

## Species Status Assessment

**Class:** Amphibia  
**Family:** Ambystomatidae  
**Scientific Name:** *Ambystoma tigrinum tigrinum*  
**Common Name:** Eastern tiger salamander

### Species synopsis:

As many as eight subspecies of tiger salamander are recognized by some scientists (Petranka 1998). The eastern tiger salamander (*A. t. tigrinum*), is a coastal plain lineage that occurs in the Atlantic Coast states and reaches its northern extent in New York, where it is listed as an Endangered species. New York's population is restricted to Long Island, where it is found in upland forest areas with sandy soils and ponds for breeding. The population is isolated, with the closest population occurring in northern New Jersey.

Among the 124 historically documented breeding locations on Long Island, surveyors have failed to find tiger salamanders during recent surveys at over a third, another third have viability rankings of fair or poor, and just 13% are considered to support populations with excellent or good viability. The statewide population has been steadily declining since 1980; a variety of management actions have been unsuccessful (NYNHP 2011). Populations are also declining rangewide (Lannoo 2005).

### 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 S1S2 Tracked by NYNHP? Yes

### Other Rank:

IUCN – Least Concern

Species of Severe Concern (NEPARC 2010)

Species of Northeast Regional Conservation Concern (Therres 1999)

**Status Discussion:**

The tiger salamander is listed as endangered in New York due to declining population trends, threats from development, and its isolated position in the range. In adjacent states and provinces populations have been extirpated (Ontario and Pennsylvania), or are state-listed (endangered in New Jersey). It has been designated as a species of Regional Conservation Concern in the Northeast due to its unknown population status and taxonomic uncertainty (Therres 1999). NEPARC (2010) lists eastern tiger salamander as a Species of Severe Concern because more than 75% of states list it as SGCN.

**II. Abundance and Distribution Trends**

**a. North America**

**i. Abundance**

declining     increasing     stable     unknown

**ii. Distribution:**

declining     increasing     stable     unknown

**Time frame considered:**     Past 30 years    

**b. Regional (e.g., Atlantic Flyway, USFWS Region 5 – Northeast, Watershed, Hydrologic Unit)**

**i. Abundance**

declining     increasing     stable     unknown

**ii. Distribution:**

declining     increasing     stable     unknown

**Regional Unit Considered:**     Northeast    

**Time Frame Considered:**     Last 20 years

**c. Adjacent States and Provinces**

**CONNECTICUT**                      Not Present   X                        No data \_\_\_\_\_

**MASSACHUSETTS**                      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**

  X   declining    \_\_\_ increasing                      \_\_\_ stable                      \_\_\_ unknown

**ii. Distribution:**

  X   declining    \_\_\_ increasing                      \_\_\_ stable                      \_\_\_ unknown

Time frame considered:   "Stability varies by site" over last 20 years  

Listing Status: \_\_\_\_\_ Endangered \_\_\_\_\_ SGCN?   No  

**ONTARIO**                              Not Present   X                        No data \_\_\_\_\_

**i. Abundance**

\_\_\_ declining    \_\_\_ increasing                      \_\_\_ stable                      \_\_\_ unknown

**ii. Distribution:**

\_\_\_ declining    \_\_\_ increasing                      \_\_\_ stable                      \_\_\_ unknown

Time frame considered: \_\_\_\_\_

Listing Status: \_\_\_\_\_ Extirpated (last record in 1950) \_\_\_\_\_

**PENNSYLVANIA**                      **Not Present**   X                        **No data** \_\_\_\_\_

**i. Abundance**

\_\_\_\_ declining    \_\_\_\_ increasing            \_\_\_\_ stable            \_\_\_\_ unknown

**ii. Distribution:**

\_\_\_\_ declining    \_\_\_\_ increasing            \_\_\_\_ stable            \_\_\_\_ unknown

Time frame considered:   Extirpated in early 1900s  

Listing Status:                   Not Listed                      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 1980s  

**Monitoring in New York.**

No regular surveys are conducted for tiger salamanders. In 2013, NYSDEC plans to survey at least half of 117 known historically-occupied breeding ponds and about 30 potential sites.

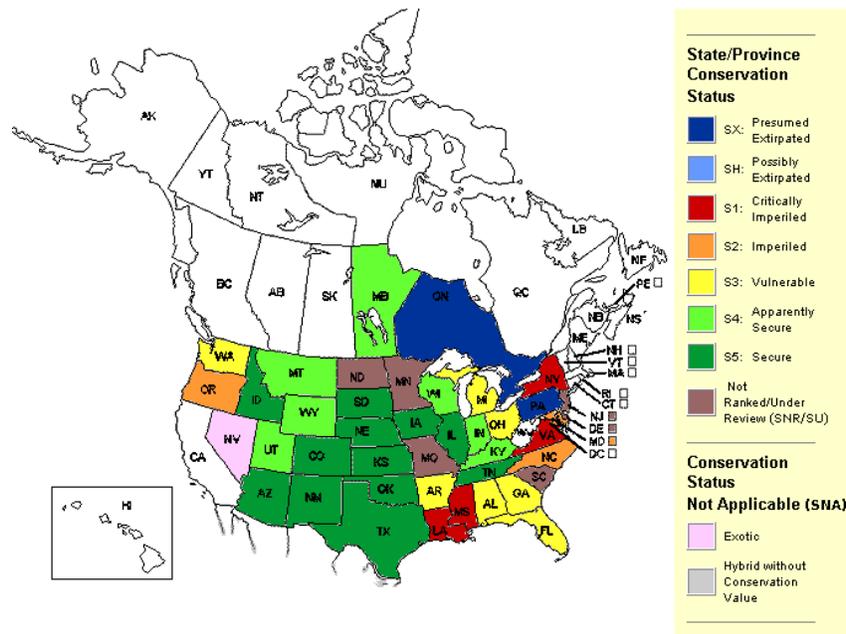
The NY Amphibian and Reptile Atlas (Herp Atlas) was conducted in 1990-99. The Herp Atlas database also includes historic records from prior to 1990; these records are primarily a compilation of museum records and researchers' field notes.

## Trends Discussion:

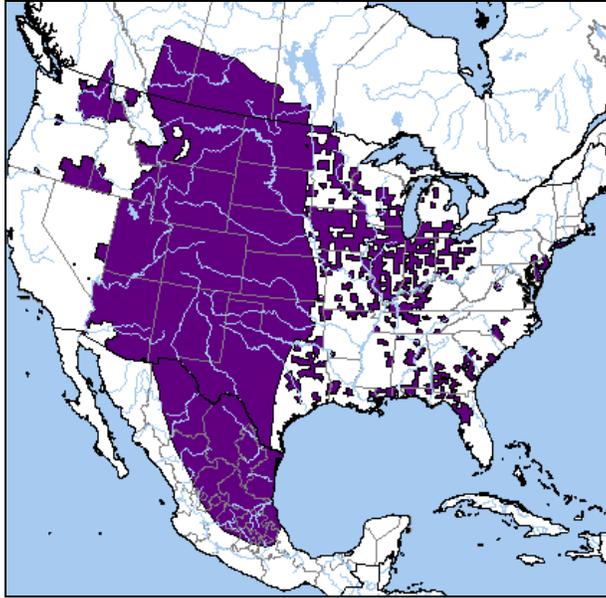
In New York, tiger salamanders currently occur only on Long Island, primarily in Suffolk County. Stewart and Rossi (1981) stated that tiger salamanders likely occurred historically in the Albany Pine Bush (Albany County) but they did not locate any during their surveys.

From NYNHP (2011): Among the 124 documented breeding locations on Long Island, surveyors have failed to find tiger salamanders during recent surveys at over a third of the locations, another third have viability rankings of fair or poor, and just 13% are considered to support populations with excellent or good viability. Populations in the heavily developed areas of western Long Island have been extirpated.

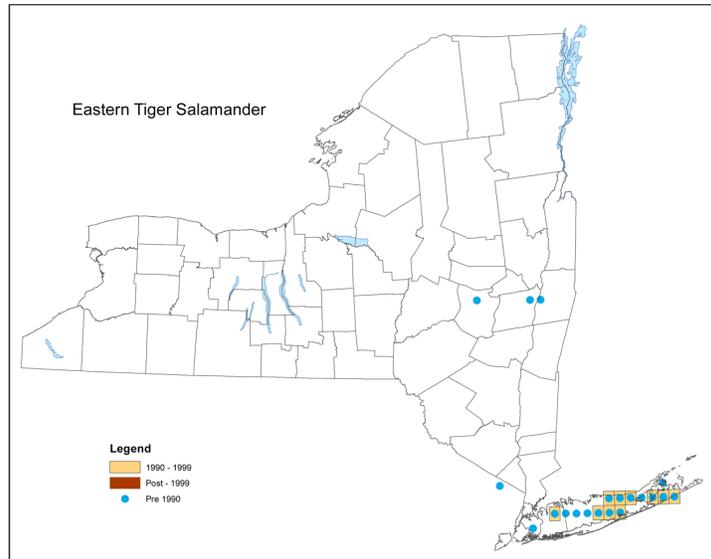
A native population of tiger salamander never occurred in Connecticut, but an introduced population that existed historically near New Haven is no longer present (Klemens 1993).



**Figure 1:** Conservation status of tiger salamander in North America (NatureServe 2013).



**Figure 2:** The broad purple band generally represents western tiger salamander (*A. mavortium*) and scattered populations to the east are eastern tiger salamander (*A. tigrinum*) (NatureServe 2012). Data developed as part of the Global Amphibian Assessment and provided by IUCN-World Conservation Union, Conservation International and NatureServe.



**Figure 3:** Distribution of tiger salamander in New York (NYS Amphibian and Reptile Atlas).

**III. New York Rarity, if known:**

<b>Historic</b> (select one)	<b><u># of Animals</u></b>	<b><u># of Locations</u></b>	<b><u>% of State</u></b>
<b>prior to 1970</b>	_____	_____	_____
<b>prior to 1980</b>	_____	_____	_____
<b>prior to 1990</b>	_____	_____	_____

**Details of historic occurrence:**

From NYNHP (2011): Tiger salamanders occurred historically in a few isolated populations in the Hudson River Valley in Albany and Rockland counties (Bishop 1941, Stewart and Rossi 1981), as well as most of Long Island including Nassau, Queens, Brooklyn, and Staten Island (Bishop 1941). Two historic observations of tiger salamanders that were reported from Onondaga County have not been confirmed, and these salamanders were most likely misidentified (Schlauch 1981).

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

**Details of current occurrence:**

Tiger salamanders occur only on Long Island, primarily in Suffolk County. The stronghold is currently in the central sections of the Pine Barrens, which stretch from Lake Ronkonkoma to Riverhead in the town of Brookhaven (Cryan 1984, Kling 2001) with a small group of populations in the town of Southampton on the South Fork (NYNHP 2011). Surveys have not been conducted regularly in the past several years. In 2011, biologists from the NY Natural Heritage Program surveyed 15 locations in Suffolk County and 1 in Nassau County. Tiger salamanders were found at three locations. Surveys are being conducted during the 2013 field season.

**New York's Contribution to Species North American Range:**

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

**Rarity Discussion:**

The population in New York is part of a coastal plain population that is thought to have been distinct from other *A. tigrinum* subspecies for the last 400,000 to 1 million years (Church et al. 2003). Tiger salamanders in New York are restricted to eastern Long Island, where they are at least 150 miles from the nearest population in New Jersey. The largest population in New York is in Suffolk County.

**IV. Primary Habitat or Community Type:**

- 1. Oak-Pine Forest
- 2. Pine Barrens
- 3. Coastal Plain Pond
- 4. Vernal Pool
- 5. Water Recharge Basin
- 6. Farm Pond/Artificial Pond

**Habitat or Community Type Trend in New York:**

X  Declining      \_\_\_ Stable      \_\_\_ Increasing      \_\_\_ Unknown

Time frame of decline/increase:  Last several decades

Habitat Specialist?                      \_\_\_ Yes       X  No

Indicator Species?                       X  Yes      \_\_\_ No

**Habitat Discussion:**

Tiger salamanders require both upland and wetland habitats with fish-free ponds for breeding. Loamy sand and sandy loam soil types allow the salamanders to burrow underground where they spend most of the time. In New York, tiger salamanders occur in pine barrens habitats with seasonal or permanent ponds; kettle holes ponds are frequently used. Deciduous (red maple and oak spp.) and mixed pine-deciduous (pitch pine-oak spp.) forests with a blueberry understory are preferred, as are ponds that have at least some surrounding forest but that are open to sunlight (Gibbs et al. 2007, Madison and Titus 2009). Individuals will use cover-boards for hiding (Kling 2001).

As natural woodland breeding ponds on Long Island have been destroyed by development,

dumping, and pollution, man-made habitats including farm ponds and stormwater retention basins (including those within clover-leaf highway exit ramps) have come to serve as breeding sites for the tiger salamanders. Tiger salamanders will use man-made breeding pools. In New Jersey, a population was successfully established when egg masses were moved to a created pond that had been excavated on state land specifically for tiger salamanders (NJ SWAP).

**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): Tiger salamanders spend about 97% of the time underground, emerging to breed and only rarely outside that time. They occupy a small home range of 3 to 10 square meters. Breeding occurs very early in spring, as soon as pond edges are free of ice. Males and females enter ponds, where mating occurs; males can be aggressive in their determination to mate with a female. Fertilized eggs are attached to submerged sticks and plants in loose masses of 20 to 100 eggs. Hatching occurs in 3 to 6 weeks and larvae metamorphose by late summer of the same year. Predators on larvae and adults include birds, snakes, fish, and small mammals.

## VI. Threats:

Summarized from NYNHP (2011): The loss and degradation of upland and wetland habitats is the most significant threat to tiger salamanders. Populations on Long Island have been subjected to intense development of commercial structures, housing, and roads. They suffer high levels of road mortality during migration from upland areas to breeding ponds. As a result of development, remaining breeding ponds experience water quality reductions due to factors such as contamination, hydrological changes, introduction of predatory fish, introduction of pathogens, spread of invasive plants, and ATV use. Road curbing and window wells can obstruct salamander dispersal. Drying of breeding ponds may result in total reproductive failure in some years (Semlitsch 1983). Tiger salamanders may incur heavy egg predation by eastern newt in some areas.

Ranavirus affects tiger salamanders and has caused mass deaths in North Dakota, Utah, and Saskatchewan (Daszak et al. 1999). The chytrid fungus, *Batrachochytrium dendrobatidis* (Bd), first described in 1998 (Longcore et al. 1999), is a fungal pathogen that has affected more than 200 amphibian species in 6 countries (Skerratt et al. 2007). Tiger salamanders are known to be susceptible to Bd (Davidson et al. 2003).

Tiger salamander was classified as “extremely 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 tiger salamander 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 no salamander 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:**

NYSDEC (2010) provides recommendations and requirements for projects within 1,000 feet of known tiger salamander breeding sites. Specifically, 100% of the existing uplands within 535 feet of the breeding pool and 50% of the uplands within 1,000 feet of the breeding pool must be maintained. Additional requirements include the following: installation of culverts to allow safe road crossings; restrictive curbing around created pool and window wells; lighting must face away from breeding pools; the breeding pool must not be used as a catch basin for drainage; certain larvicides (for mosquito control) must not be used; predatory fish must not be introduced; upland habitat must be managed to restrict recreational use.

Corser (2010) notes that a variety of management actions that have been implemented at tiger salamander ponds on Long Island over the past 25+ years have been unsuccessful at stopping or slowing the precipitous decline of the statewide population, including those sites on federal jurisdictions. Management actions have included transplanting egg masses, establishing roadway crossings, creating artificial ponds, creating salamander preserves, conducting radio-telemetry studies, designating Class 1 wetlands, and establishing buffer zones (Levy 2001, NYSDEC 2010).

Corser (2010) recommends conducting a retrospective power analysis to determine the magnitude of decline in abundance suffered by this population since monitoring began.

Conservation actions following IUCN taxonomy are categorized in the table below.

<b>Conservation Actions</b>	
<b>Action Category</b>	<b>Action</b>
Land/Water Protection	Resource & Habitat Protection
Land/Water Management	Site/Area Management
Land/Water Management	Habitat and Natural Process Restoration
Land/Water Management	Invasive/Problematic Species Control
Law/Policy	Legislation

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for vernal pool salamanders, which includes tiger salamander.

**Easement acquisition:**

\_\_\_ Secure wetland and adjacent upland habitats critical to species survival by acquisition of conservation easements, or by other land protection mechanisms.

**Habitat management:**

\_\_\_ Develop and implement measures to manage reductions of wetland habitat quality caused by invasive plants, by offroad vehicles, and by introductions of fish and other predatory species.

**Habitat research:**

\_\_\_ Enable research to further document extent of upland habitat required by vernal pond breeding salamanders.

\_\_\_ 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.

**Life history research:**

\_\_\_ Document life history parameters specific to New York populations of the species, including age and sex ratios, longevity, age at sexual maturity, survivorship of young, predator-prey relationships, and wetland/upland habitat requirements.

**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 tiger salamander, marbled salamander, Jefferson salamander and blue-spotted salamander as protected small game species.

**Other action:**

\_\_\_ 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 tiger salamanders at selected sites as needed, including head starting, 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.

\_\_\_ Develop standardized population survey protocols, and implement survey protocols at all known and potentially suitable sites, to document the statewide distribution of species in this group.

## VII. References

Bishop, S. C. 1941. The salamanders of New York. New York State Museum Bulletin 324:1-365.

Church, S. A., J. M. Kraus, J. C. Mitchell, D. R. Church, and D. R. Taylor. 2003. Evidence for multiple Pleistocene refugia in the postglacial expansion of the eastern tiger salamander, *Ambystoma tigrinum tigrinum*. Evolution 57:372-383.

Corser, J. D. 2010. Eastern tiger salamander (*Ambystoma tigrinum tigrinum*). In: A. Chaloux, J. W. Jaycox, J. D. Corser, M. D. Schlesinger, H. Y. Shaw, E. M. Spencer. Surveying for New York's high-priority reptiles and amphibians.

Cryan, J. F. 1984. The status of the eastern tiger salamander (*Ambystoma tigrinum tigrinum*) on Long Island, New York. Unpublished report to New York State Department of Environmental Conservation, Endangered Species Unit.

Daszak, P., L. Berger, A. A. Cunningham, A. D. Hyatt, D. E. Green, R. Speare. 1999. Emerging infectious diseases and amphibian population declines. *Emerging Infectious Diseases* 5(6): 735–748.

Davidson, E.W., M. Parris, J.P. Collins, J.E. Longcore, A.P. Pessier, J. Brunner, and S.J. Beaupre. 2003. Pathogenicity and transmission of chytridiomycosis in tiger salamanders (*Ambystoma tigrinum*). *Copeia* 2003:601-07.

Gibbs, J.P., A.R. Breisch, P.K. Ducey, G. Johnson, J.L. Behler, and R.C. Bothner. 2007. The amphibians and reptiles of New York State. Oxford University Press, NY.

Kling, H. M. 2001. Emergent tiger salamander (*Ambystoma tigrinum tigrinum*) use of cover-boards at Brookhaven National Laboratory. Brookhaven National Laboratory, Upton, NY. U.S. Department of Energy-Office of Science, Energy Research Undergraduate Lab.

Lannoo, M. (editor). 2005. Amphibian declines: the conservation status of United States species. University of California Press, Berkeley. xxi + 1094 pp.

Levy, J. R. 2001. Analysis of the Long Island habitat of the eastern tiger salamander (*Ambystoma tigrinum*) using a geographic information system. M.S. Thesis, University at Albany, State University of New York, Albany, NY.

Madison, D. and V. R. Titus. 2009. Final report for New York State Department of Environmental Conservation: Tiger salamander upland habitat requirements. Project MOU # AM 05513.

NatureServe. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: April 1, 2013).

NEPARC. 2010. Northeast Amphibian and Reptile Species of Regional Responsibility and Conservation Concern. Northeast Partners in Amphibian and Reptile Conservation (NEPARC). Publication 2010-1.

NYNHP (New York Natural Heritage Program). 2011. Online Conservation Guide for *Ambystoma tigrinum*. Available from: <http://www.acris.nynhp.org/guide.php?id=6689>. Accessed December 12th, 2012.

NYSDEC (New York State Department of Environmental Conservation). 2010. Guidance for land cover set aside for conservation of the eastern tiger salamander. October 26, 2010.

Schlauch, F.C. 1981. Report on the status of the eastern tiger salamander, *Ambystoma tigrinum tigrinum*, in the state of New York. Report to Endangered Species Unit, New York State Department of Environmental Conservation. Delmar, NY. 55 pp.

Schlesinger, M.D., J.D. Corser, K.A. Perkins, and E.L. White. 2011. Vulnerability of at-risk species to climate change in New York. New York Natural Heritage Program, Albany, NY.

Semlitsch, R. D. 1983. Structure and dynamics of two breeding populations of the eastern tiger salamander, *Ambystoma tigrinum*. *Copeia* 1983:608-616.

Semlitsch, R. D. 1998. Biological delineation of terrestrial buffer zones for pond breeding salamanders. *Conservation Biology* 12:1113-1119.

Shaffer, H. B. and M. L. McKnight. 1996. The polytypic species revisited: Genetic differentiation and molecular phylogenetics of the tiger salamander, *Ambystoma tigrinum* (Amphibia: Caudata) complex. *Evolution* 50:417-433.

Stewart, M.M. and J. Rossi. 1981. The Albany Pine Bush: A northern outpost for southern species of amphibians and reptiles in New York. *The American Midland Naturalist* 106:282-292.

Therres, G.D. 1999. Wildlife species of regional conservation concern in the Northeastern United States. *Northeast Wildlife* 54:93-100.

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