

**THERMAL AND SPATIAL ECOLOGY OF THE COTTONMOUTH, *AGKISTRODON PISCIVORUS*, AT A THERMALLY-ALTERED RESERVOIR IN EAST TEXAS**

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Three aspects of the biology of semi-aquatic snakes were studied at an eastern Texas reservoir, Lake Fairfield, that receives heated effluent from an industrial facility: (1) the extent of thermoregulation in *Agkistrodon piscivorus* (Viperidae); (2) the movements and total range of *A. piscivorus*; and (3) the abundance of *A. piscivorus* and *Nerodia rhombifer* (Colubridae) in thermally-altered areas of the reservoir compared to relatively unaltered areas.

Temperature has profound effects upon the physiology and ecology of reptiles. Yet the seemingly simple question “How carefully do reptiles regulate their body-temperature?” has not been addressed adequately. In the present study, the thermal ecology of a semi-aquatic snake, *A. piscivorus*, was studied to assess how carefully the species thermoregulates. Using radiotelemetry and an automated data-acquisition system, the laboratory-preferred (i.e., set-range) body temperature ( $T_b$ ), field-active  $T_b$ , and range of possible field-active  $T_b$ 's (i.e., operative temperatures) were examined during the late summer and early autumn (14 August to 20 September 1995). The field-active *A. piscivorus* maintained their  $T_b$  within their set-range, on average 82% of the time. They thermoregulated more effectively than they could have by remaining above-ground in any terrestrial or aquatic habitat; they accomplished this by retreating underground during the hottest times of the day and by spending little time in the heated reservoir.

To monitor movements and total range, ten radiotagged *Agkistrodon piscivorus* (five males, five females) were tracked for period up to 14 months. Males moved 3.5 times farther between sightings and had total ranges that were 17.7 times larger than females. This intersexual difference likely was a result of mate-searching by males; however, the larger size of the males was a confounding factor.

To compare the abundance of snakes in heated versus relatively-unheated areas of the reservoir, snakes were trapped over a 4-year period. Water temperature explained the distribution of *N. rhombifer* — they were rare in the heated effluent — but not *A. piscivorus*. The more-terrestrial *A. piscivorus* appeared to be a habitat specialist, preferring a forested area. The results of this study indicate that semi-aquatic reptiles can be negatively affected by anthropogenic thermal alterations to the environment.

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