

# **Robinson State Park**

## **Survey for Rare and Protected Species and Uncommon and Priority Natural Communities**

**Final Report**  
Prepared under  
InterAgency Service Agreement

For the  
Department of Conservation and Recreation  
Bureau of Forestry

Prepared by  
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**April 15, 2008**  
**Corrected May 16, 2008**

## Abstract

An inventory focused on rare species, natural communities and vernal pools at DCR's Robinson State Park Property in Agawam, MA, in 2007, located fifteen state protected (MESA) rare taxa, six types of NHESP priority natural communities, several certifiable vernal pools, and six plant Watch List species (not protected but of conservation interest in Massachusetts). Two vertebrate Species of Special Concern were located. Five species of state listed plants were found in multiple sites on the property. Eight state listed species of dragonfly (out of 47 Odonate species identified in the park) were found along the Westfield River; where the shallow ripple areas were particularly rich in Odonates. The west end of the park has an area of possible primary forest with several priority natural communities, vernal pools and rare species. Habitat throughout the park supports an apparently good population of turtles. There is an uncommon natural community in the east end of the park that needs to be defined in Massachusetts. The Westfield River and its shoreline provide habitat to many rare species and support several priority natural communities. Many species of invasive plants were found around the property. Management to control most of the invasives would be impractical given their pervasiveness on the property. For some species at particular locations, control efforts might be worthwhile. Other management suggestions include keeping old fields open (although not mowing dense herbaceous or shrubby areas in June or July in order to protect box turtles), and avoiding construction of barriers to turtle movement. Vernal pools should be avoided during any management work that opens the canopy or compresses the soil. Illegal use of ATVs is a management problem at Robinson, as on many public lands. There is damage to wetlands on the east end of the park from ATV use there; other places they seem to stay more on existing woods roads.

Note: Patricia Swain, NHESP May 16, 2008:

I noticed that the map of rare plant locations at Robinson SP on p. 6 (Fig.3) included three dots representing locations of vertebrate animals instead of rare plants (my own error when I made the original map). I have prepared a new map that is included in this corrected update. In addition, a questionable species identified in two of the natural community plots (Rich Mesic Forest plots 10 and 12) were checked on the site in April 2008 by Karen Searcy, and found to be Wild Leek, *Allium tricoccum*, (a native characteristic of the community type) and not Lily-of-the-Valley, *Convallaria majalis* (a non-native, non-invasive species). The plot summaries have been reprinted and updated. Nither of these corrections changes any conclusions or management recommendations in the report.

Rare Species and natural communities located on Robinson State Park 2007:

<u>Scientific Name</u>	<u>Common Name</u>	<u>MESA Status</u>
<b>Vertebrate Animals</b>		
<i>Terrapene carolina</i>	Eastern Box Turtle	SC
<i>Hemidactylium scutatum</i>	Four-toed Salamander	SC
<b>Invertebrate Animals</b>		
<i>Boyeria grafiana</i>	Ocellated Darner	SC
<i>Gomphus abbreviatus</i>	Spine-crowned Clubtail,	E
<i>Gomphus quadricolor</i>	Rapids Clubtail	T
<i>Gomphus ventricosus</i>	Skillet Clubtail	SC
<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	SC
<i>Ophiogomphus carolus</i>	Riffle Snaketail	T
<i>Stylurus scudderii</i>	Zebra Clubtail	E
<i>Stylurus spiniceps</i>	Arrow Clubtail	T
<b>Plants</b>		
<i>Boechea laevigata</i>	Smooth Rock-cress	T
<i>Claytonia virginica</i>	Narrow-leaved Spring Beauty	E
<i>Lobelia siphilitica</i>	Great Blue Lobelia	E
<i>Ranunculus pensylvanicus</i>	Bristly Buttercup or Crowfoot	T
<i>Thuja occidentalis</i>	Arborvitae	E
<i>Betula nigra</i>	River Birch	WL
<i>Dryopteris goldiana</i>	Goldie's Fern	WL
<i>Isotria verticillata</i>	Large Whorled Pogonia	WL
<i>Menispermum canadense</i>	Moonseed	WL
<i>Rhododendron periclymenoides</i>	Pinxter-flower	WL
<i>Sanicula trifoliata</i>	Trefoil Sanicle	WL
<b>Natural Communities</b>		
Cobble-bar Forest	S2	
High-terrace floodplain Forest	S2	
Major river floodplain forest, including riverine island variant	S2	
Oak Tulip Tree Forest	For now included in Red Oak – Sugar Maple Transition Forest S?	
Rich, Mesic Forest	S3	
Riverine Pointbar and Beach	S3	

**KEY TO STATUS: E = Endangered. T = Threatened. SC = Special Concern: all are regulated under MESA (Massachusetts Endangered Species Act).**

WL - unofficial, non-regulatory list of plants of known or suspected conservation concern.

**NatureServe/Natural Heritage Conservation Status Ranks:**

The conservation status of a species or community is designated by a number from 1 to 5,

G-Ranks(global) and S-Ranks (state):

1 = critically imperiled (often 5 or fewer populations)

2 = imperiled (often 20 or fewer populations)

3 = vulnerable to extirpation or extinction (often 80 or fewer populations)

4 = apparently secure

5 = demonstrably widespread, abundant, and secure

? = Inexact Numeric Rank, denotes some uncertainty about the numeric rank; (e.g. S2? - Believed most likely S2, but some chance of either S1 or S3).

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## Introduction:

The Natural Heritage & Endangered Species Program (NHESP) of the Massachusetts Division of Fisheries & Wildlife contracted with the Department of Conservation and Recreation, Bureau of Forestry, to conduct surveys for selected groups of rare species at Robinson State Park in Agawam, just upstream from the confluence of the Westfield River with the Connecticut River. Rare vascular plants, turtles and salamanders, and dragonflies, and vernal pools and priority natural communities were inventoried during the 2007 field season. These groups were chosen as the most likely to have rare species on the property, based on known occurrences in the area, the size and location of the property, and the likelihood of their being affected by the then proposed timber harvest.

### Site description and regional setting

Robinson State Park occupies over 800 acres with five miles of frontage on the Westfield River in the town of Agawam, Massachusetts. The Westfield River, which flows east along the north side of the property. Although much of the Westfield's watershed is in the rugged terrain of the Berkshire Plateau, by the time it reaches Robinson, the land is part of the flatter Connecticut Valley although the park itself has rolling terrain, incised with ravines and slopes down to the river.

Robinson State Park's location down stream from high rugged terrain of the Berkshire Plateau, and near the Connecticut River gives it a mix of southern and northern oriented species. The generalized potential vegetation of the Connecticut River Valley is Hemlock-white pine-oak, with Sugar maple-birch-beech forest in cooler and higher places. However, Robinson is along the Westfield which flows out of the cooler Hudson Highlands/Berkshire Transition area, making connections with northern species distributions. In addition, being south of the Holyoke Range, more southern climate (hotter, more humid) influences the area and some species considered southern are more common there than many other parts of the state. This transitional zone includes the oaks and hickories characteristic of the central hardwoods, along with the beech, birch and sugar maple typical of the northern hardwoods. White ash, black birch and red oak are often particularly prominent in transition hardwoods stands. At the border between two vegetation types, both types may be present within a local area, with the type present on a particular site influenced by aspect, soil fertility, soil moisture, and land use history. In particular the variation in amounts of pine and hemlock is strongly influenced by past land use. Because much of Robinson was farmed in the past, vegetation and animal habitats have been modified, mixed and homogenized over the years.

In a regional setting, using the

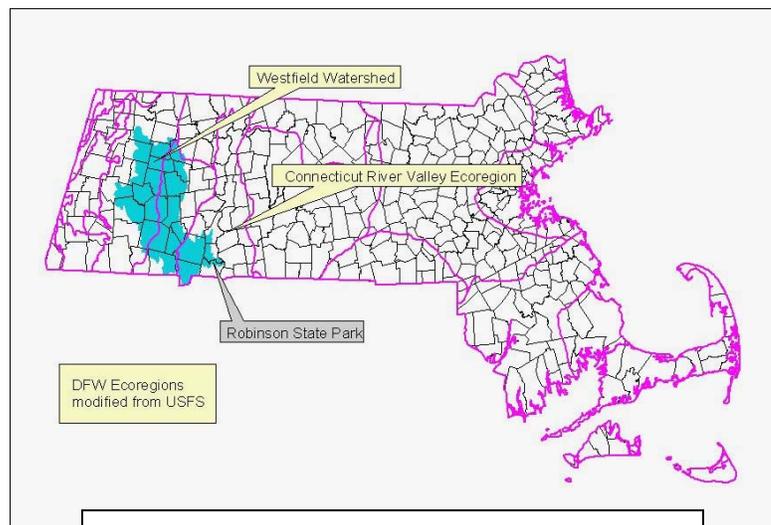


Fig. 1. Robinson State Park showing regional setting.

US Forest Service *Ecological Map Units of the Eastern United States* (Keys et al., 1995) the Park is located in the USFS's subsection 221Af, Lower Connecticut River Valley, part of the southern New England Coastal hills and Plains Section of the Eastern broadleaf forest province. The Massachusetts Division of Fisheries & Wildlife has adopted a slightly modified version of the Forest Service's subsections as DFW ecoregions. The DFW Connecticut River Valley Ecoregion has the same geographic extent as the USFS's subsection (Figure 1).

#### Inventory targets:

Because Robinson State Park property has a mix of dry uplands, wetlands of several types, the Westfield River, and various tributary streams, a variety of species of several taxonomic groups might be expected on the property. Taxonomic groups chosen for inventory included those most likely to have habitat in potential timber harvest areas and those most likely to occur on the property. Plants and natural communities were selected because they are part of the habitat for other species, as well as being of interest in themselves and the property was known to have several rare plant species and interesting natural communities. Animal groups already known or reported from the property or near by and those that use the prevailing oak forest and forested or shrubby wetlands, or the river corridor were selected for inventory: reptiles, amphibians, and Odonates (dragonflies and damselflies). Vernal pools on the property, including Potential Vernal Pools that had been identified through interpretation of aerial photographs, and other pools identified by park users, were targeted for survey.

Establishing baseline information on the presence of rare and common species, native and non-native, on the property was a major focus of the surveys. Within the taxonomic groups selected for inventory focus, some rare species from the property and surrounding area were already in the NHESP database of rare species. These known species were identified for updates of their occurrences.

#### **Methods:**

Taxonomic experts surveyed Robinson State Park property for rare species, vernal pools, and natural communities. Each surveyor was provided with lists of rare species known on the property, from within two miles of the property, and from the surrounding towns, to assist them in identifying what would likely be present. Each received copies of aerial photographs (MassGIS 2001 aerial orthophotos) with previously known relevant rare species locations marked. All of the surveys were conducted during seasons appropriate for finding the rare species of focus. The reports in the Appendices detail the methods each used in the field surveys.

#### **Results:**

The surveys included widespread sampling and observations, and although there were no big surprises, there were more rare plants and dragonflies than usually found on properties of comparable size. One other species of turtle (Wood Turtle) was expected but not found, although habitat was present. Not seeing the species during surveys does not mean it does not occur on the property, but it is not currently known there.

Fifteen state listed rare species were found at Robinson State Park in this survey, locations are shown in Figure 2 and listed with ranks in Table 1. Examples of five types

of state priority natural communities were located and plots sampled (Fig. 4). Robinson includes two variants of Major River Floodplain forests, including less common Riverine Island variants. The forest areas with Tulip Trees need additional analysis, for now those areas are included as variants of Red Oak-Sugar Maple Transition Forest. Other community types were sampled: Shrub Swamps, Red Maple Swamps, and Mixed Oak Forests were widespread in the park, and are considered secure statewide (Fig. 5).

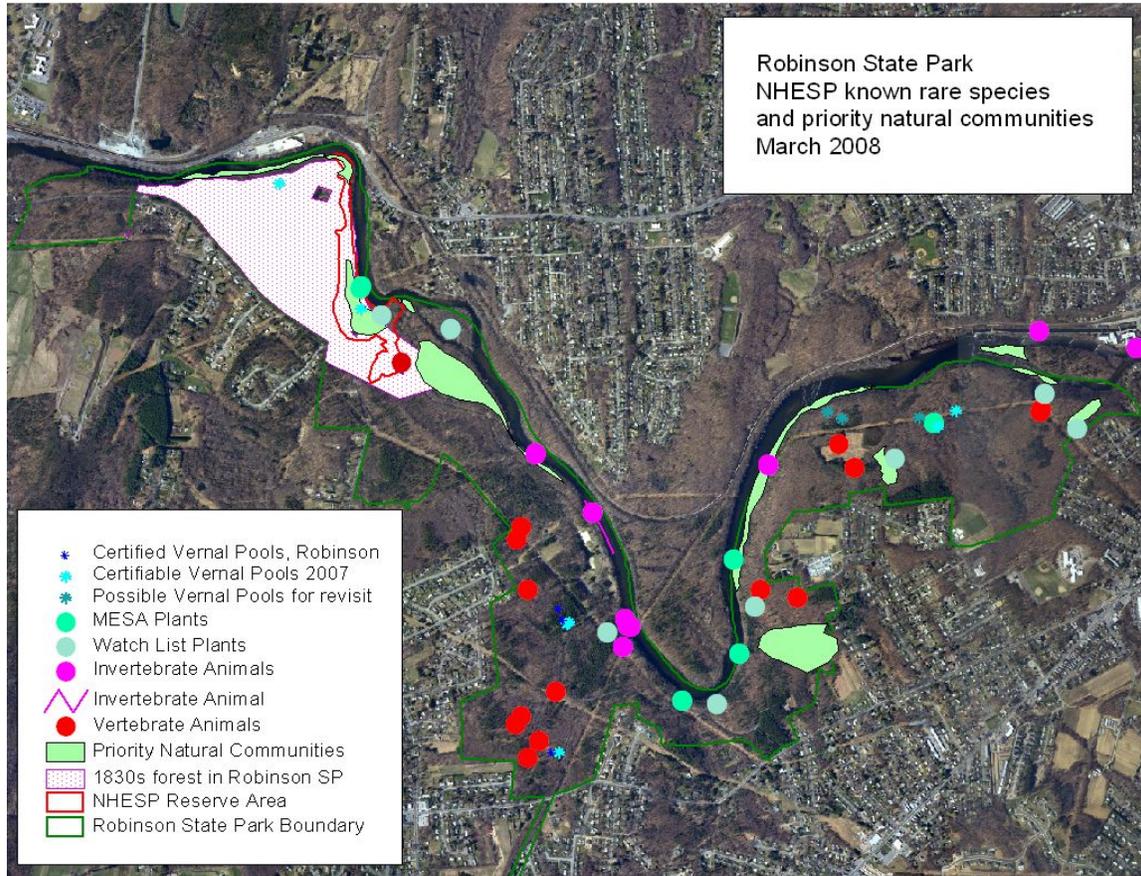


Figure 2. Locations of rare species, priority natural communities, certifiable (in 2007 conditions) vernal pools at Robinson State Park, from the NHESP database, sites new and previously known. These are all shown separately in succeeding figures. All maps use the 2005 MassGIS orthophotos as background.

Table 1. Rare Species and priority natural communities located on Robinson State Park 2007:

Scientific Name	Common Name	MESA Status	Previous sightings
<b>Vertebrate Animals</b>			
<i>Terrapene carolina</i>	Eastern Box Turtle	SC	Added sites
<i>Hemidactylium scutatum</i>	Four-toed Salamander	SC	
<b>Invertebrate Animals</b>			
<i>Boyeria grafiana</i>	Ocellated Darner	SC	
<i>Gomphus abbreviatus</i>	Spine-crowned Clubtail,	E	
<i>Gomphus quadricolor</i>	Rapids Clubtail	T	
<i>Gomphus ventricosus</i>	Skillet Clubtail	SC	
<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	SC	
<i>Ophiogomphus carolus</i>	Riffle Snaketail	T	
<i>Stylurus scudderii</i>	Zebra Clubtail	E	Added sites
<i>Stylurus spiniceps</i>	Arrow Clubtail	T	
<b>Plants</b>			
<i>Boechea laevigata</i>	Smooth Rock-cress	T	Added sites
<i>Claytonia virginica</i>	Narrow-leaved Spring Beauty	E	Relocated
<i>Lobelia siphilitica</i>	Great Blue Lobelia	E	Relocated
<i>Ranunculus pensylvanicus</i>	Bristly Buttercup or Crowfoot	T	
<i>Thuja occidentalis</i>	Arborvitae	E	
<i>Betula nigra</i>	River Birch	WL	
<i>Desmodium canescens</i>	Hoary Tick Trefoil	WL	Prior record
<i>Dryopteris goldiana</i>	Goldie's Fern	WL	
<i>Isotria verticillata</i>	Large Whorled Pogonia	WL	
<i>Menispermum canadense</i>	Moonseed	WL	
<i>Rhododendron periclymenoides</i>	Pinxter-flower	WL	
<i>Ribes americanum</i>	Wild Black Current	WL	Prior record
<i>Sanicula trifoliata</i>	Trefoil Sanicle	WL	
<b>Natural Communities</b>			
Cobble-bar Forest	S2		
High-terrace floodplain Forest	S2		
Major river floodplain forest, including riverine island variant	S2		
Oak Tulip Tree Forest	For now included in Red Oak – Sugar Maple Transition Forest S?		Prior and new
Rich, Mesic Forest	S3		
Riverine Pointbar and Beach	S3		

**Key to Table 1:**

**E = Endangered. T = Threatened. SC = Special Concern: all are regulated under MESA (Massachusetts Endangered Species Act).**

WL - unofficial, non-regulatory list of plants of known or suspected conservation concern.

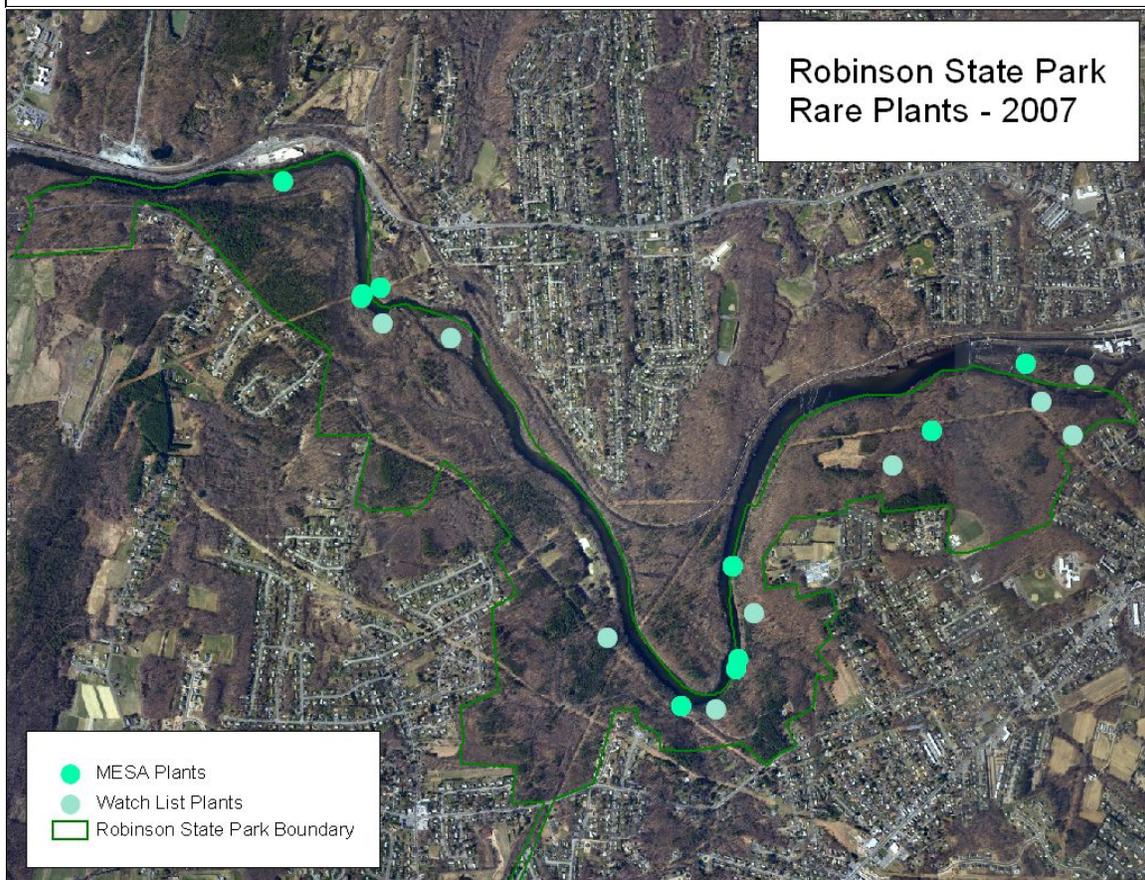
**Natural Community Ranks (NatureServe/Natural Heritage Conservation Status Ranks):**

The state - S - conservation status of a community is designated by a number from 1 to 5:

- 1 = critically imperiled (often 5 or fewer populations)
- 2 = imperiled (often 20 or fewer populations)
- 3 = vulnerable to extirpation or extinction (often 80 or fewer populations)
- 4 = apparently secure
- 5 = demonstrably widespread, abundant, and secure

Plants: The plant survey reports five species that are state listed, and six that are on the unofficial, non-regulatory Plant Watch List (species thought to be uncommon). All previously documented MESA listed plant species were relocated, and an additional threatened species and one endangered (but possibly introduced) species were found. Arborvitae (*Thuja occidentalis*)(E) and River Birch (*Betula nigra*)(WL) are probably introduced in Hampden Co. as is Great Blue Lobelia (*Lobelia siphilitica*)(E), a previously documented rare species. Several other species sought were not found and were determined not to be likely since the park lacks suitable habitat for Fen Cuckoo-flower (*Cardamine pratensis* var. *palustris*), Lily-leaf Twayblade (*Liparis lilifolia*) or Climbing Fumitory (*Adlumia fungosa*). Fig. 3 shows the approximate locations of all rare plants in Robinson State Park in the NHESP database.

Fig. 3. Rare plants at Robinson State Park, with a background of the 2005 Orthophotos from MassGIS.



Many non-native, both invasive and not known to be invasive, species are in the Park. Some appear to be impacting populations of rare plants: management recommendations are provided in the rare species individual discussions and in the discussion section.

Natural Communities: Occurrences of uncommon natural community types were sampled and mapped; other plots were sampled in areas of relatively common community types (Red Maple Swamps and Shrub Swamps for example). Types of NHESP Priority natural communities sampled are listed in Table 1, and all sampled are listed in Table 2 with their plot numbers. Locations of the NHESP Priority Natural Communities are shown in Figure 4 and more common types that were identified and located during the survey are shown in Figure 5.

Table 2. Natural Communities sampled with plots

<u>Community Type</u>	<u>State Rank</u>	<u>Priority type</u>	<u>Plot code</u>	<u>Locations and notes</u>
Cobble Bar Forest	S2	Yes	29	Narrow strip between the river and base of the river bluffs.
High Terrace Floodplain Forest	S2	Yes	14	Above the river from about the swimming area to about May Hollow Brook, probably not continuous
Major-river Floodplain forest	S2	Yes	15,16	Patches along the river, mostly western part of the park.
Major-river Floodplain Forest, Riverine Island variant	S2	Yes	27	Islands at the eastern end of the park.
Rich Mesic forest	S3	Yes	10 (11,12)	South of the park road at the base of a steep bank in an old meander, in the western part of the park. Plots 11 and 12 were in the community, but look different.
Red Oak-Sugar Maple Transition Forest, Tulip Tree Forest variant	?	?	1-5	Eastern part of park, mid to bottom ravine slopes.
Riverine Point Bar Community	S3	Yes	-	Sandbar near floodplain forest at mouth of May Hollow Brook
Low energy Riverbank	S4	No	30	Patches along the river.
Mixed Oak Forest	S5	No	28	Most of eastern part of park
Northern Hardwoods-Hemlock-White Pine	S5	No		Scattered around the western part of the park.
Red Maple Swamp	S5	No	6,8,21, 22,23, 24	Eastern DEP wetland,
Red Oak-Sugar Maple Transition Forest	S4	No	18	Moist areas along streams and base of steep deltaic deposits.
Shrub Swamp	S5	No	7,9,13,19, 20,25, 26	25 and 26 were shrubby areas in a Red Maple Swamp

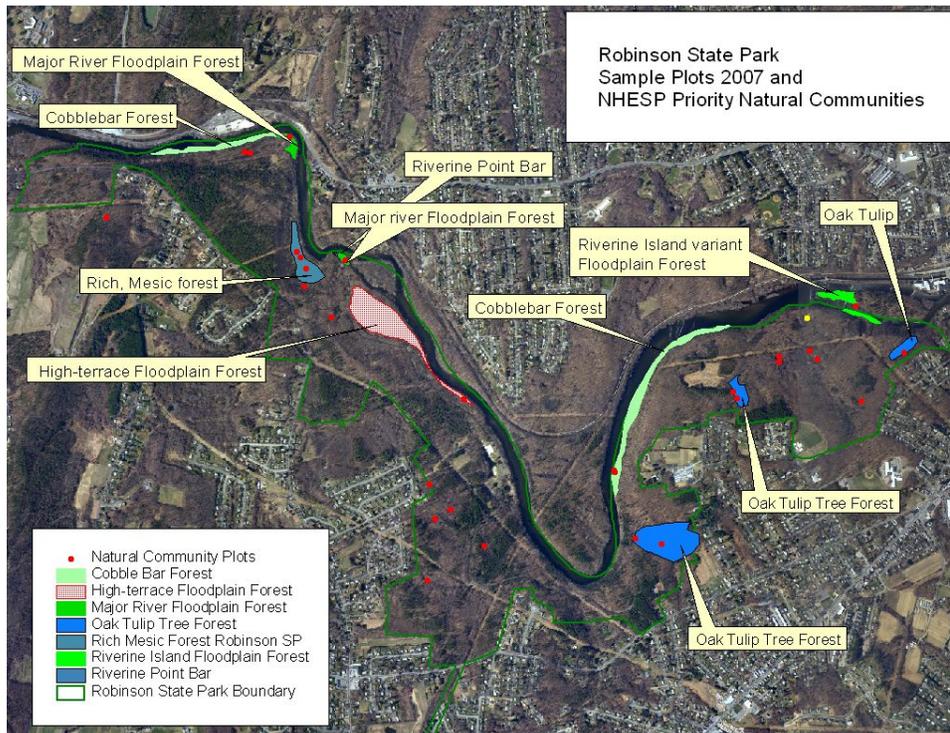


Fig. 4. Natural Community sample plots with location of priority types of natural communities.

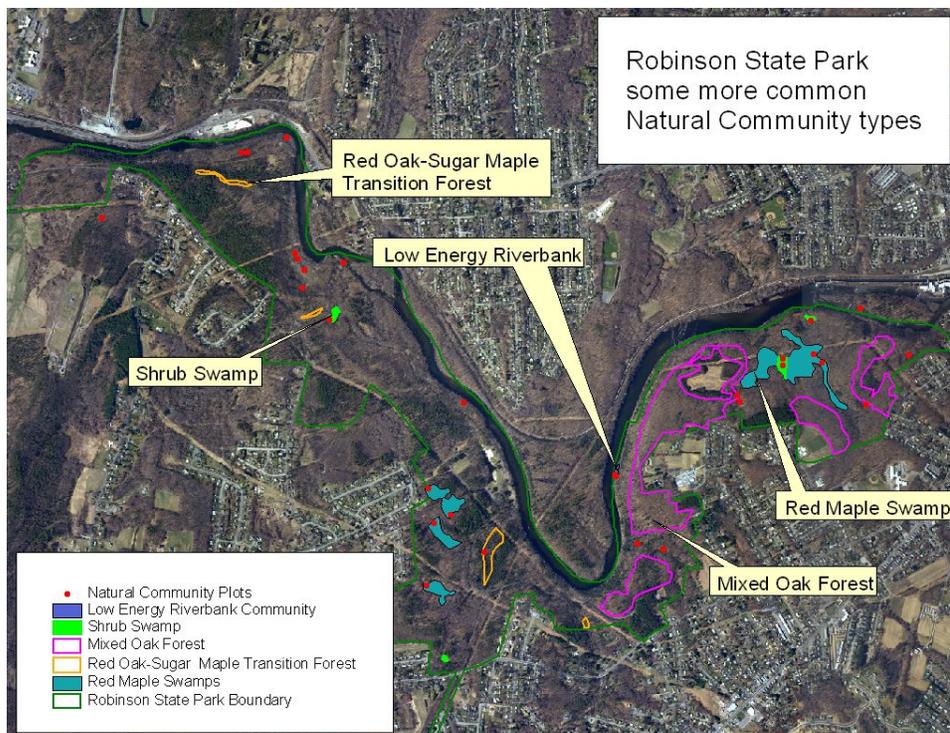


Fig. 5. Natural Community sample plots with location of common types of natural communities.

Reptiles, and Amphibians: Surveys for turtles and amphibians were focused on the particular rare species previously known from the area, two of which were found, with multiple individuals of each. Multiple occurrences of Eastern Box turtles were reported, by the UMass biologists and by others. The two turtles found by the UMass biologists were radio tagged: for the short time that the radios worked, the turtles stayed in the same area west of the Fire Access Road timber area. The signal was lost before the turtles went into hibernation. Four-toed salamanders and eggs were found in sphagnum hummocks in a shrub swamp. Likely Wood Turtle habitat was checked for the species, none were found in the 2007 survey and there are no records from the property in the NHESP database [the sighting by Carl Kamp in 2006 that Joe Sarkis mentioned has not been submitted to NHESP. Reports of rare species must be submitted by the observer on a signed field form to be considered for inclusion in the database]. Vernal pools were examined for breeding by state listed salamander species as well as more general



Figure. 6. Approximate locations of rare vertebrate animals in Robinson State Park after the 2007 field season, from NHESP database.

obligates and facultative species. No use of the vernal pools for breeding by rare salamanders was identified.

Vernal Pools: Table 3 lists best vernal pools investigated on the Robinson State Park Property. These are the pools that were thought to meet the criteria to be certified, and are therefore referred to as certifiable. An additional three pools were brought to the attention of the surveyors later in the year, and although they were visited in October, they will be visited again in spring 2008 to check them for spring conditions, referred to as possible

vernal pools on the map, Fig. 7. Details and photographs are in the appendix, in the report on rare vertebrates and vernal pools.

Table 3: Vernal Pools at Robinson State Park, after the 2007 field season.

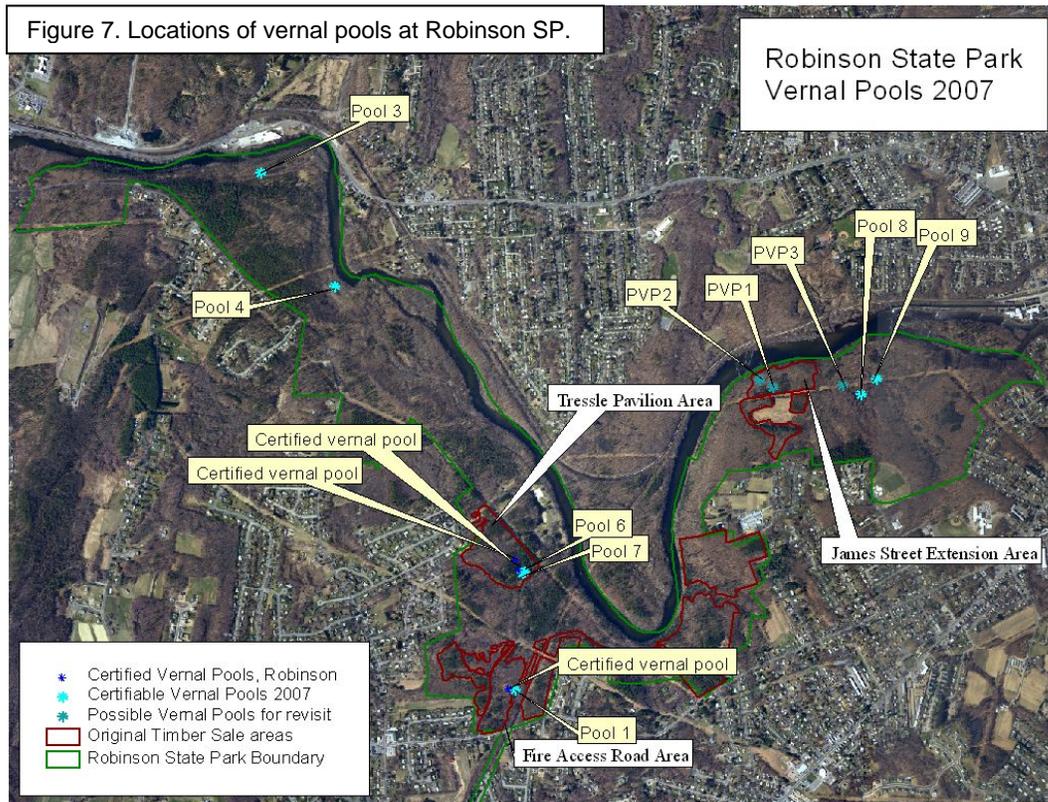
Site	Location	Certifiable	Other notes
Pool 1	Along Fire Access Road; south central	Yes	In or near DEP Deep Marsh, very near new CVP 4410
Pool 3	By pavilion/stone building; western most vp at Robinson	Yes	DEP/Searcy Shrub Swamp, sampled area as vernal pool vegetation
Pool 4	Western part of park, beside park road	Yes	In Rich, Mesic Forest
Pool 6	In Trestle Pavilion area	Yes	Very near Pool 7 and CVPs 4411 and 4412. Upland pool.
Pool 7	In Trestle Pavilion area	Yes	Very near Pool 7 and new CVPs 4411 and 4412. Upland pool.
Pool 8	East end of park, tussock sedge marsh	Yes	Red Maple Swamp
Pool 9	Large marsh east end of park.	Yes	Red Maple Swamp
PVP1	East end of park, north of powerline ROW, just north of open area.	?	In Mixed Oak Forest. Very small.
PVP2	East end of park, north of powerline ROW, north of open area.	?	Upland, near Mixed Oak Forest. Very small.
PVP3	Large marsh east end of park.	?	Red Maple Swamp
NHESP PVP	North west end of park.	No	DEP/Searcy shrub swamp. Permanent water with fish.

Certifiable Pools = Identified this study, not submitted to NHESP for certification.

PVP1-3 = Possible Vernal Pools identified late in the season that were determined to be worth revisiting in 2008 for more information on use as habitat.

CVPs are pools that have been certified as vernal pools by NHESP.

NHESP PVP – from the MassGIS datalayer showing Potential Vernal Pools, identified from interpretation of aerial photographs.



Odonates: Before this survey, one species of rare dragonfly was known from just downstream of the Robinsons section of the Westfield River. That species, Arrow Clubtail, was collected again, from the Robinson shore line, along with seven other rare species. In 2007, most of the species were identified by shed skins, which indicate that the larvae are present in the water on site, indicating that Robinson State Park is supporting a viable population of the species. The dragonfly species numbers reported are reasonable for river habitat, and even the eight rare species is not surprising in the Westfield. No management was suggested, although it is implicit that the young dragonflies in the river need clean, flowing water (not always under the control of the abutting land owner). They also need areas along the river to crawl up to as they get ready to change into their adult bodies. Figure 8 shows the locations of the dragonflies found and includes previously known locations of freshwater mussels in the Westfield near Robinson State Park.

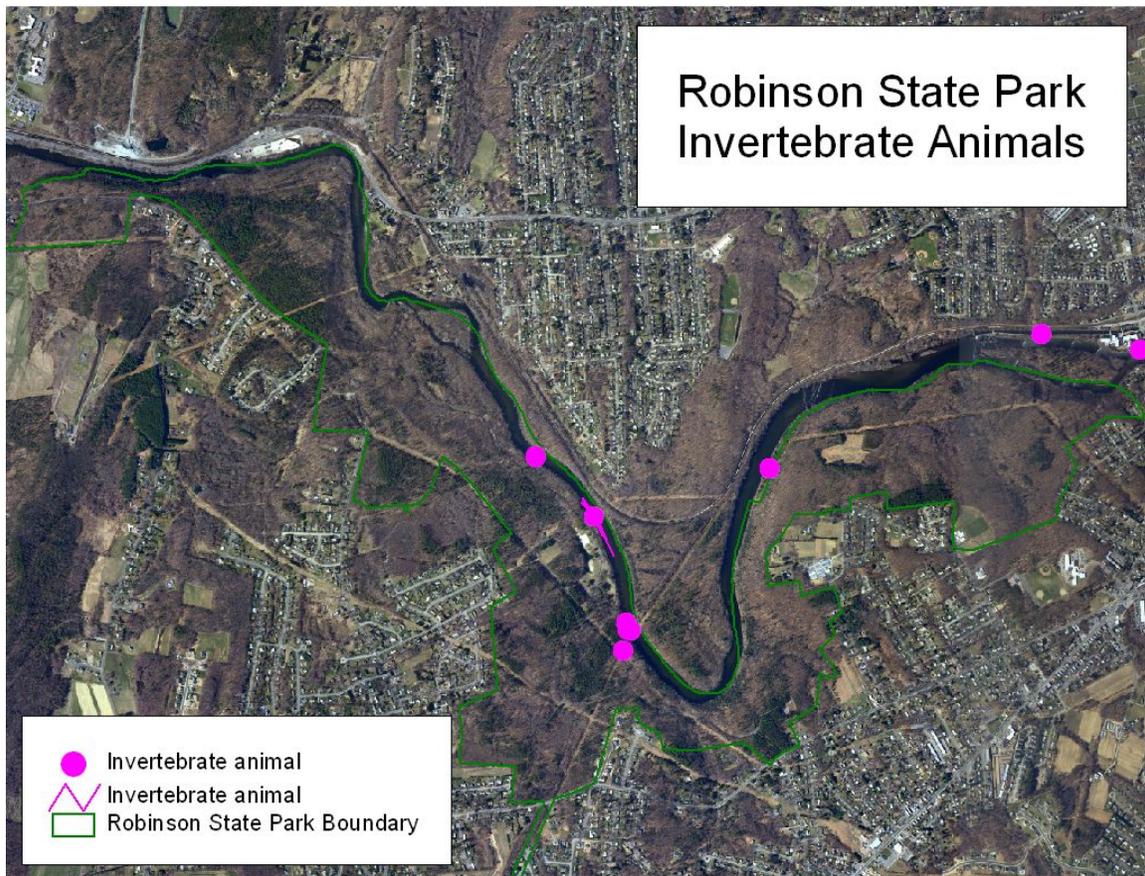


Figure 8. Locations of Odonates (dragonflies) and freshwater mussels known from Robinson State Park and the adjoining areas of the Westfield River, as of the end of 2007.

Non-native species: Many non-native species were reported on the Robinson State Park property. They are extensive and not all are considered to be manageable. Presence of invasive species were mentioned in the notes of the natural community plots, listed in the plot list when present, and discussed in the plant report write up. Some of the community types had fewer invasives than others (the Mixed Oak and Oak-Tulip Tree Forest areas, for example, have fewer invasives; the floodplain communities and wetlands had many), and are discussed in the detailed community descriptions. When there were invasive

species in the rare species population areas and were thought to be threatening the species, that is mentioned in the write-ups. The vertebrates are unlikely to be affected by non-native species except that the turtles use evergreen forest less than deciduous forest, and much of the evergreen forest is plantations of non-native red pine. The invertebrates inventoried are all aquatic and are unlikely to be affected by invasive terrestrial species (that is, if there were aquatic plants or animals that were to change the chemistry or levels of competition in the river, they might well affect the populations of the rare, and common species).

## **Discussion:**

This inventory, some simultaneous independent work, and previous NHESP records have identified fifteen state-listed rare species and several NHESP priority natural community occurrences at Robinson State Park. The inventory was commissioned to identify rare species and their habitats and uncommon natural communities so that their protection and maintenance could be incorporated into the property management. Two main actions are suggested for maintaining the biodiversity of the property. The first recommendation is for continuing to take the presence of the rare species and their habitats into consideration for planning management activities, as has been the procedure and was the reason for the inventory. Because there are so many rare species on the property, this requires site specific/ species specific planning coordination. The other recommendation is for monitoring and removing non-native invasive species where they threaten rare species or the integrity of priority natural communities, when such action will not create worse problems. Additional issues included concern expressed by several of the inventorying biologists about damage to soils and wetlands from illegal use of ATVs. And finally, important, but not under DCR control, maintenance of water quality in the river is important – although it is understood that DCR in general and at Robinson SP in particular, have very little control over the flow of the Westfield River and the quality of the water in the big picture.

Rare Vertebrates - Eastern Box Turtles: Good habitat for Eastern Box Turtles was found throughout the park in the deciduous and mixed forest sites, especially those near open nesting habitat and near wetlands. RSP probably supports a good breeding population of box turtles, based on the numbers seen and cumulative reports. The turtles likely avoid dense stands of pine and hemlock, although they may pass through them. Areas with less human activity are more likely to support better populations of turtles. Incidental collection could be significant given the high volume of pedestrian traffic in the park. Keeping people away from nesting habitat in the spring, and avoiding construction of barriers to turtle movements, such as roads, curbs, and solid fences, and maintaining the habitat diversity in wetlands and surrounding uplands are important for the Eastern Box Turtles. Mowing of densely vegetated herbaceous or shrubby areas during June and July can be a threat to turtles, since they are hard to see and occupy such sites in those months. Mowing such areas either later or earlier in the year would benefit the turtles: maintaining some areas with low dense vegetation provides good habitat for box turtles.

Rare Vertebrates - Four-toed Salamander: Observing three females with eggs suggests that a good population exists at Robinson. Female Four-toed Salamanders nest in hummocks (usually sphagnum) overhanging water into which the larvae drop after

hatching. The males, and females during the rest of the year, use shady, damp forested habitat in areas around the wetlands that they breed in. Adults in the surrounding terrestrial forests tend to be within 250m (830 ft) of the wetlands. Maintaining the mix of wetlands and surrounding forest would probably be sufficient to maintain the population.

Because the non-nesting members of the species are very difficult to find (and nests are hard for non-experts to locate), it is widely thought that this is an under-reported species. Now that NHESP has records from over 148 towns, the species has been recommended for removal from the list of species protected by MESA (to be determined later in 2008). However, protecting the species on large parcels of conservation land will continue to be important to maintaining it in the state. At Robinson, this is fairly straightforward since the western end of the Park has not been proposed for any forest management. As recommended above, leaving the mix of wetlands and surrounding forest would likely be sufficient to maintain the population.

Vernal Pools: Seven pools were identified that were considered to be certifiable. Three additional pools that are very near to two of Sievert's pools were certified by others during 2007. While all the pools are important, those in a cluster of vernal pools may provide especially important habitat because mix of types are then available and of the possibilities that different pools would provide habitat from one year to the next with changes in precipitation. The clusters were in the Trestle Pavilion and Fire Road Access areas. The possible pools along the powerline right of way are also moderately clustered, and probably provide the same conditions of alternate habitat in different years.

Rare Invertebrates - Odonates: Maintenance of the property in its current state is sufficient to sustain populations of the dragonfly species observed in this survey. Insecticide use should be avoided near the river where the young live, as should use of aquatic herbicides, unless demonstrated to be harmless to all Odonate species present. If possible, mowing of fields and vegetation adjacent to trails and woodland edges should be delayed until after frost each year, as these old fields and similar habitats provide significant foraging and roosting habitat for most species of dragonflies and damselflies. Some of these are the same fields that are used by the Eastern Box Turtles, which also benefit from late mowing, as discussed in that section. Although it will not alter the protections the species and its habitat receive, it should be noted that one of the rare dragonflies, Zebra Clubtail (*Stylurus scudderi*) has been proposed (in March 2008) to have its MESA status changed from Endangered to Special Concern.

Rare Plants: The various rare plant species found at Robinson have different habitat requirements.

The Narrow-leaved Spring Beauty (*Claytonia virginica*), in the patch reserve area in the western part of the park, is probably the plant species of greatest concern and interest in the park. For that species, Dr. Searcy noted that it was in decline, but no invasives were threatening the population. She recommends continued monitoring and searching for other sub-populations, although she did a search in 2007 and didn't find additional plants [nor did a 2001 survey by NHESP that also checked the surrounding areas]. No other management is recommended, the species does best in the long term in shaded conditions of moist forests.

Bristly Buttercup (*Ranunculus pensylvanicus*) is an opportunistic species of shorelines and marshes and re-establishes itself if flooding destroys a particular site. Awareness of the appearance of the plant would allow site personnel to keep an eye out for it at other locations on the property. No management recommendations were made. Although it will not alter the protections the species and its habitat receive, it should be noted that Bristly Buttercup is being proposed (in March 2008) to have its MESA status changed from Threatened to Special Concern (if passed that would occur in July 2008).

Smooth Rock-cress (*Boechera laevigata*) is now known from four areas in the park, with another good population across the river. In these sites, Smooth Rock-cress typically occurs just above the river along the slightly eroding top edge and a little way down the bluff. All sites were forested with filtered sun, and had relatively little herbaceous vegetation or soil litter. The populations all seemed healthy with reproductive individuals and vegetative individuals in rosettes. This species is secure in the park although careful removal of the associated invasive species would improve the species habitat. The invasives at the sites include Japanese Barberry (*Berberis thunbergii*), Garlic Mustard (*Alliaria petiolata*) and Oriental Bittersweet (*Celastrus orbiculata*).

The two other listed plant species found on the site are thought to be introduced to Hampden County (Sorrie & Somers, 1999), including Robinson State Park. Great Blue Lobelia and Arborvitae were established as small populations, which are protected under MESA. However, management is not generally expected for adventive populations.

Great Blue Lobelia (*Lobelia siphilitica*) was growing with abundant 'likely invasive' (category per Somers et al. 2006) Japanese stilt-grass (*Microstegium vimineum*). Management recommendation for this species were to remove the Japanese stilt-grass that is threatening to overgrow the site. This would also assist in keeping the Japanese stilt-grass from becoming a larger problem in the park.

Arborvitae (*Thuja occidentalis*) is a new record for RSP. The documented population occurs in a shrub swamp. It appears to be spontaneous, but the likely seed source is garden plants from the surrounding neighborhoods. No management is necessary.

Of the non-regulated Watch List plant species now known from Robinson State Park, six were found in this inventory and are discussed in the plant report. None seem particularly threatened. Pruning some of the shrubs and trees around the Large Whorled Pogonia might improve its growth. Removing exotics from around the Moonseed would improve the population's competitive ability. The two older WL records were just this winter entered into the NHESP database, so Dr. Searcy did not know about them to check. Both are on islands in the Westfield, one on each of the large islands. The eastern island is where there is also an occurrence of the Riverine Island variant of the Major-river Floodplain Forest. The WL plant was in a more open area that appears to be a Riverine Point Bar community.

Natural Communities: Managing natural communities requires a broad perspective. For wetlands and uplands alike, maintaining water quantity and quality is important. Streams, intermittent streams, and seeps need to deliver natural amounts of water with locally natural nutrients in the waters, with as little accumulated pesticides from surroundings as possible. This is difficult since the park is surrounded by many landowners using

fertilizers and pesticides, and channeling water to enhance their individual yards and lands. Keeping soils undisturbed helps to keep out invasives. Education of neighbors about problems of dumping garden debris might help with some of the invasives. Most of the priority types of natural communities at Robinson have invasive species in them that compromise the condition of the community. However, in general, the current management appears to be maintaining the communities.

For all the types of floodplain communities, Major-river Floodplain Forest, including the Riverine Island variant, Cobble Bar Forests, High-terrace Floodplain Forest, and the Riverine Point Bar community, control of invasives is important where possible. In particular, Japanese knotweed has been taking over floodplain forests state wide; it forms a very dense shrub-type layer that effectively reduces abundance of native species. Garlic mustard is also established, but much harder to control since it is widespread and an annual with a large seed bank. Floodplain community types are naturally disturbed and invasive species can become well established. Control of invasive exotics is encouraged when possible, but should be recognized as a perpetual problem for these communities.

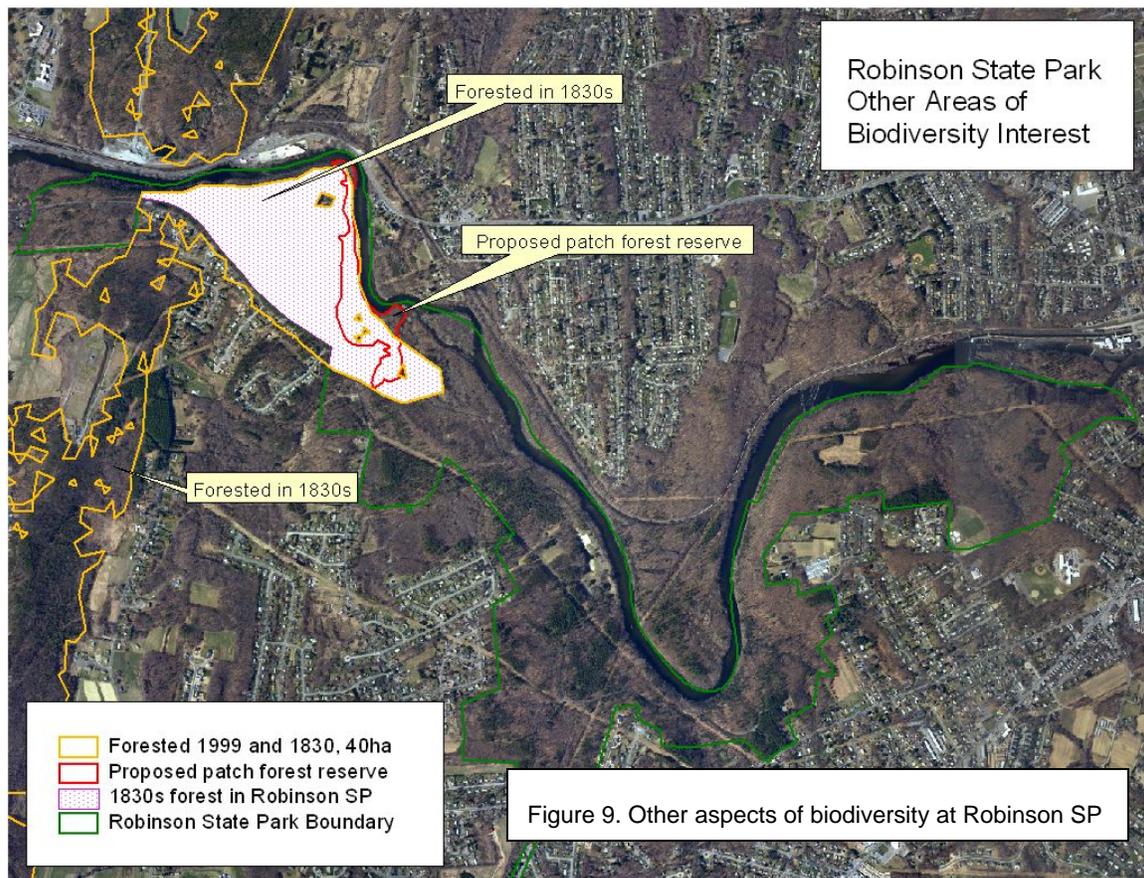
The occurrence at Robinson of the Rich, Mesic Forest has the typical rich spring flora. As is often the case for these nutrient rich, moist community types, invasive species such as Japanese Barberry can become quite dense. Removing the invasives would help protect the spring flora, but should be done in late summer through fall to protect the other understory plants. Within the polygon drawn for the Rich, Mesic Forest are a rare plant, a WL plant, and a vernal pool, with several different floodplain communities nearby. The Rich, Mesic Forest occurrence at Robinson is in an area that has been mapped as 1830s forest, and may be primary forest (discussion below).

Of particular interest are the ravines in the park that have populations of Tulip-tree (*Liriodendron tulipifera*). These communities are not formally described in the Massachusetts classification of natural communities, although New York State has a defined community type that these fit: Oak-Tulip Tree Forest. New York Natural Heritage provides the NatureServe Association from the International Vegetation Classification as 'High Allegheny Rich Red Oak - Sugar Maple Forest' (*Quercus rubra* - *Acer saccharum* - *Liriodendron tulipifera* Forest) which fits this community quite well. It is also known from Connecticut. For now Massachusetts is tracking this community at Robinson as being a variant of the Massachusetts natural community type, Red Oak-Sugar Maple Transition Forest. It is anticipated that the plots from this study will be combined with some others and a new, uncommon in Massachusetts, type of community will be described. It is likely that Massachusetts is the northern extent of the community.

#### Other aspects of Biodiversity:

Important other areas of biodiversity at Robinson State Park include an area of likely primary forest in the western end of the park that connects to a north south corridor of undeveloped land that is also 1830s forest. Agawam is one of the towns with maps showing areas forested in the 1830s, areas of possible Primary Forest, untilled woodlots and wooded pastures. Such lands have greater biodiversity than areas that have been tilled. These are not Old Growth, they have been harvested and pastured, but the ground may not have been tilled. Harvard Forest digitized maps from the 1830s that the Massachusetts legislature mandated that the Towns make. NHESP GIS staff took those

data and combined them with information from MassGIS' landcover datalayer made from 1999 aerial photos. Although a great deal will have gone on in those areas in the time between the map dates, some areas that were forested in both times will not ever have been tilled. Surveys of the soil structure in the individual sites are necessary to determine whether those sites are primary forest. The importance of primary forest is that such sites retain more native biodiversity than sites that have been tilled: soil fauna and flora, microorganisms and plants that reproduce primarily vegetatively contribute to the higher biodiversity. In addition, a variety of species of wildflowers are more common in untilled forests than previously tilled lands. The Harvard Forest website contains information on the 1830s forest datalayer and copies of papers with discussion of the information. <http://harvardforest.fas.harvard.edu/data/p01/hf014/1830readme.html>



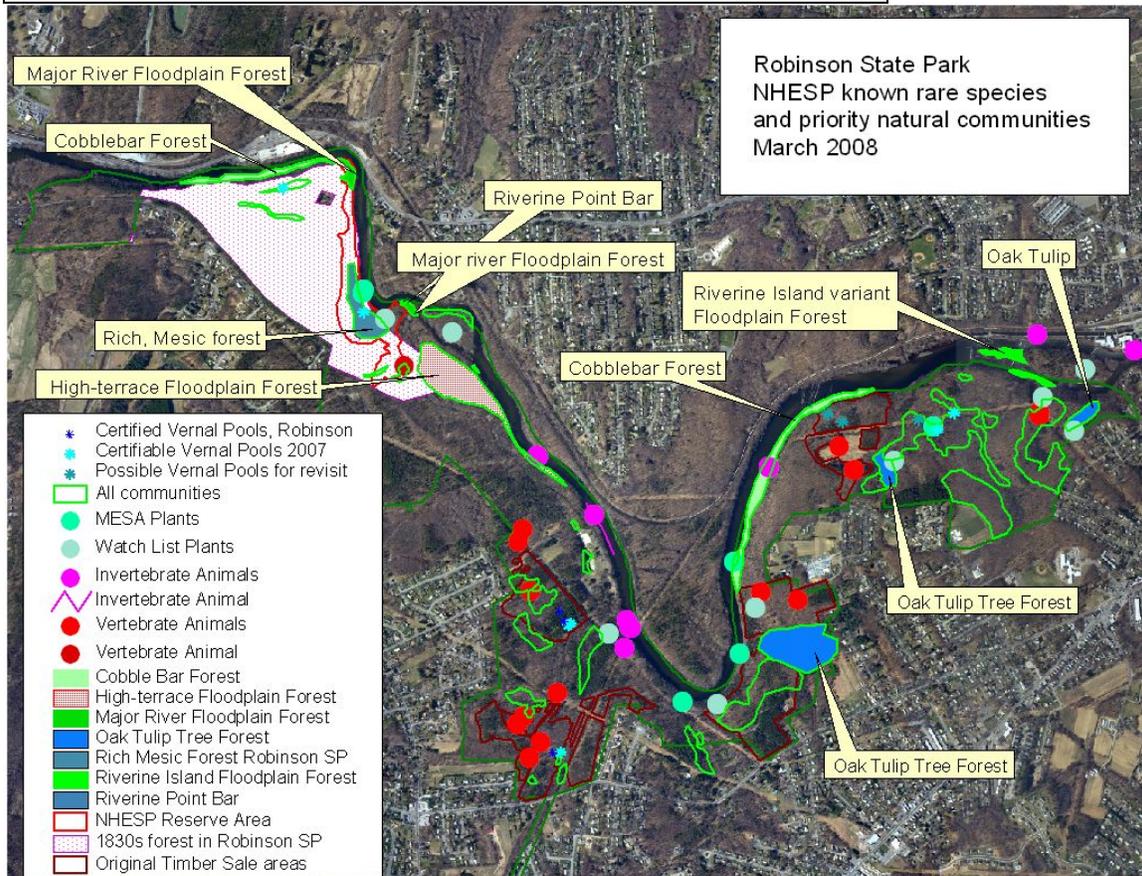
Robinson State Park also has an area designated by NHESP as patch reserve under the 'green certification' work undertaken by the state. This area is almost completely within the 1830s forest area, but was not designated with that in mind – rather a disturbance sensitive plant occurs in the area and its habitat was designated to protect the population.

Other good indicators of biodiversity importance are clusters of vernal pools, areas with multiple rare species, or good populations of one species (as indicated by multiple occurrences), and occurrences of multiple uncommon natural communities

At Robinson the Westfield River and its shoreline have multiple rare species of a variety of taxonomic groups, and a mix of different natural community types, mostly uncommon

priority types. The west end of the park has the 1830s forest, rare species, vernal pools, and priority types of natural communities. The east end of the park has the Oak-Tulip Tree Forest set in a matrix of good occurrences of the more common Mixed Oak Forest. The low areas nearer the river have several vernal pools in conjunction with the large wetlands. The Box Turtles are finding good habitat in the Oak forests with nearby wetlands, and open areas for nests. The central area along the Fire Access Road area also supports good numbers of turtles that appear to find the mix of forest and wetland to be appropriate habitat.

Figure 10. Map showing compiled areas of biodiversity interest at Robinson SP.



The matrix forest for the area appears to be the relatively common Mixed Oak Forest (see Figure 5) which was explicitly identified in the eastern part of the park around the ‘coves’ with the Oak-Tulip Tree Forest. Oak Forests are considered to be maintained by usually light fires that reduce fire sensitive competitors such as red maple. There are many discussions in the conservation and forestry literature, exemplified by Abrams 2006, Foster et al. 2004, and Hall et al. 2002, about the increase in red maple in oak forests since settlement times in New England, and elsewhere. In the community plots at Robinson (see Searcy’s report in the appendix of this report, her Tables 3 and 4), red maple commonly occurred in the Mixed Oak and Red Oak – Sugar Maple Transition Forests. At this time, no management was recommended to maintain the common forest types. However if the abundance of red maple increases to the point of changing the character of the community occurrences, prescribed fire or mechanical reduction of the

red maples might be considered.

Invasives:

Non-native terrestrial species included many of the common, problematic aliens of southern New England. While it would be difficult to eliminate many of the species on this list from the property, a few species might be controlled. See Table 4 and the plant and natural community report for full details.

Table 4: Rare plant species and natural community types that might be affected by invasive species: see the full plant and natural community report for full details and more complete management advice.

<u>Scientific name</u>	<u>Common name</u>	<u>Invasive threat</u>
<i>Boechnera laevigata</i>	Smooth Rock Cress	Careful removal of invasives.
<i>Lobelia siphilitica</i>	Great Blue Lobelia	Remove invasives, including the likely invasive Japanese stilt-grass
<i>Menispermum canadense</i>	Moonseed	Remove invasives, particularly Oriental Bittersweet
Cobble Bar Forest		Japanese Barberry and Oriental Bittersweet
High Terrace Floodplain community		Dense Winged Euonymus and Multiflora Rose, European spindle Tree. Removal not recommended.
Major-river Floodplain Forest	Broadly defined type	Garlic mustard and Japanese knotweed. Control of the Japanese knotweed is still possible and is important.
Major-river Floodplain Forest	Riverine Island Floodplain Forest variant	Many invasives, particularly Oriental Bittersweet and Japanese Barberry. Control when possible.
Oak-Tulip Tree		Remove the few invasives, including Oriental Bittersweet and Norway Maple.
Rich, Mesic Forest		Remove invasives in late summer – Japanese Barberry and Winged Euonymus.
Riverine Pointbar Community		Naturally weedy.
Low Energy River Bank Community		Mix of native and non-native weedy species. No management recommended.
Mixed Oak Community		Notable lack of invasive plants
Red Maple Swamp		Invasives, but removal would be difficult.
Red Oak - Sugar Maple Transition Forest		Oriental Bittersweet and Japanese Barberry was very abundant. Remove in late summer
Shrub Swamps		Glossy Buckthorn control; other invasives few and control not recommended.

Norway maple (*Acer platanoides*) - This species is only occasional in the forested plots

and probably should be eliminated or greatly reduced as part of a long-term forest management plan. The first step would be to remove any reproductive individuals and then to work on progressively smaller plants in subsequent years. Of the invasive plant species reported, Norway Maple is one that would actually change the forest ecosystem functioning if it were to become dense –Norway Maple limits what species can grow below it in a forest when it becomes abundant. This is one that would be possible to control at Robinson State Park property since there are few reported.

Garlic Mustard (*Alliaria petiolata*) – found all over the park, particularly in floodplains. It is an annual, and is very difficult to control, although it can be done.

Japanese Barberry (*Berberis thunbergii*), a shrub that grows in richer (less acidic) communities. This species can become dominant in the shrub layer inhibiting growth of other species. Control is suggested in particular community types including the Rich, Mesic Forest, in late summer to protect the spring flora.

Oriental Bittersweet (*Celastrus orbiculata*), vine, can smother trees. Control is suggested in particular sites and some community types.

Winged euonymus (*Euonymus alata*) - Individuals of this wind-dispersed shrub were found in many of the community plots. It is possible that moderate amount of cutting and pulling could keep it from becoming a larger problem. Probably a continual problem since there are seed sources in surrounding neighborhoods where it is a landscaping plant. Control was recommended for late summer or fall, including in the Rich, Mesic Forest area.

Japanese Knotweed (*Polygonum cuspidatum* = *Fallopia japonica*) – individuals were found in floodplain areas, Major-river Floodplain Forest plots contained the species. Control before it becomes dense is important.

Japanese stilt-grass (*Microstegium vimineum*) appears to be becoming a problem, control at this time would be practical.

Glossy Buckthorn (*Rhamnus frangula*) is a shrub that often becomes dominant in wetlands. At Robinson it is controllable in the shrub swamp (NC plot 7) in the eastern part of the Park.

Multiflora Rose (*Rosa multiflora*) – a shrub that can be very dense, at Robinson in many of the wetland communities (such as High-terrace Floodplain Community and Red Maple Swamp). It grows so densely that removal is not recommended because of the disturbance that would be caused in an attempt to control it.

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## Appendix A. Rare Species and Priority Natural Community Fact Sheets.

<u>Scientific Name</u>	<u>Common Name</u>	<u>Fact Sheet</u>
<b>Vertebrate Animals</b>		
<i>Terrapene carolina</i>	Eastern Box Turtle	Y
<i>Hemidactylium scutatum</i>	Four-toed Salamander	Y
<b>Invertebrate Animals</b>		
<i>Boyeria grafiana</i>	Ocellated Darner	Y
<i>Gomphus abbreviatus</i>	Spine-crowned Clubtail	Y
<i>Gomphus quadricolor</i>	Rapids Clubtail	Y
<i>Gomphus ventricosus</i>	Skillet Clubtail	Y
<i>Neurocordulia yamaskanensis</i>	Stygian Shadowdragon	Y
<i>Ophiogomphus carolus</i>	Riffle Snaketail	Y
<i>Stylurus scudderii</i>	Zebra Clubtail	Y
<i>Stylurus spiniceps</i>	Arrow Clubtail	Y
<b>Plants</b>		
<i>Boechera laevigata</i> (was <i>Arabis laevigata</i> )	Smooth Rock-cress	Y
<i>Claytonia virginica</i>	Narrow-leaved Spring Beauty	Y
<i>Lobelia siphilitica</i>	Great Blue Lobelia	Y
<i>Ranunculus pensylvanicus</i>	Bristly Buttercup or Crowfoot	Y
<i>Thuja occidentalis</i>	Arborvitae	Y
<b>Priority Natural Communities</b>		
Cobble-bar Forest	Classification pages	
High-terrace floodplain Forest	Classification pages	
Major river floodplain forest, including riverine island variant		Y
Oak Tulip Tree Forest	Pages from NY NHP's website	New York
Rich, Mesic Forest		Y
Riverine Pointbar and Beach	Classification pages	

## Appendix B. All Surveyors

<b>Taxa surveyed</b>	<b>Name</b>	<b>Role</b>	<b>Organization</b>
	Patricia Swain, Ph.D.	Project Manager	NHESP
Plants and Natural Communities	Karen B. Searcy, Ph.D.	Principal Investigator	Biology Dept. University of Massachusetts, Amherst
Natural Communities	Sydne Record	Field Investigator	University of Massachusetts
Natural Communities	Lena Fletcher	Field Investigator	University of Massachusetts
Natural Communities	Kristina Ferrare	Field Investigator	University of Massachusetts
Amphibians, Reptiles, Vernal Pools	Paul R. Sievert, Ph.D.	Principal Investigator	US Geological Survey Massachusetts Cooperative Fish & Wildlife Research Unit University of Massachusetts, Amherst
Amphibians, Reptiles, Vernal Pools	Alan Richmond, Ph.D.	Field Investigator	University of Massachusetts
Turtles	Michael T Jones,	Field Investigator	University of Massachusetts
Turtles	Lisabeth L. Willey	Field Investigator	University of Massachusetts
Turtles	Bradley Compton	Field Investigator	University of Massachusetts
Vernal Pools	Kimberly Ogden	Field Investigator	University of Massachusetts
Vernal Pools	David Paulson	Field Investigator	University of Massachusetts
Odonates	Fred Morrison	Principal Investigator	A Natural Focus
Odonates	Laurie Sanders	Principal Investigator	A Natural Focus

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**Education:**

Ph.D. Ecology, 1979, University of Minnesota. The development of some bogs in eastern Minnesota. A palynological analysis of community development.

Advisor: Edward J. Cushing.

M.S. Ecology, Botany minor, 1972, University of Minnesota. An analysis of morphological differences among oaks in selected stands of the *Quercus borealis*/*Q. ellipsoidalis* complex.

Advisor: Edward J. Cushing.

B.S. Biology, 1970, Tufts University, Medford, Massachusetts

**Certification:**

Senior Ecologist, Ecological Society of America. Certified in 2005.

**Current Position:**

1987-current, Plant Community Ecologist, Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife.

Job duties include:

Inventory, classify, map in GIS, monitor, and provide management advice on natural communities in Massachusetts.

Update classification of natural communities of Massachusetts, including establishing ranking criteria.

Work with Mass DCR Bureau of Forestry on ecoregional assessments and define High Conservation Value Forests for forest certification requirements.

Respond to all requests from towns for information on rare species and natural communities in their towns to include in Open Space and Recreation Plans, or other state mandated natural resource planning reports.

Project management: Obtain grants and contracts for rare species and natural community surveys statewide (about 10 since 1995). Oversee staff and contractors on grants and contracts. Coordinate reports.

Write and edit fact sheets describing rare plants, animals, and natural communities of Massachusetts.

Give talks on natural communities, NHESP, biodiversity and conservation to the public and college classes  
Conducted and participated in > 60 prescribed fires to manage plant communities, 1987-1999.

**Other recent professional activities:**

1990-2006. New England Wild Flower Society, annually (except 2001) teaching course "Plant Communities of New England". Also lead occasional field trips for NEWFS.

**Technical Publications:**

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**Robinson State Park**

**Reports on surveys for rare species 2007**

**Appendices C – E**

**Appendix C: Plant and natural community Survey Report**

**Appendix D: Herpetological Survey Report**

**Appendix E: Odonate Survey Report**