



Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

May 16, 2014

Anne Capra Madocks
Conservation Works LLC
P.O. Box 705
North Hatfield, MA 01066

via email [anne@conservationworksllc.com]

Re: Open Space and Recreation Plan, NHESP Tracking No. **14-33238**
Town of Hadley

Dear Ms Madocks:

Thank you for contacting the Natural Heritage and Endangered Species Program regarding the update for the Open Space and Recreation Plan for Hadley. Enclosed is information on the rare species, priority natural communities, vernal pools, and other aspects of biodiversity that we have documented in Hadley. We encourage the town to include this letter, species list, appropriate maps, and the BioMap2 town report in the Open Space and Recreation Plan.

Based on the BioMap2 analysis and information discussed below, NHESP recommends land protection in the BioMap2 cores or protecting lands adjacent to existing conservation land – or, best, a combination of both when feasible. All of the areas discussed below are important for biodiversity protection in Hadley. Buffers along the rivers, especially those identified as Coldwater Fisheries Resources and in BioMap2 would enhance water quality as well as protecting aspects of Hadley's remaining biodiversity.

Enclosed is a list of rare species and natural communities known to occur or have occurred in Hadley. This list and the list in BioMap2 differ because this list and discussion include all of the uncommon aspects of biodiversity in Hadley that NHESP has documented and BioMap2 focused on occurrences with state-wide significance and included species from the State Wildlife Action Plan. In addition, since BioMap2 is a planning document, species may have been included in the Hadley BioMap2 list because their habitats along the Connecticut River or in the Holyoke Range were drawn to extend to or over the town line. One last difference is that BioMap2 data are from 2010, and there have been updates in our database since then. On our website are fact sheets for all of the state-listed species and the Priority Natural Communities and some of the delisted and WL species. They can be downloaded and included in the OSRP with the list of rare species and uncommon natural communities.

In early 2013 we sent each town copies of its *BioMap2* Town Report that were developed to provide local biodiversity information to assist in conservation efforts at the town or regional level. We encourage inclusion of the town BioMap2 report and fact sheets on its components in the OSRP: I understand that you downloaded a pdf from <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/land-protection-and-management/biomap2/biomap2-town-reports.html>. The BioMap2 components relevant to Hadley are BioMap2 Core Habitats for Species of Conservation Concern, and Natural Communities, Forest, and Aquatic Cores, and, in Critical Natural Landscape (CNL), Landscape Block and Upland Buffers of Aquatic and Wetland Cores. The components are described in full in the BioMap2 summary report. <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/land-protection-and-management/biomap2/biomap2-overview-and-summary.html>

[Please note that all of NHESP's web addresses changed in June 2013; many URLs in earlier publications, including links inside the BioMap2 report, will not work properly. Links that include "mass.gov" should be alright.]

I encourage you to download species, natural community, and BioMap2 fact sheets from our website to include in the OSRP with the species list and BioMap2 discussion. <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/mesa-list/list-of-rare-species-in-massachusetts.html> and for some delisted species <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/mesa-list/non-listed-species-of-conservation-interest.html>



Natural Heritage & Endangered Species Program

1 Rabbit Hill, Westborough, MA 01581 Tel: (508) 389-6360 Fax: (508) 389-7891
An Agency of the Department of Fish & Game
<http://www.mass.gov/nhesp>

<http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/land-protection-and-management/biomap2/biomap2-overview-and-summary.html>

natural communities:

<http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/natural-communities/>

Due, I think, to the diversity of habitats and an historic abundance of field biologists who collected and cataloged in them, a large number of rare and uncommon species have been observed in Hadley over the past hundred and fifty years. The 79 state listed, watch list, and delisted species known to have occurred in town reinforces the pattern of biodiversity identifying the Connecticut River Valley as one of the most biologically diverse parts of the state. Less happily, the 40 (25 MESA listed) species known only historically in Hadley (more than 25 years since last observation) often reflect the loss of habitat from degradation or changing land use. Four of the 40 species are no longer known in the state, the rest continue to be found elsewhere in Massachusetts.

The rare animal species currently known from Hadley are a mix of species dependent on aquatic habitats, wetlands, a mix of wetlands and uplands, and a few others that use upland habitats.

The Connecticut River, its tributaries, and surroundings provide habitat not widespread in Massachusetts. These areas are included in the very large (because of connecting habitats) BioMap2 Core Habitat 2943. In the aquatic habitats of the rivers, are the fish, freshwater mussels, and the nymphs of dragonflies – along with many other species, of course..

In Massachusetts **Shortnose Sturgeons** (E, FE) are river fish that spawn in fast-flowing, rocky areas of rivers and move to deeper, slower waters during the winter. These federally endangered fish do not mature until they are 5 to 10 years old and can live into their 20s - or longer. In the Connecticut River, they are blocked from migrating to estuaries, but move around between the dams. **Eastern Silvery Minnow** (SC), a small fish of shallow backwaters and oxbows of large rivers, is in the Connecticut River in Hadley, but in very different aquatic habitats from those needed by the Shortnose Sturgeons. **Longnose Sucker** (SC) previously known in the Connecticut River in Hadley, is a torpedo-shaped fish is found mainly in cool upper sections of streams and rivers with rocky to gravel substrates. These fish may swim miles to deposit their eggs on clean and well oxygenated gravel substrates. The Fort River supports **Burbot** (SC), a species of freshwater cod with an elongate body that grows to about a foot and a half long that are generally found in deep lakes and cool streams that have shelter such as rock slabs and trees in which they can hide in areas with dense aquatic plants. Burbot have spawning migrations that average about 20 km upstream, up tributaries, or from deep areas to inshore areas. **Bridle Shiners** (SC) are small (<5 cm) minnows that are found in schools swimming in and out of vegetation along the edges of open, clear water in lakes and ponds and slack areas of streams and rivers. They feed on small insects and other aquatic animals.

Also found in the Connecticut and Fort Rivers in the very large, connected, BioMap2 Core 2943, are freshwater mussels. Hadley is a hotbed of diversity of freshwater mussels, including three state-listed species and another that was recently removed from the list and continues to be of conservation interest. Hadley also has an historic occurrence of the small (<2" long) **Dwarf Wedgemussel** (E, FE) that inhabits very shallow water along stream banks of a variety of sized rivers and streams. All freshwater mussels are sedentary filter feeders that spend most of their lives partially burrowed into the bottoms of rivers and streams; they can move in the substrate as water levels fluctuate. However, as sedentary filter feeders they are vulnerable to alterations of their water bodies with stability of flow and substrate critical for these species. **Yellow Lampmussels** (E), usually less than 5 1/4 in. long, have been found to be more abundant in shallow sandbars than in nearby areas that were deeper and had a rocky or muddy substrate. **Eastern Pondmussels** (SC), large freshwater mussels inhabit streams, rivers, and small to large lakes and ponds. **Creepers** (SC) inhabit low-gradient reaches of small to large rivers with sand or gravel substrates: cool to warm-water with diverse fish assemblages best support Creepers. **Triangle Floaters** (delisted) are commonly found in low-gradient river reaches with sand and gravel substrates and low to moderate water velocities, although they are found in a wide range of substrate and flow conditions.

Five listed and one recently delisted species of **dragonflies** are known in Hadley, also primarily found along the Connecticut and Fort Rivers in BioMap2 Core 2943. Although each has its own distinct habitat, the nymphs (young) of all are aquatic and burrow in the bottom sediments of the wetland types they prefer. Maintaining clean, free flowing water is important for maintaining the species. Young adults of all of the species make use of surrounding upland forests for protection while they reach sexual maturity, one of the many reasons for maintaining a forested buffer around streams and rivers.

Orange Sallow Moths (SC) inhabit dry, open oak woodlands on rocky uplands. Their eggs are laid on false foxgloves (*Aureolaria* spp.) where the larvae feed on flowers, seeds, and foliage. In Hadley they occur in the Holyoke Range section of BioMap2 Core 2943.

The state-listed rare bird species known in Hadley include **Bald Eagles** (T) which require large trees in floodplains to hold their nests along the Connecticut River. Hadley's **Peregrine Falcons** (E) are also associated with the Connecticut River, but in this case because a nesting platform was built on the Coolidge Bridge – and they found and use the facility there.

The other rare birds known from Hadley are associated with grasslands, with each species using somewhat different aspects of grassland habitat. **Vesper Sparrows** (T) are species of upland grasslands, such as old fields and pastures. Although considered secure globally, they have declined significantly in eastern North America due to changes in land use.

Grasshopper Sparrows (T) nest in dry grasslands. Natural situations include sandplain grasslands, but they have adapted well to anthropogenic habitats such as airports and landfills. They are very sensitive to changes in plant composition and respond well to the effects of fire management. In Massachusetts **Upland Sandpipers** (E) inhabit open expanses of grassy fields, hay fields, and mown grassy strips adjacent to runways and taxiways of airports and military bases. **Barn Owls** (SC) require grassy habitats for foraging, such as marshes and agricultural fields. They rarely occur apart from populations of meadow voles, a primary food source, and avoid areas of deep snow and prolonged cold, which can preclude successful foraging. The Barn Owl is resourceful in making use of such nesting sites as hollow trees, cavities in cliffs or riverbanks, and artificial structures such as nest boxes, old barns, and bridges. **Sedge Wrens** (E) nest in large wet meadows. They are sensitive to changes in hydrology and seral succession.

Wood Turtles (SC) are known from several areas in Hadley, particularly along the Fort River where they co-occur with many state-rare freshwater mussels and dragonflies in BioMap2 Core 2943. Wood Turtle habitat is streams and rivers preferably with long corridors of undeveloped, connected uplands extending on both sides of the waterways. Wood Turtles nest in sandy upland areas and are susceptible to becoming road kill when they move among parts of their habitats if there are there. Loss of only a few adults annually can cause populations to decline because of their having low replacement rates due to low nest and juvenile survivorship. **Eastern Box Turtles** (SC) are more terrestrial than Wood Turtles, inhabiting many dry and moist woodland habitats. Strong populations of **Spotted Turtles** (Delisted) in good habitat - large, unfragmented, protected open space - continue to be of interest to conservation. This small, dark-colored turtle with yellow spots on its carapace inhabits wetlands year-round and nests in nearby uplands during spring.

Eastern Spadefoot (T) is a short-legged, squat, big-headed toad with unmistakable cat-like, vertically elliptical pupils. This burrowing amphibian requires dry, sand or sandy loam soils interspersed with temporary ponds. It prefers areas with leaf litter, and may be found in farmland areas. In the warmer months, from April to September, the Spadefoot comes up from its burrows to breed in vernal pools after prolonged warm and heavy rains.

Of the 44 rare plant species in Hadley only 14 are considered to be current (documented in the past 25 years); of the current plant species, 9 are MESA listed, the others being on the not-regulated Plant Watch List.

Many of the rare plants in Hadley grow in floodplains or associated wetlands along the Connecticut River. **Green Dragon** (T), a relative of jack-in-the-pulpit, grows in moist floodplains with open to filtered light, usually along large rivers. **Cat-tail Sedge** (T), a perennial grass-like plant, grows in low areas of floodplain forests. **Hairy Wild Rye** (E) (historic) inhabits high terrace floodplain forests with moist alluvial soils and moist to dry rich, rocky open woods and thickets. **Sandbar Willow** (T), a low-growing, multi-stemmed shrub, is found on islands, sandbars, and beaches in the flood zone of the Connecticut River where it is subjected to annual inundation by the river. **Frank's Lovegrass** (SC), the three species of **Eleocharis** (spike-sedges and spike-rush), **Pygmyweed** (T), and **Mud Arrowhead** (WL) grow on sandy to muddy river shores.

The Holyoke Range is Hadley's other main area of biodiversity after the rivers and their shores. Many species of plant as well as some animals are currently known there, and others have been documented in the past. **Purple Clematis** (SC), a woody vine, occurs in semi-shade on sloping, circumneutral or calcareous, deciduous or mixed woodlands. **Climbing Fumitory** (SC) is an herbaceous vine of shady moist woods climbing over talus at the base of cliffs. Species no longer found in Hadley that would have been in the hills include **Drooping Speargrass** (E) which inhabits dry, rocky fertile soils on slopes and ridge crests on base-rich bedrock, within deciduous forests and woodlands and **Violet Wood-sorrel** (E), a low perennial herb that in Massachusetts inhabits dry or moist rich soils of open deciduous woodlands over circumneutral bedrock.

Some of the rare species in Hadley are those that grow best in the open without shade. **Climbing Fern** (SC) is a perennial, colonial, viney fern of low, moist woods and poorly drained, acidic to circumneutral organic rich soil. It is intolerant of shade, but can persist if forests grow over it. Other species needing open habitat have declined to the point of no longer occurring where their habitats have declined; **New England Blazing Star** (SC) is an endemic, globally rare, perennial composite of dry, sandy grasslands and clearings. In Massachusetts, New England Blazing Star inhabits open, dry, low-nutrient sandy soils of grasslands, heathlands, and barrens. It thrives in fire-influenced natural communities that are periodically disturbed and devoid of dense woody plant cover – habitats that have declined across the state.

Small whorled Pogonia (E, FT) has not been documented in Hadley since 1899. Because of the collectability of this orchid species, NHESP does not normally discuss even what towns it occurs in; however, with such an old record that has been searched for, we not only point out that it has been known from Hadley, but we would be very pleased (the botanists would be thrilled) to receive reports with photographs (no specimens, of course) of any finds in town.

Natural Communities are assemblages of plants and animals that recur in similar chemical, moisture, geological, and topographic environments. In Massachusetts, the types are defined in the *Classification of Natural Communities of Massachusetts*, available on the NHESP website. Occurrences of uncommon types – called Priority Natural Communities – are considered to be priority for conservation, as are exemplary examples of more common types of communities. All types of natural communities provide important habitat for common and uncommon species and support the biodiversity of the town. NHESP keeps track of occurrences of Priority Types of Natural Communities, a complete list of which is on the NHESP website. Two types of Priority Natural Communities and exemplary example of two types of more common natural communities have been identified in Hadley and are shown on the enclosed map of natural communities and vernal pools.

One of the least common types of natural community in the state and globally is the **Black Gum-Pin Oak-Swamp White Oak “Perched” Swamp** that forms only on glacial lake sediments and is known from very few places in Massachusetts and Connecticut. Two small patches of this community remain in northeastern Hadley in BioMap2 Cores 1938 and 2943, the larger of which MassGIS shows to be on town land that continues on Amherst Conservation Commission land and includes the whole patch of the community and some additional wetlands and uplands – the sort of protection that we would recommend for maintaining the natural community. The other uncommon type of natural community documented in Hadley is a **Major-river Floodplain Forest** on the Connecticut River. Major-River Floodplain Forests are dominated by silver maple along the floodplains of large rivers. The soils are enriched with nutrients brought by annual floods, resulting in a diversity of plants and insects. These are just small remnants of what would have been present in the past, with farmland having taken over large areas of the prime agricultural soils of the Connecticut’s floodplain. Also in Hadley along the Connecticut River on the shores of a backwater are patches of **Low-Energy Riverbank**, a relatively common open herbaceous community that occurs on sandy or silty mineral soils of river and stream banks that do not experience severe flooding or ice scour. Russell Cove has some exemplary examples of **Wet Meadow**, a relatively common type of natural community. Wet Meadows are graminoid communities similar to deep and shallow emergent marshes except that they are temporarily rather than seasonally flooded. They occur in lake basins, wet depressions, along streams, and in sloughs along rivers. Natural Community polygons are available from MassGIS at <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/natcomm.html>

Hadley contains a great deal of appropriate native biodiversity within its varied topography and provides important habitat for many common species as well as the rare species discussed above and on the attached list. Protecting lands such as those highlighted in BioMap2 is one way of improving wildlife populations: size and continuity of open space is particularly important for supporting wildlife populations. Preventing habitat fragmentation is vital in protecting the ecosystem.

DFW’s Fisheries section has identified environmentally sensitive streams throughout Massachusetts that provide important habitat for native cold water fisheries (CFR, **Coldwater Fisheries Resources**). Buffers along these streams that maintain shade and filter inflowing sediments are important for maintaining their water – and habitat – quality. Culverts in the streams should be maintained to allow movement of fish, turtles, and other aquatic species. Identification of CFRs is based on fish samples collected by staff biologists and technicians with new streams sampled and evaluated yearly. Hadley has five stream segments, Russellville Brook, the Mill and Fort Rivers and two unnamed tributaries to Harts Brook that have been identified as CFRs, shown on the attached map. Hadley’s CFR streams coincide almost completely with BioMap2 Cores and CNLs, emphasizing the importance of these areas for protecting all aspects of biodiversity. More information on describing the CFRs is available from <http://www.mass.gov/eea/agencies/dfg/dfw/wildlife-habitat-conservation/coldwater-fish-resources-cfr.html>

Vernal pools provide critical habitat for some specialized species, and indicate the likely existence of others. Hadley has 4 Certified Vernal Pools (CVPs) and 57 Potential Vernal Pools (PVPs) (identified from aerial photographs, needing verification on the ground). In addition, areas of swamps will provide habitat for vernal pool species. Hadley’s PVPs and CVPs are shown on the included map with the natural communities. Note that there is overlap between Hadley’s CVPs and PVPs, with one of the PVPs looking like it has been certified. Locations of PVPs are available as a datalayer from MassGIS at <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/pvp.html>. Clusters of vernal pools provide 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. Along the Mill River are some small vernal pool clusters. There are more small clusters of vernal pools along the Fort River and south of the mouth of the Fort River. Visiting and evaluating more of the PVPs for certification would provide more protection to these wetlands and the species that use them.

The BioMap2 core areas and Contributing Natural Landscape are particularly valuable in ecological terms, and important to the conservation of a variety of species. Completing conservation protection of remaining unprotected land in those areas would enhance the viability of these special areas - size and continuity of open space is particularly important for supporting wildlife populations. Preventing habitat fragmentation is vital in protecting the ecosystem, for the rare species on the enclosed list, as well as for additional common species. Many of the polygons of both aspects of BioMap2 extend into other municipalities: these large polygons provide opportunities to protect large unfragmented areas that will provide the best opportunities to limit further species loss from the Town and region. As discussed on the first page of this letter, the BioMap2 Core and CNL polygons are available from MassGIS: <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/biomap2.html>. There is also an interactive application to see the broad outlines of the polygons in each Town that is linked from the NHESP website. BioMap2 is more up to date than BioMap and Living Waters, which it replaced.

BioMap2 and the original BioMap and Living Waters projects are intended to be conservation planning tools. They include non-regulated components of biodiversity and include broader areas than do the regulatory maps that NHESP also produces. Estimated Habitat maps are created for use under the Wetlands Protection Act and Priority Habitat maps for use under the Massachusetts Endangered Species Act. Estimated Habitats are a complete subset of Priority Habitats. These two sets of

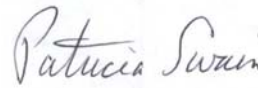
maps are created for regulatory use, shown in the *Natural Heritage Atlas* (the 2008 Atlas, the 13th edition is the current version; the next edition is scheduled to be released in early 2015). These data layers are also available from MassGIS, requiring access to some form of GIS to view them, at <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/nhESP-estimated-habitats-of-rare-wildlife-.html> and <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/prihab.html>. 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 contact me at (508) 389-6352 or by email at pat.swain@state.ma.us if you have any questions.

Sincerely,



Patricia C. Swain, Ph.D.
Ecologist

cc: Melissa Cryan, EOEEA, DCS



Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

Rare Species and Natural Communities Documented in the Town of Hadley

AS OF May 12, 2014

<u>Scientific Name</u>	<u>Common Name</u>	<u>MESA Status</u>	<u>Most recent Year</u>
VERTEBRATES			
<i>Acipenser brevirostrum</i>	Shortnose Sturgeon	E, FE	2009
<i>Catostomus catostomus</i>	Longnose Sucker	SC	1940s
<i>Hybognathus regius</i>	Eastern Silvery Minnow	SC	2003
<i>Lota lota</i>	Burbot	SC	1998
<i>Notropis bifrenatus</i>	Bridle Shiner	SC	1979
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	T	1993
<i>Bartramia longicauda</i>	Upland Sandpiper	E	1984
<i>Cistothorus platensis</i>	Sedge Wren	E	1989
<i>Falco peregrinus</i>	Peregrine Falcon	E	2013
<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	2013
<i>Poecetes gramineus</i>	Vesper Sparrow	T	2000
<i>Tyto alba</i>	Barn Owl	SC	1981
<i>Scaphiopus holbrookii</i>	Eastern Spadefoot	T	2000
<i>Clemmys guttata</i>	Spotted Turtle	Delisted	1996
<i>Glyptemys insculpta</i>	Wood Turtle	SC	2006
<i>Terrapene carolina</i>	Eastern Box Turtle	SC	1984
INVERTEBRATES			
<i>Alasmidonta heterodon</i>	Dwarf Wedge Mussel	E, FE	Historic
<i>Alasmidonta undulata</i>	Triangle Floater (freshwater mussel)	Delisted	2005
<i>Lampsilis cariosa</i>	Yellow Lamp Mussel	E	2009
<i>Ligumia nasuta</i>	Eastern Pond Mussel	SC	2001
<i>Strophitus undulatus</i>	Creeper (freshwater mussel)	SC	2007
<i>Gomphus fraternus</i>	Midland Clubtail (dragonfly)	E	2004
<i>Gomphus vastus</i>	Cobra Clubtail (dragonfly)	SC	2011
<i>Gomphus ventricosus</i>	Skillet Clubtail (dragonfly)	T	1999
<i>Ophiogomphus aspersus</i>	Brook Snaketail (dragonfly)	SC	1994
<i>Stylurus amnicola</i>	Riverine Clubtail (dragonfly)	E	2011
<i>Stylurus spiniceps</i>	Arrow Clubtail (dragonfly)	Delisted	2006
<i>Pyrria aurantiago</i>	Orange Sallow Moth	SC	2008
VASCULAR PLANTS			
<i>Acer nigrum</i>	Black Maple	WL	1985
<i>Adlumia fungosa</i>	Climbing Fumitory	SC	2002
<i>Arisaema dracontium</i>	Green Dragon	T	2007
<i>Blephilia ciliata</i>	Downy Wood-mint	E	1875
<i>Boechera stricta</i>	Drummond's Rockcress	WL	1980
<i>Botrychium angustisegmentum</i>	Narrow Triangle Grape-fern	WL	2003
<i>Botrychium matricariifolium</i>	Daisy-leaf Moonwort	WL	2003
<i>Carex bicknellii</i>	Bicknell's Sedge	WL	1870
<i>Carex haydenii</i>	Hayden's Sedge	WL	1870
<i>Carex typhina</i>	Cat-tail Sedge	T	1994
<i>Clematis occidentalis</i>	Purple Clematis	SC	2009
<i>Crassula aquatica</i>	Pygmyweed	T	1977
<i>Desmodium canescens</i>	Hoary Tick-trefoil	WL	1979
<i>Digitaria cognata ssp. cognata</i>	Fall Witch-grass	WL	1980



Natural Heritage & Endangered Species Program

Field Headquarters, Westborough, MA 01581 **Tel:** (508) 389-6360 **Fax:** (508) 389-7890

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NHESP rare species and natural communities Hadley, May 2014

<i>Eleocharis diandra</i>	Wright's Spike-rush	E	2009
<i>Eleocharis erythropoda</i>	Redfoot Spike-rush	WL	1983
<i>Eleocharis intermedia</i>	Intermediate Spike-sedge	T	2009
<i>Elymus villosus</i>	Hairy Wild Rye	E	1979
<i>Equisetum palustre</i>	Marsh-horsetail	H	1938
<i>Equisetum variegatum ssp. variegatum</i>	Variegated Scouring Rush	WL	2003
<i>Eragrostis frankii</i>	Frank's Lovegrass	SC	2009
<i>Galearis spectabilis</i>	Showy Orchis	WL	1931
<i>Hyperzia appressa</i>	Appalachian Fir-moss	E	Historic
<i>Hypericum ascyron</i>	Giant St. John's-wort	E	1875
<i>Isotria medeoloides</i>	Small Whorled Pogonia	E, FT	1899
<i>Isotria verticillata</i>	Large Whorled Pogonia	WL	2007
<i>Juglans cinerea</i>	Butternut	WL	1889
<i>Juncus filiformis</i>	Thread Rush	E	1865
<i>Lespedeza frutescens</i>	Violet Bush-clover	WL	1985
<i>Liatris scariosa var. novae-angliae</i>	New England Blazing Star	SC	1931
<i>Lygodium palmatum</i>	Climbing Fern	SC	2006
<i>Muhlenbergia capillaris</i>	Hairgrass	H	1878
<i>Nuphar microphylla</i>	Tiny Cow-lily	E	2010
<i>Oxalis violacea</i>	Violet Wood-sorrel	E	1937
<i>Pellaea atropurpurea</i>	Purple Cliff-brake	WL	2005
<i>Petasites frigidus var. palmatus</i>	Sweet Coltsfoot	E	1880
<i>Platanthera hookeri</i>	Hooker's Orchis	WL	1863
<i>Poa saltuensis ssp. languida</i>	Drooping Speargrass	E	1913
<i>Ranunculus ambigens</i>	American Spearwort	H	1927
<i>Sagittaria rigida</i>	Mud Arrowhead	WL	1985
<i>Salix exigua ssp. interior</i>	Sandbar Willow	T	1987
<i>Saururus cernuus</i>	Lizard's Tail	H	1932-PRE
<i>Scirpus polyphyllus</i>	Appalachian Bulrush	WL	1874
<i>Scleria triglomerata</i>	Tall Nut-sedge	E	Historic
<i>Symphotrichum prenanthoides</i>	Crooked-stem Aster	SC	1933
<i>Veronicastrum virginicum</i>	Culver's-root	T	1929

NATURAL COMMUNITIES

Black gum-pin oak-swamp white oak		
"perched" swamp	S1 (Critically Imperilled)	1993
Low-energy riverbank	S4 (Secure)	1992
Major-river floodplain forest	S2 (Imperilled)	1997
Wet meadow	S4 (Secure)	1991

CERTIFIED VERNAL POOLS

Certified Vernal Pool (4)	2009
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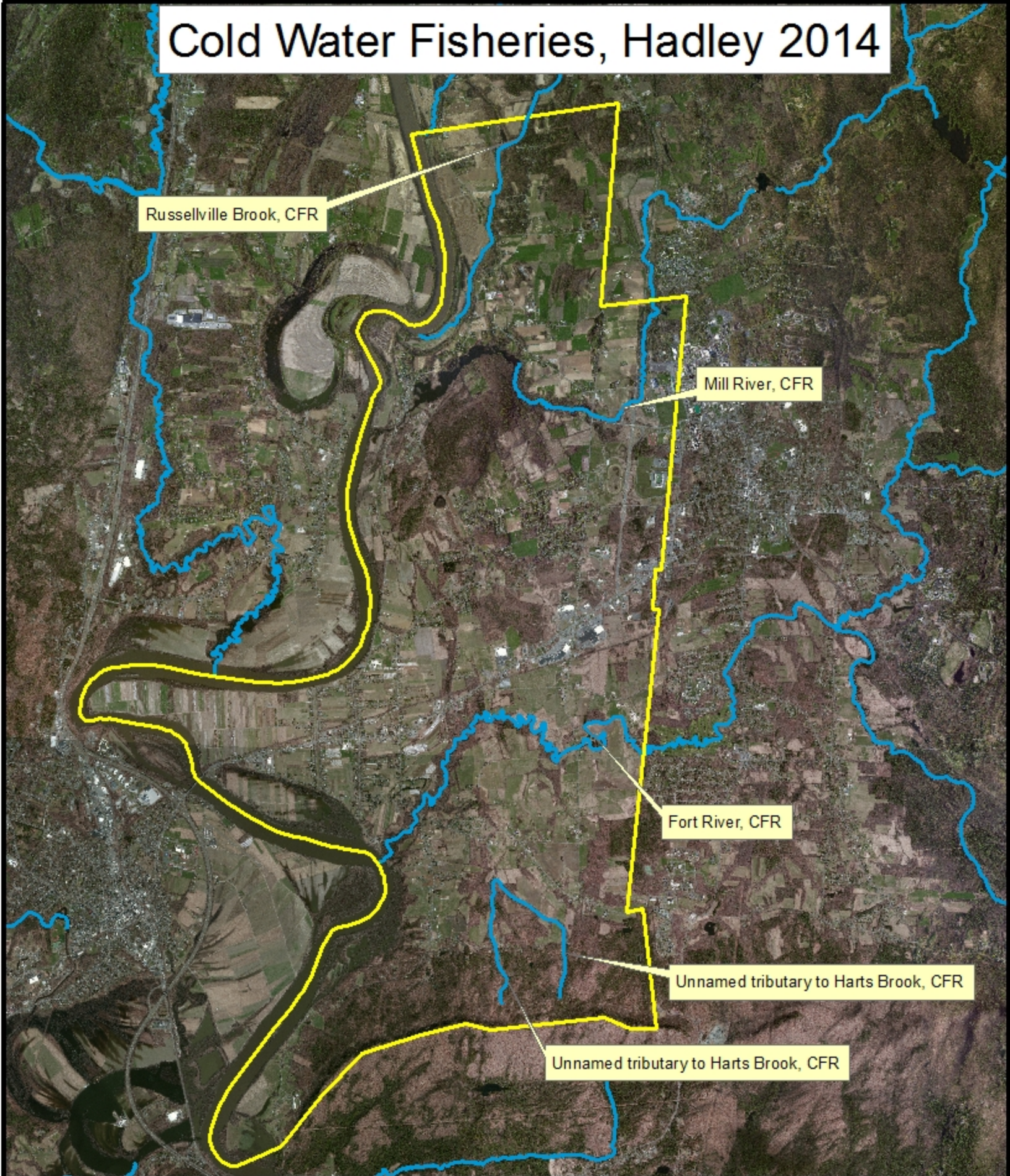
Most Recent Year means the year of the most recent record in the NHESP database.

Some Watch List or Historic dates are not available.

KEY TO MESA STATUS: E = Endangered. T = Threatened. SC = Special Concern. FE = Federally Endangered. FT = Federally Threatened. WL = unofficial Plant Watch List, not regulated. Delisted – species no longer protected under MESA. Occurrences that are more than 25 years old are not regulated; most very old observations have been searched for and are no longer present at the site. Full definitions are available at <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/mesa-list/list-of-rare-species-in-massachusetts.html>

Natural Communities are not regulated. S (state abundance) ranks are on a 1 to 5 scale, with S1 being considered Critically Imperilled, generally having 1 to 5 good occurrences or extremely low acreage statewide, S3 being Vulnerable, and S5 being Demonstrably Secure. Community types ranked S1, S2, and S3 are priority for conservation protection. Communities listed that are ranked S4 or S5 are considered to be exemplary examples of the type.

Cold Water Fisheries, Hadley 2014



Map Created: May 12, 2014, NHESP
Data Source: NHESP, DFW, MassGIS
Background: MassGIS 2012 DigitalGlobe



0 0.5 1 2 Miles

NHESP Natural Communities and Vernal Pools

