
Common Name: Boreal chorus frog *SPCN*
Scientific Name: *Pseudacris maculata*
Taxon: Amphibians

Federal Status: Not Listed **Natural Heritage Program Rank:**
New York Status: Not Listed Global: G5
New York: S2
Tracked: No

Synopsis:

Populations of chorus frog in western and northern New York previously thought to be western chorus frog, *P. triseriata*, may in fact be boreal chorus frog, *P. maculata* (Moriarty and Cannatella 2004, Lemmon et al. 2007), with the proposed dividing line between the two species lying in Oswego County (Todd 2013). Almost identical, these two species can be distinguished best by the breeding call. Because the status and distribution of boreal chorus frog in New York is not well understood, this assessment is largely based on our knowledge of the western chorus frog.

The boreal chorus frog occurs in most of Canada and the western and north-central United States southwestward to Arizona, New Mexico, northern Oklahoma, Missouri, and Illinois. Disjunct populations occur in southern parts of Quebec and Ontario, northern New York, and formerly in the northwestern corner of Vermont (Conant and Collins 1991, Stebbins 2003, Lemmon et al. 2007).

In New York, boreal chorus frogs occur in low-lying areas of the Great Lakes Plain, St. Lawrence Plain, and Champlain Valley (Todd 2013). They are found in open country with damp meadows, bottomland swamps, and temporal pools (Gibbs et al. 2007). Despite being tolerant of some disturbance, populations of western chorus frog in northern New York (Gibbs et al. 2005) and the Great Lakes region declined from 1970-2000 (Weeber and Vallianatos 2000), and are thought to be declining across the range as well (Moriarty and Lanoo in Lanoo 2005).

Distribution (% of NY where species occurs)		Abundance (within NY distribution)		NY Distribution Trend	NY Abundance Trend
0% to 5%	X	Abundant		Stable	Moderate Decline
6% to 10%		Common	X		
11% to 25%		Fairly common			
26% to 50%		Uncommon			
> 50%		Rare			

Habitat Discussion:

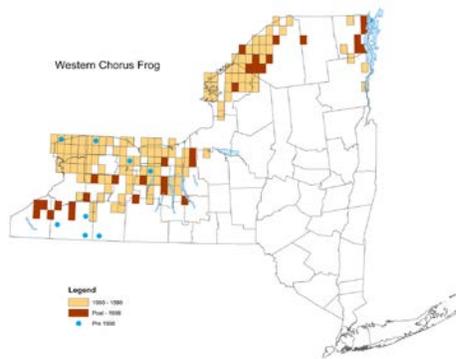
Western chorus frogs occur in open grasslands, meadows, and along forest edges. Within these habitats, adults are found in damp meadows and shallow pools with low shrubs and grasses (Kolozsvarly and Swihart 1999). Breeding occurs in any shallow temporary water bodies with at least 10 cm of water (Skelly 1996) including flooded fields, ditches, and rain pools.

Gibbs et al. (2005) found western chorus frogs in New York thrive in areas with less acidic soils and in areas with more pasture, less cultivated grasses, and less forests of all types.

Primary Habitat Type
Freshwater Marsh
Great Lakes Freshwater Estuary Marsh
Native Barrens and Savanna
Vernal Pool
Wet Meadow/Shrub Marsh

Distribution:

Chorus frogs occur on the eastern Great Lakes Plain and the St. Lawrence Valley. A separate population occurs in Clinton and Essex counties in the Champlain Valley. The NYS Herp Atlas (1990-99) documented western chorus frogs in 122 out of 979 survey quads (12%). Since 2000, 86 records have been added to the NY Herpetology database in an additional 32 quads. Three boreal chorus frog specimens were collected near Massena, NY (Angelena Ross, personal communication).



NYSDEC (2013)



Todd (2013)

Threats to NY Populations				
Threat Category	Threat	Scope	Severity	Irreversibility
1. Residential & Commercial Development	Housing & Urban Areas (habitat loss/degradation)	N	L	H
2. Agriculture & Aquaculture	Annual & Perennial Non-Timber Crops (habitat loss/degradation; agricultural intensification)	N	L	M
3. Climate Change & Severe Weather	Temperature Extremes	W	L	V
4. Climate Change & Severe Weather	Droughts	W	L	V
5. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (chytrid pathogen; ranavirus, West Nile control)	N	L	V
6. Pollution	Excess Energy (UV radiation)	P	L	V
7. Natural System Modifications	Other Ecosystem Modifications (succession)	R	L	M
8. Pollution	Agricultural & Forestry Effluents	W	L	M
9. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Triple E)	N	L	H

References Cited:

Conant, R. and Collins, J.T. 1991. A Field Guide to Reptiles and Amphibians: Eastern and Central North America. Third Edition. Houghton Mifflin Company, Boston, Massachusetts.

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, New York. xv + 422 pp.

Gibbs, J.P., K.K. Whiteleather, and F.W. Schueler. 2005. Changes in frog and toad populations over 30 years in New York State. *Ecological Applications* 15:1148-57.

Kolozsvary, M.B. and R.K. Swihart. 1999. Habitat fragmentation and the distribution of amphibians: patch and landscape correlates in farmland. *Canadian Journal of Zoology* 77:1288-99.

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

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- Moriarty, E. C. and D. C. Cannatella. 2004. Phylogenetic relationships of the North American chorus frogs (*Pseudacris*: Hylidae). *Molecular Phylogenetics and Evolution* 30(2):409-420.
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- Todd, K. C. 2013. *Frogs of the United States and Canada*, vol. 1. The Johns Hopkins University Press, Baltimore, MD.
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Common Name: Jefferson salamander *SPCN*
Scientific Name: *Ambystoma jeffersonianum*
Taxon: Amphibians

Federal Status: Not Listed **Natural Heritage Program Rank:**
New York Status: Special Concern Global: G4
New York: S4
Tracked: No

Synopsis:

The distribution of the Jefferson salamander is restricted to the northeastern quarter of the United States extending as far to the southwest as Illinois and Kentucky; the species is represented in Canada only in a small area of southern Ontario. The habitat includes upland deciduous or mixed woodlands as well as bottomland forests adjacent to disturbed and agricultural lands. Breeding occurs in temporary ponds or semi-permanent wetlands (Gibbs et al. 2007).

Hybridization occurs between the Jefferson salamander and the blue-spotted salamander (*A. laterale*). Broadly referred to as the Jefferson complex, the variety of hybrids includes up to five different chromosomal combinations. Some of the hybrids have been called Tremblay’s salamander or silvery salamander, but most references are to “Jefferson complex.” This unusual situation has led to difficulty in defining the distribution of blue-spotted salamander and Jefferson salamander, the hybrids of which are very difficult to distinguish, typically, without genetic testing in conjunction with their appearance.

Jefferson salamander is considered to be locally abundant in suitable habitat across New York. It has been designated as a Species of Regional Conservation in the Northeast due to its unknown population status and taxonomic uncertainty (Therres 1999). NEPARC (2010) lists Jefferson salamander as a Species of Severe Concern because more than 75% of northeastern states list it as SGCN, and as a High Responsibility Species because the Northeast comprises more than 50% of its distribution.

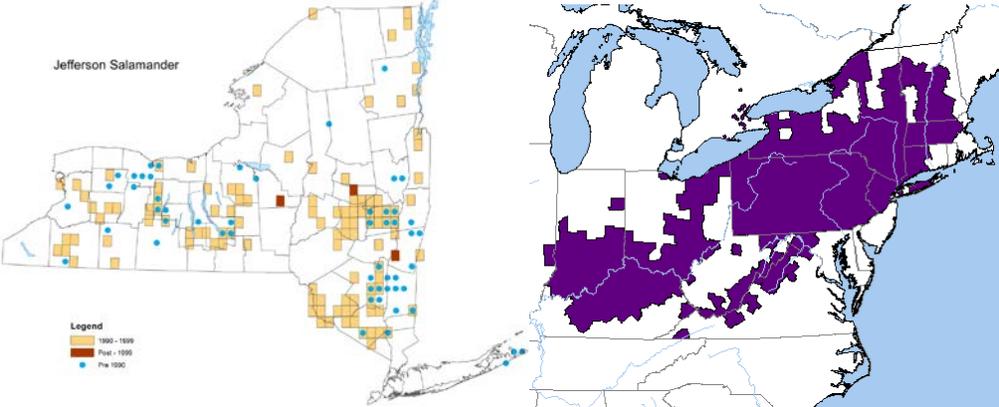
Distribution (% of NY where species occurs)		Abundance (within NY distribution)		NY Distribution Trend	NY Abundance Trend
0% to 5%		Abundant		Unknown	Unknown
6% to 10%		Common			
11% to 25%	X	Fairly common	X		
26% to 50%		Uncommon			
> 50%		Rare			

Habitat Discussion:

Jefferson salamanders occur in deciduous forest and mixed deciduous-coniferous forests with abundant tree stumps and downed logs that provide shelter. They also occur in bottomland forests adjacent to disturbed and agricultural lands. Breeding occurs in ephemeral pools and in semi-permanent wetlands adjacent to woodland habitats. Breeding pools are generally cool, slightly turbid, and with a forested shoreline and emergent vegetation on the bottom. Fish-free ponds are preferred but some populations will breed where fish are present (Gibbs et al. 2007).

Primary Habitat Type
Hardwood Swamp
Mixed Hardwood Swamp
Mixed Northern Hardwoods
Vernal Pool

Distribution:



NYSDEC (2013)

Distribution of Jefferson salamander in the United States (NatureServe 2013). Data developed as part of the Global Amphibian Assessment and provided by IUCN-World Conservation Union, Conservation International and NatureServe.

Threats to NY Populations				
Threat Category	Threat	Scope	Severity	Irreversibility
1. Residential & Commercial Development	Housing & Urban Areas (loss/degradation of habitat to development)	W	L	H
2. Agriculture & Aquaculture	Annual & Perennial Non-Timber Crops (loss/degradation of habitat to agriculture)	R	L	M
3. Transportation & Service Corridors	Roads & Railroads (roadkill)	P	M	H
4. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (disease: ranavirus, chytrid fungus)	P	L	V
5. Biological Resource Use	Hunting & Collecting Terrestrial Animals (illegal collecting)	P	L	L
6. Biological Resource Use	Logging & Wood Harvesting (effects of logging: roads, disrupting migratory movements, reducing water quality)	W	L	M
7. Pollution	Air-Borne Pollutants (acid rain; though studies are contradictory; mercury)	W	L	H
8. Pollution	Agricultural & Forestry Effluents (pesticides; larvacide & aerial spraying for West Nile)	R	L	H
9. Climate Change & Severe Weather	Drought	N	L	M
10. Climate Change & Severe Weather	Habitat Shifting & Alteration (altered snowfall)	W	L	V

References Cited:

Gibbs, J. P., A. R. Breisch, P. K. Ducey, G. Johnson, J. L. Behler, R. Bothner. 2007. Amphibians and reptiles of New York State: Identification, natural history, and conservation. Oxford University Press. 504 pages.

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

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

Common Name: Mink frog *SPCN*
Scientific Name: *Lithobates septentrionalis*
Taxon: Amphibians

Federal Status: Not Listed **Natural Heritage Program Rank:**
New York Status: Not Listed Global: G5
New York: S2
Tracked: No

Synopsis:

Mink frogs have the most northerly southern range limit of any anuran species in North America (Hedeon 1986). The species is widespread in Canada, occurring from Manitoba to Labrador. In the United States, mink frogs occur in the northern Great Lakes states (Michigan, Minnesota, and Wisconsin), and the northern portion of New York, Vermont, New Hampshire, and Maine (NatureServe 2013). In New York, occurrence of the species sharply decreases at wetlands with a mean July temperature >19.5°C (Popescu and Gibbs 2009). Mink frogs are closely associated with permanent wetlands. In New York they occupy a variety of lacustrine and palustrine systems as well as beaver-impounded riverine systems (Popescu and Gibbs 2009, Patrick et al. 2012). Breeding occurs during a prolonged period from June to August, with peak breeding in late July (Popescu 2007). Eggs are deposited under the surface of the water where they hatch within a few days, making the egg masses difficult to detect (Patrick et al. 2012). Mink frogs are morphologically cryptic, superficially resembling green frogs (*L. clamitans*) and typically definitive identifications require having an animal in hand or hearing their distinct call; thus, issues may frequently occur with misidentification of the species (A. Breisch, personal communication). In New York, the species is abundant in the Tug Hill plateau south to Oneida Lake, through the Adirondacks and into the St. Lawrence valley with NY Amphibian and Reptile Atlas Project (hereafter “Herp Atlas”) records (1990-1999) south to northern Saratoga County. Historical records from the 1890s also suggest that mink frogs may have occurred in the Catskill Mountains (Wright 2002), however we are unaware of any confirmed observations of mink frogs in this region over the past century. Uncertainty remains as to why the mink frog is confined to cold regions (Hedeon 1986); recent research suggests that early hypotheses linking the occurrence of mink frogs directly to cold highly oxygenated waters are not supported (Patrick unpublished data). Similarly, competition with American bullfrogs (*L. catesbeianus*) and green frogs does not determine occurrence of the species in the Adirondacks (Popescu 2007, Popescu and Gibbs 2009, Patrick unpublished data). Recent experimental research has demonstrated the potential for water temperature to interact strongly with the abundance of naiads of different dragonfly species in influencing the survival of green frog larvae (Patrick et al., in review) and mink frog larvae (Patrick and Byrne unpublished data). Given that the distribution of dragonfly species is likely to be shifting more rapidly than amphibian distributions, changes in predator-prey dynamics have the potential to influence the distribution of mink frogs.

Distribution (% of NY where species occurs)		Abundance (within NY distribution)		NY Distribution Trend	NY Abundance Trend
0% to 5%		Abundant	X	Unknown	Unknown
6% to 10%	X	Common			
11% to 25%		Fairly common			
26% to 50%		Uncommon			
> 50%		Rare			

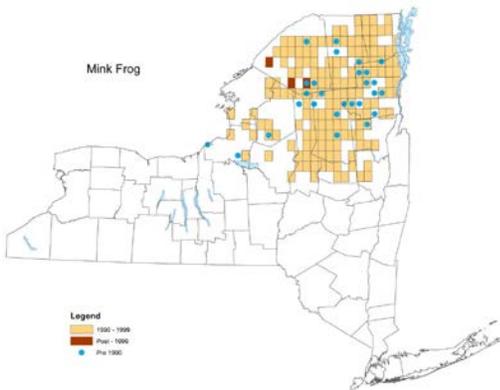
Habitat Discussion:

Mink frogs inhabit a variety of wetlands ranging from palustrine habitats to lacustrine systems (small ponds to large lakes) as long as they contain open water (Hedeem 1971, 1972b, a, 1986, Courtois et al. 1995, Bider and Matte 1996, Popescu and Gibbs 2009). They are also found in beaver-impounded riparian areas. Terrestrial habitat surrounding these wetlands includes deciduous, mixed, and coniferous forest. Juveniles and adults rarely venture far from aquatic environments, with few records of terrestrial movement (Hedeem 1986). However adult mink frogs were captured 150-m away from aquatic habitat in mixed forest in Maine (Patrick unpublished data).

Primary Habitat Type
Forest and Woodland; Boreal Upland Forest
Forest and Woodland; Boreal Wetland Forest
Forest and Woodland; Northeast Wetland Forest
Lake
Mixed Northern Hardwoods
Small River

Distribution:

Mink frogs are locally abundant within the core of their current range in New York State (the Adirondack Park, Tug Hill Plateau, and St Lawrence Valley; Popescu and Gibbs 2009; Patrick unpublished data).



NYSDEC (2013)



www.naturenorth.com (2013)

Threats to NY Populations				
Threat Category	Threat	Scope	Severity	Irreversibility
1. Residential & Commercial Development	Housing & Urban Areas (loss/degradation of habitat to development)	R	L	H
2. Pollution	Industrial & Military Effluents (acidification of wetlands)	W	L	H
3. Pollution	Agricultural & Forestry Effluents (anthropogenic nutrient additions leading to eutrophication)	N	L	H
4. Transportation & Service Corridors	Roads & Railroads (road mortality)	N	L	H
5. Climate Change & Severe Weather	Temperature Extremes (problems in embryo development and dissolved oxygen due to changes in water temperature)	R	M	V
6. Climate Change & Severe Weather	Habitat Shifting & Alteration (shifts in competition and/or predation leading to reduced abundance and population viability, e.g., anisopterans)	R	M	V
7. Residential & Commercial Development	Housing & Urban Areas (fragmentation of forest/wetland habitat, conversion to residential/agricultural use)	N	L	H

Prepared by David A. Patrick, Viorel D. Popescu, and James Gibbs.

References Cited:

Bider, J. R. and S. Matte. 1996. The Atlas of amphibians and reptiles of Quebec. St. Lawrence Valley Natural History Society and Ministère de l'Environnement et de la Faune du Québec, Québec.

Courtois, D., R. Leclair, S. Lacasse, and P. Magnan. 1995. Habitat preferences of Ranidae in oligotrophic lakes in the Laurentian Shield, Québec. *Canadian Journal of Zoology* 73:1744-1753.

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Hedeon, S. E. 1972b. Food and feeding behavior of the mink frog, *Rana septentrionalis* Baird, in Minnesota. *The American Midland Naturalist* 88:291-300.

Hedeon, S. E. 1986. The southern geographic limit of the mink frog, *Rana septentrionalis*. *Copeia* 1986:239-244.

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Patrick, D. A., E. B. Harper, V. D. Popescu, N. Bozic, A. Byrne, J. Daub, A. LeCheminant, and J. Pierce. 2012. The ecology of the mink frog, *Lithobates septentrionalis*, in the Adirondack Park, New York, with notes on conducting experimental research. *Herpetological Review* 43:396-398.

Popescu, D. V. 2007. Complex interactions shaping mink frog (*Rana septentrionalis*) distribution in New York State: pond factors, landscape connectivity, and climate change. M.S. thesis. State University of New York College of Environmental Science and Forestry, Syracuse.

Popescu, V. D. and J. P. Gibbs. 2009. Interactions between climate, beaver activity, and pond occupancy by the cold-adapted mink frog in New York State, USA. *Biological Conservation* 142:2059-2068.

Common Name: Northern red salamander *SPCN*
Scientific Name: *Pseudotriton ruber ruber*
Taxon: Amphibians

Federal Status: Not Listed **Natural Heritage Program Rank:**
New York Status: Not Listed Global: G5
New York: S3S4
Tracked: No

Synopsis:

Northern red salamanders can be found in the eastern United States from southern New York to southern Indiana and southward to the Gulf Coast, though they are absent from most of the Atlantic coastal plain south of Virginia and from peninsular Florida (Petranka 1998). Sites in New York are the northernmost occurrence for this species.

Northern red salamanders are typically found under rocks, logs, and leaf litter in moist forests near streams, pond, bogs, and wet meadows. Larvae develop in clean, cool streams and brooks. This species has disappeared from some areas where it was found historically, and remains abundant in some areas as well. A recent population trend is unknown.

Distribution (% of NY where species occurs)		Abundance (within NY distribution)		NY Distribution Trend	NY Abundance Trend
0% to 5%	X	Abundant		Unknown	Unknown
6% to 10%		Common			
11% to 25%		Fairly common			
26% to 50%		Uncommon	X		
> 50%		Rare			

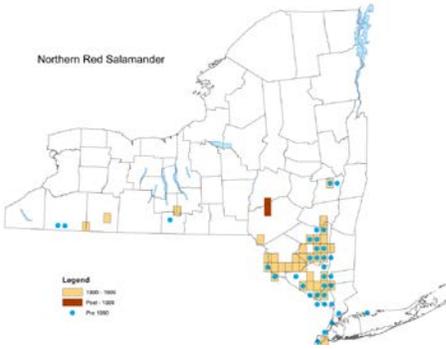
Habitat Discussion:

Red salamanders can be found in cold, clear, rocky streams, springs, ponds or bogs in hardwood, conifer, and mixed woodlands or open areas with cool running streams or beaver meadows. Adults occur in or near water in leaf-litter and under rocks, and in crevices and burrows near water. Eggs are attached to the underside of rocks in water. Larvae develop in still pools (Harding 1997, Petranka 1998, Gibbs et al. 2007).

Primary Habitat Type
Floodplain Forest
Headwater/Creek
Mixed Northern Hardwoods
Riparian
Small River
Vernal Pool

Distribution:

Red salamanders are found in the lower Hudson River Valley from Albany southward, on Staten Island, and in a few counties that border Pennsylvania. They are not found on Long Island, as the North American range map below shows.



NYSDEC (2013)



IUCN (2013)

Threats to NY Populations				
Threat Category	Threat	Scope	Severity	Irreversibility
1. Residential & Commercial Development	Housing & Urban Areas (habitat loss and degradation)	W	L	H
2. Biological Resource Use	Hunting & Collecting Terrestrial Animals (collecting)	W	L	M
3. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Chytrid fungus, ranavirus)	P	L	V
4. Transportation & Service Corridors	Roads & Railroads (road kill)	W	L	H
5. Pollution	Household Sewage & Urban Waste Water (nutrients, chemicals, garbage)	N	L	M
6. Pollution	Agricultural & Forestry Effluents (siltation)	N	L	M
7. Energy Production & Mining	Oil & Gas Drilling (hydraulic fracturing)	N	L	H

References Cited:

Gibbs, J. P., A. R. Breisch, P. K. Ducey, G. Johnson, J. L. Behler, R. Bothner. 2007. Amphibians and reptiles of New York State: Identification, natural history, and conservation. Oxford University Press. 504 pages.

Harding, J. 1997. Amphibians and Reptiles of the Great Lakes Region. Ann Arbor: Univ. of Michigan Press.

IUCN (International Union for Conservation of Nature), Conservation International & NatureServe. 2004. *Pseudotriton ruber*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2

Petranka, J.W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington and London. 587 pages.

Common Name: Southern leopard frog *SPCN*
Scientific Name: *Lithobates sphenoccephalus utricularius*
Taxon: Amphibians

Federal Status: Not Listed **Natural Heritage Program Rank:**
New York Status: Special Concern Global: G5
New York: S1S2
Tracked: Yes

Synopsis:

NOTE: More than a century of taxonomic confusion regarding the leopard frogs of the East Coast was resolved in 2012 with the publication of a genetic analysis (Newman et al. 2012) confirming that a third, cryptic species of leopard frog (*Rana* [= *Lithobates*] sp. nov.) occurs in southern New York, northern New Jersey, and western Connecticut. The molecular evidence strongly supported the distinction of this new species from the previously known northern (*R. pipiens* [= *L. pipiens*]) and southern (*R. sphenoccephala* [= *L. sphenoccephalus*]) leopard frogs. The new species’ formal description, which presents differences in vocalizations, morphology, and habitat affiliation (Feinberg et al. 2014), is nearing submission for publication. This manuscript also presents bioacoustic evidence of the frog’s occurrence in southern New Jersey, Maryland, Delaware, and as far south as the Virginia/North Carolina border, thereby raising uncertainty about which species of leopard frog occur(s) presently and historically throughout the region. Some evidence suggests that Long Island might at one time have had two species: the southern leopard frog in the pine barrens and the undescribed species in coastal wetlands and the Hudson Valley. For simplicity’s sake, in this assessment we retain the name “southern leopard frog” even though much of the information available may refer to the undescribed species or a combination of species.

The southern leopard frog occurs in the eastern United States and reaches the northern extent of its range in the lower Hudson Valley of New York. It occurs along the vegetated edges of a variety of water bodies including marshes, wetlands, ponds, ditches, and slow streams. Formerly in the genus *Rana*, the southern leopard frog was reclassified into the genus *Lithobates* in 2006 along with several other species of water frogs that occur in New York. It is more closely related to the Florida leopard frog, *L. s. sphenoccephala*, than to the northern leopard frog, *L. pipiens*. It has also formerly been known as *Rana utricularia*.

Populations are declining in Pennsylvania and New York where the species is at the northernmost edge of the range. Its status as Special Concern in New York is due to threats to breeding wetlands and its restricted distribution in the state. In Connecticut it is known from a handful of locations. It is unclear whether this species ever occurred in Massachusetts or Rhode Island, but it does not seem to occur there at present. Elsewhere, including adjacent New Jersey to coastal Texas, populations appear to be stable.

Distribution (% of NY where species occurs)		Abundance (within NY distribution)		NY Distribution Trend	NY Abundance Trend
0% to 5%	X	Abundant		Severe Decline	Severe Decline
6% to 10%		Common	X		
11% to 25%		Fairly common			
26% to 50%		Uncommon			
> 50%		Rare			

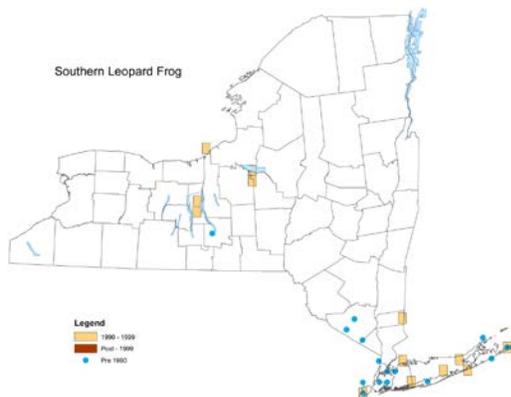
Habitat Discussion:

Southern leopard frogs breed during the spring in open permanent or temporary wetlands and brackish marshes. During the summer, they prefer moist meadows of grass, rush, and sedge. Adults may travel a distance from wetland habitats, residing in upland areas where vegetation provides shade and small pools or puddles provide moisture. Hibernation occurs in the soft mud at the bottom of wetlands (Gibbs et al. 2007).

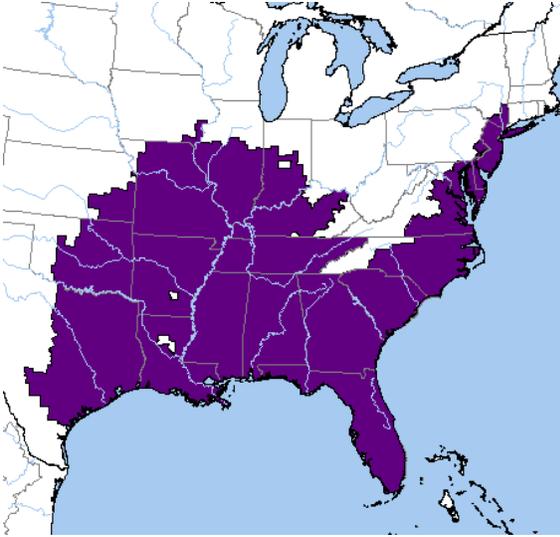
Primary Habitat Type
Ditch/Artificial Intermittent Stream
Freshwater Marsh
Lake; Pond; Eutrophic
Wet Meadow/Shrub Marsh

Distribution:

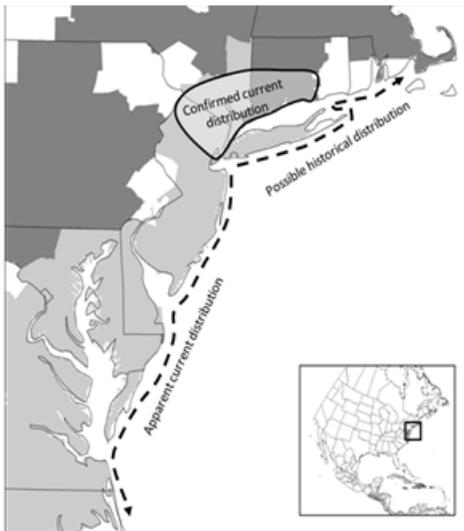
Southern leopard frogs are known from about five populations in the lower Hudson Valley of New York and two locations on Staten Island. The species may be extirpated from the rest of New York City and all of Long Island, where it was once considered the most common frog. A population is known at the Seneca Army Depot in central New York, and is believed to be the result of frogs being released over many decades, this species being a common laboratory subject (Gibbs et al. 2007).



NYSDEC (2013)



Distribution of southern leopard frog 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.



Distribution of *Rana pipiens* (dark gray), *R. sphenoccephala* (light gray), and *R. sp. nov.* (black outline, with dotted lines representing potential distribution along the coast) in the northeastern U.S. Adapted from Newman et al. (2012).

Threats to NY Populations				
Threat Category	Threat	Scope	Severity	Irreversibility
1. Residential & Commercial Development	Housing & Urban Areas (loss/degradation of habitat)	P	M	H
2. Agriculture & Aquaculture	Annual & Perennial Non-Timber Crops (loss/degradation of habitat to agriculture)	W	L	M
3. Transportation & Service Corridors	Roads & Railroads (road mortality)	P	L	H
4. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (chytrid pathogen; ranavirus)	P	L	V
5. Climate Change & Severe Weather	Temperature Extremes	P	L	V
6. Climate Change & Severe Weather	Storms & Flooding	R	M	V

References Cited:

Feinberg JA, Newman CE, Watkins-Colwell GJ, Schlesinger MD, Zarate B, et al. (2014) Cryptic Diversity in Metropolis: Confirmation of a New Leopard Frog Species (Anura: Ranidae) from New York City and Surrounding Atlantic Coast Regions. PLoS ONE 9(10): e108213. doi:10.1371/journal.pone.0108213

Gibbs, J. P., A. R. Breisch, P. K. Ducey, G. Johnson, J. L. Behler, R. Bothner. 2007. Amphibians and reptiles of New York State: Identification, natural history, and conservation. Oxford University Press. 504 pages.

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