

Species Status Assessment

Common Name: Clam shrimp

Date Updated: March 2025

Scientific Name: *Cyzicus gynecia*

Minor Edits by: NYSDEC Wildlife Section

Class: Branchiopoda

Family: Cyzicidae

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

North American clam shrimps have few eastern representatives. They are mostly animals of temporary waters and have a bivalve shell that opens to allow slow swimming by means of crustacean appendages. *Cyzicus gynecia*, so far as known, normally occurs only in long-lasting rain pools on dirt roads and ATV trails. The global range comprises New York, New Jersey, Massachusetts, Pennsylvania, and Ohio. Very few confirmed localities exist although New York may have more known localities than the other four states. Clam shrimp was first discovered in New York in 1994.

This may be an annual species, and it survives drying of the pools and perhaps the winter as a resting egg in the sediments. The shell is about 5-10 mm in the long dimension. *C. gynecia* may be found moving slowly along the bottom in a kind of slow-motion saltation, or along the underside of the surface film. Because the habitat is often very turbid and the animals are cryptically colored, it may be necessary to dipnet suitable pools (in summer) to discover them. The artificial habitat, and the possibility that this species evolved in the Midwest and was transported by human agency (e.g., wagon wheels) to the East has caused some biologists to discount its importance as an element of New York's biodiversity. However, it is a unique genetic entity and is the only known hermaphroditic clam shrimp in the family Cyzicidae.

C. gynecia is under a high level of threat range-wide from drainage or filling of pools. The rarity of this species (as currently known) in New York, the genetic and ecological uniqueness, and the high level of threat justify SGCN designation. Designation would stimulate further field surveys and research as well as detection and protection in situations where land use or environmental management is changing.

DEC is not aware of any additional data or new information on population trends or threats to this species since the last SWAP revision in 2015. This species was listed as SPCN in 2015, but with the removal of this status in the 2025 revision it has been changed to SGCN.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed

b. Natural Heritage Program

i. **Global:** G2Q

ii. **New York:** SNR **Tracked by NYNHP?:** No

Other Ranks:

-NYS 2025 SGCN Status: Species of Greatest Conservation Need

-Northeast Regional SGCN: RSGCN

Status Discussion:

This species was first described in 1949 and first discovered in New York in 1994. There are few confirmed localities and they are under a high level of threat. It's very easy to destroy the habitat.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown	Since described in 1949		-
Northeastern US	Yes	Unknown	Unknown	Since 1949*		-
New York	Yes	Unknown	Unknown	Since discovery in 1994		Yes
Connecticut	No	Choose an item.	Choose an item.			-
Massachusetts	Yes	Unknown	Unknown		Not listed	No
New Jersey	Yes	Unknown	Declining		Not listed	No
Pennsylvania	Yes	Unknown	Unknown		Not listed	No
Vermont	No	Choose an item.	Choose an item.			-
Ontario	No	Choose an item.	Choose an item.			-
Quebec	No	Choose an item.	Choose an item.			-

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*):

No regular surveys or consistent monitoring in NY.

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

Massachusetts: Two sites known in the Berkshires of western MA. Jonelle Orridge (2011) studied one or both a few years ago and may have some notion of trend.

New Jersey: Original very high-quality site discovered in 2001 was completely destroyed (E.Kiviat pers comm) in 2010 during a wetland mitigation banking project (this site contained approximately 40 pools

in 1 km of gas pipeline service road). In 2013 an apparently smaller population was discovered 5 km away also in the New Jersey Meadowlands (Kiviat unpublished). A second site is on an aqueduct service road owned or managed by a private water company; level of interest in conservation and threat level undetermined.



Figure 1. Conservation status of clam shrimp in North America (NatureServe 2023)

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

New York is one of five states in the global range; however, New York appears to support more extant sites for this species than any other state and may well support a larger population overall.

There can be hundreds of individuals in a pool at times, and the species seems to occur where there are series of pools along a road or trail. However, because all habitat at an entire site (or a large portion of one) can be destroyed (filled, drained, polluted) at once, this species should be assessed based on the number of extant confirmed sites rather than the numbers of pools or individuals.

Details of historic and current occurrence:

First documentation (NY) in 1994 (Town of Rhinebeck, Dutchess County; single shell collected in larval amphibian sample but not identified to species at that time). Another site discovered in 2002 (Town of Hyde Park, Dutchess Co.), and another in 2007 (Town of Saugerties, Ulster Co.). Several sites have been reported in southern Orange County and two of these were confirmed in 2013; others remain to be confirmed.

The Town of Rhinebeck site has not been accessible for re-survey. The Town of Hyde Park site was partly destroyed by a development project although a portion of the habitats may persist. The Town of Saugerties site is largely or entirely in Bristol Beach State Park and may be secure. Status of the Orange County sites is uncertain. Trends in population numbers are unknown. Sites described in Schmidt and Kiviat (2008) and Orridge (2011).

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
76-99%	Choose an item.	

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. Intermittent pool

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/Community Trend	Time frame of Decline/Increase
Yes	Choose an item.	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:

Many apparently suitable pool complexes apparently do not support this species. Unknown if this is due to dispersal limitation, frequent “winking out” of local populations, or habitat factors that are not apparent. The pools are created and maintained by a particular level of vehicular traffic (i.e., road vehicles, off-road vehicles). Too little traffic might result in pools filling with sediment whereas too much traffic might result in many *C. gynecia* being crushed or splashed out of the pools. Schmidt and Kiviat (2008) hypothesized that this species evolved in buffalo wallows or pools created by horse-drawn wagons. Dispersal probably occurs in mud stuck to vehicle wheels and large animals. There are numerous sites that have apparently suitable habitat where the species seems not to be present.

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/Catadromous?
Yes	(blank)	No	Yes	Yes	(blank)

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):

Life history: In the laboratory, larvae hatched from the eggs 5-33 days after hydration of soil samples from dried pools (Orridge 2011). The larval stage lasted ca 20-30 days (Orridge 2011). Lab-hatched

individuals lived a maximum of 48 days after hatching, and wild-caught individuals a maximum of 89 days after capture (Orridge 2011).

Mortality: Potential predators, such as snapping turtle and various birds, occur at the clam shrimp pools. Many adult clam shrimp die episodically when pools dry.

Dispersal: This species is thought to disperse by movement of eggs in mud stuck to vehicles (Schmidt & Kiviat 2008) or by movement with water or wind (Orridge 2011).

Systematics: Orridge (2011) found meristic data different between NJ and NY populations and suggested the NJ population should be placed in the genus *Caenestheriella* and the NY population in *Cyzicus*. However, NatureServe considers both populations to belong in *Cyzicus gynecia*. Reports of large, reddish individuals in Orange County, NY (Jay Westerveld, pers. comm.) also raise questions about classification (Robert Schmidt, pers. comm.). However, it is possible that differing degrees of redness are due to geochemical pigments in the pools or to dissolved oxygen levels (see Orridge 2011).

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

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
1. Residential and Commercial	1.1 Housing & Urban Areas	(loss/degradation of habitat)	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 (too much or too little ATV or service vehicle traffic)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
7. Natural System Modifications	7.2 Dams & Water Management/Use	-	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 (mosquito insecticides and overspray/drift of herbicides from wetland mitigation)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.3 Changes in Temperature Regimes	Choose an item. (warmer summers causing pools to dry faster)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 1. Threats to *clam shrimp*.

Threats are filling and drainage of pools for road maintenance; too little or too much vehicle traffic; and pollution of pools from contaminant spills, direct application or wind drift of pesticides (e.g., mosquito insecticides potentially including bacterial larvicides such as Bti and juvenile hormone analogs such as methoprene; herbicides used for control of environmental weeds). Perhaps the greatest threat (based on experience in NY and NJ) is wholesale destruction of habitat in connection with infrastructure for residential development, wetland mitigation, or other purposes.

It is unclear whether climate change threatens this species. Although precipitation is currently increasing in eastern NY, significant future decrease in spring and summer precipitation could result in shorter pool hydroperiods and an increased threat. Summer temperature increases might result in faster drying of pools in summer and fall. The known global range of the species lies within a relatively narrow climatic (latitudinal) belt. It cannot currently be discerned whether further temperature increases might force the geographic range to shift northward into environments that might be less favorably geochemically or ecologically.

Threats other than climate change perhaps can be reduced by education and protection of various kinds. The habitat and hypothesized dispersal modes suggest that habitat could be created, and the species introduced by translocation. To date, there are no known successful threat reductions in New York or New Jersey, nor any attempt to create habitat or new populations.

Additional notes regarding known or potential threats to clam shrimp:

Threat 1. Large scale destruction of habitat (pool) complexes for development, infrastructure, habitat restoration, etc.

Threat 2. Small or large-scale destruction of pools in a complex (anywhere from one pool to all pools in complex) by filling or draining of pools for road maintenance. This threat has not yet been observed in NY but is strongly inferred; threat has been observed in NJ.

Threat 3. Chemical pollution from pesticides (e.g., mosquito insecticides applied directly to the habitat [larvicides] or from overspray or drift of adulticides applied nearby; overspray or drift of herbicides applied nearby). A quick literature search on clam shrimp toxicology was inconclusive and it's unlikely that any research has been done on *C. gynecia*. For now, it must be assumed that pesticides are a threat based on toxicology of Crustacea in general. An advantage is that puddles with *C. gynecia* do not seem to support larval mosquitoes, but mosquito control operators may well treat these habitats reflexively.

Threat 4. Too much or too little vehicle use of dirt roads and trails supporting habitat pools. The pools observed in NY and NJ are almost certainly created and maintained by ATVs, maintenance vehicles, and other wheeled motor vehicles. Jonelle Orridge (pers comm) observed disturbance of habitat pools in NJ by heavy vehicle use that appeared to be splashing clam shrimp out of the pools and killing them, thus reducing population densities. Cessation of vehicle use is likely to result in sediment deposition and infilling of some habitat pools.

Threat 5. Collecting for science or hobby seems a minor threat, although potentially could be a concern if a single individual seined pools and collected large numbers of clam shrimp.

Threat 6. Impacts of climate change. Pools observed, especially at the Kane Natural Area site in NJ, held sufficient water to support this species most of the time; drying of pools with the death of clam shrimp (other than resting eggs) seems infrequent. If climate change causes summers to be drier in the Northeast, pool hydroperiods would become shorter and *C. gynecia* would be adversely affected.

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:

The habitat does not seem to be protected by any wetland regulations. It is unclear whether the habitat would be considered “vernal pools” although spotted salamander larvae were found with this clam shrimp at the Staatsburg NY site in 1994.

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

It seems, based on current (limited) knowledge, that creating habitat pool complexes for this species, and stocking created habitats, would be relatively simple. However, this approach needs to be tried under controlled conditions. Threats 1-5 to extant populations (see above) could be reduced or eliminated with explicit protection and management of populations on public lands. Three extant, confirmed sites are on public lands (Bristol Beach State Park in Ulster County, Glenmere – Black Meadow county water supply lands [not a formal title] on the east side of Glenmere Lake in Orange Co., and Cascade Lake Town Park, Town of Warwick, Orange Co.). The State Office of Parks, Recreation and Historic Preservation does not manage clam shrimp in Bristol Beach State Park. Clam shrimp have not been discussed with the Town of Warwick or Orange County.

Conservation Action: Research throughout the species range; Threat Addressed: Lack of knowledge about the species.

Conservation Action: Experimental habitat creation on public lands; Threat Addressed: Destruction of extant habitats.

Conservation Action: Management of extant sites throughout the species range; Threat Addressed: Destruction of extant habitats.

Action Category	Action	Description
A.1 Direct Habitat Management	A.1.0.0.0 Direct Habitat Management	Site/Area management
A.1 Direct Habitat Management	A.1.0.0.0 Direct Habitat Management	Create experimental habitats on public lands
A.1 Direct Habitat Management	A.1.0.0.0 Direct Habitat Management	Manage extant sites throughout species range

Table 2. Recommended conservation actions for clam shrimp.

VII. References

Brantner, J. 2011. Mating system inferences from representatives from two clam shrimp families (Limnadiidae and Cyzicidae) using histological and cellular observations. MS thesis, University of Akron.

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024.

https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.119717/Cyzicus_gynecia Accessed January 16, 2024.

Orridge, J.I. 2011. Genetic, morphological, and ecological relationships among populations of the clam shrimp *Caenestheriella gynecia*. PhD thesis, City University of New York.

Schmidt, R.E. & E. Kiviat. 2007 (2008). State records and habitat of clam shrimp, *Caenestheriella gynecia* (Crustacea: Conchostraca), in New York and New Jersey. *Canadian Field-Naturalist* 121:128-132.

Kiviat, Erik. 2013. Clam shrimp Status Assessment for the 2015 New York State Wildlife Action Plan. NYSDEC. Albany, New York.

(Also see references cited within these documents.)