STATUS AND DISTRIBUTION OF THE ALLIGATOR SNAPPING TURTLE,
MACROCHELYS TEMMINCKII, IN OKLAHOMA

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ABSTRACT—Although historic records of the alligator snapping turtle, Macrochelys temminckii, show a past distribution throughout eastern Oklahoma, little is known about the current status and distribution of this species in the state. In 1997, surveys were initiated to identify extant populations of M. temminckii and assess their relative densities and viability. We surveyed 67 sites in 15 counties, with a total effort of 1,085 net nights. A total of 63 M. temminckii was captured at 11 sites, which are only in the southeastern quarter of the state and occur only in protected or isolated locations. Because of this apparent decrease of the range of this species in Oklahoma and because so few sites exhibited capture rates high enough to suggest possible healthy populations, we conclude that dramatic population declines of M. temminckii have taken place in Oklahoma. Possible reasons for these declines include overharvest and habitat alteration.

RESUMEN—Aunque los registros históricos de la tortuga Macrochelys temminckii demuestran una distribución anterior en todo el este de Oklahoma, no se sabe mucho del estatus y distribución actual de la especie en el estado. En 1997, se iniciaron muestras para identificar poblaciones actuales de M. temminckii y para evaluar sus abundancias relativas y viabilidad. Muestreamos 67 sitios en 15 condados con un esfuerzo total de 1,085 red-noches. Un total de 63 M. temminckii fue capturado en 11 sitios, que se ubican solamente en el cuarto sureste del estado y se encuentran solamente en localidades protegidas o aisladas. Debido a esta aparente disminución de la distribución de esta especie en Oklahoma y debido a que sólo unos cuantos sitios mostraron tasas de captura tan altas como sugerir poblaciones saludables, concluimos que declives dramáticos de M. temminckii han ocurrido en Oklahoma. Las razones posibles para los declives incluyen la cacería excesiva y la alteración del hábitat.

The alligator snapping turtle, Macrochelys temminckii, is the largest freshwater turtle in North America, with males attaining a carapace length of 80 cm and a live mass of 113 kg (Pritchard, 1989). Adults exhibit sexual dimorphism; females reach a maximum live mass of only 35 kg (Pritchard, 1989). Little information exists on the biology of M. temminckii. Pritchard (1989) and Ernst et al. (1994) suggested that M. temminckii populations have declined throughout its range. Overharvesting and habitat alteration have been listed as the primary causes (Reed et al., 2002). In 1984, the United States Fish and Wildlife Service proposed M. temminckii for listing as a threatened species. However, the request for listing was precluded due to a lack of ecological information about the species. The status of the species was reviewed again in 1991, but no further actions were taken (United States Fish and Wildlife Service, 1991). At the state level, M. temminckii is afforded some protection in all states in which it occurs, except Louisiana (Roman and Bowen, 2000). Macrochelys temminckii currently is listed as a species of special concern in Oklahoma.

Macrochelys temminckii is confined to river systems that drain into the Gulf of Mexico. The
The alligator snapping turtle, *Macrochelys temminckii*, occurs as far north as Kansas and Illinois (Galbreath, 1961; Clarke, 1981) and from the Florida Panhandle to eastern Texas and Oklahoma (Conant and Collins, 1991). Historically, *M. temminckii* occurred throughout the eastern one-third of Oklahoma (Glass, 1949; Webb, 1970; Black, 1982; Carpenter and Krupa, 1989; and Heck, 1999; Fig. 1). Historical accounts of *M. temminckii* are based on single individuals, so information on distribution and demography of *M. temminckii* in Oklahoma is meager. Our objectives were to: 1) identify extant populations of *M. temminckii* in Oklahoma; 2) assess their relative densities and viability; and 3) capture, permanently mark, and release all specimens for subsequent population monitoring.

We sampled sites throughout the eastern one-third of Oklahoma from May through August 1997 to 1999, with supplemental sampling of 2 sites in July 2000. Many of those sites were at or near historic sites of occurrence for the species in Oklahoma. We surveyed a variety of habitats to adequately sample all possible habitats in which *M. temminckii* might occur.

We sampled sites using commercial hoop nets that were 2.1 m in length and constructed of 4 hoops (1.05 m in diameter) covered with 2.5-cm square-mesh net. Nets were set up-stream from submerged structures, such as trees and log jams, and were baited with fresh fish suspended by a piece of twine on the hoop farthest from the opening of the trap. We set nets in the late afternoon or evening and checked them the following morning.

We surveyed 67 sites in 15 counties (Fig. 2). Some sites were surveyed more than once due to the presence of *M. temminckii* or if seemingly good habitat was present. Our total trapping effort was 1,085 net nights (1 net per night = 1 net night). From 1997 to 1999, we made 69 captures of 63 individuals of *M. temminckii* (plus 8 more captures in July 2000 from Sequoyah National Wildlife Refuge) at 11 sites (Table 1; Fig. 3).

*Macrochelys temminckii* was once distributed throughout all the major river systems in eastern Oklahoma but was captured in our study at only 11 of the 67 sites sampled within that historic range. This suggests a dramatic decline in numbers of *M. temminckii* in the state. Currently known populations seem to be restricted to a few remote or protected locations in the southeastern one-quarter of Oklahoma.
FIG. 2—Sites sampled for *Macrochelys temminckii* in Oklahoma between 1997 and 1999. Some points represent more than 1 site due to close proximity of sample sites.

Those populations, only the sites at Eufala Reservoir (Mill Creek and Dutchess Creek) and Sequoyah National Wildlife Refuge (Big Vian Creek, Little Vian Creek, Dirty Creek, Horton Slough, and Hezekiah Creek) yielded capture rates high enough to suggest viable populations (Table 1). *Macrochelys temminckii* seems to have been extirpated from the northeastern one-quarter of the state. The possible reasons for this decline are habitat alteration and degradation and historical incidental and illegal harvest.

There are several forms of habitat alteration that might have a negative effect on *M. temminckii* in Oklahoma. The Verdigris River has been channelized for navigation throughout

**Table 1**—Alligator snapping turtle (*Macrochelys temminckii*) capture rates in Oklahoma by site.

<table>
<thead>
<tr>
<th>Site</th>
<th>County</th>
<th>Number of captures</th>
<th>Net nights</th>
<th>Capture rate (number of turtles per net night)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little River</td>
<td>McCurtain</td>
<td>3</td>
<td>167</td>
<td>0.018</td>
</tr>
<tr>
<td>Kiamichi River*</td>
<td>Pushmataha</td>
<td>2</td>
<td>34</td>
<td>0.059</td>
</tr>
<tr>
<td>Dirty Creek**</td>
<td>Muskogee</td>
<td>7</td>
<td>37</td>
<td>0.120</td>
</tr>
<tr>
<td>Hezekiah Creek**</td>
<td>Sequoyah</td>
<td>3</td>
<td>17</td>
<td>0.180</td>
</tr>
<tr>
<td>Big Vian Creek***</td>
<td>Sequoyah</td>
<td>24</td>
<td>126</td>
<td>0.200</td>
</tr>
<tr>
<td>Little Vian Creek</td>
<td>Sequoyah</td>
<td>26</td>
<td>64</td>
<td>0.410</td>
</tr>
<tr>
<td>Dutchess Creek</td>
<td>McIntosh</td>
<td>4</td>
<td>9</td>
<td>0.444</td>
</tr>
<tr>
<td>Mill Creek</td>
<td>McIntosh</td>
<td>8</td>
<td>13</td>
<td>0.620</td>
</tr>
</tbody>
</table>

* Represents 1 site on the Kiamichi River and 1 site on its tributary, Mill Creek.

** Resampled July 2000, bringing total number of *M. temminckii* captures to 77.

*** Represents 2 sites on Big Vian Creek and 1 site on Horton Slough.
FIG. 3—Distribution of *Macrochelys temminckii* in Oklahoma based on the 1997 to 1999 survey. Some points represent more than 1 site due to close proximity of sample sites.

much of Oklahoma. This manipulation of the river channel turns a low-energy, meandering, aquatic system with high habitat diversity into a higher energy system with low habitat diversity that is vastly different from the habitat preferred by *M. temminckii* (Shipman, 1993; Moll and Moll, 2000).

*Macrochelys temminckii* is exclusively aquatic, except for females during egg laying (Pritchard, 1989). An impoundment, such as a dam or a lock, would block movement of individuals upstream or downstream of the structure. The Arkansas, Caney, Verdigris, and Neosho rivers seem to be the major dispersal pathways for *M. temminckii* throughout the central and northern parts of its range in Oklahoma. The series of locks and dams along the Arkansas, Caney, and Verdigris rivers might be the main impediment to the dispersal of individuals into the northern reaches of Oklahoma rivers and streams.

Thermal alteration of aquatic environments, such as hypolimnetic release of cold water, also might be responsible for the decrease in *M. temminckii* abundance in Oklahoma. The Mountain Fork River in McCurtain County is managed as a coldwater stream for trout fishing. Summer water temperatures taken during the study varied between 17° and 21°C. Little work has been done with the thermal requirements of *M. temminckii*, but Allen and Neill (1950) noted that they refuse food at temperatures <18°C. Based on our observations, the thermal environment in rivers such as the Mountain Fork is suboptimal for *M. temminckii*. A 36.4-kg *M. temminckii* was captured on the Mountain Fork River in 1993 by anglers (Shipman, Fox, and Riedle, pers. obser.), but no individuals were captured on the Mountain Fork during our survey. Heck (1998) reported a decline in the number of *M. temminckii* observed on the Mountain Fork River since the construction of the Broken Bow Dam in 1969; his last *M. temminckii* reported from the Mountain Fork River was from 1995.

Heck (1998) listed several sources of pollution on the Little River that might have contributed to the decline of *M. temminckii* over the last 30 y. Sources include sewage discharge, runoff from chicken farms, wastewater discharge from chicken processing plants, chemical runoff, and soil erosion from commercial
timber harvest. Large amounts of wastewater discharge were noted on the Little River south of Broken Bow, McCurtain County, in 1998. Turtle captures at both the Little River and Mountain Fork River were not only especially low for *M. temminckii*, but for all aquatic turtles native to that area of Oklahoma (Riedle, 2001).

The primary forms of harvest of *M. temminckii* include incidental and illegal capture. Most incidental captures are those on trotlines and limb lines set by fishermen for catfish. Shipman and Riedle (1994) identified unattended limb lines and trotlines as a primary threat to turtles on the Saint Francis River in southeastern Missouri. Shipman et al. (1991) reported a specimen caught on a limb line 32 km north of the Oklahoma border on a tributary of the Verdigris River in Kansas. Heck (1998) listed several accounts of *M. temminckii* captures on limb lines and trotlines in McCurtain County, Oklahoma.

Due to its large adult size, *M. temminckii* has been harvested historically throughout its range as a source of meat for personal and commercial use (Pritchard, 1989). Sloan et al. (1995) reported 17,117 kg live-weight of *M. temminckii* purchased by a single buyer in Louisiana between 1984 and 1986. Turtles were historically taken for this market from Florida, Georgia, Mississippi, Arkansas, Texas, and possibly Oklahoma (Pritchard, 1989). The majority of historical records for Oklahoma (Glass, 1949; Webb, 1970; Black, 1982; Carpenter and Krupa, 1989; Heck, 1998) were based on individuals taken by fishermen, and all were kept by the fishermen themselves or donated to private or public collections. Commercial harvest in Louisiana is still ongoing, even though *M. temminckii* is protected in surrounding states.

Although little information is available on the historical status of *M. temminckii*, it seems that the species has suffered a severe decline in Oklahoma. Current populations occur in areas that are difficult to access and are afforded some protection from harvest. In Missouri, Shipman and Riedle (1994) found that *M. temminckii* was absent or rare from sites that had seemingly suitable habitat but were in close proximity to historic and current turtle meat markets. This also seems to be true in Oklahoma. Due to the many river impoundments in Oklahoma, recruitment upstream and downstream from current populations might be nonexistent. We recommend that the future management of this large aquatic turtle species in Oklahoma include: 1) continued monitoring of the species in the state, 2) continued protection of known populations from incidental and illegal take, and 3) reestablishment of extirpated populations.

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**LITERATURE CITED**


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BLACK-NECKED STILT (HIMANTOPUS MEXICANUS) BREEDING RANGE EXTENSION IN MEXICO

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ABSTRACT—This report documents a breeding range extension of the black-necked stilt (Himantopus mexicanus) in Coahuila, Mexico.

RESUMEN—Se amplía la distribución del área de reproducción del candelero americano (Himantopus mexicanus) en el estado de Coahuila, México.

On 6 May 2002, I found a pair of black-necked stilts (Himantopus mexicanus) nesting at Venustiano Carranza (Don Martin) Reservoir on the Rio Sabinas (27°31′15″N, 100°37′57″W). The nest was on the ground between rocks (Fig. 1). On 6 May, it had 3 eggs, and the next day had 4 eggs. The 4 eggs averaged 42.7 × 31.6 mm. Six other pairs of black-necked stilts also were observed in the immediate area, but I found no other nests. Friedmann et al. (1950) and Urban (1959) did not list this species for Coahuila. The American Ornithologists’ Union (1998) and Howell and Webb (1995) showed the species as a non-breeding visitor in southern Coahuila. Therefore, these observations document a northern extension of the known breeding range in the interior of northern Mexico and begin to fill the gap in