



Narragansett Bay

Research Reserve

Technical Report

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Herpetological Monitoring in the Narragansett Bay National Estuarine Research Reserve in 2003

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Introduction

Reptiles and amphibians (hereafter herptiles) are often an abundant and functionally important component of temperate wetland and upland habitats. Some species also serve as indicators of habitat quality or function. In addition, populations of many species of herptiles, particularly amphibians, are in decline worldwide. For these reasons, herptile monitoring over the long-term can help to promote proper stewardship of public lands.

Very little is known about the species composition, distribution, or abundance of herptiles in the Narragansett Bay National Estuarine Research Reserve in Rhode Island, USA, save for limited qualitative surveys conducted between 1985 and 1998. In addition, nothing is known about how these herptile populations are changing over time, especially in light of anthropogenic changes to the area around the reserve. The purpose of this study is to initiate basic surveys of selected herptiles in and around the NBNERR that will be used as a starting point for long-term monitoring of these species over time.

Methods

Herptiles were surveyed on Prudence Island, RI, both inside and outside the boundaries of the NBNERR in 2003. Surveys were conducted using a variety of methods including spotted salamander egg mass counts, anuran (frog and toad) calling surveys, salamander and snake cover boards, and turtle mark/recapture efforts. Much of this effort was concentrated on the permanent and vernal ponds found on the island (Figure 1).

Spotted salamander egg counts were conducted on April 23, 2003. Counts were conducted in seven ponds on Prudence Island by walking throughout the ponds and counting all egg masses encountered. The survey locations included the Kettle, Baker, Foundation, Prudence Park, Audubon, and South End ponds (Figure 2).

Anuran calling surveys were conducted at dusk at seven ponds (permanent and vernal) on Prudence Island (Figure 2). Surveys were conducted on six dates between April and June 2003. Five minutes were spent at each pond on each date recording the calls and activity levels for each species of anuran heard. Activity levels were recorded as follows: 0 = no calls; 1 = individuals can be counted; 2 = overlapping calls; 3 = continuous chorus.

Salamander cover boards were placed along transects at four wetland locations on the south end of Prudence Island (Figure 2). The Indian spring transect (the northernmost one) was established in early June 2003; the other three were established in late April. Each transect consisted of 8 pairs of 0.3 x 0.3 m plywood boards, for a total of 16 boards per transect. The two boards that constituted a pair were placed 0.5 m apart and 5 meters were placed between consecutive board pairs. Cover boards were monitored approximately bi-weekly through the end of August 2003. All salamander species found under cover boards were identified and counted. The presence of other herptiles was also noted.

Snake cover boards were placed at 30 locations covering much of Prudence Island on May 17-18, 2003 (Figure 2). At each location, an approximately 0.5 m x 1.5 m plywood board and a black plastic tarp (same dimensions) were established as a pair. Cover boards were checked for snakes on three dates during the summer of 2003. All species found under cover boards were identified and counted.

Mark and recapture efforts were initiated for spotted turtles and for the eastern box turtle on Prudence Island. All box turtles that were found between June and September 2003 on Prudence Island were collected, marked, and released. Each turtle was measured (carapace and plastron in cm), sexed, aged by counting ventral rings, and marked with a specific identification code using a small file. Spotted turtles were captured in wire mesh turtle traps baited with sardines from May through August 2003. All captured turtles were marked with a file as described above for box turtles, sexed, and measured along the carapace and plastron.

Results and Discussion

Of the seven ponds that were surveyed for spotted salamander egg masses, three contained egg masses and the remaining four were empty (Table 1). The Audubon pond contained 353 egg masses, which is among the highest values ever recorded for Rhode Island (Timm, personal communication), indicating the high value of this pond for spotted salamanders.

Spring peepers, *Pseudacris crucifer crucifer*, were the only anuran species recorded during the calling surveys, although they were recorded from six of seven sites (Table 2). (Activity levels here). Activity levels of spring peepers were highest at ponds five and six and clearly peaked on Prudence Island on April 28, 2003 (Table 2).

Salamanders were recorded from all four cover board transects. The most common species was the eastern red-backed salamander (*Plethoden cinereus cinereus*), which was found at all sites (Table 3). The only other species found were the spotted (*Ambystoma maculate*) and four-toed (*Hemidactylum scutatum*) salamanders. Spotted salamanders were found only at the south-end creek location and four-toed salamanders were found at the south end creek and Indian spring locations. Eastern red-backed salamanders displayed a clear seasonal pattern with a large peak in abundance in early June (Figure 3). The only other herptile species found under the salamander cover boards were garter snakes, *Thamnopsis sirtalis sirtalis*, with one individual found at the south-end creek site in July and one at the Indian spring site in August.

No snakes were found during the three checks of the snake cover boards, although not all locations were checked each time (some locations became impenetrable due to overgrowth of briar and vines; others were not sampled due to concerns of high deer tick abundances). Until both of these issues are resolved, snake cover boards will not be used for long-term monitoring on Prudence Island.

Nine eastern box turtles were marked between June and September 2003, although none were recaptured. Of the nine, five were males and four females. Males averaged 141 cm (carapace), 118 cm (plastron) and 20 rings. Females averaged 121 cm carapace, 103 cm plastron and 21 rings, although rings were only counted on two females (Table 4).

Spotted turtles were captured from the Pine Barrens pond (five individuals), Cranberry Road vernal pool (one individual), and the South End pond (none captured in traps but one juvenile found on the side of the pond). No individuals were captured from the ponds at Maple swamp, Prudence Park, or Audubon. Of the seven turtles marked, six were males and 1 was a female. Turtles ranged from 39 cm carapace, 37 cm plastron to 108 cm carapace, 98 cm plastron (Table 5). One fowler's toad, *Bufo fowleri*, was also captured in a turtle trap in the Pine Barrens pond on May 30, 2003.

Eight herptile species were recorded on Prudence Island during these surveys. Three other species have been observed by NBNERR staff in 2003, including the common snapping turtle, *Chelydra serpentina*, Eastern painted turtle, *Chrysemys picta*, and the northern black racer, *Coluber constrictor*. None of these 11 species was new to Prudence Island based on DEM Fish and Wildlife surveys that recorded 15 species on the island and three on Hope Island (Table 6). However, the current efforts provide more quantitative abundance estimates that can be used as the basis for long-term monitoring programs. Of the methods used during this effort, spotted salamander egg mass counts, anuran calling surveys, spotted and box turtle trapping, and salamander cover board monitoring will continue, and be enhanced where possible, in 2004 for the purposes of long-term monitoring.

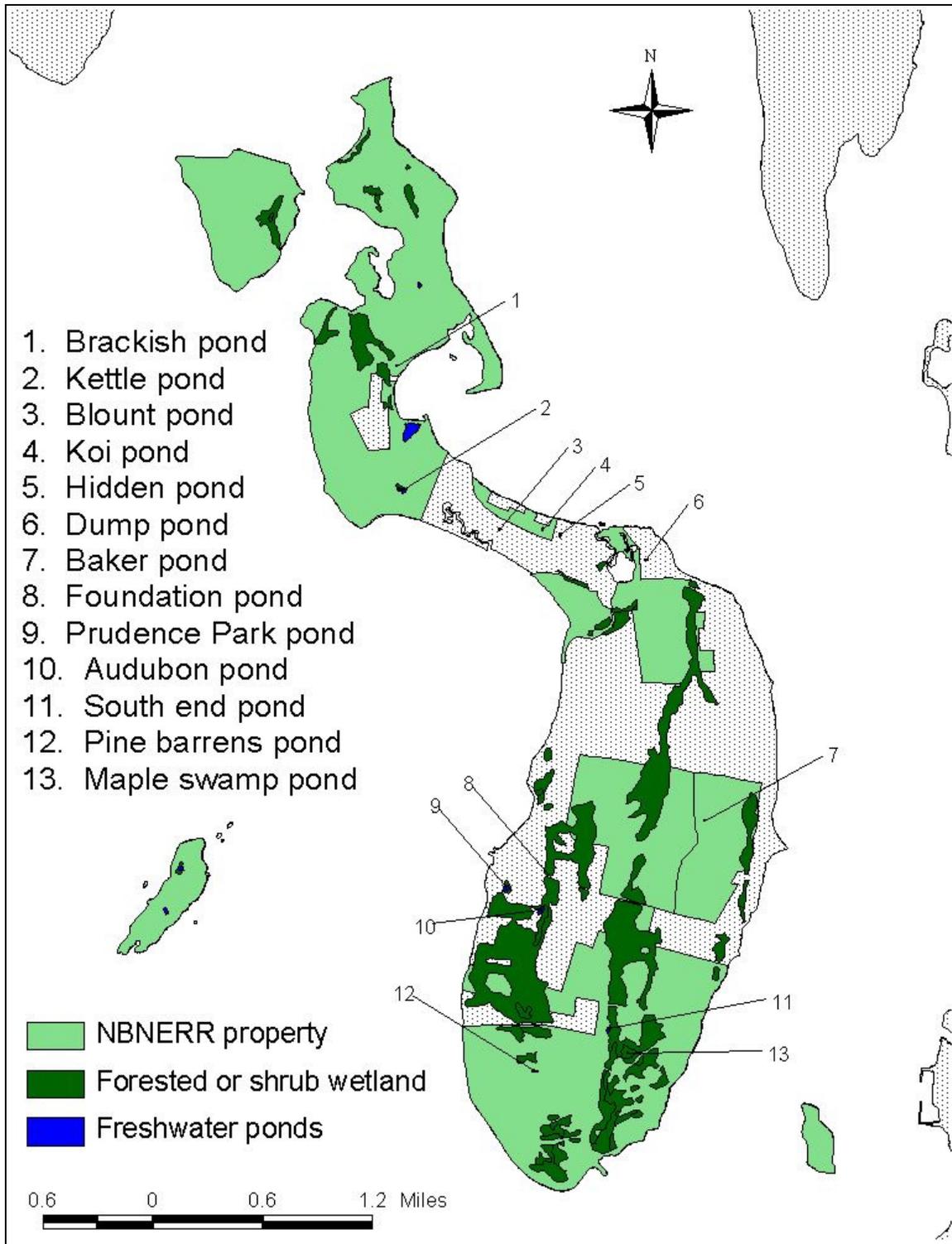


Figure 1. Permanent and vernal ponds on Prudence Island, some of which were sampled during initial herpetological surveys in 2003.

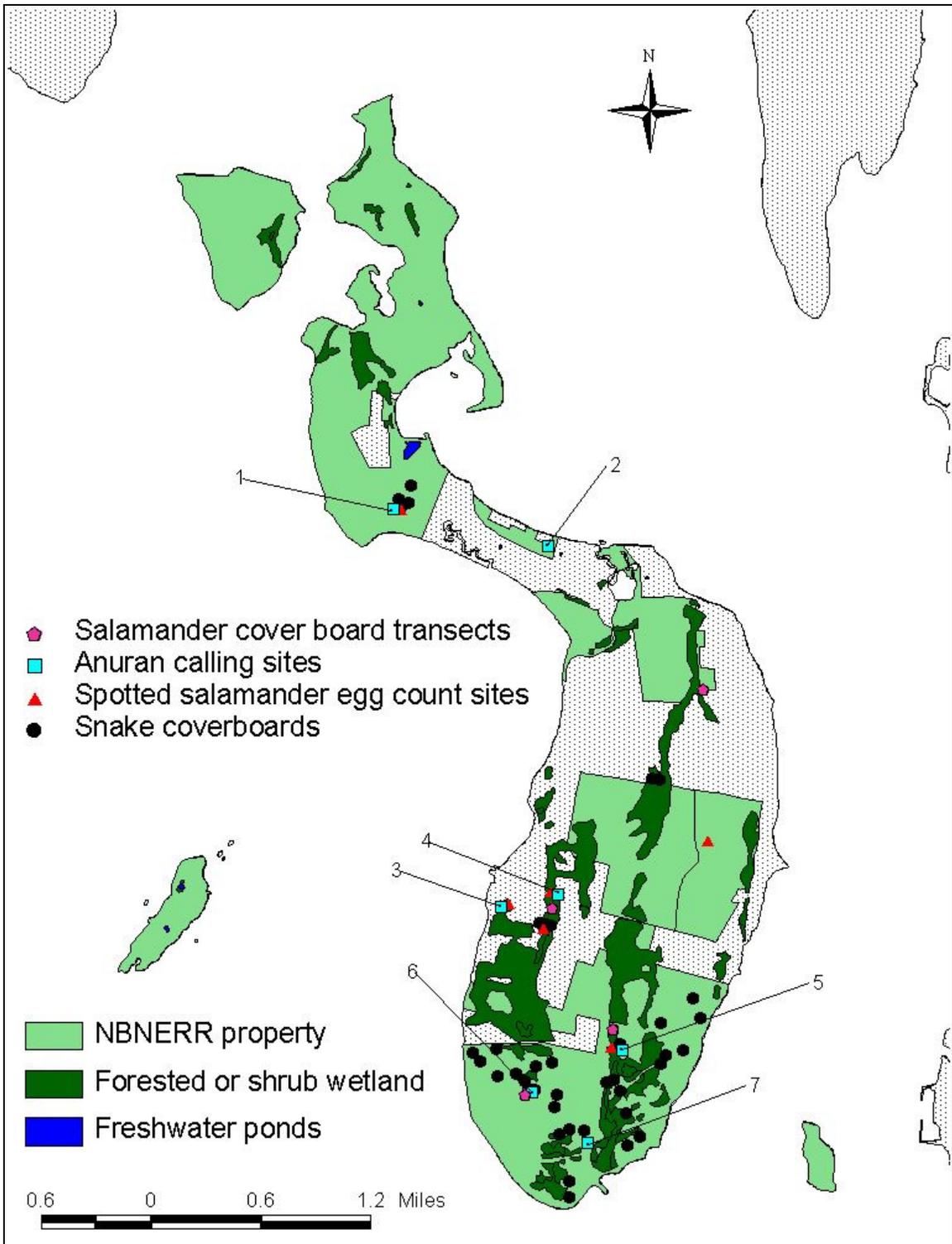


Figure 2. Locations of herptile survey sites on Prudence Island in 2003. Anuran calling sites are numbered from 1-7.

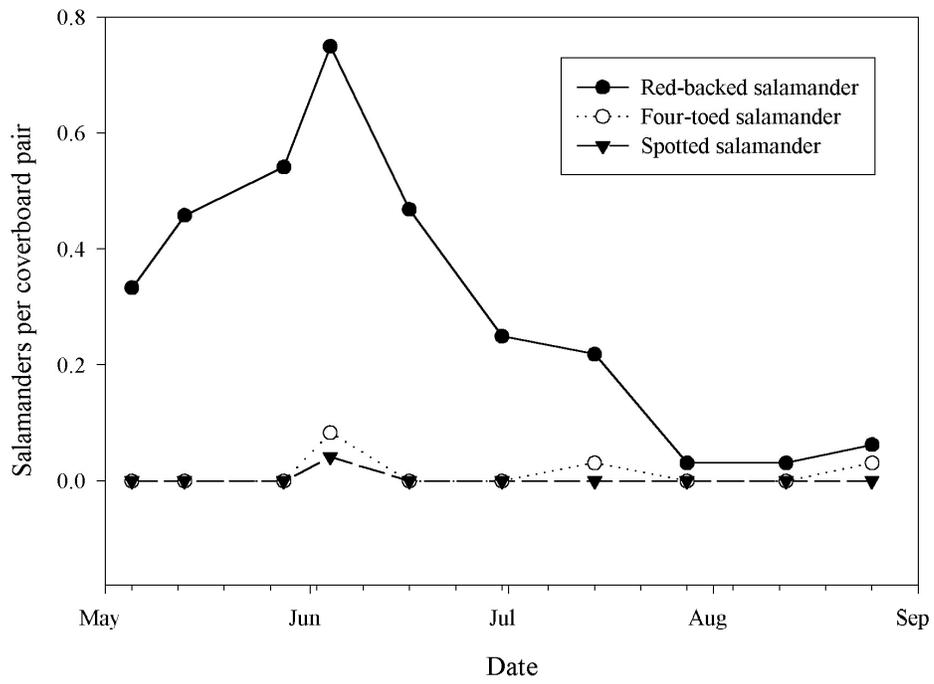


Figure 3. Abundance of salamanders found under cover boards during 2003 on Prudence Island.

Table 1. Number of spotted salamander egg masses counted in ponds on Prudence Island on April 23, 2003.

Pond name	Number of egg masses
Kettle	0
Baker	0
Foundation	0
Prudence Park	2
Audubon	353
South end	19
Pine barrens	0

Table 2. Activity level of spring peepers in selected ponds on Prudence Island on six dates in 2003.

Pond #	Apr 14	Apr 21	Apr 28	May 5	Jun 2	Jun 9
1	1	1	2	1	na	na
2	1	1	2	2	2	0
3	1	2	3	1	1	0
4	0	0	1	0	2	0
5	2	1	3	2	1	3
6	1	1	2	2	2	2
7	0	0	0	0	0	0

Table 3. Number of salamanders found under cover boards at four locations on Prudence Island. All cover board transects were set in April 2003 except Indian spring which was set in June 2003. N is the number of dates on which the cover boards were checked.

Location	N	Salamander species		
		Red-backed	Spotted	Four-toed
Pine barrens	10	22		
South end creek	10	39	1	3
Broadway	10	19		
Indian spring	6	7		1

Table 4. Size, age, and sex data for box turtles marked in 2003.

Turtle number	Sex	Carapace (cm)	Plastron (cm)	Number of rings
1	F	131	110	15
2	M	147	123	14
3	M	121	105	16
4	F	134	112	Not recorded
5	F	85	72	Not recorded
6	F	132	118	26
7	M	142	113	18
8	M	142	117	25
9	M	155	134	26

Table 5. Size and sex data for spotted turtles marked in 2003.

Turtle number	Sex	Carapace (cm)	Plastron (cm)
1	F	58.2	50.7
2	M	106.6	93.7
3	M	75.7	68.8
4	M	102.3	85.9
5	M	93.7	81.5
6	M	108.0	97.8
7	M	38.5	36.7

Table 6. Herptile species found on Prudence Island and Hope Island during DEM Fish and Wildlife surveys and more recent NBNERR surveys.

Location	Species	Common name	DEM Fish and Wildlife	NBNERR
Prudence Island	<i>Ambystoma maculatum</i>	Spotted salamander	X	X
	<i>Bufo fowleri</i>	Fowler's toad	X	X
	<i>Chelydra serpentina</i>	Common snapping turtle	X	X
	<i>Chrysemys picta</i>	Eastern painted turtle	X	X
	<i>Clemmys guttata</i>	Spotted turtle	X	X
	<i>Coluber constrictor</i>	Northern black racer	X	X
	<i>Eurycea bislineata</i>	Northern two-lined salamander	X	
	<i>Hemidactylium scutatum</i>	Four-toed salamander	X	X
	<i>Lampropeltis triangulum</i>	Eastern milk snake	X	
	<i>Opheodrys vernalis</i>	Smooth green snake	X	
	<i>Plethodon cinereus</i>	Northern redback salamander	X	X
	<i>Pseudacris crucifer</i>	Northern spring peeper	X	X
	<i>Terrapene carolina</i>	Eastern box turtle	X	X
	<i>Thamnophis sauritus</i>	Eastern ribbon snake	X	
	<i>Thamnophis sirtalis</i>	Garter snake	X	X
Hope Island	<i>Opheodrys vernalis</i>	Smooth green snake	X	
	<i>Storeria dekayi</i>	Northern brown snake	X	
	<i>Thamnophis sirtalis</i>	Garter snake	X	