
Common Name: Clam shrimp *SPCN*
Scientific Name: *Cyzicus (Caenestheriella) gynecia*
Taxon: Crustaceans

Federal Status: Not Listed **Natural Heritage Program Rank:**
New York Status: Not Listed Global: G2Q
New York: SNR
Tracked: No

Synopsis:

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.

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			
> 50%		Rare	X		

Habitat Discussion:

Found in temporary pools of water. 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.

Primary Habitat Type
Vernal Pool

Distribution:

First documented in New York 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 County), and another in 2007 (Town of Saugerties, Ulster County). 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).

Threats to NY Populations				
Threat Category	Threat	Scope	Severity	Irreversibility
1. Residential & Commercial Development	Housing & Urban Areas (loss/degradation of habitat)	W	H	H
2. Transportation & Service Corridors	Roads & Railroads (too much or too little ATV or service vehicle traffic)	W	M	M
3. Natural Systems Modification	Dams & Water Management/Use (pools on dirt roads)	W	H	M
4. Pollution	Air-Borne Pollutants (mosquito insecticides)	R	M	M
5. Pollution	Agricultural & Forestry Effluents (overspray or drift of herbicides from wetland mitigation)	R	M	M
6. Climate Change & Severe Weather	Temperature Extremes (warmer summers causing pools to dry faster)	P	H	H

References Cited:

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

Common Name: Devil crawfish *SPCN*
Scientific Name: *Cambarus diogenes*
Taxon: Crustaceans

Federal Status: Not Listed **Natural Heritage Program Rank:**
New York Status: Not Listed Global: G5
New York: S2
Tracked: Yes

Synopsis:

The devil crawfish is one of the three most widely ranging species of North American crayfishes, occurring from the Rocky Mountains to southern Canada eastward to New Jersey and throughout the Mississippi River basin and Great Lakes. This species is a burrowing crawfish, spending most of its life cycle in individually excavated underground chambers that have several openings at the surface and are surrounded by a chimney of mud pellets (Grow and Merchant 1980). Devil crawfish are a significant component of aquatic ecosystems, maintaining important ecological processes, sustaining bait fisheries, and serving as an important food source in many parts of their range. It contributes to the food web by acting as a predator to control insect populations and by processing vegetation and leaf litter to increase nutrient and organic matter availability for other organisms while maintaining high water quality (Taylor et al. 2007). The larvae of the Hines emerald dragonfly (*Somatochlora hineana*), an endangered species, regularly inhabit devil crawfish burrows in the late summer when their own larval habitats dry up, although the crawfish is also a potential threat as they are known to prey on the dragonfly larvae (Pintor and Soluk 2006). This crawfish occurs in marshy or swampy areas near rivers, streams, or ponds and has been recorded at six locations in three western New York counties, currently limited to the Lake Erie-Lake Ontario lowlands west of the Genesee River (Gall and Jezerinac 1998).

This species was first recorded in New York in 1980 at one site in Erie County and one site in Genesee County, defining the extreme northeastern edge of its range in North America. Since then, four more occurrences have been discovered, all located in the western portion of the state within three counties (Erie, Genesee, and Niagara). Available data suggests that the devil crawfish is limited to the Lake Erie-Lake Ontario lowlands west of the Genesee River, although there may be more occurrences in similar habitat throughout western New York (Gall and Jezerinac 1998).

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0% to 5%	X	Abundant		Unknown	Unknown
6% to 10%		Common			
11% to 25%		Fairly common			
26% to 50%		Uncommon			
> 50%		Rare			

Habitat Discussion:

The devil crawfish is a nocturnal primary burrower (remains in its burrow continuously and lives in areas without permanent water except during breeding) occurring in freshwater habitat including wet meadows, along the banks of rivers and streams, shorelines of ponds and lakes, roadside ditches, and other wetlands (NatureServe 2013). Burrows are generally found in clay or sandy soils or in slowly to moderately

flowing streams with silt or muck substrates and may be excavated almost anywhere where the water table is near the surface (Hobbs and Pass 1988, Cordeiro et al. 2010). Underground burrows are constructed with several openings at the surface and are usually surrounded by a chimney of mud pellets. The chimneys (which the crayfish constructs with the soil it removes during burrow excavation) can range in height from a low mound to a tower more than 30 cm high and burrows vary from 15 cm to more than 5 m deep (Grow and Merchant 1980). Burrows are not connected and are occupied by a single individual, providing shelter in which the crayfish feed, mate, lay eggs and raise young (Grow and Merchant 1980). This species can survive under nearly anaerobic conditions and studies have showed that most burrows contain very low dissolved oxygen levels, <10% of saturation (Grow and Merchant 1980). Devil crayfish are scavenger and predators; about 60% of their diet is comprised of living or decaying aquatic vegetation while the other 40% is made up of aquatic worms, insects, snails and detritus (Lui 2013).

All burrows containing the devil crayfish in New York were excavated in wetland remnants of glacial Lake Tonawanda at the Niagara Falls, Buckhorn Island, Iroquois Refuge and Lewiston Road sites; a remnant of a lacustrine wetland at the eastern end of Lake Erie (Tiftt Preserve); and wetlands associated with the Niagara River and its tributaries (Strawberry Island and Ransom Road sites) (Gall and Jezerinac 1998).

Primary Habitat Type
Ditch/Artificial Intermittent Stream
Freshwater Marsh
Headwater/Creek
Riparian
Wet Meadow/Shrub Marsh

Distribution:

The first records of this species occurred in 1980 at one location in Erie County: Woods Creek on Buckhorn Island; and one location in Genesee County: Oak Orchard Creek in the town of Shelby (NYNHP 2013). This species occurs at six locations in western New York: Tiftt Farm Marsh, Buffalo, Erie County (2007); Ransom Road Ditch, Grand Island, Erie County (2000); Oak Orchard Creek, Shelby and Alabama, Genesee County (2007); Niagara Falls Air Force Reserve Base, Niagara, Niagara County (2000); Strawberry Island, Tonawanda, Erie County (2012); and Woods Creek on Buckhorn Island, Grand Island, Erie County (2011) (NYNHP 2013).



NYNHP (2013)

Threats:

Threats were not evaluated for this species.

References Cited:

Cordeiro, J. T. Jones, and R.F. Thoma. 2010. *Cambarus diogenes*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. Available: www.iucnredlist.org. Accessed: 17 May 2013.

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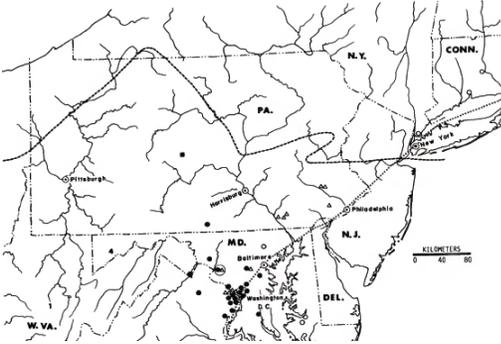
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Pintor, L.M. and D.A. Soluk. 2006. Evaluating the non-consumptive, positive effects of a predator in the persistence of an endangered species. *Biological Conservation* 130: 584-591.

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Distribution:

Historical records are from the High Allegheny Plateau, Lower New England Piedmont, and Great Lakes eco regions in the following five basins: Delaware, SE Lake Ontario, Lower Hudson-Long Island Bays, Susquehanna, and Upper Hudson River (NYSDEC 2005). There are no current records.



Distribution of *Stygobromus tenuis tenuis* in the eastern United States (Holsinger 1978). Open circles are *S. t. tenuis*, closed circles are *S. t. potamacus*.

Threats:

Threats were not assessed for this species.

References Cited:

Holsinger, J.R. 1978. Systematics of the subterranean amphipod genus *Stygobromus* (Crangonyctidae), part II: species of the eastern United States. *Smithsonian Contributions to Zoology* 266: 144p.

NatureServe. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. Arlington, Virginia. Available <http://www.natureserve.org/explorer>. Accessed: 22 May, 2013.

New York State Department of Environmental Conservation. 2005. New York State Comprehensive Wildlife Conservation Strategy. <http://www.dec.ny.gov/index.html>

Smith, D.G. 1984. The occurrence of the troglobitic amphipod, *Stygobromus tenuis tenuis* (Smith) (Crangonyctidae) in the Taconic Mountains of southwestern Massachusetts (USA): a case for the existence of a subterranean refugium in a glaciated region. *International Journal of Speleology* 14: 31-37.