

Species Status Assessment

Common Name: Devil crawfish

Date Updated: February 2025

Scientific Name: *Cambarus diogenes*

Minor Edits by: DEC Wildlife Diversity

Section

Class: Malacostraca

Family: Cambaridae

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

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).

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:** G5

ii. **New York:** **Tracked by NYNHP?:** yes

Other Ranks:

-New York 2025 SGCN status: Species of Greatest Conservation Need

-IUCN Red List: Least Concern

-Northeast Regional SGCN: Watchlist

- American Fisheries Society: Currently Stable (2007)

Status Discussion:

The devil crawfish is extremely widespread, utilizes a variety of habitat types and is tolerant to varying ecological conditions (Cordeiro et al. 2010). It is stable and secure (millions of individuals with a range > 2,500,000 sq. km) throughout its range with over 300 occurrences (NatureServe 2013). This species has recently expanded into New York and therefore habitat protection will be important for the persistence of populations in the state.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Stable	Stable	1850-2015		Choose
Northeastern US	Yes	Stable	Stable	1900-2015		Choose
New York	Yes	Stable	Stable	1980-2015	Not listed	Yes
Connecticut	No	-	-			Choose
Massachusetts	No	-	-			Choose
New Jersey	Yes	Unknown	Unknown	1900-2015	Not listed	No
Pennsylvania	Yes	Stable	Stable	1900-2015	Not listed	No
Vermont	No	-	-			Choose
Ontario	Yes	Stable	Stable	1913-2015	Not listed	Choose
Quebec	No	-	-			Choose

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 Natural Heritage Program has conducted surveys of known occurrences as recently as 2012 for Strawberry Island, 2011 for Woods Creek, 2007 for Oak Orchard Creek, 2007 for Tift Farm Marsh, and 2000 for Niagara Falls Air Force Base and Grand Island (NYNHP 2013).

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

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).

All burrows containing the devil crawfish 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 (Tift Preserve); and wetlands associated with the Niagara River and its tributaries (Strawberry Island and Ransom Road sites) (Gall and Jezerinac 1998). Morphological evidence suggest that these northwestern New York populations are derived from populations in the upper Midwest and dispersal may have occurred along the northern shore of the Lake Erie basin one or more times since the retreat of the Wisconsin ice sheets (Gall and Jezerinac 1998).

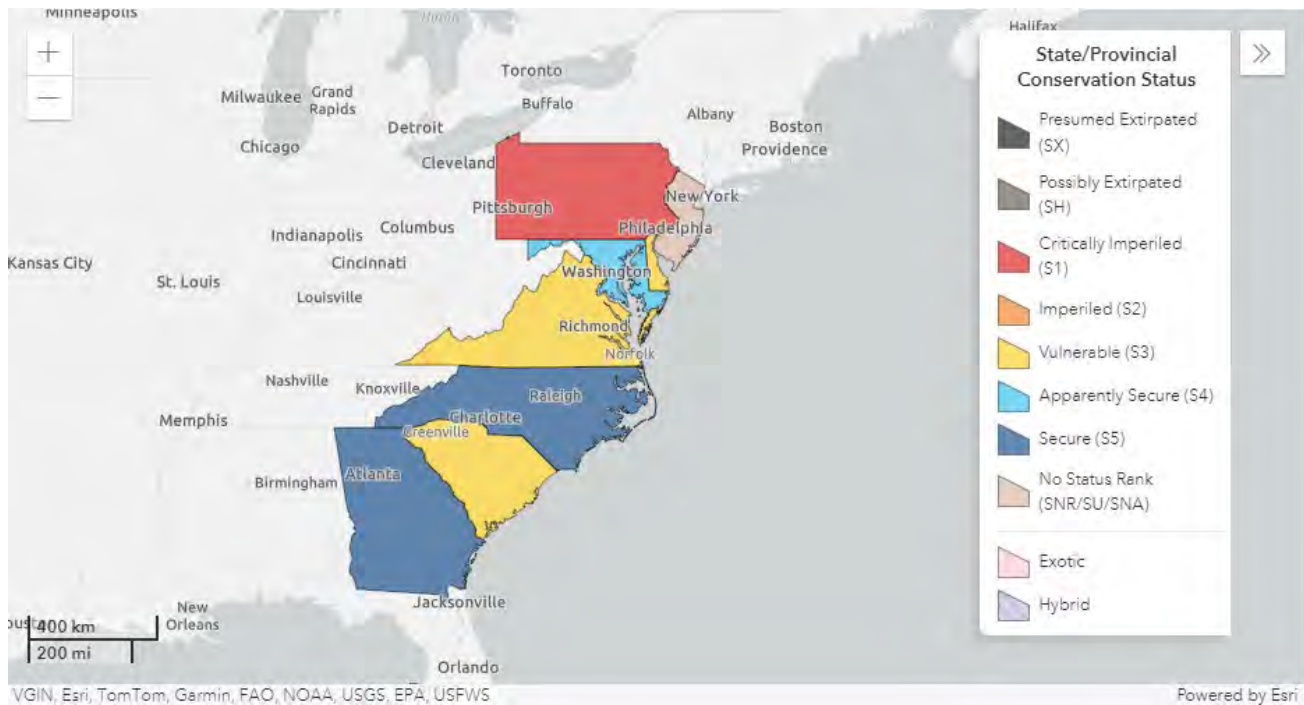


Figure 1. Conservation status of devil crawfish in North America (NatureServe 2024)

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



Figure 2: Distribution of devil crawfish in New York (NYNHP 2013).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-1995		2	<1%
1996-2014		6	<5%
2015-2023			

Table 1: Records of devil crawfish in New York.

Details of historic and current occurrence:

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: Tiff 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).

*Years are dates of last survey

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

Although this species is one of the most widely distributed and successful crayfish species in North America with stable populations, it is considered rare in New York because there are only 6 occurrences with less than 3,000 individuals (Gall and Jezerinac 1998, Cordeiro et al. 2010).

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

- a. Freshwater Marsh
- b. Riparian
- c. Headwater/Creek
- d. Wet Meadow/Shrub Swamp
- e. Ditch/Artificial Intermittent Stream

Habitat or Community Type Trend in New York

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

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:

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 crawfish 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 crawfish 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).

The following are habitat descriptions of known occurrences in New York from the Natural Heritage Program Element Occurrence Database:

Tifft Farm Marsh: This area is a reclaimed cattail marsh and one of the known locations, Lisa Pond, is likely man-made and appears degraded. Cattails, herbaceous plants, sedges, and shrubs were present and this site is a protected nature preserve.

Strawberry Island: Burrows are located along the downstream shoreline of the island located in the Niagara River. The shoreline has a continuous cover of herbs and shrubby patches, and scattered

mature *Salix* sp., *Populus deltoides*, and *Fraxinus* sp. forming a continuous cover in the western central part of the island. This site has been under the jurisdiction of the NYS OPRHP since 1989, but commercial dredging prior to 1960 has greatly reduced the surface area of the island and shoreline erosion threatens its existence.

Ransom Road Ditch: The crawfish were observed in two sections of a ditch approximately 0.5 meters deep and 1.0 meters wide with mowed lawn on both sides. This site is located in front of the Grand Island High School and is subject to highway maintenance activities.

Niagara Falls Air Force Reserve Station: Devil crawfish are found on parts of Cayuga Creek. Individuals were observed in a ditch with cattails, purple loosestrife, watercress, water plantain, curly dock, and duckweed. There is a mowed meadow on both sides of the ditch.

Oak Orchard Creek: Crawfish were found along the bank of the creek and the banks of a nearby channel. The creek is low flow with a deep clay-silt substrate and beds of submerged aquatic vegetation, scattered floating mats of green algae, and scattered emergent beds. The riparian zone alternates between marshy and forested swamps. This site offers protection since it is located in the Iroquois National Wildlife Refuge.

Wood Creek, Buckhorn Island: Individuals were found along the bank of the creek and the banks of a nearby channel. The creek has no obvious flow with a deep clay-silt substrate and beds of submerged aquatic plants, scattered floating mats of green algae, and scattered colonies of *Peltandra virginica* along the bank as emergent beds. The riparian zone is marshy with dense graminoid tussocks, scattered purple loosestrife, goldenrods, *Eupatorium* sp., Iris, and *Peltandra* sp. encroaching on the wet muddy shore between tussocks. The channel runs through a marsh and has areas of bare mud and tussock sedges near its banks. This site offers protection since it is located in Buckhorn Island State Park.

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):

Devil crawfish are solitary animals with annual cycles of reproduction and molting, only meeting with other individuals during mating season. Copulation occurs within the burrow environment during late fall and winter. Egg-laying occurs in spring after temperatures have risen. Females produce between 40-200 eggs, but only 10% typically survive past the first year (Andrews 1907). Eggs are attached to the mothers until hatching via a hardened mass and continue to stay attached to the mother's pleopods during the first larval stage, living in an embryonic-like state (Lui 2013). Larvae molt twice while attached and disconnect only in the third larval stage. Young of the year continue to stay with their mothers for protection until reaching full maturity during mid to late summer, at which time they begin to construct their own burrows (Hobbs and Jass 1988).

Two morphological types of adult males, form I and form II, occur and are associated with the reproductive cycle, usually alternating during the life cycle of an individual. Form I males are in the breeding stages while form II males are not known to mate. Immature males are in form II until the last juvenile molt when it changes to form I and alternates for the remainder of its life. Frequency of form I breeding males is lowest during the summer months, increases and reaches a maximum during the fall, and decreases during the late winter and spring months to the summer minimum (Jegla 1966). Longevity is estimated to be three years or more (Lui 2013).

The devil crawfish is prey to more than 200 predatory species, including various freshwater fishes, raccoons, owls, eastern newts, muskrats, eastern painted turtles, northern water snakes, and red-tailed hawks (Lui 2013). Their burrows, as well as their small size and ability to move quickly, give individuals some protection from predation.

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

The major threats to this species are pollution from runoff and loss and degradation of wetland habitat. Because its range is limited to Lake Erie and SW Lake Ontario watersheds, any loss or degradation of habitat in those regions will lead to population declines (NYSDEC 2005). Introduction of invasive species may cause declines in native populations (NYSDEC 2005). Other threats include water fluctuation in reservoirs and lakes, litter from anglers, channelization, habitat alteration due to changing climatic conditions, and erosion of shorelines (Cordeiro et al. 2010). Only three sites harboring populations in the state offer relatively stable or protected habitat: Buckhorn Island State Park, the Iroquois National Wildlife Refuge, and the Tiff Nature Preserve.

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.	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.
7. Natural System Modifications	7.3 Other Ecosystem Modifications	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
8. Invasive & Other Problematic Species	8.1 Invasive Non-Native Plants & Animals	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.2 Industrial & Military Effluents	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.3 Agricultural & Forestry Effluents	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.1 Habitat Shifting & Alteration	-	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 2. Threats to *devil crawfish*.

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 Freshwater Wetlands Act provides protection for wetlands greater than 12.4 acres in size under Article 24 of the NYS Environmental Conservation Law. This only covers a portion of the habitat used by this species and does not protect the habitat, nor the species, enough.

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

Surveys should be conducted in the counties where devil crawfish has been document, as well as in nearby counties (NYNHP 2013). Habitat management and conservation are necessary to protect devil crawfish populations; although two occurrences are on New York State parks and one is a national wildlife refuge, the other three are vulnerable to various disturbances.

Conservation actions following IUCN taxonomy are categorized in the table.

Action Category	Action	Description
A.1 Direct Habitat Management	A.1.0.0.0 Direct Habitat Management	Site/area management
C.6 Design and Plan Conservation	C.6.5.0.0 Conservation Planning	Site/area protection

Table 2: Recommended conservation actions for devil crawfish.

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for freshwater crustaceans, and for devil crawfish in particular.

Habitat monitoring:

- Investigate the degree of alteration to natural flow regime of waters containing the species.
- The immediate threats to these populations need to be determined.

Habitat research:

- The critical habitat needs of both species need to be evaluated.

Life history research:

- Investigate the impacts of modified flow regime on species life cycle.

Population monitoring:

- Inventories need to be conducted in their respective historical ranges.

VII. References

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