

Species Status Assessment

Class:	Reptilia
Family:	Kinosternidae
Scientific Name:	<i>Kinosternon subrubrum subrubrum</i>
Common Name:	Southeastern mud turtle

Species synopsis:

The southeastern mud turtle has the distinct characteristic of a double-hinged plastron, which allows it to protect its head and limbs from potential predators by closing its shell completely; still, its small size makes it susceptible to a number of predators including canids and bald eagles (Gibbs et al. 2007). As a semi-aquatic turtle, it inhabits a variety of wetland habitats including ponds and freshwater and brackish marshes, as well as slow-moving streams with a muddy bottom and emergent aquatic vegetation. Adjacent upland habitats with loamy or sandy soils are important for foraging and wintering (Buhlmann and Gibbons 2001, Ruhe and LaDuke 2011).

Mud turtles occur along the coastal plain of the eastern and southern United States, from New York and Indiana southward to south-central Texas (Ernst and Barbour 1972). New York is at the extreme northernmost edge of the distribution and populations occur only on Long Island, Staten Island, and adjacent small islands. Seven known populations are small, isolated, and—with one exception—declining (NYNHP 2013).

I. Status

a. Current and Legal Protected Status

- i. **Federal** Not Listed **Candidate?** No
- ii. **New York** Endangered; SGCN

b. Natural Heritage Program Rank

- i. **Global** G5
- ii. **New York** S1 **Tracked by NYNHP?** Yes

Other Rank:

IUCN Red List – Least Concern
Species of Moderate Concern (NEPARC 2010)

Status Discussion:

Southeastern mud turtle populations appear to be secure in the southern areas of the distribution but populations at the northern edge—New York and Pennsylvania—are critically imperiled. Mud turtles are listed as endangered in New York, where they exist in only seven wetland complexes on Long Island and nearby islands. The largest and most secure population was estimated to have only 68 individuals in 1996 (Larese-Casanova 1997, Soule 1997). NEPARC (2010) lists mud turtle as a species of moderate concern because more than 25% (but less than 50%) of northeastern states list it as SGCN.

In Pennsylvania, a roadkill individual found in 2008 represented the first state record in 46 years (Ruhe and LaDuke 2011); the species was added to the Pennsylvania state endangered species list in 2012.

II. Abundance and Distribution Trends

a. North America

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Time frame considered: _____

b. Regional

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Regional Unit Considered: Northern edge (NY, PA, NJ)

Time Frame Considered: _____

c. Adjacent States and Provinces

CONNECTICUT Not Present X No data _____
MASSACHUSETTS Not Present X No data _____
ONTARIO Not Present X No data _____
QUEBEC Not Present X No data _____
VERMONT Not Present X No data _____

NEW JERSEY Not Present _____ No data _____

i. Abundance

_____ declining _____ increasing _____ stable X unknown

ii. Distribution:

_____ declining _____ increasing _____ stable X unknown

Time frame considered: _____

Listing Status: Not Listed SGCN? No

PENNSYLVANIA Not Present _____ No data _____

i. Abundance

_____ declining _____ increasing _____ stable X unknown

ii. Distribution:

_____ declining _____ increasing _____ stable X unknown

Time frame considered: Considered extirpated until rediscovery in 2008

Listing Status: Endangered SGCN? No

d. NEW YORK

No data _____

i. Abundance

 X declining ___ increasing ___ stable ___ unknown

ii. Distribution:

 X declining ___ increasing ___ stable ___ unknown

Time frame considered: Since 1984

Monitoring in New York.

There are currently no monitoring activities in New York.

Trends Discussion:

The population in New York has been declining since 1984 and no new populations have been found since 1994 (NY Natural Heritage Program 2013). In 2001, Soule and Lindberg (2008) captured only 2 individuals during surveys at a known site where they had captured 20 individuals in 1989. Long-term data are lacking; one specimen is known from Westchester County in 1884 (NY Natural Heritage Program 2013).

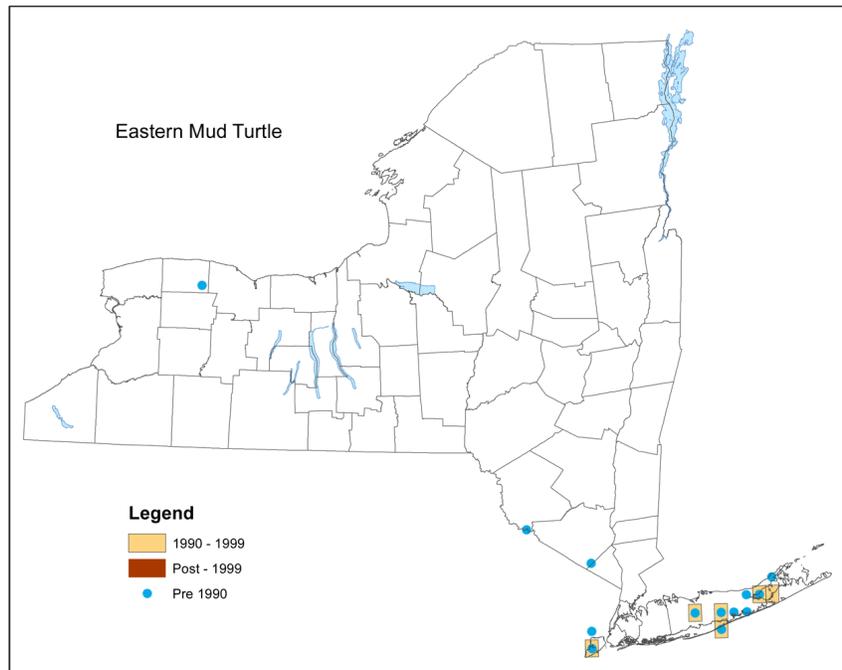


Figure 1: Distribution of southeastern mud turtle in New York (NY Amphibian and Reptile Atlas).

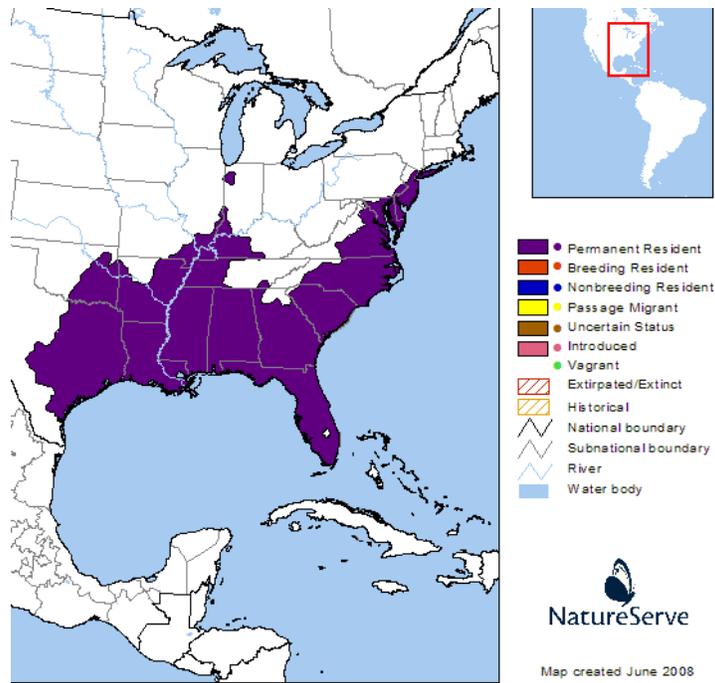


Figure 2: Distribution of southeastern mud turtle in North America (NatureServe 2013).

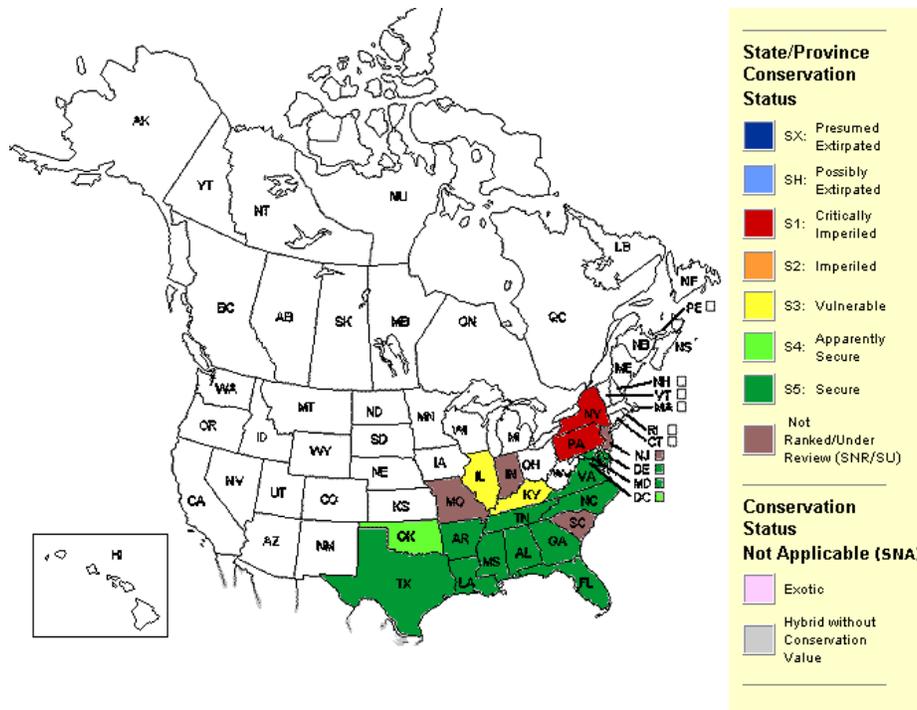


Figure 3: Conservation status of southeastern mud turtle in North America (NatureServe 2013).

III. New York Rarity, if known:

Historic	<u># of Animals</u>	<u># of Locations</u>	<u>% of State</u>
prior to 1970	_____	<u> ?</u>	_____
prior to 1980	_____	_____	_____
prior to 1990	_____	_____	_____

Details of historic occurrence:

A record exists for Westchester County in 1884 (NY Natural Heritage Program 2013). The NY Amphibian and Reptile Atlas has pre-1990 records from Orleans, Sullivan, and Orange counties. Early researchers documented the species on Long Island, Staten Island, and smaller coastal islands.

Current	<u># of Animals</u>	<u># of Locations</u>	<u>% of State</u>
	_____	<u> 7</u>	_____

Details of current occurrence:

Currently, mud turtle populations are known only from Long Island, Staten Island, and two coastal islands. Since 1990, mud turtles have been known from only 7 wetlands in these areas (NY Natural Heritage Program 2010).

New York's Contribution to Species North American Range:

% of NA Range in New York	Classification of New York Range
<u> </u> 100 (endemic)	<u> </u> Core
<u> </u> 76-99	<u> X</u> Peripheral
<u> </u> 51-75	<u> </u> Disjunct
<u> </u> 26-50	Distance to core population:
<u> X</u> 1-25	_____

IV. Primary Habitat or Community Type:

- 1. Pine Barrens
- 2. Freshwater Marsh
- 3. Coastal Plain Pond
- 4. Estuarine, Brackish Intertidal, Tidal Wetland
- 5. Coastal Coniferous Barrens

Habitat or Community Type Trend in New York:

Declining Stable Increasing Unknown

Time frame of decline/increase: Last 30 years

Habitat Specialist? Yes No

Indicator Species? Yes No

Habitat Discussion:

The southeastern mud turtle is a coastal plain species that relies on both aquatic and terrestrial habitats (Harden et al. 2009). Occupied wetland habitats include swamps, freshwater and brackish marshes, and ponds as well as slow-moving rivers with muddy bottoms. Recent research on a newly discovered population in southwestern Pennsylvania documented the extensive use of adjacent uplands (Ruhe and LaDuke 2011). Upland habitats used by mud turtles included meadows, shrublands, thickets, and open forests that had loose loamy or sandy soils that facilitated burrowing and digging. Individuals use upland habitats during late summer and winter, occurring up to 135m from the wetland edge (Buhlmann and Gibbons 2001). In New York, the farthest distance that a mud turtle was found from an occupied wetland is 0.5 mile (Soule 1997). Gibbs et al. (2007) report that use of uplands in New York can be year-round, with mud turtles leaving the wetland in late spring and returning the following year during early spring.

New York's mud turtle populations are found in brackish marshes and ponds that are dominated by giant reed grass (*Phragmites australis*) (Gibbs et al. 2007). Hibernation occurs in a dry hillside with sandy soils, in leaf litter at wetland edges, or underwater in soft mud (Gibbs et al. 2007).

V. New York Species Demographics and Life History

- Breeder in New York**
- Summer Resident**
- Winter Resident**
- Anadromous**
- Non-breeder in New York**
- Summer Resident**
- Winter Resident**
- Catadromous**
- Migratory only**
- Unknown**

Species Demographics and Life History Discussion:

Summarized from Gibbs et al. (2007): In New York, mud turtles emerge from hibernation in April and activity may extend into early October. Nesting occurs during June. The movement of gravid females to nesting areas is triggered by rain events and females may take several days—Burke et al. (1994) documented 9 days—to complete a nesting foray. Females create shallow holes in sandy soil or vegetative debris and deposit 4 to 5 eggs. The sides of muskrat houses and beaver lodges are occasionally used for nesting. Nesting may occur once or twice per year in northern areas but Burke et al. (1998) reports a high nest predation rate, typically greater than 80%. Hatching occurs in the fall, but mud turtle hatchlings commonly overwinter in the nest, emerging during the following spring (Nichols 1947). Sexual maturity is reached when the carapace measures 70-80mm, approximately in 4 to 8 years (Gibbons 1984). Mud turtles are a long-lived species; one individual captured as an adult lived 38 years (Frazer 1991). Based on work in South Carolina, Frazer (1991) reports that the annual survival rate for an adult female is 87.6%. Gibbons (1984) states that there is no evidence that the sex ratio varies from 1:1 for any population.

Eggs and hatchlings may be predated by raccoons, crows, skunks, weasels, opossums and canids. Blue crabs, hognose snakes, fish, snakes, and wading birds may also take hatchlings. Adults are taken by raccoons, canids, and even large raptors (Gibbs et al. 2007).

VI. Threats:

As a species that exists on Long Island and Staten Island, mud turtles are most threatened by loss of habitat due to urban development, and to threats associated with development including road mortality, human-commensal predators, and pollution (NY Natural Heritage Program 2013). Road mortality, which has been documented for mud turtles in New York (Cavanagh and Hassler 1990, NY Natural Heritage Program 2010), can have a significant effect on turtle species that are mobile and terrestrial or semi-terrestrial (Gibbs and Shriver 2002). The use of Belgian block curbing creates an additional hazard by trapping turtles in the roadway (Cavanagh and Hassler 1990). An over-abundance of raccoons, whose populations increase with urbanization, is a threat to mud turtle populations (Soule and Lindberg 2000, Marchand et al. 2002).

NY Natural Heritage Program (2013) cites the following additional threats: invasive non-native plants such as Phragmites and subsequent control methods (Soule and Lindberg 2008); hydrological changes in wetlands (NYSDEC 2005); water pollution from oils, road salt, insecticides, and pesticides (NYSDEC 2005); collection for illegal pet trade (NYSDEC 2005); use of lawn mowers in upland areas traversed by turtles (Cavanagh and Loop 1989); and the predicted rise in sea level from climate change (NY Natural Heritage Program 2010).

Mud turtle was classified as “highly vulnerable” to predicted climate change in an assessment of vulnerability conducted by the New York Natural Heritage Program (Schlesinger et al. 2011).

Are there regulatory mechanisms that protect the species or its habitat in New York?

No **Unknown**

Yes

The southeastern mud turtle is listed as an endangered species in New York and is protected by Environmental Conservation Law (ECL) section 11-0535 and the New York Code of Rules and Regulations (6 NYCRR Part 182). A permit is required for any proposed project that may result in a take of a species listed as Threatened or Endangered, including, but not limited to, actions that may kill or harm individual animals or result in the adverse modification, degradation or destruction of habitat occupied by the listed species.

In 2006, the State of New York adopted legislation (ECL section 11-0107 sub 2) that gave all native frogs, turtles, snakes, lizards and salamanders legal protection as game species and few species are open to harvest. The legislation also outlaws the sale of any native species of herpetofauna regardless of its origin.

The Freshwater Wetlands Act provides protection for wetlands greater than 12.4 acres in size under Article 24 of the NYS Conservation Law. The Army Corps of Engineers has the authority to regulate smaller wetlands in New York State, and the DEC has the authority to regulate smaller wetlands that are of unusual local importance. The Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Conservation Law.

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

The NY Natural Heritage Program (2013) states that all known populations of mud turtle in New York are on protected land, and summarizes the following recommendations for management:

- Control subsidized predators (raccoons and opossums) from May to August (Soule and Lindberg 2008)
- Use controlled burns, mowing, selective vegetation removal to maintain an open canopy every 5 to 10 years or as needed to provide suitable habitat for nesting (Cavanagh and Hassler 1990, Soule and Lindberg 2008). Attempts should be made to locate nests prior to these activities to avoid crushing or scorching eggs/young that overwinter in the nest (Cavanagh and Hassler 1990).
- Leave some cover—particularly young sapling trees—in cleared areas where turtles can burrow for protection from predators. Turtles have been found burrowed at the base of sapling trees during the day (Cavanagh and Loop 1989, Cavanagh and Hassler 1990).
- Leave relatively undisturbed forest habitat in area occupied by mud turtles, as areas with herbaceous vegetation and woody debris are used for overwintering (Harden et al. 2009).
- Use of vehicles in an occupied area during work to control vegetation should be restricted to the late fall and winter (Mitchell et al. 2006).
- Work to control vegetation within 300 feet of occupied wetlands should be done only by hand during any time of the year (Soule 1997).
- Plan carefully for the removal of Phragmites from occupied wetlands, taking into account movement and habitat needs of mud turtles, as well as potential negative impacts. Work could be done over a time frame of several years (Soule 1997, Mitchell et al. 2006, Soule and Lindberg 2008).
- Reduce the speed limit in key areas and post “turtle crossing” signs at roadsides to reduce road mortality (Cavanagh and Hassler 1990, Mitchell et al. 2006).
- Block curbing should be pitched at a 45 degree angle, or should have openings every few feet to avoid trapping turtles. Drainage grates should be altered to restrict turtles from falling through (Cavanagh and Hassler 1990).
- Within a 0.5 mile buffer of any occupied wetland (Soule 1997), additional barriers (e. g., culverts, ditches) should be modified in such a way as to not restrict movement of mud turtles (Cavanagh and Loop 1989, Mitchell et al. 2006).

- Minimize the use of pesticides and fertilizers near occupied wetlands (Cavanagh and Loop 1989, Mitchell et al. 2006).
- Other recommendations include placement of covers over nests, strict garbage regulations that would potentially reduce raccoon populations, and enforcement of laws to keep pets on leashes (Cavanagh and Loop 1989, Mitchell et al. 2006).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for uncommon turtles of wetlands, which includes southeastern mud turtle. Conservation actions following IUCN taxonomy are categorized in the table.

Easement acquisition:

- ___ Secure habitats critical to species survival by acquisition of conservation easements for wetlands and adjacent uplands.

Habitat management:

- ___ Develop and implement mitigation strategies to manage adverse effects of habitat fragmentation.
- ___ Conduct a variety of habitat management activities where needed, including management of vegetation succession, management of invasive species, maintenance of hydrological regimes, curtailment of contaminant inputs, and management of human access, in order to preserve wetland suitability for these uncommon turtles of wetlands.

Habitat research:

- ___ Develop standardized habitat survey protocols, and implement survey protocols at all known and potentially suitable sites, to document the character, quality and extent of occupied habitat.

Modify regulation:

- ___ Modify Freshwater Wetlands Act, in order to protect wetlands smaller than 12.4 acres where they support species of conservation concern, and in order to expand the protected upland buffer beyond the 100-foot limit where necessary.
- ___ Adopt into New York's Environmental Conservation Law provisions which designate stinkpot, southeastern mud turtle, Blanding's turtle, and spotted turtle as protected small game species.

Other action:

- ___ Develop and implement mitigation measures to manage turtle population losses to egg predators and to vehicular roadkill.
- ___ Enhance law enforcement and public education in order to curtail collection/translocation of turtle specimens.
- ___ Determine significance of specific threats to populations of species in this group, and formulate management options to control significant threats.

Population enhancement:

- ___ Employ restoration techniques for bog turtle, Blanding's turtle and mud turtle at selected sites as needed, including captive breeding, headstarting, nest protection, and repatriation/relocation strategies.

Population monitoring:

- ___ Conduct periodic re-survey of known sites of species occurrence, in order to detect population trends.

Statewide baseline survey:

- ___ Develop standardized population survey protocols, and implement survey protocols at all known and potentially suitable sites, to document the extent of occupied habitat.

Conservation Actions	
Action Category	Action
Land/Water Management	Site/Area Management
Land/Water Management	Habitat and Natural Process Restoration
Land/Water Management	Invasive/Problematic Species Control
Species Management	Species Recovery
Education & Awareness	Awareness & Communications
Law/Policy	Legislation
Law/Policy	Compliance & Enforcement

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