

ANNUAL REPORT
South Carolina State Wildlife Grant SC-T-F13AF01208
South Carolina Department of Natural Resources
October 1, 2013 – September 30, 2014

Project Title: An Evaluation of Culturing Carolina Diamondback Terrapins for Responsible Stock Enhancement

Objective: Capture gravid female diamondback terrapins and collect eggs.

Accomplishments: During the 2014 mating/nesting season, 253 diamondback terrapins (147 male/106 female) were captured using trammel nets between May 1 and July 16. Of these 106 females, only 49 were gravid. All terrapins were captured in the Charleston Harbor system, which includes sites in the Ashley River, Wando River and Charleston Harbor proper. Female terrapins captured during routine sampling efforts by Inshore Fisheries (targeting recreationally important species of fishes) were utilized as were terrapins captured during targeted sampling trips. Ten female turtles held in tanks in the South Carolina Aquarium since April 2014 were induced and returned to the aquarium to be utilized in a graduate student project studying crab pot/terrapin interactions. However, these terrapins were captured in April during trammel net sampling in the Ashley River, therefore initial collection technique was the same. Only three clutches were obtained from female terrapins that were not captured “in-water”. The first of these clutches was dug up from a marked nest on the James Island Yacht Club property and the other two females were brought in by Dr. Eric McElroy, who found the females searching for a nest site in his yard. In total, 62 gravid female terrapins were collected during this season.

Terrapins were brought back to the laboratory to be sexed, measured (head width, carapace length, carapace width, plastron length), weighed, and marked on three unique marginal scutes using an alphabetical code (A through X beginning on the right marginal scute and moving clockwise). All females were ultrasounded to detect the presence of follicles or eggs; those that had either follicles or shelled eggs were held in one of two outdoor tank systems (flow-through Charleston Harbor water) and all remaining females and males were released at the site of capture. The females retained for egg harvest were fed a natural diet (fish, snails, mussels and crabs) while in captivity and were ultrasounded every 2 – 5 days to assess follicle/egg development. Females that had only follicles or a combination of eggs and follicles were held in a completely aquatic tank. Once only shelled eggs were visible in the ultrasound images and could be easily felt by palpation, females were placed in a tank system consisting of an aquatic tank connected by a bridge to a tank filled with construction sand. The sand filled tank was meant to offer a “natural” habitat for females to construct nests. Five females made nests in the sand tank. All other females were induced to lay eggs using oxytocin. Females were brought into the laboratory and injected with 2 units of oxytocin/100 g of body weight (Tucker et al. 2007). They were then placed in a plastic bin of water individually so when eggs were laid they were not accidentally crushed by the female terrapin. Females were injected every 2 hours, up to 3 times/day until all eggs were collected (as determined through ultrasound). The time from injection to egg-laying varied from 30 minutes to multiple days. Once egg-laying began, the time until all eggs were released ranged from 10 minutes to multiple days. Following egg collection, all female terrapins were released at the site of capture.

Significant deviations: Trammel netting was used as the primary method of collection, either deployed parallel to the marsh or set and retrieved in a manner similar to a seine net. The idea of using silt fence/pitfall trap arrays was abandoned after several arrays adjacent to Fort Sumter were destroyed after a significant storm event. Next season these traps will be set-up on a more protected beach where many crawls were observed during the 2014 nesting season.

Objective: Incubate eggs at varying temperature ranges in order to produce 50% male hatchlings and 50% female hatchlings.

Accomplishments Each clutch of eggs collected from gravid female diamondback terrapins was measured (mm and grams), buried halfway in Hatchrite nesting substrate in a plastic container and placed in one of two incubators. One incubator was set at 27°C to produce male hatchlings and the other was set to incubate at 31°C to produce female hatchlings. Eggs began hatching on July 2, 2014 and the last hatchling emerged on September 8, 2014. Incubation time varied from 42 to 62 days with an average of 47 days for females and 60 days for males. Overall hatching success was 71 % resulting in 311 individuals, which consisted of 162 females and 149 males. However, 6 clutches (49 eggs) were bad and appeared to be unfertilized. If these eggs are removed from the total and only clutches with at least one good egg are included, our hatching success is increased to 83%. All hatchlings were measured once their yolk was fully absorbed and their plastron healed (carapace length, plastron length, carapace width, depth and mass). Carapace length averaged 31.4 mm (Range:18.0-35.4 mm), plastron length averaged 27.7 mm (Range:14.5-31.0 mm) and mass averaged 8.26 grams (Range:1.91-10.41 grams). There was no statistical difference between male and female size at hatching. All measurements are taken monthly for all individuals to document growth (Figure 1 below).

Significant deviations: None.

Objective: Evaluate the feasibility of culturing diamondback terrapins by altering diet to determine optimal culture growth.

Accomplishments: The effect of three different diets (2 commercially produced pellet types, 1 natural diet) on terrapin growth are currently being evaluated. One hundred and eighty hatchlings (90 females, 90 males) were selected for the feed study in early October based on size (no significant difference in hatchling size). Sixty individuals were randomly assigned to each treatment with equal female/male representation. Individuals are identified by a unique numeric identifier written on the carapace with oil-based markers in three different colors based on diet assignment. Prior to the start of the study, all terrapins were acclimated to a pellet or natural diet by offering only one food choice per feeding; in this way we ensured that all animals were feeding at the beginning of the study no matter which feed type they were assigned. Terrapins are housed in seven “raceway” tanks that include low salinity recirculating well water (5-10 ppt), plastic plants for shelter, and basking platforms. They are assigned weekly to one of seven tanks in order to minimize tank effect due to physical or behavioral interactions.

Terrapins are fed 4 times per week in separate feeding bins (15 terrapins/bin) by diet treatment. Enough food is offered so terrapins can feed to satiation over the period of 90 – 120 minutes. Diets are either ZooMed (4 mm), Mazuri (4 mm) or a natural diet of fileted and skinned croaker and spot. All turtles were measured (carapace length, carapace width, plastron length, mass) at the beginning of the

experiment and will be measured monthly to track growth. This experiment will continue through April 2015.

Significant deviations: None.

Literature Cited:

Tucker, J.K., D.L. Thomas and J. Rose. 2007. Oxytocin Dosage in Turtles. *Chelonian Conservation and Biology* 6(2):321-324.

Estimated Federal Cost: \$36,178.38 (amount spent through 8/27/2014)

Recommendations: Continue the grant.

Figure 1. Growth of 307 Diamondback Terrapin Hatchlings since July 4, 2014

