Species Status Assessment

Common Name: Eastern spadefoot **Date Updated:** January 2025

Scientific Name: *Scaphiopus holbrookii*

Updated By: NYSDEC Wildlife Diversity Section

Class: Amphibia

Family: Scaphiopodidae

Species Synopsis *(a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):*

The eastern spadefoot occurs in much of the eastern United States, from southern New England across the Great Lakes states to southeastern Missouri, south to the Gulf Coast, from eastern Louisiana to southern Florida; it is absent at higher elevations in the Appalachians (Conant and Collins 1991). Populations in New York are scattered through sandy uplands primarily found on Long Island, with isolated populations in Dutchess, Albany, and Saratoga Counties. Although not easily detected, due to spending much of its time in underground burrows, spadefoot toads may occur in large numbers where habitat characteristics are suitable. Their distribution appears to be primarily limited by the availability of sandy soils. While long-term trends are unknown due to the absence of baseline data, it is thought that habitat loss—especially loss of vernal pools and adjacent uplands from development—has resulted in a negative short-term trend for this species.

I. Status

a. Current legal protected Status

i. **Federal:** Not Listed **Candidate:** No

ii. **New York:** Special Concern; SGCN

b. Natural Heritage Program

i. **Global:** G5

ii. **New York:** S2S3 **Tracked by NYNHP?:** Yes

Other Ranks:
-IUCN Red List: Least Concern
-COSEWIC: N/A
-Northeast Regional SGCN List (2023): Watchlist [Assessment Priority]
-NEPARC Regional List (2010): Species of Severe Concern

Status Discussion:

Eastern spadefoots appear to be widespread and may be abundant in some parts of their range (particularly in the southeastern United States), but local extirpations due to urbanization have occurred in the northeastern portion of the range (NatureServe, 2025). This species is listed as endangered in Pennsylvania and Connecticut, as threatened in Massachusetts, and as special concern in New Jersey and New York. In Massachusetts, museum specimens and historic literature indicated a more widespread population, but only 32 populations have been verified since 1982 (MA Division of Fisheries and Wildlife, n.d.). NEPARC (2010) lists the eastern spadefoot a

Species of Severe Concern because more than 75% of states list the species as a Species of Greatest Conservation Need (SGCN) in their Wildlife Action Plans.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Stable	Stable		Not listed	
Northeastern US	Yes	Unknown	Unknown		Northeast Concern	Watchlist
New York	Yes	Unknown	Unknown		Special concern	Yes
Connecticut	Yes				Endangered	Yes
Massachusetts	Yes				Threatened	Yes
New Jersey	Yes				Special Concern	Yes
Pennsylvania	Yes				Endangered	Yes
Vermont	No	N/A	N/A			
Ontario	No	N/A	N/A			
Quebec	No	N/A	N/A			

Column options
Present?: Yes; No; Unknown; No data; (blank) or Choose an Item
Abundance and Distribution: Declining; Increasing; Stable; Unknown; Extirpated; N/A; (blank) or Choose an item
SGCN?: Yes; No; Unknown; (blank) or Choose an item

Monitoring in New York *(specify any monitoring activities or regular surveys that are conducted in New York):*

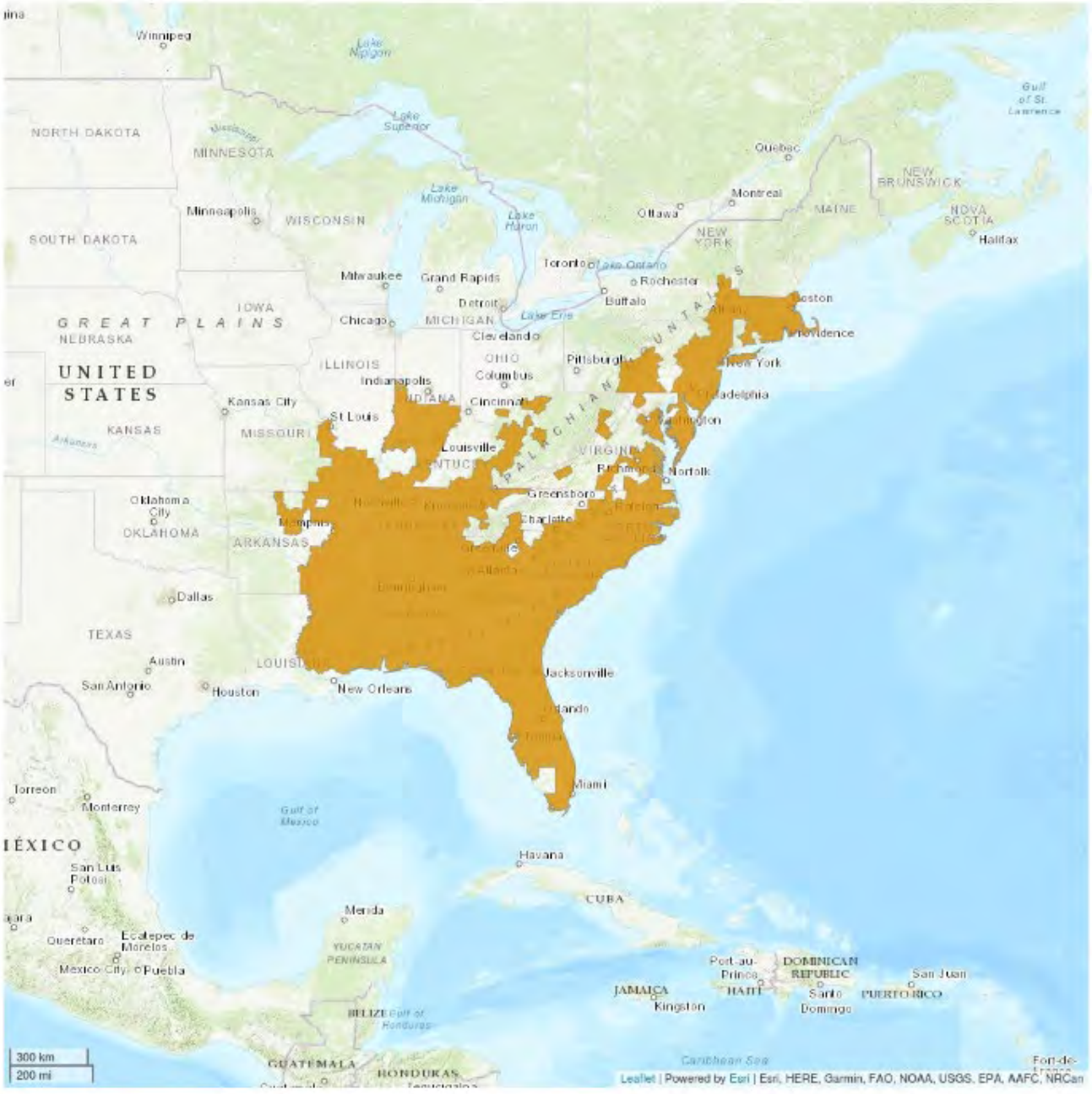
The New York Amphibian and Reptile Atlas Project (Herp Atlas), conducted from 1990-1999, documented the geographic distribution of all amphibians and reptiles in the state. The Herp Atlas database also includes pre-1990 records from various sources, such as museum records, researchers' field notes, agency reports, and published literature

In addition to the Atlas, monitoring activities occurred in populations in Saratoga County beginning in 2011. During these surveys, fungus on eggs and abnormalities in newly metamorphosed toads were observed. There was also a skewed sex ratio towards males in the population.

Trends Discussion *(insert map of North American/regional distribution and status):*

Populations appear to be widespread and secure across the southern portion of the spadefoot's range; however, they are not secure in the northern part of the range where, in several northeastern states, local extirpations have occurred due to urbanization (NatureServe 2025).

Natural fluctuations in population size associated with annual variations in weather and reproductive success render status assessments of spadefoot populations difficult (Klemens 1993, Semlitsch et al. 1996). However, extirpations have been noted in Massachusetts (MA Herp Atlas), Connecticut (Klemens 1993), and in New York. At least one historical population in New York, reported from Clarkstown in Rockland County (De Kay 1842) is believed to be extirpated (NYNHP 2025).



Legend

EXTANT (RESIDENT)

Compiled by:

IUCN (International Union for Conservation of Nature), Conservation International & NatureServe 2021

Figure 1: Distribution of the eastern spadefoot in the United States (IUCN 2022)

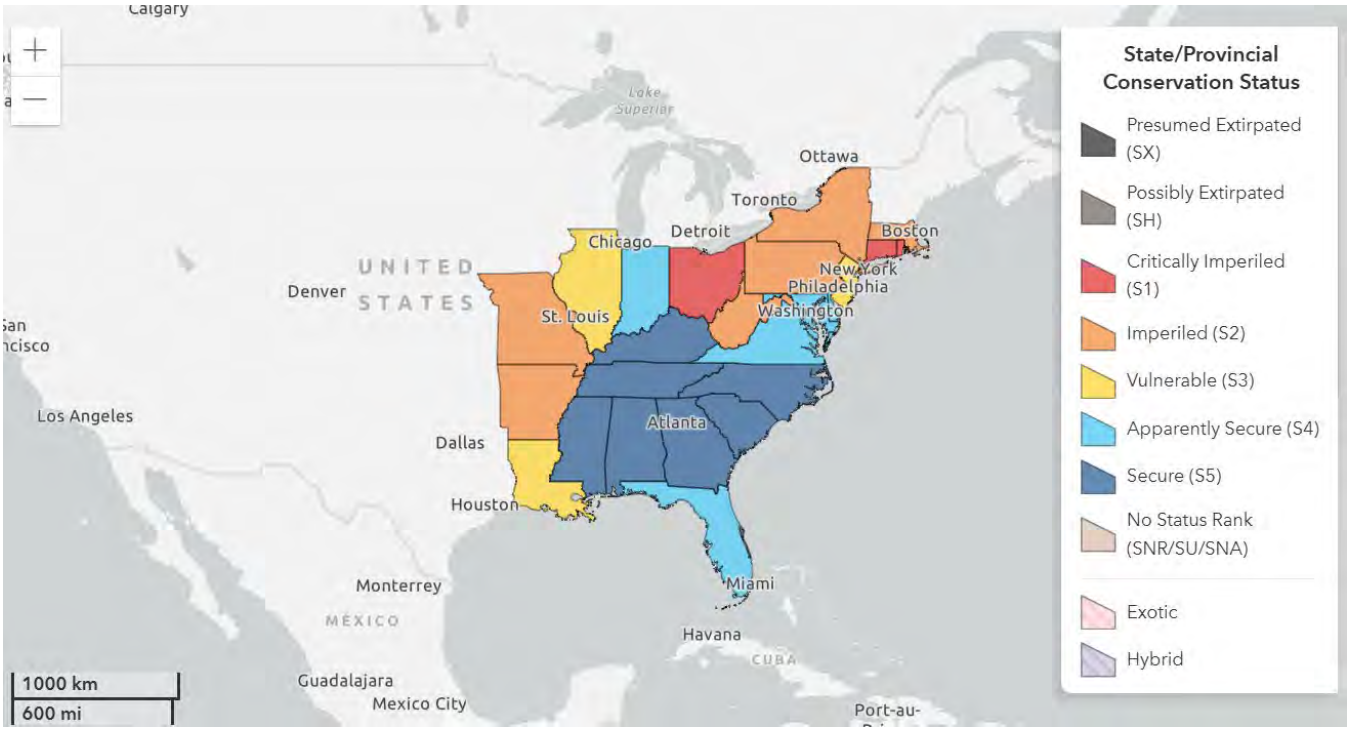


Figure 2: Conservation status of the eastern spadefoot in the United States (NatureServe 2025).

III. **New York Rarity** *(provide map, numbers, and percent of state occupied)*

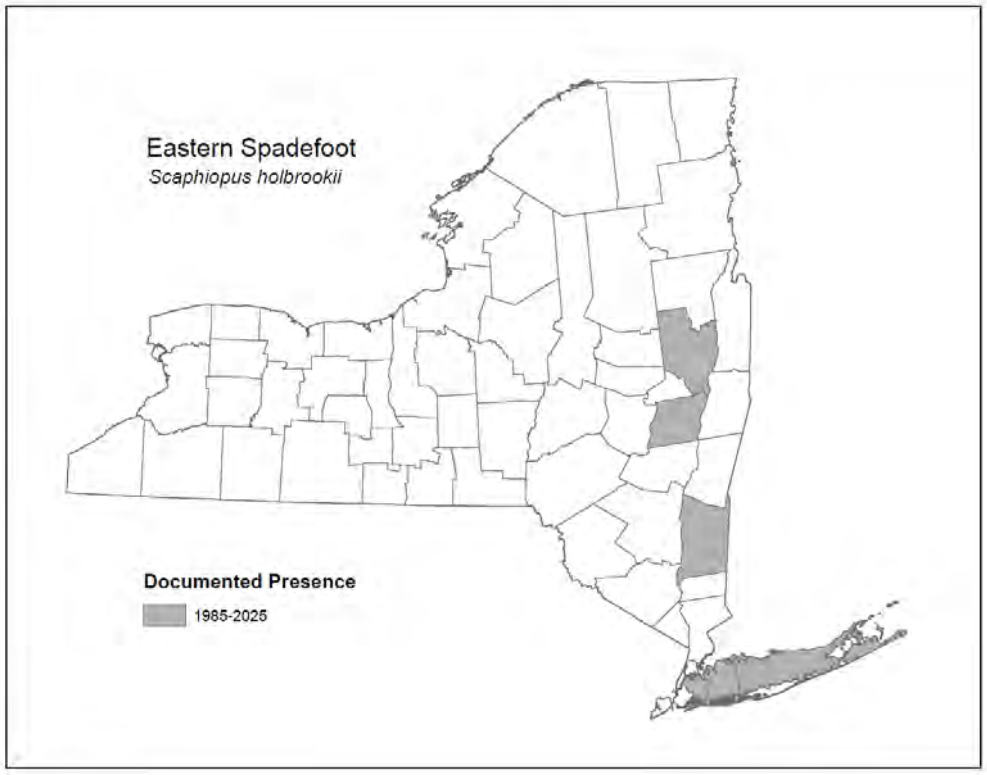


Figure 3: Distribution of eastern spadefoot in New York, 1985-2025 (NY Herpetology Database, NYSDEC)

Details of historic and current occurrence:

The eastern spadefoot is known historically from Long Island and the sand plains of Albany and Saratoga counties.

The NYS Amphibian and Reptile Atlas (1990-99) documented the eastern spadefoot in 13 survey quadrangles (USGS 7.5 minute topographic quadrangle). One of these was in Albany County and the remaining were on Long Island. Since 2000, records have been added to the NY Herpetology database in five additional survey quads, bringing the total quads with records to 18 (2%). Two of the newly added records are in Saratoga County, where sandy soils are prevalent, and a third is from a unique red cedar woodland in Dutchess County.

Populations are known in areas where sandy soils provide appropriate habitat on Long Island and in the sand plains of Albany and Saratoga counties. A new population was discovered in the Dutchess County, about halfway between Albany and New York City.

Spadefoot toads are common in the southeastern United States and can be locally abundant in the northeastern states as well, though their secretive nature may cause them to appear less abundant than they truly are. However, some populations in the Northeast are limited and fragmented. These populations generally face pressure from habitat loss caused by development. The species requires ephemeral and vernal pools, as well as the surrounding uplands, which receive limited legal protection at best (Mahaney and Klemens 2008).

New York's Contribution to Species North American Range:

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Peripheral	

Column options
Percent of North American Range in NY: 100% (endemic); 76-99%; 51-75%; 26-50%; 1-25%; 0%; Choose an item
Classification of NY Range: Core; Peripheral; Disjunct; (blank) or Choose an item

IV. Primary Habitat or Community Type *(from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):*

a. Oak-Pine Forest

b. Pine Barrens

c. Coastal Coniferous Barrens

d. Coastal Plain Pond

e. Vernal Pool

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	No	Unknown	

Column options
Habitat Specialist and Indicator Species: Yes; No; Unknown; (blank) or Choose an item
Habitat/Community Trend: Declining; Stable; Increasing; Unknown; (blank) or Choose an item

Habitat Discussion:

Due to their multistage lifecycle, eastern spadefoots require a matrix of habitat types. They are found primarily in uplands of varying cover types, including open forest, shrubland, brushy areas, and occasionally old fields and farmlands, interspersed with ephemeral pools with open canopies (Gibbs et al. 2007). As a species that spends most of the year burrowed underground, the spadefoot requires dry soils that are easy to burrow in: either sand or sandy loam. These soils are characteristic of pitch pine/scrub oak natural communities and coastal oak woodlands, with sparse shrub growth and scattered temporary pools. Areas with leaf litter are preferred, in order to prevent desiccation and avoid predation (Baughman and Todd 2007). Spadefoot toads also prefer to burrow under shrubs, particularly at the edges of forested areas, which provide higher prey abundance, increased soil moisture, and protection from predators (Timm 2013). Upland areas with high root density or unnatural substrates, such as sod or gravel, are generally avoided (Jansen et al. 2001). In New York, remaining populations are found in pine barrens habitats.

V. Species Demographic, and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	-	-	Yes	Yes	-

Column options
First 5 fields: Yes; No; Unknown; (blank) or Choose an item
Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

Species Demographics and Life History Discussion *(include information about species life span, reproductive longevity, reproductive capacity, age to maturity, and ability to disperse and colonize):*

Adult spadefoots spend large amounts of time burrowed underground, emerging to feed periodically, often on warm, rainy nights from late spring until early fall. During winter, individuals may burrow as deep as 8 feet below the surface. These toads require a habitat matrix of ephemeral or shallow vernal pools, surrounded by upland sandy soils and small shrubs with sparse root systems. They can dig burrows easily in loose sandy soils but are impeded by dense root systems and dense soils. They prefer to feed and burrow under small shrubs which act as cover from predators and afford easy access to their insect prey (Timm 2013).

The eastern spadefoot is an explosive breeder (Wells 1977). In the Northeast, breeding may occur anytime from April to September. The critical event that triggers emergence of adults from underground burrows is heavy rain when temperatures are above 55˚F (Timm 2013). These heavy rain events may not occur on an annual basis in the Northeast, and there may be several years between breeding events. In Massachusetts, breeding only occurred in 6 of 11 years sampled from 2001-2011 (Timm 2013). Breeding takes place in ponds and puddles, or in slight depressions and ditches that fill with water during heavy rains. Egg masses containing thousands of eggs are attached to submerged vegetation. Because breeding pools are ephemeral, eggs hatch quickly, sometimes in as little as 48 hours but generally in 5 to 12 days. Eggs and larvae cannot develop properly below 10˚C (50˚F) (Gosner and Black 1955). Sexual maturity is reached between 15–19 months after metamorphosis (Pearson 1955), and adults are thought to live for at least 5 years (Gibbs et al. 2007).

Pearson (1955) determined that eastern spadefoots returned to their home sites, sometimes even to the same burrow, after breeding in a pond 0.4 km (0.25 mi) away. Spadefoot toads may

emigrate up to 449 m from breeding ponds, although most travel closer to 130 m (Timm 2013). Pearson (1955) calculated that eastern spadefoot toads have an average home range of 10.1 m^2 (108.4 ft^2) while Timm (2013) found substantially larger home ranges, 108 m^2 (354 ft^2), using radio-telemetry. Individuals may shift burrows several times during the spring-fall active period, with toads generally staying within 50m of the original burrow. During the active period spadefoot toads tend to dig shallower burrows, only 0.4 m (1.3 ft) with deeper burrows for overwintering (Timm 2013).

Due primarily to its sensitivity to environmental conditions, eastern spadefoot toads have adapted to use pools with short hydroperiods; they are able to breed in pools most other amphibians cannot utilize, thus reducing predation and maximizing food resources.

VI. Threats *(from NY 2015 SWAP or newly described):*

Habitat loss and degradation are primary threats to eastern spadefoot populations. Because these toads inhabit floodplains and valleys, they are particularly vulnerable to habitat destruction caused by residential and commercial development. Development can lead to the destruction of breeding habitats (vernal pools), and the fragmentation and loss of upland habitats. Additionally, agricultural practices can alter habitats and water chemistry, further jeopardizing their survival (Jansen et al. 2001).

Other significant threats to the species include road mortality, pollution, and pathogens. The chytrid fungus, *Batrachochytrium dendrobatidis* (*Bd*), first described in 1998 (Longcore et al. 1999), has become a disease of global concern, with a recent study finding *Bd*-infection in 72% of sampled countries and in 54% of amphibian species tested (Monzon et al. 2020). Its effects on amphibian populations can be detrimental, although it has not yet been identified in spadefoot toads. 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 (Miller et al. 2011) including spadefoot toads (Hoverman et al. 2011).

Eastern spadefoot 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).

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent*	Severity*	Immediacy*	Trend	Certainty
1. Residential and Commercial	1.1 Housing & Urban Areas	Choose an item. (loss/degradation of habitat to development)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
4. Transportation & Service Corridors	4.1 Roads & Railroads	4.1.1 Roads (roadkill)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
5. Biological Resource Use	5.1 Hunting & Collecting Terrestrial Animals	5.1.4 Poaching/persecution of terrestrial animals	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
8. Invasive & Other Problematic Species	8.4 Pathogens	8.4.2 Viral pathogens (ranavirus)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
8. Invasive & Other Problematic Species	8.4 Pathogens	8.4.3 Fungal pathogens (chytrid)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.3 Agricultural & Forestry Effluents	9.3.3 Herbicides & pesticides	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 1. Threats to eastern spadefoot.

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

Yes: ✓ **No:** _____ **Unknown:** _____

If yes, describe mechanism and whether adequate to protect species/habitat:

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, with very few species open to harvest. The legislation also outlaws the sale of any native species of herpetofauna regardless of its origin.

Under Article 24 of the New York State Environmental Conservation Law, the Freshwater Wetlands Act provides protection to wetlands greater than 12.4 acres in size and smaller wetlands of 'Unusual Importance'. Beginning in 2028, the default size threshold of regulated wetlands will decrease to 7.4 acres. The U.S. Army Corps of Engineers also protects wetlands, irrespective of size, under Section 404 of the Clean Water Act.

Under Article 15 Title 5 of the New York State Environmental Conservation Law, the Protection of Waters program provides protection for the state's water resources, including rivers, streams, lakes, and ponds.

These protections are not adequate to protect all habitats utilized by this species in New York

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

Additional study of the species to help assess needed conservation actions would be beneficial, as would the development of an eastern spadefoot management plan for New York. Buffer areas surrounding vernal pools should be considered when managing state lands. A 250m buffer is recommended.

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for eastern spadefoot. Actions that have been accomplished, or where progress has been made, are indicated with a check.

Habitat management:

____ Provide for stability/security of vernal pool habitats which support the species.

Invasive species control:

____ Manage exotic competitors, predators and pathogens which might undermine the integrity of spadefoot toad populations.

Modify regulation:

✓ Adopt into New York's Environmental Conservation Law provisions which designate spadefoot toad as a protected small game species.

Population monitoring:

____ Conduct periodic monitoring of populations in order to detect population trends.

Statewide baseline survey:

____ Develop population survey protocols, and implement protocols at known and potentially suitable sites to determine present distribution and status of this species in New York.

Statewide management plan:

____ Incorporate eastern spadefoot toad conservation objectives into state land management planning.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) - https://www.iucnredlist.org/resources/conservation-actions-classification-scheme

Action Category	Action	Description
A.1 Direct Habitat Management	A.1.0.0.0 Direct Habitat Management	Site/Area management
A.2 Direct Species Management	A.2.0.0.0 Direct Species Management	Invasive/problematic species control
C.6 Design and Plan Conservation	C.6.5.1.3 Develop a conservation, management, or restoration plan for protected private lands	Habitat and natural process restoration

Table 2. Recommended conservation actions for eastern spadefoot toad.

VII. References

Baughman, B. and B. Todd. 2007. Role of substrate cues in habitat selection by recently metamorphosed *Bufo terrestris* and *Scaphiopus holbrookii*. Journal of Herpetology 41:154-157.

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.

COSEWIC. 2023. Canadian Wildlife Species at Risk. Committee on the Status of Endangered Wildlife in Canada. Web site: https://species-registry.canada.ca/index-en.html#/documents/26RBeAHh9ZftjQJ4CW3J9 [accessed 8 January 2025].

Daszak, P., Berger, L., Cunningham, A.A., et al. 1999. Emerging infectious diseases and amphibian population declines. Emerging Infectious Diseases 5:735-748.

De Kay, J.E. 1842. Zoology of New York, or the New-York Fauna, Part III: Reptiles and Amphibia. W. & A. White and J. Visscher. Albany NY.

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: Identification, Natural History and Conservation. New York; Oxford University Press.

Gosner, K. L. and I. Black. 1955. The effects of temperature and moisture on the reproductive cycle of *Scaphiopus h. holbrooki*. American Midland Naturalist 54:192-203.

Granoff A., P. E. Came, and K. A. Rafferty. 1965. The isolation and properties of viruses from *Rana pipiens*: their possible relationship to the renal adenocarcinoma of the leopard frog. Annals of the New York Academy of Science 126:237–255.

Hoverman, J. T., M. J. Gray, N. A. Haislip, and D. L. Miller. 2011. Phylogeny, life history, and ecology contribute to differences in amphibian susceptibility to ranaviruses. Ecohealth, Online ahead of print: doi: 10.1007/s10393-011-0717-7.

IUCN SSC Amphibian Specialist Group. 2022. Scaphiopus holbrookii. The IUCN Red List of Threatened Species 2022: e.T59042A196336701. https://dx.doi.org/10.2305/IUCN.UK.2022-1.RLTS.T59042A196336701.en. Accessed on 20 January 2025.

Jansen, K. P., A. P. Summers, and P. R. Delis. 2001. Spadefoot toads (*Scaphiopus holbrookii holbrookii*) in an urban landscape: effects of nonnatural substrates on burrowing in adults and juveniles. Journal of Herpetology, 35(1): 141-145.

Klemens, M.W. 1993. Amphibians and reptiles of Connecticut and adjacent regions. State Geological and Natural History Survey of Connecticut, Bulletin Number 112, Hartford, Connecticut.

Mahaney, W.S. and M.W. Klemens. 2008. Vernal Pool Conservation Policy: The federal, state and local context. In: Calhoun, A.J.K. and P.G. deMaynadier, editors. Science and conservation of vernal pools in northeastern North America. Boca Raton, FL: CRC Press. p:193-211.

Massachusetts Division of Fisheries & Wildlife. n.d. Natural Heritage and Endangered Species Program. Eastern Spadefoot- Scaphipous holbrooki. Accessed on January 21, 2025 from https://www.mass.gov/doc/eastern-spadefoot/download

Miller, D., M. Gray, and A. Storfer. 2011. Ecopathology of ranaviruses infecting amphibians. Viruses 3(11):2351-2373. doi: 10.3390/v3112351

Monzon, F.C., M.-O. Rödel, and J.M. Jeschke. 2020. Tracking *Batrachochytrium dendrobatidis* infection across the globe. EcoHealth 17:270-279.

NatureServe. 2012. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: January 4, 2013).

NatureServe. 2025. NatureServe Explorer. Page last published (January 3, 2025). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.100521/Scaphiopus_holbrookii. Accessed (January 21, 2025).

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). 2025. Online Conservation Guide for *Scaphiopus holbrookii*. Available from: https://guides.nynhp.org/eastern-spadefoot/. Accessed January 20, 2025.

Pearson, P.G. 1955. Population ecology of the spadefoot toad, *Scaphiopus h. holbrooki* (Harlan). Ecological Monographs 25:233–267.

Rittman, S.E., E. Muths, and D.E. Green. 2003. *Pseudacris triseriata* (western chorus frog) and *Rana sylvatica* (wood frog) Chytridiomycosis. Herpetological Review 34:53.

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., D.E. Scott, J.H.K. Pechmann and J.W. Gibbons. 1996. Structure and dynamics of an amphibian community: evidence from a 16-year study of a natural pond. Pp. 217–248 *in* Cody, M.L. and J.A. Smallwood (Eds.), Long-term Studies of Vertebrate Communities. Academic Press, San Diego, California.

Terwilliger Consulting, Inc. and the Northeast Fish and Wildlife Diversity Technical Committee. 2023. Northeast Regional Conservation Synthesis for 2025 State Wildlife Action Plans. Northeast Association of Fish and Wildlife Agencies, Washington, D.C.

Timm, B. 2013. The Ecology and Conservation of the Eastern Spadefoot (*Scaphiopus holbrookii*) in the Province Lands of Cape Cod National Seashore, U.S.A. Ph.D. Dissertation, University of Massachusetts Amherst.

Wells, K.D. 1977. The social behavior of anuran amphibians. Animal Behaviour 25:666–693.

Originally prepared by	Kimberley Corwin
Date first prepared	January 7, 2013
First revision	June 25, 2013
Latest revision	Minor revisions L. Pipino 1/21/2025