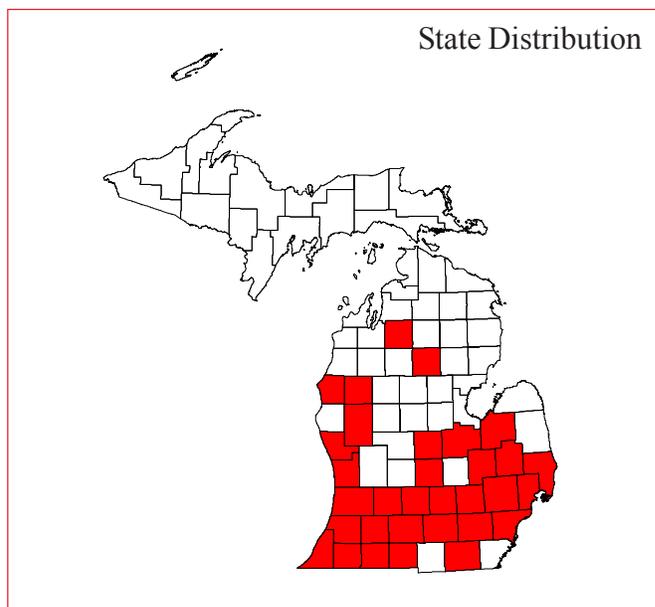
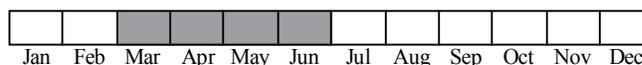


Photo by James H. Harding



Best Survey Period



Status: State threatened

Global and state rank: G5/S2

Family: Emydidae (pond and box turtle family)

Range: Spotted turtles range from northeastern Illinois east through Michigan, northern Indiana, central Ohio, Pennsylvania and New York to southeastern Ontario and southern Maine, and south along the Atlantic coast to northern Florida (Ernst et al. 1994). Isolated populations occur in central Illinois, the western Carolinas, northern Vermont and southeastern Quebec (Harding 1997).

State distribution: Spotted turtles historically have been known from primarily the southern and western portions of Michigan's Lower Peninsula. Today, spotted turtles are uncommon to rare in Michigan, and tend to occur in isolated populations surrounded by unsuitable habitat (Harding 1997). Michigan Natural Features Inventory (2000) has compiled documentation of this species from 32 counties in the state, including isolated populations in north central Michigan in Roscommon County. This species has not been reconfirmed in Kalkaska, Lake, Clinton, Eaton, Ingham, Jackson and Branch counties within the last 20 years (Michigan Natural Features Inventory 2000). However, it is important to note that this species has not been systematically surveyed throughout the state, and may still occur in additional counties as well as those in which it has not been recently confirmed.

Recognition: The spotted turtle is a small turtle with adult carapace (i.e., top shell) lengths ranging from 3.5 to 5.4 inches. This turtle can be easily identified by the **round yellow spots** on its **broad, smooth, black or brownish black carapace**. Spots may fade in older individuals, and some individuals are spotless (Ernst et al. 1994). **The plastron (i.e., bottom shell) is hingeless**, and is usually **yellow or orange with a black blotch along the outer margin of each scute or scale**; in some males or older individuals, the black blotches cover the entire plastron. Their **heads are black** and typically have at least a few **spots on top and one or more irregular yellow or orange blotches on the sides near the eardrum**. Males have tan chins, brown eyes, and concave (i.e., curved inward) plastrons, with the vent or anal opening beyond the edge of the carapace when the tail is fully extended (Harding 1997). Females have yellow chins, orange eyes, broader, higher carapaces, and flat or convex (i.e., curved outward) plastrons, with the vent under the edge of the carapace when the tail is fully extended. Hatchlings average about 1.14 inches in carapace length, and usually have a single spot on each plate of their carapace. The plastron is yellowish orange with a central dark blotch.

Best survey time: The best time to survey for this species is early in the spring during the mating season, from March through May, before the vegetation gets too tall and dense (Conant 1951, Ernst 1976). In parts of its range, spotted turtles also are fairly visible in June during the nesting season when females will leave their drying pools to migrate to nest sites (Ernst 1976). The



best way to survey for this species is to first search suitable habitat from a distance with binoculars or a spotting scope, scanning for individuals swimming in the water or basking in or along the river. This should be followed by slowly walking through the habitat, looking for turtles in the water or basking in the vegetation. Search efforts should concentrate on shallow pools of water or transitional areas from deeper water (Mauger pers. comm.). Optimal weather conditions for observing spotted turtles are sunny or partly sunny days above 60° F (Mauger pers. comm.). Spotted turtles are not very active on overcast or rainy days (Ernst 1976). Some studies have indicated a tendency for more observations during the morning hours from 7 am to 1 pm (Mauger pers. comm.), although this will vary with weather conditions.

Habitat: Spotted turtles require clean, shallow, slow-moving bodies of water with muddy or mucky bottoms and some aquatic and emergent vegetation (Ernst et al. 1994, Harding 1997). Spotted turtles utilize a variety of shallow wetlands including shallow ponds, wet meadows, tamarack swamps, bogs, fens, sedge meadows, wet prairies, shallow cattail marshes, sphagnum seepages, small woodland streams and roadside ditches (Ernst et al. 1994, Harding 1997, Mauger pers. comm.). Although spotted turtles are considered fairly aquatic, they are frequently found on land in parts of its range and during certain times of the year (i.e., during the mating and nesting seasons and during the summer) (Ward et al. 1976). Terrestrial habitats in which spotted turtles are found include open fields and woodlands and along roads.

Biology: Spotted turtles become active in early spring as soon as the ice and snow melt, usually in late March to mid-April. This species appears to tolerate and prefer cooler water and air temperatures than do other related turtles, initiating activity at water temperatures as low as 37°F (Ernst et al. 1994). In early spring, spotted turtles spend a great deal of time basking on logs, muskrat houses, and grass or sedge hummocks. Spotted turtles are generally difficult to find in the summer due to decreased activity levels and dense vegetation. Spotted turtle activity levels generally peak in May, or when mean monthly air temperatures are between 56 and 64°F, and start to decline in June, or when mean monthly air temperatures are between 64 and 72°F (Ernst et al. 1994). They become dormant or aestivate by late June or early July (Ernst 1982). In the spring, spotted turtles are active throughout the day, beginning at sunrise. At night, they burrow into the muddy bottoms of the wetland or crawl into mammal burrows or under vegetation (Ernst et al. 1994). In the summer, individuals are active primarily in the morning, and become dormant in the afternoon. Some individuals aestivate in muskrat burrows or lodges or dig into mud

or submerged root systems, while others leave the water and burrow into soil or leaf litter (Harding 1997). Only nesting females are active in the evening.

Spotted turtles typically enter hibernation in mid-October (Harding 1997). They hibernate in shallow water in the mud or in muskrat burrows or lodges (Ernst et al. 1994). These sites are deep enough to not freeze completely, but are shallow enough to thaw quickly in the spring (Ernst 1982). Spotted turtles have been found to hibernate in congregations of up to 12 individuals (Bloomer 1978).

Spotted turtles reach sexual maturity at about 7 to 10 years of age (Ernst 1970). Mating occurs from March to May, and generally takes place in the water. Nesting usually occurs in the evening in early to mid-June in the Great Lakes region (Harding 1997). Nests are placed in well-drained areas with sandy or loamy soils exposed to full sunlight. Nest sites include grassy tussocks, hummocks of grass, sedge or sphagnum moss, marshy pastures and edges of roads (Hunter et al. 1992, Ernst et al. 1994). Females appear to nest near their core activity or foraging habitat (Mauger pers. comm.). The females dig a 2- to 2.5-inch deep flask-shaped cavity into which two to seven eggs are laid (Harding 1997). The hatchlings emerge in August or September, but may overwinter in the nest.

Spotted turtles have small home ranges of about 1.2 to 8.6 acres, although this may simply be an artifact of the amount of habitat available at many of the sites (Harding 1997). A study in Pennsylvania documented typical daily movements of less than 0.01 mile (65 feet); these mostly consisted of trips from evening retreats to daytime basking or foraging areas (Ernst 1976). Foraging turtles may move up to 0.03 mile. During the mating season, males in search of females may move up to 0.16 mile from water, while nesting females in search of a suitable nest site may travel up to 0.03 mile from water (Ernst 1976). In Maine, individuals readily travelled as much as 0.30 miles overland between wetlands to take advantage of available food sources (Hunter et al. 1992).

The spotted turtle is omnivorous, feeding primarily underwater. Their diet ranges from aquatic vegetation to larval amphibians, slugs, snails, crayfish, insects, worms and carrion (Harding 1997). Spotted turtles and their eggs are preyed upon by bald eagles, raccoons, skunks and muskrats (Ernst et al. 1994, Harding 1997). Wild spotted turtles have lived over 30 years, and can probably live up to 50 years (Hunter et al. 1992, Ernst et al. 1994).

Conservation/management: Similar to other turtle species, spotted turtles are characterized by relatively



late sexual maturity and low reproductive potential. These life history traits suggest that high annual survivorship of adults and juveniles is particularly crucial for maintaining a stable population. Mortality or removal of adults and juveniles at a rate faster than they can be replaced can lead to population declines and potential local extinctions over time. Small, fragmented populations also tend to be highly susceptible to extinction as a result of catastrophic or chance events.

The primary threats to this species are habitat destruction and degradation and illegal collection for the pet trade (Harding 1997). In the last few decades, much of the shallow wetlands preferred by the spotted turtle has been drained or filled and converted to agricultural, residential and commercial land uses (Harding 1997). Many of the remaining populations occupy small, isolated, remnant wetlands (i.e., <10 acres) that continue to be threatened by development and pollution. Spotted turtles are highly valued by reptile hobbyists because of their small size and bright coloration, and collectors have severely reduced or eliminated populations throughout the species' range (Harding 1997). Increased nest predation due to large small mammal predator populations, particularly raccoons, represents a substantial threat to spotted turtles and turtle populations in Michigan in general. Increased urbanization and associated increase in road density and traffic have resulted in higher road mortality of spotted turtles, and have further fragmented their habitat and isolated populations. Vandalistic shooting of spotted turtles also occurs (Harding 1997).

Protection of extant populations and suitable wetland and nesting habitats is crucial for conserving this species. Providing connectivity among populations to allow for genetic exchange also is vital for preserving the long-term viability of this species. Increased protection of small, wetland complexes is important for maintaining sufficient habitat. In general, implementing minimum development setback distances, leaving buffer zones during agricultural and land management operations, maintaining good water quality and hydrologic integrity, minimizing the delivery of pollutants into the wetlands, and minimizing the construction of roads in or near suitable wetlands would be beneficial to this species. Maintaining open upland nesting areas through woody vegetation management also would benefit this species. Altering the timing of land use activities (e.g., working in upland habitat during the winter from November through February when spotted turtles are hibernating in the water) could help minimize the potential for adversely impacting this species. Predator control and on-site protection of nest sites may be warranted in some instances. Stream channelization and water impoundments should be avoided in areas with suitable habitat.

This species has been given various levels of legal protection throughout its range, however, protection needs to be consistent across its range to completely eliminate commercial trade of this species (Harding 1997). In Michigan, the spotted turtle is listed as state threatened and is protected under the state's Endangered Species Act and the Director's Order No. DFI-166.98, Regulations on the Take of Reptiles and Amphibians. It is unlawful to take a spotted turtle from the wild except as authorized under an endangered species permit from the Michigan Department of Natural Resources. "Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or attempt to engage in any such conduct. Public land managers and the general public should be informed that this species is protected, and should not be collected or harmed. Any suspected illegal collection of spotted turtles should be reported to local authorities, conservation officers or wildlife biologists.

Research needs: An assessment of the species' current distribution and status throughout the state is needed. Spotted turtles have been documented from a fairly large number of sites in Michigan, but intensive surveys and monitoring are needed at these sites to determine whether they contain viable populations and to document population structure and trends. Nesting and wintering areas at these sites also need to be identified. Although the general life history and ecology of the spotted turtle are fairly well known, more information specific to spotted turtles in Michigan would be useful (e.g., movement and dispersal distances, home range, habitat use, reproductive success, long-term survivorship, potential carrying capacity). Impacts of various land uses and management activities on spotted turtle populations and habitat should be further investigated. The genetic diversity of extant populations needs to be examined. The impact of illegal collecting on spotted turtles in Michigan needs to be documented and quantified. Finally, effective strategies for ensuring the long-term viability of spotted turtles need to be investigated and developed.

Related abstracts: Prairie fen, mat muhly, prairie dropseed, prairie Indian plantain, small white lady's-slipper, Blanchard's cricket frog, Blanding's turtle, eastern box turtle, eastern massasauga, Kirtland's snakewood turtle, Mitchell's satyr butterfly.

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