

**RHODE ISLAND SOUTH SHORE DIAMONDBACK TERRAPIN PROJECT
FINAL REPORT 2013**



Photo by Peter Paton, URI

This document should be referenced as:

Schwartz, M.L. 2013. Rhode Island South Shore Diamondback Terrapin Project Final Report 2013. Submitted to the U.S. Fish & Wildlife Service-Coastal Program, December 2013. Rhode Island Natural History Survey, Kingston, R.I.

Abstract

The diamondback terrapin, *Malaclemys terrapin*, is a state-endangered and protected species. To date, the only documented terrapin population in the state inhabits Hundred Acre Cove in Barrington, R.I., and nests at the Doug Raynor Wildlife Refuge (DRWR). This population has been actively monitored for 24 years by the Barrington Conservation Land Trust (BCLT), with data archived at the R.I. Natural History Survey (RINHS). The full extent of the range of *M. terrapin* in the state is currently unknown, but recent confirmed reports of terrapins along Rhode Island's South Shore begged for inquiry.

With funding from the U.S. Fish & Wildlife Service Coastal Program (USFWS), a partnership of RINHS, USFWS, and the University of Rhode Island (URI) College of the Environment & Life Sciences (CELS), with cooperation from Roger Williams Park Zoo, conducted a pilot study to survey for diamondback terrapins along the South Shore and to begin to analyze existing data—primarily from the BCLT terrapin monitoring at DRWR—to get a more complete picture of

diamondback terrapin distribution in the state as well as considering future research questions for this elusive species.

Through both beach surveys and in-water surveys by kayak, the R.I. South Shore Diamondback Terrapin Project (RIDTP) located/confirmed 15 individual terrapins among salt ponds along the South Shore. A strong outreach effort generated additional unconfirmed reports, and gave project partners promising leads for locations of future investigation. With follow-on funding, we hope to build on this pilot study to determine the full extent of *M. terrapin*'s range in Rhode Island, to document habitat preference and use, and to investigate the genetic relationship of Rhode Island's terrapin population(s) to those of neighboring Connecticut and Massachusetts.

Objectives & Methods

Objective 1. Survey and document potential and confirmed sites in Rhode Island for the presence of the diamondback terrapin, *Malaclemys terrapin*, outside of the known breeding population at the Doug Rayner Wildlife Refuge (DRWR) at Nockum Hill, Barrington, R.I., with special attention given to Rhode Island's salt ponds.

Surveys

In August 2012, Malia Schwartz, RINHS/URI, scouted recently confirmed South Shore sites for suitable nesting habitat for terrapins and to look for hatchlings, which were now emerging at the DRWR site. Sites included the Winnapaug Pond/Westerly Town Beach area and Napatree Point. Suzanne Paton, USFWS, scouted the Quonochontaug Pond area where the piping plover crew had located a dead adult terrapin. All sites provided suitable habitat for terrapins and would be the initial focus areas for surveys in summer 2013.

Additionally, Schwartz visited the DRWR with Charlotte Sornborger, BCLT, to discuss our plans for the South Shore RIDTP, observe hatchling emergence, and learn methodologies and marking protocols. The BCLT uses a notching system on the marginal scutes of the carapace to mark individual terrapins (Cagle, 1939). Sornborger provided their log of individuals/markings to use as a basis for identifying and/or newly marking terrapins found along South Shore sites.

As a result of the October 2012 Superstorm Sandy, Schwartz and S. Paton re-surveyed sites in early May 2013 to assess potential hindrances to terrapin nesting due to changes in beach profiles and other damage. Napatree Point and Quonochontaug beaches continued to provide ample nesting habitat post-Sandy, as did a small beach site on Winnapaug Pond; however, the Westerly Town Beach site/shoreline presented a "wall" of sand that would be extremely difficult for a nesting female to climb.

At the end of May—prior to the start of the terrapin nesting season in Rhode Island—Schwartz convened a meeting of the "R.I. Diamondback Terrapin Working Group" (RIDTWG) to discuss the best approach/methods to survey South Shore sites for terrapins. The RIDTWG was composed of members of the partner organizations (RINHS, USFWS, URI-CELS), along with Roger Williams Park Zoo, R.I. Department of Environmental Management (RIDEM), and BCLT (Table 1). Schwartz created a RIDTWG e-mail list and regularly communicated updates and solicited input on the project.

Table 1. Members and affiliations of the R.I. Diamondback Terrapin Working Group

Malia Schwartz	RINHS/URI-CELS
Suzanne Paton	USFWS
David Gregg	RINHS
Louis Perrotti	Roger Williams Park Zoo
Peter Paton	URI-CELS
Nancy Karraker	URI-CELS
Thomas Husband	URI-CELS
Kira Stillwell	RINHS
Meghan Beatty	URI Coastal Fellow
Charlotte Sornborger	BCLT
Steve Reinert	BCLT
Christopher Raithe	RIDEM
James Turek	NOAA Restoration Center
Cynthia Maynard	USFWS
Erin King	USFWS
Kevin Rogers	USFWS
Emma Haskett	Volunteer
Alyssa Zhang	Volunteer
Laura Craver	Volunteer
Brittany Dobrzynski	Volunteer/URI
Wendy Forber-Pratt	Volunteer/URI

Our initial, primary focus was on the following sites, where confirmed terrapin sightings existed: Napatree Point, Winnapaug Pond/Westerly Town Beach, and Quonochontaug Pond. Based on further discussion by the group regarding other areas with suitable terrapin habitat, anecdotal reports of terrapins, as well as an existing presence of USFWS staff monitoring piping plover nesting activity, Ninigret Pond, Little Maschaug Pond, and Green Hill Pond were also added to survey.

Peter Paton, URI-CELS, and Meghan Beatty, our URI Coastal Fellow (see below), developed a GIS-based grid map system for each site whereby project participants could note the specific locale of terrapins sighted, and data could later be tabulated methodically. In addition, grids were developed for Hundred Acre Cove at the DRWR site and the Palmer River in Warren, R.I.—a known terrapin site, but undocumented.

The RIDTWG felt that locating terrapins by beach patrol surveys would be akin to “looking for a needle in a haystack” and yield meager, if any, data for our pilot project as well as for Beatty’s Coastal Fellow project. Instead, Beatty would focus her efforts on surveys by kayak—protocols developed by P. Paton for the project. With the use of a hand-held GPS, Beatty’s survey tracks could be downloaded for later analysis. (See Beatty et al. (2013) for specific survey methodology.) USFWS provided the kayaks for the project’s use and seasonal staff to support RINHS’ effort of surveying sites by beach patrol and assisting Beatty with kayak surveys when possible. Additionally, we drew on volunteers already patrolling beaches for the Watch Hill Conservancy to assist in monitoring and reporting diamondback terrapin sightings.

Coastal Fellow

In March 2013, Schwartz secured “matching” funding from URI-CELS to support hiring a URI Coastal Fellow for the summer. Interest in the terrapin project among Coastal Fellow applicants was high, and we interviewed four top-notch applicants, and ultimately selected Beatty, a senior wildlife conservation biology major, as our Coastal Fellow. Schwartz enlisted P. Paton, URI natural resources science (NRS) professor, to serve as Beatty’s primary mentor and to work on development of survey protocols for the project.

As a requirement of her Coastal Fellowship, Beatty was responsible for developing a summer research project, conducting the research, analyzing the data, and reporting her findings in an “Undergraduate Student Research Poster Presentation” at the end of the Fall 2013 semester. P. Paton mentored Beatty in all aspects of her fellowship.

Volunteers

We were able to draw on USFWS seasonal staff, interested URI students, and others from involved organizations, such as the Watch Hill Conservancy, to disseminate information about terrapins and survey/monitor for their presence, especially on targeted beaches. As a result of the group’s invaluable coverage, we did not need to recruit additional volunteers for this pilot project.

Objective 2. Synthesize data, review literature, and disseminate information about *M. terrapin*—a rare and state-endangered species in Rhode Island—to the interested public, private landowners, government agencies, policymakers, and other groups.

Outreach

We decided that the best way to augment our survey efforts as well as disseminate information about this elusive species to the beachgoing public was to develop outreach materials to be distributed widely and to encourage the public’s assistance in reporting terrapin sightings. David Gregg, RINHS, created an e-mail account (terrapins@rinhs.org) for reporting sightings, and Beatty worked with Gregg to develop the outreach materials for the project, including a PDF flyer that could be posted as well as distributed electronically, a wallet card, and an information card. Materials were distributed at area beaches, through the USFWS Refuge System, at various sites in Westerly and Charlestown and statewide through partner organizations and RIDTWG members. In addition, we used RINHS’ website, Facebook page, eNews posts, and other media to provide updates on the project, answer questions, and encourage sighting reports.

Lastly, strong press coverage about the project was an unanticipated and stellar success. Cynthia Drummond’s timely and informative article for *The Westerly Sun* in early August 2013 was picked up and reprinted in the *Charlestown Press*. The URI News Bureau’s Todd McLeish wrote an article/new release profiling URI Coastal Fellow Beatty, the RIDTP, and Beatty’s “discovery” of diamondback terrapins in Winnapaug Pond for *URI Today*, which was picked up by numerous state (e.g., *Providence Journal*) and electronic news media, and also by the Associated Press, where it went **national** and yielded stories as far away as Seattle and Houston, to name a few. Articles about the project also appeared in local organization newsletters, including “Napatree Notes” and the Westerly Land Trust newsletter.

Literature Review

While sparse, Schwartz reviewed existing scientific literature on diamondback terrapins, with special attention to published information on the Rhode Island terrapin population as well as sighting information. Brennessel's book (2006), *Diamonds in the Marsh*, provided a highly useful synthesis of *M. terrapin* information throughout its range and provided much insight into the Cape Cod National Seashore terrapin population, which Brennessel monitors. Other published, peer-reviewed articles as well as notable historic data and RIDEM agency reports added information for the Rhode Island terrapin population and further informed our survey efforts. Schwartz is currently consolidating a list of sources for the whitepaper.

Data Synthesis

RINHS serves as the repository for data from the BCLT monitoring program at the DRWR. Sornborger provides nesting season annual data on CD, in an Excel spreadsheet format. Schwartz and Gregg began to synthesize these data and to look for trends, such as number of individuals sighted per year, number of new "recruits" per year, time between nesting sightings, etc. The current database includes records of 395 individual terrapins observed at DRWR over a continuous, 24-year period (1990-2013). Schwartz and Gregg will continue to synthesize/analyze these data as well as augmenting the RINHS biodiversity and rare species databases with the sighting records from our RIDTP pilot study.



Photo by Malia Schwartz, RINHS/URI

Objective 3. Develop a research agenda on the issues important to further understanding the biology, natural history, habitat use, and population dynamics of *M. terrapin* in Rhode Island, with interest in defining the species' relationship to other known populations in Connecticut and Massachusetts.

Schwartz is currently reviewing the findings and analyzing data from the summer field season and is also in the process of drafting a whitepaper summarizing the state of the knowledge on the diamondback terrapin in Rhode Island, with emphasis on the terrapins found along the South Shore during this pilot study. The whitepaper will be reviewed by members of the RIDTWG and will provide the basis for setting forth a research agenda for the future. The final whitepaper will then be used to leverage and garner follow-on funding from federal, state, and/or private foundation support—leads that are currently being pursued. Furthermore, the results from this pilot project can be used to inform policy and promote discussion on issues ranging from habitat restoration and climate change to natural resources and environmental protection.

While our primary focus for this pilot study was on documenting the occurrence of terrapins along the South Shore of Rhode Island, we plan to follow up with state agency leads in Massachusetts and Connecticut to share data/discuss trends on terrapin populations with an eye toward beginning to define species' relationships between states. And we continue to participate in meetings and discussions by the BCLT as well as assisting in their efforts when feasible.

Results & Discussion

South Shore Surveys

A total of 15 confirmed diamondback terrapins were sighted in and along Rhode Island's South Shore salt ponds during the 2013 nesting season. Confirmed sightings were documented with a photo and map location. Most notably was a cluster of up to nine (9) individuals found in an isolated cove in Winnapaug Pond, located repeatedly by Beatty during kayak surveys (Beatty et al., 2013). Terrapins were also found at Napatree Point (3), Little Maschaug Pond (1), and Succotash Salt Marsh in Pt. Judith Pond (1). A dead adult terrapin (1) was found/reported near a cove in the Pawcatuck River Estuary in October 2013. (To protect the turtles, sightings maps with specific locations are not included, but were submitted as part of the final report to USFWS.)

With the exception of Beatty's important find in Winnapaug Pond, the remaining confirmed sightings were reported by USFWS seasonal staff, RIDTWG members, and participating organization members, in some cases assisting the beachgoing public in identifying terrapins. Outreach materials and press coverage were critical to the project by raising awareness of the possible presence of terrapins in the area. We also received close to 10 *unconfirmed* sightings reports and tried to follow up when possible. Two of the unconfirmed reports of individual terrapins were from Block Island, but we did not receive photos to document their presence. However, we plan to distribute outreach materials on Block Island next summer with the hope of obtaining confirmed reports.



Photo by Peter Paton, URI

Kayak Surveys

Results of Beatty’s kayak surveys are presented in detail in Beatty et al. (2013). Notably, however, was that Beatty and P. Paton’s “groundtruthing” of the kayak survey technique in the DRWR/Hundred Acre Cove and Palmer River estuary in Warren, R.I., expanded the impact of our pilot study to both the DRWR monitoring as well as providing the first scientific documentation of diamondback terrapin distribution in the Palmer River—an area of interest for Sornborger and the BCLT for many years. In addition, Beatty, P. Paton, and Nancy Karraker, URI NRS assistant professor, actively assisted in the monitoring efforts at DRWR, thereby bringing the terrapin projects together in a collaborative fashion and further leveraging our USFWS funding for greater impact.

Future Research

The results of the RIDTP pilot study generated many exciting questions for future investigation. Areas of research interest include: 1) additional surveys along the South Shore salt ponds, as well as other potential locations of interest, such as Block Island, Narragansett Bay, Greenwich Bay and elsewhere in the state; 2) a marking program using PIT tags for individual identification, including terrapins nesting at the DRWR site; 3) telemetry tracking of adult terrapins to follow terrapin movements; 4) studies of habitat use and preferences; and 5) genetic studies to determine relationships among terrapin populations here in southern New England (the northern extent of the species’ range) as well as comparisons to diamondback terrapin populations elsewhere.

Organizations Involved

The following organizations were involved in the RIDTP in 2013: RINHS, USFWS Coastal Program, URI-CELS, Roger Williams Park Zoo, RIDEM, BCLT, Westerly Land Trust, Watch Hill Conservancy, and NOAA Restoration Center.

References

- Beatty, M., P. Paton, M. Schwartz, and S. Paton. 2013. Assessing the distribution and detection probabilities of diamondback terrapins (*Malaclemys terrapin*) during kayak surveys in Rhode Island. 2013 CELS and Engineering Undergraduate Student Research Poster Presentation, December 2013. University of Rhode Island, Kingston, R.I.
- Brennessel, B. 2006. *Diamonds in the Marsh: A Natural History of the Diamondback Terrapin*. University Press of New England, Lebanon, N.H. 219pp.
- Cagle, F.R. 1939. A system for marking turtles for future identification. *Copeia*. 2:170–173.

