

Status and Distribution of Alligator Snapping Turtles in Arkansas

Brian K. Wagner, *Arkansas Game and Fish Commission, #2 Natural Resources Drive, Little Rock, AR 72205*

Dave Urbston, *Arkansas Game and Fish Commission, #2 Natural Resources Drive, Little Rock, AR 72205*

Dennis Leek, *Arkansas Game and Fish Commission, #2 Natural Resources Drive, Little Rock, AR 72205*

Abstract: The alligator snapping turtle (*Macroclemys temminckii*) occurs throughout most of the southeastern United States, but concern exists regarding possible decline in populations throughout the range of the species. Little is known about the alligator snapping turtle in Arkansas. The species was previously documented from only 20 counties in the state. We sampled 1,905 net nights with baited hoop nets and captured 445 alligator snapping turtles in 56 counties. Captures in 41 counties were new records. We failed to capture an alligator snapping turtle in 5 counties where the species was previously reported. The alligator snapping turtles that we captured averaged 338 mm in carapace length. Catch rates were higher in counties that were previously open to commercial turtling than in counties not previously open to commercial harvest. There was no difference in average size of turtles between counties with and without a history of commercial harvest.

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The alligator snapping turtle is found throughout many of the drainages emptying into the Gulf of Mexico (Pritchard 1989), and occurs as far northwest as Oklahoma (Glass 1949, Webb 1970) and Kansas (Collins 1993). The species was studied in detail in southern Louisiana by Dobie (1971). Pritchard (1989) placed the status of the alligator snapping turtle in Arkansas as a top research priority. The rarity and exploitation of this species have led the U.S. Fish and Wildlife Service to consider the alligator snapping turtle for listing as threatened under the Endangered Species Act (Pritchard 1989).

Alligator snapping turtles are sold for meat in parts of Louisiana (Sloan and Lovich 1995). Pritchard (1978) reported that populations of this species in Louisiana were thought to be depleted, and most of the alligator snapping turtles sold for food

in New Orleans came from Arkansas. Trade in alligator snapping turtles to Japan is documented (United States of America vs. Robert Waites Guthrie. 24 April 1995. United States Court of Appeals, Eleventh Circuit. No. 95-6508). Populations of alligator snapping turtles are thought to be depleted throughout the range. A recent study in Kansas sampled 84 potential sites or sites of historical occurrence and failed to produce an alligator snapping turtle (Shipman 1993). Because of a lack of information and a heightened concern over commercial exploitation in Arkansas, the Arkansas Game and Fish Commission banned harvest of alligator snapping turtles from the wild through an Emergency Proclamation in October 1993. The goal of this study was to provide a distribution record by county and relative abundance data for alligator snapping turtles in Arkansas.

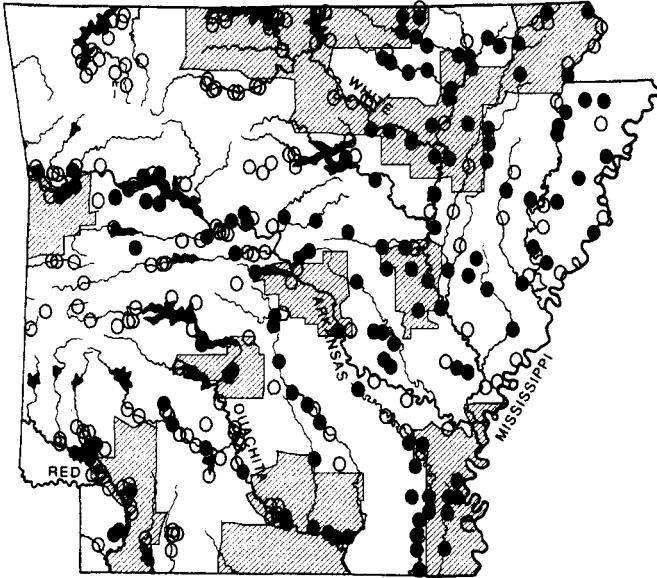
A great deal of input into the design of this study was provided by J. Welch, A. Carter, L. Hitchcock, and D. Akers, Arkansas Game and Fish Commission. Field sampling was conducted by J. Ahlert, J. Barnett, D. Broach, R. Darter, E. Ingle, and E. Poe. We would like to thank the many Arkansas Game and Fish Commission personnel that helped with field sampling during the study. We are particularly grateful for the help of several experienced commercial fishermen and turtlers, including C. Cook, B. Crofts, C. Gibbs, C. Guess, L. Hearn, J. Moon, J. Rylant, J. Thompson, J. White, and D. Woodruff. Other volunteers that assisted on the project were W. Barnett, G. Darter, R. Lawson, and J. Ayers of the Arkansas Commercial Fishermen and Shell Takers Association, D. Harris and M. Pardew of the USDA Forest Service, R. Ingle of the Prairie County Sheriff's Office, S. Keesee of the Arkansas Democrat-Gazette, and R. Shelton of the U.S. Fish and Wildlife Service.

Methods

Arkansas Game and Fish Commission wildlife officers in each of the 75 counties in Arkansas were asked to plot locations on county maps where they observed alligator snapping turtles. They were also asked to solicit input from other Arkansas Game and Fish Commission personnel and commercial turtle trappers in their county. Maps were then provided to 6 employees who were instructed to sample 4 locations in each county assigned, using the county maps as reference material. Samples were to be dispersed throughout each county.

Sampling was conducted using 1.2-m diameter hoop nets comprised of 7 hoops and 64-mm mesh. Each location was sampled 1 night (mean = 18.74 ± 0.06 hours) with 6 nets. Nets were baited with whole fresh fish or large portions thereof. All turtles captured were counted by species, carapace length of alligator snapping turtles was measured, and all turtles were released. All 75 counties of the state were sampled at a minimum of 4 locations/county (Fig. 1). Sampling was conducted between 31 May and 5 October 1994 and between 1 May and 29 June 1995.

Mean carapace lengths and catch rates of alligator snapping turtles from counties previously open and not open to commercial harvest were compared using a 2-sample *t*-test. Frequency distributions of carapace lengths of alligator snapping turtles were compared using 2 sample Kolmogorov-Smirnov test.

**KEY:**

- study sample sites where alligator snapping turtles were collected
- study sample sites where no alligator snapping turtle was collected
- ▨ counties where alligator snapping turtles were previously reported

Figure 1. Distribution of sample sites with locations of alligator snapping turtle collections in Arkansas, 1994 and 1995.

Results

Netting was conducted on 317 nights resulting in 1,905 net nights of effort. A total of 8,602 turtles was captured, 445 of which were alligator snapping turtles. Alligator snapping turtles were collected in 56 of 75 counties (75%). They were found in all but the extreme upland areas of the north and west parts of Arkansas, but were most abundant in the eastern half of the state (Figs. 1, 2). Statewide, the alligator snapping turtles captured averaged 33.8 ± 0.48 cm in carapace length.

In counties previously open to commercial turtling, 0.34 ± 0.03 alligator snapping turtles were caught/net-night. In previously closed counties 0.17 ± 0.02 were caught/net-night. These catch rates were different ($t = 4.71$, $df = 1,639$, $P = 0.001$). Average length of alligator snapping turtles captured was not different between previously open (33.6 ± 0.56 cm) and closed (34.3 ± 0.95 cm) counties ($t = 0.58$, $df = 443$, $P = 0.56$). The frequency of turtles by carapace length for previously open and closed counties (Fig. 3) was not different (Kolmogorov-Smirnov test = 0.08, $P = 0.68$).

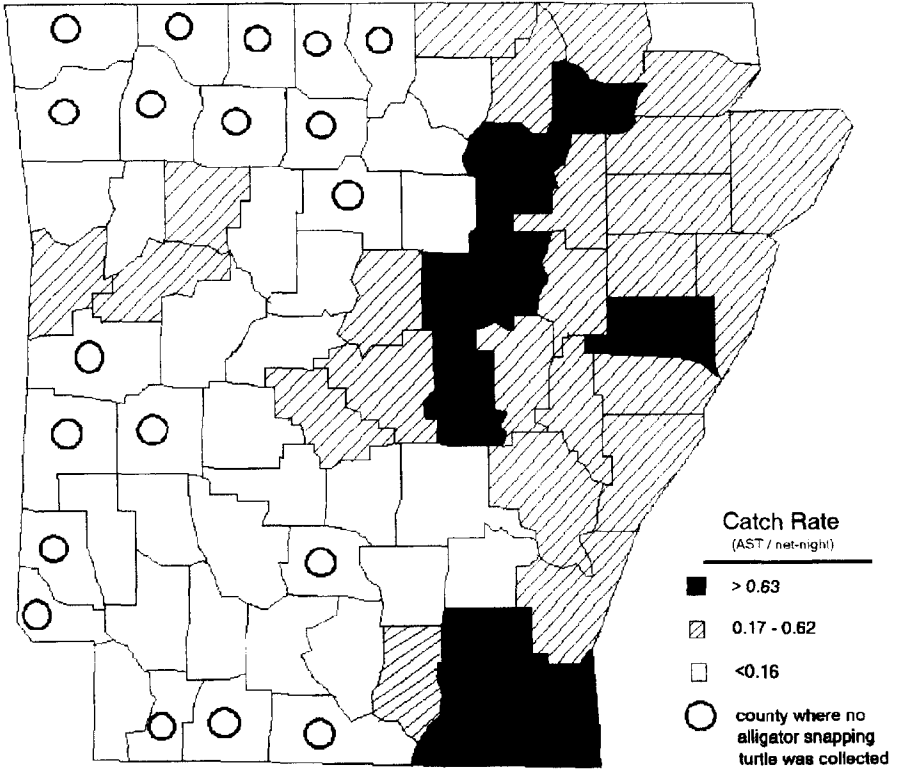


Figure 2. Number of alligator snapping turtles collected by county in Arkansas, 1994 and 1995.

Other turtles captured were red-eared sliders (*Trachemys scripta elegans*, $N = 6,621$), Missouri river cooters (*Pseudemys concinna metteri*, $N = 535$), soft-shell turtles (*Apalone* sp., $N = 384$), snapping turtles (*Chelydra serpentina*, $N = 230$), and unidentified turtles ($N = 387$).

Discussion

Previous reports document alligator snapping turtles from 20 counties in Arkansas (Dellinger and Black 1938, Pritchard 1989). The current study expanded the known range by 41 counties, but failed to locate alligator snapping turtles in 5 counties where the species was previously documented. We believe that this study provides a complete survey of the distribution of alligator snapping turtles in Arkansas. Our sampling yielded no alligator snapping turtle from Columbia and Lafayette counties, areas where alligator snapping turtles were expected (Dellinger and Black 1938). The potential habitats for alligator snapping turtles in Baxter, Marion, and Boone counties are large reservoirs, where we found no alligator snapping turtle. Pritchard (1989)

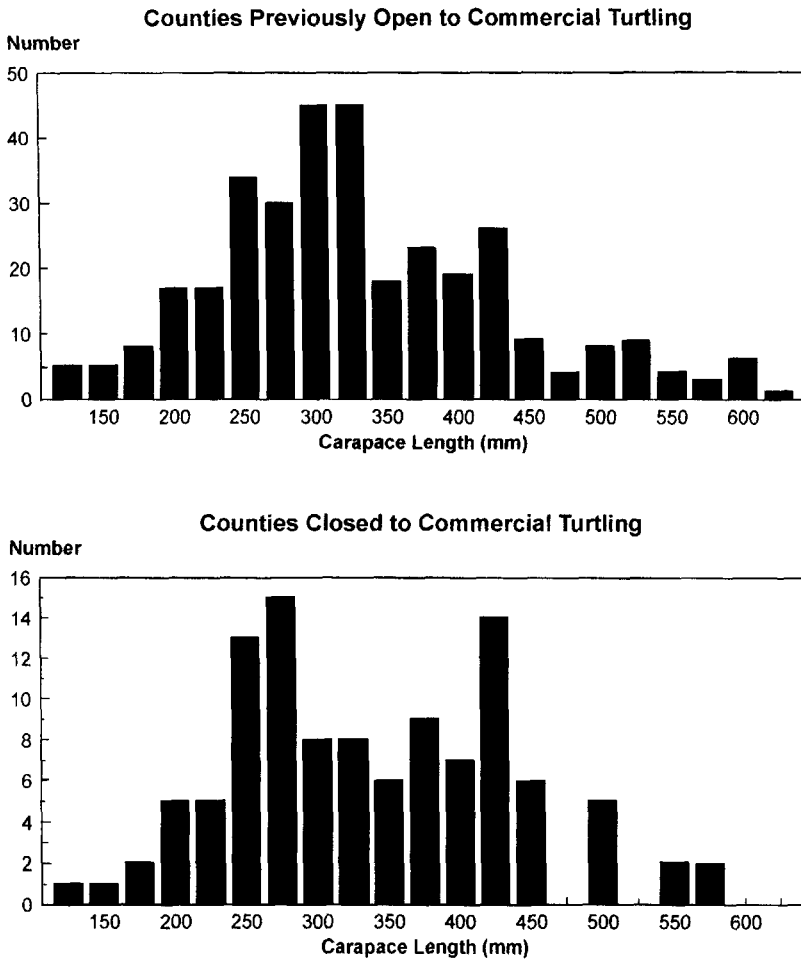


Figure 3. Frequency distribution of alligator snapping turtles by carapace length for turtles collected in counties previously open and not open to commercial turtling in Arkansas, 1994 and 1995.

reports records of alligator snapping turtles from all 3 of these counties, and 1 alligator snapping turtle was caught by an angler in Baxter county the week after our netting was completed (M. Oliver, pers. commun.).

The frequency distributions of alligator snapping turtles by carapace length show a possible drop in abundance above the 325-mm size class for counties previously open to commercial turtling (Fig. 3). In counties previously closed to turtling, a more gradual decline in numbers by size class is evident beginning after 275 mm. The sharp drop shown for previously open counties in a pattern associated with fish populations having a minimum length limit and subject to heavy exploitation (Austen and Orth

1984, Paragamian 1984). For alligator snapping turtles this may indicate over-harvest. Dobie (1971) reported that alligator snapping turtles in Louisiana attain sexual maturity in 11 to 13 years at carapace lengths of 370 mm for males and 330 mm for females. If we assume these sizes hold for the Arkansas population of alligator snapping turtles, these data indicate that the population is over-harvested, beginning at the size when turtles first reach sexual maturity. We suggest that continued exploitation could jeopardize the long-term viability of the population.

In a study focusing on another turtle species, Congdon et al. (1993) contend that "life-history traits of long-lived organisms consist of co-evolved traits that result in severe constraints on the ability of populations to respond to chronic disturbances." In this discussion, the plight of sea turtles appears to remarkably parallel that of alligator snapping turtles: harvest of both eggs and adults, a decline of nesting areas due to development, and incidental mortality in non-target fishing gear. Congdon et al. (1993) add that "the relatively low fecundity, low nest survival and high adult survival, coupled with extremely high juvenile survival required to maintain stable populations, argue strongly against applying the concept of sustained harvest to long-lived organisms."

Management Implications

This study embodies the most comprehensive look at alligator snapping turtle status and distribution ever completed in Arkansas. While numbers captured were somewhat higher than expected, it appears that some local populations in the state may be in jeopardy. A more detailed study revealing information on absolute density, growth rates, size and age at maturity, sampling effectiveness, and biases due to trapping gear or season is now recommended. This information will help to better evaluate the overall status of the species and determine if local populations are at risk.

Our data indicate that Arkansas is 1 of the last areas where an abundant population of alligator snapping turtles exist. It is very important to the long-term conservation of the species to protect the population in Arkansas. Our review and analysis suggest that no further harvest of these turtles from the wild should be permitted in Arkansas until more detailed studies of abundance and population structure are completed.

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