernal pools are quite often very small and shallow; vernal pools that support rich communities of vertebrate and invertebrate animals may measure only a few yards across. However, vernal pools of several acres occur throughout Massachusetts.

WHERE ARE VERNAL POOLS FOUND?

Vernal pools are common in Massachusetts, probably occurring in every town in the state. Vernal pools are found across the landscape where small woodland depressions, swales or kettle holes collect spring runoff or intercept seasonally high groundwater tables. Although many people associate vernal pools only with upland wooded areas, valuable vernal pools also occur in meadows, river floodplains, interdunal swales, and large vegetated wetland complexes. Vernal pool habitat occurs wherever water is contained for more than 2 months in the spring and summer of most years, where no fish are present.

WHY ARE VERNAL POOLS VALUABLE?

Vernal pools constitute a unique and increasingly vulnerable type of wetland. Vernal pools are inhabited by many species of wildlife, some of which are totally dependent on vernal pools for their survival. Vernal pools do not support fish because they dry out annually or at least periodically. Some may contain water year round, but are free of fish as a result of significant draw-downs that result in extremely low dissolved oxygen levels. The wood frog (*Rana sylvatica*), the eastern spadefoot toad (*Scaphiopus h. holbrooki*), and the four local species of mole salamander (*Ambystoma* spp.) have evolved breeding strategies intolerant of fish predation on their eggs and larvae; the lack of fish populations is essential to the breeding success of these species. Other amphibian species, including the American toad (*Bufo americanus*), green frog (*Rana clamitans*), and the red-spotted newt (*Notophthalmus viridescens*), often exploit the fish-free waters of vernal pools but do not depend on them. Vernal pools also support rich and diverse invertebrate fauna. Some invertebrate species, such as fairy shrimp (*Eubranchipus* spp.), are also entirely dependent upon vernal pool habitat. Invertebrates are both important predators and prey in vernal pool ecosystems. Vernal pools are an important habitat resource for many birds, mammals, reptiles and amphibians, including many state-listed rare species.

State-listed species found in vernal pools

Species	Status
Blue-spotted salamander (<i>Ambystoma laterale</i>) ¹	SC
Jefferson salamander (<i>Ambystoma jeffersonianum</i>) ¹	SC
Marbled salamander (<i>Ambystoma opacum</i>) ²	T
Four-toed salamander (<i>Hemidactylium scutatum</i>) ²	SC
Eastern spadefoot toad (<i>Scaphiopus holbrooki</i>) ¹	T
Spotted turtle (<i>Clemmys guttata</i>) ²	SC
Wood turtle (<i>Clemmys insculpta</i>) ²	SC
Blanding's turtle (<i>Emydoidea blandingi</i>) ²	T

¹ Obligate species require vernal pool habitat to successfully breed

² Facultative species may use vernal pools but do not require them

³ Status pursuant to the MA Endangered Species Act; T: Threatened, SC: Special Concern

VERNAL POOL PROTECTION

The Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00), the Massachusetts Surface Water Quality Standards (314 CMR 4.00) used to administer section 401 of the federal Clean Water Act, the Massachusetts Environmental Code: Title 5, and the Forest Cutting Practices Act regulations all provide protection to vernal pools that have been officially certified. The regulations for both the Wetlands Protection Act and Forest Cutting Practices Act also provide protection to vernal pools that have not been certified if their occurrence is adequately documented during permit review. Protection under any of these laws requires the following:

- 1) the vernal pool occurs in an area subject to the jurisdiction of the regulations; and
- 2) the activities proposed are regulated.

The Massachusetts Wetlands Protection Act regulations (310 CMR 10.00) protect certified vernal pools and up to 100 feet beyond the boundary of the pool (referred to as the “vernal pool habitat”), by preventing alterations which would result in the reduction of the wildlife habitat value of the certified vernal pool. A certified vernal pool is not automatically protected by these regulations, though. Certified vernal pools must occur within a resource area that comes under the jurisdiction of the Act before they receive protection. Similarly, the 100 feet around the vernal pool must also fall within a resource area, and not in non-jurisdictional upland or the buffer zone of a resource area in order to be protected under the Act. The March, 1996 Massachusetts Department of Environmental Protection Wetlands Report Alert established a desire within the DEP to protect vernal pools that occur within any jurisdictional wetlands. Although performance standards exist only for vernal pools that occur within *Land Subject to Flooding*, vernal pools occurring within any wetlands resource area should be protected through the incorporation of appropriate conditions in an Order of Conditions issued by a conservation commission or the DEP.

Vernal pools that are not certified may also be protected by a local conservation commission or the DEP if credible scientific evidence is presented up until the end of the appeals period for a Superseding Order of Conditions issued by the DEP. A conservation commission, or the DEP on appeal, can incorporate protective conditions into an Order of Conditions that would prevent the alteration of the wildlife habitat value of the pool and its 100 foot “vernal pool habitat” if they occur within a regulated wetland even though it is not certified.

Each DEP Regional Office has at least one Vernal Pool Liaison who should be contacted for all questions related to the protection of both certified and uncertified vernal pools. Since regulatory authority rests with the Department, they are best able to answer questions about what may or may not happen in or around vernal pools. Your regional liaison may be reached at the following addresses:

Northeast Regional Office
203-A Lowell Street
Wilmington, MA 01887

Southeast Regional Office
20 Riverside Drive
Lakeville, MA 02347

Central Regional Office
627 Main Street
Worcester, MA 01608

Western Regional Office
State House West, 4th Floor
Springfield, MA 01103

The Massachusetts Surface Water Quality Standards (314 CMR 4.00) administer Section 401 of the federal Clean Water Act and protect certified vernal pools. Under these regulations, any certified vernal pool is classified as an Outstanding Resource Water (ORW). The regulations, administered by the DEP, strictly prohibit discharges of solid or liquid fill within certified vernal pools. Storm drainage from roads and rooftops as well as solid fill are prohibited within the boundaries of the pool. As is the case with the Wetlands Protection Act however, the certified vernal pool as well as the proposed activity must be within the jurisdiction of these regulations - the state’s Clean Water Act - before it receives this protection.

VERNAL POOL PROTECTION CONTINUED

The Massachusetts Environmental Title 5 (310 CMR 15.000) regulates the siting and construction of subsurface sewage disposal (septic) systems in the state. A system's septic tank and distribution box must be located a minimum of 50 feet, and the leaching field a minimum of 100 feet, from the boundary of a certified vernal pool.

The Massachusetts Forest Cutting Practices Act Regulations (3.04 CMR 11.00) protect certified vernal pools from certain forestry impacts. Harvesting requirements limit cutting to no more than 50% of the trees within 50 feet of a certified vernal pool. They also require that trees or tree tops not be felled in certified vernal pools, and restrict the use of pools as staging areas or skidder trails. Guidelines, similar to the regulations, are established for activities planned near uncertified vernal pools identified by consulting foresters.

THE VERNAL POOL BOUNDARY

When a vernal pool has been certified and the local conservation commission or the state Department of Environmental Protection has determined that it is protectable, the boundary of the vernal pool may require delineation.

The extreme edges of vernal pool habitat represent one of the most ecologically valuable portions of these habitats. Shallow water at the edges of a pool is generally the first to thaw in the spring. This provides early access to the pool for the earliest breeding species. The shallow water zones also tend to be significantly warmer than the deeper portions of a vernal pool throughout the spring. Egg masses of early breeding amphibians benefit from the warmer water temperatures at the pool edges that promote rapid egg development.

The ecological boundary of vernal pool habitat is therefore defined as

the lower of:

- a) the maximum elevation of a topographic depression that holds water for a minimum of 2 continuous months; or
- b) the maximum observed or recorded water level in a topographic depression

PLEASE NOTE The boundary of vernal pool habitat may be defined differently for the purpose of state or federal protection.

The boundary of a certified vernal pool is not established when a certification number is issued. Field observations of maximum flood levels or of indicators of the maximum water level obtained must be made to determine the boundary. Therefore, in recording observations of vernal pools for the purpose of certification, notes pertaining to observed water level and recognizable landmarks that show maximum flooding are extremely helpful in boundary delineation.

The Wetlands Protection Act regulations allows a project proponent to submit an opinion as to the extent of a certified vernal pool that is based upon a theoretical one year storm of a total of 2.7 inches of water in 24 hours. If an opinion based on this theoretical storm event is to be submitted, it should take into account ground water that the basin is holding at the beginning of the spring amphibian breeding season. The DEP has stated in its program policies that ground water inputs should not be ignored in these calculations because it will result in a total volume that may be considerably smaller than the basin holds in any given spring.

HOW CAN VERNAL POOLS BE CERTIFIED?

The Massachusetts Natural Heritage & Endangered Species Program administers the official vernal pool certification program. The Certification Program depends entirely on volunteer effort and the initiative of interested individuals and organizations. Interested parties should locate potential vernal pools and then:

1. Contact the Massachusetts Natural Heritage & Endangered Species Program [(508) 792-7270, ext.200] to obtain the official "Guidelines for the Certification of Vernal Pool Habitat," along with Vernal Pool Field Observation Forms;

Certification is based on proof that a confined basin depression provides important wildlife habitat consistent with the vernal pool certification criteria in the "Guidelines". Animals that use vernal pools at some point in their life cycle are generally divided into two groups:

Obligate Species: those vertebrate and invertebrate species that rely on vernal pools for all or a portion of their life cycle and are unable to successfully complete their life cycle without vernal pools

Facultative Species: those vertebrate and invertebrate species that can use vernal pool habitat for all or a portion of their life cycle, but are able to successfully complete their life cycle in other water bodies

Obligate species serve as *direct* indicators of vernal pool habitat because they require at least two months of flooded conditions and the absence of established fish populations. When breeding evidence of obligate species is documented, it is not necessary to prove that an established, reproducing fish population does not exist.

Facultative species serve as *indirect* indicators of vernal pool habitat. Therefore, if only facultative species are observed, evidence that there is no reproducing fish population must also be submitted for certification.

2. Fill out and submit a Field Observation Form along with photographic documentation of the physical and biological criteria required by the "Guidelines" and required maps to the NHESP for review. Photographs (slides or prints) are the preferred type of documentation of the biological certification criteria observed in a vernal pool. The most easily photographed evidence of vernal pool indicator species is egg masses of wood frogs and mole salamanders. These are conspicuous in the early spring and easily distinguished from other amphibian eggs. See the "Guidelines" for details.

Following receipt of certification materials, the Natural Heritage & Endangered Species Program assesses the completeness and accuracy of the information and documentation submitted. The NHESP does not field visit pools prior to certification but relies on the presentation of accurate and clear documentation.

After it is determined that a vernal pool meets the physical and biological criteria established in the "Guidelines," it will be officially certified by the NHESP. The observer, local conservation commission, regional office of the Department of Environmental Protection and the landowner are notified of the certification. The locations of Certified Vernal Pools are plotted on the NHESP's "Estimated Habitats of Rare Wetlands Wildlife and Certified Vernal Pools" on a biennial basis. These maps are sent to the town clerk and to the Conservation Commission, and are available for viewing by the public. The NHESP also produces a statewide Atlas of these maps, reproduced at a reduced scale, which is available at cost.



Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

Spring 2000

CERTIFICATION CRITERIA

Please read and understand the DOCUMENTATION REQUIREMENTS in the next section before submitting vernal pool certification applications.

Documentation of the biological and physical criteria described in this section is necessary to obtain official certification of any vernal pool.

DOCUMENTATION OF ANY ONE OF THE FOLLOWING (1-3) WILL CONFIRM THE EXISTENCE OF VERNAL POOL HABITAT AND IS SUFFICIENT FOR OFFICIAL CERTIFICATION

- 1) The Obligate Species Method**
- 2) The Facultative Species Method**
- 3) The Dry Pool Method**

1) The Obligate Species Method

Evidence of a confined basin depression with no permanently flowing outlet **AND** one or more of the following:

- 1A Breeding* Obligate Amphibian**
- Wood frog (*Rana sylvatica*)
 - Spotted salamander (*Ambystoma maculatum*)
 - Blue-spotted salamander (*Ambystoma laterale*)**
 - Jefferson salamander (*Ambystoma jeffersonianum*)**
 - Marbled salamander (*Ambystoma opacum*)**
 - Eastern spadefoot toad (*Scaphiopus holbrookii*)**

OR

- 1B Adult Obligate Invertebrate**
- Fairy shrimp (ANOSTRACA: *Eubranchipus*)

* Acceptable Breeding Evidence

Documentation of **any one** of the following proves that an area functions as vernal pool habitat. For the purposes of official certification, if amphibian evidence is submitted it must show evidence of breeding.

1. Breeding Adults
 - Frogs and toads: breeding chorus and/or mated pairs
 - Salamanders: courting individuals (congressing) and/or spermatophores
2. Egg Masses (**two or more are required**)
3. Larvae (tadpoles or salamander larvae)
4. Transforming Juveniles
 - Frogs and toads: tail remnants evident
 - Salamanders: gill remnants evident

** State-listed Species

State-listed Endangered (E), Threatened (T) and Special Concern (SC) species are protected under the Massachusetts Endangered Species Act (321 CMR 10.60); fill out a Rare Animal Observation Form and submit along with Certification Form.

CERTIFICATION CRITERIA

2) The Facultative Species Method

Evidence of a confined basin depression with no permanently flowing outlet **AND** evidence that there is no established, reproducing fish population

AND photographs of two or more of the following:

AMPHIBIANS

Breeding* Spring peeper (*Pseudacris crucifer*)
Breeding* Gray treefrog (*Hyla versicolor*)
Breeding* American toad (*Bufo americanus*)
Breeding* Fowler's toad (*Bufo woodhousii*)
Breeding* Green frog (*Rana clamitans melanota*)
Breeding* Pickerel frog (*Rana palustris*)
Breeding* Leopard frog (*Rana pipiens*)
Breeding* Four-toed salamander
(*Hemidactylium scutatum*)**
Adult or Breeding* Red-spotted Newt
(*Notophthalmus v. viridescens*)

REPTILES

Spotted turtle (*Clemmys guttata*)**
Blanding's turtle (*Emydoidea blandingii*)**
Wood turtle (*Clemmys insculpta*)**
Painted turtle (*Chrysemys p. pictata*)
Snapping turtle (*Chelydra serpentina*)

INVERTEBRATES

Predaceous diving beetle larvae (*Dytiscidae*)
Water scorpion (*Nepidae*)
Dragonfly larvae (*Odonata: Anisoptera*)
Damselfly larvae (*Odonata: Zygoptera*)
Dobsonfly larvae (*Corydalidae*)
Whirligig beetle larvae (*Gyrinidae*)
Caddisfly larvae (*Trichoptera*)
Leeches (*Hirundinea*)
Freshwater (fingernail) clams (*Pisidiidae*)
Amphibious, air-breathing snails (*Basommatophora*)

3) The Dry Pool Method

Evidence of a confined basin depression containing no standing water (dry pool)

AND one or more of the following:

Cases of caddisfly larvae (*Trichoptera*)
Adults, juveniles or shells of either of the following:
Freshwater clams (*Pisidiidae*)
Amphibious, air-breathing snails (*Basommatophora*)
Shed skins (exuvia) of dragonfly or damselfly larvae on vegetation along the edge of pool

DOCUMENTATION REQUIREMENTS

Documentation of the biological and physical characteristics listed in the CERTIFICATION CRITERIA must be submitted for official certification of a vernal pool. Photographic prints or slides are the preferred method of documentation, but video tapes of evidence or audio recordings of calling frogs are acceptable. Field notes are encouraged, but are not accepted as evidence; they must be submitted along with photographic or taped documentation.

Label all photographs as follows:

**Location of pool
(or tracking number)
Date of photograph
Observer's name**

The following field observations must be adequately documented

1. Biological criteria:

1A Clear photographs or video of obligate amphibian breeding evidence

OR

1B Clear photographs or video of facultative invertebrate or vertebrate species (**AND** 2B or 2C)

OR

1C Audio tape of frog breeding chorus

2. Fishlessness:

2A Evidence of obligate species per CERTIFICATION CRITERIA (1A above)

OR

2B Photograph of dry vernal pool

OR

2C Scientific evidence (e.g. seining) that documents the absence of fish

3. Physical criteria:

Clear photographs or video of the vernal pool demonstrating the lack of permanently flowing connections to larger wetlands

MAPPING REQUIREMENTS

It is critical to provide maps that are accurate and clear when submitting information for state vernal pool certification. A 1:24,000 or 1:25,000 scale **U.S. Geological Survey topographic map is required**, and additional maps that clarify the position of the vernal pool must be submitted. Many maps are acceptable for this purpose. Large scale street maps generally are not acceptable as supporting maps.

At least one from each of the following groups must be submitted:

GROUP 1

USGS topographic:

The location of the vernal pool must be clearly and accurately marked with an 'X' or dot

GROUP 2

Aerial photograph

Large scale (1:12,000 or better) with pool clearly visible

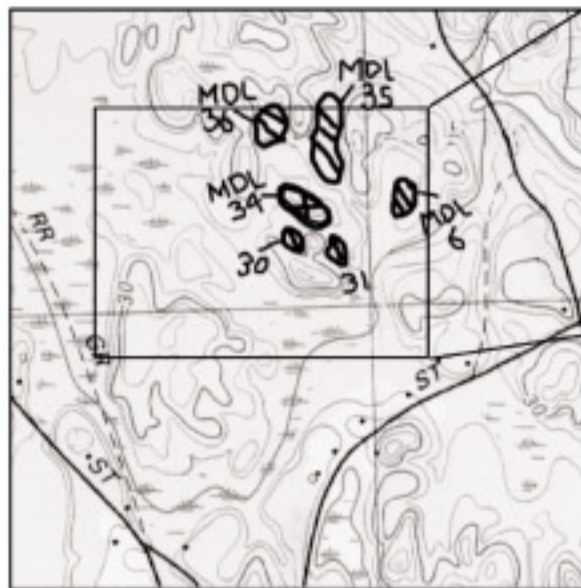
Compass directions and distances

Magnetic compass direction and distances from two permanent landmarks within 1000 feet of the pool. Landmarks should be readily identifiable in the field and clearly described on the submitted map

Professional survey

Large scale topographic maps or project plans where the depression is evident

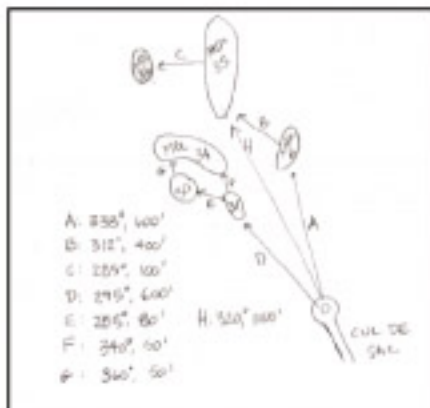
Some examples of required maps



USGS Topographic map section with pools clearly marked



B&W copy of **color infra-red aerial photograph** (1:12,000 scale) with pools also marked



Sketch map with compass directions and distance in feet

Field Observation Form

Application for certification of vernal pool habitat should be made using the standard field observation form (revised in 1999). All requested information should be filled out to the fullest extent possible. Additional directions are provided on the field form.

Please give particular attention to the following items:

Section 1: Written directions to the pool must be provided, noting field markers to help navigation.

Section 2: Please indicate the dates on which evidence was collected, including the year.

Section 3: Indicate the evidence of obligate and facultative species collected at each pool. If egg masses were found, indicate the number of masses discovered.

Section 4 and 5: Check the boxes corresponding to evidence submitted for each pool (in photographs or tape)

Optional Information: Information provided in this section gives the Natural Heritage & Endangered Species Program a better sense of the type of vernal pools that are being identified through the certification program, and aids in-field identification of the pools should anyone need to visit it. This section is optional, but provides very helpful information.

Section 6: Field forms must be signed at the bottom of page 2.

Incomplete submissions will be returned in full with a letter indicating any missing information. When the requested information has been collected, the application may be resubmitted.

Submit completed applications to:

Vernal Pool Certification
 Natural Heritage & Endangered Species Program
 Route 135
 Westborough, MA 01581



Natural Heritage & Endangered Species Program Massachusetts Division of Fisheries and Wildlife Vernal Pool Field Observation Form

(7/99)

(For use with *Guidelines for Certification of Vernal Pool Habitat*)

For office use only.

1. Pool location

Town _____ County _____

USGS Quadrangle name _____ ☐ SERIES 7.5' X 7.5'☐ SERIES 7.5' X 15'

WRITTEN DIRECTIONS TO POOL: _____

THIS INFORMATION
MUST BE SUBMITTED

(Use additional pages, if necessary.)

Instructions

FOR COMPLETE INFORMATION ABOUT CERTIFICATION, REFER TO GUIDELINES FOR CERTIFICATION OF VERNAL POOL HABITAT.

PROVIDE ALL OF THE INFORMATION REQUESTED IN BOXES 1-6. IF MORE SPACE IS REQUIRED, ATTACH ADDITIONAL PAGES. INCLUDE ALL REQUIRED PHOTOGRAPHS AND DOCUMENTATION. SIGN THE FORM IN THE AREA PROVIDED ON THE REVERSE SIDE. **INCOMPLETE OR UNSIGNED SUBMISSIONS WILL BE RETURNED.**

THE FOLLOWING INSTRUCTIONS REFER TO EACH OF THE NUMBERED BOXES.

1. THE 7.5 X 7.5 SERIES HAS THE LEGEND "7.5 MINUTE SERIES" IN THE UPPER RIGHT HAND CORNER ALONG WITH THE QUADRANGLE NAME. THE 7.5 X 15 MINUTE SERIES IS SO LABELED IN THE UPPER RIGHT HAND CORNER AND HAS THE QUADRANGLE NAME IN THE LOWER RIGHT CORNER.

WRITTEN DIRECTIONS **MUST** BE INCLUDED.

2. INDICATE THE FIRST AND LAST DATES THAT THE POOL OR ITS BIOLOGICAL COMPONENTS WERE OBSERVED.

3. PART A AND B ARE FOR CERTIFICATION BY OBLIGATE SPECIES. PART C IS EITHER FOR ADDITIONAL INFORMATION (APPRECIATED) OR FOR CERTIFICATION BY THE FACULTATIVE SPECIES. IF CERTIFYING BY OBLIGATE SPECIES, PROVIDE A PHOTOGRAPH OF THE POOL HOLDING WATER AND AT LEAST ONE PHOTOGRAPH (OR AUDIO TAPE FOR CHORUSING) OF BREEDING ACTIVITY.

FOR CERTIFICATION BY FACULTATIVE SPECIES, PROVIDE PHOTOGRAPHS OF THE POOL HOLDING WATER AND PHOTOGRAPHS (OR TAPES) OF THE FACULTATIVE SPECIES AS REQUIRED. ADDITIONALLY, PROVIDE A PHOTOGRAPH OF THE POOL WHEN DRY OR OTHERWISE PROVE THAT IT HAS NO FISH.

2. Observation dates

First date pool/species observed _____

Last date pool observed _____ Last date species observed _____

3 A. Evidence: obligate amphibians

Indicate date of observation.

* = RARE SPECIES	COURTING ADULTS	SPERMATOPHYTES	EGG MASSES (2+)	SALAMANDER LARVAE	TRANSFORMING JUVENILES
SPOTTED SALAMANDER					
* BLUE-SPOTTED SALAMANDER					
* JEFFERSON SALAMANDER					
* MARBLED SALAMANDER					
UNIDENTIFIED MOLE SALAMANDER					
	BREEDING CHORUS	MATED PAIRS	EGG MASSES (2+)	FROG TADPOLES	TRANSFORMING JUVENILES
WOOD-FROG					
* SPADEFOOT TOAD					

3 B. Evidence: fairy shrimp

DATE OBSERVED _____

3 C. Evidence: facultative organisms

Two or more must be documented. Indicate date of observation.

* = RARE SPECIES	DATE OBSERVED	ACTIVITY OBSERVED		DATE OBSERVED	ACTIVITY OBSERVED
BREEDING SPRING PEEPERS			PAINTED TURTLES		
BREEDING GRAY TREEFROGS			SNAPPING TURTLES		
BREEDING GREEN FROGS			PREDACEOUS DIVING BEETLE LARVAE		
BREEDING LEOPARD FROGS			WATER SCORPIONS		
BREEDING PICKEREL FROGS			DRAGONFLY NYMPHS		
BREEDING AMERICAN TOADS			DAMSEL NYMPHS		
BREEDING FOULARD'S TOADS			DOBSONFLY LARVAE		
* BREEDING FOUR-TOED SALAMANDERS			WHIRLIGIG BEETLE LARVAE		
RED-SPOTTED NEWT (ADULTS)			CADDISFLY LARVAE		
* SPOTTED TURTLES			LEECHES		
* WOOD TURTLES			FINGERNAIL (FRESHWATER) CLAMS		
* BLANDINGS TURTLES			AMPHIBIOUS AIR-BREATHING SNAILS		

Instructions (continued)

4. INDICATE THE PHOTOGRAPHS BEING SUBMITTED. LABEL, DATE, AND SIGN ALL PHOTOS.

5. MARK THE POOL CLEARLY ON ALL MAPS. THE POOL MUST BE CLEARLY DISTINGUISHED FROM OTHER WETLANDS AND BE RELOCATEABLE BY OTHERS. PROVIDE ANY MAPS THAT WOULD HELP SOMEONE UNFAMILIAR WITH THE AREA LOCATE THE VERNAL POOL IN THE FIELD.

6. THE FORM **MUST** BE SIGNED. UNSIGNED SUBMISSIONS WILL BE RETURNED WITHOUT FURTHER ACTION.

OPTIONAL INFORMATION:

PROPERTY OWNER. PROVIDE INFORMATION ABOUT PROPERTY OWNER(S), IF KNOWN. IT IS RECOMMENDED THAT YOU SEEK PROPERTY OWNER PERMISSION PRIOR TO CERTIFICATION ACTIVITIES.

RARE SPECIES. A PHOTOGRAPH IS NECESSARY FOR DOCUMENTATION OF RARE SPECIES HABITAT.

DESCRIPTION. PROVIDE ANY INFORMATION THAT WILL DISTINGUISH THE POOL FROM OTHER WETLANDS (BOULDERS, DEBRIS, TREE SPECIES, ETC.).

Optional information

Although the following information is not required for certification, it is useful to NH&ESP to possibly better protect the vernal pool, its habitat and species.

Property owner

IT IS STRONGLY RECOMMENDED THAT LANDOWNER PERMISSION BE OBTAINED PRIOR TO COLLECTING CERTIFICATION DOCUMENTATION.

Name _____

Address _____

Town _____ State _____ ZIP _____

Rare wetland species

☐ Y ☐ N

WERE ANY RARE STATE-LISTED SPECIES OBSERVED USING THIS POOL?

☐ Y ☐ N

IS A PHOTOGRAPH OF THE RARE SPECIES INCLUDED WITH THIS FILING?

4. Photographs

MUST BE LABELED, DATED, AND SIGNED.

- ☐ POOL HOLDING WATER
☐ OBLIGATE +/OR FACULTATIVE SPECIES
☐ DRY POOL (REQUIRED FOR EVIDENCE 3C)

5. Maps submitted

- ☐ USGS TOPOGRAPHIC MAP (REQUIRED)

AND ONE OR MORE OF THE FOLLOWING:

- ☐ AERIAL PHOTOGRAPH
☐ DISTANCE/COMPASS DIRECTIONS
☐ PROFESSIONAL SURVEY
☐ LARGE SCALE TOPO
☐ OTHER _____

OPTIONAL EXTRA INFORMATION

- ☐ SKETCH MAP OF AREA
☐ ASSESSOR'S MAP
☐ GPS LONGITUDE/LATITUDE COORDINATES

Description of pool and surroundings

DIMENSIONS: APPROXIMATE LENGTH _____ APPROXIMATE WIDTH _____

APPROXIMATE DEPTH _____

DESCRIBE DISTINCTIVE FEATURES (ROADS, STRUCTURES, BOULDERS, ETC.) WHICH ARE VISIBLE FROM OR NEAR THE POOL.

ARE THERE OTHER DISTINCTIVE FEATURES ABOUT THIS POOL (VEGETATION TYPES, ABANDONED VEHICLES, FOOT TRAILS, ETC.) THAT WOULD HELP SOMEONE RECOGNIZE IT?

6. Observer information & signature

Name _____

Address _____

Town _____ State _____ ZIP _____

Telephone _____

e-mail _____

I hereby certify under the pains and penalties of perjury that the information contained in this report is true and complete to the best of my knowledge.

Signature _____ Date _____

SEND COMPLETED FORM AND SUPPORTING DOCUMENTATION TO:

NH&ESP
VERNAL POOL CERTIFICATION
MA DIVISION OF FISHERIES & WILDLIFE
ROUTE 135
WESTBOROUGH, MA 01581

All submissions and supporting documents will be retained by the Natural Heritage & Endangered Species Program. Information submitted on this form and other documents is part of the public record and is available to interested parties under the State Documents Request Law.



Natural Heritage & Endangered Species Program

Commonwealth of Massachusetts
Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581
(508) 792-7270 ext. 200
<http://www.heritage.tnc.org/nhp/us/ma>

Natural Community Fact Sheet: Non-forested Acidic Peatlands

Community description

Peatlands, commonly called “bogs” or “fens,” are wetland communities with accumulations of incompletely decomposed organic material, or peat. Acidic peatlands form on poorly drained sites in areas with cool moist summers, where precipitation exceeds evapotranspiration. The combination of cool temperatures and low amounts of dissolved oxygen and nutrients in the water limits the decomposition of organic matter by microorganisms. Consequently, dead vegetation builds up forming a layer of peat. The peat layer locks up essential nutrients making them unavailable to plants, and if the peat is sufficiently thick, it cuts off plants from nutrient-rich groundwater below. The amount of nutrient availability in peatland communities depends on the degree of isolation from the water table and the amount of stream flow through the system. Ombrotrophic (or “rain-nourished” peatlands, called bogs) are the most isolated, highly acidic, and nutrient-poor, while minerotrophic (or “mineral-nourished” peatlands, called fens) typically have calcareous, nutrient-rich stream and/or groundwater inputs. Acidic fens are intermediate between the two extremes. This fact sheet deals with the acidic end of the spectrum of peatland communities (i.e. bogs and acidic fens). Calcareous fens, which also occur in Massachusetts, are described in a separate fact sheet.

In 1998, the Massachusetts Natural Heritage & Endangered Species Program (MNHESP) initiated a project to inventory the state’s acidic peatlands in order to classify the range of vegetation associations, to assess community quality, and to establish land protection priorities. Based on that work, four acidic peatland communities are currently recognized in the Commonwealth—Level Bogs, Kettlehole Level Bogs, Acidic Shrub Fens, and Acidic Graminoid Fens (Table 1). The word “level” is used to differentiate Massachusetts’ bogs from the raised or domed bogs of more northern latitudes. In raised bogs, the peat becomes so thick that the surface of the bog is actually domed, and the only way nutrients enter the system is through precipitation. The climate of Massachusetts is not cold enough to permit raised bog development.

Table 1. Non-forested Acidic Peatland Community Types in Massachusetts

Community Name	Est. # of high-quality sites in MA	Example
Level Bog	< 20	Ponkapoag Bog (Canton)
Kettlehole Level Bog	< 10	Arcadia Bog (Belchertown)
Acidic Shrub Fen	< 10	Turner Pond Bog (Acushnet Cedar Swamp, New Bedford)
Acidic Graminoid Fen	< 10	Grassy Pond (Acton)

Good examples of acidic peatland communities are limited in Massachusetts, in part because Massachusetts is at the southern limit of their geographic range and climatic conditions are marginal. The sites that do occur are threatened by wetland alterations (including dock building, small-scale peat mining operations, and conversion to commercial cranberry bogs), encroaching development, changes in hydrology, and nutrient enrichment from leach fields, road salt run-off, and siltation. Due to their limited occurrence and their distinct assemblages of plant and animal species, the four types of acidic peatlands listed in Table 1 have been designated **Priority Natural**

Communities for Protection within the Commonwealth. High-quality examples of non-forested acidic peatland communities are tracked by MNHESP.

Environment

Level bog communities receive little or no streamflow and they are isolated from the water table, making them the most acidic and nutrient-poor of peatland communities. The pH of level bogs is in the range of 3 to 4. Level bogs develop along pond margins, at the headwaters of streams, or in isolated valley bottoms without inlet or outlet streams. **Kettlehole level bogs** are a subset of level bogs that occur in iceblock depressions (commonly called kettleholes) in sandy glacial outwash. They are typically small (< 3 acres), round, and they lack inlets and outlets. Acidic fens are less acidic and nutrient-poor than level bogs because they tend to have more surface water inflow, and they have some groundwater connectivity. **Acidic shrub fens** and **Acidic graminoid fens** most often occur along pond margins, slow-moving streams, and along the outlet streams of stream headwater peatlands. More information is needed to identify the physical, geochemical, or hydrological differences between acidic shrub fens and acidic graminoid fens.

Characteristic plant species in Massachusetts

Sphagnum moss species (*Sphagnum* spp.) are the most common plants in all acidic peatlands. Other species vary depending on acidity and nutrient availability. **Level bogs** and **Kettlehole level bogs**, the most acidic and nutrient-poor of peatland communities, are characterized by a mixture of tall and short shrubs that are predominantly ericaceous (or members of the Heath family). Leatherleaf (*Chamaedaphne calyculata*) is dominant. Other typical ericaceous shrubs include rhodora (*Rhododendron canadense*), sheep laurel (*Kalmia angustifolia*), bog laurel (*Kalmia polifolia*), bog rosemary (*Andromeda polifolia* var. *glaucophylla*), Labrador tea (*Ledum groenlandicum*), and low-growing large and small cranberry (*Vaccinium macrocarpon* and *V. oxycoccus*). Scattered, stunted coniferous trees (primarily tamarack (*Larix laricina*) and black spruce (*Picea mariana*)) occur throughout. A mixture of specialized bog plants grow on the hummocky sphagnum surface, including carnivorous pitcher plants (*Sarracenia purpurea*) and sundews (*Drosera rotundifolia* and *D. intermedia*). **Acidic shrub fens** are composed primarily of low-growing, interwoven shrubs with patches of sphagnum moss growing at the shrub bases. Both evergreen and deciduous shrubs occur; typical species include leatherleaf, water-willow (*Decodon verticillatus*), sweet-gale (*Myrica gale*), meadow-sweet (*Spiraea alba* var. *latifolia*), sweet-pepperbush (*Clethra alnifolia*), and alder (*Alnus* spp.). Scattered red maples (*Acer rubrum*) and Atlantic white cedar (*Chamaecyparis thyoides*) can also occur. There is a limited number of herbaceous species, including St. John's-wort (*Hypericum* spp.) and arrowweed (*Sagittaria* spp.). **Acidic graminoid fens** are the most species-rich of acidic peatland communities. They have similar species to acidic shrub fens, but graminoid and herbaceous species are dominant. Typical graminoids include beaked sedge (*Carex utriculata*), slender woolly-fruited sedge (*Carex lasiocarpa* var. *americana*), white beak-sedge (*Rhynchospora alba*), twig-sedge (*Cladium mariscoides*), and pondshore-rush (*Juncus pelocarpus*). Associated herbaceous species are St. John's-wort (*Hypericum* spp.), pickerel weed (*Peltandra virginica*), and rose pogonia (*Pogonia ophioglossoides*). Large cranberry can also be abundant.



Sphagnum magellanicum

A common sphagnum moss species in Massachusetts acidic peatlands

Damman, A.W.H. and T.W. French. 1987. *The Ecology of Peat Bogs of the Glaciated Northeastern United States: A Community Profile*. U.S. Fish Wildl. Serv. Biol. Rep. 85(7.16).

Rare plant species in Massachusetts

Five of Massachusetts' rare plant species—pod-grass (*Scheuchzeria palustris*; T), dwarf-mistletoe (*Arceuthobium pusillum*; SC), mud sedge (*Carex limosa*; WL), three-leaved Solomon's seal (*Maianthemum trifolium*; WL), and northern yellow-eyed grass (*Xyris montana*; WL)—occur almost exclusively in acidic peatlands. Two of those species (pod-grass and dwarf-mistletoe) are protected under the Massachusetts Endangered Species Act. Pod-grass, mud sedge, and northern yellow-eyed grass occur most commonly in open sphagnum lawns of level bog communities where they are not shaded by woody shrubs. Three-leaved Solomon's seal prefers the dry, stable sphagnum hummocks of northern kettlehole bogs where it grows with leatherleaf and bog laurel. Dwarf-mistletoe is a parasitic plant that grows on the branches of black spruce trees; it is limited to northern level bogs where black spruce occurs. Several other rare plant species can occur in acidic peatland habitats in Massachusetts, but they are also found in other community types. They are golden-club (*Orontium aquaticum*; T), arethusa (*Arethusa bulbosa*; T), bog-sedge (*Carex exilis*; WL), bog-willow (*Salix pedicellaris*; WL), and rough aster (*Aster radula*; WL).

T=State Threatened, SC=State Special Concern, WL=State Watch List

Habitat values

Due to the extended periods of saturation, lack of nutrients, and the high acidity and low oxygen content of the water, acidic peatlands are inhospitable to many animal species. Winged animals and large terrestrial animals can use peatlands as part of their habitat and then move on when conditions are unfavorable. Moose and white-tail deer use acidic peatlands for browsing and grazing, and their trails are often evident across the peat mat. Many bird species use peatlands for part of the year as nesting or foraging habitat. Massachusetts' birds that can be found in acidic peatlands include Swamp and White-tailed Sparrows, Common Yellowthroat, Olive-sided and Alder Flycatchers, Red-winged Blackbirds, and Gray Catbirds. Many species of dragonflies and damselflies inhabit acidic peatlands, especially where there is adjacent open water. The acidity and low oxygen content of level bogs makes them poor habitat for most amphibians and reptiles, although some species can breed in the shallow pools that form among the sphagnum hummocks.

State-protected rare animal species in Massachusetts

The southern bog lemming (*Synaptomys cooperi*; SC) and three state-protected rare dragonfly species—the banded bog skimmer (*Williamsonia lintneri*; E), ebony bog skimmer (*Williamsonia fletcheri*; E), and the Kennedy's emerald (*Somatochlora kennedyi*; E)—are limited to acidic peatlands in Massachusetts. Several other state-protected rare animal species use acidic peatlands as an important component of their habitat. Four-toed salamanders (*Hemidactylium scutatum*; SC) use acidic peatlands as breeding habitat. Spotted turtles (*Clemmys guttata*; SC) occupy a variety of wetland habitats in Massachusetts, including acidic peatlands. Larvae of the pitcher plant borer moth (*Papaipema appassionate*; SC) feed on the stems and roots of pitcher plants, and larvae of the chain fern borer moth (*Papaipema stenocelis*; SC) feed on the rhizomes of Virginia Chain fern. They are limited to sites where those plant species occur. Hessel's hairstreak (*Mitoura hesseli*; SC) is found in acid bogs with Atlantic white cedar.

SC=State Special Concern, E=State Endangered

Range & distribution of acidic peatlands in Massachusetts

In North America, bogs and acidic fens are northern community types that are distributed across Canada and northern sections of the United States. Massachusetts is at the southern limit of the geographic range of acidic peatlands meaning that climatic conditions are marginal and occurrences are patchy. Level bogs occur throughout the state, but most occur in north-central Massachusetts on the Worcester Plateau. Kettlehole level bogs are most abundant in parts of the state where there are abundant



Distribution of high-quality, non-forested acidic peatland communities in Massachusetts by town

● Level bogs, ○ Acidic fens

glacial outwash sediments, i.e. the Connecticut Valley, southern Plymouth County, and Cape Cod. Acidic fens are more broadly distributed, but most of the best occurrences are in the eastern half of the state. At present, over 300 non-forested acidic peatlands are known to occur in the state, but only 30 (19 level bogs and 11 acidic fens) are high-quality natural communities. Due to their limited acreage and habitat values, acidic peatlands warrant active land protection efforts.

Threats and Management Recommendations

Although land acquisition and conservation restrictions are important ways to protect the remaining examples of non-forested acidic peatlands in Massachusetts, land protection alone will not maintain these sites as high-quality, natural communities. Preliminary data and field observations indicate that alterations of hydrology and surface and peat water chemistry impact species composition and community quality. For example, cat-tails (*Typha* spp.), although native to Massachusetts, do not normally occur in level bog or acidic fen communities, and their occurrence is indicative of alteration to the natural hydrology and chemistry of peatland systems. Preliminary analyses at a level bog in Gardner, MA show that cat-tails are associated with high concentrations of Ca, Mg, K, and high alkalinity. Cat-tails at the site only occur in a section of the peat mat adjacent to railroad tracks, and it is hypothesized that episodic water runoff across the railroad bed increases nutrient concentrations and alkalinity in the adjacent bog mat. Road salt runoff has been linked to the occurrence of the highly invasive species, phragmites (*Phragmites australis*), and to overall changes in plant species composition at a calcareous fen in Stockbridge. In acidic peatlands, phragmites also appears to be associated with road salt run-off.

Acidic shrub and graminoid fens, which are naturally more nutrient-enriched than level bogs, appear to be more susceptible to non-native species invasions. However, when the normal hydrologic and geochemical conditions of level bogs are altered (such as through road construction or nutrient loading from lawns, railroad track fill and road salt runoff), non-native and invasive native species (like cat-tails) can establish and expand. More work on the geochemical and hydrological parameters of both natural and "impacted" peatlands is needed in order to understand the underlying causes of non-native species invasions and factors influencing species composition. However, available data indicate that all efforts should be made to limit nutrient-loading and run-off into these naturally acidic community types.

While hydrology and geochemistry appear to have the greatest effect on species composition, trampling has the greatest impact on peat mat integrity and quality. Trampling by humans flattens the natural hummock-hollow topography of peatlands, wears permanent trails into the mat, and kills plants. All efforts must be made to limit trampling, particularly at sites that are frequently visited by researchers and students. Whenever possible, site visits should only be made to those publicly owned peatlands with established boardwalks. There are many in the state, including: Ponkapoag Bog in Canton, Ward Bog in Andover, Black Pond Bog in Norwell, Poutwater Pond in Holden, and Hawley Bog in Hawley.

J. Kearsley-1999



Natural Heritage &
Endangered Species
Program

Commonwealth of Massachusetts
Division of Fisheries & Wildlife
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Natural Community Fact Sheet:
FRESHWATER TIDAL MARSHES

Community Description

Freshwater tidal marshes occur along free-flowing coastal rivers, and are influenced twice daily by the incoming tides. Although they are flooded by the tides, they are located just upstream of the salt front, the river essentially becoming backed up as it meets resistance from high tides. Freshwater tidal marshes are characterized by salt intolerant plant species, typically a rich association of emergent grasses, sedges, rushes and forbs, with only occasional shrubs. Freshwater tidal marshes are considered a globally rare habitat, they support several rare species, and they are tracked by the Natural Heritage and Endangered Species Program as a high priority natural community.

Environment

Freshwater tidal marshes occur along the dynamic shores of rivers, and hence are often structurally diverse. They may include low marsh, high marsh, mud flats, rocky shores, and the river channel. Ditches and freshwater seepages and streams may add to the complexity of the habitat. The phenomenon of the saltwater "wedge," formed by the freshwater floating on the heavier saltwater, extends the salt influence further upstream in the lower-lying areas such as mud flats, ditches and shores (brackish and freshwater environments may therefore be adjacent). Lower lying zones are also subject to more prolonged inundation. All of these habitat variations share two common features: average annual salinity is less than 0.5 parts per thousand, and the habitat is flooded (usually twice) daily. Freshwater tidal marsh represents the upstream end of a gradient, ranging from coastal salt marsh, to brackish tidal marsh, to freshwater tidal marsh. In one rare case along the North River, extensive tidal shrubland and tidal forest communities have developed in the uppermost freshwater tidal zones.

- High marsh, also called backmarsh, is similar in structure to the high marsh of tidal salt marshes. Backmarsh begins with an abrupt bank of peat 1-3 feet above mean low water. Backmarsh is generally more developed along lower gradient rivers (North, Agawam, Palmer Rivers), and is often the most diverse vegetated zone of the freshwater tidal marsh.
- Low marsh develops on the muddy or rocky sloping shores of tidal freshwater areas, the result of respective deposition or scouring. Low marsh is usually limited to small pockets in low gradient rivers, located below the bank of the high marsh. Higher gradient or larger rivers (such as the Merrimack) appear to have more low marsh habitat in their freshwater tidal marshes.
- Mud flats are usually much more sparsely vegetated than the low marsh, supporting a different suite of low-growing plants, perhaps due to the increased disturbance from sediment deposition and more prolonged flooding.
- Rocky shore habitat, like the mud flats, is sparsely vegetated with low growing annuals, perhaps due to shallow soils and stronger erosive forces from the river. Rocky shore habitat is usually limited to small patches, however higher gradient or larger rivers appear to support more of this habitat type.

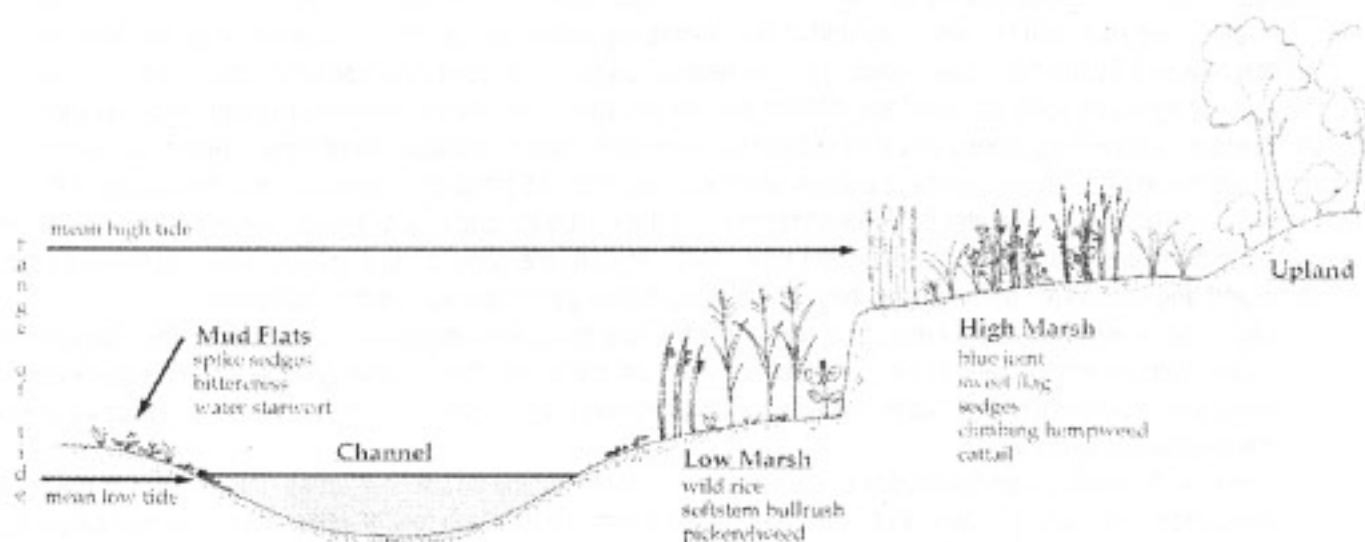
Characteristic Plant Species in Massachusetts

Much of the backmarsh consists of loose associations of herbaceous plants and grasses such as blue joint (*Calamagrostis canadensis*), sedges (*Carex lacustris*, *C. stricta*), smartweeds & tearthumbs (*Polygonum punctatum*, *P. arifolium*), jewelweed (*Impatiens capensis*), arrow arum (*Peltandra virginica*) and bur-marigolds (*Bidens* spp.). A few species such as narrow-leaved cattail (*Typha angustifolia*) and sweet flag (*Acorus calamus*) occasionally forms exclusive stands, and climbing hempweed (*Mikania scandens*) often sprawls over large patches of backmarsh. Occasional shrubs include buttonbush (*Cephalanthus occidentalis*), silky dogwood (*Cornus amomum*) and swamp rose (*Rosa palustris*), which often occur in the upper edges of the backmarsh.

Low marsh typically supports stand-forming emergent plants, often with tough mat-forming rhizomes that resist erosion, although some annuals may also dominate large sections of marsh. Large stands of wild rice (*Zizania aquatica*) usually dominate the muddy areas, however stands of sweet flag (*Acorus calamus*), soft-stem bulrush (*Scirpus tabernaemontani*), arrowhead (*Sagittaria graminea*), pickerel-weed (*Pontederia cordata*) and water dock (*Rumex orbiculatus*) frequently occur in some freshwater tidal low marshes. Freshwater cord-grass (*Spartina pectinata*), three-square (*Scirpus pungens*) and water hemp (*Amaranthus cannabinus*) are typical of rockier substrates.

Typical species of the more sparsely vegetated mud flats include spike sedges (*Eleocharis* spp.), water purslane (*Ludwigia palustris*), water starwort (*Callitriche palustris*) and bittercress (*Cardamine* spp.).

Rocky shore habitat supports creeping spearwort (*Ranunculus flammula* var. *reptans*) and the rare plant Parker's pipewort (*Eriocaulon parkeri*).



Cross section showing characteristic species of Fresh water tidal marsh, including mudflats, low and high marsh.

Rare Plant Species in Massachusetts

The freshwater tidal marsh community includes many state listed rare species, including Parker's pipewort (*Eriocaulon parkeri*) (E), Long's bittercress (*Cardamine longii*) (E), river arrowhead (*Sagittaria subulata*) (E), estuary beggar ticks (*Bidens hyperborea* var. *colpophila*) (E) and pygmyweed (*Crassula aquatica*) (T). Most of these species are found in the lower zones of tidal mudflats or rocky shores. A large population of hemlock parsley (*Conioselinum chinense*) (SC), a species more typical of calcareous fens in the western part of the state, thrives in the back marsh along the North River. Several of these species are also considered globally rare. Inundated false pimpernel (*Lindernia dubia* var. *inundata*) also appears to be both locally and globally restricted, although it is not currently listed in Massachusetts.

SC = State Special Concern; T = State Threatened; E = State Endangered;

Characteristic Animal Species in Massachusetts

Freshwater tidal marshes provide habitat for nesting Marsh Wren (*Cistothorus palustris*), Common Yellowthroat (*Geothlypis trichas*), Red-winged Blackbird (*Agelaius phoeniceus*), Eastern Kingbird (*Tyrannus tyrannus*), Gray Catbird (*Dumetella carolinensis*), Wood Duck (*Aix sponsa*) and Mallard (*Anas platyrhynchos*). The habitat is also used by resident Great Blue Heron (*Ardea herodias*), Green Heron (*Butorides striatus*), Osprey (*Pandion haliaetus*), and Red-shouldered Hawk (*Buteo lineatus*) nesting nearby. Wild rice is a very important food source for migrating Sora (*Porzana carolina*) and other rails, and many of the dominant plant species are important food plants for migrating and wintering American Black Duck (*Anas rubripes*). The channel may provide spawning habitat for anadromous fish such as shad or herring (*Alosa* spp.). Freshwater mussels are locally abundant along the tidal channel.

Rare Animal Species in Massachusetts

New England Siltsnail (*Cincinnatia winkleyi*) (SC) and Coastal Marsh Snail (*Littoridinops tenuipes*) (SC) are both associated with drainage ditches and seepages in fresh and brackish tidal marshes.

Range

Freshwater tidal marshes are uncommon natural communities in Massachusetts: they are geographically limited to short stretches of tidal rivers in coastal areas. Many rivers in Massachusetts, including the Mystic, Saugus and Charles Rivers, have lost their freshwater tidal reach from dams located below the limit of tidal influence. Two large and high quality examples of this community type occur on the North River, at the confluence of the Indian Head River and (4th) Herring Brook, and on the Merrimack River, between the Indian and Artichoke Rivers. Several small but good examples of this community type occur on the Agawam, Mashpee, Palmer, Parker, and South Rivers.

Threats and Management Recommendations

Much of the damage to freshwater tidal marshes has already occurred from historic land uses, such as damming, filling and channelization. With the more recent trend of breached or intentionally deconstructed dams, the potential exists for natural restoration of additional habitat. Two current threats to this community type are hydrologic alteration from excessive water withdrawal, and invasive plant species. The extent of tidal influence in freshwater tidal wetlands, and the upstream range of the salt front, depend in part on the amount of water flowing downstream. Excessive water withdrawal, either due to large municipal wells upstream, or the cumulative impact of smaller withdrawals, could have profound impacts on the natural development of this vegetation community. The invasive purple loosestrife (*Lythrum salicaria*) is established in some systems, although it has not yet demonstrated the ability to dominate this sensitive habitat. Yellow flag (*Iris pseudacorus*), is also occasionally established as an invasive. Excessive nutrient enrichment may impact this habitat: certain areas within the tidal freshwater reach often have the highest fecal coliform counts, probably due to concentration in areas of poor tidal flushing.



Pickerel Weed at Low Tide

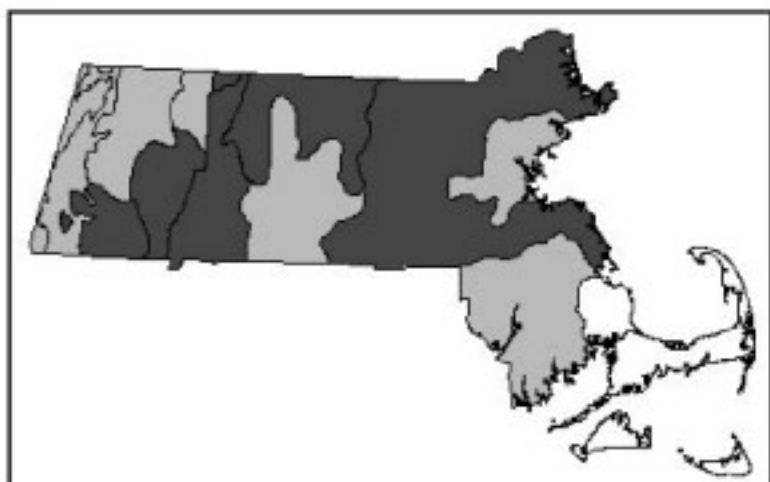


Pickerel Weed at High Tide

Additional Reading

- Fact sheets are available on associated habitats: salt marsh, brackish tidal marsh, and tidal swamp forest.
- Odum, W.E., T.J. Smith III, J.K. Hoover, & C.C. McIvor. 1984. The Ecology of Tidal Freshwater Marshes of the United States East Coast: A Community Profile. USFWS. FWS/OBS – 83/17. 177 pp. [Explains how freshwater tidal marshes function, and provides an excellent summary of collective knowledge on this community. Part of series produced by U. S. Fish & Wildlife Service.]
- Caldwell, F.A. & G.E. Crow. 1992. A floristic and vegetation analysis of a freshwater tidal marsh on the Merrimack River, West Newbury, Massachusetts. *Rhodora* 94:63-97.

Community Name: **HEMLOCK-HARDWOOD SWAMP**
 Community ELCODE: CP1A120000
 SRANK: S4
 Tracked: No



- Concept:** Acidic forested swamps where hemlock is dominant or co-dominant in the canopy.
- Environmental setting:** Hemlock-hardwood swamps occur in poorly drained basins in bedrock and till throughout the central and western portions of the state. The soil is muck and it is saturated throughout the year. Some groundwater seepage appears to be typical. At sites where mixed hemlock swamp and red maple swamp occur [1000 Acre Swamp in Athol and Phillipston], hemlock-dominated areas appear to occupy higher elevations. More information is needed to characterize the environmental setting and physical characteristics of hemlock-hardwood swamp forests.
- Vegetation Description:** Many swamps have hemlock (*Tsuga canadensis*) as a component of the canopy but "hemlock-hardwood swamps" are differentiated from others by having hemlock as the major canopy species. In some cases, hemlock forms dense stands. In other cases, probably more commonly, hemlock is associated with a mixture of white pine (*Pinus strobus*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*). The hemlock-dominated canopy allows little light into the subcanopy and shrub species are sparse, but shrubs can form dense thickets in canopy gaps. Typical shrubs include alders (*Alnus* spp.), highbush blueberry (*Vaccinium corymbosum*), winterberry (*Ilex verticillata*), and mountain holly (*Nemopanthus mucronatus*). The ground layer is hummocky and covered in various moss species. Ferns are common, especially cinnamon fern (*Osmunda cinnamomea*). Sensitive fern (*Onoclea sensibilis*) occurs less abundantly. Goldthread (*Coptis trifolia* ssp. *groenlandica*) is characteristic. In areas where hemlock is mixed with hardwoods, there appears to be higher species diversity: woodferns such as spinulose woodfern (*Dryopteris carthusiana*), intermediate woodfern (*D. intermedia*), and crested woodfern (*D. cristata*) can be abundant in the herbaceous layer. Rich variants of hemlock-hardwood swamps occur. One rich site located at the base of a steep forested slope in Huntington has a mixture of spice bush (*Lindera benzoin*), mountain-laurel (*Kalmia latifolia*), and hobble-bush (*Viburnum lantanoides*) in the shrub layer, and an herbaceous layer of more than 20 species, including jack-in-the-pulpit (*Arisaema triphyllum*), spotted touch-me-not (*Impatiens capensis*), Pennsylvania bittercress (*Cardamine pennsylvanica*), cinnamon fern (*Osmunda cinnamomea*), interrupted fern (*O. claytoniana*), goldthread (*Coptis trifolia* ssp. *groenlandica*), and blue marsh-violet (*Viola cucullata*). Rich hemlock-hardwood swamps are differentiated from calcareous seepage swamps by their lower herbaceous species richness, about 20 species as compared to >40 for calcareous seepage swamps, and their lack of characteristic calciphiles (calcium-loving), such as delicate sedge (*Carex leptalea*), brome-like sedge (*Carex bromoides*), long-stalked sedge (*Carex pedunculata*), rough-leaved goldenrod (*Solidago patula*), and golden ragwort (*Senecio aureus*).
- Associations:** No associations have been described in Massachusetts.
- Habitat values for Associated Fauna:** Hemlock-hardwood swamps can function as vernal pool habitat if water remains standing for 2-3 months and they lack fish; these areas provide important amphibian breeding habitat.

Associated rare plants:

MALAXIS BRACHYPODA	WHITE ADDER'S-MOUTH	T
RIBES TRISTE	SWAMP RED CURRANT	- WL

Associated rare animals:

AMBYSTOMA JEFFERSONIANUM	JEFFERSON SALAMANDER	SC
AMBYSTOMA LATERALE	BLUE-SPOTTED SALAMANDER	SC
CLEMMYS GUTTATA	SPOTTED TURTLE	SC
CLEMMYS INSCULPTA	WOOD TURTLE	SC
HEMIDACTYLUM SCUTATUM	FOUR-TOED SALAMANDER	SC

Examples: Bear Swamp, DEM Representative Natural Areas, Beartown SF, Great Barrington; 1000 Acre Swamp, Athol/Phillipston ; Knightville Dam property, ACOE, Huntington/Chester.

Threats: More information is needed to determine the threats to hemlock-hardwood swamps.

Management needs: More information is needed to assess the management needs for hemlock-hardwood swamps.

Inventory need rank: 2

Inventory comments:**Synonyms:**

USNVC/TNC: Tsuga canadensis/Sphagnum spp. forest [CEGL006226]

MA [old name]: not described, included within Northern New England basin swamp [CP2B2B0000]

ME: Not described.

VT: Hemlock swamp

NH: Hardwood-conifer seepage swamp-Tsuga canadensis/Taxus canadensis association

NY: Hemlock-hardwood swamp; Rich hemlock-hardwood peat swamp

CT: Tsuga canadensis seasonally flooded forest

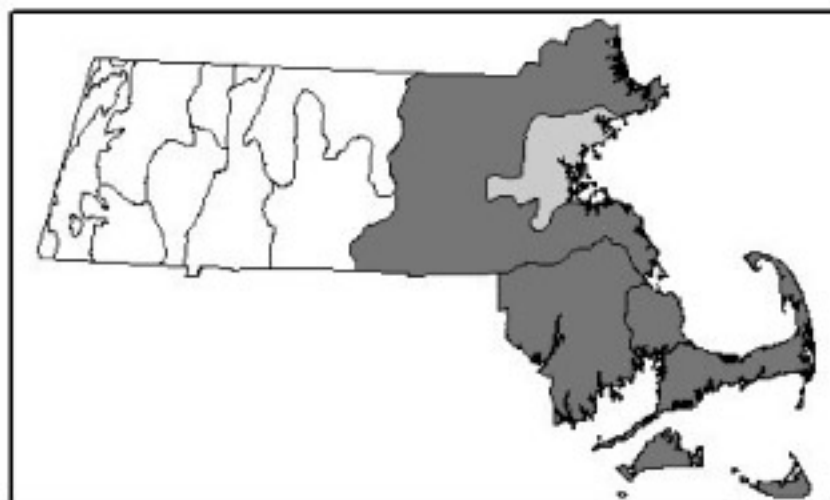
RI: Hemlock-hardwood swamp

Golet & Larson, 1974: Evergreen wooded swamp [WS-2]

Other:

Author: J. Kearsley **Date:** 7/21/99

Community Name: ESTUARINE INTERTIDAL: FRESHWATER TIDAL MARSH
 Community CODE: CE2B400000
 SRANK: S1
 Tracked: Yes



Concept: Mixed herbaceous marsh flooded by daily tides, and occurring in the freshwater reach of coastal rivers.

Environmental setting: Freshwater tidal marshes occur along free-flowing coastal rivers. Tidal amplitude may range from 0 to 150 cm, and average annual salinity is less than 0.5 ppt. [from 0.5 ppt. to 5 pp. salinity, there is a gradient of species to the more clearly brackish, which has an average annual salinity of 5-18 ppt.]. This community occurs upstream of brackish tidal marsh, in the upper limits of tidal influence. The community may often be structurally diverse, including high marsh, low marsh, mud flats, rocky shore, ditches and seepages.

Vegetation Description: Dominant species include: blue joint (*Calamagrostis canadensis*), sedges (*Carex stricta*), narrow-leaved cattail (*Typha angustifolia*), wild rice (*Zizania aquatica*), smartweeds & tearthumbs (*Polygonum punctatum*, *P. arifolium*), jewelweed (*Impatiens capensis*), climbing hempweed (*Mikania scandens*) and sweet flag (*Acorus calamus*). Shrubs such as buttonbush (*Cephalanthus occidentalis*) and silky dogwood (*Cornus amomum*) may occasionally be present. Inundated False Pimpernel (*Lindernia dubia* var. *inundata*), which occurs in this community, is globally ranked by The Nature Conservancy but not listed in Massachusetts.

Associations: Caldwell & Crow (1992) describe eight cover types from a freshwater tidal area of the Merrimack River: (1) *Spartina alterniflora*; (2) *Sagittaria graminea*; (3) *Scirpus tabernaemontani*; (4) *Spartina pectinata*; (5) *Amaranthus cannabinus*; (6) *Scirpus pungens*; (7) *Acorus calamus*; (8) *Zizania aquatica*. That study area did not have a well developed high marsh area. Three of the TWINSpan types were on rocky substrate, but within the freshwater tidal influence: (4) *Spartina pectinata*; (5) *Amaranthus cannabinus*; and (6) *Scirpus pungens*.

Habitat Values for Associated Fauna: This community provides outstanding general wildlife habitat, with abundant food sources for migratory and wintering waterfowl, and is generally associated with river reaches with spawning habitat for anadromous fisheries. It tends to have more vertebrate species than do the Brackish Tidal Marshes, such as freshwater snakes and muskrats.

Associated rare plants:

BIDENS HYPERBOREA VAR COLPOPHILA	ESTUARY BEGGAR-TICKS	E
CARDAMINE LONGII	LONG'S BITTER-CRESS	E
CONIOSELINUM CHINENSE	HEMLOCK PARSLEY	SC

CRASSULA AQUATICA	PYGMYWEED	T
ERIOCAULON PARKERI	ESTUARY PIPEWORT	E
SAGITTARIA SUBULATA VAR SUBULATA	RIVER ARROWHEAD	E
SCIRPUS FLUVIATILIS	RIVER BULRUSH	SC

Associated rare animals:

CINCINNATIA WINKLEYI	NEW ENGLAND SILTSNAIL	SC
LITTORIDINOPS TENUIPES	COASTAL MARSH SNAIL	SC

Examples with Public Access: Best examples are along the North River, and the Merrimack River. Smaller examples on the South, Palmer, Mashpee, Agawam and Parker Rivers.

Threats: Invasive plants purple loosestrife (*Lythrum salicaria*) and yellow flag (*Iris pseudacorus*) are established in some systems, although long-term threat is unknown. Alteration of river hydrology from excessive water withdrawal may have significant effect on plant communities. Development associated with recreational activity (*docks, landings*) may threaten rare plants in tidal shore habitat. In the past dams were often placed in rivers below the upper reaches of the tidal influence and so reduced the areas with tidal influence.

Management needs: Monitor invasive plant populations. Determine hydrologic requirements, and develop system for monitoring hydrologic stress. Prevent alteration of tidal shores.

Inventory need rank: 2 [Cape Cod]

Inventory comments:

Synonyms:

USNVC/TNC: Includes: Eriocaulon parkeri Tidal Herbaceous Alliance -- Eriocaulon parkeri - Polygonum punctatum Herbaceous Vegetation [CEGL006352]; Nuphar lutea Tidal Herbaceous Alliance -- Nuphar lutea ssp. advena Tidal Herbaceous Vegetation [CEGL004472]; Peltandra virginica - Pontederia cordata Tidal Herbaceous Alliance -- Mixed Forbs (High Marsh) Tidal Herbaceous Vegetation [Provisional] [CEGL006325]; Zizania aquatica Tidal Herbaceous Alliance -- Zizania aquatica Tidal Herbaceous Vegetation [CEGL004202]; Amaranthus cannabinus Tidal Herbaceous Alliance -- Amaranthus cannabinus Herbaceous Vegetation [CEGL006080].

MA (old name): FW Tidal Marsh [formerly Southern New England FW Tidal]

ME: Freshwater Tidal Marsh

NH:

NY: Includes: part of Brackish intertidal mudflats; part of Freshwater Intertidal Mudflats; Freshwater tidal marsh; Freshwater intertidal shore; Freshwater Tidal Marsh; understory of Freshwater tidal swamp.

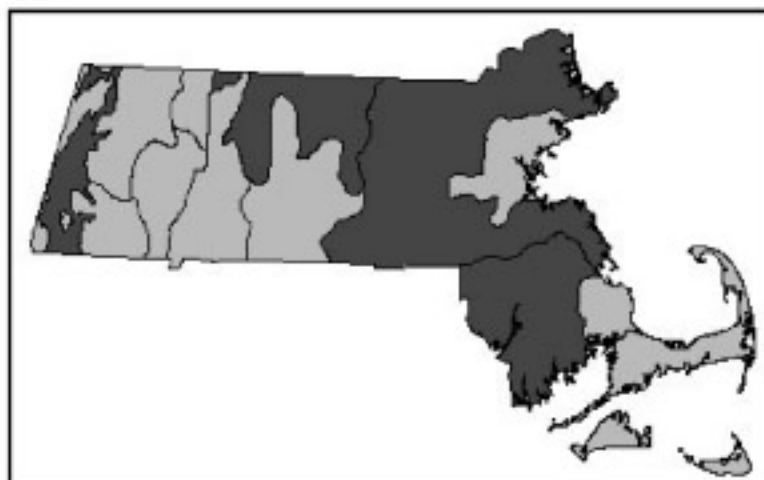
CT: Includes: Eriocaulon parkeri - Polygonum punctatum Community; Peltandra virginica - Cyperus strigosus; Pontederia cordata low forb vegetation; Eupatorium - Ludwigia palustris community; Hypericum mutilum - Gratiola aurea community; Zizania aquatica - Pontederia cordata community; Acorus calamus tall grasslands; Typha latifolia tall grasslands (semipermanently flooded); Peltandra virginica - Scirpus fluviatilis - Typha Community; Onoclea sensibilis - Scirpus fluviatilis - Typha spp. Community; Carex lacustris - Calamagrostis canadensis - Elymus canadensis community.

RI: Part of: Brackish intertidal mud flat [not in RI as such, no Eriocaulon parkeri]; Freshwater tidal marsh.

Other:

Author: B. Reid; P. Swain 1/25/2000 **Date:** 6/18/99

Community Name: **ACIDIC SHRUB FEN**
 Community ELCODE: CP2B0B2000
 SRANK: S3
 Tracked: Yes



- Concept:** Shrub-dominated acidic peatlands characterized by a mixture of primarily deciduous shrubs. Acidic shrub fens experience some groundwater and/or surface water flow but not calcareous seepage.
- Environmental setting:** Acidic shrub fens are less acidic and nutrient-poor than level bogs; they appear to have more surface water inflow and some groundwater connectivity. Acidic shrub fens are typically found along wet pond margins in the eastern half of the state, but they also characterize many wet pond margins in northern Worcester County [e.g., Cheshire and Lincoln Ponds, Ashburnham] and the Berkshires [Horseshoe-Mud Pond Bog, Otis]. More information is needed to identify the physical, geochemical, or hydrological differences between acidic shrub fens and acidic graminoid fens.
- Vegetation Description:** Acidic shrub fens are composed primarily of low-growing, interwoven shrubs with patches of Sphagnum moss growing at the shrub bases. Evergreen and deciduous shrubs occur; typical species include leatherleaf (*Chamaedaphne calyculata*), water-willow (*Decodon verticillatus*), sweet-gale (*Myrica gale*), meadow-sweet (*Spiraea alba* var. *latifolia*), sweet-pepperbush (*Clethra alnifolia*), and alder (*Alnus* spp.). Scattered red maples (*Acer rubrum*) and Atlantic white cedar (*Chamaecyparis thyoides*) can also occur. There is a limited number of herbaceous species, including St. John's-wort (*Hypericum* spp.) and arrow-weed (*Sagittaria* spp.). These associations are similar in structure to dwarf ericaceous shrub bogs, but they are wetter with a less well-developed sphagnum mat.
- Associations:** One association has been described in Massachusetts: the *Decodon verticillatus*-*Chamaedaphne calyculata*-*Myrica gale* acidic shrub fen association [TYPE F; described in Kearsley, 1999c].
- Habitat values for** Acidic shrub fens can function as vernal pool habitat if water remains standing for 2-3 months; these
- Associated Fauna:** areas provide important amphibian breeding habitat.
- Associated rare plants:**
 NONE KNOWN
- Associated rare animals:**
- | | | |
|--------------------------|-------------------------|----|
| CLEMMYS GUTTATA | SPOTTED TURTLE | SC |
| LITHOPHANE VIRIDIPALLENS | PALE GREEN PINION MOTH | SC |
| PAPAPEMA SULPHURATA | WATER-WILLOW STEM BORER | T |
| WILLIAMSONIA LINTNERI | RINGED BOGHAUNTER | E |

Examples: Mud Pond-Horseshoe Pond bog, Otis; Lowell-Dracut State Forest bog, Dracut.

Threats: Hydrological alterations that affect either water quality or quantity threaten the community occurrences and the component species. Nutrient enrichment from surrounding land uses allows less tolerant species to displace low nutrient specialists.

Management needs: Maintaining water quality and quantity are important to all wetland communities.

Inventory need rank: 2

Inventory comments:

Synonyms:

USNVC/TNC: In part *Chamaedaphne calyculata*-(*Gaylussacia dumosa*)-*Decodon verticillatus*/Woodwardia virginica dwarf-shrubland ; also in part *Decodon verticillatus* semipermanently flooded shrubland and *Myrica gale* saturated shrubland.

MA [old name]: Part of SNE acidic basin fen [CP3A2B1000].

ME: Related to and includes: 2001 - Leatherleaf Boggy Fen. 1991 - Part of Acidic fen community.

VT: Similar to Poor fen.

NH: Not described.

NY: Not described.

CT: Not described.

RI: Not described.

Golet & Larson, 1974:

Other:

Author: J. Kearsley **Date:** 7/21/99

Community Name: **LEVEL BOG**
 Community ELCODE: CP2B0C1000
 SRANK: S3
 Tracked: Yes



- Concept:** Acidic dwarf ericaceous shrub peatlands, generally with pronounced hummock-hollow topography. Level bogs are the most acidic and nutrient-poor of Massachusetts' peatland communities.
- Environmental setting:** Level bog communities receive little or no streamflow and they are isolated from the water table, making them the most acidic and nutrient-poor of peatland communities. The pH of level bogs is in the range of 3 to 4. Level bogs develop along pond margins, at the headwaters of streams, or in isolated valley bottoms without inlet or outlet streams.
- Vegetation Description:** Level bogs are characterized by a mixture of tall and short shrubs that are predominantly ericaceous (i.e. members of the Heath family). Leatherleaf (*Chamaedaphne calyculata*) is dominant. Other typical ericaceous shrubs include rhodora (*Rhododendron canadense*), sheep laurel (*Kalmia angustifolia*), bog laurel (*Kalmia polifolia*), bog rosemary (*Andromeda polifolia* var. *glaucophylla*), Labrador tea (*Ledum groenlandicum*), and low-growing large and small cranberry (*Vaccinium macrocarpon* and *V. oxycoccus*). Scattered, stunted coniferous trees, primarily tamarack (*Larix laricina*) and black spruce (*Picea mariana*), occur throughout. A mixture of specialized bog plants grow on the hummocky Sphagnum surface, including carnivorous pitcher plants (*Sarracenia purpurea*) and sundews (*Drosera rotundifolia* and *D. intermedia*).
- Associations:** Five associations have been described in Massachusetts. They are: 1. *Vaccinium corymbosum*-*Rhododendron viscosum* tall shrub bog and bog border association [TYPE A in Kearsley, 1999c], 2. *Vaccinium corymbosum*-*Rhododendron canadense*-*Ledum groenlandicum* tall shrub bog association [TYPE B in Kearsley, 1999c], 3. A *Chamaedaphne calyculata*-*Kalmia polifolia*-*Malanthemum trifolium* dwarf ericaceous shrub bog association [TYPE C in Kearsley, 1999c], 4. *Chamaedaphne calyculata* dwarf ericaceous shrub bog association [TYPE D], and 5. *Vaccinium oxycoccus*-*Rhynchospora alba*-*Utricularia cornuta* open sphagnum lawn association [TYPE E].
- Habitat values for** The high acidity and low oxygen content of the water make level bogs inhospitable to many reptiles,
- Associated Fauna:** fish, and amphibians. However, several of the state's protected rare animal species are found in level bogs. Moats or pools associated with level bogs can provide important amphibian breeding habitat and function as vernal pools if they have two to three months of ponding and lack fish.

Associated rare plants:

ARCEUTHOBIUM PUSILLUM	DWARF MISTLETOE	SC
CAREX LIMOSA	MUD-SEDGE	- WL
SCHEUCHZERIA PALUSTRIS	POD-GRASS	T

XYRIS MONTANA	NORTHERN YELLOW-EYED GRASS	- WI.
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Associated rare animals:

AESHNA MUTATA	SPATTERDOCK DARNER	E
AMBYSTOMA JEFFERSONIANUM	JEFFERSON SALAMANDER	SC
AMBYSTOMA LATERALE	BLUE-SPOTTED SALAMANDER	SC
LITHOPHANE VIRIDIPALLENS	PALE GREEN PINION MOTH	SC
METARRANTHIS PILOSARIA	COASTAL SWAMP METARRANTHIS MOTH	SC
PAPAPEMA APPASSIONATA	PITCHER PLANT BORER MOTH	SC
WILLIAMSONIA FLETCHERI	EBONY BOGHAUNTER	E
WILLIAMSONIA LINTNERI	RINGED BOGHAUNTER	E

Examples: Ponkapoag Bog Reservation MDC, Canton; Poutwater Pond, MDC, Sterling.

Threats: Hydrologic alteration and nutrient enrichment from road and lawn runoff. Trampling from humans affects peat mat integrity.

Management needs: Public should be encouraged to visit only those sites with established boardwalks. Signs need to be posted along boardwalks encouraging visitors to stay off the peat mat. Monitor the impact of salt and other nutrient runoff into bogs, and work to minimize runoff. Remove phragmites where it has become established.

Inventory need rank: 3

Inventory comments: Site visits should be made to 71 sites identified in 1998 bog inventory that were not visited in '98.

Synonyms:

USNVC/TNC: Includes *Vaccinium corymbosum*/Sphagnum spp. Shrubland ; *Picea mariana*/Kalmia angustifolia/Sphagnum spp. Forest; *Picea mariana*/Sphagnum spp. (Lower New England /Northern Piedmont, North Atlantic Coast) Woodland ; *Kalmia angustifolia*-*Chamaedaphne calyculata* (*Picea mariana*)/*Cladina* dwarf-shrubland.

MA [old name]: SNE Level Bog [CP2C2A0000].

ME: Includes and related to: 2001 – Sheep Laurel Dwarf Shrub Bog and Bog Moss Lawn. 1991 - Dwarf shrub bog community.

VT: Dwarf shrub bog.

NH: similar to Coastal/southern dwarf shrub bog and to Boreal/transitional dwarf shrub bog.

NY: Dwarf shrub bog.

CT: *Chamaedaphne calyculata* dwarf shrubland s.

RI: Dwarf shrub bog.

Golet & Larson, 1974:

Other:

Author:	J. Kearsley	Date:	7/21/99
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Freshwater Fish Species of Norwell - Summarized by Steve Hurley, MassWildlife, Southeast District Fisheries Manager

Waterbody	Accord Pond	Jacobs Pond	Black Pond Brook	Second Herring Brook	First Herring Brook	Wildcat Brook	Wildcat Creek	Black Brook	Third Herring Brook	Un named Tributary - Third Herring Brook	Second Herring Brook	Third Herring Brook	Torrey Brook
Location	Historic data only	Below Mt. Blue Street	Above Routs 123	S. of First Parish Rd Below Pond	Behind Norwell Town Hall	Upstream from Pleasant Street	End of Clapp Brook Road	Below Jacobs Pond	Below Leonard Lane	Mid-reaches Below Jacobs Pond	Below Norwell Ave.		
Date Sampled	5/8/2001	9/25/2001	9/20/2001	9/20/2001	6/27/2001	9/25/2001	9/25/2001	6/27/2001	8/24/2001	9/14/1955	9/15/1955	8/15/1955	
Scientific Name													
<i>Petromyzon marinus</i>													
American eel	1912	X		48	13	2	3	14	11	10	8	20	7
Blueback herring													
Alsewife													
Rainbow trout													
Brown trout													
Brook trout													
Redfin pickerel													
Chain pickerel	1912	X		1	3	31	1	15	1		5	10	96
Golden shiner	1912	X									3	8	
White sucker	1912										47	2	
Creek chubsucker													
Brown bullhead	Probable	X		1				1	8		233	26	1
Banded sunfish											2	40	
Pumpkinseed	1930	X		3					7		12		
Bluegill		X											
Smallmouth bass	1912												
Largemouth bass	Probable	X											
Black crappie		X											
Swamp darter		X											
Yellow perch		X											

Reported from lower reaches

Reported from lower reaches

Anadromous Anadromous

Anadromous Anadromous

Observed in tributary

Fish Species Theoretical and Confirmed in Norwell

COMMON NAME	LATIN NAME	CONFIRMED IN NORWELL	COMMENTS
BROWN BULLHEAD	<i>Ameiurus nebulosus</i>	DFWELE	
CHAIN PICKEREL	<i>Esox niger</i>	DFWELE	
REDFIN PICKEREL	<i>Esox americanus americanus</i>	DFWELE	
RAINBOW SMELT	<i>Osmerus mordax</i>		
COHO SALMON	<i>Oncorhynchus kisutch</i>		
BROOK TROUT (Brook Charr)	<i>Salvelinus fontinalis</i>	DFWELE	Stocked in Norris Reservation
BANDED KILLIFISH	<i>Fundulus diaphanus</i>		
MUMMICHOG	<i>Fundulus heteroclitus</i>		
ATLANTIC SILVERSIDE	<i>Menidia menidia</i>		
FOURSPINE STICKLEBACK	<i>Apeltes quadracus</i>	BD	Biodiversity Days
THREESPINE STICKLEBACK	<i>Gasterosteus aculeatus</i>		
BLACKSPOTTED STICKLEBACK	<i>Gasterosteus wheatlandi</i>		
NINESPINE STICKLEBACK	<i>Pungitius pungitius</i> Linnaeus		
NORTHERN PIPEFISH	<i>Syngnathus fuscus</i>		
WHITE PERCH	<i>Morone americana</i>		
BANDED SUNFISH	<i>Enneacanthus obesus</i>	DFWELE	Mid-reaches of Second Herring Brook
PUMPKINSEED	<i>Lepomis gibbosus</i>	DFWELE	
BLUEGILL	<i>Lepomis macrochirus</i>		
SMALLMOUTH BASS	<i>Micropterus dolomieu</i>		
LARGEMOUTH BASS	<i>Micropterus salmoides</i>	DFWELE	One record from Second Herring Brook (above RT 123)
BLACK CRAPPIE	<i>Pomoxis nigromaculatus</i>	DFWELE	Third Herring Brook- record from 1955 survey
THE PERCH FAMILY Percidae			
SWAMP DARTER	<i>Etheostoma fusiforme</i>		No records DFWLE survey
TESSELLATED DARTER	<i>Etheostoma olmstedii</i>		
YELLOW PERCH	<i>Perca flavescens</i>	DFWELE	Third Herring Brook-record from 1955 survey
CREVALLE JACK	<i>Caranx hippos</i>		
AMERICAN EEL	<i>Anguilla rostrata</i>	DFWELE	
Anadromous Fish			
BLUEBACK HERRING	<i>Alosa aestivalis</i>		
ALEWIFE	<i>Alosa pseudoharengus</i>		
AMERICAN SHAD	<i>Alosa sapidissima</i>	FS	

SOURCES: DFLELE-Confirmed by Steve Hurley, BD- Biodiversity Days, FS- Fred St. Ours

BREEDING BIRD ATLAS DATA Quad 115 Block 2 (Records 1 - 50)

SPECIES CODE	AOU #	COMMON NAME	FAMILY	ORDER	STATE LISTING	BREEDING STATUS
AMCR	4880	AMERICAN CROW	CORVIDAE	PASSERIFORMES		POSSIBLE BREEDING
AMGO	5290	AMERICAN GOLDFINCH	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
AMKE	3600	AMERICAN KESTREL	FALCONIDAE	FALCONIFORMES		PROBABLE BREEDING
AMRE	6870	AMERICAN REDSTART	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
AMRO	7610	AMERICAN ROBIN	TURDIDAE	PASSERIFORMES		CONFIRMED BREEDING
AMWO	2280	AMERICAN WOODCOCK	SCOLOPACIDAE	CHARADRIIFORMES		CONFIRMED BREEDING
BAOW	3680	BARRED OWL	STRIGIDAE	STRIGIFORMES		PROBABLE BREEDING
BASW	6130	BARN SWALLOW	HIRUNDINIDAE	PASSERIFORMES		CONFIRMED BREEDING
BAWW	6360	BLACK-AND-WHITE WARBLER	PARULIDAE	PASSERIFORMES		CONFIRMED BREEDING
BBCU	3880	BLACK-BILLED CUCKOO	CUCULIDAE	CUCULIFORMES		PROBABLE BREEDING
BCCH	7350	BLACK-CAPPED CHICKADEE	PARIDAE	PASSERIFORMES		CONFIRMED BREEDING
BHCO	4950	BROWN-HEADED COWBIRD	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
BLDU	1330	BLACK DUCK	ANATIDAE	ANSERIFORMES		CONFIRMED BREEDING
BLJA	4770	BLUE JAY	CORVIDAE	PASSERIFORMES		CONFIRMED BREEDING
BOBW	2890	BOBWHITE	PHASIANIDAE	GALLIFORMES		PROBABLE BREEDING
BRCR	7260	BROWN CREEPER	CERTHIIDAE	PASSERIFORMES		POSSIBLE BREEDING
BRTH	7050	BROWN THRASHER	MIMIDAE	PASSERIFORMES		POSSIBLE BREEDING
BWHA	3430	BROAD-WINGED HAWK	ACCIPITRIDAE	FALCONIFORMES		PROBABLE BREEDING
BWWA	6410	BLUE-WINGED WARBLER	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
CHSP	5600	CHIPPING SPARROW	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
CHSW	4230	CHIMNEY SWIFT	APODIDAE	APODIFORMES		CONFIRMED BREEDING
COFL	4120	COMMON FLICKER	PICIDAE	PICIFORMES		CONFIRMED BREEDING
COGR	5110	COMMON GRACKLE	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
COYE	6810	COMMON YELLOWTHROAT	PARULIDAE	PASSERIFORMES		CONFIRMED BREEDING

BREEDING BIRD ATLAS DATA 2

SPECIES CODE	AOU #	COMMON NAME	FAMILY	ORDER	STATE LISTING	BREEDING STATUS
CSWA	6590	CHESTNUT-SIDED WARBLER	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
DOWO	3940	DOWNY WOODPECKER	PICIDAE	PICIFORMES		CONFIRMED BREEDING
EAKI	4440	EASTERN KINGBIRD	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING
EAPH	4560	EASTERN PHOEBE	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING
EUST	4930	STARLING	STURNIDAE	PASSERIFORMES		CONFIRMED BREEDING
EWPE	4610	EASTERN WOOD PEWEE	TYRANNIDAE	PASSERIFORMES		PROBABLE BREEDING
GCFL	4520	GREAT CRESTED FLYCATCHER	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING
GHOW	3750	GREAT HORNED OWL	STRIGIDAE	STRIGIFORMES		PROBABLE BREEDING
GOSH	3340	GOSHAWK	ACCIPITRIDAE	FALCONIFORMES		CONFIRMED BREEDING
GRCA	7040	GRAY CATBIRD	MIMIDAE	PASSERIFORMES		CONFIRMED BREEDING
HAWO	3930	HAIRY WOODPECKER	PICIDAE	PICIFORMES		CONFIRMED BREEDING
HOFI	5190	HOUSE FINCH	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
HOSP	6882	HOUSE SPARROW	PLOCEIDAE	PASSERIFORMES		CONFIRMED BREEDING
HOWR	7210	HOUSE WREN	TROGLODYTIDAE	PASSERIFORMES		CONFIRMED BREEDING
INBU	5980	INDIGO BUNTING	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
LEFL	4670	LEAST FLYCATCHER	TYRANNIDAE	PASSERIFORMES		PROBABLE BREEDING
MALL	1320	MALLARD	ANATIDAE	ANSERIFORMES		CONFIRMED BREEDING
MOCK	7030	MOCKINGBIRD	MIMIDAE	PASSERIFORMES		CONFIRMED BREEDING
MODO	3160	MOURNING DOVE	COLUMBIDAE	COLUMBIFORMES		CONFIRMED BREEDING
NOCA	5930	CARDINAL	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
NOOR	5070	NORTHERN ORIOLE	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
OVEN	6740	OVENBIRD	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
PUIF	5170	PURPLE FINCH	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
RBGR	5950	ROSE-BREASTED GROSBEAK	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
REVI	6240	RED-EYED VIREO	VIREONIDAE	PASSERIFORMES		CONFIRMED BREEDING
RSHA	3390	RED-SHOULDERED HAWK	ACCIPITRIDAE	FALCONIFORMES		CONFIRMED BREEDING

BREEDING BIRD ATLAS DATA 3

SPECIES CODE	AOU #	COMMON NAME	FAMILY	ORDER	STATE LISTING	BREEDING STATUS
RSTO	5870	RUFOUS-SIDED TOWHEE	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
RTHA	3370	RED-TAILED HAWK	ACCIPITRIDAE	FALCONIFORMES		PROBABLE BREEDING
RTHU	4280	RUBY-THROATED HUMMINGBIRD	TROCHILIDAE	APODIFORMES		POSSIBLE BREEDING
RUGR	3000	RUFFED GROUSE	TETRAONIDAE	GALLIFORMES		CONFIRMED BREEDING
RWBB	4980	RED-WINGED BLACKBIRD	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
SCOW	3730	SCREECH OWL	STRIGIDAE	STRIGIFORMES		PROBABLE BREEDING
SCTA	6080	SCARLET TANAGER	THRAUPIDAE	PASSERIFORMES		PROBABLE BREEDING
SOSP	5810	SONG SPARROW	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
TRSW	6140	TREE SWALLOW	HIRUNDINIDAE	PASSERIFORMES		POSSIBLE BREEDING
VEER	7560	VEERY	TURDIDAE	PASSERIFORMES		PROBABLE BREEDING
WBNU	7270	WHITE-BREASTED NUTHATCH	SITTIDAE	PASSERIFORMES		CONFIRMED BREEDING
WODU	1440	WOOD DUCK	ANATIDAE	ANSERIFORMES		CONFIRMED BREEDING
WOTH	7550	WOOD THRUSH	TURDIDAE	PASSERIFORMES		PROBABLE BREEDING
YBCU	3870	YELLOW-BILLED CUCKOO	CUCULIDAE	CUCULIFORMES		POSSIBLE BREEDING
YEWA	6520	YELLOW WARBLER	PARULIDAE	PASSERIFORMES		CONFIRMED BREEDING
ACFL	4650	ACADIAN FLYCATCHER	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING
AMCR	4880	AMERICAN CROW	CORVIDAE	PASSERIFORMES		CONFIRMED BREEDING
AMGO	5290	AMERICAN GOLDFINCH	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
AMKE	3600	AMERICAN KESTREL	FALCONIDAE	FALCONIFORMES		CONFIRMED BREEDING
AMRE	6870	AMERICAN REDSTART	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
AMRO	7610	AMERICAN ROBIN	TURDIDAE	PASSERIFORMES		CONFIRMED BREEDING
AMWO	2280	AMERICAN WOODCOCK	SCOLOPACIDAE	CHARADRIIFORMES		CONFIRMED BREEDING
BARO	3650	BARN OWL	TYTONIDAE	STRIGIFORMES	SPECIAL CONCERN	CONFIRMED BREEDING
BASW	6130	BARN SWALLOW	HIRUNDINIDAE	PASSERIFORMES		CONFIRMED BREEDING

BREEDING BIRD ATLAS DATA 4

SPECIES CODE	AOU #	COMMON NAME	FAMILY	ORDER	STATE LISTING	BREEDING STATUS
BAWW	6360	BLACK-AND-WHITE WARBLER	PARULIDAE	PASSERIFORMES		CONFIRMED BREEDING
BBCU	3880	BLACK-BILLED CUCKOO	CUCULIDAE	CUCULIFORMES		PROBABLE BREEDING
BCCH	7350	BLACK-CAPPED CHICKADEE	PARIDAE	PASSERIFORMES		CONFIRMED BREEDING
BEKI	3900	BELTED KINGFISHER	ALCEDINIDAE	CORACIIFORMES		CONFIRMED BREEDING
BHCO	4950	BROWN-HEADED COWBIRD	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
BKSW	6160	BANK SWALLOW	HIRUNDINIDAE	PASSERIFORMES		POSSIBLE BREEDING
BLDU	1330	BLACK DUCK	ANATIDAE	ANSERIFORMES		POSSIBLE BREEDING
BLJA	4770	BLUE JAY	CORVIDAE	PASSERIFORMES		CONFIRMED BREEDING
BOBW	2890	BOBWHITE	PHASIANIDAE	GALLIFORMES		CONFIRMED BREEDING
BRTH	7050	BROWN THRASHER	MIMIDAE	PASSERIFORMES		CONFIRMED BREEDING
BTGW	6670	BLACK-THROATED GREEN WARBLER	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
BWHA	3430	BROAD-WINGED HAWK	ACCIPITRIDAE	FALCONIFORMES		CONFIRMED BREEDING
BWWA	6410	BLUE-WINGED WARBLER	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
CAWA	6860	CANADA WARBLER	PARULIDAE	PASSERIFORMES		CONFIRMED BREEDING
CAWR	7180	CAROLINA WREN	TROGLODYTIDAE	PASSERIFORMES		PROBABLE BREEDING
CEWX	6190	CEDAR WAXWING	BOMBYCILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
CHSP	5600	CHIPPING SPARROW	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
CHSW	4230	CHIMNEY SWIFT	APODIDAE	APODIFORMES		CONFIRMED BREEDING
COFL	4120	COMMON FLICKER	PICIADAE	PICIFORMES		CONFIRMED BREEDING
COGR	5110	COMMON GRACKLE	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
COYE	6810	COMMON YELLOWTHROAT	PARULIDAE	PASSERIFORMES		CONFIRMED BREEDING
CSWA	6590	CHESTNUT-SIDED WARBLER	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
DOWO	3940	DOWNY WOODPECKER	PICIADAE	PICIFORMES		CONFIRMED BREEDING
EABL	7660	EASTERN BLUEBIRD	TURDIDAE	PASSERIFORMES		CONFIRMED BREEDING
EAKI	4440	EASTERN KINGBIRD	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING
EAME	5010	EASTERN MEADOWLARK	ICTERIDAE	PASSERIFORMES		POSSIBLE BREEDING
EAPH	4560	EASTERN PHOEBE	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING

BREEDING BIRD ATLAS DATA 5

SPECIES CODE	AOU #	COMMON NAME	FAMILY	ORDER	STATE LISTING	BREEDING STATUS
EUST	4930	STARLING	STURNIDAE	PASSERIFORMES		CONFIRMED BREEDING
EWPE	4610	EASTERN WOOD PEWEE	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING
FISP	5630	FIELD SPARROW	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
GCFL	4520	GREAT CRESTED FLYCATCHER	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING
GHOW	3750	GREAT HORNED OWL	STRIGIDAE	STRIGIFORMES		CONFIRMED BREEDING
GRCA	7040	GRAY CATBIRD	MIMIDAE	PASSERIFORMES		CONFIRMED BREEDING
GRHE	2010	GREEN HERON	ARDEIDAE	CICONIIFORMES		CONFIRMED BREEDING
HAWO	3930	HAIRY WOODPECKER	PICTADAE	PICIFORMES		CONFIRMED BREEDING
HOFI	5190	HOUSE FINCH	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
HOSP	6882	HOUSE SPARROW	PLOCEIDAE	PASSERIFORMES		CONFIRMED BREEDING
HOWR	7210	HOUSE WREN	TROGLODYTIDAE	PASSERIFORMES		CONFIRMED BREEDING
INBU	5980	INDIGO BUNTING	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
KILL	2730	KILLDEER	CHARADRIIDAE	CHARADRIIFORMES		CONFIRMED BREEDING
MALL	1320	MALLARD	ANATIDAE	ANSERIFORMES		CONFIRMED BREEDING
MOCK	7030	MOCKINGBIRD	MIMIDAE	PASSERIFORMES		CONFIRMED BREEDING
MODO	3160	MOURNING DOVE	COLUMBIDAE	COLUMBIFORMES		CONFIRMED BREEDING
NOCA	5930	CARDINAL	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
NOOR	5070	NORTHERN ORIOLE	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
NSWO	3720	SAW-WHET OWL	STRIGIDAE	STRIGIFORMES		CONFIRMED BREEDING
OROR	5060	ORCHARD ORIOLE	ICTERIDAE	PASSERIFORMES		PROBABLE BREEDING
OVEN	6740	OVENBIRD	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
PRWA	6730	PRAIRIE WARBLER	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
PUFI	5170	PURPLE FINCH	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
RBGR	5950	ROSE-BREASTED GROSBEAK	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
RBNU	7280	RED-BREASTED NUTHATCH	SITTIDAE	PASSERIFORMES		PROBABLE BREEDING
REVI	6240	RED-EYED VIREO	VIREONIDAE	PASSERIFORMES		CONFIRMED BREEDING
RODO	3131	ROCK DOVE	COLUMBIDAE	COLUMBIFORMES		POSSIBLE BREEDING

BREEDING BIRD ATLAS DATA 6

SPECIES CODE	AOU #	COMMON NAME	FAMILY	ORDER	STATE LISTING	BREEDING STATUS
RSHA	3390	RED-SHOULDERED HAWK	ACCIPITRIDAE	FALCONIFORMES		POSSIBLE BREEDING
RSTO	5870	RUFIOUS-SIDED TOWHEE	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
RTHA	3370	RED-TAILED HAWK	ACCIPITRIDAE	FALCONIFORMES		CONFIRMED BREEDING
RTHU	4280	RUBY-THROATED HUMMINGBIRD	TROCHILIDAE	APODIFORMES		CONFIRMED BREEDING
RUGR	3000	RUFFED GROUSE	TETRAONIDAE	GALLIFORMES		CONFIRMED BREEDING
RWBB	4980	RED-WINGED BLACKBIRD	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
RWSW	6170	ROUGH-WINGED SWALLOW	HIRUNDINIDAE	PASSERIFORMES		CONFIRMED BREEDING
SCOW	3730	SCREECH OWL	STRIGIDAE	STRIGIFORMES		CONFIRMED BREEDING
SCTA	6080	SCARLET TANAGER	THRAUPIDAE	PASSERIFORMES		CONFIRMED BREEDING
SOSP	5810	SONG SPARROW	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
SPSA	2630	SPOTTED SANDPIPER	SCOLOPACIDAE	CHARADRIIFORMES		POSSIBLE BREEDING
SWSP	5840	SWAMP SPARROW	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
TRSW	6140	TREE SWALLOW	HIRUNDINIDAE	PASSERIFORMES		CONFIRMED BREEDING
TUTI	7310	TUFTED TITMOUSE	PARIDAE	PASSERIFORMES		CONFIRMED BREEDING
VEER	7560	VEERY	TURDIDAE	PASSERIFORMES		CONFIRMED BREEDING
WBNU	7270	WHITE-BREASTED NUTHATCH	SITTIDAE	PASSERIFORMES		CONFIRMED BREEDING
WIWR	7220	WINTER WREN	TROGLODYTIDAE	PASSERIFORMES		PROBABLE BREEDING
WODU	1440	WOOD DUCK	ANATIDAE	ANSERIFORMES		CONFIRMED BREEDING
WOTH	7550	WOOD THRUSH	TURDIDAE	PASSERIFORMES		CONFIRMED BREEDING
WTSP	5580	WHITE-THROATED SPARROW	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
YBCU	3870	YELLOW-BILLED CUCKOO	CUCULIDAE	CUCULIFORMES		CONFIRMED BREEDING
YEWA	6520	YELLOW WARBLER	PARULIDAE	PASSERIFORMES		CONFIRMED BREEDING
AMCR	4880	AMERICAN CROW	CORVIDAE	PASSERIFORMES		POSSIBLE BREEDING
AMGO	5290	AMERICAN GOLDFINCH	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
AMKE	3600	AMERICAN KESTREL	FALCONIDAE	FALCONIFORMES		CONFIRMED BREEDING
AMRO	7610	AMERICAN ROBIN	TURDIDAE	PASSERIFORMES		CONFIRMED BREEDING
AMWO	2280	AMERICAN WOODCOCK	SCOLOPACIDAE	CHARADRIIFORMES		PROBABLE BREEDING

BREEDING BIRD ATLAS DATA 7

SPECIES CODE	AOU #	COMMON NAME	FAMILY	ORDER	STATE LISTING	BREEDING STATUS
BASW	6130	BARN SWALLOW	HIRUNDINIDAE	PASSERIFORMES		CONFIRMED BREEDING
BAWW	6360	BLACK-AND-WHITE WARBLER	PARULIDAE	PASSERIFORMES		POSSIBLE BREEDING
BCCH	7350	BLACK-CAPPED CHICKADEE	PARIDAE	PASSERIFORMES		CONFIRMED BREEDING
BEKI	3900	BELTED KINGFISHER	ALCEDINIDAE	CORACIIFORMES		POSSIBLE BREEDING
BGGN	7510	BLUE-GRAY GNATCATCHER	SYLVIIDAE	PASSERIFORMES		CONFIRMED BREEDING
BHCO	4950	BROWN-HEADED COWBIRD	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
BLDU	1330	BLACK DUCK	ANATIDAE	ANSERIFORMES		POSSIBLE BREEDING
BLJA	4770	BLUE JAY	CORVIDAE	PASSERIFORMES		CONFIRMED BREEDING
BOBW	2890	BOBWHITE	PHASIANIDAE	GALLIFORMES		PROBABLE BREEDING
BRCR	7260	BROWN CREEPER	CERTHIIDAE	PASSERIFORMES		PROBABLE BREEDING
BRTH	7050	BROWN THRASHER	MIMIDAE	PASSERIFORMES		POSSIBLE BREEDING
BWHA	3430	BROAD-WINGED HAWK	ACCIPITRIDAE	FALCONIFORMES		POSSIBLE BREEDING
CEWX	6190	CEDAR WAXWING	BOMBYCILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
CHSP	5600	CHIPPING SPARROW	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
CHSW	4230	CHIMNEY SWIFT	APODIDAE	APODIFORMES		CONFIRMED BREEDING
COFL	4120	COMMON FLICKER	PICIADAE	PICIFORMES		POSSIBLE BREEDING
COGR	5110	COMMON GRACKLE	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
COYE	6810	COMMON YELLOWTHROAT	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
DOWO	3940	DOWNY WOODPECKER	PICIADAE	PICIFORMES		CONFIRMED BREEDING
EAKI	4440	EASTERN KINGBIRD	TYRANNIDAE	PASSERIFORMES		POSSIBLE BREEDING
EAPH	4560	EASTERN PHOEBE	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING
EUST	4930	STARLING	STURNIDAE	PASSERIFORMES		CONFIRMED BREEDING
EWPE	4610	EASTERN WOOD PEWEE	TYRANNIDAE	PASSERIFORMES		POSSIBLE BREEDING
GCFL	4520	GREAT CRESTED FLYCATCHER	TYRANNIDAE	PASSERIFORMES		POSSIBLE BREEDING
GHOW	3750	GREAT HORNED OWL	STRIGIDAE	STRIGIFORMES		PROBABLE BREEDING
GOSH	3340	GOSHAWK	ACCIPITRIDAE	FALCONIFORMES		CONFIRMED BREEDING
GRCA	7040	GRAY CATBIRD	MIMIDAE	PASSERIFORMES		CONFIRMED BREEDING

BREEDING BIRD ATLAS DATA 8

SPECIES CODE	AOU #	COMMON NAME	FAMILY	ORDER	STATE LISTING	BREEDING STATUS
GRHE	2010	GREEN HERON	ARDEIDAE	CICONIIFORMES		POSSIBLE BREEDING
HAWO	3930	HAIRY WOODPECKER	PICTADAE	PICIFORMES		POSSIBLE BREEDING
HOFI	5190	HOUSE FINCH	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
HOSP	6882	HOUSE SPARROW	PLOCEIDAE	PASSERIFORMES		CONFIRMED BREEDING
HOWR	7210	HOUSE WREN	TROGLODYTIDAE	PASSERIFORMES		CONFIRMED BREEDING
MALL	1320	MALLARD	ANATIDAE	ANSERIFORMES		POSSIBLE BREEDING
MAWR	7250	MARSH WREN	TROGLODYTIDAE	PASSERIFORMES		CONFIRMED BREEDING
MOCK	7030	MOCKINGBIRD	MIMIDAE	PASSERIFORMES		CONFIRMED BREEDING
MODO	3160	MOURNING DOVE	COLUMBIDAE	COLUMBIFORMES		CONFIRMED BREEDING
NOCA	5930	CARDINAL	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
NOOR	5070	NORTHERN ORIOLE	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
OVEN	6740	OVENBIRD	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
PUFI	5170	PURPLE FINCH	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
REVI	6240	RED-EYED VIREO	VIREONIDAE	PASSERIFORMES		PROBABLE BREEDING
RNPH	3090	RING-NECKED PHEASANT	PHASIANIDAE	GALLIFORMES		POSSIBLE BREEDING
RODO	3131	ROCK DOVE	COLUMBIDAE	COLUMBIFORMES		CONFIRMED BREEDING
RSHA	3390	RED-SHOULDERED HAWK	ACCIPITRIDAE	FALCONIFORMES		PROBABLE BREEDING
RSTO	5870	RUFOUS-SIDED TOWHEE	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
AMCR	4880	AMERICAN CROW	CORVIDAE	PASSERIFORMES		CONFIRMED BREEDING
AMGO	5290	AMERICAN GOLDFINCH	FRINGILLIDAE	PASSERIFORMES		POSSIBLE BREEDING
AMKE	3600	AMERICAN KESTREL	FALCONIDAE	FALCONIFORMES		CONFIRMED BREEDING
AMRO	7610	AMERICAN ROBIN	TURDIDAE	PASSERIFORMES		CONFIRMED BREEDING
AMWO	2280	AMERICAN WOODCOCK	SCOLOPACIDAE	CHARADRIIFORMES		CONFIRMED BREEDING
BASW	6130	BARN SWALLOW	HIRUNDINIDAE	PASSERIFORMES		CONFIRMED BREEDING
BAWW	6360	BLACK-AND-WHITE WARBLER	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
BBCU	3880	BLACK-BILLED CUCKOO	CUCULIDAE	CUCULIFORMES		PROBABLE BREEDING
BCCH	7350	BLACK-CAPPED CHICKADEE	PARIDAE	PASSERIFORMES		CONFIRMED BREEDING

BREEDING BIRD ATLAS DATA 9

SPECIES CODE	AOU #	COMMON NAME	FAMILY	ORDER	STATE LISTING	BREEDING STATUS
BEKI	3900	BELTED KINGFISHER	ALCEDINIDAE	CORACIIFORMES		CONFIRMED BREEDING
BHCO	4950	BROWN-HEADED COWBIRD	ICTERIDAE	PASSERIFORMES		POSSIBLE BREEDING
BLDU	1330	BLACK DUCK	ANATIDAE	ANSERIFORMES		POSSIBLE BREEDING
BLJA	4770	BLUE JAY	CORVIDAE	PASSERIFORMES		CONFIRMED BREEDING
BOBW	2890	BOBWHITE	PHASIANIDAE	GALLIFORMES		PROBABLE BREEDING
BRTH	7050	BROWN THRASHER	MIMIDAE	PASSERIFORMES		CONFIRMED BREEDING
BWHA	3430	BROAD-WINGED HAWK	ACCIPITRIDAE	FALCONIFORMES		PROBABLE BREEDING
CEWX	6190	CEDAR WAXWING	BOMBYCILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
CHSP	5600	CHIPPING SPARROW	FRINGILLIDAE	PASSERIFORMES		PROBABLE BREEDING
CHSW	4230	CHIMNEY SWIFT	APODIDAE	APODIFORMES		POSSIBLE BREEDING
COFL	4120	COMMON FLICKER	PICIADAE	PICIFORMES		CONFIRMED BREEDING
COGR	5110	COMMON GRACKLE	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
COYE	6810	COMMON YELLOWTHROAT	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
DOWO	3940	DOWNY WOODPECKER	PICIADAE	PICIFORMES		CONFIRMED BREEDING
EAKI	4440	EASTERN KINGBIRD	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING
EAME	5010	EASTERN MEADOWLARK	ICTERIDAE	PASSERIFORMES		PROBABLE BREEDING
EAPH	4560	EASTERN PHOEBE	TYRANNIDAE	PASSERIFORMES		CONFIRMED BREEDING
EUST	4930	STARLING	STURNIDAE	PASSERIFORMES		CONFIRMED BREEDING
FICR	4900	FISH CROW	CORVIDAE	PASSERIFORMES		POSSIBLE BREEDING
FISP	5630	FIELD SPARROW	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
GCFL	4520	GREAT CRESTED FLYCATCHER	TYRANNIDAE	PASSERIFORMES		PROBABLE BREEDING
GHOW	3750	GREAT HORNED OWL	STRIGIDAE	STRIGIFORMES		POSSIBLE BREEDING
GRCA	7040	GRAY CATBIRD	MIMIDAE	PASSERIFORMES		CONFIRMED BREEDING
GRHE	2010	GREEN HERON	ARDEIDAE	CICONIIFORMES		PROBABLE BREEDING
HAWO	3930	HAIRY WOODPECKER	PICIADAE	PICIFORMES		CONFIRMED BREEDING
HOSP	6882	HOUSE SPARROW	PLOCEIDAE	PASSERIFORMES		CONFIRMED BREEDING
HOWR	7210	HOUSE WREN	TROGLODYTIDAE	PASSERIFORMES		CONFIRMED BREEDING

BREEDING BIRD ATLAS DATA 10

SPECIES CODE	AOU #	COMMON NAME	FAMILY	ORDER	STATE LISTING	BREEDING STATUS
KILL	2730	KILLDEER	CHARADRIIDAE	CHARADRIIFORMES		PROBABLE BREEDING
MALL	1320	MALLARD	ANATIDAE	ANSERIFORMES		CONFIRMED BREEDING
MOCK	7030	MOCKINGBIRD	MIMIDAE	PASSERIFORMES		CONFIRMED BREEDING
MODO	3160	MOURNING DOVE	COLUMBIDAE	COLUMBIFORMES		CONFIRMED BREEDING
NAWA	6450	NASHVILLE WARBLER	PARULIDAE	PASSERIFORMES		POSSIBLE BREEDING
NOCA	5930	CARDINAL	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
NOOR	5070	NORTHERN ORIOLE	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
OROR	5060	ORCHARD ORIOLE	ICTERIDAE	PASSERIFORMES		POSSIBLE BREEDING
OVEN	6740	OVENBIRD	PARULIDAE	PASSERIFORMES		PROBABLE BREEDING
PUFI	5170	PURPLE FINCH	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
RBGR	5950	ROSE-BREASTED GROSBEAK	FRINGILLIDAE	PASSERIFORMES		POSSIBLE BREEDING
REVI	6240	RED-EYED VIREO	VIREONIDAE	PASSERIFORMES		POSSIBLE BREEDING
RODO	3131	ROCK DOVE	COLUMBIDAE	COLUMBIFORMES		CONFIRMED BREEDING
RSHA	3390	RED-SHOULDERED HAWK	ACCIPITRIDAE	FALCONIFORMES		CONFIRMED BREEDING
RTHA	3370	RED-TAILED HAWK	ACCIPITRIDAE	FALCONIFORMES		CONFIRMED BREEDING
RUGR	3000	RUFFED GROUSE	TETRAONIDAE	GALLIFORMES		POSSIBLE BREEDING
RWBB	4980	RED-WINGED BLACKBIRD	ICTERIDAE	PASSERIFORMES		CONFIRMED BREEDING
SCOW	3730	SCREECH OWL	STRIGIDAE	STRIGIFORMES		PROBABLE BREEDING
SOSP	5810	SONG SPARROW	FRINGILLIDAE	PASSERIFORMES		CONFIRMED BREEDING
TUTI	7310	TUFTED TITMOUSE	PARIDAE	PASSERIFORMES		CONFIRMED BREEDING
VEER	7560	VEERY	TURDIDAE	PASSERIFORMES		PROBABLE BREEDING
WBNU	7270	WHITE-BREASTED NUTHATCH	SITTIDAE	PASSERIFORMES		CONFIRMED BREEDING
WHIP	4170	WHIP-POOR-WILL	CAPRIMULGIDAE	CAPRIMULGIFORMES		PROBABLE BREEDING
WOTH	7550	WOOD THRUSH	TURDIDAE	PASSERIFORMES		PROBABLE BREEDING
YBCU	3870	YELLOW-BILLED CUCKOO	CUCULIDAE	CUCULIFORMES		PROBABLE BREEDING
YEWA	6520	YELLOW WARBLER	PARULIDAE	PASSERIFORMES		POSSIBLE BREEDING

South Shore Natural Science Center Biodiversity List
2000-2003

Species Latin Name	Species Common Name	SSNSC Woodland	SSNSC Meadow	SSNSC Wetland	Jacobs Pond	Black Pond	Status
Wildflowers							
<i>Anemone quinquefolia</i>	Anemone - Wood, Wind-flower	x					
<i>Peltandra virginica</i>	Arrow Arum, Tuckahoe					x	
<i>Sagittaria latifolia</i>	Arrowhead - Common White					x	
<i>Aster novae-angliae</i>	Aster - New England		x				
<i>Galium</i>	Bedstraw		x				
<i>Epifagus virginiana</i>	Beech-drops	x				x	
<i>Bidens sp.</i>	Beggar-Ticks		x				
<i>Uvularia perfoliata</i>	Bellwort	x				x	
<i>Uvularia sessilifolia</i>	Bellwort - Sessile, Wild Oats, Little Merrybells	x					
<i>Convolvulus sepium</i>	Bindweed		x			x	
<i>Celastrus orbiculatus</i>	Bittersweet - Oriental		x			x	
<i>Rubus flagellaris</i>	Blackberry - Creeping Dewberry		x			x	
<i>Rudbeckia hirta</i>	Black-eyed Susan, Yellow Daisy		x				
<i>Sisyrinchium</i>	Blue-eyed Grass						
<i>Cornus canadensis</i>	Bunchberry, Dwarf Cornel	x				x	
<i>Arctium minus</i>	Burdock - Common		x				
<i>Linaria vulgaris</i>	Butter-and-Eggs, Common Toadflax		x				
<i>Ranunculus</i>	Buttercup		x			x	
<i>Silene cucubalus</i>	Campion - Bladder		x				
<i>Malanthemum canadense</i>	Canada Mayflower, False Lily-of-the-valley	x				x	
<i>Typha Latifolia</i>	Cat Tails - Broad-leaved, Common				x		
<i>Chelidonium majus</i>	Celandine, Swallow-wort		x			x	
<i>Cerastium vulgatum</i>	Chickweed - Mouse Ear		x			x	
<i>Potentilla canadensis</i>	Cinquefoil - Canadian Dwarf, Running Five-fingers		x			x	
<i>Potentilla simplex</i>	Cinquefoil - Common					x	
<i>Clintonia borealis</i>	Clintonia - Yellow, Bluebeard	x					
<i>Trifolium aureum</i>	Clover - Palmate Hop, Yellow Hop		x				
<i>Trifolium pratense</i>	Clover - Red		x			x	
<i>Trifolium repens</i>	Clover - White					x	
<i>Melilotus alba</i>	Clover - White Sweet		x				
<i>Melampyrum lineare</i>	Cowheat						
<i>Vaccinium macrocarpon</i>	Cranberry - Large, American			x		x	
<i>Vaccinium oxycoccus</i>	Cranberry - Tiny Leaf					x	
<i>Euphorbia cyparissias</i>	Cypress-spurge						
<i>Leucanthemum vulgare</i>	Daisy - Oxeye		x			x	
<i>Taraxacum officinale</i>	Dandelion		x			x	
<i>Hemerocallis fulva</i>	Daylily - Orange		x				

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<i>Dianthus amurens</i>	Deptford Pink		x				
<i>Rubus hispidus</i>	Dewberry - Prickly, Bristly, Running, Swamp		x	x			
<i>Rumex crispus</i>	Dock - Curly, Sour		x			x	
<i>Lemna minor</i>	Duckweed - Lesser				x	x	
<i>Dicentra cucullaria</i>	Dutchman's Breeches	x	x				
<i>Sambucus canadensis</i>	Elderberry - Black, Common		x	x			
	Fanwort				x		
<i>Leucothoe racemosa</i>	Fetterbush				x		
Linaceae	Flax						
<i>Nymphoides cordata</i>	Floating Heart				x		
<i>Tiarella cordifolia</i>	Foamflower, False Miterwort	x					
Galax	Galax	x					
<i>Allium canadense</i>	Garlic - Wild, Wild Onion		x				
<i>Coptis trifolia</i>	Gold Thread	x				x	
<i>Solidago sp</i>	Goldenrod		x		x		
<i>Vitis labrusca</i>	Grape - Fox					x	
<i>Smilax rotundifolia</i>	Greenbrier - Common, Catbrier, Bullbrier	x				x	
<i>Glechoma hederacea</i>	Ground Ivy, Gill-over-the-ground		x				
<i>Hieracium canadense</i>	Hawkweed - Canada, Toothed		x				
<i>Hieracium pilosella</i>	Hawkweed - Mouse Ear		x				
<i>Hieracium pratense</i>	Hawkweed - Yellow, King Devil		x			x	
<i>Conyza canadensis</i>	Horseweed, Hogweed, Butterweed						
<i>Medeola virginiana</i>	Indian Cucumber Root	x				x	
<i>Monotropa uniflora</i>	Indian Pipe	x				x	
<i>Iris versicolor</i>	Iris - Northern Blue Flag, Wild, Poison-flag			x		x	
<i>Arisaema triphyllum</i>	Jack in the Pulpit - Woodland	x		x			
<i>Polygonum cuspidatum</i>	Knotweed - Japanese, Japanese Bamboo						
<i>Cynopodium acaule</i>	Lady's Slipper - Pink, Moccasin Flower	x					
<i>Chaemaedaphne calycul</i>	Leatherleaf	x			x	x	
<i>Lilium philadelphicum</i>	Lily - Wood						
<i>Convallaria majalis</i>	Lily-of-the-valley						
<i>Lythrum salicaria</i>	Loosestrife - Purple, Spiked				x		
<i>Decodon verticillatus</i>	Loosestrife - Swamp, Water Willow				x	x	
<i>Lysimachia quadrifolia</i>	Loosestrife - Whorled	x	x				
<i>Podophyllum peltatum</i>	Mayapple, Mandrake	x					
<i>Epigaea repens</i>	Mayflower, Trailing Arbutus	x					
<i>Asclepias syriaca</i>	Milkweed		x				
<i>Calystegia sepium</i>	Morning-glory - Wild		x				
<i>Leonurus cardiaca</i>	Motherwort		x				
<i>Kalmia latifolia</i>	Mountain-laurel	x					

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<i>Morus alba</i>	Mulberry - White			x			
<i>Verbascum thapsus</i>	Mullein - Common		x				
<i>Alliaria officinalis</i>	Mustard - Garlic		x				
<i>Urtica dioica</i>	Nettle - Stinging					x	
<i>Elaeagnus umbellata</i>	Oleaster - Autumn-olive		x				
<i>Leucanthemum vulgare</i>	Oxeye-daisy, Marguerite		x				
<i>Mitchella repens</i>	Partridgeberry	x			x		
<i>Lepidium</i>	Pepperweed		x				
<i>Phlox subulata</i>	Phlox - Moss, Mountain, Pink						
<i>Monotropa hypopitys</i>	Pinesap, False Beech-drops	x					
<i>Chimaphila umbellata</i>	Pipsissewa - Prince's Pine	x					
<i>Chimaphila maculata</i>	Pipsissewa - Striped, Spotted Wintergreen	x					
<i>Sarracenia purpurea</i>	Pitcher Plant					x	
<i>Goodyera</i>	Plantain - Rattlesnake	x				x	
<i>Plantago</i>	Plantain - Common		x			x	
<i>Pogonia ophioglossoides</i>	Pogonia - Rose, Snakemouth					x	
<i>Rhus radicans</i>	Poison Ivy	x	x			x	
<i>Phytolacca americana</i>	Pokeweed, pokeberry, Poke		x				
<i>Potamogeton</i>	Pondweeds				x		
<i>Pyrola americana</i>	Pyrola	x				x	
<i>Daucus carota</i>	Queen Anne's Lace		x				
<i>Rosa multiflora</i>	Rose - Multiflora	x	x			x	
<i>Aralia nudicanulis</i>	Sarsaparilla - Wild	x				x	
<i>Carex stricta</i>	Sedge - Tussock					x	
<i>Capsella bursa-pastoris</i>	Shepherd's Purse		x				
<i>Symphlocarpus foetidus</i>	Skunk Cabbage			x		x	
<i>Smilacina racemosa</i>	Solomon's Seal - False					x	
<i>Polygonatum biflorum</i>	Solomon's Seal - Giant, Smooth	x	x			x	
<i>Oxalis europaea</i>	Sorrel - Yellow Wood					x	
<i>Sonchus</i>	Sow Thistle		x				
<i>Hypericum perforatum</i>	St. John's-Words		x				
<i>Trientalis borealis</i>	Starflower	x				x	
<i>Hypoxis hirsuta</i>	Star-grass - Yellow				x		
<i>Spiraea tomentosa</i>	Steeplebush					x	
<i>Fragaria virginiana</i>	Strawberry - Wild	x				x	
<i>Drosera rotundifolia</i>	Sundew - Round-leaved					x	
<i>Acorus americanus</i>	Sweet Flag						
<i>Cirsium arvense</i>	Thistle - Canada		x				
	Timothy		x				
<i>Nuttallanthus canadensis</i>	Toadflax - Blue, Old Field		x			x	

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<i>Impatiens capensis</i>	Touch-me-not - Spotted, Orange Jewelweed		x	x		x	
<i>Vicia sp.</i>	Vetch					x	
<i>Viola cucullata</i>	Violet - Blue Marsh				x		
<i>Viola lanceolata</i>	Violet - Lance-leaf						
<i>Viola blanda</i>	Violet - Sweet White						
<i>Echium vulgare</i>	Viper's Bugloss, Blue Devil, Blue Weed		x				
<i>Parthenocissus quinquefoil</i>	Virginia Creeper, Woodbine	x	x				
<i>Nymphaea odorata</i>	Water-lily - White, Fragrant				x		
<i>Nuphar variegatum</i>	Water-lily - Yellow Pond, Bullhead-lily				x	x	
<i>Nymphaeaceae</i>	Water-lily				x		
<i>Alismataceae</i>	Water-plantain				x		
<i>Brasenia schreberi</i>	Water-shield				x		
<i>Gaultheria procumbens</i>	Wintergreen, Checkerberry, Teaberry	x				x	
<i>Ambrosia artemisiifolia</i>	Yarrow - Ragweed		x				
<i>Ageratina altissima</i>	Yarrow - White		x				
Trees/Shrubs							
<i>Alnus rugosa</i>	Alder - Speckled	x			x		
<i>Viburnum recognitum</i>	Arrowwood - Northern, Smooth	x	x		x		
<i>Fraxinus pennsylvanica</i>	Ash - Green	x	x		x		
<i>Rhododendron viscosum</i>	Azalea - Swamp, Swamp Honeysuckle			x	x	x	
<i>Berberis thunbergii</i>	Barberry - Japanese	x					
<i>Myrica pensylvanica</i>	Bayberry, Wax-myrtle, Candleberry		x			x	
<i>Fagus grandifolia</i>	Beech - American	x			x	x	
<i>Betula lenta</i>	Birch - Black, Sweet	x				x	
<i>Betula populifolia</i>	Birch - Gray	x	x	x	x	x	
<i>Betula alleghaniensis</i>	Birch - Yellow					x	
<i>Vaccinium corymbosum</i>	Blueberry - Highbush	x	x			x	
<i>Vaccinium angustifolium</i>	Blueberry - Lowbush		x			x	
<i>Rhamnus cathartica</i>	Buckthorn - Common, European		x		x		
<i>Rhamnus frangula</i>	Buckthorn - Glossy, Alder, Smooth Alder				x		
<i>Chamaecyparis thyoides</i>	Cedar - Atlantic White	x	x		x	x	
<i>Juniperus virginiana</i>	Cedar - Eastern Red	x	x		x	x	
<i>Thuja occidentalis</i>	Cedar - Northern/Eastern White, Eastern Arborvitae	x	x	x	x	x	
<i>Pinus serotina</i>	Cherry - Black, Wild Rum	x	x		x	x	
<i>Castanea dentata</i>	Chestnut - American		x				
<i>Aronia melanocarpa</i>	Chokeberry - Black		x				
<i>Cornus alternifolia</i>	Dogwood - Alternate-leaf, Pagoda	x	x		x		
<i>Cornus florida</i>	Dogwood - Flowering	x	x				
<i>Cornus amomum</i>	Dogwood - Silky	x	x			x	

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<i>Crataegus</i>	Hawthorn		x				
<i>Tsuga canadensis</i>	Hemlock - Eastern	x	x			x	
<i>Ilex opaca</i>	Holly - American	x	x		x	x	
<i>Rhododendron viscosum</i>	Honeysuckle - Swamp			x	x		
<i>Gaylussacia</i>	Huckleberry			x		x	
<i>Ilex glabra</i>	Inkberry						
<i>Kalmia latifolia</i>	Laurel - Bog, Pale					x	
<i>Kalmia latifolia</i>	Laurel - Mountain	x	x	x	x		
<i>Kalmia angustifolia</i>	Laurel - Sheep, Lambkill	x				x	
<i>Syringa vulgaris</i>	Lilac - Common		x				
<i>Magnolia accuminata?</i>	Magnolia - Cucumber	x					
<i>Magnolia virginiana</i>	Magnolia - Sweet Bay	x					
<i>Acer rubrum</i>	Maple - Red	x		x	x	x	
<i>Acer saccharinum</i>	Maple - Silver					x	
<i>Acer saccharum</i>	Maple - Sugar		x				
<i>Quercus velutina</i>	Oak - Black	x					
<i>Quercus rubra</i>	Oak - Northern Red	x			x	x	
<i>Quercus palustris</i>	Oak - Pin	x	x				
<i>Quercus coccinea</i>	Oak - Scarlet	x	x				
<i>Quercus bicolor</i>	Oak - Swamp White			x			
<i>Quercus alba</i>	Oak - White	x		x	x	x	
<i>Pinus strobus</i>	Pine - Eastern White	x	x				
<i>Pinus rigida</i>	Pine - Pitch	x	x		x		
<i>Pinus resinosa</i>	Pine - Red	x			x		
<i>Rhododendron canadense</i>	Rhodora					x	
<i>Sassafras albidum</i>	Sassafras	x	x			x	
<i>Amelanchier canadensis</i>	Shadbush - Thicket, Juneberry, Eastern Serviceberry		x				
<i>Carya ovata</i>	Shagbark-hickory	x					
<i>Spiraea tomentosa</i>	Steeplebush		x	x		x	
<i>Rhus vernix</i>	Sumac - Poison					x	
<i>Rhus glabra</i>	Sumac - Smooth		x				
<i>Rhus typhina</i>	Sumac - Staghorn		x				
<i>Comptonia peregrina</i>	Sweet Fern		x			x	
<i>Myrica gale</i>	Sweet Gale				x		
<i>Clethra alnifolia</i>	Sweet Pepperbush		x	x	x	x	
<i>Liriodendron tulipifera</i>	Tulip Tree, Yellow Poplar		x				
<i>Nyssa sylvatica</i>	Tupelo, Black Gum, Sour Gum	x		x		x	
<i>Viburnum recognitum</i>	Viburnum - Arrowwood	x		x		x	
<i>Viburnum acerifolium</i>	Viburnum - Maple-leaf, Dockmackie	x			x		
<i>Ilex verticillata</i>	Winterberry, Black Alder			x		x	

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<i>Hamamelis virginiana</i>	Witch Hazel	x				x	
Club Mosses							
<i>Lycopodium complanatum</i>	Creeping Jenny, Ground Cedar	x			x		
<i>Lycopodium obscurum</i>	Princess Pine, Tree Clubmoss, Ground-pine	x			x	x	
<i>Lycopodium clavatum</i>	Staghorn Clubmoss					x	
Mosses							
<i>Dicranum</i> sp.	Broom	x				x	
<i>Ceratodon purpureus</i>	Burned-ground, Roof-top	x					
<i>Funaria hygrometrica</i>	Cord				x		
<i>Hypnum</i> sp.	Feather	x					
<i>Thuidium</i> sp.	Fern	x			x		
<i>Polypodium commune</i>	Haircap	x	x			x	
<i>Sphagnum</i>	Sphagnum, Peat			x	x	x	
<i>Mnium</i>	Star	x			x	x	
<i>Leucobryum glaucum</i>	White Cushion	x				x	
Ferns							
Bracken							
<i>Dennstaedtia punctilobula</i>	Hay Scented		x			x	
<i>Pteridium aquilinum</i>	Pine Barrens Bracken, Tailed Bracken	x				x	
Flowering							
<i>Osmunda cinnamomea</i>	Cinnamon			x		x	
<i>Osmunda claytoniana</i>	Interrupted		x			x	
<i>Thelypteris noveboracensis</i>	New York	x					
<i>Athyrium filix-femina</i>	Northern Lady			x		x	
<i>Osmunda regalis</i>	Royal					x	
Wood							
<i>Matteuccia struthiopteris</i>	Ostrich						
<i>Onoclea sensibilis</i>	Sensitive		x				
<i>Dryopteris carthusiana</i>	Spinulose Wood, Toothed Wood	x					
Mushrooms							
<i>Ganoderma applanatum</i>	Artist's Polypore, Conk						
<i>Piptoporus betulinus</i>	Birch Polypore	x					
<i>Apiosporina morbosa</i>	Black Knot of Cherry Flask	x	x				
<i>Peurotius ostreatus</i>	Oyster	x					

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<i>Laetiporus sulphureus</i>	Sulphur Shelf, Chicken	x					
<i>Trametes versicolor</i>	Versicolored Turkeytail					x	
<i>Amanita muscaria</i>	Yellow-orange Fly Amanita						
<i>Amanita virosa</i>	Destroying Angel	x					
<i>Calvatia</i>	Puffballs		x		x		
Lichens							
<i>Xanthoparmelia</i>	Boulder		x				
<i>Cladonia cristatella</i>	British Soldiers	x	x				
<i>Cladonia</i>	Goblet, Pin						
<i>Usnea</i>	Old Man's Beard			x			
<i>Cladonia pyxidata</i>	Pixie Cup	x	x				
<i>Cladonia rangifer</i>	Reindeer Moss	x	x				
	Shield	x				x	
Liverworts							
	Leafy Liverwort					x	
Birds							
<i>Agelaius phoeniceus</i>	Blackbird - Red-winged				x	x	
<i>Sialia sialis</i>	Bluebird - Eastern		x				
<i>Cardinalis cardinalis</i>	Cardinal - Northern	x	x		x		
<i>Dumetella carolinensis</i>	Catbird - Gray	x	x		x	x	
<i>Parus atricapillus</i>	Chickadee - Black-capped	x	x		x	x	
<i>Phalacrocorax auritus</i>	Cormorant - Double-crested				x		
<i>Certhia americana</i>	Creepers - Brown	x					
<i>Corvus brachyrhynchos</i>	Crow - American	x		x	x		
<i>Coccyzus erythrophthalmus</i>	Cuckoo - Black-billed	x	x				
<i>Zenaidura macroura</i>	Dove - Mourning		x		x		
<i>Anas platyrhynchos</i>	Duck - Mallard				x		
<i>Aix sponsa</i>	Duck - Wood				x		
<i>Carpodacus mexicanus</i>	Finch - House				x		
<i>Myiarchus cinerascens</i>	Flycatcher - Great-crested	x			x		
<i>Carduelis tristis</i>	Goldfinch - American				x	x	
<i>Branta canadensis</i>	Goose - Canada				x		
<i>Quiscalus quiscula</i>	Grackle - Common	x			x		
<i>Larus argentatus</i>	Gull - Herring				x		
<i>Larus delawarensis</i>	Gull - Ring-Billed				x		
<i>Buteo lineatus</i>	Hawk - Red-shouldered	x		x	x		

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<i>Cistothorus palustris</i>	Wren - Marsh						
Insects							
Dragonflies							
<i>Pantodon tenera</i>	Ambwing - Eastern		x		x		
<i>Enallagma civile</i>	Bluet - Familiar				x		
<i>Anax junius</i>	Darner - Common Green	x	x		x		
<i>Sympetrum rubicundulum</i>	Meadowhawk - Ruby		x				
<i>Cellithemus eponia</i>	Pennant - Halloween	x	x				
<i>Erythemis simplicicollis</i>	Pondhawk - Eastern				x	x	
<i>Libellula luctuosa</i>	Skimmer - Widow				x		
Butterflies							
<i>Vanessa atalanta</i>	Admiral - Red		x				
<i>Celastrina ladon</i>	Azure - Spring		x				
<i>Euphydryas phaeton</i>	Checkerspot - Baltimore						
<i>Polygonia comma</i>	Comma - Eastern		x				
<i>Lycena phlaeas</i>	Copper - American		x				
<i>Phyciodes tharos</i>	Crescent - Pearl		x				
<i>Vanessa cardui</i>	Lady - American Painted		x				
<i>Lycena plexippus</i>	Monarch		x				
<i>Nymphalis antiopa</i>	Mourning Cloak						
<i>Megisto cymela</i>	Satyr - Little Wood	x					
<i>Colias philodice</i>	Sulphur - Clouded		x				
<i>Papilio polyxenes</i>	Swallowtail - Black		x				
<i>Papilio glaucos</i>	Swallowtail - Eastern Tiger		x				
<i>Papilio troilus</i>	Swallowtail - Spicebush		x				
<i>Limenitis archippus</i>	Viceroy		x				
<i>Pieris rapae</i>	White - Cabbage		x				
Moths							
<i>Malacosoma americanum</i>	Eastern Tent Caterpillar	x					
<i>Alypia octomaculata</i>	Eight-spotted Day						
<i>Hyphantria cunea</i>	Fall Webworm	x					
<i>Lymantria dispar</i>	Gypsy	x					
<i>Hemaris thysbe</i>	Hummingbird		x				
<i>Noctua pronuba</i>	Large Yellow Underwing						
<i>Manduca quinque-maculata</i>	Tomato Hornworm						
<i>Isia isabella</i>	Woolly Bear Caterpillar		x				

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Beetles							
Meloidae	Blister, Oil						
Dytiscidae	Diving - Predacious						
Popillia japonica	Japanese						
Coccinellidae	Lady, Lady-bug						
Cerambycidae	Long-horned						
Scarabaeidae	Scarab						
Cicindela	Tiger						
Lycidae	Wet-winged						
Gyrinidae	Whirligig - Large						
Flies							
Tipulidae	Crane						
Chrysops callidus	Deer						
Tephritidae	Fruit						
Tabanus americanus	Horse - American						
Musca domestica	House						
Metasyrphus americanus	Hover - American						
Culicidae	Mosquitoes						
Asilidae	Robber						
Other							
Notonectidae	Backswimmers						
Bombus	Bees - Bumble			x	x		
Ceratina	Bees - Carpenter						
Apis mellifera	Bees - Honey						
Trichoptera	Caddisflies			x	x		
Magickicada	Cicadas-Periodical		x				
Gryllus pennsylvanicus	Crickat - Northern Field		x				
Corydalus cornutus	Dobsonfly - Eastern			x			
Forficula auriculata	Earwig - European						
Melanopus	Grasshoppers		x				
Coccoidea	Hemlock Woolly Adelgid						
Vespula maculata	Hornet - Bald-faced						
Pterophylla camellifolia	Katydid - Northern True						
Dissosteira carolina	Locust - Carolina						
Mantis religiosa	Mantis - European Praying	x	x				
Ephemera	Mayflies						

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<i>Parcoblatta pennsylvanicus</i>	Roach - Pennsylvania Wood						
Pentatomidae	Stink Bugs						
Plecoptera	Stoneflies						
Isoptera	Termites						
Metopius	Wasp - Ichneumon						
<i>Neuroterus clavensis</i>	Wasp - Oak Gall			x	x		
Corixidae	Water Boatmen			x			
Belastomatidae	Water Bugs - Giant				x		
Gerridae	Water Striders			x	x		
<i>Vespula maculifrons</i>	Yellowjacket - Eastern						
Spiders							
<i>Misumena vatia</i>	Crab - Goldenrod						
<i>Argiope aurantia</i>	Garden - Black-and-yellow						
<i>Agelenopsis naevia</i>	Grass - Funnel-web						
Araneidae	Orb Weaver						
Lycosidae	Wolf						
Crustaceans							
<i>Gammarus</i>	Amphipods, Scuds - Freshwater			x	x		
Copepoda	Copepods, Cyclops			x	x		
<i>Cambarus bartoni</i>	Crayfish				x		
Daphnia	Daphnia, Water-fleas			x	x		
Isopoda	Isopods - Freshwater, Aquatic Sowbugs			x	x		
<i>Armadillidium</i>	Pillbugs						
<i>Eubrachipus vernalis</i>	Shrimp - Fairy			x			
<i>Porcellio</i>	Sowbugs						
Mollusks							
Bivalvia	Clam - Fingernail						
	Mussel - Freshwater			x	x		
Gyraulid	Snail - Freshwater			x	x		
Misc. Arthropods							
<i>Scutigera</i>	Centipedes						
<i>Leiodontomys</i>	Daddy-long-legs, Harvestmen						

Species Latin Name	Species Common Name	SSNSC Woodland	SSNSC Meadow	SSNSC Wetland	Jacobs Pond	Black Pond	Status
<i>Spirobolus</i>	Millipedes						
<i>Oligonychus ilicinus</i>	Mite- Red Spider				x		
<i>Dermacentor variabilis</i>	Tick - Brown Dog, Wood						
<i>Ixodes dammini</i>	Tick - Eastern Deer						
Mammals							
<i>Eplesicus fuscus</i>	Bat - Big Brown				x		
<i>Myotis lucifugus</i>	Bat - Little Brown				x		
<i>Canis latrans</i>	Coyote	x	x				
<i>Odocoileus virginianus</i>	Deer - White-tailed			x			
<i>Tamias striatus</i>	Eastern Chipmunk	x				x	
<i>Sylvilagus floridanus</i>	Eastern Cottontail	x	x		x	x	
<i>Urocyon cinereoargenteus</i>	Fox - Gray	x		x			
<i>Vulpes vulpes</i>	Fox - Red	x	x	x	x		
<i>Microtus pennsylvanicus</i>	Meadow Vole		x				
<i>Peromyscus leucopus</i>	Mouse - White-footed	x					
<i>Ondatra zebethicus</i>	Muskrat			x	x		
<i>Didelphis virginiana</i>	Opussum	x	x	x	x		
<i>Procyon lotor</i>	Raccoon	x	x	x	x	x	
<i>Blarina brevicauda</i>	Shrew - Northern Short-tailed	x	x				
<i>Mephitis mephitis</i>	Skunk	x	x	x	x	x	
<i>Sciurus carolinensis</i>	Squirrel - Eastern Gray	x			x		
<i>Tamiasciurus hudsonicus</i>	Squirrel - Red	x					
<i>Glaucomys volans</i>	Squirrel - Southern Flying	x		x			
<i>Mustela frenata</i>	Weasel - Long-tailed	x					
<i>Marmota monax</i>	Woodchuck	x	x				
Amphibians							
Frogs							
<i>Rana catesbeiana</i>	Bullfrog				x		
<i>Rana clamitans</i>	Green				x	x	
<i>Rana pipiens</i>	Northern Leopard		x	x	x		
<i>Rana palustris</i>	Pickeral		x	x	x		
<i>Bufo americanus</i>	Toad - American	x	x	x			
<i>Bufo woodhousii fowleri</i>	Toad - Fowler's	x	x	x			
<i>Hyla versicolor</i>	Treefrog - Common Gray	x		x			
<i>Hyla crucifer</i>	Treefrog - Spring Peeper	x		x	x		
<i>Rana sylvatica</i>	Wood	x		x			
Salamanders							

Species Latin Name	Species Common Name	SSNSC Woodland	SSNSC Meadow	SSNSC Wetland	Jacobs Pond	Black Pond	Status
<i>Notophthalmus viridescens</i>	Newt - Eastern, Red-spotted	x		x			
<i>Plethodon cinereus</i>	Red-backed - Eastern	x		x			
<i>Ambystomata maculatum</i>	Spotted - Yellow	x		x			
Reptiles							
Turtles							
<i>Trapene carolina</i>	Box - Common		x				SC
<i>Sternotherus odoratus</i>	Musk - Common				x		
<i>Chrysemys picta</i>	Painted			x			
<i>Chelydra serpentina</i>	Snapping				x		
<i>Clemmys guttata</i>	Spotted			x			SC
Snakes							
<i>Thamnophis sirtalis</i>	Garter - Common	x	x				
<i>Lampropeltis triangulum</i>	Milk	x					
<i>Crotalus constrictor</i>	Racer - Black		x				
<i>Nerodia sipedon</i>	Water - Northern				x		
Fish							
<i>Micropterus salmoides</i>	Bass - Largemouth				x		
	Calico				x		
<i>Ameiurus nebulosus</i>	Catfish, Brown Bullhead				x		
	Sunfish				x		

Butterflies of Plymouth County

Theoretical and Confirmed in Norwell

COMMON NAME	LATIN NAME	CONFIRMED IN NORWELL
SWALLOWTAILS (Family Papilionidae)		
Pipevine Swallowtail	Battus philenor	No
Black Swallowtail	Papilio polyxenes	Yes- BD
Eastern Tiger Swallowtail	Papilio glaucus	Yes- BD
Spicebush Swallowtail	Papilio troilus	No
WHITES AND SULPHURS (Family Pieridae)		
Cabbage White	Pieris rapae	Yes- BD
Clouded Sulphur	Colias philodice	Yes- BD
Orange Sulphur	Colias eurytheme	Yes- FS
Cloudless Sulphur	Phoebis sennae	No
Sleepy Orange	Eurema nicippe	No
COPPERS (Subfamily Lycaeninae)		
American Copper	Lycaena phlaeas	Yes- BD
Bog Copper Lycaena epixanthe	Lycaena epixanthe	No
HAIRSTREAKS (Subfamily Theclinae)		
Coral Hairstreak	Satyrium titus	No
Acadian Hairstreak	Satyrium acadica	No
Edwards' Hairstreak	Satyrium edwardsii	No
Banded Hairstreak	Satyrium calanus)	No
Striped Hairstreak	Satyrium liparops	No
Brown Elfin	Callophrys [Incisalia] augustinus	No
Hoary Elfin	Callophrys [Incisalia] polios	No
Frosted Elfin	(Callophrys [Incisalia] irus	No
Henry's Elfin	Callophrys [Incisalia] henrici	No
Eastern Pine Elfin	Callophrys [Incisalia] niphon)	No
Juniper Hairstreak	Callophrys [Mitoura] gryneus)	No
Hessel's Hairstreak	Callophrys [Mitoura] hesseli	No- SC
White M Hairstreak	Parrhasius m-album	No
Gray Hairstreak	Strymon melinus	No
BLUES (Subfamily Polyommatainae)		
Eastern Tailed-Blue	Everes comyntas	No
Spring Azure	Celastrina "ladon"	Yes- BD
Summer Azure	Celastrina neglecta	No

Butterflies of Plymouth County

Theoretical and Confirmed in Norwell

COMMON NAME	LATIN NAME	CONFIRMED IN NORWELL
BRUSH-FOOTED BUTTERFLIES (Family Nymphalidae)		
Heliconians and Fritillaries (Subfamily Heliconiinae)		
Variegated Fritillary	Euptoieta claudia	No
Great Spangled Fritillary	Speyeria cybele	No
Aphrodite Fritillary	Speyeria aphrodite	No
Regal Fritillary	Speyeria idalia	No
Silver-bordered Fritillary	Boloria selene	No
TRUE BRUSH-FOOTS (Subfamily Nymphalinae)		
Pearl Crescent	Phyciodes tharos	Yes- BD
Baltimore	Euphydryas phaeton	Yes- BD
Question Mark	Polygonia interrogationis	No
Eastern Comma	Polygonia comma	No
Compton Tortoiseshell	Nymphalis vaualbum	No
Mourning Cloak	Nymphalis antiopa	Yes- BD
American Lady	Vanessa virginiensis	No
Painted Lady	Vanessa cardui	Yes- BD
Red Admiral	Vanessa atalanta	Yes- BD
Common Buckeye	Junonia coenia	No
ADMIRALS AND RELATIVES (Subfamily Limenitidinae)		
Red-spotted Purple	Limenitis arthemis	Yes- BD
Astyanax' Red-spotted Purple	Limenitis arthemis astyanax (incl. arizonensis)	
Viceroy	Limenitis archippus	
SATYRS (Subfamily Satyrinae)		
Northern Pearly Eye	Enodia anthedon	No
Appalachian Brown	Satyroides appalachia	No
Little Wood Satyr	Megisto cymela	Yes- BD
Common Ringlet	Coenonympha tullia	Yes- BD
Common Wood Nymph	Cercyonis pegala	No
MONARCHS (Subfamily Danainae)		
Monarch	Danaus plexippus	
SKIPPERS (Family Hesperiidae)		
Spread-wing Skippers (Subfamily Pyrginae)		
Silver-spotted Skipper	Epargyreus clarus (incl. huachuca)	Yes- FS
Long-tailed Skipper	Urbanus proteus	No
Hoary Edge	Achalarus lyciades	Yes- FS
Southern Cloudywing	Thorybes bathyllus (=daunus)	No
Northern Cloudywing	Thorybes pylades	No

Butterflies of Plymouth County Theoretical and Confirmed in Norwell

COMMON NAME	LATIN NAME	CONFIRMED IN NORWELL
Dreamy Duskywing	<i>Erynnis icelus</i>	No
Sleepy Duskywing	<i>Erynnis brizo</i>	No
Juvenal's Duskywing	<i>Erynnis juvenalis</i>	No
Horace's Duskywing	<i>Erynnis horatius</i>	No
Wild Indigo Duskywing	<i>Erynnis baptisiae</i>	No
Persius Duskywing	<i>Erynnis persius</i>	No- E
Common Sootywing	<i>Pholisora catullus</i>	Yes- FS

GRASS SKIPPERS (Subfamily Hesperinae)

Least Skipper	<i>Ancyloxypha numitor</i>	No
European Skipper	<i>Thymelicus lineola</i>	Yes- BD
Leonard's Skipper	<i>Hesperia leonardus</i> (incl. pawnee))	No
Cobweb Skipper	<i>Hesperia metea</i>	No
Indian Skipper	<i>Hesperia sassacus</i>	No
Peck's Skipper	<i>Polites peckius</i> (=coras)	Yes- FS
Tawny-edged Skipper	<i>Polites themistocles</i>	No
Crossline Skipper	<i>Polites origenes</i>	No
Long Dash	<i>Polites mystic</i>	No
Northern Broken-Dash	<i>Wallengrenia egeremet</i>	No
Little Glassywing	<i>Pompeius verna</i>	No
Sachem	<i>Atalopedes campestris</i>	No
Delaware Skipper	<i>Anatrytone logan</i> (=delaware)	No
Mulberry Wing	<i>Poanes massasoit</i>	No
Hobomok Skipper	<i>Poanes hobomok</i>	No
Broad-winged Skipper	<i>Poanes viator</i>	No
Black Dash	<i>Euphyes conspicua</i>	No
Two-spotted Skipper	<i>Euphyes bimacula</i>	No
Dun Skipper	<i>Euphyes vestris</i> (=ruricola))	No
Dusted Skipper	<i>Atrytonopsis hianna</i> (incl. loammi)	No
Pepper and Salt Skipper	<i>Amblyscirtes hegon</i> (=samaset)	No

BD= Biodiversity Days information for Norwell 2002-2003 as confirmed on website

E = Endangered

SC = Special Concern

FS= Confirmed by Fred St. Ours, Naturalist

SOURCE: Information adapted from USGS Northern Prairie Wildlife Research Center website

<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/ma/toc.htm>

Appendix C: Amphibian of Massachusetts

COMMON NAME	SCIENTIFIC NAME	DISTRIBUTION	CONFIRMED IN NORWELL
CAUDATA: Ambystomatidae (Mole Salamanders)			
Spotted Salamander	Ambystoma maculatum	Statewide except Martha's Vineyard Island and Nantucket County.	Yes
Marbled Salamander*	Ambystoma opacum	Statewide except Barnstable, Dukes, and Nantucket counties. There are old records for Essex and Plymouth counties. Listed as Threatened.	No
Salamandridae (Newts)			
Eastern Newt	Notophthalmus viridescens	Statewide except Nantucket County.	Yes
Plethodontidae (Lungless Salamanders)			
Northern Dusky Salamander	Desmognathus fuscus	Statewide except Barnstable, Dukes and Nantucket Counties.	No
Eastern Red-backed Salamander	Plethodon cinereus	Statewide.	Yes
Four-toed Salamander*	Hemidactylium scutatum	Statewide except Nantucket and possibly Suffolk counties. Listed as Special Concern.	No
Northern Two-lined Salamander	Eurycea bislineata	Statewide except Dukes, Nantucket, and possibly Barnstable counties.	No
ANURA: Pelobatidae (Spadefoot Toads)			
Eastern Spadefoot*	Scaphiopus holbrookii	Eastern Massachusetts and Connecticut River valley area. Extirpated from Martha's Vineyard Island. Listed as Threatened.	No
Bufonidae (True Toads)			
American Toad	Bufo americanus	Statewide except Nantucket County.	Yes
Fowler's Toad	Bufo fowleri	Statewide except probably extirpated from Nantucket County.	Yes
Hylidae (True Tree Frogs)			
Spring Peeper	Pseudacris crucifer	Statewide	Yes
Gray Treefrog	Hyla versicolor	Statewide except Martha's Vineyard Island and Nantucket County.	Yes
Ranidae (True Frogs)			
American Bullfrog	Rana catesbeiana	Statewide except Dukes County. Recently introduced to Nantucket island and probably established there.	Yes
Green Frog	Rana clamitans	Statewide.	Yes
Pickereel Frog	Rana palustris	Statewide.	Yes
Northern Leopard Frog	Rana pipiens	Statewide except Barnstable, Dukes & Nantucket Counties. Due to the widespread release of leopard frogs from extra-limital sources, their original distribution and native status is uncertain.	No
Wood Frog	Rana sylvatica	Statewide except Dukes and Nantucket counties.	Yes

Appendix C: Reptiles of Massachusetts

COMMON NAME	SCIENTIFIC NAME	DISTRIBUTION	CONFIRMED IN NORWELL
Snapping Turtle	<i>Chelydra serpentina</i>	Statewide.	Yes
Kinosternidae (American Mud and Musk Turtles)			
Eastern musk turtle	<i>Sternotherus odoratus</i>	Statewide except Dukes and Nantucket counties.	Yes
Emyidae (Pond Turtles)			
Painted Turtle	<i>Chrysemys picta</i>	Statewide.	Yes
Spotted Turtle*	<i>Clemmys guttata</i>	Statewide except northern Berkshire County and possibly Suffolk County. Listed as Special Concern.	Yes
Wood Turtle*	<i>Clemmys insculpta</i>	Statewide north and west of northern Bristol and Plymouth counties. Reports from Barnstable County probably reflect released animals. Listed as Special Concern.	No
Blanding's Turtle*	<i>Emydoidea blandingii</i>	Bristol, Essex, Middlesex, Norfolk, Plymouth (1994) and Worcester counties. Older records exist for Franklin County. Listed as Threatened.	No
Diamond-backed Terrapin*	<i>Malaclemmys terrapin</i>	Coastal areas of Barnstable, Bristol, and Plymouth counties. Introductions of terrapins from extralimital sources occurred on at least two occasions. Listed as Threatened .	No
Northern Redbellied Cooter*	<i>Pseudemys rubriventris</i>	Formerly listed as "Plymouth Redbelly Turtle" (<i>Pseudemys rubriventris bangsi</i>). Recorded from Plymouth County. Listed as Endangered.	No
Eastern Box Turtle*	<i>Terrapene carolina</i>	Statewide. Genetic identity disrupted by releases of box turtles from extralimital sources. Listed as Special Concern.	Yes
TESTUDINES: Cheloniidae (Sea Turtles)			
Loggerhead Seaturtle*	<i>Caretta caretta</i>	Recorded from coastal southeastern Massachusetts. Listed as Threatened.	No
Kemp's Ridley Seaturtle*	<i>Lepidochelys kempii</i>	Recorded from coastal southeastern Massachusetts. Listed as Endangered.	No
LACERTILIA: Scincidae (Skinks)			
SERPENTES: Colubridae (Harmless Snakes)			
Eastern Racer	<i>Coluber constrictor</i>	Statewide except Nantucket County. Local subspecies known as "black racer"	Yes
Ringnecked Snake	<i>Diadophis punctatus</i>	Statewide	No
Eastern Ratsnake*	<i>Elaphe obsoleta</i>	Recorded from Franklin, Hampden, Hampshire, and Worcester counties. Local subspecies called "black rat snake". Listed as Endangered.	No
Eastern Hognosed Snake	<i>Heterodon platirhinos</i>	Probably statewide except Dukes and Nantucket counties.	No
Milksnake	<i>Lampropeltis triangulum</i>	Statewide.	No
Northern Watersnake	<i>Nerodia sipedon</i>	Statewide except Dukes County.	Yes
Smooth Greensnake	<i>Opheodrys vernalis</i>	Statewide.	No

Appendix C: Reptiles of Massachusetts

COMMON NAME	SCIENTIFIC NAME	DISTRIBUTION	CONFIRMED IN NORWELL
DeKay's Brownsnake	<i>Storeria dekayi</i>	Statewide except Martha's Vineyard Island and Nantucket County.	No
Red-bellied Snake	<i>Storeria occipitomaculata</i>	Statewide except Nantucket County.	No
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	Statewide.	No
Common Gartersnake	<i>Thamnophis sirtalis</i>	Statewide.	Yes

SERPENTES: Viperidae (Vipers and Pit Vipers)

Common Name	Scientific Name	Distribution	
Copperhead*	<i>Agkistrodon contortrix</i>	At present, found only in Hampden and Norfolk counties. Listed as Endangered.	No
Timber Rattlesnake*	<i>Crotalus horridus</i>	At present, found only in Berkshire, Hampden, Hampshire, and Norfolk counties. Listed as Endangered.	No

SOURCE: Baseline data from MassWildlife's State Reptiles & Amphibians List 3rd edition, 2000, revised 2002 and James E. Cardoza & Peter G. Mirick, Massachusetts Division of Fisheries and Wildlife; Fauna of Massachusetts Series, No. 3
Adapted for Norwell local use by Committee

DISCUSSION

A total of 60 genera from 43 families of aquatic invertebrates were identified from all sampling events combined (Appendix A). This is approximately half of what is known from tributary streams of the nearby North River (F. SaintOurs, unpublished data). In addition 40 out of 83, or nearly half, of the Odonata species known from the North River watershed were found in the First Herring Brook watershed. One damselfly species considered locally rare, the Eastern Red Damselfly *Amphiagrion saucium* (Odonata: Coenagrionidae), was added to the regional list during an outdoor educational program sponsored by the Gates Environmental Club, funded through grants received by FHBWI.

Mayflies (Ephemeroptera).

Mayflies are considered to be one of the best indicators of stream habitat quality, as many species require fast flowing water and relatively clean substrates (boulders/cobble vs. organic muck), and have low tolerances to organic pollution. One genus of the lotic family Ephemerellidae, *Eurylophella*, was found in the main channel of First Herring Brook at more than one location. The family Leptophlebiidae was represented by the genus *Leptophlebia*, which was found primarily in the larger streams and seemed to be most commonly found among aquatic plants or overhanging shoreline vegetation. An especially notable find was the collection of several larvae of a Spring Minnow Mayfly (Ameletidae), genus *Ameletus*, in a tiny, semi-permanent rill that flows into First Herring Brook just to the east of the relatively new Laurelwood Estates settling pond (LAURLWD). Members of this genus are known to occur in springs and very small forest streams, and are very intolerant to organic pollution.

Stoneflies (Plecoptera).

Six families of stoneflies are known from the area, and examples from four of these were found during the First Herring Brook surveys. Some such as *Leuctra* (Leuctridae) and *Prostia* (Nemouridae) are capable of withstanding drought conditions, and were found in the most intermittent of all sites sampled (ROUTE3A). The nemourid genus *Amphinemura* is commonly found in second order streams in the region, and many were found in the main channel of First Herring Brook. The late summer emergent genus *Perlesta* (Perlidae) was found in Tan Brook, making this the only location known for this family in the watershed, although they have been found in other nearby locations. Members of these last two families are generally regarded as having relatively low tolerance to organic pollution (Hilsenhoff 1982).

Caddisflies (Trichoptera).

The caddisflies are typically the most diverse group of aquatic macro invertebrates found in small streams, and this was indeed found to be true for many of the Scituate sites. The most frequently encountered were from the family Limnephilidae, or "Northern Casemakers", which are found in a wide range of aquatic habitats from seasonal vernal pools to perennial fast-flowing rivers. *Hydatophylax* and *Pycnopsyche* were common and widespread as expected, but *Anabolia* was found at only one location and seemed to be associated with an open canopy and overhanging streamside vegetation, particularly

Carex stricta or Tussock Sedge. *Pseudostenophylax* were found in a few of the intermittent stream sites, but most notable in terms of abundance in intermittent stream caddisflies was the collection of a number of mid-stage *Platycentropus* larvae from the intermittent stream at Teak Sherman Park (TEAKSHR) and another site upstream (ROUTE3A). Examples from the lotic "Net-Spinner" family Hydropsychidae were also abundant and widespread throughout the watershed. Because hydropsychid caddisflies are primarily lotic, this group is useful as indicators of flow conditions. Several specimens of the genus *Diplectrona* were found in one stream that is known to stop flowing during the driest part of the summer (GROVEST), apparently living under stones in very wet soil in the streambed, while *Hydropsyche* was only found in perennial streams. *Molanna* (Molannidae) were encountered in most of the perennial stream sites, primarily in sandy pools and runs, and members of the family Polycentropodidae, probably *Polycentropus*, were found to be quite common in the samples from the head of First Herring Brook just below Damon Pond. Two other caddisflies of interest in this study are *Psilotreta* (Odontoceridae) and *Lype* (Psychomyiidae). The former makes its case almost exclusively out of clear quartz sand grains, and is typically found in clean streams with sandy bottoms. The latter was encountered only twice during surveys of these streams and other North River tributaries, and could either be truly rare in this area or simply difficult to find.

Dragonflies and Damselflies (Odonata).

Small streams in this region are habitat for several species of dragonflies and damselflies, particularly Spiketail Dragonflies (Cordulegastridae), Clubtails (Gomphidae), and damselflies from the families Calopterygidae and Coenagrionidae (see Appendix B). Two relatively rare species were found during the surveys, one in intermittent streams (*C. obliqua*) and the other near a spring that feeds the Scituate Reservoir (*A. saucium*).

All three Spiketail (Cordulegastridae) species known from Massachusetts were observed at various locations in Scituate between May and July of 2000, 2001, and 2002.

Spiketail Dragonfly Larvae



Cordulegaster larvae are burrowers, burying themselves in the sand and organic detritus in the streambed, and they are semi-voltine, requiring three or more years to develop in northern latitudes. Perhaps the most interesting find during the surveys of Scituate streams were observations of the Arrowhead Spiketail *Cordulegaster obliqua*. This species is on the official Massachusetts "Watch List", and was first recorded from Plymouth County in 1998 at a tiny stream that feeds Black Pond near the Norwell - Scituate line. The larvae of these large dragonflies (Figure 2) inhabit small, semi-permanent streams that exhibit flow for most of the year but go dry at some point during the summer, usually from late July until October. Adults of this species were observed at three locations,

OLDFORG, ROUTE3A, and GROVEST, in July 2001. One mid-stage larva (>1 year)

was subsequently found during a visit to LAURLWD in May 2002, giving this tiny rill more recognition as high-quality stream habitat harboring uncommon species. A late-stage larva (more than 2 years old) of *C. obliqua* was also sampled during a subsequent survey of the GROVEST site in April 2002. Both streams were observed to stop flowing in mid-summer, although the streambeds remained moist throughout the dry spells (A. Santos, unpublished data; VanWart, pers. com.; pers. obs.).

Aquatic Beetles (Coleoptera)

Many beetles that are found in streams are known to be semi-aquatic, and tolerant of drought or seasonal flow. This is particularly true with members of the family Dytiscidae, of which adults are capable of long-distance flight and can easily move to a new location if the habitat becomes unsuitable. The family Elmidae, or "Riffle Beetles", on the other hand, are thought to be good indicators of permanent flow and high stream habitat quality. Two genera were found in samples from First Herring Brook (OLDFRG2), and one in Wagner's Brook. The latter is an interesting case however, since the stream has been observed to go almost completely dry during summers with low rainfall, due to low water levels in the reservoir upstream. The specimens collected from this stream were of the genus *Stenelmis*, which is the most commonly encountered elmid in this area (SaintOurs, unpublished data), suggesting that this genus may not be as vulnerable to drought or human disturbance as other members of the Riffle Beetle family.

True Flies (Diptera)

Several types of aquatic fly larvae were found during the surveys. The most abundant were midges (Chironomidae) and blackflies (Simuliidae), which are fairly ubiquitous throughout the region. Blackfly larvae are typically common in running water, sometimes occurring in dense aggregations below impoundments, while midges are found in essentially all types of aquatic habitats. The most diverse group besides the Chironomidae (which were not identified beyond family) was the crane flies, or Tipulidae. Some crane fly larvae can get quite large, and like the midges are also found in a variety of aquatic habitats. The adults are sometimes referred to as "daddy longlegs", and often mistaken for giant mosquitoes because of the superficially similar body and wing structure. Perhaps the most interesting find was *Molophilus*, a small tipulid that is somewhat uncommon in the region and typically found in relatively undisturbed streams, discovered in Tan Brook during a training session in May 2002 (TANBRK2).

Crustaceans and Mollusks

Isopods (Asellidae) are ubiquitous and very tolerant of disturbance and drought, thus they are not of much interest. In locations where isopods are dominant, there is likely to be low flow or high disturbance levels. An example is Wagner's Brook (EISNHWR), which has been observed to stop flowing during the dry season (July-October) (pers. obs.) due to water withdrawal from the Scituate Reservoir immediately upstream. Amphipods are also ubiquitous, and more diverse than isopods. Members of the genus *Gammarus* (Gammaridae) are thought to be the least tolerant to drying and generally lotic, whereas *Crangonyx* (Crangonyctidae) and *Hyaella* (Hyaellidae) are known to inhabit wetlands and vernal pools. The genus *Crangonyx* includes the state-listed Mystic Valley Amphipod *C. abberans*, which has been found in Scituate (L. Van Lenten, pers. com.).

Locations with significant populations of this genus should be investigated further. Fingernail clams of the genus *Sphaerium*, *Pisidium* (Sphaeriidae) and non-operculate snails from the families Planorbidae and Physidae were also found to be fairly common throughout the watershed.

CONCLUSIONS

Overall, First Herring Brook was found to have a fairly diverse macro invertebrate fauna. The main channel above route 3A, a first order stream for much of its length, was found to have above average invertebrate richness (number of families and genera) when compared with other tributary streams in the North River watershed (Appendix C). The highest invertebrate richness found in First Herring Brook was observed during the first survey in the fall of 1999 at OLDFORG, which is roughly the mid-point of the stream's length. Rich

ness for the main channel did not vary by much in subsequent surveys, despite the fact that sampling locations and efforts were not duplicated.

One very interesting discovery was the collection of a large number of invertebrates from the semi-permanent stream site known as ROUTE3A. The density of organisms was extremely high in these samples compared to other intermittent streams in the area, although richness was comparable to the others sampled. Even more interesting was the fact that the samples from this stream were dominated by the stonefly *Prostoia* (Nemouridae), as well as a large number of mid-stage limnephilid caddisflies of the genus *Platycentropus*. Despite the proximity to the heavily traveled Chief Justice Cushing Highway (Route 3A), the density of the forest canopy and relatively low direct input from the road above the sampling point likely contribute to its high biological activity.

Two sites that stand out in terms of biological diversity and uniqueness are LAURLWD and SUMMRST. The first is a tiny forest rill that stops flowing in July and remains nearly dry until some time in October. This site is most interesting for the presence of two unique and uncommon aquatic invertebrates, the Arrowhead Spiketail dragonfly *Cordulegaster obliqua* (Odonata: Cordulegastridae) and the Spring Minnow Mayfly *Ameletus* (Ephemeroptera: Ameletidae). The second site is a very small, spring-fed, perennial stream. Several Delta-Spotted Spiketail dragonfly (*Cordulegaster diastatops*) larvae were found here, as well as a large number of caddisflies from various families including *Lepidostoma* (Trichoptera: Lepidostomatidae) and *Psilotreta* (Trichoptera: Odontoceridae). It should be noted here that the latter stream, located in the west end of Scituate, is not a tributary to First Herring Brook, but flows north into Tan House Brook which feeds the Aaron River Reservoir.

Efforts should be made to locate other streams that harbor Arrowhead Spiketail dragonfly larvae. This ancient species is probably one of the most likely to be negatively affected by large-scale development projects, and is a candidate for protection in Massachusetts.

All drainage and forest-clearing issues should be addressed with consideration towards species such as this long-lived but rarely encountered insect.

APPENDIX B

Dragonflies and Damselflies (Odonata) of the First Herring Brook watershed.

FAMILY	SCIENTIFIC NAME	COMMON NAME	HAB	ABUN
Calopterygidae	<i>Calopteryx maculata</i>	Ebony Jewelwing	S	A
Coenagrionidae	<i>Amphiagrion saucium</i>	Eastern Red Damsel	SS	R
	<i>Chromagrion conditum</i>	Aurora Damsel	G	C
	<i>Enallagma exulans</i>	Stream Bluet	S, P	C
	<i>Enallagma geminatum</i>	Skimming Bluet	P	C
	<i>Enallagma signatum</i>	Orange Bluet	P	A
	<i>Enallagma vesperum</i>	Vesper Bluet	P	A
	<i>Ischnura posita</i>	Fragile Forktail	G	A
	<i>Ischnura verticalis</i>	Eastern Forktail	G	A
Lestidae	<i>Lestes congener</i>	Spotted Spreadwing	P, W	O
	<i>Lestes disjunctus</i>	Common Spreadwing	P	A
	<i>Lestes rectangularis</i>	Slender Spreadwing	P	O
	<i>Lestes vigilax</i>	Swamp Spreadwing	P, W	C
Aeshnidae	<i>Aeshna clepsydra</i>	Mottled Damer	P	R
	<i>Aeshna umbrosa</i>	Shadow Damer	P, S	C
	<i>Aeshna verticalis</i>	Green Striped Damer	P	O
	<i>Anax junius</i>	Common Green Damer	P, W	C
	<i>Boyeria vinosa</i>	Fawn Damer	S	C
Cordulegastridae	<i>Cordulegaster diastatops</i>	Delta Spotted Spiketail	S	O
	<i>Cordulegaster maculata</i>	Twin Spotted Spiketail	S	O
	<i>Cordulegaster obliqua</i>	Arrowhead Spiketail	S	R*
Corduliidae	<i>Epicordulia princeps</i>	Prince Baskettail	P	O
	<i>Epitheca cynosura</i>	Common Baskettail	P, W	A
	<i>Somatochlora tenebrosa</i>	Clamp Tipped Emerald	S, W	O
Gomphidae	<i>Gomphus exilis</i>	Lancet Clubtail	S, P	C
Libellulidae	<i>Celithemis elisa</i>	Valentine Pennant	P	O
	<i>Erythemis simplicicollis</i>	Eastern Pondhawk	G	A
	<i>Ladona exusta</i>	White Corporal	P, W	C
	<i>Libellula cyanea</i>	Spangled Skimmer	P	C
	<i>Libellula incesta</i>	Slaty Skimmer	G	A
	<i>Libellula luctuosa</i>	Widow Skimmer	P, W	C
	<i>Libellula pulchella</i>	12 Spotted Skimmer	P, W	C
	<i>Libellula semifasciata</i>	Painted Skimmer	P	O
	<i>Pachydiplax longipennis</i>	Blue Dasher	G	A
	<i>Pantala flavescens</i>	Wandering Glider	P, W	C
	<i>Pantala hymenaea</i>	Spot Winged Glider	P, W	C
	<i>Perithemis tenera</i>	Eastern Amberwing	P	C
	<i>Plathemis lydia</i>	Common Whitetail	P, W	C
	<i>Sympetrum rubicundulum</i>	Ruby Meadowhawk	P, W	A
	<i>Sympetrum vicinum</i>	Yellow Legged Meadowhawk	P, W	C

HABITAT: S = Streams, P = ponds, W = Wetlands, SS = Springs or Seeps, G = Generalist

ABUNDANCE: A = Abundant, C = Common, O = Occasional, R = Rare

*C. obliqua is on the official Massachusetts Watch List of rare species (MNH&ESP).

Appendix C: Natural Resources Information

NORWELL PONDS

Third Herring Brook System: the system begins with a wetlands complex upstream of Jacob's Pond to Grove Street. Downstream of Jacob's Pond, Third Herring Brook flows through Peterson Pond just south of Route 3, and the former Mill Pond between South Street and the YMCA complex. Next the system reaches the Tack Factory Pond just west of Church Hill before reaching the North River.

Second Herring Brook System: the brook begins with the cranberry bog reservoir west of Winter Street, flows to Turner Pond southwest of Cross Street, then into Dead Swamp and Torrey Pond at Mill Street, and into Mill Pond in the Norris Reservation. From there the brook reaches Gordon Pond, also in Norris Reservation, before flowing into the North River.

Bound Brook Pond, at the base of Mount Blue to the south and east, and Mount Blue Street to the West, is controlled by a dam on Mt. Hope Street, before flowing into the Aaron River and the Aaron River Surface Water Reservoir in Cohasset.

There is a small pond in Wompatuck State park, just south of the intersection of Norwell, Cohasset and Scituate.

Damon Pond is on 60 acres of watershed protection land owned by the Town of Scituate south of First Parish Road. This pond is in the First Herring Brook Watershed, and drains South Swamp to the north in Scituate.

There is a small pond at the intersection of Dover Street and River Street that takes flows from along Forest Street and conveys them into Second Herring Brook.

An un-named pond at the southeast base of Buttonwood Hill on Cross Street takes its flows from Satsuit Meadow at Satuit Meadow Lane, and forms the upper part of the Stony Brook Watershed. This pond is a popular ice skating locale, for it is in a "frost pocket" that freezes before other water bodies in Norwell.

Appendix C: Natural Resources Information

NORWELL SOILS

A general description of the location of generalized soils types in Norwell is as follows:

Birchwood - Poquonock-Mattapoisett A triangle, generally from Mt. Blue east of Judge's Hill to the easterly end of Samuel Woodworth, to Main Street at Circuit Street.

Freetown-Swansea-Scarboro (seen as Berryland on Graphic) These are all wetlands (hydric soils), in six locations in Norwell as follows:

- Along the Wildcat Brook Drainageway from Circuit Street to Third Herring Brook, into Old Pond Meadows, across Route 3
- Hoop Pole Swamp, between Bowker and Lincoln Streets
- The Brunt Plain/Flat Swamp complex, from the east side of Mt Blue, along the west side of School Street, to nearly Prospect Street
- Black Pond Swamp north and east of Cuffey Hill north of Mt. Blue Street
- The Satsuit Meadow/Second Herring Brook which crosses Winter Street, and Cross Street, to Dead Swamp north of Mill Lane
- Valley Swamp. from the northern portion of Jacobs Pond into the Valley Swamp Complex across and north of Grove Street.

Hinkley-Windsor-Deerfield The west of Norwell to Prospect Street and Jacobs Pond and a small area north and south of Grove Street to nearly School Street.

Montauk-Scituate-Norwell A small area on the Scituate boundary north and northwest of Old Oaken Bucket Road and northeast of Summer Street, bounded by First Parish Road on the northwest side.

Plymouth-Carver The southerly section of Norwell, from Riverside Drive south across Rt. 3 to Third Herring Brook.

Ipswich-Pawcatuck-Hooksan The wetlands along the Norwell side of the North River.

Raynam-Scio-Birdsall The center of Norwell, a complex shape from Bowker to Central Streets, along Main Street, and south to Pleasant and into the center of the Circuit Street "U."

Woodbridge-Paxton-Ridgebury three areas in Norwell, as follows:

- The area at the eastern edge of the Town centered on Mina, Cross, and Winter Streets
- The southerly area of Norwell, from Forest Street at Circuit St south to Rt. 3 and Riverside Drive
- A complex-shaped area that begins in the northern section of Norwell, extending from Prospect Street in the west to Old Oaken Bucket at the Scituate Line, southerly along Bowker Street and further southerly along South Street to Third Herring Brook.

GENERAL SOIL MAP UNITS (In Brief)

1. Birchwood-Poquonock-Mattapoissett Very deep, nearly level to moderately steep, well drained to poorly drained soils formed in sandy mantled underlain by loamy firm to friable glacial till in areas of ground moraines and uplands.

2. Freetown-Swansea-Scarboro Very deep, nearly level, very poorly drained soils formed in very deep to shallow freshwater organic deposits, underlain by glacial fluvial deposits in swamps and depressions.

3. Hinckley-Windsor-Deerfield Very deep, nearly level to steep, excessively to moderately well drained soils formed in glacial fluvial deposits on outwash plains, deltas, kames, and ice contact deposits.

4. Scituate- -Montauk-Norwell Very deep, gently sloping to steep, well drained to poorly drained soils formed in loamy glacial till overlying dense glacial till; on upland oval hills (drumlins) and ground moraines.

5. Plymouth-Carver Gently sloping to steep, excessively drained soils formed in loose sandy ice contact and glacial outwash deposits on moraines and outwash plains.

6. Canton-Chatfield-Rock Outcrop Very deep to moderately deep, gently sloping to very steep, well drained soils formed in glacial till and ice-contact, stratified drift; in areas of bedrock controlled uplands.

7. Carver Nearly level to steep, very deep, excessively drained sandy soils formed in glacial outwash and ice-contact deposits, on outwash plains and kames.

8. Ipswich-Pawcatuck-Hooksan Level, very deep, very poorly drained and excessively drained soils formed in organic and sandy eolian marine deposits; in areas sheltered from ocean waves along coastal shorelines and adjacent to brackish water bodies.

9. Raynham-Scio-Birdsall Very deep, nearly level to gently sloping, moderately well to very poorly drained soils formed in silty lacustrine deposits.

10. Woodbridge-Paxton-Ridgebury Very deep, gently sloping to steep, well drained to poorly drained soils formed in loamy glacial till overlying dense glacial till; on upland oval hills (drumlins) and ground moraines.

GENERAL SOIL MAP UNITS (In Detail)

1. Birchwood-Poquonock-Mattapoisett

Very deep, nearly level to moderately steep, moderately well drained, well drained, and poorly drained soils formed in sandy eolian and/or fluvial material underlain by loamy firm to friable glacial till in areas of ground moraines, drumlins and uplands. The depth to the underlying dense till typically ranges from 35 to 70 inches.

This map unit occurs throughout Plymouth County. The type of basal till underlying these soils varies depending on the bedrock type carried and deposited by the glacier. In general, the Southern portion of the County has a sandy, granitic till, the Northern and Western part has a loamy dark till high with a high percentage of flat shale and siltstone, the Central part of the county has a loamy olive colored till with mixed mineralogy. For more information see the geology section.

Birchwood soils are moderately well drained soils on gentle sideslopes and footslopes of hills. Birchwood soils have a perched, seasonal high watertable about 1.5 to 4 feet below the surface. Poquonock soils are well drained soils on convex hilltops and moderately steep sideslopes. Poquonock soils have a perched, seasonal high watertable approximately 2.5 to 5 feet below the surface. Mattapoisett soils are poorly drained soils on lowlying flat areas along drainageways. Mattapoisett soils have a perched, seasonal high watertable about 0.5 to 1.5 feet below the surface. Complete descriptions of Birchwood, Poquonock, and Mattapoisett soils can be found in the "classification of the soils" section of this report.

Minor soils in this map unit are the well drained Montauk and Paxton soils, the moderately well drained Scituate and Woodbridge soils, and the very poorly drained Brockton soils. Deerfield and Windsor soils are on nearby fluvial landforms. Montauk, Paxton, Woodbridge, and Scituate soils are loamy throughout and have a firm to very firm substratum. Brockton soils have a perched watertable at or near the surface for most of the year. Deerfield and Windsor soils are sandy throughout.

Most areas of this map unit are in woodland, some areas are developed and some areas used for agricultural production.

These soils are generally poorly suited for dwellings with on-site septic tank absorption fields because of the slow permeability of the substratum and perched, seasonal high watertables. Mattapoisett soils are very poorly suited for most uses because of the high watertable. Birchwood and Poquonock soils are suited for woodland and crop productivity, irrigation is needed for optimal production.

2. Freetown-Swansea-Scarboro

Very deep, nearly level to gently sloping, very poorly drained soils formed in very deep to shallow, freshwater organic deposits, underlain by glacial fluvial or Lacustrine deposits in swamps, bogs, fens, and depressions.

This map unit occurs throughout Plymouth County.

Freetown, Swansea, and Scarboro soils are all mapped within lowlying depressional areas and are associated with swamps and freshwater wetlands. All three soils have a seasonal high watertable at or near the surface for most of the year and are often ponded for long durations. Freetown soils consist of very deep organic material ranging from 51 to more than 20 feet in thickness. Swansea soils consist of organic material, 16 to 51 inches thick, underlain by fluvial material. Scarboro soils consist of organic material less than 16 inches thick, underlain by fluvial deposits. A description of each soil can be found in the "classification of the soils" section of this report.

Minor soils in this map unit are excessively drained Carver and Hinckley soils, moderately well drained Birchwood and Deerfield soils, and poorly drained Mattapoisett and Pipestone soils. Very poorly drained Berryland and Brockton soils are also included in this map unit.

Most areas of this map unit are wooded and scrub-shrub wetlands, many areas are used for cranberry production.

These soils are very poorly suited for most uses due to a seasonal high watertable and low soil strength. Areas that are used for the cultivation of cranberries are well suited for production. Areas of this map unit are well suited for wetland wildlife habitat.

3. Hinckley-Windsor-Deerfield

Very deep, nearly level to steep, excessively to moderately well drained soils formed in glacial fluvial deposits on outwash plains, deltas, kames, and ice contact deposits.

Hinckley soils are very gravelly, excessively drained, soils on kames, eskers, moraines and heads of outwash plains. Windsor soils are sandy, excessively drained, soils on deltas and along the southern end of outwash plains (distal part). Deerfield soils are moderately well drained soils on lower elevations and in swales of outwash plains and deltas. Descriptions of Hinckley, Windsor, and Deerfield soils can be found in the "classification of the soils" section of this report.

Minor soils in this map unit are the somewhat excessively drained Merrimac soils, moderately well drained Sudbury soils, poorly drained Wareham and Pipestone soils, and very poorly drained Scarboro and Berryland soils. Merrimac and Sudbury soils have loamy solums. Wareham and Pipestone soils have a seasonal high watertable between .5 and 1.5 feet below the surface. Scarboro and Berryland soils have a seasonal high watertable at or near the surface for most of the year.

Most areas of this map unit are in woodland or mixed residential or industrial development, some areas are in cropland.

These soils are generally well suited to building site development. Deerfield soils have an apparent seasonal high watertable between 1.5 and 4 feet and require mounded septic systems. These soils occur in areas of aquifer recharge and caution should be taken to protect the aquifer. These

soils are well suited for woodland productivity, they are also well suited for cropland, irrigation is required for optimal growth.

4. Scituate- -Montauk-Norwell

Very deep, gently sloping to steep, well drained to poorly drained soils formed in sandy loam eolian material underlain by dense glacial till derived primarily from granitic materials on uplands, drumlins, and ground moraines.

Scituate soils are moderately well drained soils on foot slopes and gently sloping hillsides. Scituate soils have a perched, seasonal high watertable about 1.5 to 4 feet below the surface. Montauk soils are well drained soils convex top and side slopes of hills. Montauk soils have a perched, seasonal high watertable approximately 2.5 to 5 feet below the surface. Norwell soils are poorly drained soils on concave slopes along drainageways and depressions. Norwell soils have a perched, seasonal high watertable about 0.5 to 1.5 feet below the surface. Descriptions of Scituate, Montauk, and Norwell soils can be found in the "classification of the soils" section of this report.

Minor soils in this map unit are the well-drained Poquonock and Paxton soils, moderately well drained Birchwood and Woodbridge soils, and poorly drained Ridgebury and Mattapoisett soils. Poquonock Birchwood, and Mattapoisett soils have sandy solums, Paxton, Woodbridge and Ridgebury soils have a finer textured and more compact substratum.

Most areas of this map unit are in woodland and mixed residential and industrial development. Some areas are used for cropland.

Montauk and Scituate soils are well suited for woodland productivity and cropland, Norwell soils are poorly suited for woodland and cropland due to wetness. These soils are poorly suited to use as sites for septic tank absorption fields because the slowly permeable dense substratum which does not readily absorb the effluent. Subsurface drainage is also a problem with these soils; the firm substratum causes a perched seasonal high watertable.

5. Plymouth-Carver

Gently sloping to steep, excessively drained soils formed in thick sand deposits and/or loose sandy ice contact till on end and recessional moraines and ice contact landforms.

This map unit is mapped primarily in the southeastern part of Plymouth County. It is about 45 percent Plymouth soils, 40 percent Carver soils, and 15 percent other soils.

Plymouth and Carver soils are commonly mapped in a complex of the two soils due to their similar properties. Plymouth soils have a higher percentage of coarse fragments (cobbles to boulder size), while Carver soils typically lack the larger size coarse fragments. Both soils are extremely droughty. A description of each soil can be found in the "classification of the soils" section of this report.

Minor inclusions in this general soil map unit consist of the very poorly drained Freetown soils,

moderately well drained Deerfield soils, and well drained Merrimac, Barnstable, and Montauk soils. Freetown soils formed in freshwater organic deposits and are commonly used for the production of cranberries. Deerfield soils have a seasonal high watertable. Merrimac soils have a loamy topsoil and subsoil underlain by sand and gravel. Barnstable soils are similar to Plymouth soils except they have loamy topsoil and subsoil layers. Montauk soils formed in dense glacial till.

Most areas of this map unit are forested with pitch pine, white pine, and scrub oak, some areas are used for homesites or cropland. Areas of this map unit are poorly suited to woodland, cultivated crops and pasture because of the very low water holding capacity. There are no major limitations which affect the use of these soils as building sites. Large boulders are associated with the Plymouth soils and may hinder excavation activities. This map unit is associated with groundwater aquifer recharge areas and precautions should be taken to protect the aquifer.

6. Canton-Chatfield-Rock Outcrop

Very deep to shallow, gently sloping to very steep, well drained soils formed in ablation glacial till in areas of bedrock controlled uplands.

This map unit is occurs primarily in the northern and central part of Plymouth County.

Canton soils are very deep soils (greater than 6 feet to bedrock) on low pockets in bedrock controlled uplands, and on small undulating hills adjacent to valleys. Chatfield soils are moderately deep soils and typically have hard bedrock between 20 to 40 inches. Chatfield soils are on knobs and near ridge tops in bedrock controlled uplands. A description of Canton and Chatfield soils can be found in the "classification of the soils" section of this report. Rock outcrops are areas where bedrock (ledge) is exposed at the surface, some areas have a very shallow covering of soil less than 20 inches thick. The type of bedrock depends on the area, for more information regarding bedrock types refer to the bedrock map included with this report.

Minor soils included in this map unit are the well drained Paxton and Newport soils, moderately well drained Woodbridge and Pittstown soils, and very poorly drained Brockton soils. Also included are soils that have bedrock between 40 and 60 inches. Paxton and Newport soils are on smooth slopes, both soils are very deep and have dense till in the substratum. Woodbridge and Pittstown soils are at the base of slopes and smooth gentle slopes. Both soils have dense till in the substratum and a perched seasonal high watertable between 1.5 and 3 feet. Brockton soils are along drainage-ways and in depressions.

Most of the soils in this map unit are used for woodland and residential development, some areas are used as sites for quarries.

These soils are fairly well suited to woodland productivity; areas of shallow depth to bedrock have shallow rooting depth and tree-throw hazard. Canton soils are well suited for cropland. Areas of Canton soils are also well suited for development. Areas of Chatfield soils and bedrock outcrop are poorly suited for most uses due to the shallow depth to hard bedrock.

Blasting is often required for excavation; however, in the northern part of the county the bedrock is ripable in many areas.

7. Carver

Nearly level to steep, very deep, excessively drained sandy soils formed in glacial outwash and ice-contact deposits, on outwash plains and kames.

This map unit occurs in the southeastern part of Plymouth County. It is mapped within the Wareham-Plymouth pitted outwash plain and the Kings pond plain (see geology section).

Nearly level to gently sloping, broad areas of Carver soils occur throughout this unit. Strongly sloping to steep areas of this soil occur on the side slopes of swales and valleys on outwash plains, and on ridges and hills within areas of ice-contact deposits. A description of Carver soils can be found in the "classification of the soils" section of this report.

Minor soils in this map unit are the excessively drained Plymouth, Hinckley, and Merrimac soils, and the very poorly drained Berryland, Swansea and Freetown soils. Plymouth and Hinckley soils have a higher percentage of coarse fragments (cobble to boulder size) and Merrimac soils have a loamy surface and subsoil. The Berryland, Swansea and Freetown soils have a seasonal high water table within 0.5 feet of the surface and occur in swales, depressions, and in lowlying areas adjacent to streams, ponds and lakes. Berryland soils formed in sandy outwash. Freetown and Swansea soils formed in freshwater organic deposits.

Most areas of this map unit are in scrub oak and pitch pine woodland. Some areas have been developed for homesites. This map unit is poorly suited to cultivated crops and pasture because of a very low available water capacity and low fertility. There are no major limitations for use as building sites, but the sides of excavations generally cave in because of the loose nature of the substratum. This map unit is associated with aquifer recharge areas and caution should be taken to protect the aquifer.

8. Ipswich-Pawcatuck-Hooksan

Level to steep, very deep, very poorly drained and excessively drained soils formed in organic and mineral marine deposits and eolian sand deposits along coastal areas.

This map unit occurs along Buzzards Bay, Cape Cod Bay, and Boston Harbor. It is about 50 percent Ipswich soils, 25 percent Pawcatuck soils, and 20 percent Hooksan, and about 5 percent soils of minor extent.

The level, very poorly drained Ipswich and Pawcatuck soils border salt water and brackish water bodies that are protected, by beaches and sand dunes, from the direct force of ocean waves. These soils are in tidal areas subject to daily inundation and are vegetated with salt grasses. Excessively drained Hooksan soils are on vegetated dunes adjacent to beaches. Descriptions of Ipswich, Pawcatuck, and Hooksan soils can be found in the "Classification of

Soils" section of this report. Included within this map unit are areas of Dunes and Beeches and very poorly drained Matunuck soils.

Areas of this map unit are in grassy vegetation, many areas are used for homes and recreational uses. Ipswich and Pawcatuck soils are best suited for wetland habitat and poorly suited for other uses due to flooding, low strength, and wetness. Hooksan soils are poorly suited for most uses due to droughtyness and high erosional and depositional events.

9. Raynham-Scio-Birdsall

Very deep, nearly level to gently sloping, very poorly to moderately well drained soils formed in silty lacustrine sediments in areas of glacial lakebeds plains and deltas.

This map unit occurs in the central part of Plymouth County.

Raynham soils are poorly drained soils on level and depressional slopes. Raynham soils have a seasonal high watertable about 0.5 to 1.5 feet below the surface. Eldridge soils are moderately well drained soils on undulating landforms. Eldridge soils have a seasonal high watertable approximately 1.5 to 4 feet below the surface. Birdsall are very poorly drained soils in drainageways and swamps. Birdsall soils are ponded for long periods of time. Descriptions of Raynham, Eldridge and Birdsall soils can be found in the "classification of the soils" section of this report.

Minor soils in this map unit are the moderately well drained Scio soils, poorly drained Enosburg soils, and well drained Hinesburg soils. Scio soils have silty textures throughout, Enosburg soils have sandy material underlain by the silty lacustrine sediments, and Hinesburg soils have a sandy solum.

Most areas of this map unit are in woodland and cropland.

Eldridge soils are well suited for woodland productivity and cropland production, Raynham and Birdsall soils are poorly suited for most uses due to wetness. Areas of this map unit are generally poorly suited for dwellings with on-site sewage disposal systems due to slow permeability and seasonal high watertables.

10. Woodbridge-Paxton-Ridgebury

Very deep, gently sloping to steep, well drained to poorly drained soils formed in fine sandy loam eolian material underlain by loamy dense glacial till on uplands, drumlins, and ground moraines.

Woodbridge soils are moderately well drained soils on foot slopes and gently sloping hillsides. Woodbridge soils have a perched, seasonal high watertable about 1.5 to 4 feet below the surface. Paxton soils are well drained soils convex top and side slopes of hills. Paxton soils have a perched, seasonal high watertable approximately 2.5 to 5 feet below the surface. Ridgebury soils are poorly drained soils on concave slopes along drainageways and depressions. Ridgebury soils have a perched, seasonal high watertable about 0.5 to 1.5 feet below the surface Descriptions of

Woodbridge, Paxton, and Ridgebury soils can be found in the "classification of the soils" section of this report.

Minor soils in this map unit are the well-drained Poquonock and Montauk soils, moderately well drained Birchwood and Scituate soils, and poorly drained Norwell and Mattapoisett soils. Poquonock Birchwood, and Mattapoisett soils have sandy solums, Montauk, Scituate and Norwell soils have a coarser textured and less dense substratum derived mainly from granitic material.

Most areas of this map unit are in woodland and mixed residential and industrial development. Some areas are used for cropland.

Paxton and Woodbridge soils are well suited for woodland productivity and cropland, Ridgebury soils are poorly suited for woodland and cropland due to wetness. These soils are poorly suited to use as sites for septic tank absorption fields because the slowly permeable dense substratum which does not readily absorb the effluent. Subsurface drainage is also a problem with these soils; the firm substratum causes a perched seasonal high watertable.

Base URL: <http://nesoil.com/index.html>

From: <http://nesoil.com/plymouth/gsm/norwell.htm>, page maintained by Jim Turenne, State Soils Scientist, Rhode Island

Appendix C: Natural Resources Information

NORWELL SWAMPS

Dead Swamp upstream of Torrey Pond between Center Street to its west and Winter Street to its east

Satsuit Meadow, on the Town's northeast boundary

South Swamp, the very southern portion shared with Scituate

Black Pond Swamp between Judges and Cuffey Hills

Flat Swamp between Judges Hill and Mount Blue

Bound Brook Pond that is in the last eutrophic stage of a pond becoming a swamp

Burnt Plain Swamp both north and south of Grove Street just west of School Street

Valley Swamp, north and south of Grove Street, flowing to the north into Hingham and south to Jacobs Pond and the Third Herring Brook

Hoop Pole Swamp, the source of Wildcat Creek between Bowker and Lincoln Streets

Old Pond Meadows, a large wetland complex where The Wildcats (Creek and Brook) flow together and join Third Herring Brook

Appendix C: Natural Resources Information

W I L D L I F E

UPLAND

Mammals

Deer Mice, *Peromyscus maniculatus*
Eastern Cottontail Rabbit, *Sylvilagus floridanus*
Grey Squirrel, *Sciurus carolinensis*
Mink, *Mustela vison*
Muskrat, *Ondatra zibethicus*
Meadow Vole, *Microtus pennsylvanicus*
Raccoon, *Procyon lotor*
Red Backed Vole, *Clethrionomys gapperi*
Red Squirrel, *Sciurus vulgaris*
Short Tailed Shrew, *Blarina brevicauda*
Striped Skunk, *Mephitis mephitis*
Virginia Opossum, *Didelphis virginiana*
White-tailed Deer, *Odocoileus virginianus borealis* Miller
Woodchuck, *Marmota monax*

Birds

American Robin, *Turdus migratorius*
Black-capped Chickadee, *Parus atricapillus*
Cardinal, *Cardinalis cardinalis*
Carolina Wren, *Thyrothorus ludoriciensis*
Cedar Waxwing, *Bombycilla cedrorum*
Downy Woodpecker, *Dendrocopos pubescens*
Eastern Phoebe, *Sayornis phoebe*
Golden Crowned Kinglet, *Regulus satrapa*
Hairy Woodpecker, *Dendrocopos villosus*
Hermit Thrush, *Hylocichla guttata*
Mourning Dove, *Zenaidura macroura*
Ovenbird, *Seiurus aurocapillus*
Red Breasted Nuthatch, *Sitta canadensis*
Red-tailed Hawk, *Buteo jamaicensis*
Ruby Crowned Kinglet, *Regulus calendula*
Ruffed Grouse, *Bonasa umbellus*
Rufous-sided Towhee, *Pipilo erythrophthalmus*
White Breasted Nuthatch, *Sitta carolinensis*
Woodcock, *Scolopax minor*
Yellow Shafted Flicker, *Colaptes auratus*
Yellowthroat, *Geothlypis*

Reptiles

Northern Black Racer, *Coluber constrictor*
Painted Turtle, *Chrysemy picta*
Spotted Turtle, *Clemmys guttata*
Eastern Box Turtle, *Terrapene carolina*
Garter Snake, *Thamnophis sirtalis*
Milk Snake, *Lampropeltis triangulum*
Yellow Spotted Salamander, *Ambystoma maculatum*

Appendix C: Stetson Meadows Management Plan

W I L D L I F E

MARSH

Birds

Black Duck, *Anas rubripes*
Great Blue Heron, *Ardea herodias*
Mallard Duck, *Anas platyrhynchos*
Marsh Hawk, *Circus cyaneus*
Marsh Wren, *Cistothorus palustris*
Virginia Rail, *Rallus limicola*
Sora, *Porzana carolina*
Red-winged Blackbird, *Agelaius phoeniceus*
Snowy Egret, *Egretta thula*

*Aquatic Life**

Atlantic Mackerel, *Scomber scombrus*
American Shad, *Alosa sapidissima*
Alewife, *Alosa pseudoharengus*
American Sand Eel, *Anguilla rostrata*
Black Crappie, *Pomoxis nigromaculatus*
Bluegill, *Lepomis macrochirus*
Brook Trout, *Salvelinus fontinalis* - stocked
Brown Trout, *Salmo trutta* - stocked
Catfish, *Ictalurus nebulosus*
Chain Pickerel, *Esox niger*
Golden Shiner, *Notemigonus crysoleucas*
Johnny Darter, *Etheostoma nigrum* Rafinesque
Lamprey, *Petromyzon marinus*
Largemouth Bass, *Micropterus salmoides*
Pumpkinseed, *Lepomis gibbosus*

*From "A Study of the Marine Resources of the North River," Division of Marine Fisheries, 1966.



Living With Wildlife

Fisher in Massachusetts

MassWildlife

Photo © by Bill Byrne



The fisher, *Martes pennanti*, is relatively common in many areas of Massachusetts, but due to its alert, secretive nature and generally solitary habits, most people have never seen this interesting predator. It was eliminated from the state by the 19th century due to agricultural land clearing that virtually eliminated its forest habitat, but it has made an amazing comeback that began during the 1960s. Once considered strictly a wilderness species, fisher now live in more populated areas that offer mature forest habitat and the squirrels that are its chief prey. Fisher are found throughout Massachusetts except in some areas of the southeast, Cape Cod, and the islands.

Description: The fisher is one of the largest members of the Mustelid or weasel family. Fishers exhibit what is referred to as sexual dimorphism (physical differences) in body size between males and females. Adult male fishers weigh 8 to 16 pounds and measure approximately 3 feet from head to tail. Adult female fishers are smaller than males, weighing 4 to 6 pounds and measuring approximately 2+ feet in length. In both males and females, the tail accounts for approximately $\frac{1}{3}$ of the total body length.

The fisher exhibits the typical "weasel" shape with a long, slender body, short legs, and furred tail. It has a pointed face (although not as pronounced as fox or coyote) with large, rounded ears set close to the head. It is well adapted for climbing and has sharp, retractable claws similar to those of a domestic cat. Its coloration is generally a rich brown to black with grizzled grayish coloring on the head and shoulders and the darkest coloring occurring on the rump, tail, and legs. Females typically have the darkest fur. Individuals may also have irregular white patches of fur on their chest and lower abdomen.

Life history: Fishers breed from February to March and exhibit a reproductive strategy called "delayed implantation" that is common to members of the weasel family. The adult female breeds within days after giving birth, but the fertilized eggs remain dormant in her uterus for the next 10 to 11 months. Then the fertilized eggs implant in the uterine wall and begin normal development. The young are born 1 to 2 months after implantation occurs. Female fishers produce 1 litter each year consisting of 1 to 4 kits, with an average litter size of 3 kits.



Photo © by Bill Byrne

The young are born helpless, blind, and sparsely furred. Maternal dens, typically located in a cavity high in a large tree, are used for the first 8 to 10 weeks. Once the kits become mobile, they are moved from the maternal den to one on or below the ground. It is believed that the maternal den functions to protect the helpless young from aggressive male fishers and ground predators. The female nurses the kits until they reach 4 months of age. By five months of age the kits are approximately the same size as the adult female and have begun to learn how to kill their own prey. The young remain with the female until late summer or early fall, at which time they disperse to begin their solitary lives as adults. They reach sexual maturity at one year of age, and females produce their first litter at the age of two.

Habits: Fishers are shy and elusive animals that are rarely seen even in areas where they are abundant. They can be active day or night and tend to exhibit crepuscular (dawn and dusk) and nocturnal activity in the summer and diurnal (daytime) activity in the winter. They remain active year round and do not hibernate. Their preferred habitat is mixed forest with heavy canopy cover, as they tend to avoid traveling in large open areas. They commonly use hollow logs, stonewalls, tree cavities, and brushpiles for resting sites.

Food: Fishers are omnivorous. Their primary foods include small rodents, squirrels, rabbits, birds, eggs, fruit, porcupines, and carrion. They will also opportunistically prey on poultry and domestic cats. Although they are proficient climbers, most of their hunting takes place on the ground.

As with other wildlife species, problems with fishers may sometimes arise, but these are usually restricted to predatory attacks on domestic birds, rabbits, and free ranging housecats. Most problems involving fisher can be avoided by following a few basic practices:

Remove any potential food sources. Fishers are opportunistic feeders that will consistently hunt in areas where they have been successful in the past. Suspend supplemental bird feeding, as the seed attracts small mammals (particularly squirrels) which in turn attract fishers. It is also a good idea to secure trash, garbage, compost and pet food, as these are also potential attractants.

Protect pets and poultry. Fishers are predators that prey on medium sized mammals and poultry. Fishers view domestic cats and rabbits as food, and will prey on them when hunting. They will also raid chicken coops and can kill numerous chickens at a time. For their safety, cats should be kept indoors at all times. Pet rabbits and poultry should be kept in tightly secured buildings or hutches that prevent access by fishers.

Educate your neighbors. If you are experiencing problems with fishers in your yard, be sure to alert neighbors so they, too, can follow these basic practices.

The fisher is an important and valuable natural resource in Massachusetts. It is classified as a furbearer species, for which a regulated trapping season and management program have been established. If you are experiencing problems with fisher, or have any questions regarding this interesting predator, please contact your nearest MassWildlife District Office. Further information on fisher and other native furbearers is also available on our website: www.masswildlife.org.



For more information contact **MassWildlife** at:

Western Wildlife District, Pittsfield: (413) 447-9789

Connecticut Valley Wildlife Dist., Belchertown: (413) 323-7632

Central Wildlife District, West Boylston: (508) 835-3607

Northeast Wildlife District, Acton: (978) 263-4347

Southeast Wildlife District, Bourne: (508) 759-3406

or visit our website at www.masswildlife.org

MassWildlife "Balancing the needs of wildlife with the needs of people."

Appendix D: Massachusetts Bureau of Waste Site Cleanup Site

Reportable Release

Release Tracking Number (RTN)	Release Address	Site Name/ Location Aid	Reporting Category	Notification Date (dd,mm,yy)	Compliance Status	Date (dd,mm,yy)	Phase	RAO Class	Chemical Type
4-0010697	41 Accord Park	No Location Aid	120 DY	22.08.98	RAO	07.04.95		B1	Hazardous Material
4-0012749	10 & 22 Pond St.	No Location Aid	120 DY	27.12.96	DPS	24.12.97			Hazardous Material
4-0000529	10 & 22 Pond St.	South Shore Acura	None	15.10.98	DEP NFA	23.07.93			Oil
4-0010009	46 Bridge St.	Off Rt 123, Main St.	72 HR	06.10.93	RAO	19.12.95	Phase II	A1	Oil
4-0015012	Brigantine Circle	Pole 18	2 HR	16.09.99	RAO	22.11.99		A2	Oil
4-0014568	Cordwainer Drive	SE of Nursing Home	120 DY	05.03.99	RAO	02.08.99		A1	Hazardous Material
4-0012425	111 Cross St.	No Location Aid	72 HR	14.08.96	RAO	22.05.97		A1	Oil
4-0011269	32 Glen Trlr Park	Off 214 Washington St	2 HR	12.04.95	Tier 1C	14.03.97	Phase II		Oil
4-0013242	82 Green St.	No Location Aid	72 HR	01.08.97	RAO	30.09.97		A2	Oil
4-0012240	7 Grove St.	Bus Terminal	72 HR	06.06.96	RAO	05.08.96		A2	Oil
4-0015288	86 High St.	No Location Aid	2 HR	18.02.00	RAO	27.09.00		A2	Oil
4-0015314	86 High St.	No Location Aid	2 HR	18.02.00	Tier 1D	27.02.00			Oil
4-0000726	223 Main St.	Hilltop Service Station	None	15.10.89	DEP NFA	24.04.96			
4-0013918	310 Main St.	No Location Aid	2 HR	01.06.98	RAO	05.04.02	Phase II	A2	Oil
4-0014450	310 Main St.	Norwell Highway Dept	72 HR	08.01.99	RTN Closed	08.06.99			Oil
4-0017648	310 Main St.	DPW	2 HR	20.02.03	RAO	12.05.03		A2	
4-0013154	334 Main St.	H. Goldman School	72 HR	03.07.97	RAO	10.07.98		A2	Oil
4-0000133	724 Main St.	Joseph's Pontiac	None	09.05.86	Tier 2	13.09.00	Phase IV		Oil
4-0016160	998 Main St.	No Location Aid	2 HR	04.02.01	RAO	01.06.01		A2	Oil
4-0012566	43 Masthead Dr.	No Location Aid	72 HR	17.10.96	RAO	18.12.96		A1	Oil
4-0014129	88 Masthead Dr.	No Location Aid	72 HR	20.08.98	RAO	21.09.98		A2	Oil
4-0016621	75 Masthead Way	Residence	72 HR	12.10.01	RAO	11.10.02		A2	Oil
4-0013234	36 May Elm St.	Collins Residence	72 HR	31.07.97	RAO	29.09.97		A2	Oil
4-0017157	291 Mt. Blue St.	No Location Aid	72 HR	21.06.02	RAO	27.08.02		B1	Oil
4-0012792	Mt. Hope St.	Pole #15	2 HR	21.01.97	RAO	21.03.97		A1	Oil
4-0015433	102 Old Oaken Bucket Rd	Vinal Ele. School	72 HR	20.04.00	RAO	21.08.00		A2	Oil
4-0013101	44 Old Pottery Lane	No Location Aid	2 HR	16.06.97	RAO	10.06.98		A2	Oil
4-0014117	142 Parker St.	No Location Aid	72 HR	18.08.98	RAO	03.02.99		A2	Oil
4-0018082	Pine & Wildcat St.	No Location Aid	2 HR	21.10.03	Unclassified	20.10.03			Oil
4-0012574	10 Pond St.	So. Shore Acura (frmr)	120 DY	17.12.96	RAO	09.03.99	Phase II	A2	Oil & Hazardous Mtl
4-0000705	32 Pond St.	Fabricare House	None	15.04.89	REMOPS	26.09.03	Phase V		Oil
4-0000941	75 Pond St.	South Shore Volvo	None	29.06.90	RAO	16.10.95		A2	Oil
4-0014470	40 River St.	Norwell Police Station	72 HR	20.01.99	RAO	19.03.99		A1	Oil
4-0000134	Rt 228 & 53	Queen Ann's Arco (frmr)	None	15.01.87	REMOPS	02.09.03	Phase V		Oil
4-0016466	Rt 3 N	200 Ft N of River St.	2 HR	07.08.01	RAO	21.02.02		A2	Oil
4-0015227	Rt 3 S	Mile Marker 30	2 HR	08.01.00	RAO	17.03.00		A2	Oil
4-0010290	Satuit Ln.	Pad Mount #1 off Winter St.	2 HR	25.02.94	RAO	13.01.95		A2	Oil
4-0012196	Tiffany Rd.	Pole #11 (25KVA)	2 HR	21.05.96	RAO	22.07.96		A2	Oil
4-0016942	10 Washington St.	Queen Ann's Arco (frmr)	72 HR	13.03.02	RTN Closed	13.05.02			Hazardous Material
4-0000674	119 Washington St.	Sullivan Tire Co. (frmr)	None	10.01.89	RAO	27.10.95		A3	Oil
4-0016350	271 Washington St.	No Location Aid	2 HR	03.07.01	RAO	05.11.01		A2	
4-0000524	271 Washington St.	Atlantic Towing Co.	None	15.10.88	RAO	05.11.01		A2	Oil & Hazardous Mtl
4-0000402	412 Washington St.	Boston Whaler Inc.	None	15.10.87	RAO	14.03.97		B1	
4-0000713	433 Washington St.	North River Elec. Supply	None	15.01.89	DEP NFA	02.08.95			Oil
4-0016053	72 Washington St.	Shell Station (frmr)	72 HR	21.02.01	Tier 1C	07.02.02	Phase II		Oil
4-0016067	72 Washington St.	Shell Station (frmr)	72 HR	28.02.01	RAO	04.05.01		A1	Oil
4-0016674	72 Washington St.	Shell Station (frmr)	120 DY	22.10.01	RAO	21.10.02		A2	Oil & Hazardous Mtl
4-0016941	72 Washington St.	Shell Station (frmr)	72 HR	12.03.02	TCLASS	04.02.03			Oil
4-0000999	89 Washington St.	Mobil Station 01 QLW	None	15.01.91	RAO	24.08.94		A2	Oil
4-0000665	95 Washington St.	Sunoco Service Station	None	14.12.88	RAO	23.02.95		A2	Oil
4-0012405	376 Washington St.	Garden Center	2 HR	11.08.96	Tier 1D	18.08.97			Oil
4-0014863	6 West St.	State Police Barracks	72 HR	16.07.99	RTN Closed	13.01.00			Oil
4-0010259	West St.	State Police Barracks	2 HR	03.02.94	REMOPS	28.06.01	Phase V		Oil
4-0000608	4 Whiting St.	Getty Service Station	None	15.01.89	Tier 1C	29.04.03			

Key: Active Cleanup Sites

<http://www.state.ma.us/cgi-bin/dep/wscreport.cgi> - 13 Dec 03

Appendix E

RULES AND REGULATIONS
FOR THE USE OF LAND UNDER THE CONTROL
OF THE NORWELL CONSERVATION COMMISSION

- Obey all State, Local and Federal Laws; mainly the hunting, fishing and littering statutes.
- No overnight camping without permission from the Conservation Commission.
- No open fires without Conservation Commission and Fire Department permission.
- No motorized vehicles except in parking areas.
- No removal of any plant material, living or dead, without the permission of the Conservation Commission.
- Disturbing, defacing, or removing feature, sign or poster, or barrier is prohibited.
- The Town of Norwell assumes no liability for injury or loss of personal property.

ARTICLE 97:
Constitution of the Commonwealth of Massachusetts

Article XCVII. Article XLIX of the Amendments to the Constitution is hereby annulled and the following is adopted in place thereof: - The people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and esthetic qualities of their environment; and the protection of the people in their right to the conservation, development and utilization of the agricultural, mineral, forest, water, air and other natural resources is hereby declared to be a public purpose.

The general court shall have the power to enact legislation necessary or expedient to protect such rights.

In the furtherance of the foregoing powers, the general court shall have the power to provide for the taking, upon payment of just compensation therefor, or for the acquisition by purchase or otherwise, of lands and easements or such other interests therein as may be deemed necessary to accomplish these purposes.

Lands and easements taken or acquired for such purposes shall not be used for other purposes or otherwise disposed of except by laws enacted by a two thirds vote, taken by yeas and nays, of each branch of the general court.

Appendix G: Norwell Open Space Criteria

The Open Space and Recreation Committee defines “Open Space” as including, but not limited to, land protecting the quality and quantity of the town’s water supply including existing and future well fields, aquifers and recharge areas; land protecting natural communities to support wildlife and biodiversity; land to preserve other natural resources such as forests, salt water marshes, wetlands rivers, streams and ponds; land to protect scenic vistas and unique and historic resources such as agricultural land, grasslands, fields; and land for active and passive recreational use such as bikeways, walking trails, bridle paths, athletic fields, access to the North River and other recreational needs of the community.

The Open Space and Recreation Committee has developed the following checklist of natural resource and community functions, and created a point-based ranking system. Other criteria such as cost, development pressures, partnership opportunities, and subjectivity will be evaluated on a parcel-by-parcel basis.

GROUND WATER SUPPLY (including Hanover, Scituate and Cohasset)

Existing Zone 1 (identified as potential ground water supply)	3 points
Existing Zone 2 (mapped recharge area surrounding ground water supply)	2 points
Existing Zone 3 (within watershed of ground water supply)	1 point
No existing or potential function as water supply	0 points

SURFACE WATER SUPPLY/QUALITY/ SOIL EROSION (including Scituate, Hingham and Cohasset)

Parcel would protect a Class A water (within 400 ft. of surface water supply & 200 ft. from tributary to surface water supply)	3 points
Parcel would protect a Class B water (within half mile of surface water supply)	2 points
Parcel would protect a Class C water (within watershed of surface water supply)	1 point
Parcel is not proximate to any surface waters	0 points

MAINTENANCE OF BIOLOGICAL DIVERSITY OR WILDLIFE HABITAT

Parcel is within Core Habitat, Supporting Natural Landscape, and certified and potential vernal pools in the NHESP Biomap	3 points
Parcel is identified as Natural Resources Priorities in the Master Plan	2 points
Parcel is identified as local natural communities or is contiguous to existing habitat	1 point
Parcel does not provide significant habitat functions	0 points

BUFFERING CONFLICTING USES

Site buffers public site or large scale private site from conflicting adjacent land uses	3 points
Site buffers small scale private sites from conflicting uses	2 points
Site buffers sites that are not sensitive to adjacent uses	1 point
Site does not serve a buffering role	0 points

RECREATIONAL VALUE

The parcel is recognized as a destination for recreational activities including potential bikeway, athletic fields and pedestrian network as outlined in the Master Plan and/or Open Space & Recreation Plan	3 points
The parcel meets criteria identified in the Master Plan and/or Open Space and Recreation Plan for recreation/open space	2 points
The parcel is not identified in the Master Plan and/or Open Space and Recreation Plan but provides recreational opportunities	1 point
The parcel does not provide recreational values	0 points

SCENIC VIEWS

The parcel provides a distinctive landscape view from a public way or provides a vista from which to view significant and distinctive landscape qualities.	3 points
The parcel is associated with an identified visual element of the town including scenic roads.	2 points
The parcel provides distinctive views but is not readily accessible to the public	1 point
The parcel does not provide scenic qualities	0 points

LANDSCAPE/GREENWAYS CONTEXT

The parcel is contiguous to existing protected open space and recreation lands AND is identified as a greenway corridor between open spaces	3 points
The parcel is located in the “Protective River Corridor” as identified in the NSRWA’s North River Mapping Project	3 points
The parcel abuts existing open spaces and recreation lands	2 points
The parcel does not abut open space but is identified with a greenway corridor between existing open spaces	1 point
The parcel is remote and does not abut any existing open space	0 points

TOTAL POINTS

Appendix H: ADA Access Self-Evaluation
and Supporting Documentation

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1. ADA Access Self-Evaluation
2. Letter of Compliance with all Policies of the ADA (American Disabilities Act)
from the ADA Coordinator
3. Public Notice of Compliance with the ADA Act
4. Examples of Job Posting listing AA/EOE for Town Planner and Treatment
Facility Manager
5. Agreement between Union Local 285 SEIU, AFL-CIO and town of Norwell
6. Grievance Procedure for the ADA for the Town of Norwell
7. Complaint Form for Violations of the ADA
8. Norwell Handicap Commission Information Sheet (ADA of 1990)

Appendix H: ADA Access Self-Evaluation

A RECREATION

OVERVIEW

The following list includes those properties used by the Norwell Recreation Commission for programming or public use. These sites were evaluated in spring and summer of 2003 with members of the Norwell Commission on Disabilities.

Once the site inventory was complete, the self-evaluation was presented to the Norwell Commission on Disabilities. They recommended improved access for people with disabilities especially to the facilities at the Norwell High School campus. The Transition Plan for Recreation has been developed with these comments in mind. The Recreation Commission will continue to work with the Commission on Disabilities when creating and maintaining access to facilities used for public recreation programs. The Recreation Commission will also work various other town departments, youth and sports organizations, scouts and other interested parties to encourage projects and improvements at public facilities that will include access to people with disabilities.

Programs: All Recreation programs are open to all abilities. As stated in our quarterly brochures—“All abilities are invited. If special accommodations are needed, please give us a two week notice.”

RECREATION AREAS OVERSEEN BY RECREATION COMMISSION

Centennial Park (site visit-6/12/03) is located on Pine Street and has two full soccer fields and an outdoor basketball court. The recreational usage is under the jurisdiction of the Recreation Commission. The primary usage is by the independent Norwell Youth Soccer Association. Because it is on the closed landfill, the Board of Health has the ultimate jurisdiction and must approve improvements.

The accessible signage is missing and there is no accessible path from parking to the field of play. The slope of the ground to the field is between 4-8% at its steepest. There is no spectator seating of any kind. Player seating, port-o-john and drinking fountain is not accessible or adequate by design or placement.

TRANSITION PLAN SUGGESTION

- Replace Accessible Parking Signs – (Recreation Commission 2005)
- Letter from Open Space & Recreation Committee (OS&RC) and/or Recreation Commission to Norwell Youth Soccer Association including self

evaluation findings and asking for future improvements to include Architectural Access Board/Americans with Disabilities Act (AAB/ADA) Compliance (2005):

- Port-o-Johns, benches and/or bleachers
- Funding future improvements to replace water fountain with accessible one (Recreation Commission/NYSA 2005)
- Improve pathway from parking to basketball court to field (with earth ramp or other solution (Recreation Commission/NYSA 2005/06)

“Ed” White Recreation Area is about 7 acres located on Green Street and has no access or off-street parking. It is undeveloped open space that abuts the Centennial Park. It is under the jurisdiction of the Recreation Commission

TRANSITION PLAN SUGGESTION

- Recreation Commission sends letter to Athletic Field Committee asking them to determine the feasibility and cost of developing for athletic field/s – 2005.

Reynolds Playground (site visit-6/12/03) is under the Recreation Commission’s jurisdiction and is located on Prouty Ave. It is a small neighborhood playground with swings, slide, play structure, paved basketball court, and small grassy area. There is no off-street parking as most users live in the neighborhood.

Pathways are paved or stone dust with part of the slopes between 6-7% (should be 5%). The 3’ width is somewhat narrowed by encroaching sod & landscape mulch. The basketball court is good. The play structure has accessible elements and transition platforms. The safety surface is manufactured wood-fiber, which meets accessibility standards. One bench has a back but no arms and is on grassy surface. The accessible child’s seat is missing the safety strap. The picnic table is not accessible.

TRANSITION PLAN SUGGESTION

- Replace safety strap on accessible swing (Recreation Commission 2005)
- Trim sod to widen pathway to 36”, add stonedust and improve grade as needed (Recreation Commission 2005)
- Replace picnic table with accessible one when table needs replacing (Recreation Commission 2005/2006)
- Add accessible bench with arms (Recreation Commission 2006)

Stetson Meadows has 20+/- upland acres designated for recreation located at the end of Stetson Shrine Lane. The agreement was for Recreation to have the first 20 acres of the property at the cul-de-sac. The remaining 120+/- acres are under Conservation Commission jurisdiction and about three acres with the Historical Commission and the Stetson Ford House. The property has not been surveyed or registered exactly which acreage is under which commissions' jurisdiction. There are several trails throughout the property. Access is poor, no trails are ADA accessible. The roadway is dirt and poorly graded – parking is limited to the cul-de-sac and an interior rough field (not accessible).

TRANSITION PLAN SUGGESTION

- Survey community for possible recreation uses for the 20 acres (Recreation Commission 2004).

Update: Recreation's Summer 04 Brochure, mailed to all postal customers, included the question: "What would you like to see on Recreation's 20 acres at Stetson Meadows?" We asked for a response by phone or mail. Seven (7) responses were made between May & August 2004!

Results:

- 2– Pool (no chlorine); Summer camp site with pool
- 3– walking trails, children's play area & picnic tables. Biking trails. Horse trails & keep natural.
- 1– Sell the 20 acres & use money to improve high school athletic facility with an artificial turf field
- 1– Golf course (9 holes or more) with giant lake for holding water
- Contact Athletic Fields Committee to determine the feasibility and cost of developing athletic fields at site. (Recreation Commission 2005/2006)
- Encourage town to complete a land survey to determine property line for historical, recreation and conservation jurisdiction and file deed (Open Space & Recreation Committee 2006)

Woodworth Park (site visit-6/12/03) is the complex of 3 Little League/Softball fields located on Main Street across from Jacob's Pond. The fields are used by the Norwell Little League, Girls' Softball and Adult Softball Leagues. It is under the Recreation Commission's jurisdiction but the deed has restrictions managed by the Society for the Preservation of New England Antiquities (SPNEA) who must approve improvements.

There is no accessible spectator seating, port-o-johns or drinking fountains. Player dugouts on

fields 1 and 2 are too narrow (30") to enter and benches inside are not accessible (32" minimum clearance is needed). The batting cage is accessible. The snack bar serving window is too high (4') to access easily from a wheelchair. Interior has sills and steps. The roadway has a dirt base, uneven surface with potholes and puddles. The one picnic table is not accessible by placement or design. Field 1: Gates and field paths are accessible. There is an accessible parking space. Field 2: Accessible-parking sign is missing. Gate and field path is too narrow (31.5" and 28" respectively) for field access. Field 3: There is accessible parking signage. Field gate is too narrow (27"). Player benches have no backs or arms. There are no pathways from player benches to field (grassy surface). There is no spectator seating of any kind.

TRANSITION PLAN SUGGESTION

- Replace accessible parking sign on fields 2 & 3 (Recreation Commission 2005)
- Send letter to Norwell Little League including self evaluation finds and asking for future improvements to include (AAB/ADA) compliance for: Port-o-johns, drinking fountain, dugouts with openings (min 32"), benches, spectator seating, snack bar service window lowered (now 48" at maximum for front) and improved access for inside snack bar (Recreation Commission 2005)
- Improve roadway surface to reduce potholes and standing water (Recreation Commission, Little League and Town 2005/2006)

RECREATION AREAS OVERSEEN BY THE BOARD OF SELECTMEN

Gaffield Park (site visit-6/12/03) is a playground located at the junction of River and Forest Streets. It is under the jurisdiction of the Board of Selectmen. There is presently a Friends of Gaffield Park Committee raising funds to improve and rebuild the playground in the spring of 2004. There is no accessible parking signage. The pathway from parking to play structure is okay until it becomes pea gravel. All benches have no backs or arms. There are no elements for accessible play and safety surfacing is inaccessible (pea gravel).

Update: Site visit 10/2004. A new, accessible playground was installed in May 2004. Parking and pathway are accessible and play structures now have some accessible elements.

TRANSITION PLAN SUGGESTION

- Notify Board of Selectmen that no picnic tables include accessible seating – when replacing in future, accessibility should be considered.

Osborne Field is the soccer field located on Main Street next to the roadway into the Highway Garage Complex. It is under the jurisdiction of the Board of Selectmen and the Athletic Field Committee oversees improvements. A softball field has been completed in 2003. There is no parking on site. The closest parking is located at the Sparrell and Middle Schools adjacent (across the access roadway). There is available space next to the bridge and field path to make accessible parking. A short path and bridge access the field. The path has a dirt/gravel base and exposed roots and the slope maximum is 14%. The bridge is accessible. Player benches have no backs or arms and some of poor design-unbalanced, which allows for a tipping if a person sits on the end.

TRANSITION PLAN SUGGESTION

- OS&R Committee to send letter to the Board of Selectmen including self evaluation findings and asking for future improvements to include AAB/ADA compliance for the following:
 - One accessible parking place near the bridge (2005)
 - Improve pathway to/from the bridge to fields using dust or asphalt (2005)
 - Improve benches (2005/06)
 - Add spectator seating (2007)

RECREATION AREAS OVERSEEN BY THE SCHOOL COMMITTEE

All Schools

TRANSITION PLAN SUGGESTION

- OS&R Committee to send letter to school department asking for improved signage for all after-school access and routes to “after-hours” entrances and fields including accessible parking designation, pathway surfacing curb cuts closer to ramps and doors, door signs, etc.
- Signage at all elevators or gate to fields which need keys indicating how to get keys need for usage after-hours
- Suggest adding auto-open doors at main entrance and after-hours entrances

Cole School (site visit-6/17/03) is located on High Street and is used for programming by the Recreation Commission, especially the gym, cafeteria and playground. The fields were still under growth as of the summer of 2003 but, as of fall 2004 still show evidence of poor drainage and inadequate turf for athletic field use.

PLAYGROUND: There are not many elements for play for all abilities – only a slide & bridge. There is no accessible parking signage near the entry to the playground and no ramp or curb cuts from any of the building doors closest to the playground (library, hallway, community room or gym). The safety surfacing is accessible. The placement of the playground next to delivery areas and trash storage is unfortunate.

GYM/STAGE: The after-hours/weekend door has no designation as such. And there is no designated accessible parking at that entrance. There is no automatic door opener. The stage elevator needs keys to operate but no signage about how to obtain the key. Restroom/hallway doors seem heavy.

TRANSITION PLAN SUGGESTION

- Improve after hours signage and access
- Improve access with curb cuts and ramps to the right side of the building closest to the playground and fields
- Improve doors to restroom so they open more easily from the hallway

High School (site visit-6/17/03) is located at 18 South Street and used by the Recreation Commission for programming, especially the gym, cafeteria, various classrooms, tennis courts and fields. It is under the jurisdiction of the School Committee and is nearing a four- year process of renovations.

The roadway to the playing fields is dirt, potholes and puddles. A key to the gate is needed for accessibility but no signage for how to obtain the key. The accessible parking signs are near the football field only (none marked near tennis courts or other sports fields). Two sets of portable bleachers block the accessible path from the parking to the bleachers (no bleachers have accessible seating). The pathway from the parking to the snack bar has a slope range of 4-6.5%. The service window seems quite high for easy use by someone in a wheelchair and the inside is not accessible. The picnic area has no accessible tables or surfacing (asphalt chunks). The restrooms are usable but do not have accessible plumbing placement or hardware.

TENNIS COURTS have no accessible pathway from parking to court entry. The gateway onto the court is accessible in width but has a lip in the pavement. Benches have backs but no arms.

BUILDING: The ramp to the door (north side) is 8% at the maximum.

GYM: The after-hours/weekend door has no designation as such. The accessible parking spot and curb cut is more than 180' from the ramp and 260' from the door. The gym is located on the sec-

ond level and the elevator needs a key for operation. There is no signage about where to obtain a key. Because all access to the gym is by stairs or elevator it could be a real hazard if emergency use prohibited use of the elevator for egress. The ramp to the lockers and restrooms is 8.2-9.7% at maximum slope.

CAFETERIA: The ramp has a maximum slope of 10-11%. (greater than the 8% for compliance) Tables and chairs are accessible.

AUDITORIUM: Has adequate accessible seating and access. The elevators need keys to operate but no signage about how to obtain the key.

TRANSITION PLAN SUGGESTION

- Improve “after-hours” signage for access
- Improve roadway to fields and accessibility to all fields. Key or combination lock needed for security gate
- Improve pathway to tennis courts from parking (stone dust or pave) and add accessible parking signage near courts
- Improve snack bar access and picnic area tables

Middle School (site visit-6/17/03) is located on Main Street and used by the Recreation Commission for programming, especially the cafetorium and gym (and future fields). It is under the jurisdiction of the School Committee and is a new school completed in 2002.

The accessible curb cut is more than 100’ from the front door. There is no accessible parking signage near the after-hours gym access (to the back side of the building). The cafetorium has a stage accessible with an elevator that needs a key (there is no signage about how to obtain a key). The elevator was blocked by storage of equipment on the stage level on the day of our visit. The gym is accessible with access and spectator seating. The new sports fields should be ready for play in 2005.

TRANSITION PLAN SUGGESTION

- Improve after-hours signage/access and accessible parking near after-hours entrance

Sparrell School (site visit-6/17/03) is located on Main Street and used by the Recreation Commission for programming in the gym with stage. It is under the jurisdiction of the School Committee.

The curb cut and accessible parking is more than 100' from the end of the building ramp. The ramp slope ranges from 6-10%. The outside door is very heavy and 33" wide clearance. There is no automatic door opener. The elevator (means of access to lower level gym/stage) needs a key for operation and no signage of how to obtain it. The elevator buttons are at 51" and the call button at 54". The elevator egress on the lower level is compromised by storage of chairs. The gym has no accessible seating. The stage has no accessibility from floor to stage. The stage is currently used as storage space so really accessible to no one. Because all access to this area requires use of stairs or elevator, there would be a real hazard if an emergency prohibited use of the elevator for egress.

TRANSITION PLAN SUGGESTION

- Encourage use of other buildings first as accessibility for after-hours is difficult (poor seating in gym, nor access to stage, etc)
- Improve after-hours signage for access routes and entrances
- Add accessible parking spot nearer to ramp

Vinal School (site visit-6/17/03) is located on Old Oaken Bucket Road and is used for programming by the Recreation Commission, especially the gym, cafeteria and playground. It is under the jurisdiction of the School Committee.

GYM: The accessible parking and curb cut for the front visitor entrance is more than 100' from the after-hours/weekend gym entrance. There is no automatic door opener. The gym, spectator seating, and restrooms are accessible.

PLAYGROUND: The pathway to the gate is dirt, rough and a curb at the entry. There are few elements for diverse play (similar to the play structure at Cole). The safety surfacing is accessible.

FIELDS: There is no designated accessible parking near the field or playground areas. The field surface is extremely poor with little sod and exposed rocks and stones. There is no seating of any kind.

TRANSITION PLAN SUGGESTION

- Improve after-hours signage, access and accessibility parking
- Improve turf field

FUNDING SUGGESTIONS

- Local sports associations assistance, as primary users of facilities
- Grants: Federal, State, Local and private foundations

-
- CPA Funding
 - “Adopt” a Project – Community clubs, organizations, businesses or individuals
 - Eagle Scout Projects
 - Town Meeting Articles or Departmental Budgets

B CONSERVATION LANDS

OVERVIEW

The following list includes those properties owned and/or managed by the Norwell Conservation Commission that have public access. These properties were evaluated in spring and summer of 2003 with members of the Norwell Commission on Disabilities. None of the properties owned by the Conservation Commission have public restrooms, bathhouses, play areas, athletic fields, or swimming facilities. The Conservation Commission currently does not offer any educational programs such as interpretive walks

Once the site inventory was completed, the self-evaluation was presented to the Norwell Commission on Disabilities. They recommended improved access for people with disabilities to Jacob’s Pond and the North River (including Stetson Meadows). The Transition Plan for Conservation properties has been developed with these comments in mind. The Conservation Commission will continue to work with the Commission on Disabilities when creating and maintaining access on its properties. The Conservation Commission will also work with Eagle Scouts and other interested parties to encourage projects on Conservation Land that will include access to people with disabilities.

SITES

Jacobs Pond is a 189-acre parcel located in the northwestern portion of town. There is an extensive trail system with access at Jacob’s Lane, Prospect Street, Judith Street, Beers Avenue and Duncan Drive extension. There are unpaved parking areas at the Jacob’s Lane and Duncan Drive Extension entrances. The trails are mostly narrow and unimproved with many exposed rocks and tree roots). There is a dirt road from the parking lot at Jacob’s Lane to the Pond, however, a metal gate blocks access to the road from the parking lot. While most visitors can walk around the gate, a boulder is less than 3 feet away from the gatepost and prevents wheelchair access. A small wooden dock is located at the end of this road and is also inaccessible. A handicapped-accessible picnic table has been placed in a wooded area to the west of the parking lot but requires an accessible path from the parking lot to the picnic table. At the Duncan Drive

Extension, the parking area is unpaved and drops from the road at a steep gradient to the Cliff Prentiss Bridge and further to a canoe launch area at the edge of the Pond. The bridge is at least 36" wide with railings, but there is a step up at the access point from the parking lot and wooden posts narrow the entrance to the bridge. The trails from the bridge into the wooded area are quite steep, narrow and unimproved.

TRANSITION PLAN SUGGESTION

- Install a sign in the Jacob's Lane parking area indicating where a gate key (can be obtained to facilitate vehicular access to the Pond.
- Move the boulder to the left of the metal gate in the Jacob's Lane parking area to allow access around the gate.
- Grade and surface the parking area and the path from the parking area on Jacob's Lane to the Pond to provide safe wheelchair access.
- Create a handicap parking space in the Jacob's Lane parking lot.
- Coordinate with the Highway Department or an Eagle Scout to create an accessible pathway from the Jacob's Lane parking area to the picnic table.
- Construct a ramp from the Duncan Drive Extension to the Cliff Prentiss Bridge. Remove the step and posts that prevent access to this bridge.
- Create a handicap parking space near the Duncan Drive Extension ramp entrance.

Betzold Property is contiguous with the Jacob's Pond parcel. An unimproved steep and narrow path provides difficult access to this property at the end of Beers Avenue. There is no designated parking area.

Donovan Property is comprised of more than 150 acres of land at the corners of Circuit, Pleasant and Forest Streets. A portion of this land has been set aside for public use but has not been developed at this time. The Conservation Commission developed a Management Plan that includes the creation of a parking area and several hiking trails. The Management Plan states that the Conservation Commission will work closely with the Norwell Commission on Disabilities to ensure that the proposed additions comply with all applicable laws pertaining to people with disabilities.

TRANSITION PLAN SUGGESTION

- The Conservation Commission will apply for funding from the Community Preservation Committee or other sources to implement the Donovan Farm

Management Plan and will work with the Commission on Disabilities to ensure that the area set aside for public use will be accessible to people with disabilities

Miller Woods is a 45-acre parcel located off of Forest Street. Access to this land is via an unpaved parking lot. Unimproved narrow trails extend into the property from the parking lot.

Fogg Forest is a 40-acre parcel located near the center of town. There is trail access from Main Street and Central Street. There is no parking area at the Central Street access but visitors can park in the grassy field on Main Street. Homestead Farm Drive also provides access but has not been developed. Trails within this property are well maintained but narrow and unimproved.

Gould Property This parcel is located in the central part of town between Trout Brook Lane and Hemlock Drive. There is a paved parking area off Trout Brook Lane but access is blocked by a metal guard rail. Large boulders and an earthen and rock berm block access to an unimproved trail. The trails within this property have not been maintained and are overgrown and in poor condition. There is also an undeveloped right-of-way from Hemlock Drive.

Hatch Lots comprise 44 acres in the northern part of town between Grove Street, Prospect Street and Bowker Street. There is no off-street parking but there is trail access from Edgewood Park and from Grove Street. There is also an unimproved right-of-way that runs from Grove Street to Prospect Street that is wide (more than 36") and well maintained. The trails extending from the right-of-way are much narrower and also unimproved.

Cuffy Hill is a 47-acre parcel off Mt. Blue Street. Cuffey Hill, which is leased to the Massachusetts Audubon Society by The Nature Conservancy, is contiguous with the Black Pond Reservation. There is no off-street parking at this location but there is a grass parking area on Mt. Blue Street across from the entrance to Black Pond Reservation. A chain blocks vehicle access to the parking lot. Access to the Cuffey Hill property is on Mt. Blue Street via an unimproved trail.

Clark Woods is a 27-acre parcel located on Wildcat Lane near John Neil Drive. There is no off-street parking. There is a narrow unimproved trail leading into the site from Wildcat Lane.

Stetson Meadows is a 116-acre parcel located along the North River. Access is from an ungraded dirt road from the end of Stetson Shrine Lane. The road is in poor condition. There is a grass parking area at the junction of several walking trails. A large log blocks one trail and a

metal gate blocks another trail. Another narrow unimproved trail leads into the Norwell Recreation Department property at the paved cul-de-sac at the beginning of the dirt road.

TRANSITION PLAN SUGGESTION

- Make trails more accessible.
- Work with Eagle Scouts and other organizations, such as The Friends of Stetson Meadows, to make the dirt road, parking lot and trails accessible to people with disabilities.

CONSERVATION OWNED PROPERTIES WITH NO PUBLIC ACCESS

The following list contains properties that are surrounded by private property and those properties that have street frontage, but no developed walking trails, parking areas, picnic areas or other means of access into the property.

Perry H. Osborn Woods – 25 acres of land located off Winter Street
Kings Landing – 23.6 acres located on King's Landing and along the North River
North River Salt Marsh – 69.3 acres of Salt Marsh along the North River
Bond Land – 17 acres off Old Oaken Bucket Road. Abuts Scituate Conservation Land
Cooper Lot – 16 acres off Mt. Blue Street
Washington Park Land – 9 acres adjacent to the cemetery
Grove Street Well sites – 4.5 acres adjacent to Water Department Land
Turner Lot – 10 acres off Old Oaken Bucket Road. Borders First Herring Brook
Couch Lot – 34 acres of salt marsh in the Stetson Shrine Lane area
John Lind Lots – 2.6 acres on School Street
Barbuto property – 14 acres off Captain Vinal Way
Dunn property – 11 acres of land recently donated to Conservation Commission off Cushing Hill Road and South Streets
Larsen property – 5 acres off Old Oaken Bucket Road
Alloca Land – 1 acre on Main Street
Eurlle Property – 10 acres of land on Mt. Blue Street
Wildcat Park Access – 1 acre on John Neil Drive
Judges Hill Road Land – 10 acres at the corner of Judges Hill Road and Mt. Blue Street
Howe property – 15 acres on Bowker Street. Abuts the Hatch lots



DIVISION OF INSPECTIONS
TOWN OF NORWELL

345 MAIN STREET P.O. BOX 295
NORWELL, MASSACHUSETTS 02061
(781) 659-8018 • Fax (781) 659-1892

December 21, 2004

To Whom it may Concern:

As the ADA coordinator of the town of Norwell, I do attest that the town is in compliance with all policies of the ADA Act with respect to the following: Recruitment, Personnel Actions, Leave Administration, Training, Tests, Medical Exams/Questionnaires, Social & Recreational Programs, Fringe Benefits, Collective Bargaining Agreements and Wage and Salary Administration.

Sincerely,

Timothy J. FitzGerald
ADA Coordinator

PUBLIC NOTICE

The Americans with Disabilities Act Title II regulations require that municipalities notify applicants, employees, participants and interested persons of their rights under the law.

AMERICANS WITH DISABILITIES ACT

THE TOWN OF NORWELL DOES NOT DISCRIMINATE ON THE BASIS OF DISABILITY IN ADMISSION OR ACCESS TO, TREATMENT OR EMPLOYMENT IN ITS PROGRAMS, SERVICES AND ACTIVITIES.

THE TOWN OF NORWELL HAS DESIGNATED THE FOLLOWING PERSON TO COORDINATE EFFORTS TO COMPLY WITH THESE REQUIREMENTS. QUESTIONS, REQUESTS FOR AUXILIARY AIDS AND SERVICES OR MODIFICATIONS OF POLICIES AND PRACTICES AND COMPLAINTS SHOULD BE DIRECTED TO:

Mr. Tim Fitzgerald ADA Coordinator

Town Hall, 345 Main Street, Norwell, MA

(617) 659-8018

The information in the notice must be communicated on an ongoing basis in formats that ensure access to persons with visual, cognitive, physical or hearing impairments.

This may include the use of public service radio and television announcements, printing information in brochures, program notifications and other municipal publications, sending notices to disability organizations including organizations that have telephone tapes for people who are blind, posting notices in municipal facilities and printing notices in local newspapers.

Massachusetts Office on Disability
One Ashburton Place
Boston, MA 02108

1-800-322-2020 voice/TDD
(617) 727-7440 voice/TDD



OFFICE OF BOARD OF SELECTMEN
TOWN OF NORWELL

345 MAIN STREET P.O. BOX 295
NORWELL, MASSACHUSETTS 02061

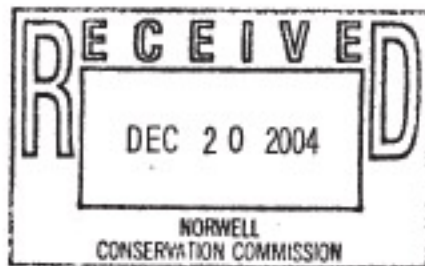
(781) 659-8000
FAX (781) 659-7795

TOWN OF NORWELL

TOWN PLANNER

Norwell is accepting applications for a qualified full-time Town Planner. Performs professional, technical, administrative work associated with planning/land use controls, provides assistance to Planning Board and assists in Master Planning process. Candidate must possess knowledge of basic land use concepts, subdivision control, roadway/landscape design, site development, knowledge of local zoning bylaws, rules/regulations and other applicable State statutes. Strong interpersonal, written communication and computer skills required. Familiarity with GIS a plus. A Master's Degree and three years of experience or a Bachelor's Degree and five years experience in urban, municipal, or environmental land use planning. Salary range \$41,132 to \$53,574. Send cover letter and resume by August 4, 2003, to the Selectmen's Office P.O. Box 295, Norwell, MA 02061, E-Mail: prenaud@townofnorwell.net.
AA/BOE

Boston Globe
July 20, 2003





OFFICE OF BOARD OF SELECTMEN
TOWN OF NORWELL

345 MAIN STREET P.O. BOX 295
NORWELL, MASSACHUSETTS 02061

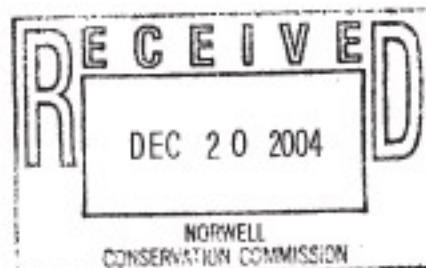
(781) 659-8000
FAX (781) 659-7795

TREATMENT FACILITY MANAGER'S POSITION

The Norwell Board of Water Commissioners is seeking applications for the position of Treatment Facilities Manager. The position requires a full knowledge of public water supply operations and regulations, excellent oral/written communication skills, ability to accurately interpret plans, management skills and proficiency with M.S. Office Suite.

The successful candidate must possess a degree in engineering, biological and/or environmental sciences, have acquired a Grade IV D and IV T Drinking Water Supply Facility Operator Licenses, be proficient in SCADA system components and have a working knowledge of Haestad Methods Water CAD. In addition, the successful candidate must have a minimum of five-years experience of all aspects in the operation of a public water supply treatment facility. The salary range is \$47,680 - \$59,600, non-union position. Please submit cover letter and resume/application by June 14, 2004 to the Norwell Selectmen's Office, 345 Main St., Norwell, MA 02061, E-Mail: lallen@townofnorwell.net, job description available by calling 781-659-8000.
AA/EOE

Patriot Ledger
May 29/30, 2004



AGREEMENT

THE TOWN OF NORWELL

&

LOCAL 285
SEIU, AFL-CIO

JULY 1, 2002 – JUNE 30, 2005

WWW.SEIU285.ORG

LOCAL 285 Local 285
Service Employees International Union, AFL-CIO
21 Fellows Street, Norwell, MA 02119-2523
617 442-4100 Toll-free 1 800 832-1487 Fax 617 541-6659

SEIU Regional Office
P.O. Box 60839, Florence, MA 01062
413 536-7866 Fax 413 534-1159
Street Address: 267 Locust Street, Northampton

Leading the Way

Your Rights and Responsibilities in the Union

Rights

- The right to have opinions heard and respected, to be informed of union activity, to be educated in union values and union skills.
- The right to choose the leaders of the union in a fair and democratic manner.
- The right to a full accounting of union dues and the proper stewardship over union resources.
- The right to participate in the union's bargaining efforts and to approve union contracts.
- The right to have members' concerns resolved in a fair and expeditious manner.

Responsibilities

- The responsibility to help build a strong and more effective labor movement, to support the organizing of unorganized workers, to help build a political voice for working people, and to stand up for one's co-workers and all workers.
- The responsibility to get informed about the internal governance of the union and to participate in the conduct of the union's affairs.
- The responsibility to contribute to the support of the union.
- The responsibility to treat all workers and members fairly.
- The responsibility to offer constructive criticism of the union.

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ARTICLE 1 – PREAMBLE

Pursuant to the provisions of Chapter 150E of the Massachusetts General Laws, this Agreement is made and entered into on this 1st day of July, 2002 by the Board of Selectmen, Town of Norwell (hereinafter referred to as the "Town" or the "Employer") and the Norwell Town Employees Union, Service Employees International Union, Local 285 AFL-CIO (hereinafter referred to as the "Union").

The intent and purpose of this Agreement is the promotion of a harmonious relationship between the Town and the Union, the establishment of an equitable and peaceful process for resolution of differences, and the establishment of conditions of employment.

ARTICLE 2 – NON-DISCRIMINATION

Neither the Town nor the Union shall discriminate against bargaining unit employees on the basis of age, sex, marital status, race, color, creed, national origin, handicap, political affiliation, religion or sexual preference.

No employee shall be discriminated against by either party for Union activities or membership or non-membership in the Union.

If a bargaining unit employee initiates a challenge to disciplinary action in any administrative forum on the same grounds as those raised in a pending grievance concerning such disciplinary action, except a grievance alleging discrimination on the basis of union activity then the employee shall not have access to arbitration under the contract arbitration procedure. In the event an individual has already elected to pursue his challenge in an administrative forum, the employee shall have the option of withdrawing the appeal to the outside forum in favor of preserving the Union's right to arbitrate the grievance within ten (10) calendar days of being notified of the conflict by the employer.

ARTICLE 3 – RECOGNITION

For the purpose of collective bargaining with respect to wages, hours and other conditions of employment, the Town recognizes the Union as the exclusive bargaining agent for all full-time and regular part-time clerical, administrative and custodial employees of the Town including the following positions: administrative secretary, administrative aide, clerk, principal clerk, senior clerk, custodian, recreation superintendent, recreation program coordinator, animal control officer, dispatcher, assistant treasurer/collector, deputy collector, assistant assessor/appraiser, assistant town accountant, assistant town clerk, registrar's agent, health agent, building inspector, conservation administrator, meter reader/clerk, administrative director for the Cushing Center, lead dispatcher, field technician/clerk, recycling coordinator, planning

H. Any member of the Sick Leave Bank who requests use of sick leave bank days agrees to permit the Bank Committee access to his/her attendance and sick leave records.

I. The Bank Committee shall vote on each request of sick leave bank days and report their vote to the Town Administrator. Approval of the Bank Committee is necessary to be entitled to the use of sick bank days.

J. The denial of the Bank Committee is not subject to the grievance and arbitration procedure of the collective bargaining agreement.

K. The Bank Committee has the right, in case the bank has depleted all of its days, to come before the membership for additional contribution of sick days, subject to 2/3 vote of members present at the meeting.

L. Any member who has used bank days, may at his/her discretion, repay any or all days used.

M. Any employee who is an active member of the sick leave bank and is ill and unable to contribute sick leave days on July 1st or at request time, shall not be penalized or removed from membership.

ARTICLE 19 -- HEALTH INSURANCE

The Town will continue to maintain its coverage of health and life insurance benefits as exists on the effective date of this Agreement except as may be modified by the Plymouth County Commissioner System. Permanent part-time employees working a minimum of 20 hours per week for a total of 800 hours on a year-round basis are entitled to join the Town's group insurance program.

ARTICLE 20 -- GRIEVANCE PROCEDURE

This Agreement sets forth the basic terms and conditions of employment and is intended to continue the present and good relations between the Town and its employees. In the event of a grievance between the Union and the Town, the representatives of both agree to make prompt and earnest efforts to settle the matter. A grievance is an allegation by the Union that a specific provision of this collective bargaining agreement has been violated. All grievances shall be handled as follows:

Step 1. The Union Steward and/or Representative, with the aggrieved employee shall take up the grievance in writing with his/her immediate supervisor within seven (7) days of the occurrence giving rise to the grievance. Any grievance not timely filed at this step will be null and void. The Union shall present all grievances on a form mutually agreed to by the parties and the form shall be signed and dated by the representative(s) of the Union that files the grievance.

The immediate supervisor shall, within seven (7) days of the receipt of a written grievance, meet to attempt to adjust the matter with the aggrieved and his/her representative and shall respond in writing within seven (7) days of the close of the meeting.

Any grievance resolved at Step 1 must have the written approval of the Town Administrator and the President of the Local. If the grievance is not satisfactorily settled at this step:

Step 2. The grievance may be submitted to the Town Administrator within seven (7) days of the immediate supervisor's written answer. The Town Administrator or designee shall, within seven (7) days of the receipt of a written grievance, meet to attempt to adjust the matter with the aggrieved and his/her representatives and shall respond in writing within seven (7) days of the close of the meeting. If the grievance is not satisfactorily settled at this step:

Step 3. The grievance may be submitted to the Board of Selectmen within seven (7) days of receipt of the Town Administrator's written answer. The Board of Selectmen shall, within fourteen (14) days, meet with the aggrieved and his/her representatives and shall respond in writing within twenty-one (21) days following the conclusion of the meeting. If the grievance is not satisfactorily settled at this step:

Step 4. It may be appealed to arbitration by written notice of such intention to appeal given to the Board of Selectmen within twenty-one (21) days after the receipt of the written answer under Step 3.

A grievance not initiated within the time limit specified shall be deemed waived. Failure of a party to appeal a decision within the time limit specified will mean the grievance shall not be eligible for further appeal. Failure of a party to answer an appeal within the time limit specified shall mean that the appeal may be taken to the next step immediately. The above limitations may be waived by mutual written agreement of the parties.

The time periods as described in this Article will exclude Saturdays, Sundays and holidays.

Any grievance challenging a suspension will be initiated with the Town Administrator and any grievance challenging a termination will be initiated with the Board of Selectmen.

Time taken off by the Chief Steward or his/her designee, for investigations and settling of grievances shall not exceed two (2) paid hours in a regular work week. In all cases, advance notice of such absences will be required to be given to the Department Head whose approval shall not be unreasonably denied.

Arbitration – In the event that the Union elects to submit a grievance to arbitration, the parties shall select an impartial arbitrator through the American Arbitration Association and the arbitration shall be conducted in accordance with the rules of the American Arbitration Association.

The decision of the arbitrator shall be rendered within thirty (30) days of the completion of the arbitration hearings, but such period may be extended by mutual agreement of the parties hereto. The award of the arbitrator shall be final and binding on the parties and the expense of the American

Arbitration Association fees and the arbitrator's fees shall be shared equally; otherwise each party shall bear its own costs. The arbitrator shall have no right to add to, detract from or in any way alter the provisions of this Agreement.

ARTICLE 21 – LAYOFF/REDUCTION IN FORCE

In the event of a reduction in force which results in the termination of any bargaining unit position, the Town shall provide the Union and the affected employees with notice fourteen (14) days prior to the effective date of the layoff.

Layoff will be by seniority and will be accomplished by laying off the least senior person in the position within the bargaining unit to be affected. A displaced employee shall have the right to bump the least senior employee in any job classification provided the employee meets the minimum qualifications for the position. Employees may bump to a lower grade, provided there is no vacant position at his/her present grade.

ARTICLE 22 – SENIORITY

Seniority shall be defined as an employee's continuous service with the Town of Norwell.

Individuals who have been employed by the Town for three (3) years or more and terminated under favorable conditions; and who are re-employed within ten years, will be given 50% credit for their previous employment years. This credit will apply to

present and future employees and will be for vacation and longevity only, and cannot be used in job standing for promotions or personnel reductions.

ARTICLE 23 – SEVERABILITY

Should any Article, section or provision of this Agreement be held unlawful or unconstitutional by any court of any jurisdiction, the remaining Articles, sections, and provisions shall remain in full force and effect.

ARTICLE 24 – RESOLUTION BY PEACEFUL MEANS

The Union and the Town agree that differences between the parties shall be settled by peaceful means as provided within this agreement. The Union will not engage in, instigate or condone any strike, work stoppage or concerted refusal to perform normal duties on the part of any employee covered by the agreement.

ARTICLE 25 – MISCELLANEOUS

1. **Part-time employees** under 20 hours. If an unpaid holiday, illness or vacation causes a part time employee who works less than 20 hours/week to miss a regularly scheduled work day, the employee may make up the hours on another day that week, subject to advance approval by the Department Head/Chair. The provisions of this paragraph do not apply to dispatchers.

2. **Clothing.** The Town will provide the initial uniform for employees who are required to wear a uniform and who have passed their initial probation period in accordance with the following:

16 hours or less:	2 shirts, 1 pant, and 1 sweater
16 hours to 32 hours:	3 shirts, 2 pants, 1 sweater
32 hours to 40 hours:	4 shirts, 2 pants, 1 sweater
Animal Control:	Jacket in lieu of sweater
Recycling Coordinator:	Jacket in lieu of sweater
Full-time Custodian:	Jacket in lieu of sweater

If during the probation period the Town purchases a uniform (minimum requirements) and the employee leaves, the uniform becomes the property of the Town. If the uniform (minimum requirements) is purchased by the employee, after successful probation, the employee will be reimbursed. Clothing will meet the Town's concept of a uniform. Each uniform shall be clearly identified with the employee's name, where required, and department while engaged in Town duties.

TOWN OF NORWELL

COMMISSION ON DISABILITY

Americans with Disabilities Act
(ADA)

GRIEVANCE PROCEDURE

January , 1994

Town of Norwell, Massachusetts

ADA Grievance Procedure

(Adopted pursuant to the Americans with Disabilities Act)

28 CFR Part 35

Purpose:

This procedure was adopted by the Board of Selectmen, on behalf of the Town of Norwell, on _____ It is to ensure a prompt and equitable resolution of complaints by any Employee, Applicant, Service Recipient, or Member of the General Public that she/he or a specific class of individuals has been subjected to discrimination on the basis of disability by the Town of Norwell. Any Grievant may, by her or himself file a complaint under 28 CFR Part 35 with a Federal Agency or the Town within 180 days of the date of the alleged discrimination, unless the time for filing is extended by the Town, or Federal Agency for good cause.

Applicability:

This grievance procedure has been adopted by all agencies of the Town of Norwell, with the exception of the Norwell Public Schools and the Norwell Housing Authority, both of which maintain separate grievance policies in accordance with regulations issued by the Massachusetts Office of Education and the Massachusetts Executive Office of Education and Development, respectively.

Standing:

A grievance may be brought by any Town Employee, Applicant, Service Recipient or Member of the General Public. Only the Grievant shall have official standing; that is, the grievance must be brought directly by the Grievant seeking redress or remedy, unless, the Grievant is unable, because of a disability, to represent her/himself. However, the Grievant may be accompanied at any meeting or hearing by other family members or friends, not to exceed two (2), if she/he desires. However, such others have no standing in this procedure and their participation may be limited at the discretion of the hearing officer.

This grievance policy does not supplant any provision of an existing collective bargaining agreement with an employee representation group. Any grievance processed (or in process) under the terms of collective bargaining agreement may not be submitted through this ADA Grievance Procedure.

Legal Representation:

This grievance procedure is meant to be informal, and cannot be legally binding on either party. Therefore, legal representation on the behalf of either party is discouraged and shall only be allowed in special circumstances. Such legal representation obviously carries with it the threat of litigation and is thus contrary to the intent of this policy. Similarly, any grievance or complaint involving existing or threatened civil or criminal litigation cannot be addressed by this policy.

Procedure:

This procedure has been structured to try to resolve problems at the operating level; that is, at the level of the department or agency that would be responsible for implementing any action resulting from the grievance.

Step 1 - Department Level:

The Grievant shall first attempt to resolve the complaint at the level of the department exercising jurisdiction; i.e. with responsibility for the action, program, or service at issue. This grievance may be oral or written, and shall be submitted to the Department Head (or designee), who shall meet with the Grievant as necessary.

The Department Head shall notify the ADA Coordinator upon receipt of the grievance.

The Department Head shall issue a written finding, with copies to the Grievant and to the ADA Coordinator, within twenty (20) working days of submission of the grievance.

Step 2 - Building Inspector (ADA Coordinator)

If the complaint is not resolved to the satisfaction of the Grievant, or if the Department Head lacks authority or jurisdiction, the Grievant may submit the grievance to the ADA Coordinator.

Said submission must be in writing and filed within ten (10) working days of the of the finding of the Department Head.

The ADA Coordinator (or designee) shall meet with the Grievant and shall issue a written finding within twenty (20) working days of submission of the Step 2 grievance, and shall provide a copy of the finding to the Grievant.

Step 3: - The Board of Selectmen

If the complaint is not resolved to the satisfaction of the Grievant, she/he may submit the grievance to the Board of Selectmen.

Said submission must be in writing and filed within ten (10) working days of the findings of the ADA Coordinator.

The Board of Selectmen (or designee) shall meet with the Grievant and shall issue a written finding within twenty (20) working days of the submission of the step 3 grievance and shall provide a copy of the finding to the Grievant.

Note:

Any decision or recommendation that requires approval of actions or commitment of funds beyond the level of normal departmental authority must be submitted by the ADA Coordinator to the appropriate Board or Commission, together with his recommendation for action. Said Board or Commission must approve the recommendation prior to implementation, and must seek any necessary funding from the Town Meeting.

Norwell Handicap Commission:

The Department Head and ADA Coordinator may refer a grievance or complaint or any part thereof to the Disability Commission for advice and for technical assistance and support on a formal or informal basis.

Adopted by the Board of Selectmen

Rebecca Z. Freed, Chair

Donald R. LeClair, Jr.

Richard A. Merritt

Actions for the Town of Norwell to implement as mandated by the Americans with Disabilities Act (ADA)

Requirement 1:

28 CFR Part 35.105

Establishes a requirement (based on the section 504 regulations) that a public entity evaluate current policies and practices to identify and correct any that are not subject to the provisions of 504.

This evaluation must be on file and available for public inspection for three (3) years.

Requirement 2:

28 CFR Part 35.107

Requires Public entities of more than 50 employees to designate a responsible employee and adopt grievance procedures.

Requirement 3:

28 CFR Part 35.170

Details the Complaint Procedure.

Town of Norwell
345 Main Street
Norwell, MA 02061-0040
Tel: (617) 659-8018 - Voice
Tel: (617) 659-7979 - TDD

Sheet 1 of 2 Sheets

COMPLAINT FORM
FOR VIOLATIONS OF THE AMERICANS WITH DISABILITIES ACT

1. Name: _____
(Last) (First) (Middle Initial)

Street Address: _____
City and State: _____ Zip Code: _____
Telephone Number: (____) _____

2. In the event the Town is unable to locate you to discuss this complaint, please provide the following information concerning a person who can contact you:

Name: _____
Street Address: _____
City and State: _____
Telephone Number: () _____

3. Who or what do you allege has violated requirements of the Americans with Disabilities Act?

Name: _____
Street Address: _____
City and State: _____ Zip Code: _____
Department/Organization/Unit: _____
Program: _____
Individual: _____

4. Have you filed a complaint with respect to this matter with any other Federal, State or local government agency:

Yes No

If yes, name of agency: _____
 Month _____ Day _____ Year 19 _____

If not, do you intend to file with another agency:

Yes No

Name of agency: _____
Street Address: _____
City and State: _____ Zip Code: _____

5. Have you pursued resolution of your complaint through the internal grievance procedure at your institution?

Yes _____ No _____

(Note!! - It is not required that you pursue your complaint through your institution's internal grievance procedure.)

If your answer is "yes", what is the statue of your complaint in this grievance procedure?

6. Have you or do you intend to file this complaint with a lawyer?

Yes _____ No _____

If "yes", Lawyer's name: _____

Lawyer's address: _____

7. In order to determine if you have filed a complaint in a timely manner, the following is requested

- a. On what dates and times was a violation/discriminatory act noted?

8. Describe in detail the alleged discriminatory conduct or actions. If more space is required to answer this or any other question on this form, attach additional sheets. (NOTE!! - in describing discriminatory conduct, it will be helpful if you could provide information as to other persons allegedly treated in the same manner; non-handicapped persons treated differently;; has the institution given an explanation for its actions or conduct?)

9. Submit any written materials, date, documents, etc. which you think are relevant to this complaint.

_____, 19____
(Signature) (Date)

NORWELL HANDICAP COMMISSION INFORMATION SHEET

THE AMERICANS WITH DISABILITY ACT OF 1990

FACT SHEET

OBJECTIVE:

Further the goal of full participation for persons with disabilities by giving civil rights protections to these individuals. It guarantees equal opportunity for these individuals in (1) employment, (2) public accommodations, (3) transportation, (4) state and local government services and (5) telecommunications.

(1) EMPLOYMENT:

Employers with 25 or more employees must comply, effective 26 July, 1992.

Employers with 15-24 employees must comply, effective 26 July, 1994.

Complaints may be filed with the U. S. Equal Employment Opportunity Commission.

(2) PUBLIC ACCOMMODATIONS: (TITLE III)

Effective 26 January, 1992 - Public accommodations such as restaurants, hotels, theaters, doctor's offices, pharmacies, retail stores, museums, libraries, parks, private schools, day care centers may not discriminate. Private clubs and religious organizations are exempt.

Reasonable changes must be made in policies, practices and procedure to avoid discrimination.

Elevators are generally not required in buildings under three stories or with fewer than 3,000 square feet per floor, unless the building is a shopping center, all or professional office of a health care provider.

INDIVIDUALS MAY:

- (a) Bring lawsuits to obtain court orders to stop discrimination, but money damages can not be awarded - or -
- (b) Can file complaints with the U. S. Attorney General who may file lawsuits to stop discrimination and obtain money damages and penalties.

(3) TRANSPORTATION:

Public Bus/Rail: New buses and/or rail vehicles, ordered after 26 August, 1990, must be accessible.

Private Bus/Vans: New over-the-road buses ordered on or after 26 July, '996 (July 26, 1997 for small companies). Note: After completion of a study, the president may extend this deadline by one year - if appropriate.) Other private transportation operations must meet the

Individuals may file complaints with the U. S. Attorney General or bring private lawsuits under the public accommodations procedures.

(4) STATE AND LOCAL GOVERNMENT OPERATIONS: (TITLE II)

State and or local governments may not discriminate against qualified individuals. All government facilities, services, and communications must be accessible consistent with the requirements of section 504 of the rehabilitation act of 1973.

Individuals may file complaints with federal agencies designated by the U. S. Attorney General or bring private lawsuits.

(5) TELECOMMUNICATIONS:

Companies offering telephone services to the general public must offer telephone relay services to individuals who use telecommunication devices for the deaf (TDD's) or similar devices.

Individuals may file complaints with the Federal Communications Commission.

For additional information and answer to questions, contact the U. S. Department of Justice:

(202) 514-0301 (Voice 11:00 A.M. to 4:00 P.M. Eastern Time

(202) 514-0381 (TDD) 11:00 A.M. to 4:00 P.M. Eastern Time

(202) 514-0383 (TDD) 11:00 A.M. to 4:00 P.M. Eastern Time

For copies of the full 90 page Americans with Disability Act of 1990, at no cost contact:

U. S. Senate Subcommittee on Disability Policy
113 Senate Hart Office Building
Washington , DC 20010

Coxe delivers grant to Norwell

By Pattie Hainer
The Patriot Ledger

NORWELL — State Secretary of Environmental Affairs Trudy Coxe announced Friday that the town has been awarded \$300,000 to help offset the \$3.9 million purchase of the Doris Donovan estate.

Specifically, the money is for two parcels of about 25 acres each at the corner of Circuit and Pleasant streets which were put under conservation protection. One parcel is a hay field and the other has been cleared for a horse pasture.

"What is the population of Norwell anyway?" Coxe asked looking out at the crowd of roughly 75 residents and public officials. "This is fantastic. If I had known the turnout would be so great, I would have asked the governor to be here."

Coxe recognized both Sen. Michael Morrissey, D-Quincy, and Rep. Jan O'Brien, D-Hanover, both of whom attended the event, for their support of the legislation that made the grant possible.

Called the Scenic and Natural Diversity program, more commonly referred to as S.A.N.D., the money comes from a \$30 million bond bill signed by acting Gov. Paul Cellucci four months ago. The funds will pay for protection of various open space projects in Southeastern Massachusetts, Cape Cod and the Islands over the next

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Norwell gets conservation grant

■ COXE

Continued from Page 13

four years.

The bond money is designed to protect the vulnerable South Shore-Cape Cod corridor from the suburban sprawl.

Coxe said that 89,000 acres of open space has been protected in the state with such bond proposals since 1991.

Coxe handed over a giant mock-up of a check to Herb Heidt, the chairman of the conservation commission, prompting a loud "Wow" from one spectator when he saw the \$300,000 figure. The amount of the grant was kept secret until Coxe arrived.

Voters overwhelmingly approved the purchase of the Donovan property in December 1996 with the understanding that the town would try to cover the purchase price with revenue from different sources.

Although the purchase of the estate was one of the most widely supported proposals in the town's history, officials have been nervous about absorbing the cost.

Officials were disappointed in early November when they heard from Coxe's office that the town did not get

\$500,000 that they were hoping for from another state grant program.

However, as soon as that grant was denied, the conservation commission submitted what was one of the first applications for the S.A.N.D. program.

In June last year, the 1809 house formerly occupied by Doris Donovan, was sold with five acres for \$562,000 to help defray the purchase price.

The sale of a small cottage on the property has been delayed while selectmen work out problems with the septic system. The health board reviewed preliminary plans for a new system last week that could cost up to \$20,000.

While the town hoped to collect \$249,000 for the sale of the cottage, Treasurer-Collector Patricia Crowley said she expects the amount to be closer to \$225,000.

Initially, taxpayers will not notice any great difference in their bills with the \$300,000 grant. The purchase is being paid for with short-term loans while the town considers proposals for residential development on another portion of the land and is only making interest payments on the money. The \$300,000 will reduce those interest payments by \$13,500 a year. $\times 10 \text{ years} =$
 $\$135,000$
 $\div 300,000 =$



Fred Field/The Norwell Conservation Commission Chairman Herb Heidt oversized check from the state environmental affairs office. conservation commission member Gail Storm.