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SNAPPING TURTLE, *CHELYDRA SERPENTINA*, OVERLAND MOVEMENTS NEAR THE SOUTHEASTERN EXTENT OF ITS RANGE

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ABSTRACT

Terrestrial movements of turtles are of interest due to the conservation implications for this imperiled group and the general lack of information on this topic, particularly in wide-ranging species. The snapping turtle, *Chelydra serpentina*, is one of the most broadly distributed chelonians in the world; they occur from southeastern Canada westward to Alberta and throughout the eastern half of the United States and into Central America. Most research on this species has been focused on populations in the northern portion of the range. In this study, we radio-tracked five turtles in southwestern Georgia, where published data on spatial ecology and movements are lacking. Turtles exhibited extensive overland movements which we suspect occurred in response to drought.

Key Words: Reptile, Turtle, Spatial Ecology, Wetlands

INTRODUCTION

Terrestrial movements of freshwater turtles are of interest due to recent concerns about the need to accommodate inter-wetland movements and terrestrial habitat requirements of many aquatic turtles (*e.g.*, 1,2). Limited data are available on terrestrial habitat requirements of widely distributed species. The snapping turtle, *Chelydra serpentina*, is locally common to abundant and ranges from southeastern Canadian provinces westward to Saskatchewan and throughout the United States east of the Rocky Mountains and in Central America to Ecuador (3). A highly aquatic species (3), they may even bask while beneath the water's surface. Snapping turtles are capable of extensive aquatic movements (*e.g.* 4, 5, 6, 7, 8). However, accounts of overland movements of snapping turtles are less frequently documented and suggest the species makes only limited use of terrestrial habitats (*i.e.* primarily for female nesting migrations, 9, and hatchling dispersal, 10). However, the vast majority of published studies of this species have been conducted in the northern United States and Ontario, Canada. A recent publication (11) indicated snapping turtles may make extensive use of terrestrial habitats in the southeastern portion of its range. Our study, conducted during a regional drought, documented movements of five snapping turtles.

MATERIALS AND METHODS

Study Area. We conducted this research at Ichauway, the research site of the Joseph W. Jones Ecological Research Center (Jones Center), approximately 16 km south of Newton, in Baker County, Georgia. The 12,000-ha site is predominantly longleaf pine forest, with numerous isolated seasonal wetlands. The property is bordered on the east by the Flint River and transected by approximately 24 km of Ichawaynochaway Creek. The region receives an average of 1272.3 mm of rainfall per year (The Southeast Regional Climate Center, www.sercc.net).

Radio-telemetry. Five adult snapping turtles (211-318 mm straight-line carapace length; 2058 to 7000 g) were radio-tracked from 9 April and 11 November 2006 (Table I). Turtles were captured incidentally either on roads, the creek, or in dry isolated wetlands. Sex of the turtles was determined based on the position of the cloaca relative to the carapace (3). Turtles were marked via scute notching (12) and previously used 26 g radio transmitters (Model SM-1H; AVM Instrument Company, LTD, Colfax, CA) were attached to the posterior vertebral scutes with marine epoxy.

Table I. Morphometric and movement data on common snapping turtles radio-tracked at Ichauway, Baker, County, Georgia, 2006.

ID	Sex	Mass(g)	SLCL(mm)	Start Date	End Date	Total Distance Overland[a](m)	Total Distance (m)
170	F	7000	318	6/19/06	8/20/08	389	389[c]
141	M	2223	211	5/13/06	5/17/06	194	194
142	F?	2058	216	6/26/06	11/17/06	248	248
160	M	3075	231	4/9/06	5/1/06	1724	2302
190	F	6600	309	5/12/06	6/6/06	916[b]	916

[a]Distances are straight lines between location points
[b]Turtle's overland movements included temporary stopovers at isolated wetlands and sloughs
[c]Distance from release point to location where turtle was found dead two years after the study ended

We located turtles as time and resources allowed. For most locations, turtles were found by homing. However, for some turtles within aquatic habitats, an estimate of the turtle's location was obtained via biangulation of signals.

RESULTS

During the first six months of 2006, when the study was conducted, precipitation was 128.9 mm below average for the period (Georgia Environmental Monitoring Network, http://georgiaweather.net). Nearly all isolated wetlands on the property were completely dry (pers. obs.); although water levels were below normal, Ichawaynochaway Creek and the Flint River maintained flow over the period.

Turtle 170 (female) was captured by hand on Ichawaynochaway Creek on 19 June 2006. After release, it was not located again by telemetry despite repeated attempts to obtain a signal. However, on 20 August 2008 the carapace of this turtle (with the transmitter still attached) was located in a slough adjacent to Ichawaynochaway Creek, approximately 390 m from the initial capture site. Only a few of the scutes remained in place and the turtle had obviously been dead for several months or longer.

Turtle 141 (male) was captured in an upland area adjacent to the creek on 13 May 2006 and released. This individual was first tracked on 17 May 2006 ca. 194 m from its release point. The turtle was in Ichawaynochaway Creek. This was the last time a signal was obtained for this individual despite additional attempts.

Turtle 142 (probable female) was captured on a dirt road on 26 June 2006 and released. On 27 June this individual was located 35 m from its capture point in a mesic hardwood hammock. By 28 June the turtle had traveled 160 m overland to a small, nearly dry, seasonal wetland. The turtle stayed at this location until at least 10 July (tracked four times in the interim). When it was located on 18 July, it had traveled 20 m and was underneath thick vegetation and leaf litter. The turtle stayed in this location until it was found 19 m away on 27 September, <10 m from an inundated portion of the wetland (tracked four times in the interim). When it was next located on 4 October it had moved 14 m. The turtle did not move from this location by the time the transmitter had failed on 17 November. Although the wetland was dry when the turtle arrived, by November, rains had flooded areas adjacent to the turtle.

Turtle 160 (male) was captured at a drift fence as it exited a seasonally inundated wetland on 9 April 2006. The wetland had dried down on 3 April after being inundated from 2 January 2006 through 3 April 2006. After release, the turtle was first located on 20 April in an upland habitat ca. 966 m from its capture point. It traveled ca. 151 m by the next day but was still located in terrestrial uplands. On 22 April the turtle had traveled ca. 600 m to the Flint River. The turtle was tracked three additional times through 1

May and was found within the same general area. After 1 May it was never located again despite additional attempts.

Turtle 190 (gravid female) was captured incidentally on land on 12 May 2006. By the next day it had traveled 131 m and was found within a seasonal wetland. The turtle was tracked again on 15 and 22 May and both new locations were within approximately 10 m of each other and within the wetland. On 9 June the turtle was again found on land, ca. 460 m from its last known location. On 12 June the turtle was located ca. 300 m away in a small slough adjacent to Ichawaynochaway Creek. It was located again on 23 June about 9 m from the previous location and still underwater. It was never located again despite additional attempts.

DISCUSSION

Our data, although limited, document significant overland movements by snapping turtles (at least 1700 m for one individual; Table I). Further, these movements generally lead to more permanent bodies of water (*i.e.* Ichawaynochaway Creek or the Flint River) a behavior potentially related to the dry down of seasonal wetlands on site during a drought. One individual did not appear to attempt to reach either riverine system in the study area and instead moved to a small seasonal wetland that although relatively dry when it arrived, became inundated months later.

Three individuals that undertook overland movements appearing to culminate in either the creek or river were lost shortly after they reached them. We also quickly lost the turtle initially captured within the creek. The detection range on the transmitters varied depending on the habitat; we could generally detect a signal within 0.25-0.5 km of the animal. Unfortunately, we do not know the extent of aquatic movements of the turtles within the creek or river and we suggest that either: 1) transmitter batteries failed after release, 2) our search efforts were insufficient.

Our results cumulatively indicate snapping turtles have considerable dispersal ability and may undergo non-nesting related terrestrial movements more extensive than often suggested for this highly aquatic turtle (3). This apparent inconsistency may be due to regional differences in turtle behavior. The majority of studies of this species have occurred in the northern portion of its range where the activity season is shorter than in the south and aquatic habitats may not be as ephemeral. Indeed, a recent review of the species in Florida indicates they likely exhibit significant overland movements (11).

Also of interest in this study was use of both isolated seasonal wetlands and streams by individual turtles. Many streams in the Dougherty Plain receive groundwater recharge, whereas isolated seasonal wetlands receive water from rainfall. Hence, streamflow is generally less impacted by seasonal dry downs and drought than wetlands. As there are no natural lakes in the region, snapping turtles may depend on both aquatic systems to persist during extreme droughts. Eastern long-necked turtles, (*Chelodina longicollis*) exhibited a similar pattern of behavior: permanent lakes were occupied during droughts although ephemeral wetlands were used after flooding (13). More research is needed to determine the role isolated wetlands play in snapping turtle life history. Of interest is the frequency of movements between the two aquatic habitats in this landscape and the degree to which snapping turtles are associated with each of the two systems, particularly in drought conditions.

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