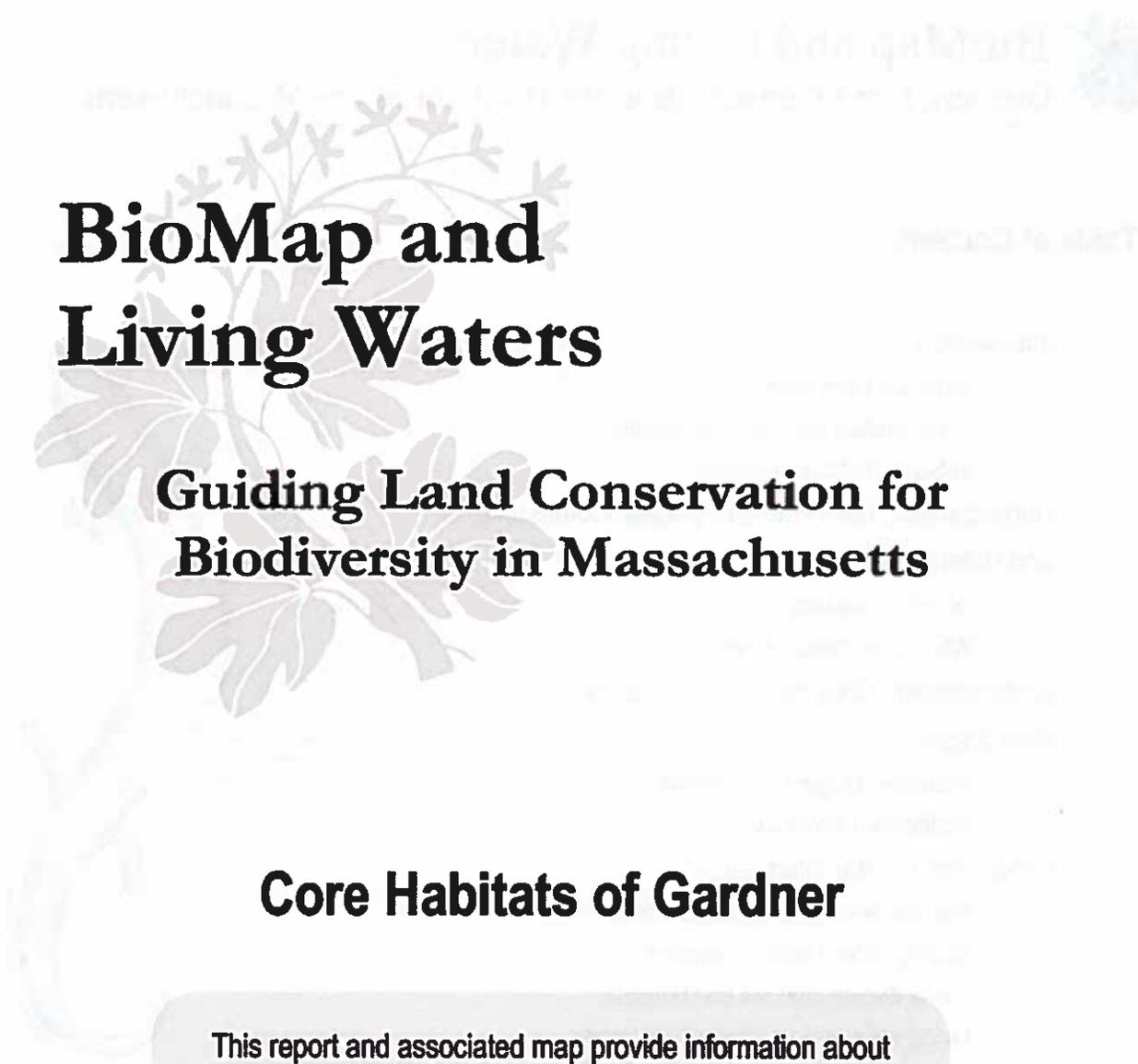


Appendix A



BioMap and Living Waters

Guiding Land Conservation for Biodiversity in Massachusetts

Core Habitats of Gardner

This report and associated map provide information about important sites for biodiversity conservation in your area.

This information is intended for conservation planning, and is not intended for use in state regulations.

Produced by:

**Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries and Wildlife
Executive Office of Environmental Affairs
Commonwealth of Massachusetts**

Produced in 2004



BioMap and Living Waters: Guiding Land Conservation for Biodiversity in Massachusetts

Table of Contents

Introduction

- What is a Core Habitat?
- Core Habitats and Land Conservation
In Support of Core Habitats

Understanding Core Habitat Species, Community, and Habitat Lists

- What's in the List?
- What does 'Status' mean?

Understanding Core Habitat Summaries

Next Steps

- Protecting Larger Core Habitats
- Additional Information

Local Core Habitat Information*

- BioMap: Species and Natural Communities
- BioMap: Core Habitat Summaries
- Living Waters: Species and Habitats
- Living Waters: Core Habitat Summaries

* Depending on the location of Core Habitats,
your city or town may not have all of these sections.

Spring Salamander
(*Gyrinophilus porphyriticus*)
Species of Special Concern



Funding for this project was made available by the Executive Office of Environmental Affairs, contributions to the Natural Heritage & Endangered Species Fund, and through the State Wildlife Grants Program of the US Fish & Wildlife Service.



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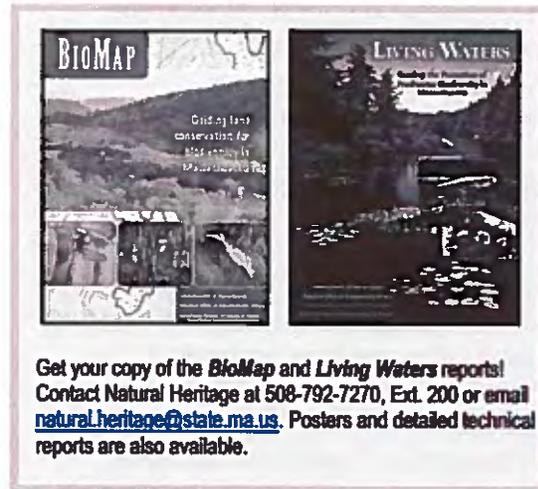
Introduction

In this report, the Natural Heritage & Endangered Species Program provides you with site-specific biodiversity information for your area. Protecting our biodiversity today will help ensure the full variety of species and natural communities that comprise our native flora and fauna will persist for generations to come.

The information in this report is the result of two statewide biodiversity conservation planning projects, *BioMap* and *Living Waters*. The goal of the BioMap project, completed in 2001, was to identify and delineate the most important areas for the long-term viability of terrestrial, wetland, and estuarine elements of biodiversity in Massachusetts. The goal of the Living Waters project, completed in 2003, was to identify and delineate the rivers, streams, lakes, and ponds that are important for freshwater biodiversity in the Commonwealth. These two conservation plans are based on documented observations of rare species, natural communities, and exemplary habitats.

What is a Core Habitat?

Both BioMap and Living Waters delineate *Core Habitats* that identify the most critical sites for biodiversity conservation across the state. Core Habitats represent habitat for the state's most viable rare plant and animal populations and include exemplary natural communities and aquatic habitats. Core Habitats represent a wide diversity of rare species and natural communities (see Table 1), and these areas are also thought to contain virtually all of the other described species in Massachusetts. Statewide, BioMap Core Habitats encompass 1,380,000 acres of uplands and wetlands, and Living Waters identifies 429 Core Habitats in rivers, streams, lakes, and ponds.



Core Habitats and Land Conservation

One of the most effective ways to protect biodiversity for future generations is to protect Core Habitats from adverse human impacts through land conservation. For Living Waters Core Habitats, protection efforts should focus on the *riparian areas*, the areas of land adjacent to water bodies. A naturally vegetated buffer that extends 330 feet (100 meters) from the water's edge helps to maintain cooler water temperature and to maintain the nutrients, energy, and natural flow of water needed by freshwater species.

In Support of Core Habitats

To further ensure the protection of Core Habitats and Massachusetts' biodiversity in the long-term, the BioMap and Living Waters projects identify two additional areas that help support Core Habitats.

In BioMap, areas shown as *Supporting Natural Landscape* provide buffers around the Core Habitats, connectivity between Core Habitats, sufficient space for ecosystems to function, and contiguous undeveloped habitat for common species. Supporting Natural Landscape was



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generated using a Geographic Information Systems (GIS) model, and its exact boundaries are less important than the general areas that it identifies. Supporting Natural Landscape represents potential land protection priorities once Core Habitat protection has been addressed.

In Living Waters, *Critical Supporting Watersheds* highlight the immediate portion of the watershed that sustains, or possibly degrades, each freshwater Core Habitat. These areas were also identified using a GIS model. Critical Supporting Watersheds represent developed and undeveloped lands, and can be quite large. Critical Supporting Watersheds can be helpful in land-use planning, and while they are not shown on these maps, they can be viewed in the Living Waters report or downloaded from www.mass.gov/mgis.

Understanding Core Habitat Species, Community, and Habitat Lists

What's in the List?

Included in this report is a list of the species, natural communities, and/or aquatic habitats for each Core Habitat in your city or town. The lists are organized by Core Habitat number.

For the larger Core Habitats that span more than one town, the species and community lists refer to the entire Core Habitat, not just the portion that falls within your city or town. For a list of all the state-listed rare species within your city or town's boundary, whether or not they are in Core Habitat, please see the town rare species lists available at www.nhesp.org.

The list of species and communities within a Core Habitat contains only the species and

Table 1. The number of rare species and types of natural communities explicitly included in the BioMap and Living Waters conservation plans, relative to the total number of native species statewide.

BioMap		
Biodiversity Group	Species and Verified Natural Community Types	
	Included in BioMap	Total Statewide
Vascular Plants	246	1,538
Birds	21	221 breeding species
Reptiles	11	25
Amphibians	6	21
Mammals	4	85
Moths and Butterflies	52	An estimated 2,500 to 3,000
Damselflies and Dragonflies	25	An estimated 165
Beetles	10	An estimated 2,500 to 4,000
Natural Communities	92	> 105 community types
Living Waters		
Biodiversity Group	Species	
	Included in Living Waters	Total Statewide
Aquatic Vascular Plants	23	114
Fishes	11	57
Mussels	7	12
Aquatic Invertebrates	23	An estimated > 2500

natural communities that were explicitly included in a given BioMap or Living Waters Core Habitat. Other rare species or examples of other natural communities may fall within the Core Habitat, but for various reasons are not included in the list. For instance, there are a few rare species that are omitted from the list or summary because of their particular sensitivity to the threat of collection. Likewise, the content of many very small Core Habitats are not described in this report or list, often because they contain a single location of a rare plant



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species. Some Core Habitats were created for suites of common species, such as forest birds, which are particularly threatened by habitat fragmentation. In these cases, the individual common species are not listed.

What does 'Status' mean?

The Division of Fisheries and Wildlife determines a status category for each rare species listed under the Massachusetts Endangered Species Act, M.G.L. c.131A, and its implementing regulations, 321 CMR 10.00. Rare species are categorized as Endangered, Threatened, or of Special Concern according to the following:

- **Endangered** species are in danger of extinction throughout all or a significant portion of their range or are in danger of extirpation from Massachusetts.
- **Threatened** species are likely to become Endangered in Massachusetts in the foreseeable future throughout all or a significant portion of their range.
- **Special Concern** species have suffered a decline that could threaten the species if allowed to continue unchecked or occur in such small numbers or with such restricted distribution or specialized habitat requirements that they could easily become Threatened in Massachusetts.

In addition, the Natural Heritage & Endangered Species Program maintains an unofficial *watch list* of plants that are tracked due to potential conservation interest or concern, but are not regulated under the Massachusetts Endangered Species Act or other laws or regulations. Likewise, described natural communities are not regulated any laws or regulations, but they can help to identify ecologically important areas that are worthy of protection. The status of natural

Legal Protection of Biodiversity

BioMap and Living Waters present a powerful vision of what Massachusetts would look like with full protection of the land that supports most of our biodiversity. To create this vision, some populations of state-listed rare species were deemed more likely to survive over the long-term than others.

Regardless of their potential viability, all sites of state-listed species have full legal protection under the Massachusetts Endangered Species Act (M.G.L. c.131A) and its implementing regulations (321 CMR 10.00). Habitat of state-listed wildlife is also protected under the Wetlands Protection Act Regulations (310 CMR 10.37 and 10.59). The *Massachusetts Natural Heritage Atlas* shows Priority Habitats, which are used for regulation under the Massachusetts Endangered Species Act and Massachusetts Environmental Policy Act (M.G.L. c.30) and Estimated Habitats, which are used for regulation of rare wildlife habitat under the Wetlands Protection Act. For more information on rare species regulations, see the *Massachusetts Natural Heritage Atlas*, available from the Natural Heritage & Endangered Species Program in book and CD formats.

BioMap and Living Waters are conservation planning tools and do not, in any way, supplant the Estimated and Priority Habitat Maps which have regulatory significance. Unless and until the combined BioMap and Living Waters vision is fully realized, we must continue to protect all populations of our state-listed species and their habitats through environmental regulation.

communities reflects the documented number and acreages of each community type in the state:

- **Critically Imperiled** communities typically have 5 or fewer documented sites or have very few remaining acres in the state.
- **Imperiled** communities typically have 6-20 sites or few remaining acres in the state.
- **Vulnerable** communities typically have 21-100 sites or limited acreage across the state.
- **Secure** communities typically have over 100 sites or abundant acreage across the state; however excellent examples are identified as Core Habitat to ensure continued protection.



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BioMap and Living Waters: Guiding Land Conservation for Biodiversity in Massachusetts

Understanding Core Habitat Summaries

Following the BioMap and Living Waters Core Habitat species and community lists, there is a descriptive summary of each Core Habitat that occurs in your city or town. This summary highlights some of the outstanding characteristics of each Core Habitat, and will help you learn more about your city or town's biodiversity. You can find out more information about many of these species and natural communities by looking at specific *fact sheets* at www.nhesp.org.

Next Steps

BioMap and Living Waters were created in part to help cities and towns prioritize their land protection efforts. While there are many reasons to conserve land – drinking water protection, recreation, agriculture, aesthetics, and others – BioMap and Living Waters Core Habitats are especially helpful to municipalities seeking to protect the rare species, natural communities, and overall biodiversity within their boundaries. Please use this report and map along with the rare species and community fact sheets to appreciate and understand the biological treasures in your city or town.

Protecting Larger Core Habitats

Core Habitats vary considerably in size. For example, the average BioMap Core Habitat is 800 acres, but Core Habitats can range from less than 10 acres to greater than 100,000 acres. These larger areas reflect the amount of land needed by some animal species for breeding, feeding, nesting, overwintering, and long-term survival. Protecting areas of this size can be

very challenging, and requires developing partnerships with neighboring towns.

Prioritizing the protection of certain areas within larger Core Habitats can be accomplished through further consultation with Natural Heritage Program biologists, and through additional field research to identify the most important areas of the Core Habitat.

Additional Information

If you have any questions about this report, or if you need help protecting land for biodiversity in your community, the Natural Heritage & Endangered Species Program staff looks forward to working with you.

Contact the Natural Heritage & Endangered Species Program:

by Phone 508-792-7270, Ext. 200

by Fax: 508-792-7821

by Email: natural.heritage@state.ma.us

by Mail: North Drive
Westborough, MA 01581

The GIS datalayers of BioMap and Living Waters Core Habitats are available for download from MassGIS: www.mass.gov/mgis

Check out www.nhesp.org for information on:

- Rare species in your town
- Rare species fact sheets
- BioMap and Living Waters projects
- Natural Heritage publications, including:
 - * Field guides
 - * Natural Heritage Atlas, and more!



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BioMap: Species and Natural Communities

Gardner

Core Habitat BM255

Natural Communities

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Acidic Rocky Summit/Rock Outcrop Community		Secure
Acidic Talus Forest/Woodland		Secure
Oak - Hemlock - White Pine Forest		Secure
Shrub Swamp		Secure
Spruce-Fir Boreal Swamp		Vulnerable

Vertebrates

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Avian Habitat		_____

Core Habitat BM358

Plants

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Dwarf Mistletoe	<i>Arceuthobium pusillum</i>	Special Concern
Slender Cottongrass	<i>Eriophorum gracile</i>	Threatened

Vertebrates

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Common Loon	<i>Gavia immer</i>	Special Concern

Core Habitat BM475

Vertebrates

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
American Bittern	<i>Botaurus lentiginosus</i>	Endangered



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BioMap: Species and Natural Communities

Gardner

Core Habitat BM478

Natural Communities

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Kettlehole Level Bog		Imperiled

Core Habitat BM508

Natural Communities

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Level Bog		Vulnerable

Core Habitat BM518

Natural Communities

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Hemlock-Hardwood Swamp		Secure
High-Energy Riverbank		Vulnerable
Northern Hardwoods - Hemlock - White Pine Forest		Secure
Red Maple Swamp		Secure
Shrub Swamp		Secure
Spruce-Tamarack Bog		Imperiled

Plants

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Bartram's Shadbush	<i>Amelanchier bartramiana</i>	Threatened
Dwarf Mistletoe	<i>Arceuthobium pusillum</i>	Special Concern
New England Blazing Star	<i>Liatris scariosa var. novae-angliae</i>	Special Concern

Invertebrates

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Blueberry Sallow	<i>Apharetra dentata</i>	_____
Bog Elfin	<i>Callophrys lanoraieensis</i>	Threatened



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BioMap: Species and Natural Communities

Gardner

Coastal Swamp Metarranthis Moth	<i>Metarranthis pilosaria</i>	Special Concern
Purple Tiger Beetle	<i>Cicindela purpurea</i>	Special Concern

Vertebrates

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
American Bittern	<i>Botaurus lentiginosus</i>	Endangered
Eastern Box Turtle	<i>Terrapene carolina</i>	Special Concern
Four-toed Salamander	<i>Hemidactylum scutatum</i>	Special Concern
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Special Concern
Spring Salamander	<i>Gyrinophilus porphyriticus</i>	Special Concern
Wood Turtle	<i>Clemmys insculpta</i>	Special Concern

Core Habitat BM533

Natural Communities

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Acidic Shrub Fen		Vulnerable

Core Habitat BM548

Natural Communities

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Level Bog		Vulnerable

Core Habitat BM552

Natural Communities

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Level Bog		Vulnerable



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BioMap: Core Habitat Summaries

Gardner

Core Habitat BM255

Spanning the towns of Winchendon and Gardner, this Core Habitat encompasses upland and wetland habitats that together support a diversity of forest, shrubland, and wetland birds typical of the northern Worcester Plateau. Exemplary natural communities found here include Shrub Swamps and Spruce-Fir Boreal Swamps.

Natural Communities

This Core Habitat contains a variety of upland and wetland communities. Of particular interest are the large, high-quality, minimally disturbed, and species-rich Shrub Swamp and Spruce-Fir Boreal Swamp. Shrub Swamp communities are a common and variable type of wetland occurring on seasonally or temporarily flooded soils. They are often found in the transition zone between emergent marshes and swamp forests. Meanwhile, Spruce-Fir Boreal Swamps are forested wetlands dominated by Red Spruce and Balsam Fir. These swamps are typically found at stream headwaters or in poorly drained basins in the mountainous, northwestern part of the state.

Vertebrates

This Core Habitat encompasses many square miles of largely roadless habitat in Winchendon and Gardner. It includes upland forests, forested and scrub-shrub wetlands, a bog east of Nineteenth Hill, and riparian habitats along four miles of Bailey Brook that collectively provide habitat for a diversity of forest, shrubland, and wetland birds characteristic of the northern Worcester Plateau. Parts of the central and southeast portions of the area are protected as conservation land.

Core Habitat BM358

Plants

Parts of this Core Habitat support populations of the uncommon Dwarf Mistletoe, a parasitic plant that forms a "witch's broom" on Black Spruce trees. Growing in a narrow bog is Slender Cottongrass, which looks like a stalk with a cotton-ball at its tip.

Vertebrates

The shoreline and waters of Lake Wampanoag in Ashburnham and Gardner provide breeding habitat for Common Loons. Common Loons are threatened by lack of suitable natural sites and available nesting rafts, as well as water level fluctuations.

Core Habitat BM475

Vertebrates

This Core Habitat encompasses emergent freshwater marsh, wet meadows, and shrub swamp habitat. The area provides habitat for the American Bittern, a rare marsh bird, and is largely contained within protected conservation land.



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BioMap: Core Habitat Summaries

Gardner

Core Habitat BM478

Natural Communities

This Core Habitat contains a nice, although poorly buffered, Kettlehole Level Bog with a well-developed bog mat. Kettlehole Level Bogs are acidic dwarf shrub peatlands with little water input or outflow that form in circular depressions left by melting iceblocks in sandy glacial outwash. The vegetation in Kettlehole Level Bogs usually grows in rings.

Core Habitat BM508

Natural Communities

This Core Habitat contains a classic Level Bog community bordering a pond. Level Bogs are dwarf shrub peatlands, generally with pronounced hummock and hollow formations. These wetland peatlands are our most acidic and nutrient-poor, because they receive little overland water input, and are not connected to the water table. Although somewhat affected by an adjacent railroad embankment, this bog is considered to be of good quality.

Core Habitat BM518

This is one of the largest Core Habitats, encompassing mostly roadless conservation lands within the Ware River watershed in Rutland, Barre, and Hubbardston. Included are riparian habitats and extensive upland forests along the Ware River, the Bumshirt River, and several brooks. This Core Habitat contains several natural communities, including the state's largest known Spruce-Tamarack Bog in Blood Swamp. This wetland is important for many invertebrate species, particularly for rare butterflies and moths. Wetland and upland habitats alike support several rare plant populations, and this Core Habitat also supports rare reptiles, amphibians, and birds. In particular, protecting this area may represent one of the best opportunities in the state to preserve viable populations of Wood Turtles. Conservation of the relatively small remaining areas of unprotected land within this Core Habitat is desirable to help ensure the long-term protection of the rare species found here.

Natural Communities

This large Core Habitat contains an extensive, species-rich Spruce-Tamarack Bog in a wide basin of the Stevens Branch of the Ware River. This is the largest known Spruce-Tamarack Bog in the state. Spruce-Tamarack Bog communities are acidic forested peatlands with an overstory of Black Spruce and Tamarack and an understory of Heath shrubs on Sphagnum moss. They occur in kettlehole depressions, watershed divides, and along pond margins. Other communities of interest in this Core Habitat are Shrub Swamps, a good length of High-Energy Riverbank, and Hemlock-Hardwood Swamps.

Plants

This Core Habitat is home to one of the best populations of Dwarf Mistletoe in the state. The Dwarf Mistletoe is a parasitic plant that forms a "witch's broom" on Black Spruce trees. The population is quite large and is found in the headwaters of a swamp, surrounded by pristine landscape. Other interesting plant rare plants found here, New England Blazing Star and Bartram's Shadbush, are found in upland natural communities.



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BioMap: Core Habitat Summaries

Gardner

Invertebrates

A particularly important habitat for invertebrates within this Core Habitat is Blood Swamp and the surrounding undeveloped, unfragmented landscape in northwestern Rutland, northern Oakham, and southeastern Barre. Blood Swamp is pristine habitat for butterflies and moths including the Bog Elfin and the Blueberry Sallow moth; vegetation is characteristic of northern bogs, including mats of Sphagnum moss, Pitcher Plants, Leatherleaf, Highbush Blueberry, Rhodora, Black Spruce, and Tamarack. It is likely that Blood Swamp is inhabited by other rare invertebrates such as the Slender Clearwing Sphinx moth and the Ebony Boghaunter dragonfly.

Vertebrates

The more than 25 miles of meandering rivers and streams with bordering wetlands and uplands contained within this large Core Habitat may offer some of the best opportunities in the state to preserve viable populations of Wood Turtles. Conservation efforts should seek to preserve roadless and undeveloped habitats in unbroken corridors at least 600 yards wide on either side of streams. Significant habitat for Jefferson, Four-toed, and likely Blue-spotted Salamanders occurs in some of the forested wetlands or clusters of vernal pools within this Core Habitat. Significant habitat for Spring Salamanders is present in high gradient brooks and cool, wooded springs and seeps. An emergent marsh along Longmeadow Brook at Rutland State Park provides habitat for American Bitterns, and additional habitat for this bird species may occur elsewhere in this Core Habitat, especially where beaver activity has created emergent marshes or meadows or relatively open scrub-shrub wetland habitat.

Core Habitat BM533

Natural Communities

This Core Habitat contains a fairly small Acidic Shrub Fen with moderate diversity, which, although close to development, is free of human disturbances. Acidic Shrub Fens are shrub-dominated acidic peatlands found primarily along pond margins in the eastern and central part of the state. These wetland communities experience some groundwater and/or surface water inputs, but no calcareous seepage.

Core Habitat BM548

Natural Communities

This Core Habitat includes the good-quality Level Bog associated with the edges of a larger reservoir. Level Bogs are dwarf shrub peatlands, generally with pronounced hummock and hollow formations. These wetland peatlands are our most acidic and nutrient-poor, because they receive little overland water input, and are not connected to the water table. Here the Level Bog includes various bog mats, averaging 10 acres in size, which consist of well-developed peat mats with a good diversity of habitats, including open Sphagnum lawns and dwarf shrublands.



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BioMap: Core Habitat Summaries

Gardner

Core Habitat BM552

Natural Communities

This Core Habitat includes the good-quality Level Bog associated with the edges of a larger reservoir. Level Bogs are dwarf shrub peatlands, generally with pronounced hummock and hollow formations. These wetland peatlands are our most acidic and nutrient-poor, because they receive little overland water input, and are not connected to the water table. Here the Level Bog includes various bog mats, averaging 10 acres in size, which consist of well-developed peat mats with a good diversity of habitats, including open Sphagnum lawns and dwarf shrublands.



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Living Waters: Species and Habitats

Gardner

Core Habitat LW261

Plants

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>
Algae-like Pondweed	<i>Potamogeton confervoides</i>	Threatened



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Living Waters: Core Habitat Summaries

Gardner

Core Habitat LW261

Lake Wampanoag, a naturally acidic lake, is home to a rare species of aquatic plant, the Algae-like Pondweed. This species is so named because of its filamentous and many-branched underwater leaves. Native freshwater plants like the Algae-like Pondweed are an important component of aquatic ecosystems, providing habitat and nutrition for fishes and invertebrates, and adding oxygen to the water through photosynthesis.



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and the Commonwealth's rare species, visit our web site at: www.nhesp.org.