

Species Status Assessment

Class: Amphibia
Family: Plethodontidae
Scientific Name: *Hemidactylium scutatum*
Common Name: Four-toed salamander

Species synopsis:

Four-toed salamanders occur patchily in most of the eastern United States and northward into southern Canada (Conant and Collins 1991). They are found in moist forests with adjacent wetlands that contain sphagnum hummocks over open water, a vital component for nesting. Such areas include bogs, swamps, fens, wet meadows, vernal pools, and the edges of lakes and ponds. Though four-toed salamanders can be difficult to find, 18 new county records across the range were added during the period 1995-2000 (NatureServe 2012) and populations rangewide appear to be stable. In 2006, four-toed salamander was removed from the list of Special Concern species in Massachusetts because it was found to be more abundant than previously thought. In New York four-toed salamanders occur patchily across the state. They are difficult to find in many areas and locally abundant in only a few (Gibbs et al. 2007), but Klemens (1993) noted the discovery of ten new populations in New York as a result of species-specific surveys.

I. Status

a. Current and Legal Protected Status

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

b. Natural Heritage Program Rank

- i. **Global** G5
- ii. **New York** S5 **Tracked by NYNHP?** No

Other Rank:

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

Status Discussion:

Four-toed salamanders are more abundant than available records indicate, as they are relatively difficult to find without focused surveys (NatureServe 2012). NEPARC (2010) lists four-toed salamander as a Species of Moderate Concern because fewer than 50% of northeastern 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 10 years

b. Regional

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Regional Unit Considered: Northeast

Time Frame Considered: Past 10 years

c. Adjacent States and Provinces

CONNECTICUT **Not Present** _____ **No data** _____

i. Abundance

____ declining ____ increasing X stable ____ unknown

ii. Distribution:

____ declining ____ increasing X stable ____ unknown

Time frame considered: last 20 years

Listing Status: Not Listed SGCN? Yes

MASSACHUSETTS **Not Present** _____ **No data** _____

i. Abundance

____ declining ____ increasing X stable ____ unknown

ii. Distribution:

____ declining ____ increasing X stable ____ unknown

Time frame considered: _____

Listing Status: Not Listed (formerly Special Concern SGCN? Yes

NEW JERSEY **Not Present** _____ **No data** _____

i. Abundance

____ declining ____ increasing X stable ____ unknown

ii. Distribution:

____ declining ____ increasing X stable ____ unknown

Time frame considered: Not Specified

Listing Status: Not Listed SGCN? No

VERMONT **Not Present** _____ **No data** _____

i. Abundance

___ **declining** ___ **increasing** ___ **stable** ___ **X unknown**

ii. Distribution:

___ **declining** ___ **increasing** ___ **stable** ___ **X unknown**

Time frame considered: Not Specified

Listing Status: Special Concern SGCN? Yes

d. NEW YORK

No data _____

i. Abundance

___ **declining** ___ **increasing** ___ **stable** ___ **X unknown**

ii. Distribution:

___ **declining** ___ **increasing** ___ **stable** ___ **X unknown**

Time frame considered: _____

Monitoring in New York.

There are currently no regular monitoring activities in New York. 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:

Rangewide, the short-term trend is relatively stable; the long-term trend is described as, "Likely stable in extent of occurrence, probably less than 25% decline in population size, area of occurrence, and number/condition of occurrences, but data are scant" (NatureServe 2012).

Early concern was expressed by Wright (1918), who stated that four-toed salamanders were vanishing in New York due to draining of wetlands. There is no trend information for this species in New York, but populations are likely to be reduced from 100 years ago as a result of habitat loss. Klemens (1993) called the population in southern New England (his survey area included southern NY) secure and noted that it was flourishing in many moderately developed and semi-rural areas.

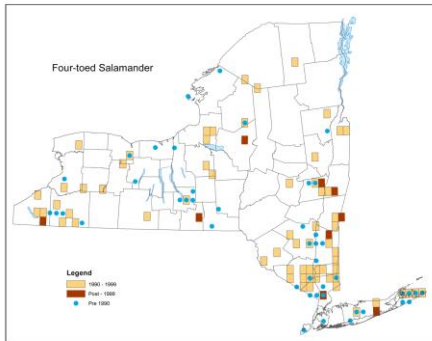


Figure 1: Distribution of four-toed salamander in New York (NY Herpetology database)

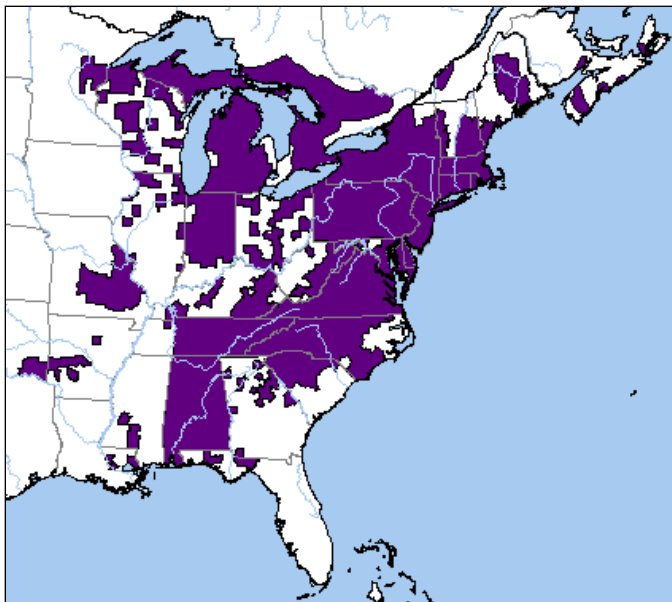


Figure 2: Distribution of four-toed salamander in North America (NatureServe 2012). Data developed as part of the Global Amphibian Assessment and provided by IUCN-World Conservation Union, Conservation International and NatureServe.

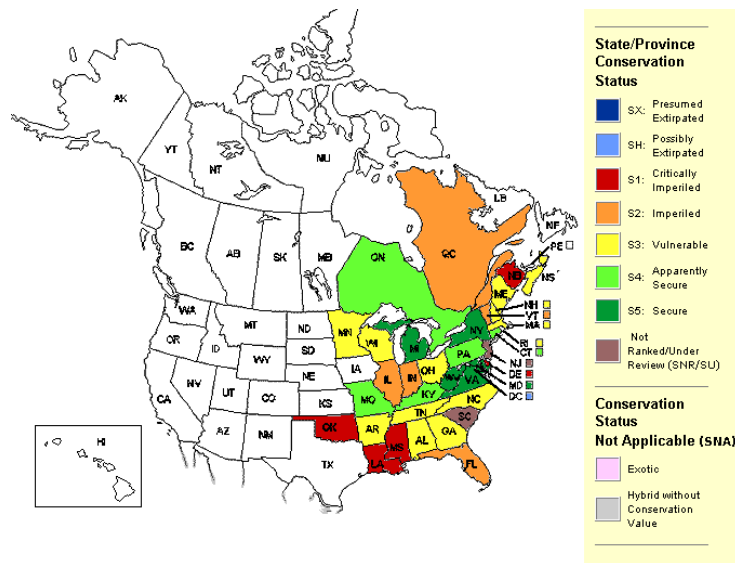


Figure 3: Conservation status of four-toed salamander in North America (NatureServe 2012).

III. New York Rarity, if known:

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

Details of historic occurrence:

Current	<u># of Animals</u>	<u># of Locations % of State</u>	
	_____	_____	_____7%_____

Details of current occurrence:

The NYS Amphibian and Reptile Atlas (1990-99) documented four-toed salamanders in 64 out of 979 survey quadrangles statewide. Since 2000, records were added to the NY Herpetology database in an additional 9 survey quads.

New York's Contribution to Species North American Range:

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

Rarity Discussion:

Hundreds of occurrences have been documented and new locations have recently been added. From 1995 to 2000, 18 new county records were reported in Herpetological Review (NatureServe 2012). The species is more abundant than available records indicate; four-toed salamanders are relatively difficult to find.

IV. Primary Habitat or Community Type:

- 1. Mixed Northern Hardwoods
- 2. Hardwood Swamp
- 3. Floodplain Forests
- 4. Riparian
- 5. Mixed Hardwood Swamp
- 6. Vernal Pool
- 7. Open Acidic Peatlands

Habitat or Community Type Trend in New York:

Declining Stable Increasing Unknown

Time frame of decline/increase: wetland loss since 1970s

Habitat Specialist? Yes No

Indicator Species? Yes No

Habitat Discussion:

Four-toed salamanders occur in moist forest habitats of a wide variety as long as they include small ponds, seeps, bogs, or swamps. Eggs are laid in mossy areas that just overhang water, a microhabitat that may be limited even in relatively large wetlands. Vegetative moisture level appears to be more critical than the species of moss that are present.

Chalmers (2004) observed that four-toed salamanders in Maine were typically found nesting in marshes with a history of beaver activity or in wetlands with a forested canopy and some input from groundwater (e.g., seeps or slow-moving, seasonal streams). Other wetlands with nesting

four-toed salamanders included large, beaver-dammed ponds with fish; natural and human-constructed, isolated vernal pools; and fens.

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): Four-toed salamander is in the lungless salamander family (Plethodontidae) and absorbs oxygen through its moist skin. Individuals reach sexual maturity at three years of age. Mating and courtship takes place in terrestrial habitats during the fall and hibernation takes place in terrestrial habitats as well. Adults have been found up to 660 feet away from the nearest wetland. Females do not breed every year, likely because of limitations on food resources (Harris and Ludwig 2004). Four-toed salamanders spend the winter beneath rotting logs or leaf litter, or in the spaces between rotting tree roots, frequently together with wood frogs, spring peepers, eastern newts, or other salamanders. Emergence occurs in late March to early May.

Upon emergence, gravid female four-toed salamanders migrate to aquatic habitats, where they lay eggs in a nest of mosses or plant roots just overhanging the water's edge. In New York a single clutch averages 25 eggs (Gilbert 1941), but communal nesting is common, and a single nest can contain eggs from multiple females. The nest is attended by one or more females until the larvae hatch in 4 to 6 weeks, falling directly into the water below. Nests are sometimes abandoned, which reduces hatching success but eggs are still protected by a chemical repellent in the jelly layer (Hess and Harris 2000). The larval period may last up to 18 weeks. Little is known of the ecology of larvae and juveniles.

VI. Threats:

The four-toed salamander has specialized breeding requirements that make it vulnerable to habitat disturbance including road construction, development, and timber harvest in and around boggy wetlands, peat lands, and forested wetlands. Habitat disruption may be ameliorated to some extent by wetland protection regulations.

Corser and Dodd (2004) found that four-toed salamanders exist in metapopulations that use multiple ponds. Population size at a given pond was negatively correlated to its distance from adjacent ponds, suggesting that fragmentation can affect population size. Fragmentation that disrupts this salamander's ability to move between breeding and terrestrial sites, changes water/soil chemistry, temperature, pool hydroperiod, humidity, etc, may have negative effects. Klemens (1993) notes that populations may flourish in many moderately developed and semi-rural areas in southern New England and that road mortality does not appear substantial when compared to many species of frogs and Ambystomid salamanders.

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). Infection in four-toed salamanders has apparently not been documented. First identified in the 1960s (Granoff et al. 1965), ranaviruses have been shown to cause mortality in at least 14 families and more than 70 individual species of amphibians, although it has not been documented in four-toad salamander (Miller et al. 2011).

Unlike other salamanders whose reproduction has been adversely affected by acid precipitation, the four-toed salamander may have some tolerance to low pH (MA SWAP), though Chalmers (2004) found no evidence of this in Maine. Climate change that affects hydroperiod and/or water temperature of breeding pools could have significant impacts on productivity.

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

No Unknown

Yes

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.

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

To reduce negative effects of forestry practices, a 50 ft no-cut buffer should be left around wetlands where breeding occurs. Canopy cover of at least 75% should be left in 70% of the areas within a 250 ft' buffer around breeding sites. Use of mechanized equipment within 250 ft of breeding sites should only occur between 15 November and 15 March of any given year. No vehicles should be allowed within 50 ft of breeding wetlands (NHESP 2007).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for freshwater wetland amphibians, which includes four-toed salamander. Conservation actions following IUCN taxonomy are categorized in the table.

Easement acquisition:

___ Secure habitats critical to species survival by acquisition of conservation easements, or by other land protection mechanisms.

Habitat management:

___ Manage the variety of factors which might be limiting wetland habitat suitability for resident amphibian species, including management of exotic plant and animal species, management of adverse hydrological alterations, and management of anthropogenic inputs of sediments and toxicants.

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.

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 provisions into New York's Environmental Conservation Law designating four-toed salamander and Fowler's toad as a protected small game species.

Other action:

- ___ Periodically evaluate status of the subject species to determine whether appropriate E/T/SC status listings are in effect.

Population monitoring:

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

Statewide baseline survey:

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

Conservation Actions	
Action Category	Action
Land/Water Protection	Site/Area Protection
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

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