

Spiny Softshell Project Summary for 2017

Steve Parren, Vermont Fish & Wildlife Department (VFWD) steve.parren@vermont.gov

Background:

The Eastern Spiny Softshell Turtle (*Apalone spinifer spinifer*) is a medium to large aquatic turtle found in Lake Champlain and the lower reaches of some tributaries with concentrations occurring in Missisquoi Bay and the Lamoille River. Unlike other turtles, the softshell has a leathery, pliant shell. Softshells utilize a variety of habitats to fulfill daily and seasonal requirements: soft bottomed and vegetated aquatic areas for foraging and escape cover; exposed rocks and logs for basking; vegetation-free sandbars and shale pebble beaches that are well-drained and have adequate solar exposure for nesting; and underwater wintering sites (hibernacula) that provide well-oxygenated water and are free of ice scour and disturbance. The Vermont Softshell Turtle population is thought to be about 200-300 individuals (adults and large juveniles, not including hatchlings) and is separated from other populations in the Great Lakes and Mississippi drainage.

Direct loss and degradation of habitat, high predation pressure on eggs and young, and human disturbance threaten the long-term viability of Lake Champlain's softshell population. In 1987, due to their historic decline, their small population size, and continued threats to their survival, the Spiny Softshell Turtle was state-listed as threatened in Vermont. In 1991, the Spiny Softshell was nationally listed as threatened in Canada and Québec officially listed it as threatened in 1999. The maintenance of the Lake Champlain Spiny Softshell population is a shared responsibility of Québec and Vermont because the turtle uses both U.S. and Canadian waters, wetlands, and shoreline habitats and are affected by human activities in both countries. Spiny Softshell Turtle conservation efforts have benefited from the involvement of many organizations and international cooperation. The Vermont Eastern Spiny Softshell Turtle Recovery Plan guides recovery activities. It may be found on the Vermont Fish and Wildlife website at:

<http://www.vtfishandwildlife.com/cms/one.aspx?pageId=268450>

Activities during 2017 were carried out in compliance with the Vermont Endangered and Threatened Species Permit issued to me as a biologist with the Vermont Fish and Wildlife Department. A State Wildlife Grant from the US Fish and Wildlife Service and the Nongame Wildlife Fund supported this work. I greatly appreciate the cooperation of landowners and land managers who allowed staff onto their property and the assistance of volunteers, especially Greg Van Buiten, Shannon Kane, Kristen Howell, and Eric Lazarus, as well as USDA Wildlife Services staff, ECHO Lake Aquarium and Science Center (ECHO) staff, and Toni Mikula and Tom Rogers (VFWD). I would also like to acknowledge the relationship that has been forged with the UVM Wildlife and Fisheries Society whose student members assist each year with the annual nesting beach work day.

Results and Discussion:

Management of important communal nesting areas has allowed us to save many state-threatened Spiny Softshell, Map, Snapping, and Painted turtle hatchlings each year. One hundred twelve Spiny Softshell nests were examined during the 2017 nesting season. We determined that one nest was from 2015, six were from 2016, and 105 were laid in 2017. We estimate that 469 hatchlings emerged or were collected from 39 nests. This is an undercount because we only estimated hatchling success for nests we found that were largely intact. If

nests survive until late August before a depredation event, it is likely a predator detected the nest because some hatchlings successfully got out of the nest and to the surface. In 2017, 17 nests were depredated during the emergence period and some of these might have had hatchling emerge but did not contribute to the estimate of hatchlings.

Depredation remains a challenge at all sites. We continued to implement nest protection techniques, including the use of 1-inch x 2-inch mesh fencing laid directly over nesting substrate following the active nesting (July 15), an electric perimeter fence deployed at the largest communal nesting area, as well as a second 68-inch-high fence to deter predators that jump (fox), and regular monitoring and mammal trapping. Shale beaches are more effectively protected by wire mesh than sand beaches because predators find it more difficult to pull the shale through the mesh.

The winter of 2016/2017 was very mild and many mammals, including skunks and raccoons, appeared to have had high survival and were abundant during 2017 in the Champlain Valley. One site at a summer girl's camp lost 28 softshell nests to mammal predators prior to emergence. We trapped mammals more aggressively at this site and documented at least partial success from 10 of the 52 nests found at the camp. Although we had hoped to protect more nests at this challenging site, this was the best outcome we have had so far.

The 2017 nesting season got started with a rainy June. Lake Champlain's level was high and one low-lying sand beach on an island was washed over by waves, likely drowning some nests and rendering the area largely unsuitable for nesting. Other nesting areas remained above water and were used for nesting. A total of 17 softshell nests laid in 2017 were excavated on the island and none of these produced live young. Some drowned but most were laid in a higher patch of sand that did not receive sufficient sunlight (and therefore heat) to successfully develop. We were able to partially protect nests in sand with wire mesh that was elevated above the sand with 5-inch diameter rolls of wire fencing that were 4-foot long. Although more labor intensive, but it is harder for a mammal predator to dig nests in the sand through the elevated wire.

During 2017, hatchling emergence was first documented on August 23. The last nest with evidence of emergence was located on October 7. We were able to collect 132 live softshell hatchlings that were either released (123) or kept in captivity (9). Some young were hatched but not yet ready to emerge from underground nests, and some were found as viable embryos and eggs. This increased the survival of young 28%. We release young, weather permitting, when their shells have stiffened, and they had shed the inner egg membrane that remains attached immediately after hatching. I try to release hatchlings after their shell has stiffened and they have completely absorbed their yolk, but before they need to actively feed. This might only take a few days for hatchlings, but up to several weeks for eggs and embryos. When the weather gets colder in the fall and the lake temperature drops, hatchlings are kept over the winter. Nine captive Spiny Softshell hatchlings from the 2017 nesting season were given to the ECHO Leahy Center for Lake Champlain for care over the winter and early spring (head starting) and used for public education about this threatened species.

On 6/21/2017, 13 Spiny Softshell Turtles that had been kept over the previous winter in captivity at ECHO were released, as well as four Softshell and two Map Turtles I had kept in captivity. Some of the captives had grown to carapace lengths of 2.5-3.5 inches, which likely increased their survival upon release.

The 2017 nesting season was much less productive than the previous three seasons, which all had been record high years. Over the years, we have raised the elevation of the nesting substrate at a northern nesting site and have been successful limiting human disturbances and mammalian depredation. It was therefore puzzling and disappointing to only document 36 softshell nests at this site during 2017 compared to 78 during the 2016 nesting season. Nest depredation was low at this site in both years. It is possible that a 5-day cold snap in August was responsible and embryos were either killed or development was impacted enough that hatchlings did not fully develop. This site has both north and west facing beaches and only 33% of the nests with emergence were on the north facing beach during 2017. During 2016, 43% of the nests with emergence were found on the north facing beach. At a smaller north facing beach, no softshells nests were found in 2017. We documented a record 52 softshell nests at the girl's camp, which has west facing sand beaches. Many of these nests were depredated so it is unclear if all of the nests would have emerged if left undisturbed. We will continue to examine the possible effects of solar aspect and summer temperature. The west facing sand beach produced 22% of all hatchings during 2017 and we will attempt to further enhance nesting success at this important site.