

Turtles of Bond, Macoupin and Montgomery Counties, Illinois, 2006-2008

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ABSTRACT

During 2006-2008, we used baited hoop nets to sample Bond, Macoupin and Montgomery counties for the presence of aquatic turtles. We had 457 captures of turtles representing five species (*Chelydra serpentina*, *Chrysemys picta*, *Trachemys scripta elegans*, *Sternotherus odoratus* and *Apalone spinifera*) during 122 net-nights of effort at 53 sites. Lentic habitats yielded greater numbers of captures and species than lotic sites. Species encountered during our efforts were the same as those documented by collections from the area more than 50 years ago. This group, comprised of habitat generalists with moderately diverse aquatic resources at their disposal, appears to have done well despite dramatic anthropogenic changes to the landscape.

INTRODUCTION

State law (515 Illinois Compiled Statutes 5/1-150) directs the Illinois Department of Natural Resources to take all measures necessary for conservation of fish and aquatic life. This broad directive is refined by planning processes to identify long-term goals and actions needed to achieve them. The Illinois Comprehensive Wildlife Conservation Plan and Strategy (Illinois Department of Natural Resources 2005) embodies recent planning efforts. It advocates long-term goals of understanding the distribution and abundance of reptile and amphibian populations with confidence and conducting sentinel monitoring to identify conservation needs (Illinois Department of Natural Resources 2005: p. 41). During 2006, our agency received a State Wildlife Grant (T-10-P) to pursue these goals by documenting occurrences of reptiles and amphibians, with an emphasis on aquatic turtles. One of the areas we targeted was south-central Illinois, where records of reptiles and amphibians are considered sparse compared to many parts of the state (Wilson 1999). During 2006-2008, we sampled lentic and lotic habitats for the presence of aquatic turtles in Bond, Macoupin, and Montgomery counties to better understand their distribution, status and relative use of aquatic resources in the area.

STUDY AREA

Bond, Macoupin and Montgomery counties encompass 5,078.5 km² in south-central Illinois. Agriculture is the predominant land use (3,347.5 km²; Illinois Department of Natural Resources 1996). Aquatic habitats include wetlands (84.6 km²) and streams (31.2 km²;

Illinois Department of Natural Resources 1996). Impoundments (47.9 km²), mostly private ponds, are a common feature ($n = 5,405$) in the area (Illinois Department of Natural Resources 2001). Most large lakes (>40 ha) were created by impounding streams to provide municipal water supplies. Shoal and Macoupin creeks, the largest flowing waters in the region, are both tributaries of the Illinois River. Species documented in the study area by museum collections include snapping (*Chelydra serpentina*), painted (*Chrysemys picta*), slider (*Trachemys scripta elegans*), common musk (*Sternotherus odoratus*), and spiny softshell (*Apalone spinifera*) turtles (Phillips et al. 1999).

METHODS

We chose sampling locations (Appendix I) opportunistically based on ease and legality of access because most (>95%) property in the area is privately owned. Hoop nets, made locally by a commercial fisherman, were used to capture turtles in lentic (i.e., lakes, ponds and wetlands) and lotic habitats (i.e., small to mid-sized streams; first to fifth order) during June through August, 2006-2008. Nets were 60.96 cm in diameter and had 3.81-cm-mesh with a single “fingered” throat. We suspended a fresh or fresh-frozen bluegill (*Lepomis macrochirus*) or bass (*Micropterus salmoides*) carcass from the hoop farthest from the throat in a wire mesh container. Baits were replaced daily when we checked devices, recorded the number of each species captured and released turtles unharmed. A representative of each species was photographed at each location the first time it was encountered to serve as a record of occurrence and verify correct identification. We did not mark turtles because we anticipated that we would have too few recaptures for valid estimators of abundance.

RESULTS

We had 457 captures of turtles representing five species during 122 net-nights (2,956 hrs) of effort at 53 sites (Fig. 1). Lentic habitats yielded greater numbers of captures and species (Table 1) than lotic sites (Table 2). We detected slider, snapping, and painted turtles at most ($\geq 70\%$) of the sites we sampled in lentic habitats. In lotic habitats, snapping and spiny softshell turtles were encountered at more sites (57% and 52%, respectively) than other species.

DISCUSSION

Comparison of our findings to those of past studies suggests we encountered all of the species that were present in our study area. It also suggests that the turtle assemblage in this part of the state is unchanged from more than 50 years ago. For example, Cahn (1937) reported four of five species (all except *S. odoratus*) from Macoupin County. Collections from Bond County in 1956 and Macoupin County during 1947 each included slider, painted, snapping, common musk and spiny softshell turtles (<http://ellipse.inhs.uiuc.edu:591/INHSCollections/herpsearch>; accessed 5 Sep 2008). More recently, the same five species were captured during a three-year study at a pond in Jersey County, which borders Macoupin (Reehl et al. 2006).

Readel et al. (2008) sampled 44 ponds in five counties in central and southern Illinois; they captured seven species, two of which (*Pseudemys concinna*, *Graptemys pseu-*

dogeographica) were represented by single specimens. Our study area occurs outside the range of *P. concinna* and lacks habitat suitable for *G. pseudogeographica*, which prefers large rivers and their backwaters (Phillips et al. 1999). Our lentic sites yielded greater detections of slider, painted, snapping and common musk turtles (83%, 70%, 80% and 10% of sites, respectively) than those sampled by Readell et al. (2008; 68%, 45%, 61% and 7%, respectively); the opposite was true for spiny softshells (13% vs. 18%). Given differences in geographic locations, habitats and sampling protocols, we find consistency between these studies (i.e., ranks for detections of species across sites) more remarkable than disparities in actual percentages.

Our sampling protocol was better suited for detecting the presence of species at large spatial scales than at individual sampling locations because we expended a small amount of effort (often 2-4 net-nights) per site. Nevertheless, the maximum number of species we detected at individual sites in lentic habitats ($n = 4$) is best described as “typical” for the region. Dreslik and Phillips (2005) compiled attributes of 19 chelonian communities in the upper Midwest. Species richness varied from 3-10 species, with the simplest assemblages occurring in lacustrine habitats (average species richness = 3.8) and the most diverse in ecotonal areas such as oxbows and sloughs associated with large rivers (Dreslik and Phillips 2005).

Relationships among occupancy, density and habitat correlates are poorly understood for freshwater turtles. Our data were not adequate to investigate these relationships because data were collected in an opportunistic rather than probabilistic manner. However, some of the patterns suggested by our data deserve more scrutiny using appropriate sampling designs. For example, slider and painted turtles, considered two of the most widespread and abundant species in the state, were encountered at a relatively small proportion (26%) of lotic sites. The same was true for surveys on the upper Sangamon and Mackinaw rivers, where slider and painted turtles were encountered rarely if at all (R. Bluett and C. Bartman, Illinois Department of Natural Resources, unpublished data). We speculate that *T. scripta* and *C. picta* were able to use or colonize some stream locations in Bond, Macoupin and Montgomery counties because of their proximity to reservoirs or other habitat modifications that imparted lentic characteristics to lotic sites.

Few studies have documented effects of impoundments on chelonian assemblages. Those that have (e.g., Vandewalle and Christiansen 1996, Reese and Welsh 1998) suggest negative impacts on lotic specialists (Bodie 2001). Examining effects of impoundments on assemblages comprised only of generalists, such as those found in south-central Illinois, would help to place threats from dam construction - and the need for conservation actions like mitigation - in a context that recognizes variable sensitivities of chelonian inhabitants. Efforts to control feral populations of *T. scripta elegans*, considered one of the world's most invasive species (Lowe et al. 2000), might benefit from a better understanding of whether unimpounded small to mid-sized streams serve as barriers or corridors among more favorable habitats in a landscape.

Putative threats to freshwater turtles include habitat loss, exploitation, vehicular traffic and predators (Burke et al. 2000). Types of risks and demographic responses to them vary widely among species and populations of turtles (Burke et al. 2000). As a rule, habitat specialists have fared poorly compared to generalists like slider, painted, spiny softshell

and snapping turtles (Moll and Moll 2004:9). Our findings also suggest that these generalist species remain widely distributed and common in south-central Illinois despite severe anthropogenic changes to the landscape. The status of the common musk turtle is less clear because we lack adequate historical benchmarks and knowledge about the effectiveness of baited hoop nets for their capture.

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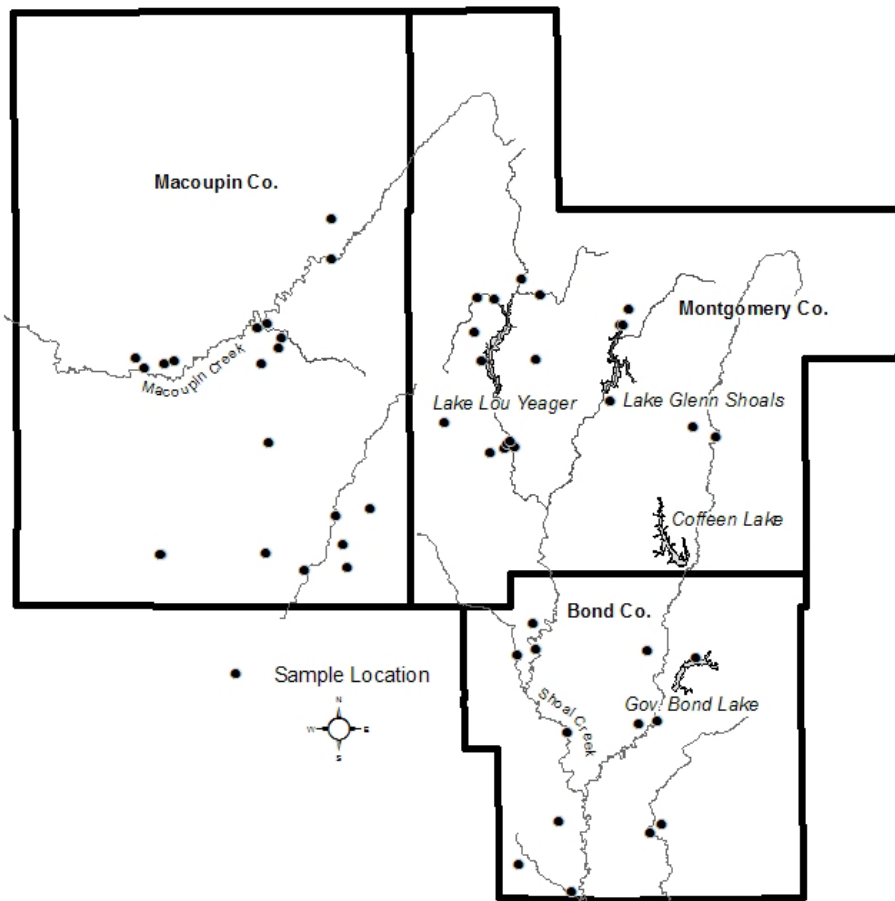
Table 1. Turtles captured in lentic habitats in Bond, Macoupin, and Montgomery counties, Illinois, 2006-2008.

County	No. Sites	Effort (hrs)	No. captures (No. sites where captured)				
			<i>Trachemys scripta</i>	<i>Chrysemys picta</i>	<i>Chelydra serpentina</i>	<i>Apalone spinifera</i>	<i>Sternotherus odoratus</i>
Bond	7	434	41 (5)	36 (5)	5 (4)	2 (1)	1 (1)
Macoupin	13	742	126 (12)	15 (7)	22 (11)	1 (1)	1 (1)
Montgomery	10	604	66 (8)	37 (9)	22 (9)	4 (2)	3 (1)
Total	30	1780	233 (25)	88 (21)	49 (24)	7 (4)	5 (3)

Table 2. Turtles captured in lotic habitats in Bond, Macoupin, and Montgomery counties, Illinois, 2006-2008.

County	No. Sites	Effort (hrs)	No. captures (No. sites where captured)			
			<i>Trachemys scripta</i>	<i>Chrysemys picta</i>	<i>Chelydra serpentina</i>	<i>Apalone spinifera</i>
Bond	6	290	0 (0)	1 (1)	3 (3)	9 (3)
Macoupin	7	369	4 (3)	0 (0)	5 (3)	9 (5)
Montgomery	10	519	10 (3)	15 (5)	8 (7)	11 (4)
Total	23	1176	14 (6)	16 (6)	16 (13)	29 (12)

Figure 1. Sites sampled for the presence of aquatic turtles in Bond, Macoupin, and Montgomery counties, Illinois, 2006-2008.



APPENDIX 1.

Sampling locations, habitat types and captures of freshwater aquatic turtles in Bond, Macoupin and Montgomery counties, Illinois, 2006-2008.

County	Habitat	Latitude/longitude	No. captures				
			<i>Trachemys scripta</i>	<i>Chrysemys picta</i>	<i>Chelydra serpentina</i>	<i>Apalone spinifera</i>	<i>Sternotherus odoratus</i>
Bond	pond	39.9597/-89.4306	0	1	0	0	0
Bond	pond	38.8094/-89.5307	8	1	1	0	0
Bond	lake	38.9538/-89.3743	0	3	0	2	1
Bond	lake	38.8957/-89.4389	8	0	1	0	0
Bond	lake	38.8065/-89.4133	5	0	2	0	0
Bond	lake	38.7718/-89.5748	6	1	1	0	0
Bond	lake	38.9841/-89.5593	14	30	0	0	0
Macoupin	wetland	39.2118/-89.9779	0	2	1	0	0
Macoupin	wetland	39.2353/-89.8454	5	2	0	0	0
Macoupin	lake	39.2470/-89.8623	4	4	1	0	1
Macoupin	lake	39.1426/-89.8593	2	0	1	0	0
Macoupin	pond	39.0436/-89.9809	9	3	1	0	0
Macoupin	lake	39.0844/-89.7441	1	0	1	0	0
Macoupin	pond	39.0457/-89.8629	4	1	1	0	0
Macoupin	lake	39.2162/-90.0116	65	0	5	1	0
Macoupin	pond	39.2266/-89.8480	7	2	1	0	0
Macoupin	lake	39.3392/-89.7886	11	1	4	0	0
Macoupin	lake	39.2124/-89.8675	11	0	1	0	0
Macoupin	lake	39.0527/-89.7754	3	0	0	0	0
Macoupin	lake	39.0323/-89.7700	4	0	5	0	0
Montgomery	lake	39.2153/-89.6182	2	2	2	1	0
Montgomery	lake	39.1800/-89.4715	17	4	3	0	3
Montgomery	pond	39.2159/-89.5571	0	1	4	0	0
Montgomery	pond	39.2465/-89.4600	4	6	1	0	0
Montgomery	pond	39.1567/-89.3786	0	0	1	0	0
Montgomery	pond	39.1377/-89.5921	6	2	0	0	0
Montgomery	pond	39.1416/-89.5880	5	10	2	0	0
Montgomery	wetland	39.1387/-89.5808	5	3	1	0	0
Montgomery	pond	39.2409/-89.6259	11	8	4	0	0

County	Habitat	Latitude/longitude	No. captures				
			<i>Trachemys scripta</i>	<i>Chrysemys picta</i>	<i>Chelydra serpentina</i>	<i>Apalone spinifera</i>	<i>Sternotherus odoratus</i>
Montgomery	lake	39.1606/-89.6600	16	1	4	3	0
Bond	stream	38.7991/-89.4262	0	1	0	0	0
Bond	stream	38.9562/-89.5765	0	0	0	0	0
Bond	stream	38.7483/-89.5155	0	0	1	0	0
Bond	stream	38.8875/-89.5208	0	0	0	2	0
Bond	stream	38.9610/-89.5569	0	0	1	6	0
Bond	stream	38.8984/-89.4195	0	0	1	1	0
Macoupin	stream	39.0307/-89.8179	1	0	0	0	0
Macoupin	stream	39.0789/-89.7826	0	0	1	2	0
Macoupin	stream	39.2440/-89.8733	1	0	0	1	0
Macoupin	stream	39.2143/-89.9672	2	0	3	3	0
Macoupin	stream	39.3042/-89.7886	0	0	1	0	0
Macoupin	stream	39.2078/-90.0014	0	0	0	2	0
Macoupin	stream	39.0429/-89.9827	0	0	0	1	0
Montgomery	stream	39.2701/-89.6232	0	0	1	0	0
Montgomery	stream	39.2696/-89.6040	4	1	1	0	0
Montgomery	stream	39.2730/-89.5518	0	0	1	0	0
Montgomery	stream	39.1345/-89.6088	0	0	1	0	0
Montgomery	stream	39.2466/-89.4575	1	2	0	1	0
Montgomery	stream	39.2612/-89.4516	5	8	0	1	0
Montgomery	stream	39.1387/-89.5808	0	3	1	3	0
Montgomery	stream	39.1446/-89.5848	0	0	1	6	0
Montgomery	stream	39.1486/-89.3522	0	0	0	0	0
Montgomery	stream	39.2868/-89.5735	0	1	2	0	0