Commonwealth of Massachusetts

Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

October 23, 2013

Patricia J. Cassady
Agent for the Middleborough Conservation Commission
20 Centre Street, 2nd Floor
Middleborough, MA 02346

Via e-mail: pcssdy@middleborough.com

Re: Open Space and Recreation Plan, NHESP 08-24654, Town of Middleborough

Dear Ms Cassady:

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

Enclosed is a list of rare species and natural communities known to occur or have occurred in Middleborough. This list and the list in BioMap2 differ because this list and discussion include all of the uncommon aspects of biodiversity in Middleborough that NHESP has documented and BioMap2 focused on occurrences with state-wide significance as well as species from the State Wildlife Action Plan. In addition, since BioMap2 is a planning document, species may have been included in the Middleborough BioMap2 list because their habitats extend over the town line from observed locations in nearby towns. 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 some of the delisted and WL species, and the Priority Natural Communities. They can be downloaded and included in the OSRP with the list of rare species and uncommon natural communities.
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 the non-MESA listed species;
http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/mesa-list/non-listed-species-of-conservation-interest.html and for the natural communities:
http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/natural-communities/

In early 2013 we sent copies of NHESP's BioMap2 town reports on BioMap2 Core Habitats and Critical Natural Landscapes (CNL) and their components to Massachusetts' towns. If you haven't done so, I recommend that you download the electronic version for Middleborough (available from: http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/land-protection-and-management/biomap2/biomap2-town-reports.html). I encourage you to download BioMap2 fact sheets (accessible from the BioMap2: Overview& Summary tab on the right side of the webpage BioMap2 homepage) from our website to include in the OSRP and BioMap2 town report.

The BioMap2 components relevant to Middleborough are Forest, Aquatic, Wetland, and Vernal Pool Cores, and Species of Conservation Concern and Priority & Exemplary Natural Communities, and, in 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 recently changed; web addresses in publications from before June 2013 will not work properly.]

The rare animal species currently known from Middleborough occupy a mix of habitats from open water to forests, some restricted to particular conditions and others using a mix in habitats in different parts of their lives. Part of the reason that Middleborough has so many rare species is the variety of habitats available for them.

The uncommon bird species known in Middleborough include predators of fish that nest in large trees near open water. The Assawompset Pond complex in BioMap2 Core 823 includes important habitat for these species. Bald Eagles (T) nest on shores of lakes, rivers, and oxbows and feed on fish from them. In the winter Bald Eagles may congregate in areas of open water. Ospreys (Delisted), sometimes called fish hawks, normally nest in large dead trees, although in Massachusetts they favor platforms on poles erected for the purpose in salt marshes and marshes along rivers and lakes. Ospreys do not overwinter here, but migrate south, some as far as South America.

Middleborough supports populations of a group of reclusive marsh birds. American Bitterns (E), heron-like birds, and King Rails (T) are secretive marshbirds of large cattail beds, tussock marshes, and occasionally shrub marshes and are very sensitive to disturbance. Pied-billed Grebes (E) and Common Moorhens (SC) are secretive marshbirds that typically nest in dense cattail beds adjacent to open water. They are very sensitive to disturbance and changes in water levels. Most of the occurrences of these reclusive marsh birds are in open areas of the Great Cedar Swamp in BioMap2 Core 798, reflecting the importance of that area as wildlife habitat.

Middleborough also supports forest inhabiting uncommon birds, in BioMap2 Cores 823 and 798, and in scattered occurrences elsewhere in town. Northern Parulas (T) are one of the smallest and most distinctly marked of the North American wood warblers. They seldom breed in Massachusetts, but when they do, it is in coastal wet woodlands, such as red maple or Atlantic white cedar swamps that have Old-Man's Beard (*Usnea* spp.), a moss-like lichen with which they build their nests. Cooper's Hawks (Delisted) are medium sized hawks of forests and woodlands that prey on smaller birds that they catch while flying among trees. Cooper's Hawks are increasingly common in suburbs and urban areas where they have added pigeons and starlings to their diet. Several of the uncommon birds that nest in forests do their hunting in more open, shrubby or grassland areas. Sharp-shinned Hawks (SC) nest in mixed woodlands and coniferous forests, often with nearby open areas. They are sensitive to disturbance around the nest, but they do occasionally nest near human development. This species has not been documented in Middleborough since 1931 when eggs were collected for museum specimens. Long-eared Owls (SC) generally nest in dense coniferous or mixed forests or groves close to fields or other open areas suitable for foraging. Their diet is primarily of meadow voles, along with a small percentage of shrews, white-footed mice, and small songbirds.

The nesting and foraging habitat of two other state-listed birds in Middleborough is open grassland. In Massachusetts Upland Sandpipers (E), slender, moderate-sized shorebirds, are restricted to open expanses of grassy fields, hay fields, and mown grassy strips adjacent to runways and taxiways of airports and military bases. Vesper Sparrows (T) are also species of upland grasslands, including old fields and pastures. Although considered secure globally, they have declined significantly in eastern North America due to changes in land use where many agricultural grasslands have reverted to forest. In Middleborough, these species have found habitat in BioMap2 Cores 798 and 823, both of which have a diversity of habitat types.

Several uncommon species and resources in Middleborough are completely aquatic: 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, in Middleborough in BioMap2 Core 823. They feed on small insects and other aquatic animals. In addition, 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. In Middleborough, portions of Poquoy, Puddingshear, Otis Pratt, Fords, and Fall Brooks and 'UNT to Fuller Street Bog Reservoir' (Unnamed Tributary- not named on the USGS topo maps) are identified as CFRs. The significant overlap of the CFRs with BioMap2 Cores indicates good environmental conditions identified by each project and emphasizes the importance of the areas for biodiversity – natural resource - preservation. Maps of the CFRs are included with this letter.

Middleborough has a good diversity of freshwater mussels, including three state-listed species and another that was recently removed from the list and remains of conservation interest. All freshwater mussels are sedentary filter feeders that spend most of their lives partially burrowed into the bottoms of rivers, streams, and lakes and ponds; 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. In Middleborough, they primarily occur in the Assawompset Pond complex in BioMap2 Core 823 and along the Taunton River in another part of the large Core 823. In Massachusetts, Eastern Pondmussels (SC) inhabit streams, rivers, and small to large lakes and ponds in the southeastern part of the state; they show no preference for substrate, depth, or flow conditions. Tidewater muckets (SC), medium-sized mussels that are rarely more

than four inches long, inhabit depositional areas with slow currents in small to large rivers, ponds, and lakes that have, or historically had, unimpeded connections with coastal waters. Good densities are known in the sandy bottoms of coastal freshwater ponds of southeastern Massachusetts that have springtime alewife runs. Creepers (SC) inhabit low-gradient reaches of 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. The presence of good populations of mussels usually indicates good quality water. Overlapping threats to mussels – and all aquatic species - include nutrient enrichment, sedimentation, other forms of pollution, and competition from non-native invasive species.

Other rare animal species in Middleborough are associated with wetlands, although most use a mix of habitats. While the different rare turtles and amphibians in Middleborough have varied habitat requirements, they all require wetlands, nearby forests, and sandy areas for nesting. Middleborough has five species of turtle that are of conservation concern. Loss of only a few adult turtles annually can cause populations to decline because of their having low replacement rates due to low nest and juvenile survivorship, and often many years to sexual maturity. The most aquatic of the turtles is the state and federally Endangered Red-bellied Cooter. Northern Red-bellied Cooters are large, 10 -12 in. long and weighing up to 10 lbs. Plymouth County in Massachusetts has an isolated disjunct population of this southern turtle that currently occurs only in freshwater ponds that have abundant aquatic vegetation, although there have been a few observations along riverways as well, including in Middleborough. For nesting, Red-bellied Cooters, like all turtles, require sandy soil on land surrounding their ponds. Multiple observations of the cooter have been made in the river and ponds of BioMap2 Core 823. Middleborough is peripheral to the main population locations for Wood and Blanding's Turtles in Massachusetts - central Massachusetts for Wood Turtles and north central for Blanding's; the few records in Middleborough tend to be in areas identified for conservation of other species as well. Habitat for Wood Turtles (SC) 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. Blanding's Turtles (T) inhabit a mix of seasonal pools, marshes, shrub swamps, forest, and open uplands. After overwintering in the deep muds of wetlands, Blanding's Turtles move overland to vernal pools and shrub swamps to feed and mate. As with Wood Turtles, roads are the primary cause of adult mortality of Blanding's Turtles. 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. It occurs in BioMap2 Cores 823 and 798 and other areas around town. Like the Northern Red-bellied Cooter, the Eastern Box Turtle (SC) has the core of its Massachusetts population in the southeastern part of the state where it is particularly important to maintain the species. Eastern Box Turtles primarily live in hardwood/ pine forests, with some wetland use for hydration and foraging. There are many observations in Middleborough, in BioMap2 Cores 798, several parts of 823, and scattered around town in smaller Cores and other areas. Several of the areas with the densest populations are being considered to be box turtle conservation protection zones, including much of BioMap2 Core 798 and land to the west of it including Core 739, areas in Core 823 and north and east of Assawompset Pond to and including Core 568, and areas in and around Cores 694 and 682.

Four-toed Salamanders (Delisted) live in forested habitats surrounding swamps and other wetlands with fish-free waters that are used as breeding sites. Most breeding sites in Massachusetts have mounds of sphagnum moss in which eggs are laid hanging over water. Newly hatched larvae wriggle through the moss and drop into the water, where they develop for several weeks prior to metamorphosis. Protection of large forested areas with imbedded boggy wetlands is needed to protect populations of the species.

Eastern Spadefoots (T) are short-legged, squat, big-headed toads that burrow into dry sandy soils characteristic of Pitch Pine communities, coastal oak woodlands, or sparse shrub growth, interspersed with temporary ponds. After prolonged warm and heavy rains, from April to September, Spadefoots come up from the soil to breed in vernal pools. The species has not been reported in Middleborough since 1931 reflecting a pattern throughout the state of populations lost, likely from loss of large areas of habitat.

Mystic Valley Amphipods (Delisted) are small crustaceans that live among the roots of aquatic plants in cool, shallow slow moving water with leaf litter such as is found in Atlantic White Cedar Swamps and Red Maple Swamps, and other seepage wetlands. They are found only in (endemic to) southeastern New England, but are relatively abundant within the restricted area. Water-willow Borer Moths (T) are endemic to southeastern Massachusetts where they inhabit shallow portions of coastal plain wetlands (swamps, edges of streams and ponds, abandoned cranberry bogs, etc.) where water-willow (*Decodon verticillatus*), which the larvae live in, grows. Threats to this and the other rare species include loss of habitat, hydrologic alteration, and pesticide spraying.

The habitats of the 14 species of rare plants in Middleborough range from aquatic to pondshores and open grasslands to forests. Featherfoil (WL), the only true aquatic plant on Middleborough's list of uncommon species, has submerged inflated leaves and a white flower that rises above the water on a spongy inflated stalk. It grows in quiet backwaters, and pools in streams and swamps. Several of Middleborough's other uncommon plants are characteristic of coastal plain pondshore

communities: Dwarf Bulrush (T), Round-fruited False-loosestrife (E), Pondshore knotweed (SC), and Plymouth Gentian (SC) occur together on shorelines in BioMap2 Core 823 around the Assawompset Pond complex. Philadelphia Panic-grass subspecies philadelphicum also grows primarily on sandy shores of lakes and streams. The populations of these species in Middleborough are large and on protected land. Plymouth Gentian is interesting because it is almost endemic to Massachusetts with a few populations outside the state, but is relatively abundant locally on pond shores. Fluctuations of the water levels in the ponds actually protect the adapted species from competitors as long as the fluctuations stay neither high nor low for multiple years in a row.

Several of the uncommon plants in Middleborough grow in other wetlands. Gypsywort (E), a non-aromatic member of the mint family, is found along streams in red maple swamps. Pale Green Orchis (T), a perennial orchid, grows in a variety of mesic to wet habitats, usually near moving water. Long-leaved Panic-grass (T), a slender-stemmed perennial of the Grass family, grows in dense tufts in open, wet, often seasonally inundated, peaty depressions.

A few of Middleborough's rare plants are species of grasslands, a habitat that has been reduced by changing land use – reduction in agriculture and reforestation. Orange Milk-weed (WL), also called Butterfly Weed, grows in full sun in dry, sandy or gravelly soil - in fields, grasslands or heathlands. Nuttall's Milkworts (WL), perennial herbaceous plants, grow in dry, sandy soils in eastern Massachusetts. Principal habitats of Lion's Foot (E), a robust perennial in the Aster family, are sandplain grasslands and heathlands, and they may also occur on rocky slopes, along roadsides, and in other disturbed habitats. Little Ladies'-tresses (WL) are small white orchids of dry to moist sandy acidic soils of fields and open woodlands. Open woodlands are also habitat for Lily-leaf Twayblade (T), a short herbaceous orchid with a spike of 1/2 inch long purple-brown flowers.

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. Three types of Priority Natural Communities and exemplary examples of a more common type have been identified in Middleborough and are shown on the accompanying map. A large example of a Coastal Atlantic White Cedar Swamp in the Rocky Gutter WMA, BioMap2 Core 659 is in excellent condition and is well buffered by a mosaic of wetlands. Coastal Atlantic White Cedar Swamps are acidic, low nutrient basin swamps dominated by Atlantic white cedar trees in the overstory and a mixture of species in the understory. This community type typically occurs in basins on the Atlantic Coastal Plain. Middleborough has four separate occurrences, two on the Taunton, one along Puddingshear Brook, and one along Black Brook, of Alluvial Red Maple Swamp which are an uncommon type of red maple swamp that occurs in low areas along rivers and streams. Regular flooding enriches the soil with nutrients, resulting in an unusual set of associated trees and plants. The best of these is a large occurrence along Black Brook that extends into Rochester in BioMap2 Core 823. It is in excellent condition, with minimal anthropogenic disturbances, has good structural and floristic diversity, and a large, naturally vegetated buffer. In the same wetland is a very nearby example of a small Kettlehole Level Bog that is in good condition, and is also well buffered by natural vegetation which includes a very good example of a Red Maple Swamp, the most common, although highly variable, type of forested wetland in Massachusetts. The other very good example of a Red Maple Swamp is in BioMap2 Core 798 in Great Cedar Swamp between Bartlett and Raven Brooks. The Great Cedar Swamp example is a large, but young Red Maple Swamp that is part of a much larger wetland complex. Red Maple Swamps seem to have replaced Atlantic White Cedar swamps in many areas as a result of lack of regeneration of Atlantic White Cedar (AWC) which requires full sun and mineral soil to reproduce. In this interpretation, Red Maple Swamps may have replaced AWC Swamps when conditions have not been right for AWC regeneration, such as large disturbances that reduce the canopy of Red Maple so that AWC could grow and lack of nearby AWC seed sources.

Middleborough 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. Protecting lands such as those highlighted in BioMap2 is one way of maintaining the biodiversity of the town and region: size and continuity of open space is particularly important for supporting wildlife populations. Preventing habitat fragmentation is vital in protecting the ecosystems. For example, the Black Brook area and Assawompset Pond complex in BioMap2 Core 823 has an impressive mix of conservation ownership, including lands managed by Middleborough's Conservation Commission (Fall Brook-Washburn Conservation area) and Water Department (with a conservation restriction held by The Nature Conservancy), the City of New Bedford Water Department (also with a conservation restriction), and MassWildlife. Protecting lands abutting and connecting the protected open space parcels would be an important step to preserving the exiting biodiversity of the area.

Vernal pools provide critical habitat for some specialized species, and indicate the likely existence of others. Middleborough has 12 Certified Vernal Pools (CVPs) and 388 Potential Vernal Pools (PVPs) (identified from aerial photographs, needing verification on the ground). In addition, areas of swamps provide habitat for vernal pool species. Middleborough's PVPs and CVPs are shown on the included map with the natural communities. 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. BioMap2 Core 754 east of the Taunton River is a BioMap2 Vernal Pool Core, a cluster of state wide significance. Middleborough has many clusters of PVPs, some of which have been noted on the map. 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 ecosystems, 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/mgis/biomap2.htm. 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.

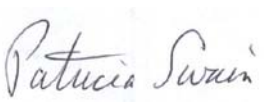
Estimated Habitat maps are created for use under the Wetlands Protection Act and Priority Habitat maps for use under the Massachusetts Endangered Species Act. Estimated Habitats are a complete subset of Priority Habitats. These two sets of maps are created for regulatory use, shown in the *Natural Heritage Atlas* (the 2008 Atlas, the 13th edition is the current version). 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.
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cc: Melissa Cryan, EOEEA, DCS