Nesting Activity in the Alabama Redbelly Turtle (Pseudemys alabamensis) on the Mobile Bay Causeway - Final Report

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ABSTRACT

A study of nesting activity in the Alabama redbelly turtle was conducted in the vicinity of the Mobile Bay causeway (Baldwin Co.) during the summer of 2003. Females were observed as they deposited eggs in the field. Nests were labeled and protected by predator-exclusion covers to conserve eggs until they could successfully complete development. Nests were laid along terrestrial elevations from June 15 to August 5, 2003. Clutch sizes for 20 nests where hatchlings emerged ranged from 7 to 19 eggs (mean = 12.0). Development periods (from oviposition to emergence) for nests ranged from 67 to 126 days (mean = 99.2 days). The numbers of hatchlings emerging from each of the nests ranged from 0 to 14 (mean = 8.4). The numbers of undeveloped eggs ranged from 0 to 17 eggs per nest (mean = 3.5). Virtually all hatchlings manifested maxillary cusps, eyebars, and reddish plastrons (with vermiculations). Measurements of 177 hatchlings (from 21 clutches) disclosed a mean carapace (straight line) length of 3.7 cm, a mean carapace width of 3.6 cm, a mean plastron length of 3.4 cm, a mean tail length of 0.97 cm, and a mean wet body weight of 11.9 grams. Predation of uncovered nests by fish crows, raccoons, and ants was very high. At one site on the Blakely River, the ratio of depredated to covered nests was 13:1. A total number of 175 protected hatchlings were released into the environment.

INTRODUCTION

I. Statement of Problem

The Alabama redbelly turtle (Pseudemys alabamensis Baur) is currently regarded as federally "endangered" species by the U.S. Fish and Wildlife Service. It has also been designated as the official "state reptile" by the Alabama State legislature. The geographic distribution of this turtle is restricted to freshwater habitats in the vicinity of Mobile Bay, including parts of Mobile and Baldwin Counties, Alabama (Mount 1975; Conant and Collins 1991; Ernst, Lovich and Barbour, 1994). The primary nesting site for this species is reported to be Gravine Island in Baldwin County. Apparently the species has been declining in numbers for the past two decades. Potential hazards include predation (humans, hogs, fire ants, fish crows, alligators, raccoons), herbicides, and heavy boat traffic (Boschung 1976, Mount 1986). The recovery plan for the Alabama redbelly turtle was formulated by Dobie and Bagley in 1990. They recommended that the species be protected through law enforcement, that critical nesting habitats be managed, and that population trends be monitored. Having such a restricted geographic distribution, the Alabama redbelly turtle is extremely susceptible to extirpation. Using hoop/trammel nets, Dobie (1992a) recorded specimens of Pseudemys alabamensis from Chocolata Bay, Apalachee River and Minette Bay. He also recorded a sharply skewed sex ratio. Dobie (1993) provided information on mortality and parasitism, and he recommended that some sites be posted and that others might be fenced. He also suggested that raccoons and fish crows be controlled.

Our studies began ten years ago (Nelson 1994) and initially focused on the current geographic distribution of P. alabamensis in the Mobile-Tensaw delta. During the first four years of field work, a total of 262 Alabama redbelly turtles were captured; many of these were

collected from several locations previously undocumented. Several artificial spoil banks and natural levees were located that now are known to provide some turtle nesting sites (Nelson 1995, Nelson 1996, Nelson 1997). In 1998, we revised (reduced) the extent of the turtles' geographic distribution. We are now preparing this information for publication in the herpetological literature. In 1998, we also conducted a study of turtle movement via radiotelemetry (Nelson, 1998). We radiotagged 43 specimens of Alabama redbelly turtles on Gravine Island and tracked them from November, 1997 to October, 1998. Although most specimens remained in the vicinity of the Island, we did record straight-line movements as far as 17.9 km north (Negro Lake Basin) and 15.8 km south (Big Bay John). In 1998 we also documented a clutch size of 13.8 eggs (N=22 turtles) via x-ray radiography.

In 1999 we conducted a systematic sampling program of the submergent aquatic vegetation on Gravine Island (Nelson 1999). Our analysis revealed that six of the nineteen species of plants sampled were exotic (introduced). These six species also accounted for 74% of the total plant mass sampled. Preliminary stomach flushing of 25 specimens of P. alabamensis revealed the dominance of the introduced plant Hydrilla verticillata in most of the samples. The analysis of turtle stomach contents was completed in 2000 (Nelson 2000). The diet of Pseudemys alabamensis was found to be strictly herbivorous. Stomach content analysis of 80 turtles revealed the dominance of 8 species of aquatic macrophytes. The most abundant species was the introduced Hydrilla verticillata.

Preliminary studies of nesting activity (Nelson 2001) indicated that nest predation (by raccoons and crows) was almost complete. Some nests that were protected by predator-excluder covers however, survived to hatch. Nests were laid from May to August; hatchlings emerged from September to November. An additional, weekly roadkill survey indicated that Pseudemys alabamensis accounted for 71% of the turtles dead on the causeway. Sixty specimens of dead

hatchlings recorded in March and April indicated that some hatchlings may over-winter in the nest. Statistics are presented for 91 hatchlings that were protected then later released into the natural environment (Blakeley River).

METHODS

Nest mortality in freshwater turtles is notoriously high for many species that have been studied. Aquatic trapping and roadkill surveys along the causeway both indicate that Pseudemys alabamensis is the most abundant turtle along the Mobile Bay causeway (US Hwy 90), especially along the Apalachee and Blakeley Rivers. All turtles and most reptiles lay eggs on land. The lower delta has very limited elevations favorable to turtle nesting. Active predators (raccoons and fish crows) are especially abundant in these areas.

Apparently the greatest limitation to success in Alabama redbelly turtles is in available favorable nesting habitat. To protect them from depredation, we covered all nests with predator excluders. Successful emergences provided us with size records for hatchlings of the Alabama redbelly turtles. We monitored natural egg laying along the causeway at the Blakeley River. We documented nesting activity, covered egg clutches, then monitored them until they hatched. These data provided valuable information on timing and size of the hatchlings. Furthermore the study assured a significant hatchling recruitment for the year (that constituted a significant population boost).

RESULTS

Twenty-six nests of Alabama redbelly turtles were covered along the Blakeley River at Meaher State Park (Table 1). Eggs were laid from June 15 to August 5, 2003. Natural

emergences of hatchlings occurred from September 15 to November 28, 2003. Natural developmental periods of emergent hatchlings ranged from 67 days to 126 days (mean = 99.2 days). Ten remaining nests (from which hatchlings had not emerged) were excavated on November 28, 2003 that probably would have overwintered. Hatching success per clutch ranged from 20% to 100% (mean = 69.1%) among the 10 nests that emerged naturally. Four nests manifested no embryonic development (or were perhaps infertile). Data from another (roadkill) survey for the past two years have documented that hatchlings of Pseudemys alabamensis commonly overwinter in the nest to emerge in the spring (March and April). We have yet to establish what proportion of the hatchlings emerge in the fall (as opposed to the spring). This needs to be determined.

A total number of 175 hatchling Alabama redbelly turtles were released into the environment: 138 from Meaher State Park, 22 from Howards, and 15 from the Bluegill Restaurant (Table 2). All specimens were examined, weighed, measured and photographed. Mean values for mass, carapace length, carapace width, plastron length and tail length are presented on Table 2. All specimens manifested the distinctive reddish plastrons (usually with vermiculations), maxillary cusps and eyebars. Depending upon developmental stage, many specimens were characterized by umbilical scars and egg teeth. Two specimens from Meaher State Park were found dead from unknown causes.. Hatchling data are now being subjected to a more thorough statistical analysis.

Egg predations of freshwater turtle nests are frequently notoriously high. A systematic analysis of depredated nests at Howard's (on the Blakeley River) documented 65 nests from June to early August, 2003 (Table 3). Nest dimensions and estimates of eggshell fragments are presented, along with GPS coordinates. Nest depths ranged from 3.5 cm to 14 cm (mean = 10.0). Nest diameters ranged from 4 cm to 12 cm (mean = 6.9). The estimated number of eggshell

fragments ranged from 0 to 17 (mean = 8.8). Most conspicuous predators were fish crows, raccoons and fire ants. At the site (Howard's) where the depredation survey was conducted, there were 13 depredated nests for each nest covered. Thus for every nest observed and covered, 13 others (93%) were missed and depredated. At all nesting sites studies (Big Island, Howard's, Meaher Park), a large majority of nests are pillaged by predators. These are all areas of clear visibility where fish crows watch female turtles deposit eggs (and remove them). Raccoons effectively "sniff out" the eggs by night. Eggshells depredated by raccoons were usually shredded by claws. Fish crow depredation was characterized by punctured eggshells. Fish crows were frequently observed to fly away with eggs (to consume elsewhere).

SUMMARY

Alabama redbelly turtles constitute the most frequently encountered turtle along the causeway of the Mobile Bay. Nesting occurs along the few elevations available near the vegetated waters (roadsides, bridge ramps, riverbanks, Meaher State Park, ADCNR). Nest mortality in these areas is very high. Thus, most nests are excavated and depredated soon after oviposition. Hatchlings in nature apparently emerge from very few nests that are not protected. Nests that are covered with predator excluders can successfully complete embryonic development. A nest protection/ head-start program can effectively conserve the nests until hatchlings can emerge, and enhance the recruitment of hatchlings in to the population. Additional head-start programs in the future can significantly promote the recovery of the small population of the endangered Alabama redbelly turtles along coastal Alabama.

ACKNOWLEDGEMENTS

This study was funded by the Alabama Center for Estuarine Studies (ACES). The research could not have been completed without the enthusiastic support, encouragement and participation of several people. I greatly appreciate the cooperation and help of Mark Pillion (manager) and John Kennedy at Meaher State Park. They provided access to the site and facilitated data collection. Jesse and Terry Kersh (campers at the park during the study) also assisted with the collection of field data. Three excellent field assistants: Joel Borden, Gabriel Langford, and Brandon Gill provided effective and reliable assistance in the field.

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