Species Status Assessment

Common Name: A mayfly **Date Updated:** 12/19/23

Scientific Name: *Acentrella barbarae* **Updated By:** B. Denoncour

Class: Insecta

Family: Baetidae

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

Need info

I. Status

a. Current legal protected Status

i. **Federal:** Unlisted **Candidate:** No

ii. **New York:** Unlisted

b. Natural Heritage Program

i. **Global:** G2G3

ii. **New York:** SPCN (2015 SWAP) **Tracked by NYNHP?:** No

Other Ranks:
Northeast Regional SGCN: Watchlist

Status Discussion:

Need info

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			(blank)
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	Unknown	Unknown			(blank)
Massachusetts	No	Unknown	Unknown			(blank)
New Jersey	No	Unknown	Unknown			(blank)
Pennsylvania	No	Unknown	Unknown			(blank)
Vermont	No	Unknown	Unknown			(blank)
Ontario	No data	Unknown	Unknown			(blank)
Quebec	No data	Unknown	Unknown			(blank)

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):*

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

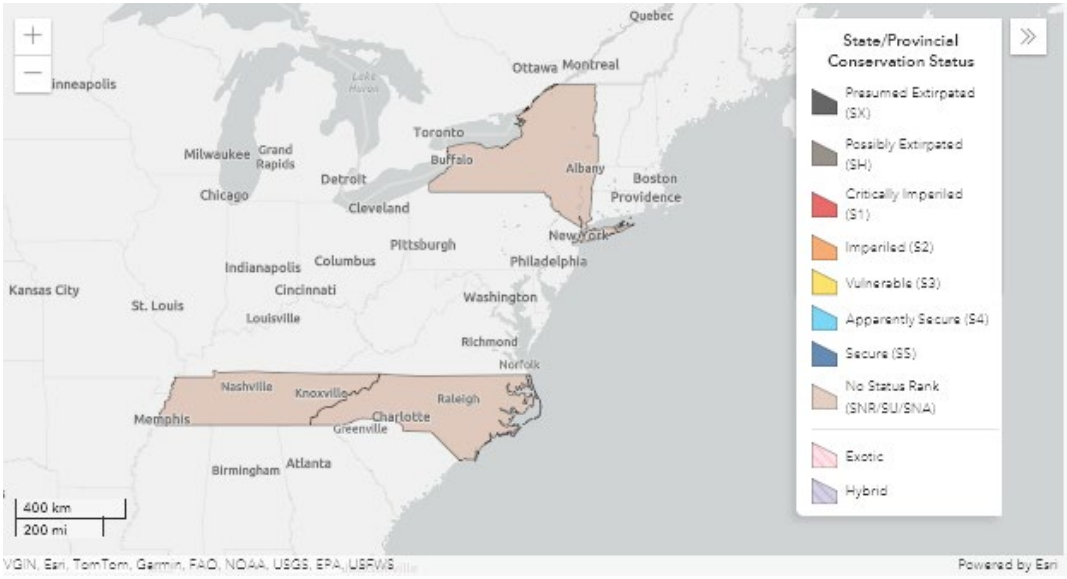

Figure 1. Conservation status of *Acentrella barbarae* in North America (NatureServe 2023)

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

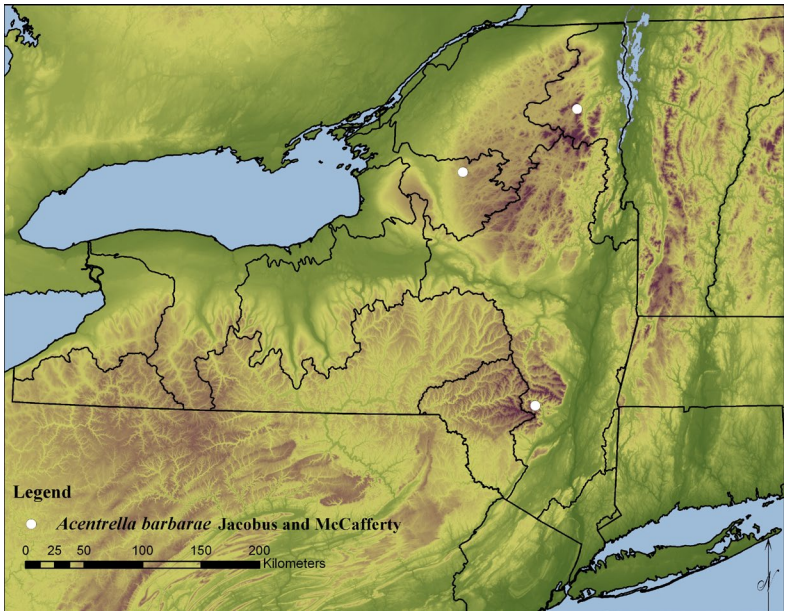

Figure 2. Distribution of *Acentrella barbarae* in New York (Jacobus and McCafferty, 2006)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State

Pre-2000	_____	_____	_____
2000- 2023	_____	_____	_____

Table 1. Records of *Acentrella barbarae* in New York.

Details of historic and current occurrence:

Three animals found at 3 locations in New York.

Essex Co., W. B. Ausable River Notch, Rt. 86 nr. Wilmington, 44.3475N, 73.8763W, July 28, 2007, 1 larva, L. Myers (Myers et al., 2008)

Herkimer Co., Sunday Creek, Number Four Rd., 43.8658N, 75.1041W, July 21, 2009, 1 larva, L. Myers (CSUC)

Ulster Co., Panther Kill, Panther Kill Rd., Southwest Phonecia, 42.0657N, 74.3513W, August 22, 2008, 1 larva, L. Myers (CSUC).

These records extend this species known range of geographic distribution northwards from Tennessee and North Carolina, representing the first reports of the species since its original description from Great Smoky Mountains National Park (Jacobus and McCafferty 2006). In New York, mature nymphs of this species have been collected in July and August from small streams and medium sized rivers.

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
26-50%	(blank)	

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. Headwater Creek

b. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	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:

Small perennial streams to medium-sized rivers.

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	(blank)	(blank)	(blank)	(blank)	(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):*

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

Threats to NY Population	
Threat Category	**Threat**
1. Natural Systems Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

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:

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Acentrella barbarae)*

VII. References

Jacobus, L.M. and W.P. McCafferty. 2006 A new species of Acentrella Bengtsson (Ephemeroptera: Baetidae) from Great Smoky Mountains National Park, USA. Aquatic Insects 28: 101-111.

Myers, L. 2013. NYSDEC SWAP 2015 Species Status Assessment for Acentrella barbarae. Prepared on October 29, 2013. Revised by Samantha Hoff on February 11, 2014.

Originally prepared by	Luke Myers
Date first prepared	October 29, 2013
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Illinois snowfly **Date Updated:** 12/21/23

Scientific Name: *Allocapnia illinoensis* **Updated By:** B. Denoncour

Class: Insecta

Family: Capniidae

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

The Illinois snowfly (*Allocapnia illinoensis*) is little known in New York. There is one historical occurrence of this species in New York in the Susquehanna watershed (Otsego Co.) and one recently recorded occurrence in the Lake Champlain watershed (Clinton Co.) (Myers et al. 2010). Isolated populations of this species have been reported from Quebec west to Minnesota, and southward to Virginia (Ross and Ricker 1971, Stark et al. 2010). Ross and Ricker (1971) provided a distributional map of this species that included several localities throughout New York; however, no precise locality information was given. A single male specimen was collected during recent surveys by Myers et al. (2010) from a small first order tributary to True Brook in the northeastern Adirondacks. This particular stream has a low gradient and a substrate composed primarily of sand and cobble, with moss covering some of the larger in-stream substrates (Myers et al. 2010). Ross and Ricker (1971) describe the habitat for this species as small perennial streams.

I. Status

a. Current legal protected Status

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

ii. **New York:** Unlisted; SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
-Northeast Regional SGCN: RSGCN, Moderate Concern

Status Discussion:

Little is known about the status of this species.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	Choose an item.	Choose an item.			Choose an item.
Massachusetts	No	Choose an item.	Choose an item.			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	Yes	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No data	Unknown	Unknown			Choose an item.
Quebec	No data	Unknown	Unknown			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):*

There are no current monitoring activities or regular surveys for this species.

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

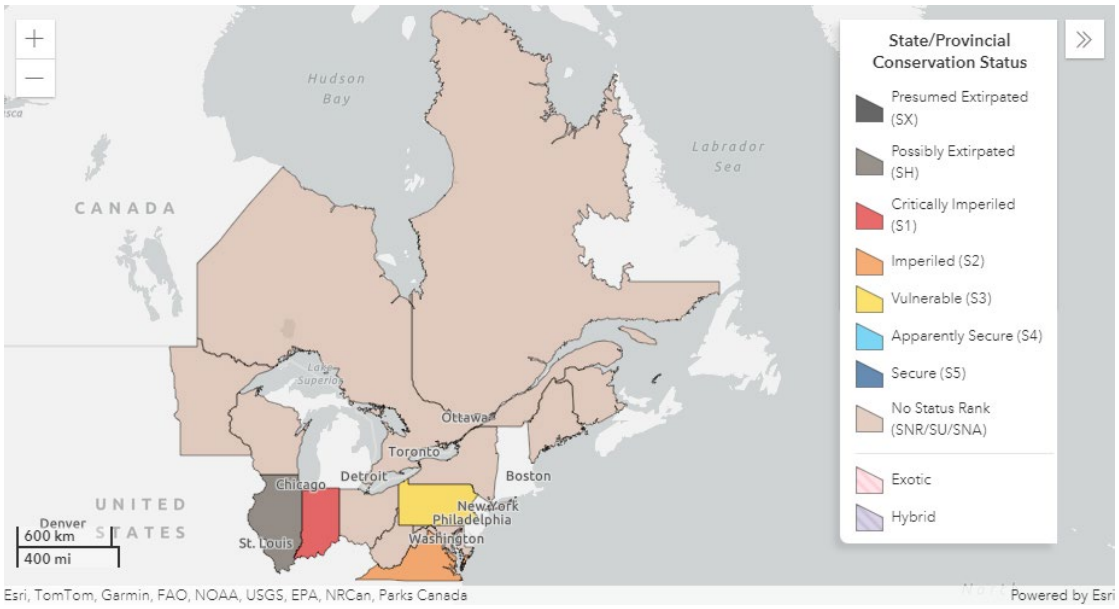

Figure 1. Conservation status *of Allocapnia illinoensis* in North America (NatureServe 2023)

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

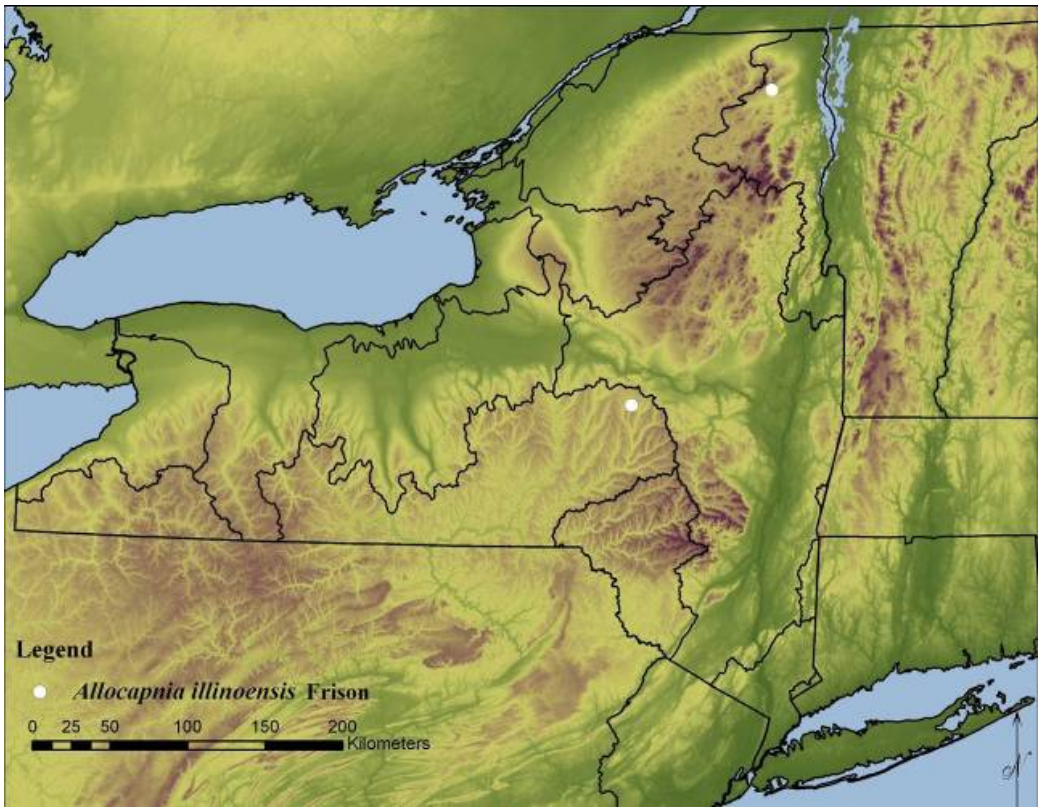

Figure 3. Distribution of *Allocapnia illinoensis* (Frison) in New York State

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	1	1	0-5%
2000- 2023	1	1	0-5%

Table 1. Records of *Allocapnia illinoensis* in New York.

Details of historic and current occurrence:

Otsego County: Trout Brook, Southeast of Richfield, April 2, 1960, 1 male. K.R. Chadwick (INHS).

Clinton County: Tributary to True Brook, Clark Hill Rd., 44.6588N, 73.8022W, April 1, 2007, 1 male, T. Mihuc (CSUC).

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%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

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

Small perennial streams (Ross and Ricker 1971). True Brook in the northeastern Adirondacks has a low gradient and a substrate composed primarily of sand and cobble, with moss covering some of the larger in-stream substrates (Myers et al. 2010).

V. Species Demographic and Life History:

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

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):*

Nymphs of this genus are often associated with the hyporheic zones of streams. Populations could be adversely affected by disturbances to the benthos such as dredging and channel modifications. Adults of this species are known to have limited dispersal capabilities. Adult males are wingless and although females do have wings they have never been observed in free flight. Significant downstream dispersal of members of this genus has been observed on floating sheets of ice (Myers, pers. comm.).

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation,

nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

New conservation actions have not been identified. Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

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

Conservation Actions	
Action Category	**Action**

1. Habitat management	Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).
2. Habitat research	Determine the critical habitat of the species
3. Population monitoring	Survey sites within the historical range of these species

Table 2. Recommended conservation actions for stoneflies and mayflies of lotic waters, and for *Allocapnia illinoensis* in particular, as identified in the Comprehensive Wildlife Conservation Strategy (NYSDEC 2005).

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.113850/Allocapnia_illinoensis Accessed: December 21, 2023.

New York State Department of Conservation (NYSDEC). 2005. New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Ross, H. H. and W. E. Ricker. 1971. The classification, evolution, and dispersal of the winter stonefly genus *Allocapnia*. Illinois Biological Monographs 45: 1-166.

Shea, J. 2011. NYSDEC SWAP 2015 Species Status Assessment for *Allocapnia illinoensis*. Prepared on December 19, 2011. Revised by Samantha Hoff on February 10, 2014.

Stark, B. P., R. W. Baumann and R. E. DeWalt. 2010. Valid Stonefly Names for North America. Available http://plsa.inhs.uiuc.edu/plecoptera (Accessed: January 27, 2010).

Originally prepared by	John Shea
Date first prepared	December 19, 2011
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Ohio snowfly **Date Updated:** 12/21/23

Scientific Name: *Allocapnia ohioensis* **Updated By:** B. Denoncour

Class: Insecta

Family: Capniidae

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

Previous reports of this species are available from New York, Ohio, Indiana, West Virginia and Kentucky (Ross and Ricker, 1971; Stark et al., 2010). This species reportedly occurs in small, gravel bottom streams with cool spring-fed tributaries (Ross and Ricker, 1971). In New York, this species appears to be uncommon; a single record is available from New York, collected 50 years ago from Herkimer County, in the Mohawk Valley, and there are no reports from neighboring states.

I. Status

a. Current legal protected Status

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

ii. **New York:** SGCN

b. Natural Heritage Program

i. **Global:** G4

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

Other Ranks:
None

Status Discussion:

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Unknown			Yes
Connecticut	No data	Unknown	Unknown			Choose an item.

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Massachusetts	No data	Unknown	Unknown			Choose an item.
New Jersey	No data	Unknown	Unknown			Choose an item.
Pennsylvania	No data	Unknown	Unknown			Choose an item.
Vermont	No data	Unknown	Unknown			Choose an item.
Ontario	No data	Unknown	Unknown			Choose an item.
Quebec	No	Unknown	Unknown			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):*

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

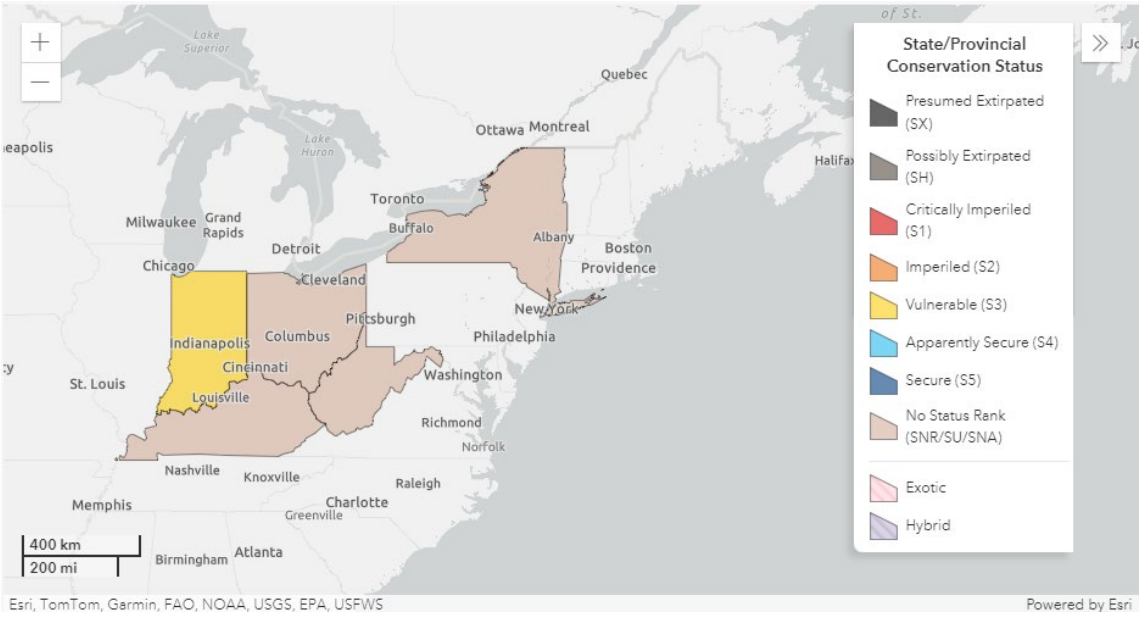

Figure 1. Conservation status of *Allocapnia ohioensis* in North America (NatureServe 2023)

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

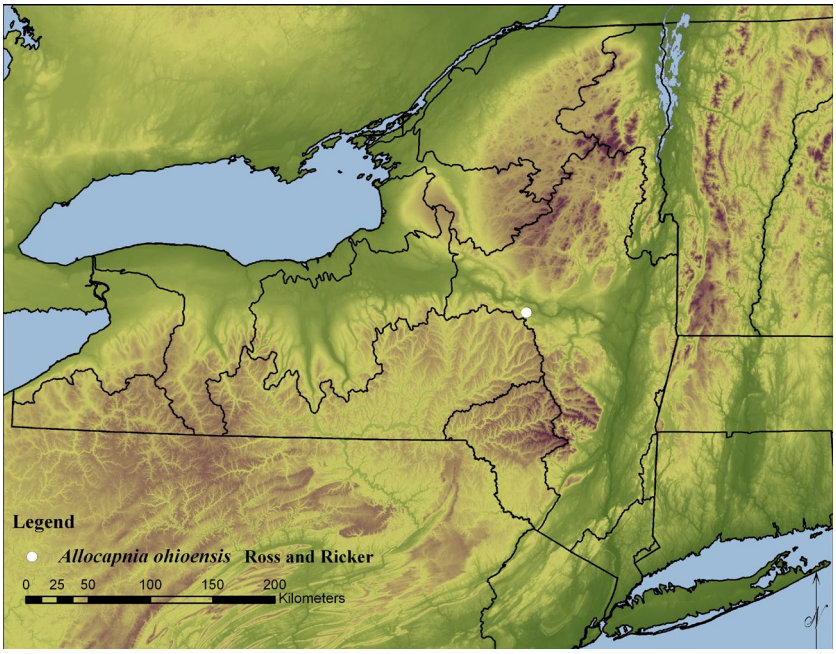

Figure 3. Records of *Allocapnia ohioensis* in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	2	1	0-5%
2000- 2023			

Table 1. Records of *Allocapnia ohioensis* in New York.

Details of historic and current occurrence:

Herkimer Co., NW Starkville, March 27, 1960, 1 male, 1 female, K.R. Chadwick (INHS).

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. Headwater Creek

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	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:

Small spring-fed streams (Ross and Ricker, 1974).

V. Species Demographic and Life History:

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

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):*

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

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:

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Allocapnia ohioensis)*.

VII. References

Myers, L. 2013. NYSDEC SWAP 2015 Species Status Assessment for *Allocapnia ohioensis*. Prepared on October 29, 2013. Revised by Samantha Hoff on February 10, 2014.

NatureServe. 2023. NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.117155/Allocapnia_ohioensis Accessed December 21, 2023.

Ross, H. H. and W. E. Ricker. 1971. The classification, evolution, and dispersal of the winter stonefly genus *Allocapnia*. Illinois Biological Monographs 45: 1-166.

Stark, B. P., R. W. Baumann and R. E. DeWalt. 2010. Valid Stonefly Names for North America. Available http://plsa.inhs.uiuc.edu/plecoptera (Accessed: January 27, 2010).

Originally prepared by	Luke Myers
Date first prepared	October 29, 2013
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: A stonefly **Date Updated:** 1/3/2024

Scientific Name: *Alloperla leonarda* **Updated By:** B. Denoncour

Class: Insecta

Family: Chloroperlidae

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

This species has been reported from scattered locations extending from New Brunswick and Quebec south and west along the Great Lakes and St. Lawrence Drainages to Missouri (Surdick, 1985; Kondratieff and Baumann, 1994; Surdick, 2004; Willett and Stark, 2009; Stark et al., 2010). A morphological analysis of *A leonarda* has indicated that there may be two distinct species in eastern North America (Willett and Stark, 2009).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed

b. Natural Heritage Program

i. **Global:** G4

ii. **New York:** none **Tracked by NYNHP?:** No

Other Ranks:
None

Status Discussion:

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	No data	Unknown	Unknown			Choose an item.

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Connecticut	No data	Choose an item.	Choose an item.			Choose an item.
Massachusetts	No data	Choose an item.	Choose an item.			Choose an item.
New Jersey	No data	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	No data	Choose an item.	Choose an item.			Choose an item.
Vermont	No data	Choose an item.	Choose an item.			Choose an item.
Ontario	No data	Choose an item.	Choose an item.			Choose an item.
Quebec	No data	Choose an item.	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):*

None.

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

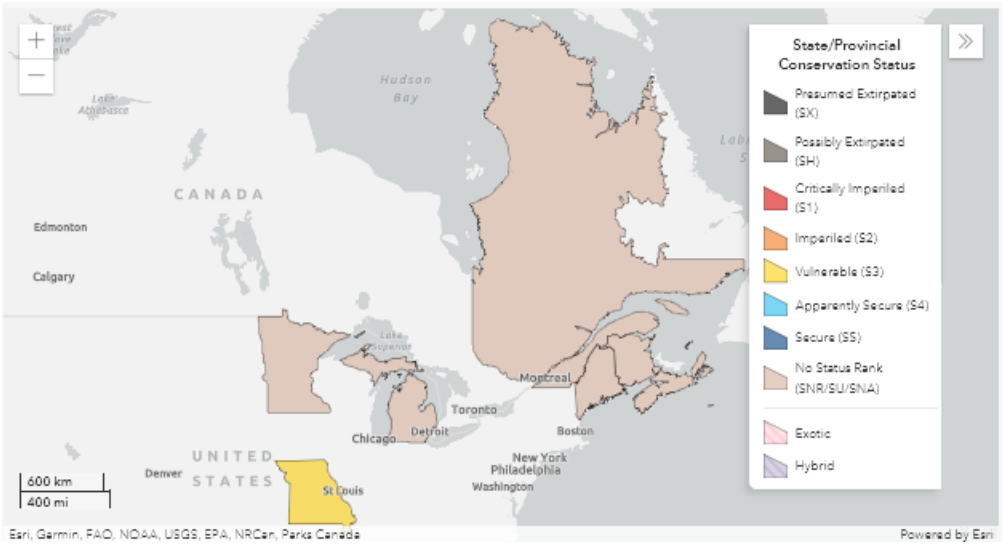

Figure 1. Conservation status of *Alloperla leonarda* in North America (NatureServe 2023)

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

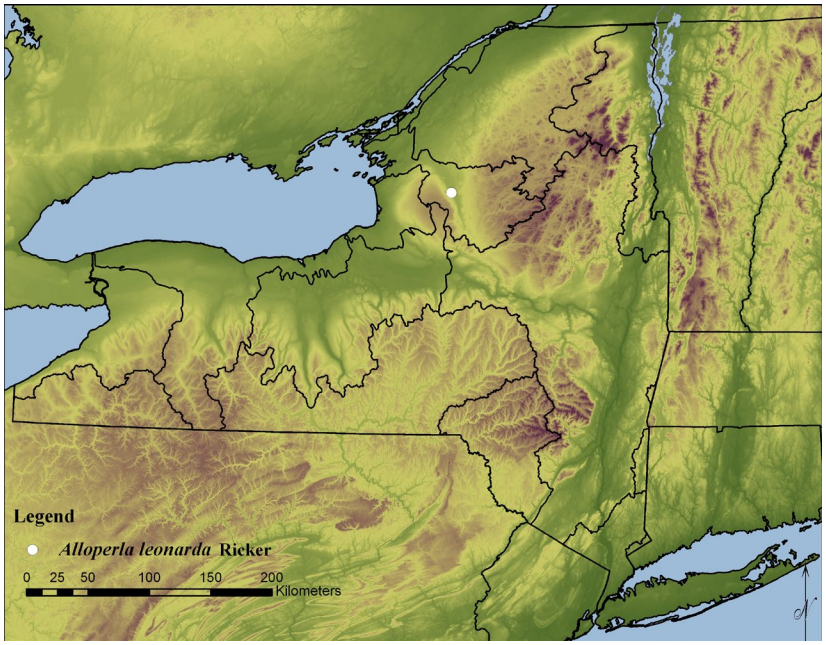

Figure 2. Distribution of *Alloperla leonarda* (Ricker) in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000			
2000- 2023	1	1	

Table 1. Records of *Alloperla leonarda* in New York.

Details of historic and current occurrence:

Lewis Co., Black River, Number Four Rd., nr. Lowville at Beeches Bridge Boat Launch, 43.7746, 75.4468W, May 22, 2008, 1 male, B. C. Kondratieff, R. W. Baumann, and L. Myers (CSUC).

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%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	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:

Large rivers

V. Species Demographic and Life History:

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

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):*

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

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:

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Alloperla leonarda*)

VII. References

NatureServe. 2023. NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.107296/Alloperla_leonarda Access January 3, 2024.

Ross, H. H. and W. E. Ricker. 1971. The classification, evolution, and dispersal of the winter stonefly genus *Allocapnia*. Illinois Biological Monographs 45: 1-166.

Stark, B. P., R. W. Baumann and R. E. DeWalt. 2010. Valid Stonefly Names for North America. Available http://plsa.inhs.uiuc.edu/plecoptera (Accessed: January 27, 2010).

Originally prepared by	Luke Myers
Date first prepared	October 29, 2013
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Lawrence sallfly **Date Updated:** 1/3/2024

Scientific Name: *Alloperla voinae* **Updated By:** B. Denoncour

Class: Insecta

Family: Chloroperlidae

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

There are four occurrences of Lawrence sallfly in New York, two historic and two recent. Both historic occurrences were from the Lake Champlain watershed in Essex County. One recent occurrence is from the Lake Champlain watershed (Clinton Co.) and the other is from the St. Lawrence River watershed (Franklin Co.). All occurrences for this species were found within the Adirondack Park (Myers et al. 2010). Outside of New York, records of this uncommon species are available from the following Canadian Provinces and states: Nova Scotia, Quebec, Maine, Massachusetts, and Vermont (Surdick 1985, 2004, Baumann and Kondratieff 2009, Stark et al. 2010). In New York, this species has been collected from cold, small to medium sized, high elevation streams in the Adirondack Mountains. Adult collection dates ranged from mid-June to late July.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
Northeast Regional SGCN: RSGCN

Status Discussion:

Status of this stonefly is unknown.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	Choose an item.	Choose an item.			Choose an item.
Massachusetts	Yes	Unknown	Unknown			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	Yes	Unknown	Unknown			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No data	Choose an item.	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):*

There are no monitoring activities or regular surveys for this species.

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

Trend information for this species is unknown.

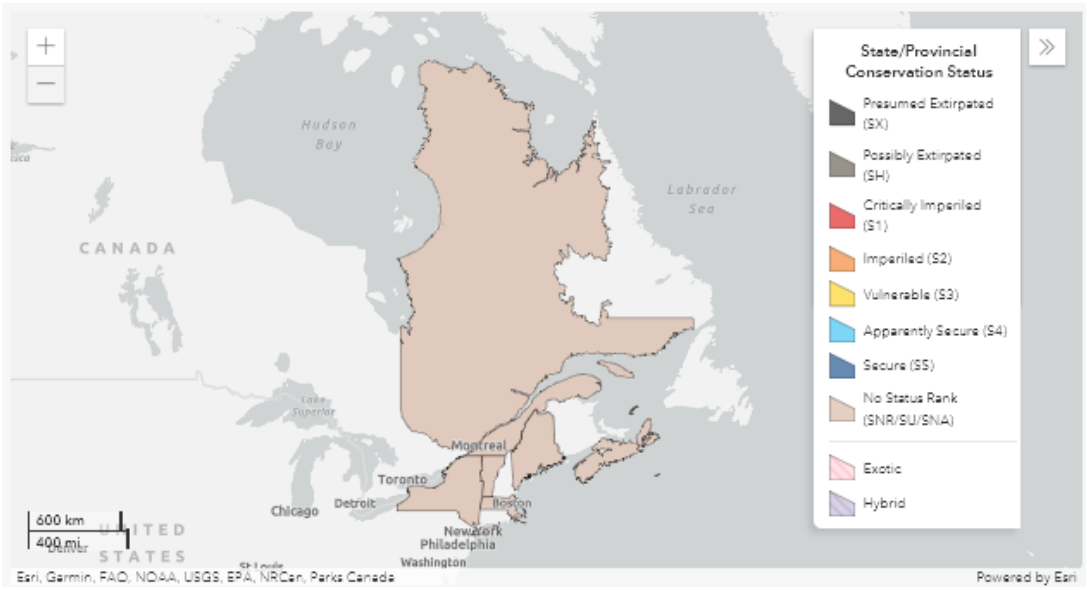

Figure 1. Conservation status of *Alloperla voinae* in North America (NatureServe 2023)

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

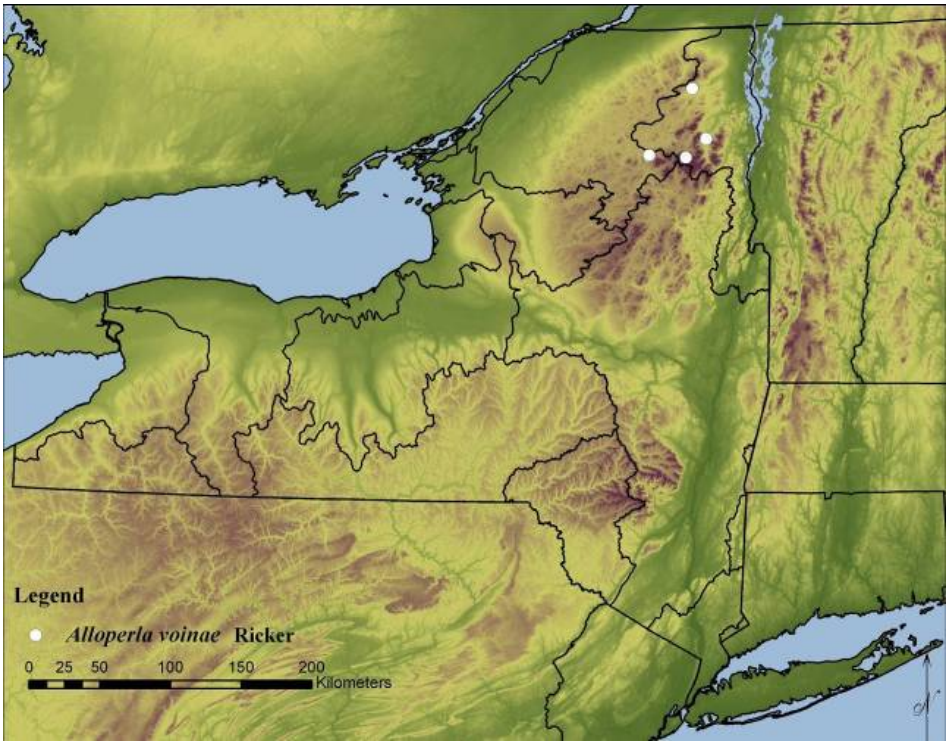

Figure 2. Distribution of *Alloperla voinae* (Ricker) in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State

Pre-2000	_____	2	_____
2000- 2023	_____	_____	_____

Table 1. Records of *Alloperla voinae* in New York.

Details of historic and current occurrence:

Essex County, Adirondack Lodge, June 28, 1923, 1 male, P.W. Claassen (CUIC); Keene, Tributary of Ausable River, June 20, 1941, 1 male, T.H. Frison and H.H. Ross (paratype, INHS).

Clinton Co: Cold Brook, Standish Rd. High Banks, 44.6191N, 73.9032W, July 27, 2007, 4 males, L. Myers (CSUC).

Essex Co: Adirondack Lodge, June 28, 1923, 1 male, P.W. Claassen (CUIC); Keene, Tributary of Ausable River, June 20, 1941, 1 male, T.H. Frison and H.H. Ross (paratype, INHS).

Franklin Co: Ampersand Brook, Coreys Rd. nr. Pickerel Pond Outlet, 44.1988N, 74.2916W, July 28, 2007, 3 males, 3 females, L. Myers (CSUC); Same location, June 27, 2007, 4 males, L. Myers and B. C. Kondratieff (CSUC).

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

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. Riverine

Habitat or Community Type Trend in New York

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

Small to medium sized cool headwater streams (Myers et al. 2010).

V. Species Demographic and Life History:

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

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):*

Nymphs of this genus are often associated with the hyporheic zones of streams. Populations could be adversely affected by disturbances to the benthos such as dredging and channel modifications. Larvae of this genus are extremely intolerant of stream pollution. Adults of this species have been collected from lights. Populations of this species could be adversely affected by light pollution (Myers, pers. comm.).

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.
From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

Conservation actions following IUCN taxonomy are categorized in the table.

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

Conservation Actions

Action Category	Action
Land/Water Protection	Resource/Habitat Protection

Table 2. Recommended conservation actions for *Alloperla voinae*.

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of uncertain habitat.

Habitat management:

____ Control the activity level and intensity in and around historic waters where these species are known to have habitats.

Habitat research:

____ Determine the critical habitat for these species.

Population monitoring:

____ Survey potential sites in the historical range of the species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Baumann, R. W. and B. C. Kondratieff. 2009. A study of the eastern Nearctic *Alloperla* (Plecoptera: Chloroperlidae) with hirsute epiprocts using the scanning electron microscope. Illiesia 5: 99-107.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.112626/Alloperla_voinae Accessed January 3, 2024.

New York State Department of Environmental Conservation (NYSDEC). 2005. New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Stark, B. P., R. W. Baumann and R. E. DeWalt. 2010. Valid Stonefly Names for North America. Available http://plsa.inhs.uiuc.edu/plecoptera (Accessed: January 27, 2010).

Surdick, R. F. 1985. Nearctic genera of Chloroperlidae (Plecoptera: Chloroperlidae). Illinois Biological Monographs 54: 1-146.

Surdick, R. F. 2004. Chloroperlidae (The Sallflies), *In* B. P. Stark and B. J. Armitage (editors), The Stoneflies (Plecoptera) of eastern North America Volume II. Chloroperlidae, Perlidae, and Perlodidae (Perlodinae). Bulletin of the Ohio Biological Survey New Series 14: 1-60.

Originally prepared by	John Shea
Date first prepared	December 19, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Scotia sallfly **Date Updated:** 1/3/2024

Scientific Name: *Alloperla vostoki* **Updated By:** B. Denoncour

Class: Insecta

Family: Chloroperlidae

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

There is one historic occurrence of Scotia sallfly from the Lake Ontario watershed (Wyoming Co.) and three recent occurrences: two from the Lake Ontario watershed (Jefferson Co.) and one from the Upper Hudson River watershed (Greene Co.) (Myers et al. 2010). This species has also been reported infrequently from Nova Scotia, New Brunswick, Maine, and Pennsylvania (Surdick 1985, Surdick 2004, Baumann and Stark 2009, Stark et al. 2010). More surveys using effective collection techniques (i.e. beating sheets and light traps) targeting appropriate habitats, may yield additional distributional records of this rare species in New York (Myers et al. 2010). The habitat is described as medium-sized rivers.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
Northeast Regional SGCN: RSGCN

Status Discussion:

Status information is relatively unknown due to lack of information and occurrence records.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
New York	Yes	Unknown	Unknown			Yes
Connecticut	No data	Choose an item.	Choose an item.			Choose an item.
Massachusetts	No data	Choose an item.	Choose an item.			Choose an item.
New Jersey	No data	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	Yes	Unknown	Unknown			Choose an item.
Vermont	No data	Choose an item.	Choose an item.			Choose an item.
Ontario	No data	Choose an item.	Choose an item.			Choose an item.
Quebec	No data	Choose an item.	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):*

None.

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

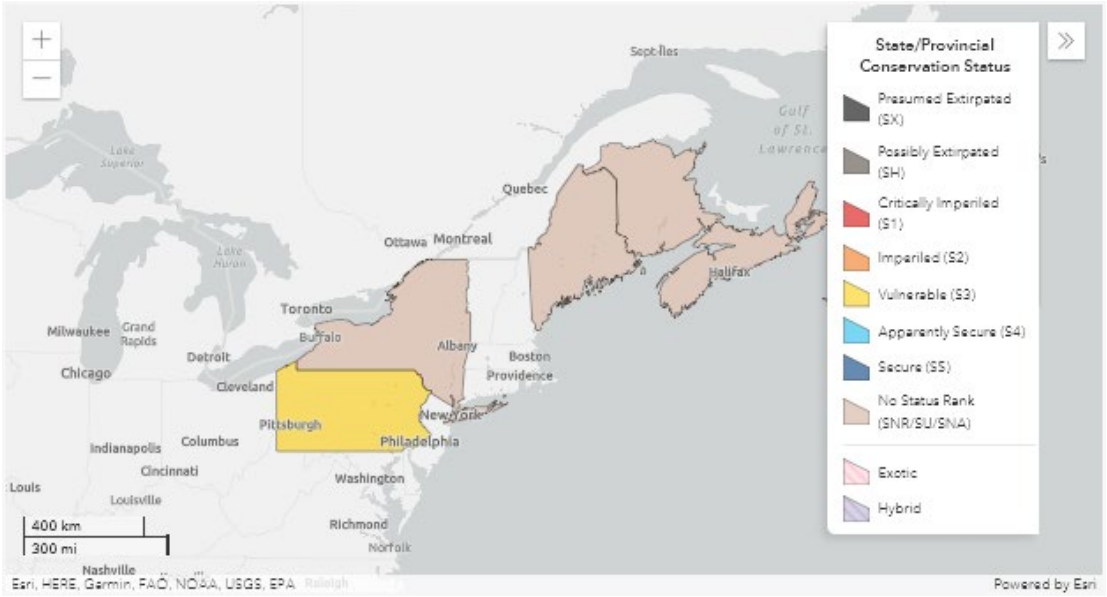

Figure 1. Conservation status of *Alloperla vostoki* in North America (NatureServe 2023)

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

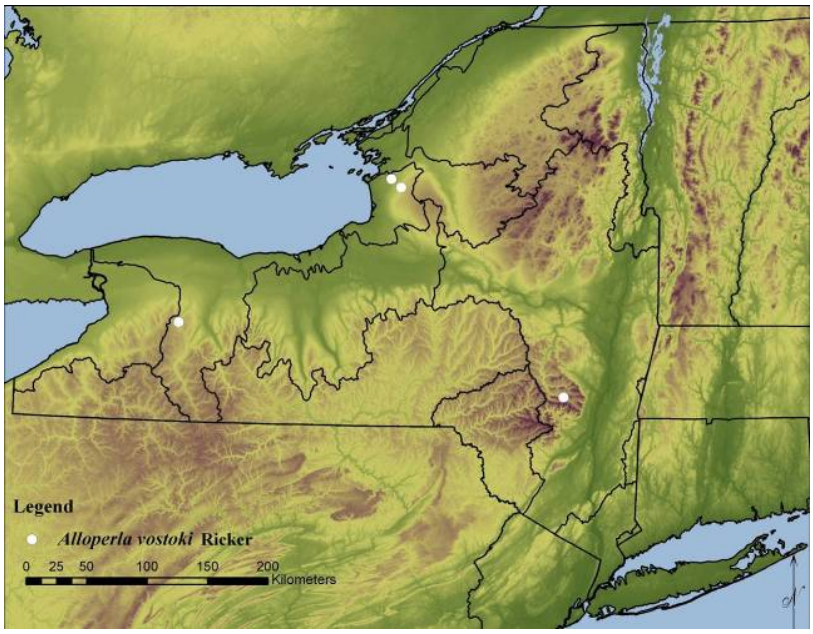

Figure 2. Distribution of *Alloperla vostoki* (Ricker) in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	_____
2000- 2023	_____	3	0-5%

Table 1. Records of *Alloperla vostoki* in New York.

Details of historic and current occurrence:

Wyoming County, Warsaw, June 18, 1941, 12 females, T.H. Frison and H.H. Ross (INHS); Same location, June 18, 1941, 3 males, T.H. Frison and H.H. Ross (paratypes, INHS).

Greene Co., Schoharie Creek, Jct. Denning Rd. and Rt. 23A, 42.2164N, 74.2431W, June 25, 2007, 1 male, L. Myers and B. C. Kondratieff (CSUC).

Jefferson Co., BLT, South Sandy Creek, CR-95, N. Bullock Corners, 43.7881N, 75.8948W, June 29, 2009, 1 male, L. Myers (CSUC); N. B. Sandy Creek, Jct. CR-69 and Fuller Rd, 43.8518N, 75.9951W, June 30, 2009, 2 males, L. Myers (CSUC).

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%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

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

V. Species Demographic and Life History:

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

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):*

Nymphs of this genus are often associated with the hyporheic zones of streams.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.
From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Alloperla vostoki*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Alloperla vostoki* in particular.

Habitat management:

_____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

_____ Determine the critical habitat of the species.

Population monitoring:

_____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.113982/Alloperla_vostoki Accessed January 3, 2024.

New York State Department of Environmental Conservation (NYSDEC). 2005. New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

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Originally prepared by	John Shea
Date first prepared	December 19, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Tarter's comb minnow mayfly **Date Updated:** 12/21/23

Scientific Name: *Ameletus tarteri* **Updated By:** B. Denoncour

Class: Insecta

Family: Ameletidae

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

Ameletus tarteri is a mayfly of which little is known in New York. Outside of New York, this uncommon species has been reported from West Virginia and Virginia (Burrows 1987). In New York it has only been found at a single location in the Susquehanna watershed in Chemung County. Burrows (1987) reported this species from rocky first- and second-order streams (Burrows 1987).

I. Status

a. Current legal protected Status

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

ii. **New York:** SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
None

Status Discussion:

This species is globally ranked vulnerable because it is evidently restricted in its geographic distribution, although it was only described relatively recently and little is known about its status.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Choose an item.			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	Choose an item.	Choose an item.			Yes

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Massachusetts	No	Choose an item.	Choose an item.			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trends for this species are unknown.

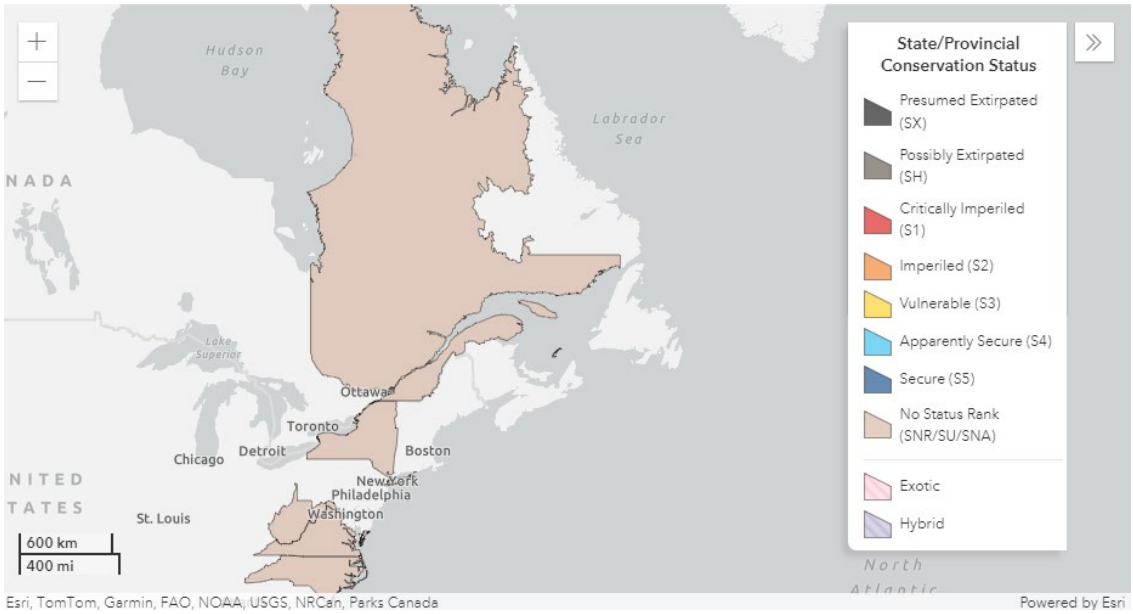

Figure 1. Conservation status of *Ameletus tarteri* in North America (NatureServe 2023)

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

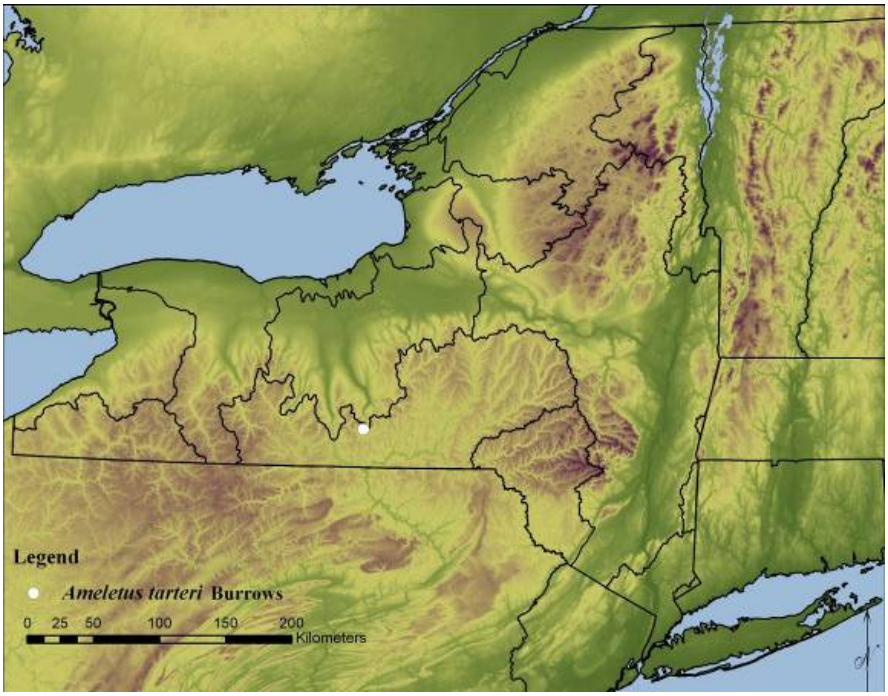

Figure 3. Distribution of *Ameletus tarteri* in New York (Meyers et al. 2010).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Ameletus tarteri* in New York.

Details of historic and current occurrence:

There is one historical record of occurrence at McCorn Creek, Chemung County on April 7, 1976 (Burrows 1987). There are no current occurrence records available for this species in New York. There are fewer than 20 individuals reported from New York at fewer than five locations.

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
26-50%	Disjunct	West Virginia, Virginia

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. Riverine, coldwater stream

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	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:

The habitat preference of *A. tarteri* is vertical rock surfaces, perhaps even slanted beyond the perpendicular for the mature nymphs, while flat rock surfaces in shallow eddies were preferred by the younger nymphs. Nymphs have been found to have a preference for high elevation streams and have been found at elevations >3000 ft. (Matthews and Tarter 1989).

V. Species Demographic and Life History:

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

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):*

Very little is known regarding the life history of this species.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive/ Non-native Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

New conservation actions have not been identified. Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

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

Conservation Actions	
Action Category	**Action**
1. Habitat management	Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found)
2. Habitat research	Determine the critical habitat of the species
3. Population monitoring	Survey sites within the historical ranges of these species

Table 2. Recommended conservation actions for stoneflies and mayflies of lotic waters, and for *Ameletus tarteri* in particular, as identified in the Comprehensive Wildlife Conservation Strategy (NYSDEC 2005).

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Burrows, W. L. 1987. A new species of *Ameletus* (Ephemeroptera: Siphlonuridae) from eastern North America. Proceedings of the Entomological Society of Washington 89: 284-287.

Matthews, K.A. and D.C. Tarter. 1989. Ecological life history, including laboratory investigation, of the mayfly, Ameletus tarteri. Psych 96:21-38.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

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New York State Department of Environmental Conservation (NYSDEC). 2005. New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Originally prepared by	John Shea
Date first prepared	December 8, 2011
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Trinity comb minnow mayfly **Date Updated:** 1/9/24

Scientific Name: *Ameletus tertius* **Updated By:** B. Denoncour

Class: Insecta

Family: Amelitidae

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

Ameletus tertius is a mayfly of which little is known in New York. Its range extends from the Canadian Maritime provinces southward to the southern Appalachian Mountains in the United States (Zloty 1996, DeWalt et al. 2007). This species appears to be relatively common in Maine and New Hampshire (Burian and Gibbs 1991, Chandler et al. 2006). Previously known to occur only in the Susquehanna watershed, a recent study identified individuals in the Upper Hudson (Greene Co.), Lake Champlain (Washington Co.), and NE Lake Ontario – St. Lawrence (Hamilton Co.) watersheds (Holst 2005, Myers et al. 2010). The habitat for this species is described as stream order 1-4, erosional with secondary depositional areas (Burian and Gibbs 1991).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed, SGCN

b. Natural Heritage Program

i. **Global:** G4

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

Other Ranks:
Northeast Regional SGCN: Watchlist

Status Discussion:

This species is globally ranked Apparently Secure as it has a widespread distribution and is relatively common in some portions of its range (NatureServe 2023).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Choose an item.	Choose an item.			(blank)
Northeastern US	Yes	Unknown	Unknown			(blank)
New York	Yes	Unknown	Unknown			Yes
Connecticut	Yes	Unknown	Unknown			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Massachusetts	Yes	Unknown	Unknown			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No	N/A	N/A			(blank)
Vermont	Yes	Unknown	Unknown			Yes
Ontario	No data	Unknown	Unknown			(blank)
Quebec	No data	Unknown	Unknown			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York.

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

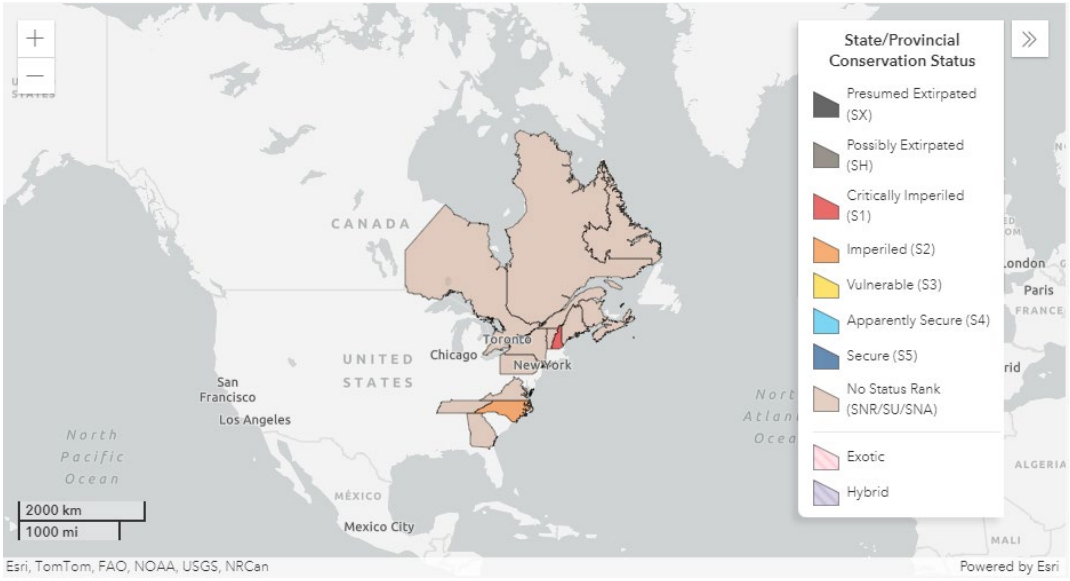

Figure 1. Conservation status of *Ameletus tertius* in North America (NatureServe 2023)

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

Trend information for this species is unknown.

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

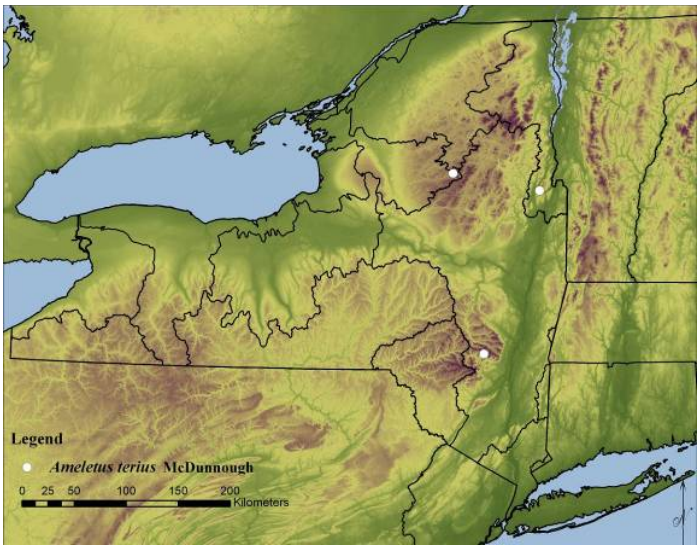

Figure 2. Records of *Ameletus tertius* (McDunnough) in New York (Meyers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	0	_____
2000- 2023	_____	4	_____

Table 1. Records of *Ameletus tertius* in New York.

Details of historic and current occurrence:

County Unspecified, New York State (Zloty 1996); Greene Co., BLT, Lanesville, 412 meters, June 20, 1978, 1 male, T.L. McCabe (NYSM); Hamilton Co., reared, June 12, 2008, Silver Run, Limekiln Rd., 43.6954N, 74.6019W, June 6, 2008, 3 males, L. Myers and R. Mowrey (CSUC); Washington Co., reared, May 20, 2008, Stream off Little Buck Mountain, Shelving Rock Rd., 43.5385N, 73.5723W, April 30, 2008, 12 females, 12 E, 3L, L. Myers (CSUC).

There are four known occurrences of this species in New York and it has been reported recently from several northern rivers in the White Mountain region of New Hampshire and documented in New Brunswick as well (NatureServe 2013).

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%	Disjunct	

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. Riverine, cold water stream, SAV

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	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:

It occurs in first through fourth order erosional streams with depositional areas (Burian and Gibbs 1991).

V. Species Demographic, 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):*

Very little is known regarding the life history of this species.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Ameletus tertius*).

Habitat management:
____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).
Habitat research:
____ Determine the critical habitat of the species.
Population monitoring:
____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Burian, S. K. and K. E. Gibbs. 1991. Mayflies of Maine: an annotated faunal list. Maine Agricultural Experiment Station, Technical Bulletin 142: 109 pp.

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DeWalt, R. E., L. M. Jacobus and W. P. McCafferty. 2007. Summer Ephemeroptera, Plecoptera, and Trichoptera from southwestern drainages in Great Smoky Mountains National Park, with additional Ephemeroptera records. Proceedings of the Entomological Society of Washington 109: 136-154.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.111289/Ameletus_tertius Accessed January 9, 2024

New York State Department of Environmental Conservation (NYSDEC). 2005 New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Zloty, J. 1996. A revision of the Nearctic *Ameletus* mayflies based on adult males, with descriptions of seven new species (Ephemeroptera: Ameletidae). Canadian Entomologist 128: 293-34.

Originally prepared by	John Shea
Date first prepared	December 7, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Rusty small minnow mayfly **Date Updated:** 1/9/2024

Scientific Name: *Baetis rusticans* **Updated By:** B. Denoncour

Class: Insecta

Family: Baetidae

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

Baetis rusticans is a mayfly of which little is known in New York. This species occurs primarily in the northeastern United States and Canada, and a small disjunct population is known in Texas (McCafferty 2001). McCafferty (2001) reviewed past reports, including historic misidentifications; larvae are still unknown for this species. Preliminary DNA barcode data obtained from these recent collections of *B. ruticans* in New York has raised concerns over the validity of this species. This mayfly was known to occur historically only in the NE Lake Ontario – St. Lawrence watershed (Traver 1935). Recent surveys have located additional occurrences of this species in the Lake Champlain (Clinton Co.), NE Lake Ontario – St. Lawrence (St. Lawrence, Fulton counties), and the Upper Hudson (Lewis, Warren, Saratoga, Greene counties) watersheds. The habitat for this species consists of medium to large streams and rivers (Myers et al. 2010).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G2

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

Other Ranks:
None

Status Discussion:

This species is globally ranked Imperiled because it is considered an infrequently taken species, potentially of concern (NatureServe 2013).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No data	Unknown	Unknown			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No data	Unknown	Unknown			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No data	Unknown	Unknown			(blank)
Quebec	No data	Unknown	Unknown			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York. This species is known from 7 locations in New York state but is infrequently taken throughout its range (NatureServe 2023).

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

Trend information for this species is unknown. Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

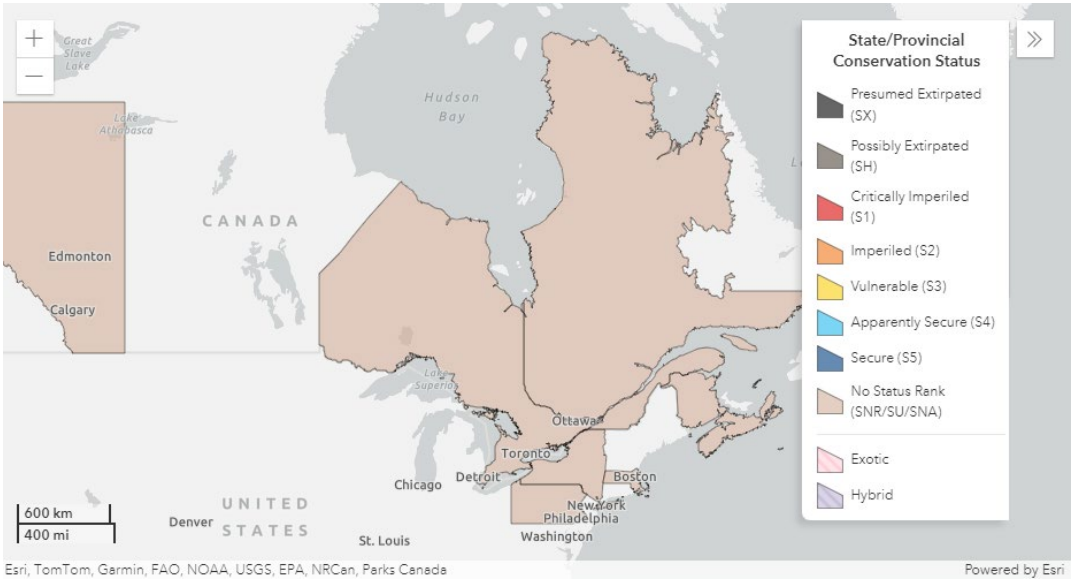

Figure 1. Conservation status of *Baetis rusticans* in North America (NatureServe 2023)

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

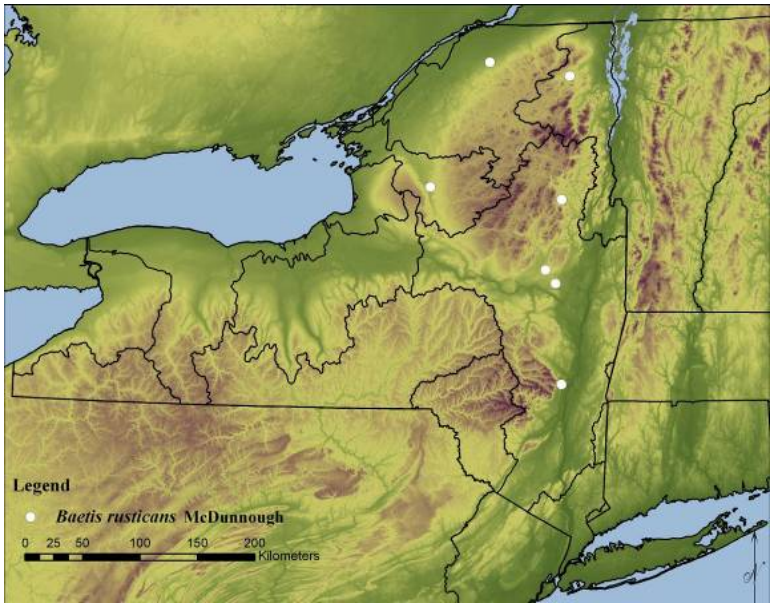

Figure 2. Records of *Baetis rusticans* (McDunnough) in New York (Meyers et al. 2010).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	_____
2000- 2023	_____	7	0-5%

Table 1. Records of *Baetis rusticans* in New York.

Details of historic and current occurrence:

Clinton Co., BLT, S. B. Saranac River, Silver Lake Rd., 44.5913N, 73.8394W, August 3, 2006, 1 male, L. Myers (Myers et al., 2008)
Fulton Co., BLT, Kennyetta Creek, CR-138 Eagle Mills, 43.0799N, 74.1276W, June 10, 2009, 2 males, L. Myers (CSUC)
Greene Co., BLT, Kaaterskill Creek, High Falls Rd. Ext. 0.5 mi. S of 23A, 42.1840N, 73.9719W, June 24, 2007, 1 male, L. Myers and B. C. Kondratieff (Myers et al., 2008)
Lewis Co., BLT, Independence River, Crossing Pine Grove Rd., 43.7301N, 75.3655W, June 29, 2007, 2 males, L. Myers and B. C. Kondratieff (Myers et al., 2008)
Saratoga Co., Alplaus Kill, Rt. 67, Galway, 42.9742N, 74.0197W, May 26, 2009, 1 male, L. Myers (CSUC)
Warren Co., Mill Cr., Rt. 8 nr. Weavertown, 43.6283N, 73.9452W, June 26, 2007, 1 male, L. Myers and B. C. Kondratieff (Myers et al., 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%	Core	

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. Riverine, coldwater stream, SAV

b. Riverine, coldwater stream, structure

Habitat or Community Type Trend in New York

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

The habitat for this species consists of medium to large streams and rivers (Myers et al. 2010).

V. Species Demographic 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):*

Very little is known about the life history of this species.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Baetis rusticans*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Baetis rusticans* in particular.

Habitat management:

____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

McCafferty, W. P. and L. M. Jacobus. 2001. Revisions to *Pauditus cestus* and *P. gloveri* (Ephemeroptera: Baetidae). Entomological News 112: 305-310.

Myers, L. W., L. M. Jacobus and B. C. Kondratieff. 2008. Insecta, Ephemeroptera: New and additional records from New York (U.S.A.). Check List 4: 415-423.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.121310/Baetis_rusticans Accessed January 9, 2024

New York State Department of Environmental Conservation (NYSDEC). 2005 New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Traver, J. R. 1935. Part II: Systematic. pp. 237-739. *In* J. G. Needham, J. R. Traver, and Y. C. Hsu. The biology of mayflies, with a systematic account of North American species. Ithaca, Comstock Publishing.

Originally prepared by	John Shea
Date first prepared	December 9, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: A mayfly **Date Updated:** 12/21/23

Scientific Name: *Dannella provonshai* **Updated By:** B. Denoncour

Class: Insecta

Family: Ephemerellidae

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

Dannella provonshai is a species of mayfly of which little is known in New York. It is known from one location (in 1923) in the SE Lake Ontario watershed (Cayuga County). Outside of New York, this uncommon species has been found in Alabama, Arkansas, Kentucky, and Tennessee (McCafferty 1977, Randolph and McCafferty 1998, McCafferty and Webb 2006, Parker et al. 2007). Merritt et al. (2008) report the habitat of this genus as depositional areas of streams and rivers, but specific requirements are not well understood (Myers et al. 2010).

I. Status

a. Current legal protected Status

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

ii. **New York:** SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
-IUCN Red List: None

-Northeast Regional SGCN: Watchlist

Status Discussion:

This species is rare but is not likely extirpated in New York (L. Myers, personal communication).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Unknown			Yes

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Connecticut	No	Choose an item.	Choose an item.			Choose an item.
Massachusetts	No	Choose an item.	Choose an item.			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No	Choose an item.	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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is not available.

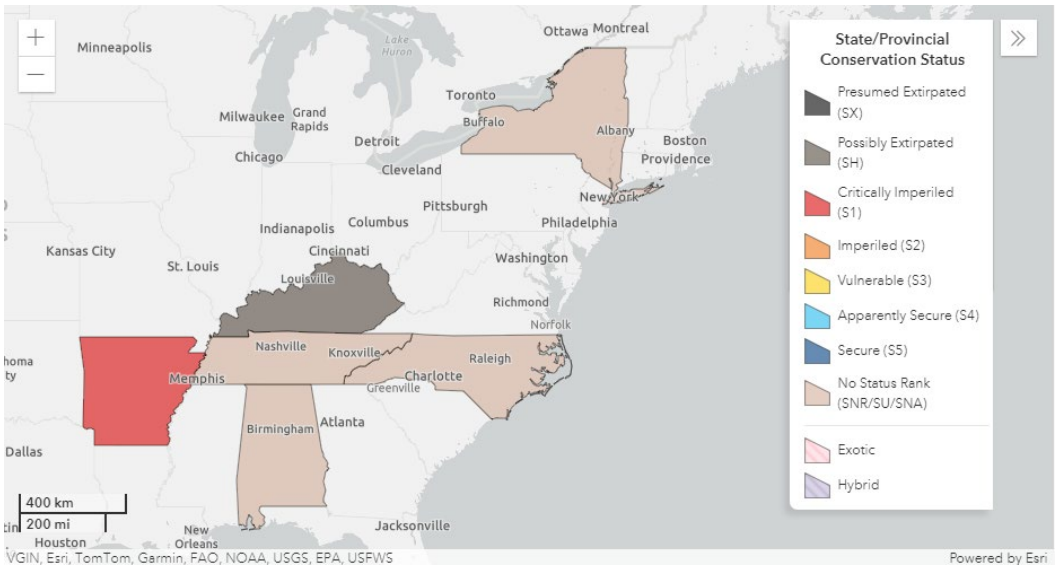

Figure 1. Conservation status of *Dannella provonshai* in North America (NatureServe 2023)

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

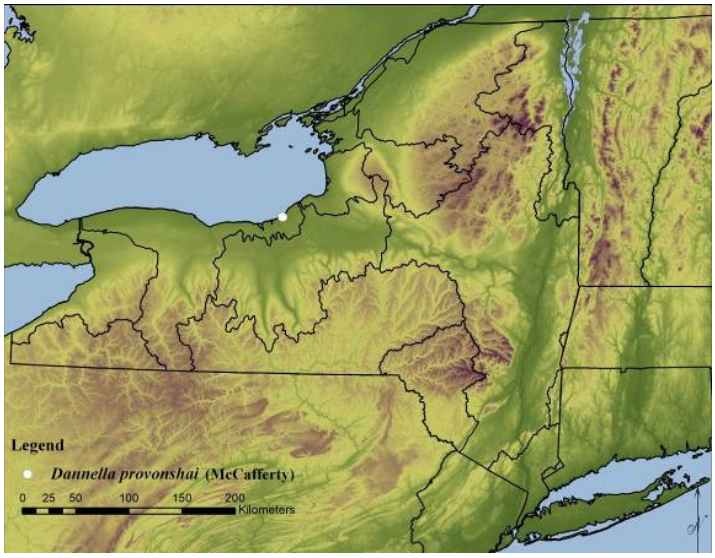

Figure 3. Distribution of *Dannella provonshai* (McCafferty) in New York (Meyers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Dannnella provonshai* in New York.

Details of historic and current occurrence:

There is one historical record of occurrence from Cayuga County, “Afterglow” North Fair Haven, July 31, 1932, J.G. Needham (Jacobus and Mccafferty 2001a). There are no current occurrence records for this species in New York. Rarity in New York is unknown due to lack of occurrence records.

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
26-50%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

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

Habitat is unknown for this species.

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

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):*

Information regarding life history for this species is unknown.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Conservation Law.

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

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

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

Conservation Actions	
Action Category	**Action**
1. Habitat management	Control the activity level and intensity in and around historic waters where these species are known to have habitats
2. Habitat research	Determine the critical habitat for these species
3. Population monitoring	Survey potential sites in the historical range of the species.

Table 2. Recommended conservation actions for stoneflies and mayflies of uncertain habitat, as identified in the Comprehensive Wildlife Conservation Strategy (NYSDEC 2005).

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Jacobus, L. M. and W. P. McCafferty. 2001.The mayfly fauna of New York State (Insecta: Ephemeroptera). Journal of the New York Entomological Society 109: 47-80.

Merritt, R. W., K. W. Cummins, and M. B. Berg (Editors). 2008. An Introduction to the Aquatic Insects of North America, Fourth Edition. Kendall Hunt Publishing Company, Dubuque, Iowa. 1158 pp.

McCafferty, W. P. 1977. Biosystematics of *Dannella* and related subgenera of *Ephemerella* (Ephemeroptera: Ephemerellidae). Annals of the American Entomological Society 70: 881-889.

McCafferty, W.P. and J.M. Webb. 2006. Insecta, Ephemeroptera: range extensions and new Alabama state records. Check List, 2(1): 6-7.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.117492/Dannella_provonshai Accessed December 21, 2023.

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Parker, C. R., O. S. Flint Jr., L. M. Jacobus, B. C. Kondratieff and J. C. Morse. 2007. Ephemeroptera, Plecoptera, Megaloptera, and Trichoptera of Great Smoky Mountain National Park. Southeastern Naturalist Special Issue 1: 159-174.

Randolph, R. P. and W. P. McCafferty. 1998. Diversity and distribution of the mayflies (Ephemeroptera) of Illinois, Indiana, Kentucky, Michigan, Ohio, and Wisconsin. Ohio Biological Survey Bulletin, New Series 13: 1-188.

Originally prepared by	John Shea
Date first prepared	December 9, 2011
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Roaring brook mayfly **Date Updated:** 1/11/2024

Scientific Name: *Epeorus frisoni* **Updated By:** B. Denoncour

Class: Insecta

Family: Heptageniidae

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

Experts have recommended that this species be removed from the list of SGCN due to incorrect historical records; there are no occurrences for New York. This has been shown with DNA barcoding (SGCN Insect Expert meeting, November 2013).

Epeorus frisoni was originally described from a single male specimen collected by T. H. Frison from "Roaring Brooks" in Baxter State Park, Maine (Burks 1946). This remained the only known population until a recent study by Steve K. Burian and others (Burian et al. 2008) provided the first description of the nymph and located several other populations around the type locality and in Vermont.

Previous reports of this species in New York by Jacobus and McCafferty (2001) are based on misidentifications (Burian et al. 2008). The records presented here are based on male larvae identified using the key provided by Burian et al. (2008). L. Myers recorded this species in 2009 within the Lake Champlain watershed (Essex Co.). This record should be considered unverified until adult males from this or other locations are examined.

The habitat for this mayfly is high gradient, pristine streams above 1,200' elevation (Burian et al. 2008).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed

b. Natural Heritage Program

i. **Global:** G1

ii. **New York:** none **Tracked by NYNHP?:** No

Other Ranks:
Northeast Regional SGCN: RSGCN

Status Discussion:

This species is globally ranked Critically Imperiled due to lack of occurrence records.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			Yes
New York	Unknown	Unknown	Unknown			(blank)
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No	N/A	N/A			(blank)
Vermont	Yes	Unknown	Unknown			Yes
Ontario	No	N/A	N/A			(blank)
Quebec	No	N/A	N/A			(blank)

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):*

There are no current monitoring activities or regular surveys for this species.

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

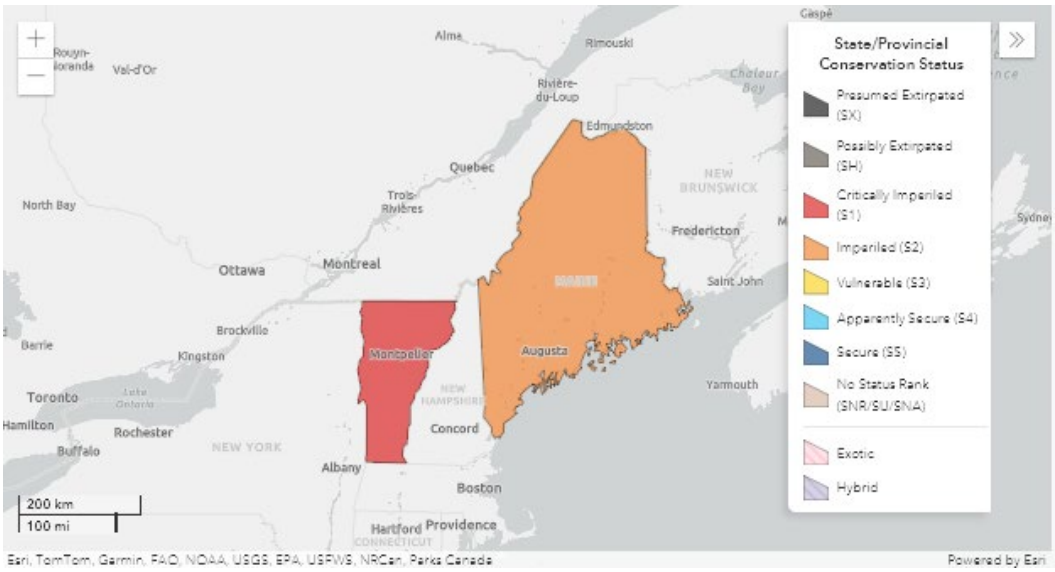

Figure 1. Conservation status of *Epeorus frisoni* in North America (NatureServe 2023)

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

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided

a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

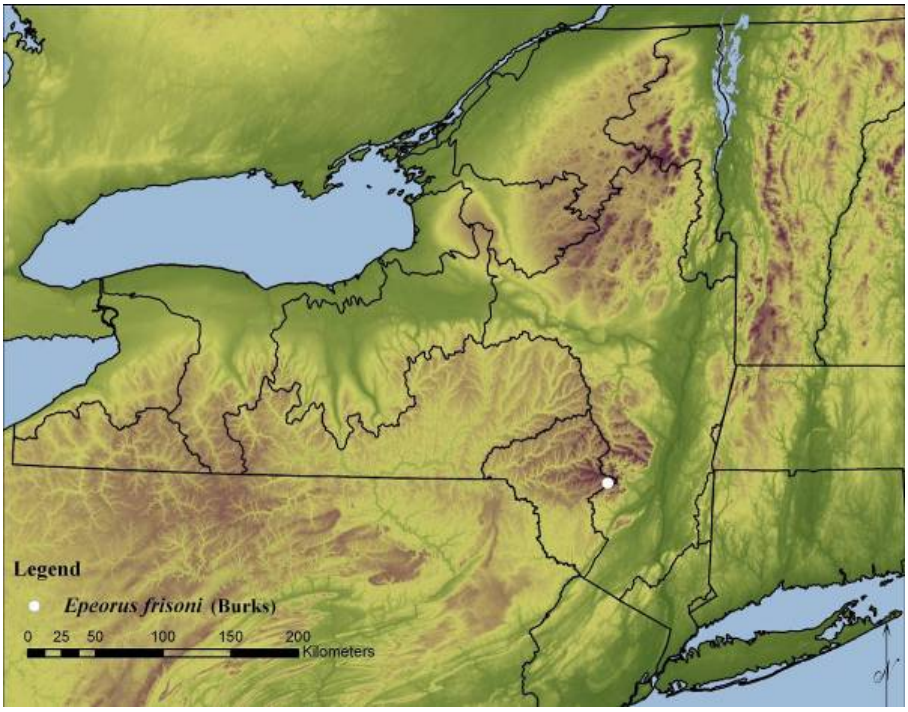

Figure 2. Records of *Epeorus frisoni* (Burks) in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	0	_____
2000- 2023	_____	_____	_____

Table 1. Records of (species) in New York.

Details of historic and current occurrence:

To date, only four small stream populations are known worldwide (Kart et al. 2005).

Essex Co: reared September 18, 2009, East Branch Neversink River, end of Denning Rd., off trail to Slide Mountain, 41.9715N, 74.4376W, September 17, 2009, 7 female, 10 larvae, 7 exuvia, L. Myers (CSUC).

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%	Disjunct	Vermont

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. Lacustrine

b. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

Larvae known from a second order, high gradient stream and from smaller, first and second order tributaries of high elevation streams. May be associated with conditions of pristine water quality and minimally or undisturbed riparian habitat (Swartz et al. 2004).

V. Species Demographic 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):*

Adult emergence begins in mid- to late-July and continues into early fall (adaptation to high latitudes). This seems to be a univoltine species that requires an extended period to complete its development. Late adult emergence suggests that eggs or perhaps first instar larvae are the over-wintering life stages (Swartz et al. 2004)

The life history of the Roaring Brook mayfly is poorly known. It likely has a single-year life cycle. Adults emerge in late August. Subimagos probably remain close to the stream, where they cling to streamside vegetation and molt into final adult form. Adults only live for a few days and do not feed. Males and females gather over the brook in mating swarms. Females lay their eggs over the water surface. Eggs likely overwinter in the stream bottom and hatch the following spring. Nymphs undergo several instars, or size classes, as they molt and grow. Nymphs occur in stream bottoms scoured by the currents and ice. Mayfly nymphs feed on leaf detritus that fell into the stream the previous fall and has been broken down by other aquatic insect larvae and bacteria. Nymphs travel to the surface and emerge as adults, usually on summer evenings. Mayflies in Roaring Brook are likely an important source of food for brook trout, bats, dragonflies, and other wildlife (Maine DIFW 2003).

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

Myers et al. (2010) recommend this species for delisting from SGCN.

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Epeorus frisoni*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Epeorus frisoni* in particular.

Habitat management:

_____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

_____ Determine the critical habitat of the species.

Population monitoring:

_____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Burian, S. K, B. I. Swartz and P. C. Wick. 2008. Taxonomy of *Epeorus frisoni* (Burks) and a key to New England species of *Epeorus.* Pp. 277-294 *In* F. R. Hauer, J. A. Stanford, R. L. Newell (editors), International advances in the ecology, zoogeography, and systematics of mayflies and stoneflies. University of California Publications in Entomology 128.

Burks, B. D. 1946. New heptagenine mayflies. Annals of the Entomological Society of America 39: 607-615.

Kart, J., R. Regan, S.R. Darling, C. Alexander, K. Cox, M. Ferguson, S. Parren, K. Royar, B. Popp, editors. 2005. Vermont's Wildlife Action Plan. Vermont Fish & Wildlife Department. Waterbury, Vermont. www.vtfishandwildlife.com

Maine DIFW. 2003. Roaring Brook Mayfly (*Epeorus frisoni*). http://www.maine.gov/ifw/wildlife/species/endangered_species/roaring_brook_mayfly/index.htm

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.116701/Epeorus_frisoni Accessed January 11, 2024.

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Swartz, B.I., P.C. Wick, S.K. Burian, and A.D. Huryn. 2004. Status of the endangered “Roaring Brook mayfly”. Final report MOHF grant #021-03-09 to the Maine Outdoor Heritage Fund Board and Baxter State Park, November 19, 2004. 19 pp.

Originally prepared by	John Shea
Date first prepared	December 12, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Dotted flat-headed mayfly **Date Updated:** 12/28/23

Scientific Name: *Epeorus punctatus* **Updated By:** B. Denoncour

Class: Insecta

Family: Heptageniidae

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

Epeorus punctatus is a mayfly of which little is known in New York State. This infrequently collected species has been reported previously in Arkansas, Ohio, West Virginia, New York, Quebec, and Ontario (McDunnough 1925, Walley 1927, Traver 1935, Webb and McCafferty 2006, McCafferty 2009). There is only one occurrence documented in New York, from the Lake Erie watershed (Buffalo, Erie County) (Traver 1935). Suitable habitat for this species has likely been eliminated in the Buffalo metropolitan area (Myers et al. 2010). Specific habitat characteristics for this species are unknown.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G4

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

Other Ranks:
Northeast Regional SGCN: RSGCN

Status Discussion:

Status of this species is unknown. There have been no records since 1935 but it is not considered extirpated in New York (L. Myers, personal communication).

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Choose an item.			Yes
Connecticut	No	Choose an item.	Unknown			Choose an item.
Massachusetts	No	Choose an item.	Choose an item.			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	Yes	Unknown	Unknown			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No data	Unknown	Unknown			Choose an item.
Quebec	No data	Unknown	Unknown			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):*

None.

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

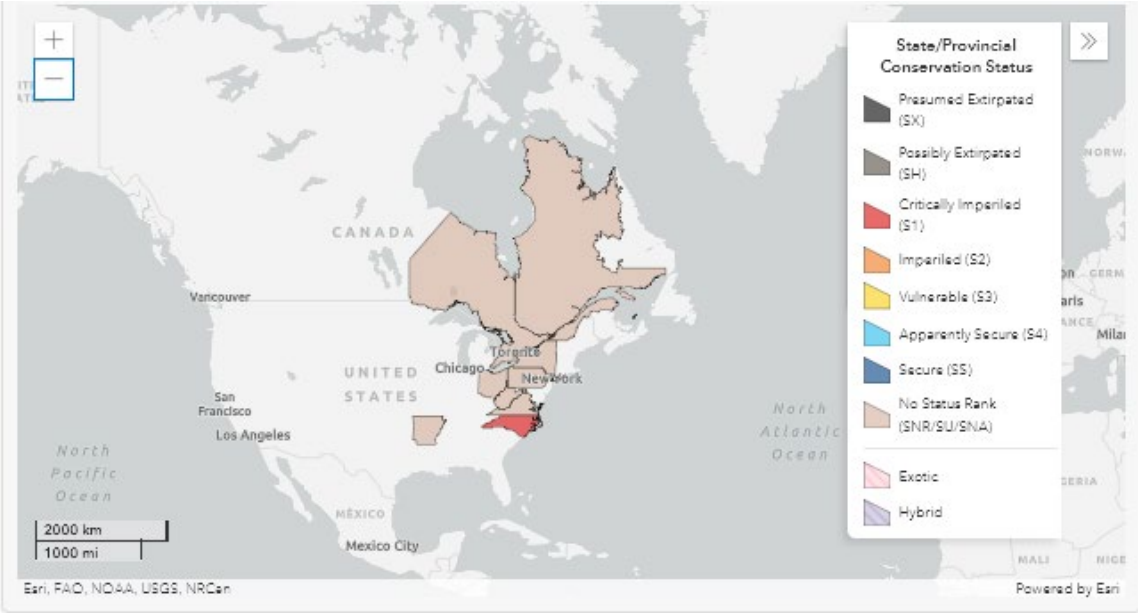

Figure 1. Conservation status of *Epeorus punctatus* in North America (NatureServe 2023)

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

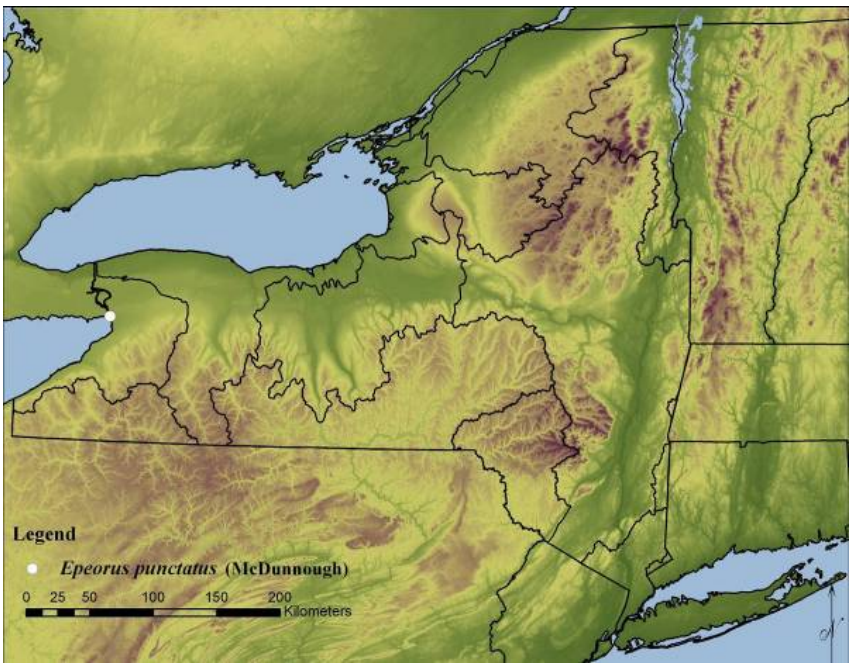

Figure 2. Distribution of *Epeorus punctatus* (McDunnough) in New York State

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%

2000- 2023	_____	_____	_____

Table 1. Records of *Epeorus punctatus* in New York.

Details of historic and current occurrence:

Erie Co.: Buffalo, C. Betten (Traver 1935).

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%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

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

Specific habitat characteristics for this species are unknown.

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Choose an item.	Choose an item.	Unknown	Unknown	Choose an item.

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 information for this species is unknown.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Epeorus punctatus*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Epeorus punctatus* in particular.

Habitat management:

____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

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Traver, J. R. 1935. Part II: Systematic. pp. 237-739. *In* J. G. Needham, J. R. Traver, and Y. C. Hsu. The biology of mayflies, with a systematic account of North American species. Ithaca, Comstock Publishing.

Walley, G. S. 1927. Ephemeroptera, pp. 59-61 *In* N. Criddle (editor). The entomological record, 1926. Annual Report of the Entomological Society of Ontario 57: 47-62.

Webb, J. M. and W. P. McCafferty. 2006. Contribution to the taxonomy of eastern North American *Epeorus* Eaton (Ephemeroptera: Heptageniidae). Zootaxa 1128: 57-64.

Originally prepared by	John Shea
Date first prepared	December 9, 2011
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Blushing flat-headed mayfly **Date Updated:** 12/28/23

Scientific Name: *Epeorus suffusus* **Updated By:** B. Denoncour

Class: Insecta

Family: Heptageniidae

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

Epeorus suffuses is a mayfly of which little is known in New York. Outside of New York, this species has been found in Maine, Ontario, and Quebec. One historic occurrence in New York, in the Upper Hudson watershed (Hudson River at Corinth), has likely become extirpated due to habitat degradation since the initial report in 1916. A new occurrence of this species was recently found in the Lake Champlain watershed (Clinton Co.). Its habitat is described as medium to large swift rivers (Myers et al. 2010).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G1

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

Other Ranks:
Northeast Regional SGCN: Watchlist

Status Discussion:
This species is globally ranked Critically Imperiled but it is currently undergoing revision due to a question of validity (NatureServe 2013).

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Choose an item.	Choose an item.			Yes
Connecticut	No	Choose an item.	Choose an item.			Choose an item.
Massachusetts	No	Choose an item.	Choose an item.			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No data	Unknown	Unknown			Choose an item.
Quebec	No data	Unknown	Unknown			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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is unavailable.

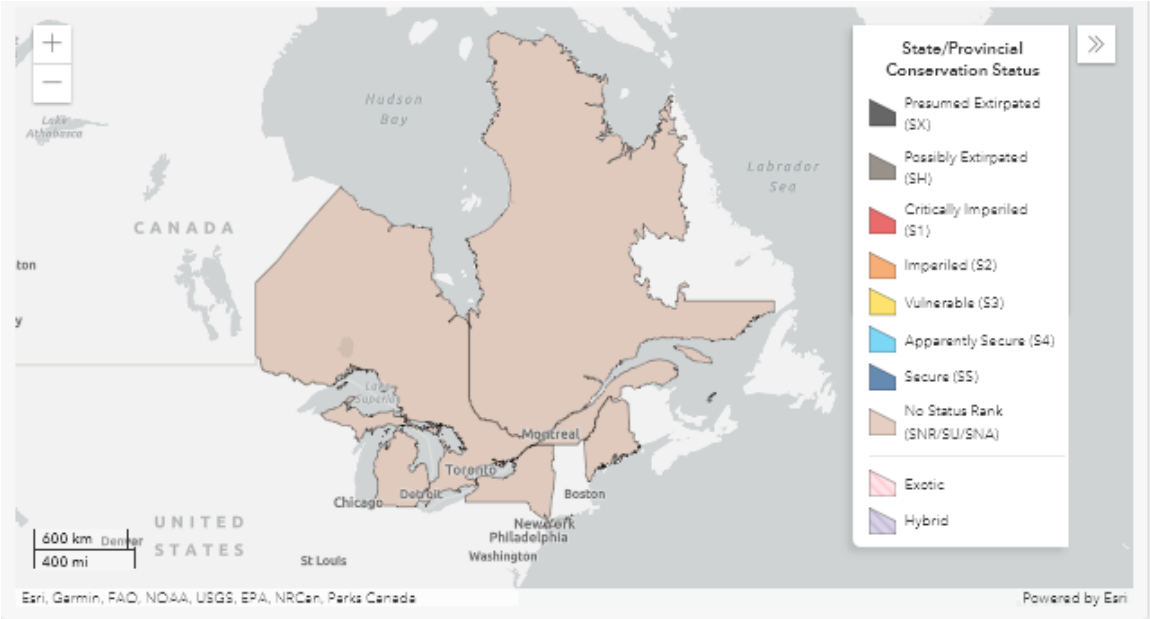

Figure 1. Conservation status of *Epeorus suffuses* in North America (NatureServe 2023)

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

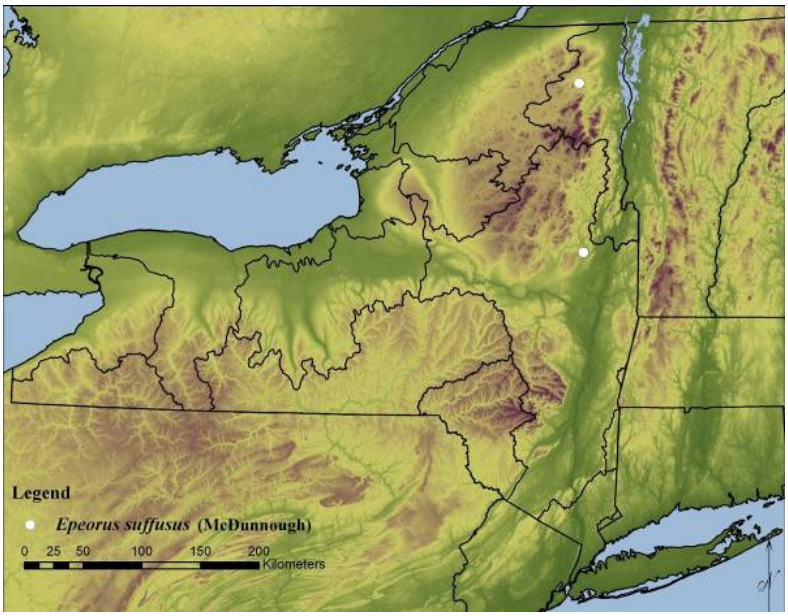

Figure 2. Distribution of *Epeorus suffusus* (McDunnough) in New York State (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%
2000- 2023	_____	1	_____

Table 1. Records of *Epeorus suffusus* in New York.

Details of historic and current occurrence:

Historic occurrence: There is one historical record from Corinth, Saratoga/Warren County, June 1, 1916, but this species is likely extirpated from this site (Traver 1935, Jacobus and McCafferty 2001).

Current occurrence: There is one current record of occurrence from Clinton County, BLT, S. B. Saranac River, Silver Lake Rd. at Teft Pond, 44.5506N, 73.8549W, June 8, 2008, 1 male, L. Myers (CSUC).

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
26-50%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

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

This species occurs in medium to large swift rivers (Myers et al. 2010).

V. Species Demographic and Life History:

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

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):*

Although nymphs were not collected or observed by Myers (2010) they likely inhabit swift sections of larger streams and rivers.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

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Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from

agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Epeorus suffusus*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Epeorus suffusus* in particular.

Habitat management:

____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Jacobus, L. M. and W. P. McCafferty. 2001. The mayfly fauna of New York State (Insecta: Ephemeroptera). Journal of the New York Entomological Society 109: 47-80.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.113973/Epeorus_suffusus. Accessed December 28, 2023.

New York State Department of Environmental Conservation. (2005). New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. Available: http://www.dec.ny.gov/index.html.

Traver, J. R. 1935. Part II: Systematic. pp. 237-739. *In* J. G. Needham, J. R. Traver, and Y. C. Hsu. The biology of mayflies, with a systematic account of North American species. Ithaca, Comstock Publishing.

Originally prepared by	John Shea
Date first prepared	December 9, 2011
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Nova Scotia spiny crawler mayfly **Date Updated:** 1/9/2024

Scientific Name: *Eurylophella bicoloroides* **Updated By:** B. Denoncour

Class: Insecta

Family: Ephemerellidae

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

Eurylophella bicoloroides is a species of mayfly that has been found in the Delaware, Upper Hudson, and SE Lake Ontario watersheds. More specifically, this species has been reported from the Delaware River, Mohawk River, and Schoharie Creek (Funk and Sweeney 1994). Elsewhere, this species has been reported infrequently from Nova Scotia, Vermont, and Pennsylvania (Funk and Sweeney 1994).

Habitat from which this mayfly has been collected includes small streams (2nd order) to medium sized rivers (6th to 7th order). Its distribution can be very patchy at the local level (Funk and Sweeney 1994). Funk and Sweeney (1994) also reported this species from reaches of larger streams below dams with hypolimnetic releases.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
Northeast Regional SGCN: Watchlist

Status Discussion:

This species is globally ranked Vulnerable and has yet to be ranked in New York.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			Yes
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	Yes	Unknown	Unknown			(blank)
Vermont	Yes	Unknown	Unknown			Yes
Ontario	No	N/A	N/A			(blank)
Quebec	No	N/A	N/A			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is unknown.

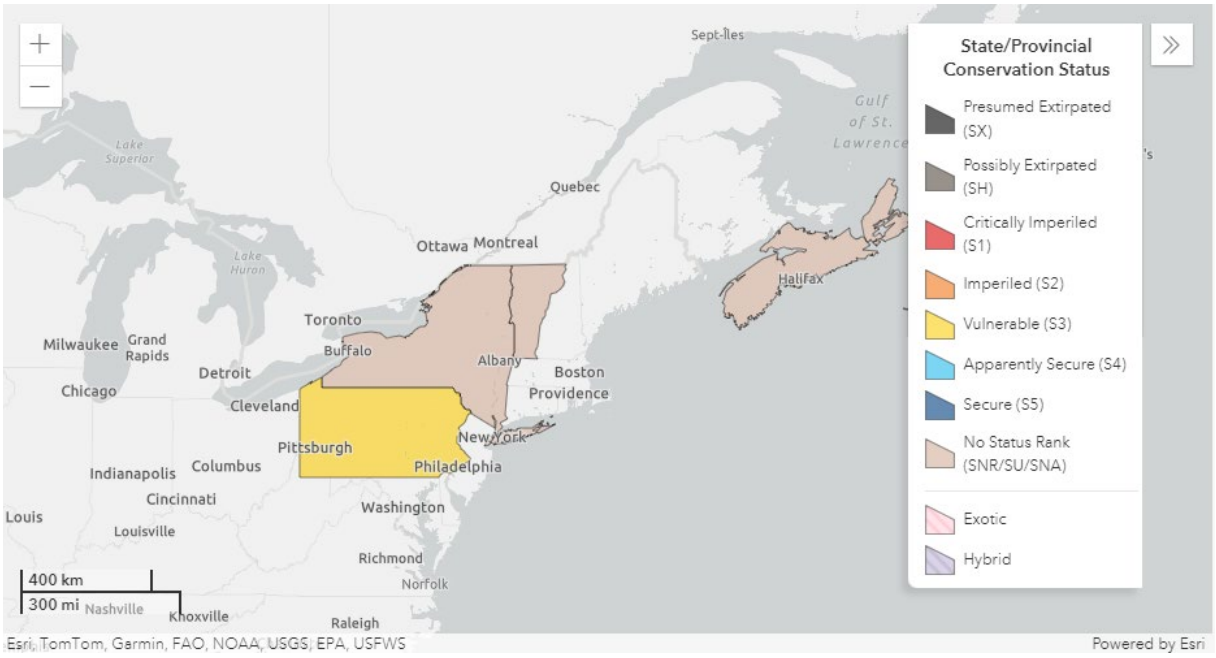

Figure 1. Conservation status of *Eurylophella bicoloroides* in North America (NatureServe 2023)

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

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided

a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

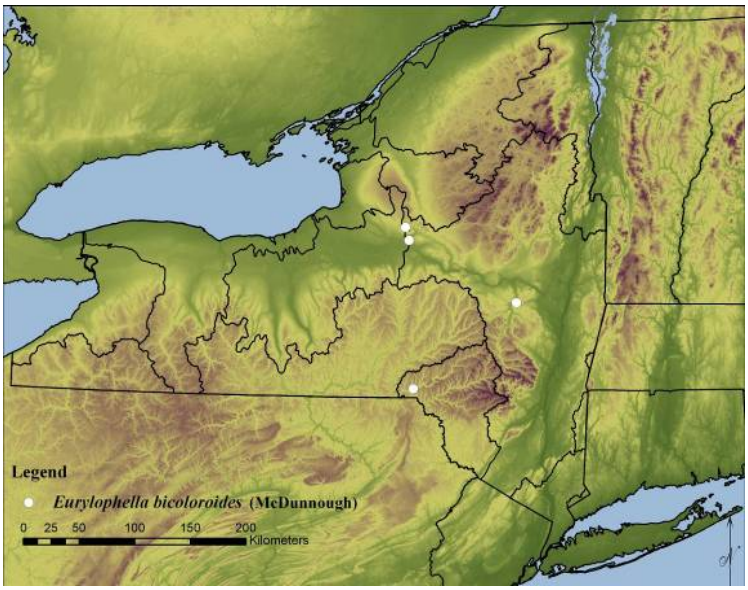

Figure 2. Records of *Eurylophella bicoloroides* (McDunnough) in New York (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	4	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Eurylophella bicoloroides* in New York.

Details of historic and current occurrence:

Delaware Co: East Branch Delaware River, 0.8 miles SW Downsville, 42.0703N, 75.3850W, July 18, 1983, D. H. Funk (Funk and Sweeney, 1994)
Oneida Co: East Branch Mohawk Creek at Rt. 67, June 1, 1979, 1 larva, D. H. Funk, B. W. Sweeney, R. L. Vannote (Funk and Sweeney, 1994); Mohawk River on Rt. 46, May 31, 1979, 9 larvae, D. H. Funk, B. W. Sweeney, R. L. Vannote (Funk and Sweeney, 1994)
Schoharie Co: Schoharie Creek near Esperance at US Rt. 20, 42.7605N, 74.2546, June 5, 1986, 2 males, 3 females (Funk and Sweeney, 1994).

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%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

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

Habitat from which this mayfly has been collected includes small streams (2nd order) to medium sized rivers (6th to 7th order). Its distribution can be very patchy at the local level (Funk and Sweeney 1994). Funk and Sweeney (1994) also reported this species from reaches of larger streams below dams with hypolimnetic releases.

V. Species Demographic 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):*

Very little is known regarding the life history of this species.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agriculture & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Eurylophella bicoloroides*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Eurylophella bicoloroides* in particular.

Habitat management:
____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).
Habitat research:
____ Determine the critical habitat of the species.
Population monitoring:
____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Funk, D. H. and B. W. Sweeney. 1994. The larvae of eastern North American *Eurylophella* Tiensuu (Ephemeroptera: Ephemerellidae). Transactions of the American Entomological Society 120: 209-286.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.112364/Eurylophella_bicoloroides Accessed January 9, 2024.

New York State Department of Environmental Conservation (NYSDEC). 2005 New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Originally prepared by	John Shea
Date first prepared	December 12, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: A mayfly **Date Updated:** 1/12/2024

Scientific Name: *Heptagenia calacantha* **Updated By:** B. Denoncour

Class: Insecta

Family: Heptageniidae

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

Heptagenia culacantha is a species of mayfly of which little is known in New York. Within the state it has been recorded in the Lake Champlain (Clinton Co.), Upper Hudson (Orange Co.), Delaware (Sullivan Co.), and Susquehanna (Tioga Co.) watersheds (Evans et al. 1985, Jacobus and McCafferty 2001). The only other state that this species has been recorded in is Pennsylvania. All occurrences in New York are pre-1990.

Recent surveys of an historic location in the Lake Champlain (Clinton Co.) watershed did not find this species. The preferred habitat is thought to be medium to large erosional rivers on the undersides of large boulders and other large in-stream substrate (Myers et al. 2010). Larvae reportedly occur singly on the undersides of large objects in shallow water with fast current (Jacobus and McCafferty 2001).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed

b. Natural Heritage Program

i. **Global:** G2

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

Other Ranks:
None

Status Discussion:

This species is globally ranked Imperiled due to its narrow distribution and small number of populations (NatureServe 2023). It has yet to be ranked in New York or Pennsylvania, the only two states where it is known to occur.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Northeastern US	Yes	Unknown	Unknown			(blank)
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No data	Unknown	Unknown			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No	N/A	N/A			(blank)
Quebec	No	N/A	N/A			(blank)

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 monitoring activities or regular surveys are conducted for this species.

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

Trend information for this species is unavailable.

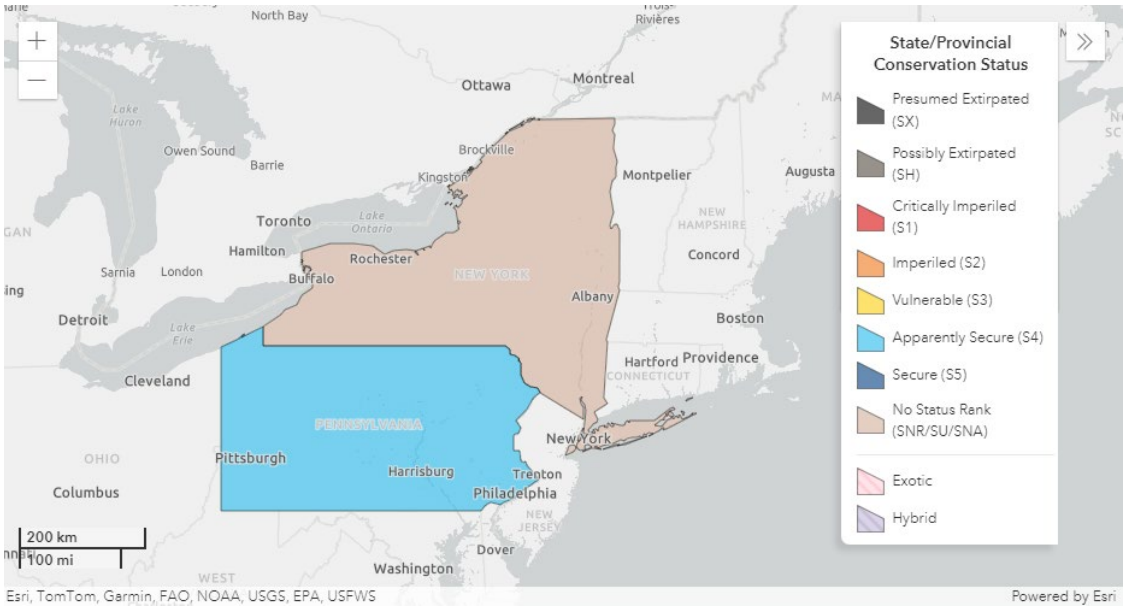

Figure 1. Conservation status of *Heptagenia culacantha* in North America (NatureServe 2023)

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

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

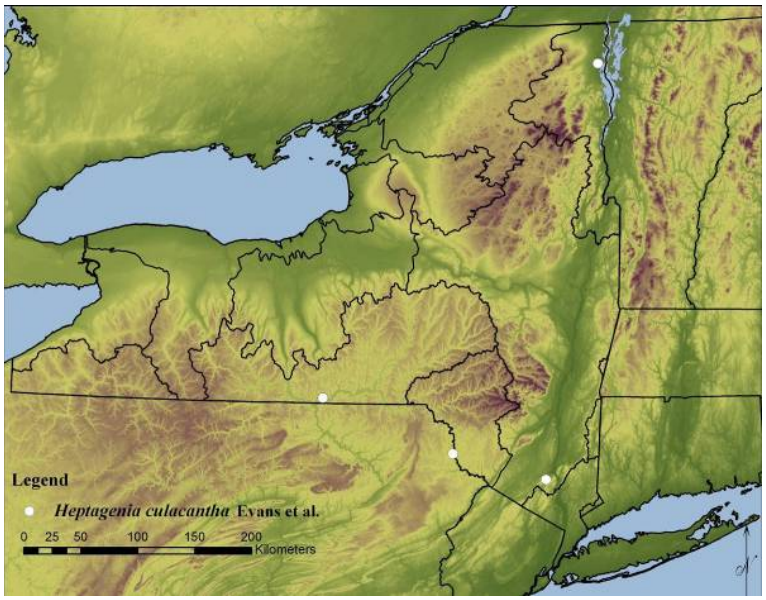

Figure 3. Records of *Heptagenia culacantha* (Evans et al. 1985) in New York (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	10	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Heptagenia culacantha* in New York.

Details of historic and current occurrence:

This species is known from few populations within a narrow range in New York and Pennsylvania, but it was only recently discovered and has 5 known occurrences in New York.

Clinton Co: Saranac River, 44.6877N, 73.4580W, August 7, 1986, 1 larva (NYSDEC); **Orange Co**: Woodbury Creek, 41.4000N, 74.0822W, May 5, 1987, 4 larvae (NYSDEC); **Sullivan Co**: Delaware River at Narrowsburg, September 18, 1974, 2 males, 7 females, 10 larvae, K. W. Simpson (Evans et al. 1985); **Tioga Co**: Lower Susquehanna River, 42.0400N, 76.4463W, 1 larva, October 30, 1973 (NYSDEC); Susquehanna River at Barton, October 30, 1974, K. W. Simpson (Evans et al. 1985).

Clinton Co: Saranac River, 44.6877N, 73.4580W, August 7, 1986, 1 larva (NYSDEC); **Orange Co**: Woodbury Creek, 41.4000N, 74.0822W, May 5, 1987, 4 larvae (NYSDEC); **Sullivan Co**: Delaware River at Narrowsburg, September 18, 1974, 2 males, 7 females, 10 larvae, K. W. Simpson (Evans et al., 1985); **Tioga Co**: Lower Susquehanna River, 42.0400N, 76.4463W, 1 larva, October 30, 1973 (NYSDEC); Susquehanna River at Barton, October 30, 1974, K. W. Simpson (Evans et al., 1985).

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%	Core	

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. Riverine, coldwater stream

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

The habitat of this species is medium to large erosional rivers on the undersides of large boulders and other large in-stream substrate (Myers et al. 2010). Larvae reportedly occur singly on the undersides of large objects in shallow water with fast current (Jacobus and McCafferty 2001).

V. Species Demographic 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):*

Information about this species life history is unknown.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Heptagenia culacantha*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Heptagenia culacantha* in particular.

Habitat management:

____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Evans, J. L., J. F. Botts Jr. and R. W. Flowers. 1985. A new *Heptagenia* from the Susquehanna and Delaware Rivers from eastern North America. Annals of the American Entomological Society 78: 5-7.

Jacobus, L. M. and W. P. McCafferty. 2001. The mayfly fauna of New York State (Insecta: Ephemeroptera). Journal of the New York Entomological Society 109: 47-80.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.119620/Heptagenia_culacantha Accessed January 12, 2024.

New York State Department of Environmental Conservation (NYSDEC). 2005 New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Originally prepared by	John Shea
Date first prepared	December 12, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Julia's flat-headed mayfly **Date Updated:** 1/10/2024

Scientific Name: *Heptagenia julia* **Updated By:** B. Denoncour

Class: Insecta

Family: Heptageniidae

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

Heptagenia julia is a species of mayfly of which little is known in New York State. The only recorded occurrence of this species in the state is from the SE Lake Ontario watershed (Tompkins Co.) in 1933 (Jacobus and McCafferty 2001). This questionable record from New York should be considered tentative until an adult male imago is examined. Outside of New York this species has also been reported from North Carolina, West Virginia, and Georgia (Traver 1933, 1935, Faulkner and Tarter 1977, Berner 1977). Specific habitat for this species is unknown. ***This species has been recommended by experts for removal from the SGCN list based on past misidentification, northernmost record, and questionable single historic record***

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed

b. Natural Heritage Program

i. **Global:** G4

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

Other Ranks:
None

Status Discussion:

Status information for this species is unknown. It is recommended for delisting by experts based on past misidentification, northernmost record, and a questionable single historic record (expert meeting).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			(blank)
New York	Yes	Unknown	Unknown			(blank)
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Pennsylvania	No	N/A	N/A			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No	N/A	N/A			(blank)
Quebec	No	N/A	N/A			(blank)

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):*

There are no current monitoring activities or regular surveys for this species.

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

Trend information is unknown.

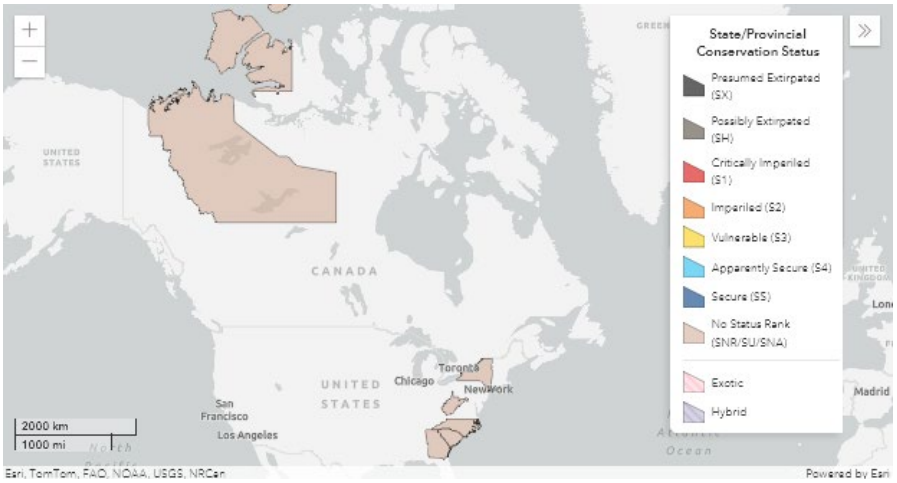

Figure 1. Conservation status of *Heptagenia julia* (NatureServe 2023)

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

Rarity information for this species is unknown. Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

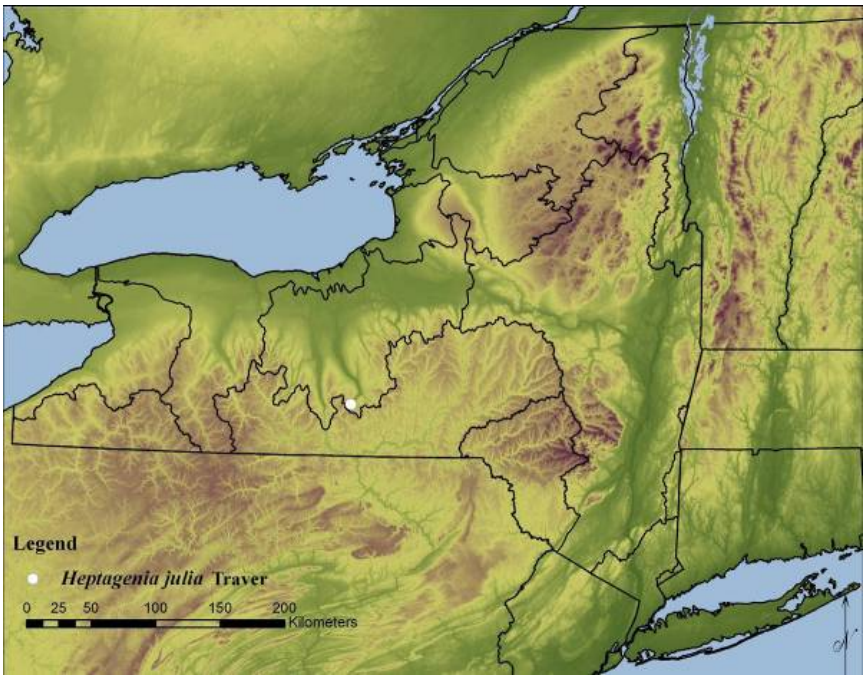

Figure 2. Records of *Heptagenia julia* (Traver) in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	_____
2000- 2023	_____	_____	_____

Table 1. Records of *Heptagenia julia* in New York.

Details of historic and current occurrence:

Tompkins Co., Newfield, June 25, 1933, larva (Jacobus and McCafferty 2001).

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%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

Specific habitat for this species is unknown.

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Unknown	Unknown	Unknown	Unknown	(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 information for this species is unknown.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are

commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

Myers et al. (2010) recommend that this species be removed from the SGCN list until additional material from New York is examined.

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Heptagenia Julia)*.

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Heptagenia julia* in particular.

Habitat management:

____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites within the historical ranges of these species.

VII. References

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Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

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Originally prepared by	John Shea
Date first prepared	December 12, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Hudsonian springfly **Date Updated:** 12/28/23

Scientific Name: *Isogenoides frontalis* **Updated By:** B. Denoncour

Class: Insecta

Family: Perlodidae

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

Previous distributional records of this species form a diagonal band across northern states and provinces with distributional records available from Newfoundland, Quebec, Maine and New York, west to Saskatchewan (Kondratieff, 2004; Sandberg and Stewart, 2005; Stark et al., 2010). This species has not been recorded in New York for over a century, and further surveys are needed to determine its status in the state. There are no known occurrences in neighboring states. Hilsenhoff and Billmyer (1973) reported *I. frontalis* from small, high gradient Wisconsin streams, additionally suggesting a univoltine life cycle.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G5

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

Other Ranks:
None

Status Discussion:

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Unknown			Yes

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Connecticut	No data	Unknown	Unknown			Choose an item.
Massachusetts	No data	Unknown	Unknown			Choose an item.
New Jersey	No data	Unknown	Unknown			Choose an item.
Pennsylvania	No data	Unknown	Unknown			Choose an item.
Vermont	No data	Unknown	Unknown			Choose an item.
Ontario	No data	Unknown	Unknown			Choose an item.
Quebec	No data	Unknown	Unknown			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):*

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

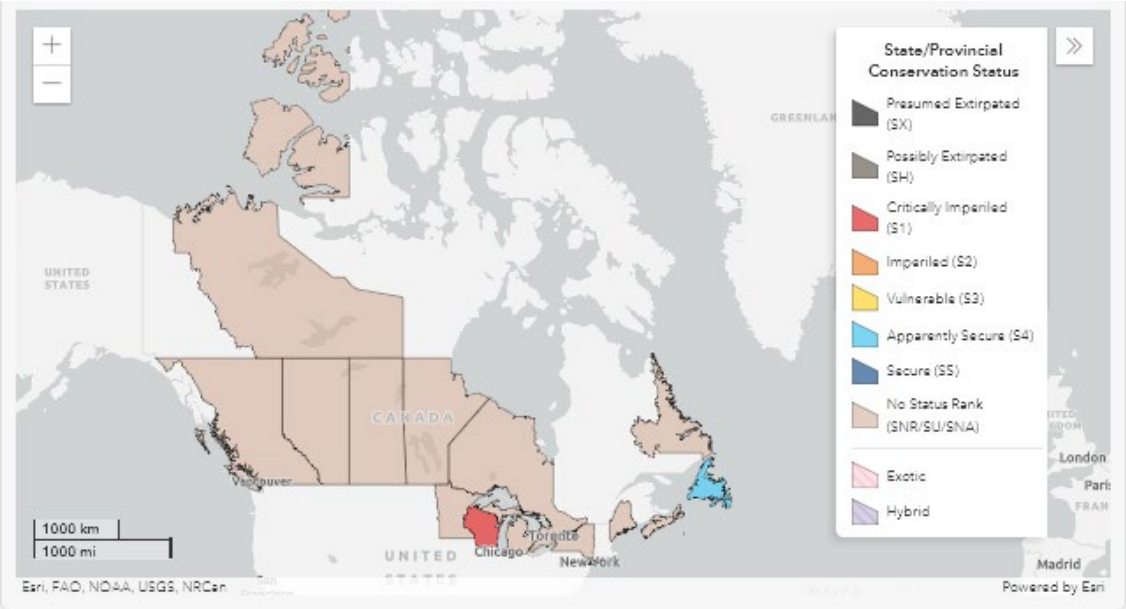

Figure 1. Conservation status of *Isogenoides frontalis* in North America (NatureServe 2023)

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

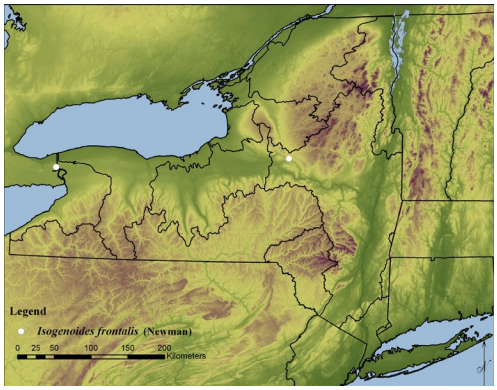

Figure 2. Distribution of *Isogenoides frontalis* (Newman) in New York State

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	2	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Isogenoides frontalis* in New York.

Details of historic and current occurrence:

Niagara Co., Niagara Falls, June 24, 1901 (Needham and Claassen, 1925)
Oneida/Herkimer Co., Trenton Falls (Holotype, Newman, 1838)

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%	Disjunct	

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. High gradient rivers and streams?

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	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:

Small high gradient streams (Hilsenhoff and Billmyer, 1973) and larger rivers in Quebec and Newfoundland (B. Kondratiff, Personal Communication, October 28, 2013).

V. Species Demographic and Life History:

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

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):*

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

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:

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Isogenoides frontalis*).

VII. References

Kondratieff, B. C. 2004. Perlodidae – Perlodinae (The Springflies), *In* B. P. Stark and B. J. Armitage (editors), The stoneflies (Plecoptera) of eastern North America Volume II. Chloroperlidae,

Hilsenhoff, W. L. and S. J. Billmyer. 1973. Perlodidae (Plecoptera) of Wisconsin. The Great Lakes Entomologist 6: 1-14.

NatureServe. 2023 NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.115585/Isogenoides_frontalis. Accessed December 28, 2023.

Needham, J. G. and P. W. Claassen. 1925. A monograph of the Plecoptera or stoneflies of America North of Mexico. Entomological Society of Americaca, Thomas Say Foundation 2: 1-397.

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Sandberg, J. B. and K. W. Stewart. 2005. Holomorphology and systematics of the stonefly genus *Isogenoides* (Plecoptera: Perlodidae). Transactions of the Amercian Entomological Society 131: 269-345.

Stark, B. P., R. W. Baumann and R. E. DeWalt. 2010. Valid Stonefly Names for North America. Available http://plsa.inhs.uiuc.edu/plecoptera (Accessed: January 27, 2010).

Originally prepared by	Luke Myers
Date first prepared	October 29, 2013
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Quebec stripetail **Date Updated:** 12/28/23

Scientific Name: *Isoperla gibbsae* **Updated By:** B. Denoncour

Class: Insecta

Family: Perlodidae

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

This species has been reported previously from limited collections in Quebec, New York, Connecticut, Maryland and West Virginia (Harper, 1971; Stark et al., 2010). Records from Connecticut, Maryland and West Virginia are likely misidentifications (Szczytko and Kondratieff 2013). This species has not been collected in New York since its original description in 1971.

Only known from QC and NY; records from CT misidentification (NYSDEC SGCN Experts Meeting for 2015 revision of NY SWAP)

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G4

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

Other Ranks:
Northeast Regional SGCN: Moderate Concern

Status Discussion:

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Unknown			Yes

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Connecticut	Yes	Unknown	Unknown			Choose an item.
Massachusetts	Yes	Unknown	Unknown			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No data	Unknown	Unknown			Choose an item.
Quebec	No data	Unknown	Unknown			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):*

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

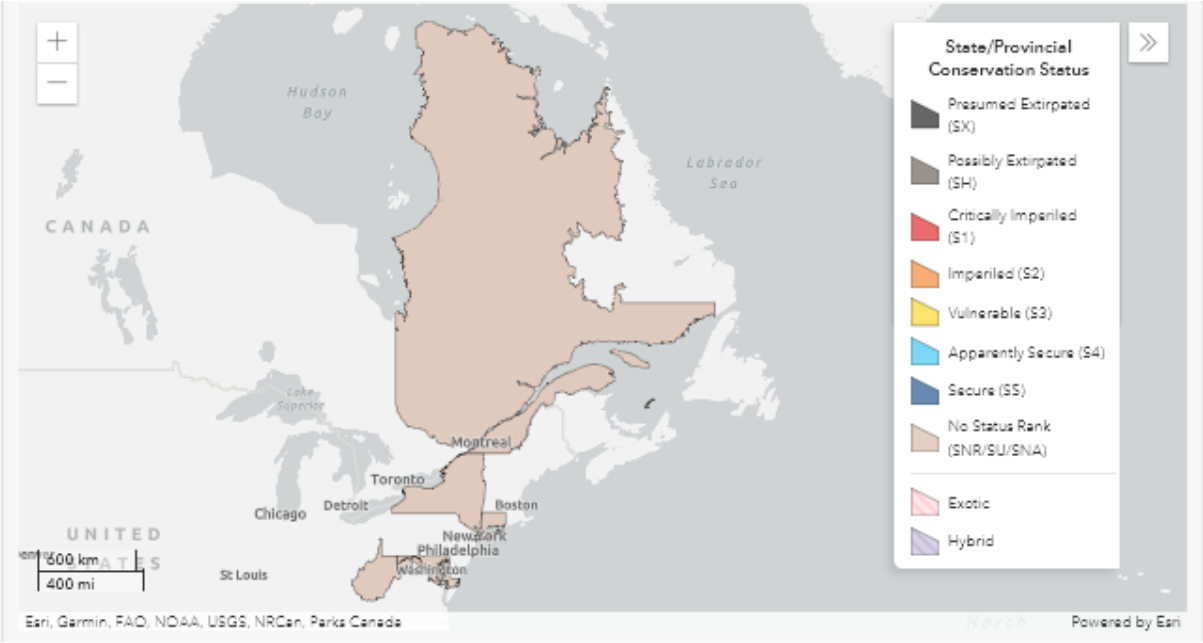

Figure 1. Conservation status of *Isoperla gibbsae* in North America (NatureServe 2023)

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

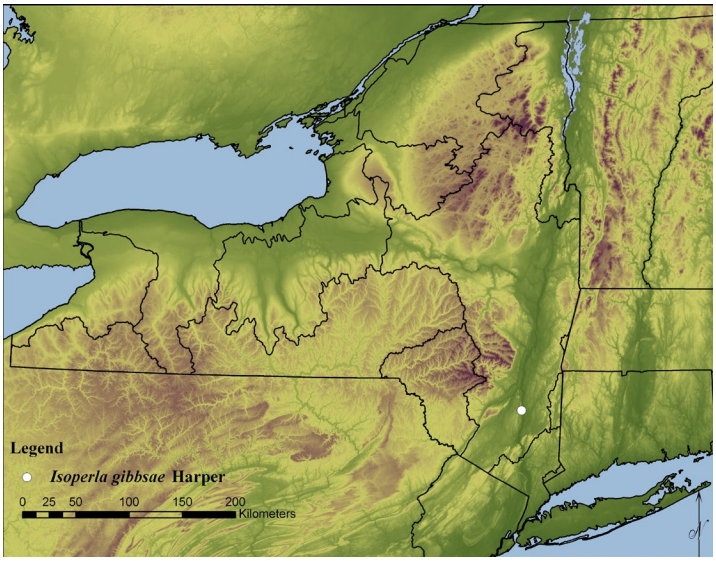

Figure 2. Distribution of *Isoperla gibbsae* (Harper) in New York State.

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	8	1	0-5%
2000- 2023			

Table 1. Records of *Isoperla gibbsae* in New York.

Details of historic and current occurrence:

Ulster Co., Highland, May 21, 1967, 4 males, 4 larvae, P. P. Harper and F. Harper (Harper, 1971).

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
51-75%	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. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	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:

Unknown

V. Species Demographic and Life History:

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

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):*

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

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:

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Isoperla gibbsae*).

VII. References

Harper, P. P. 1971. Plécoptères nouveux du Quebec (Insectes). Canadian Journal of Zoology 49: 685-690.

NatureServe. 2023. NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.114717/Isoperla_gibbsae. Accessed December 28, 2023.

Szczytko, S. W. and B. C. Kondratieff. 2013. A review of the Eastern Nearctic Isoperlinae (Plecoptera: Perlodidae) with the description of 22 new species. Illiesia (in press).

Originally prepared by	Luke Myers
Date first prepared	October 29, 2013
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Paddle stripetail **Date Updated:** 1/9/2024

Scientific Name: *Isoperla myersi* **Updated By:** B. Denoncour

Class: Insecta

Family: Perlodidae

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

This new species is currently known from only one location in Ulster County.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** GNR

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

Other Ranks:
Northeast Regional SGCN: RSGCN

Status Discussion:

Unknown.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			Yes
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No	N/A	N/A			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No	N/A	N/A			(blank)
Quebec	No	N/A	N/A			(blank)

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):*

None.

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

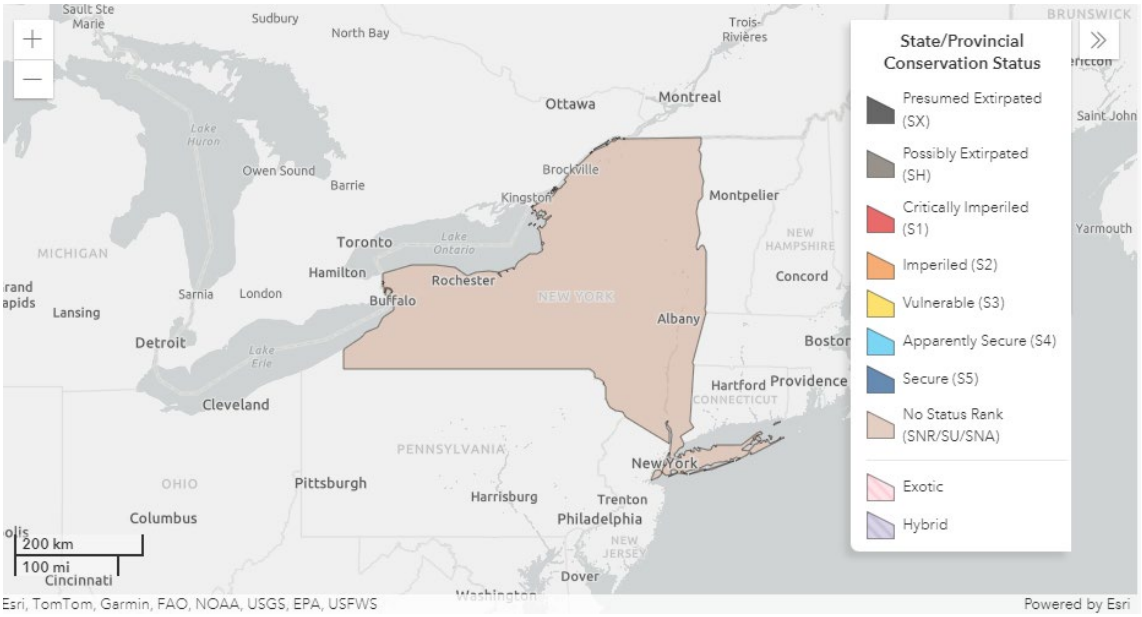

Figure 1. Conservation status of *Isoperla myersi* in North America (NatureServe 2023)

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

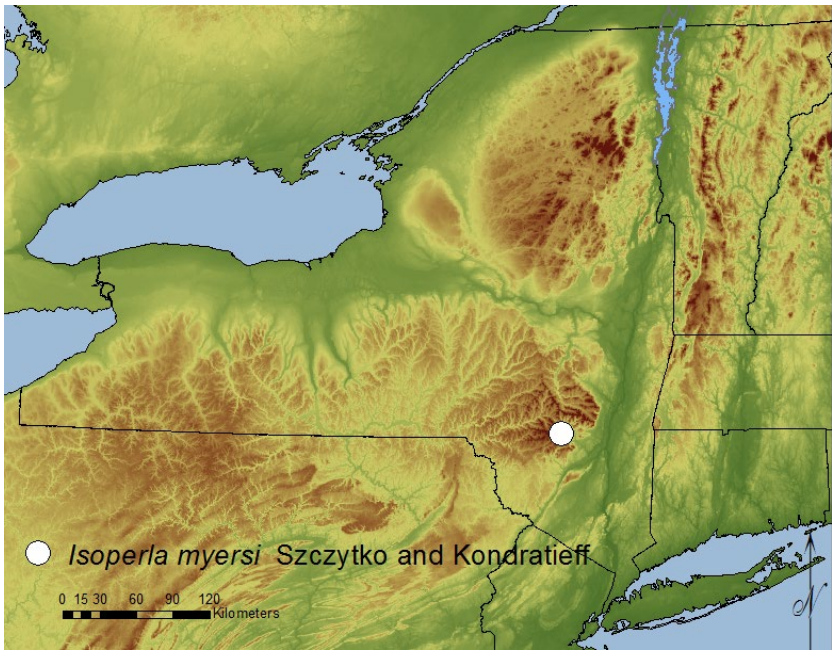

Figure 2. Records of *Isoperla myersi* in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	_____	_____
2000- 2023	_____	1	_____

Table 1. Records of *Isoperla myersi* in New York.

Details of historic and current occurrence:

This species is known from one location in Ulster County.

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
100% (endemic)	Core	

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. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Unknown	Unknown	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:

Medium-sized streams and rivers.

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	(blank)	(blank)	(blank)	(blank)	(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):*

Unknown

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

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:

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Isoperla myersi*).

VII. References

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.982039/Isoperla_myersi Accessed January 9, 2024.

Szczytko, S. W. and B. C. Kondratieff. 2013. A review of the Eastern Nearctic Isoperlinae (Plecoptera: Perlodidae) with the description of 22 new species. Illiesia (in press).

Originally prepared by	
Date first prepared	
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: A mayfly **Date Updated:** 1/9/2024

Scientific Name: *Leucrocuta thetis* **Updated By:** B. Denoncour

Class: Insecta

Family: Heptageniidae

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

Leucrocuta thetis is a species of mayfly of which little is known in New York. There is only once historical occurrence of this species in the state, from the Susquehanna watershed (Chemung Co.) in 1976. It has also been reported from Pennsylvania, Tennessee, Virginia, North Carolina, and South Carolina (Traver 1935, Unzicker and Carlson 1982, Grant and Masteller 1984, Long and Kondratieff 1996, DeWalt and Heinold 2005, McCafferty and Meyer 2008, McCafferty 2009). Grant et al. (1997) reported a discontinuous six-week emergence period starting in mid-May and ending in late-June for a population of *L. thetis* in Pennsylvania. Its habitat is described as streams and rivers (Myers et al. 2010).

I. Status

a. Current legal protected Status

i. **Federal:** No listed **Candidate:** No

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
None

Status Discussion:

This species is globally ranked Vulnerable and is not yet ranked in New York State.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			(blank)
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	Yes	Unknown	Unknown			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No	N/A	N/A			(blank)
Quebec	No	N/A	N/A			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is unknown.

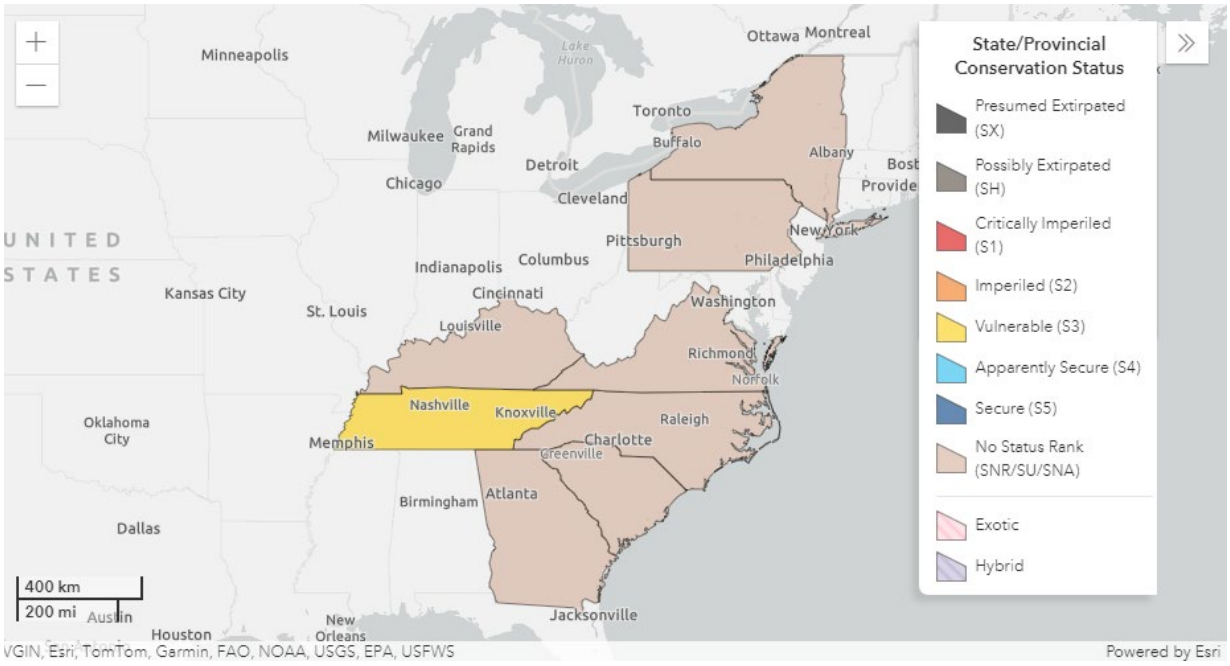

Figure 1. Conservation status of *Leucrocuta thetis* in North America (NatureServe 2023)

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

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by

Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

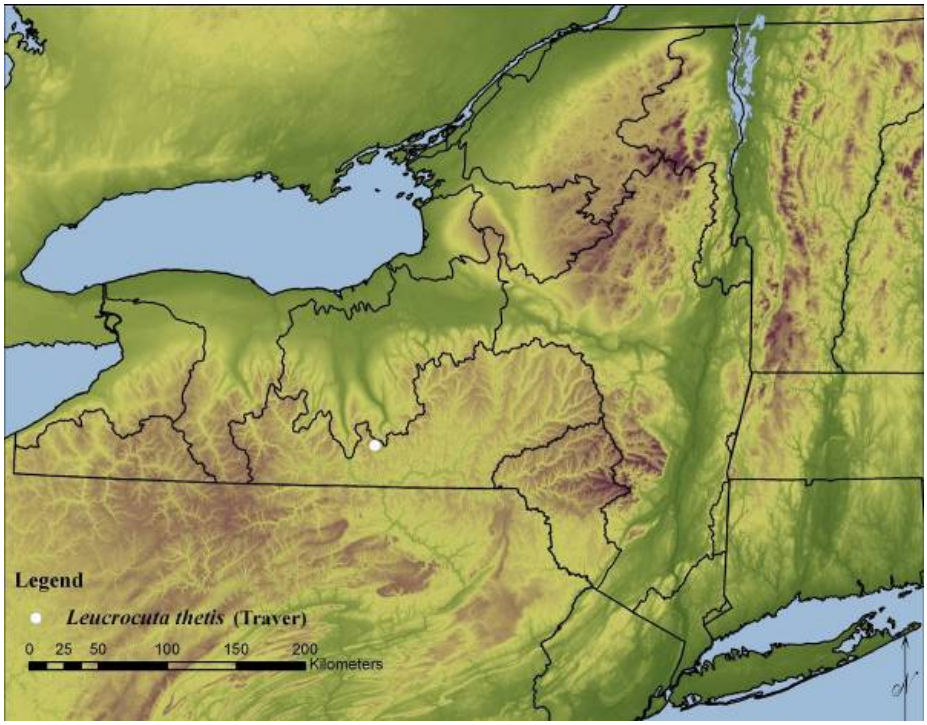

Figure 2. Records of *Leucrocuta thetis* (Traver) in New York (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Leucrocuta thetis* in New York.

Details of historic and current occurrence:

There is one record of historic occurrence from McCorn Creek at Van Etten, Chemung County, June 4, 1976, N. J. Lamb (Jacobus and McCafferty 2001).

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. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

The habitat of this mayfly is described as streams and rivers (Myers et al. 2010).

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Unknown	Unknown	Unknown	Unknown	(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):*

Very little is known regarding the life history of this species.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
Land/Water Protection	Resource/Habitat Protection

Table 2. Recommended conservation actions for *Leucrocuta thetis*.

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of uncertain habitat.

Habitat management:
____ Control the activity level and intensity in and around historic waters where these species are known to have habitats.
Habitat research:
____ Determine the critical habitat for these species.
Population monitoring:
____ Survey potential sites in the historical range of the species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

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Grant, P. and E. C. Masteller. 1984. New state mayfly (Ephemeroptera) records from Pennsylvania. Entomological News 95: 180-182.

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McCafferty, W. P. and M. D. Meyer. 2008. South Carolina mayflies (Ephemeroptera). Transactions of the American Entomological Society 134: 283-335.

McCafferty, W. P. 2009. New state and provincial records for 100 Ephemeroptera species. Transactions of the American Entomological Society 135: 353-368.

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NatureServe. 2023. NatureServe Explorer. Page last published 1/8/2024.: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.116640/Leucrocuta_thetis Accessed January 9, 2024.

New York State Department of Environmental Conservation (NYSDEC). 2005 New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Unzicker, J. D. and P. H. Carlson, 1982. Ephemeroptera, pp. 3.1-3.97. *In* A. R. Brigham, W. U. Brigham, and A. Gnilka (editors). Aquatic insects and oligochaetes of North and South Carolina, Midwest Aquatic Enterprises, Mohomet, Illinois.

Originally prepared by	John Shea
Date first prepared	December 15, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Rusty flat-headed mayfly **Date Updated:** 1/10/2024

Scientific Name: *Nixe rusticalis* **Updated By:** B. Denoncour

Class: Insecta

Family: Heptageniidae

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

Nixe rusticalis is a mayfly that is known to occur at several locations throughout New York. The only historical record of this species is from Traver (1935) who located three occurrences within the Susquehanna watershed (Tompkins Co.). Recent surveys by Myers et al. (2010) have located the species in three additional locations within the Upper Hudson watershed (2 in Greene Co. and 1 in Warren Co.). More recently this species was collected from a wave-swept shoreline of Lake Champlain in 2011 (L. Myers, personal communication). It has been reported elsewhere in North America, with records from Quebec (McDunnough 1931), Saskatchewan (Whiting and Sheard 1990), Maine (Burian and Gibbs 1991), Ohio (Randloph and McCafferty 1998), Iowa (Klubertanz 1995), and Alabama (Kondratieff and Harris 1986). Its habitat is high gradient small streams to medium-sized rivers (Myers et al. 2010) and the wave-swept shorelines of large lakes (L. Myers, personal communication).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G5

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

Other Ranks:
None

Status Discussion:

This species is globally ranked Secure and has yet to be ranked in New York.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Choose an item.	Choose an item.	Choose an item.			Choose an item.
New York	Yes	Unknown	Unknown			Yes

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No data	Unknown	Unknown			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No data	Unknown	Unknown			(blank)
Quebec	No data	Unknown	Unknown			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York.

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

There is no trend information available for this species.

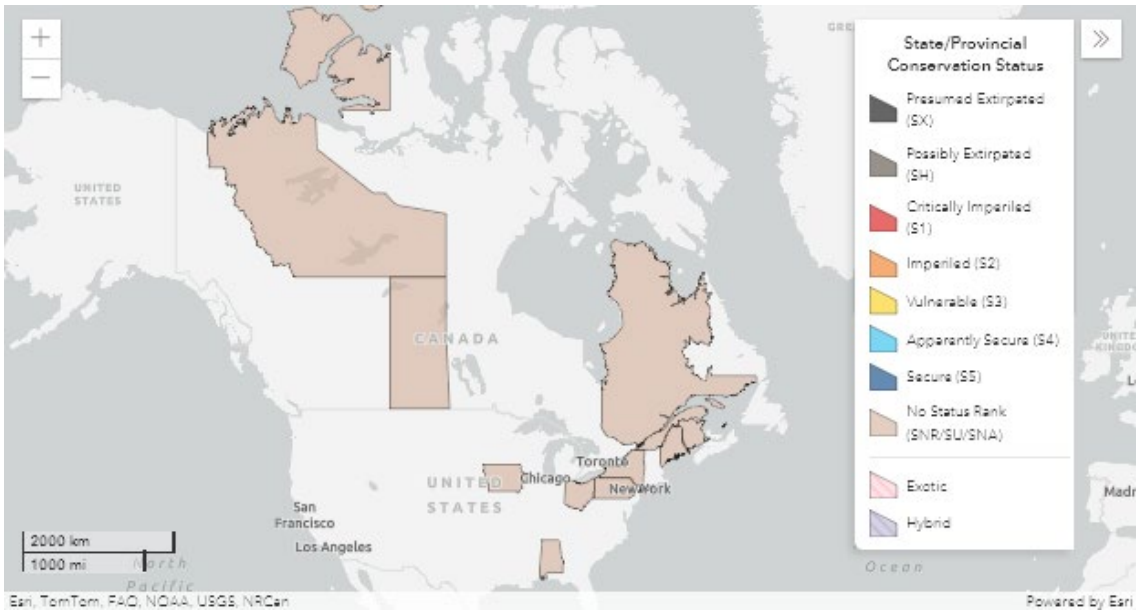

Figure 1. Conservation status of *Nixe rusticalis* in North America (NatureServe 2023)

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

Although there are a few recent occurrence records, rarity in New York state is unknown. Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of

new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

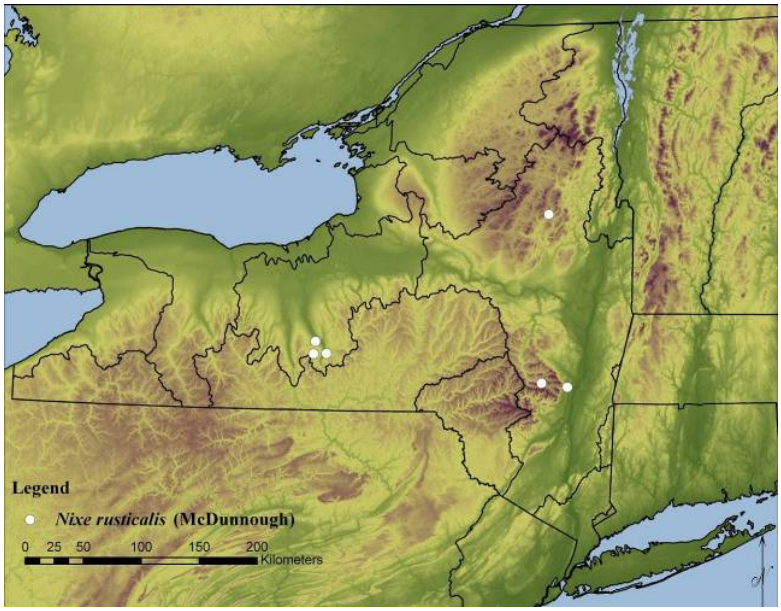

Figure 2. Records of *Nixe rusticalis* (McDunnough) in New York (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	3	_____
2000- 2023	_____	3	0-5%

Table 1. Records of *Nixe rusticalis* in New York.

Details of historic and current occurrence:

There are three historical records from Tompkins County: Ithaca (Traver 1935); Taughannock Glens (Traver 1935); Enfield (Traver 1935).

There are three records of current occurrence:
Greene County- BLT, Kaaterskill Creek, High Falls Rd. Ext. 0.5 mi. S of 23A, 42.1840N, 73.9719W, June 24, 2007, 2 males, L. Myers and B. C. Kondratieff (CSUC); Schoharie Creek, Jct. Denning Rd. and Rt. 23A, 42.2164N, 74.2431W, June 25, 2007, 1 male, L. Myers and B. C. Kondratieff (CSUC);
Warren County- BLT, E. B. Sacandaga River, Rt. 30 mm 1022, 43.5256N, 74.1492W, June 25, 2007, 1 male, L. Myers and B. C. Kondratieff (CSUC).

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%	Disjunct	

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. Riverine, coldwater stream, sand and gravel bottom

b. Riverine, coldwater stream, mud bottom

c. Lacustrine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

This species occurs in high gradient small streams to medium sized rivers and wave-swept shorelines of large lakes (L. Myers, personal communication, Myers et al. 2010).

New habitat information: found in waveswept shorelines of large lakes; small to medium-sized high gradient streams and rivers (NYSDEC 2015 SWAP: SGCN Experts Meeting).

V. Species Demographic 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):*

Information on the life history of this species is unknown.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Nixe rusticalis*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Nixe rusticalis* in particular.

Habitat management:

____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites within the historical ranges of these species.

VII. References

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Originally prepared by	John Shea
Date first prepared	December 15, 2011
First revision	February 10, 2014
Latest revision	

Species Status Assessment

Common Name: Glover's small minnow mayfly **Date Updated:** 1/10/2024

Scientific Name: *Plauditus gloveri* **Updated By:** B. Denoncour

Class: Insecta

Family: Baetidae

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

Plauditus gloveri is a species of mayfly of which little is known in New York. The only occurrence of this species in the state is from the SW Lake Ontario watershed (Livingston Co.) (Jacobus and McCafferty 2001a). This uncommon species has also been reported from Kansas, Indiana, Manitoba, Montana, Saskatchewan, South Carolina, and Texas (McCafferty and Waltz 1998, Jacobus and McCafferty 2001a, Jacobus and McCafferty 2001b, McCafferty and Jacobus 2001, McCafferty et al. 2004, Webb et al. 2004, McCafferty and Jacobus 2008).
Adults of this species are currently undescribed. The known distribution has increased significantly since this species was first reported from New York and subsequently listed as a species of potential environmental concern by Jacobus and McCafferty (2001a). The specific habitat is unknown.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G5

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

Other Ranks:
None

Status Discussion:

This species is globally ranked Secure due to its widespread distribution but is not yet yanked in New York State.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			No
New York	Yes	Unknown	Unknown			Yes

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No	N/A	N/A			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No	N/A	N/A			(blank)
Quebec	No	N/A	N/A			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is unknown.

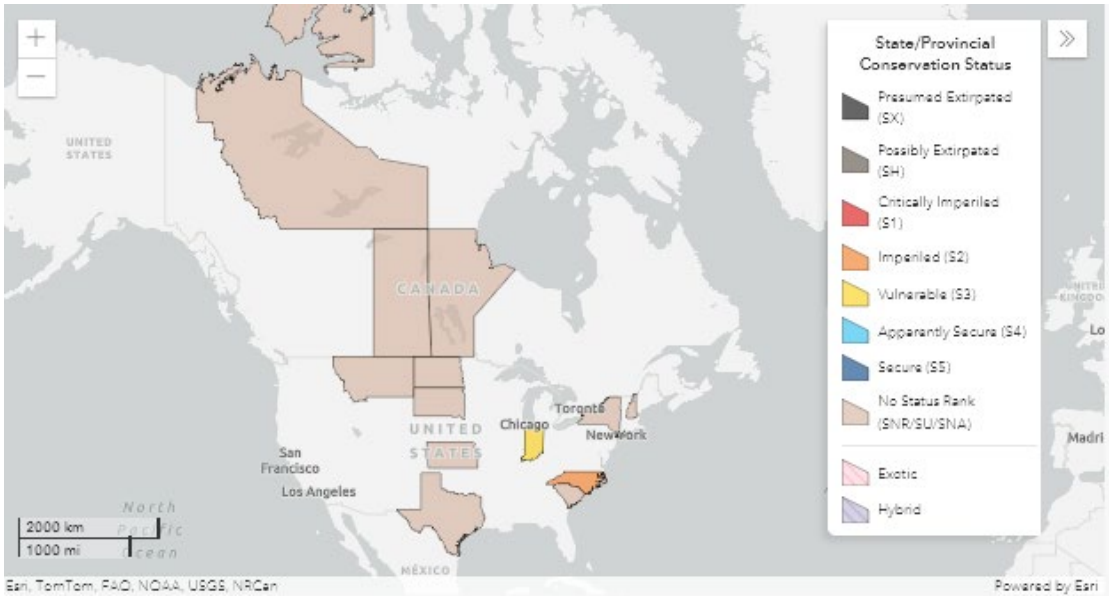

Figure 1. Conservation status of *Plauditus gloveri* in North America (NatureServe 2023)

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

Rarity in New York state is unknown due to lack of occurrence records. Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new

information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

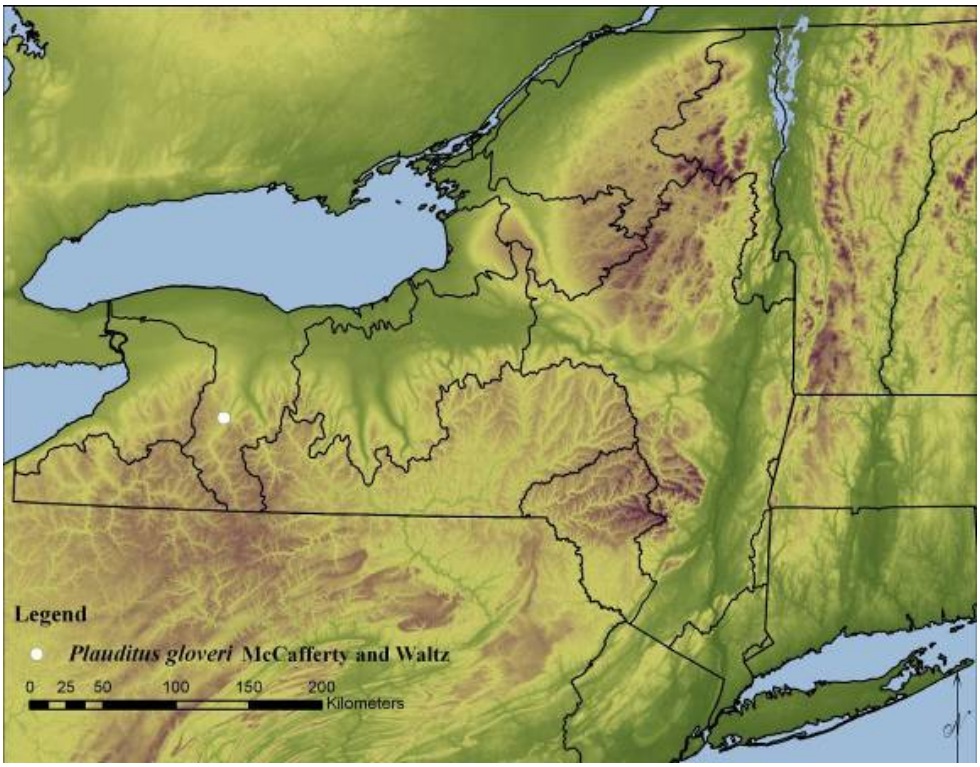

Figure 2. Records of *Plauditus gloveri* (McCafferty and Waltz) in New York (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Plauditus gloveri* in New York.

Details of historic and current occurrence:

There is one current record of occurrence from the Genesee River, Livingston County, 42.5714N, 78.0416W, August 1, 1999, L. M. Jacobus and R. P. Randolph (Jacobus and McCafferty 2001a).

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%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

Specific habitat information for this species is unknown.

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Unknown	Unknown	Unknown	Unknown	(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):*

Very little is known regarding the life history of this species.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
Land/Water Protection	Resource/Habitat Protection

Table 2. Recommended conservation actions for *Plauditus gloveri.*

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of uncertain habitat.

Habitat management:
____ Control the activity level and intensity in and around historic waters where these species are known to have habitats.
Habitat research:
____ Determine the critical habitat for these species.
Population monitoring:
____ Survey potential sites in the historical range of the species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Jacobus, L. M. and W. P. McCafferty. 2001a. The mayfly fauna of New York State (Insecta: Ephemeroptera). Journal of the New York Entomological Society 109: 47-80.

Jacobus, L. M. and W. P. McCafferty. 2001b. Additions to the Canadian Ephemeroptera. Journal of the New York Entomological Society 109: 367-371.

McCafferty, W. P., M. D. Meyer, J. M. Webb and L. M. Jacobus. 2004. New state and provincial records for North American small minnow mayflies (Ephemeroptera: Baetidae). Entomological News 115: 93-100.

McCafferty, W. P. and L. M. Jacobus. 2001. Revisions to *Pauditus cestus* and *P. gloveri* (Ephemeroptera: Baetidae). Entomological News 112: 305-310.

McCafferty, W. P. and L. M. Jacobus. 2008. Insecta, Ephemeroptera, Baetidae: Range extensions and new state records from Kansas, U.S.A. Check List 4: 92-97.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

McCafferty, W. P. and R. D. Waltz. 1998. A new species of the small minnow mayfly genus *Plauditus* (Ephemeroptera: Baetidae) from South Carolina. Entomological News 109: 354-356.

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.112558/Plauditus_gloveri Accessed January 10, 2024.

New York State Department of Environmental Conservation (NYSDEC). 2005 New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Webb, J. M., D. W. Parker, D. M. Lehmukuhl and W. P. McCafferty. 2004. Additions and emendations to the mayfly (Ephemeroptera) fauna of Saskatchewan, Canada. Entomological News 115: 213-218.

Originally prepared by	John Shea
Date first prepared	December 15, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Faulty small minnow mayfly **Date Updated:** 1/10/2024

Scientific Name: *Procloeon mendax* **Updated By:** B. Denoncour

Class: Insecta

Family: Baetidae

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

Procloeon mendax is a mayfly about which little is known in New York. There are a total of four occurrences for this species in the state: two in the Lake Champlain watershed (Clinton Co.), one in the NE Lake Ontario – St. Lawrence watershed (Herkimer Co.), and one in the Upper Hudson watershed (Albany Co.) (Needham 1908, Myers et al. 2010). This species has been reported infrequently from scattered localities in northeastern and midwestern North America (Wiersema and McCafferty 2004). The recent records by Myers et al. (2010) represent the first substantiated report of this species in New York since its initial report from the foot of First Lake in Herkimer County (Needham 1908). All specimens reported from these surveys were collected using light traps, therefore no specific habitat determinations can be made (Myers et al. 2010).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G4

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

Other Ranks:
None

Status Discussion:

This species is globally ranked Apparently Secure and has yet to be ranked in New York state.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			No
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No	N/A	N/A			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No	N/A	N/A			(blank)
Quebec	No	N/A	N/A			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is unknown.

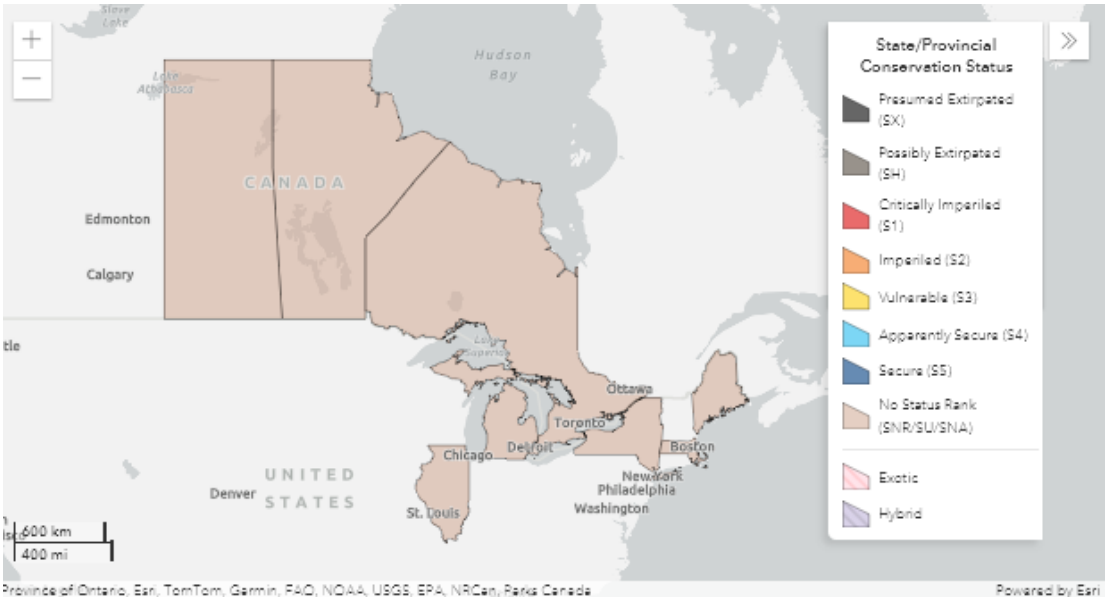

Figure 1. Conservation status of *Procloeon mendax* in North America

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

Rarity information for this species is unavailable due to very few records of occurrence.

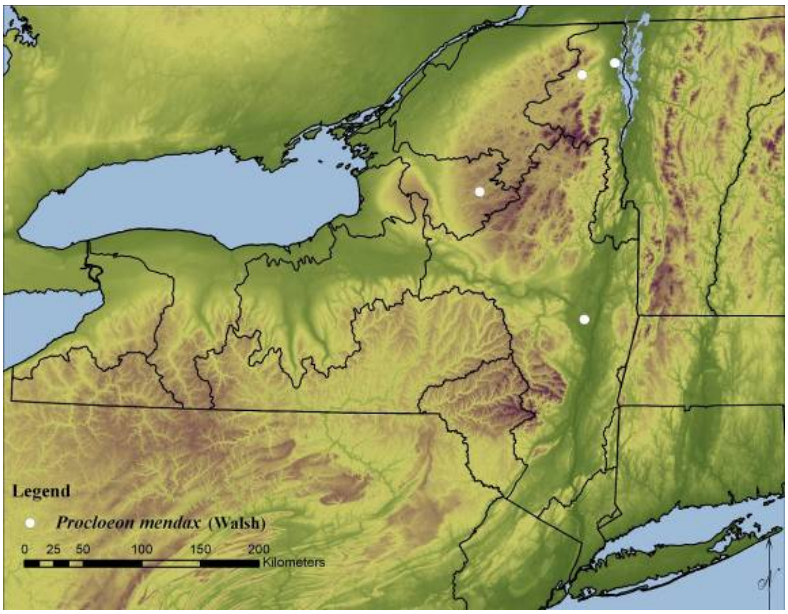

Figure 2. Records of *Procloen mendax* (Walsh) in New York (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	_____
2000- 2023	_____	3	0-5%

Table 1. Records of *Procloen mendax* in New York.

Details of historic and current occurrence:

There are two historical records of occurrence: Albany County, Colonie Village, September 16, 1971, 19 males, J. Wilcox (NYSM); and Herkimer County, First Lake, 1906 (Needham 1908b).

There are two current occurrence records, both from Clinton County: BLT, Wetland, Redford Sand Quarry, Ferrell Rd., 44.6061N, 73.8232W, August 3, 2006, 1 male, L. Myers (Myers et al. 2008); BLT, SUNY Plattsburgh, Jct. Beekman and Broad Streets, 44.6957N, 73.4666W, June 16, 2008, 4 males, R. Mowrey (CSUC).

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%	Disjunct	

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. Lacustrine, coldwater shallow

b. Riverine, coldwater stream, SAV

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

The habitat for this mayfly has not been described.

V. Species Demographic 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):*

Very little is known regarding the life history of this species.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural Systems Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Procloeon mendax*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Procloeon mendax* in particular.

Habitat management:
____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).
Habitat research:
____ Determine the critical habitat of the species.
Population monitoring:
____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.107315/Procloeon_mendax Accessed January 10, 2024

Needham, J. G. 1908. New data concerning mayflies and dragon flies of New York. New York State Museum Bulletin 124 (1907): 188-195.

New York State Department of Environmental Conservation (NYSDEC). 2005 New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Wiersema, N. A. and W. P. McCafferty. 2004. New specific synonyms and records of North American *Centroptilum* and *Procloeon* (Ephemeroptera: Baetidae). Entomological News 115: 121-128.

Originally prepared by	John Shea
Date first prepared	December 16, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Ozburns small minnow mayfly **Date Updated:** 1/10/2024

Scientific Name: *Procloeon ozburni* **Updated By:** B. Denoncour

Class: Insecta

Family: Baetidae

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

Procloeon ozburni is a mayfly of which little is known in New York. The only recorded occurrence of this species in New York is from the SE Lake Ontario watershed (Tompkins Co.) (Traver 1935). Outside of New York, this uncommon species has also been recorded from Quebec, Nova Scotia, Ontario, and Maine (McDunnough 1924, McDunnough 1925, Jacobus and McCafferty 2001b). This species is at the southern edge of its apparent range in New York. Larvae reportedly occur in vegetation in first through third order streams (Burian and Gibbs 1991).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
None

Status Discussion:

Although there is little data to indicate that this species is of high environmental concern at this time, it is globally ranked vulnerable and has seldom been reported (NatureServe 2023). This species is unlikely to be extirpated in New York (L. Myers, personal communication).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			No
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Pennsylvania	No	N/A	N/A			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No data	Unknown	Unknown			(blank)
Quebec	No data	Unknown	Unknown			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is unknown.

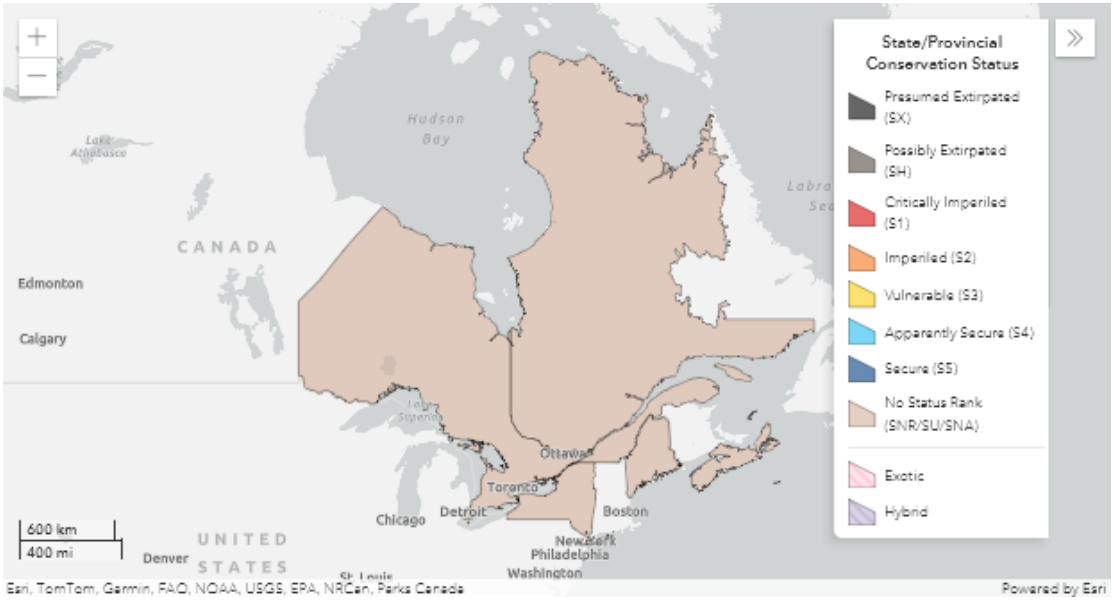

Figure 1. Conservation status of *Procloeon oxburni* in North America (NatureServe 2023)

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

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

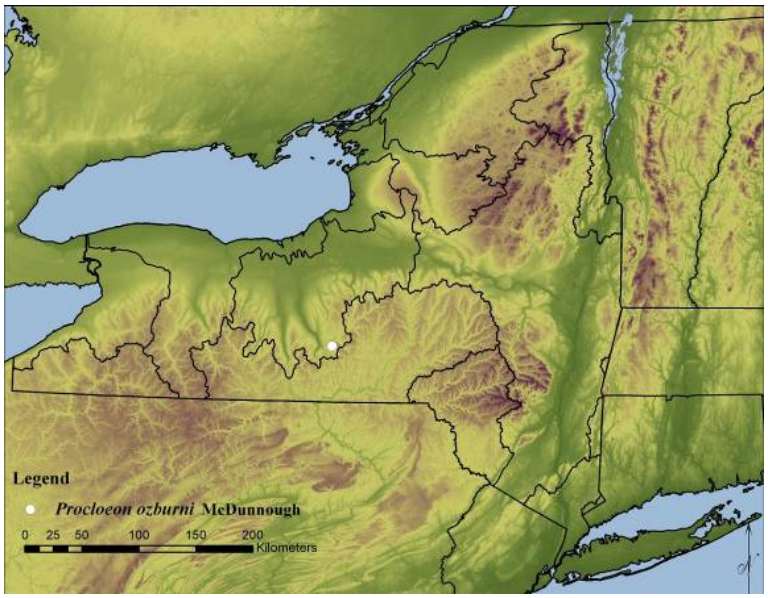

Figure 2. Records of *Procloeon ozburni* (McDunnough)in New York (Myers et al. 2010).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Procloeon ozburni* in New York.

Details of historic and current occurrence:

There is one historical record of occurrence from Ringwood, Tompkins County (Traver 1935).

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. Lacustrine, coldwater shallow

b. Riverine, coldwater stream, SAV

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	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:

Larvae occur among vegetation in first through third order streams (Burian and Gibbs 1991).

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Unknown	Unknown	Unknown	Unknown	(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):*

Very little is known regarding the life history of this species.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are

commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Procloeon ozburni*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Procloeon ozburni* in particular.

Habitat management:
____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).
Habitat research:
____ Determine the critical habitat of the species.
Population monitoring:
____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Burian, S. K. and K. E. Gibbs. 1991. Mayflies of Maine: an annotated faunal list. Maine Agricultural Experiment Station, Technical Bulletin 142: 109 pp.

Jacobus, L. M. and W. P. McCafferty. 2001b. Additions to the Canadian Ephemeroptera. Journal of the New York Entomological Society 109: 367-371.

McDunnough, J. 1924. New Canadian Ephemeridae with notes, II. Canadian Entomologist 56: 90-98

McDunnough, J. 1925. Ephemeroptera. pp. 104-106 *In* N. Criddle (editor). The entomological record, 1924. Annual Report of the Entomological Society of Ontario 55: 89-106.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.118133/Procloeon_ozburni Accessed January 10, 2024.

New York State Department of Environmental Conservation (NYSDEC). 2005 New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Traver, J. R. 1935. Part II: Systematic. pp. 237-739. *In* J. G. Needham, J. R. Traver, and Y. C. Hsu. The biology of mayflies, with a systematic account of North American species. Ithaca, Comstock Publishing.

Originally prepared by	John Shea
Date first prepared	December 15, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Likeable small minnow mayfly **Date Updated:** 1/10/2024

Scientific Name: *Procloeon simile* **Updated By:** B. Denoncour

Class: Insecta

Family: Baetidae

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

Procloeon simile is a mayfly about which little is known in New York. There are three historical occurrences of this species in the state: the NE Lake Ontario – St. Lawrence (St. Lawrence Co.), SE Lake Ontario (Tompkins Co.), and Upper Hudson (Rensselaer Co.) watersheds. This species has also been reported infrequently in eastern North America from New Brunswick, Quebec, Ontario, and North and South Carolina (McDunnough 1924, Traver 1935, Pescador et al. 1999). No specific locality data are available from reports of this species in North and South Carolina. Recent surveys by Myers et al. (2010) did not locate this species. Adult collection dates range from May to June (Jacobus and McCafferty 2001). Specific habitat for this species is unknown.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
None

Status Discussion:

This species is globally ranked Vulnerable due to lack of information and has yet to be ranked in New York.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			(blank)
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No	N/A	N/A			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No data	Unknown	Unknown			(blank)
Quebec	No data	Unknown	Unknown			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is unknown.

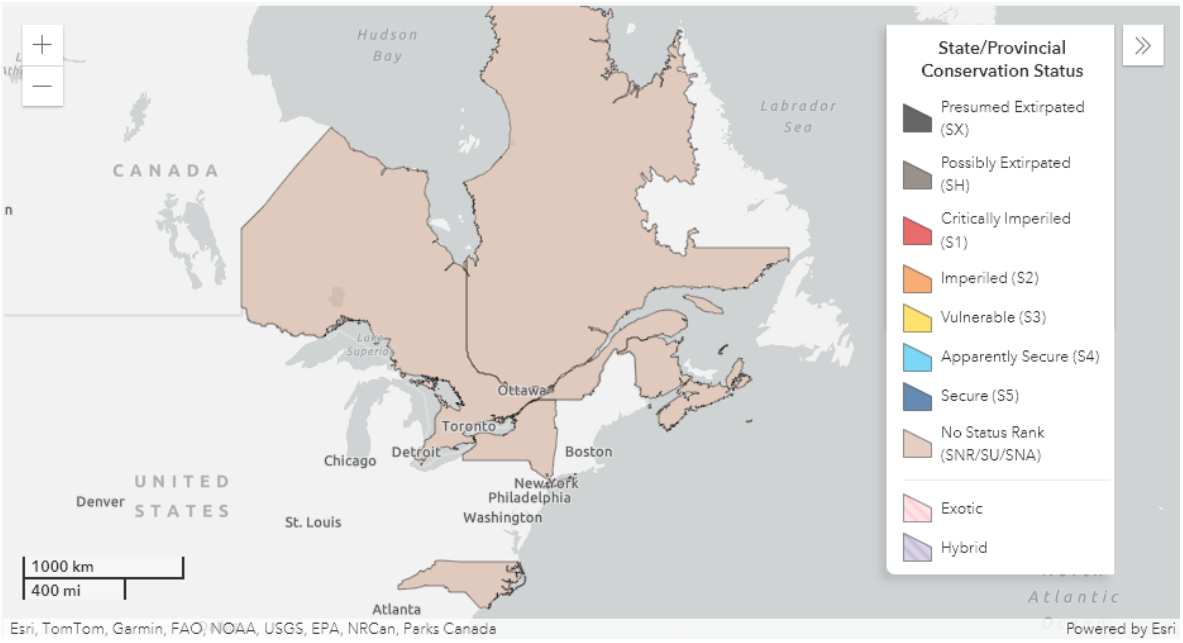

Figure 1. Conservation status of *Procloeon simile* in North America (NatureServe 2023)

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

Rarity in New York state is unknown due to lack of occurrence records.

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by

Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

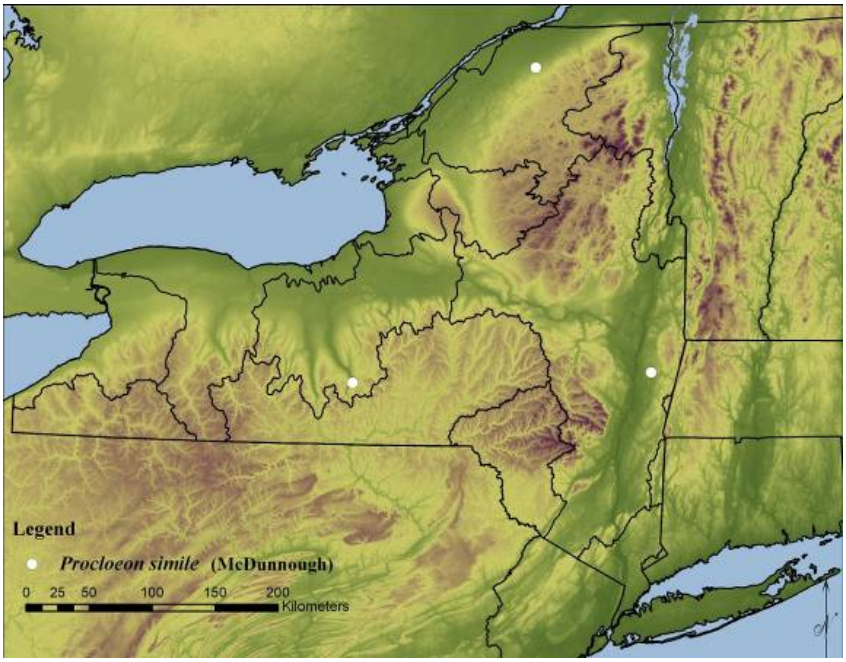

Figure 2. Records of *Procloeon simile* (McDunnough) in New York (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	3	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Procloeon simile* in New York.

Details of historic and current occurrence:

Historical records of occurrence are from Fort Jackson, St. Lawrence County (Traver 1935); Ithaca, Tompkins County, May 4, 1937 (Jacobus and McCafferty 2001); and Nassau Rensselaer County (Traver 1935).

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%	Disjunct	

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. Lacustrine, coldwater stream

b. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

Habitat information for this species is unknown.

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Unknown	Unknown	Unknown	Unknown	(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 information for this species is unknown.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
Land/Water Protection	Resource/Habitat Protection

Table 2. Recommended conservation actions for *Procloeon simile*.

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of uncertain habitat.

Habitat management:
____ Control the activity level and intensity in and around historic waters where these species are known to have habitats.
Habitat research:
____ Determine the critical habitat for these species.
Population monitoring:
____ Survey potential sites in the historical range of the species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Jacobus, L. M. and W. P. McCafferty. 2001. The mayfly fauna of New York State (Insecta: Ephemeroptera). Journal of the New York Entomological Society 109: 47-80.

McDunnough, J. 1924. New Canadian Ephemeridae with notes, II. Canadian Entomologist 56: 90-98.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.111427/Procloeon_simile Accessed January 10, 2024.

New York State Department of Environmental Conservation (NYSDEC). 2005 New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Pescador, M. L., D. R. Lenat and M. D. Hubbard. 1999. Mayflies (Ephemeroptera) of North Carolina and South Carolina: an update. Florida Entomologist 82: 316-332.

Traver, J. R. 1935. Part II: Systematic. pp. 237-739. *In* J. G. Needham, J. R. Traver, and Y. C. Hsu. The biology of mayflies, with a systematic account of North American species. Ithaca, Comstock Publishing.

Originally prepared by	
Date first prepared	
First revision	
Latest revision	

Species Status Assessment

Common Name: Potomac small minnow mayfly **Date Updated:** 1/10/2024

Scientific Name: *Procloeon vicinum* **Updated By:** B. Denoncour

Class: Insecta

Family: Baetidae

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

Procloeon vicinum is a species of mayfly about which little is known in New York. There is only one historical record of the species in the state, from the NE Lake Ontario – St. Lawrence watershed (Herkimer Co.) (Needham 1908). This infrequently collected species has also been reported from the District of Colombia, West Virginia, Ontario, and Quebec (Hagen 1861, Needham 1908, Burks 1953, Jacobus and McCafferty 2001). No specific record data was listed for previous reports of this species from West Virginia by Burks (1953). This species has not been reported in North America for over fifty years; however, due to its rarity it should not be considered extirpated in New York (L. Myers, personal communication). The specific habitat for this species is unknown (Myers et al. 2010).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G2

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

Other Ranks:
Northeast Regional SGCN: Watchlist

Status Discussion:

This species is globally ranked Imperiled because it is poorly known and reported sparsely from the far eastern U.S. and Canada (NatureServe 2013). There have been no specimens from North America in > 50 years, however it is a rare species and the habitat is unknown. It therefore should not be considered extirpated (L. Myers, personal communication).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Choose an item.	Choose an item.			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Northeastern US	Yes	Unknown	Unknown			(blank)
New York	Yes	Unknown	Unknown			(blank)
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	Yes	Unknown	Unknown			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No data	Unknown	Unknown			(blank)
Quebec	No data	Unknown	Unknown			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is unknown.

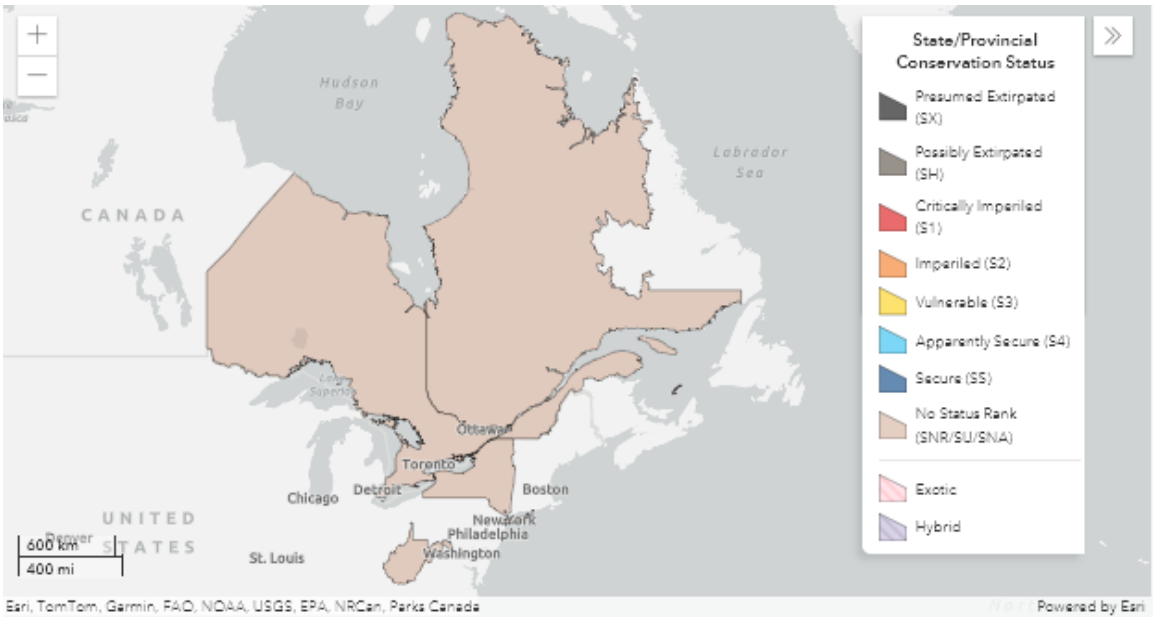

Figure 1. Conservation status of *Procloeon vicinum* in North America (NatureServe 2023)

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

This species is rare in New York.

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

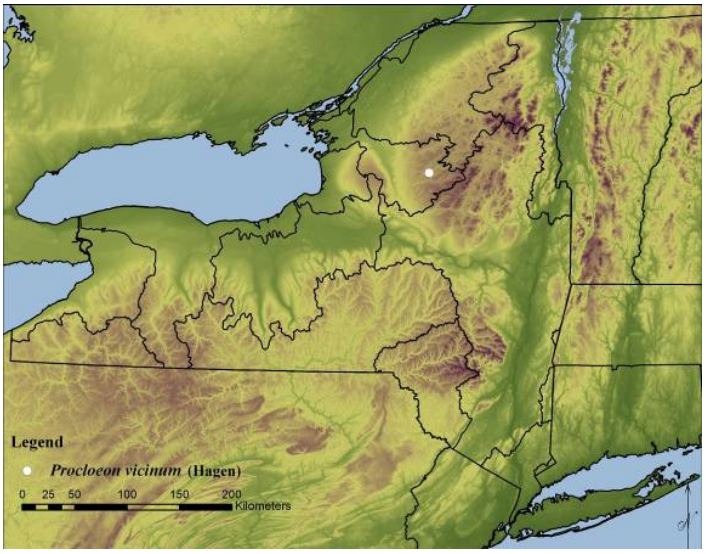

Figure 2. Records of *Procloeon vicinum* (Hagen) in New York (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Procloeon vicinum* in New York.

Details of historic and current occurrence:

There is one historical record of occurrence in First Lake, Herkimer County, 1906 (Needham 1908).

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%	Disjunct	

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. Lacustrine, coldwater shallow

b. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

Habitat information for this species is unknown.

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Unknown	Unknown	Unknown	Unknown	(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 information for this species is unknown.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
Land/Water Protection	Resource/Habitat Protection

Table 2. Recommended conservation actions for *Procloeon vicinum*.

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of uncertain habitat.

Habitat management:
____ Control the activity level and intensity in and around historic waters where these species are known to have habitats.
Habitat research:
____ Determine the critical habitat for these species.
Population monitoring:
____ Survey potential sites in the historical range of the species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Burks, B. D. 1953. The mayflies, or Ephemeroptera, of Illinois. Bulletin of the Illinois Natural History Survey 26: 1-216.

Hagen, H. 1861. Synopsis of the Neuroptera of North America, with a list of the South American species. Smithsonian Miscellaneous Collections, Ephemerina 4: 33-55.

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NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.113106/Procloeon_vicinum Accessed January 10, 2024.

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Originally prepared by	John Shea
Date first prepared	December 16, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Spiny salmonfly **Date Updated:** 1/10/2024

Scientific Name: *Pteronarcys comstocki* **Updated By:** B. Denoncour

Class: Insecta

Family: Pteronarcyidae

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

There are five known occurrences of the spiny salmonfly in the state, including historical records from the Lake Champlain (Essex Co.), Upper Hudson (Herkimer/Hamilton, Oneida/Herkimer counties), and SE Lake Ontario (Tompkins CO.) watersheds, and one current record from the Lake Champlain (Essex Co.) watershed. Isolated populations of *P. comstocki* have also been reported from New Brunswick, Maine, Pennsylvania, West Virginia, Virginia, and Kentucky (Nelson 2000, Stark et al. 2010). Records from Myers et al. (2010) are the first reports of this relatively rare species from the state in more than 65 years. The habitat is described as small to medium sized streams and rivers (Myers et al. 2010).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
None

Status Discussion:

The spiny salmonfly is globally ranked Vulnerable due to isolated populations throughout its range.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			No
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No data	Unknown	Unknown			Unknown

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Vermont	No	N/A	N/A			(blank)
Ontario	No	N/A	N/A			(blank)
Quebec	No	N/A	N/A			(blank)

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):*

None

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

Trend information for this species is unknown.

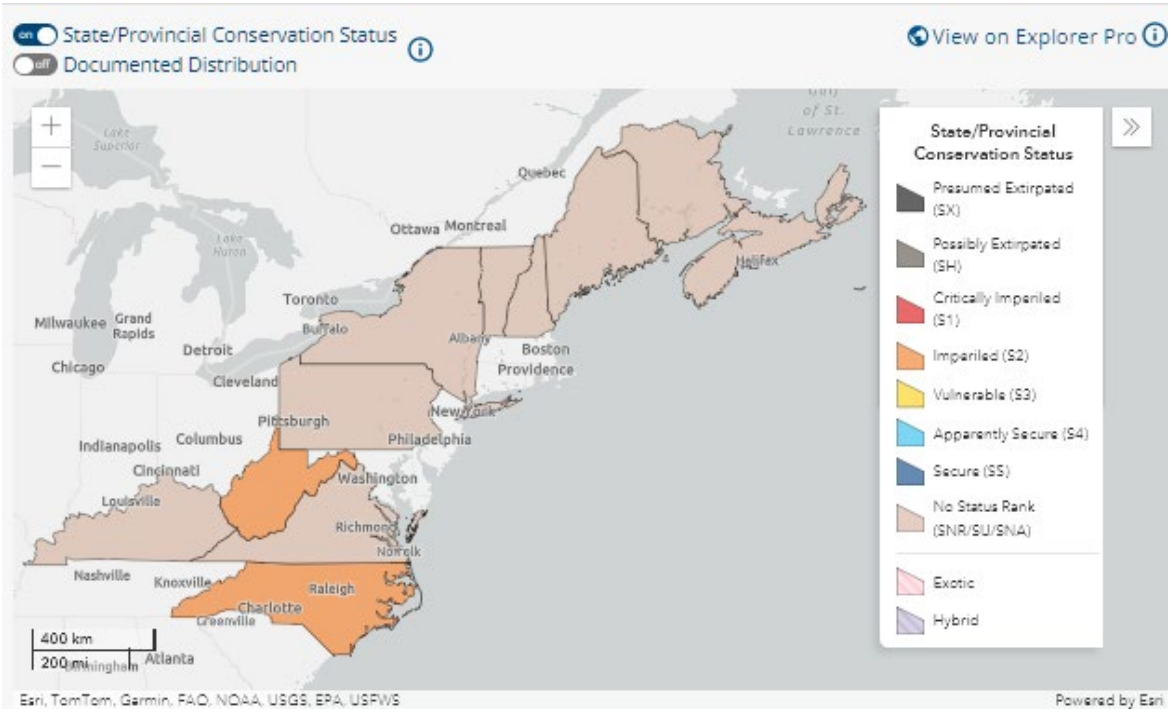

Figure 1. Conservation status of *Pteronarcys comstocki* in North America (NatureServe 2023)

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

Rarity information about this species in New York is unknown.
Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided

a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

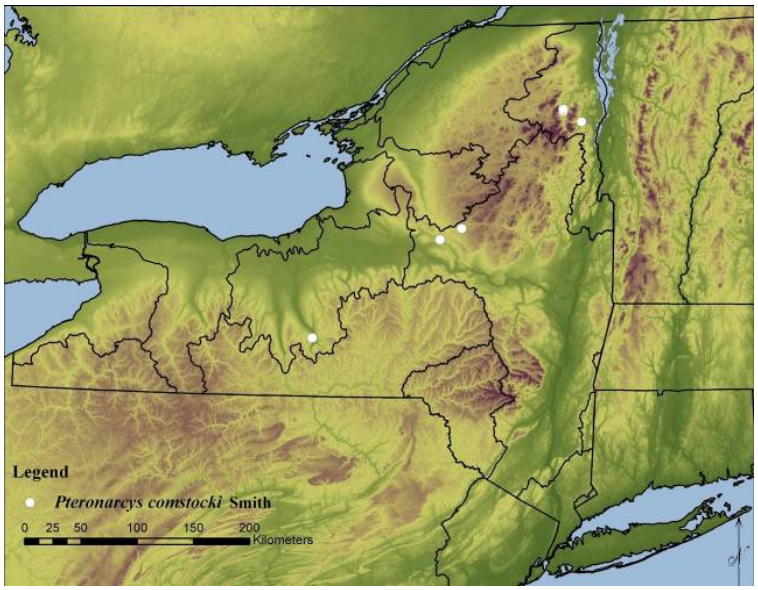

Figure 2. Records of *Pteronarcys comstocki* (Smith) in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	4	_____
2000- 2023	_____	1	0-5%

Table 1. Records of *Pteronarcys comstocki* in New York.

Details of historic and current occurrence:

Essex Co: Keene, Tributary of Ausable River, June 20, 1941, 1 exuvia, T.H. Frison and H.H. Ross (INHS)

Herkimer/Hamilton Co.: Wilmurt, 1 female (Holotype, CUIC)

Oneida/Herkimer Co.: Trenton Falls (Needham and Claassen 1925)

Tompkins Co.: Tarbel, June 1, 1915, 1 female, W.T. Davis (CUIC).

Essex Co: reared, May 27, 2008, Boquet River, Rt. 9N, S. Elizabethtown, 44.2125N, 73.5839W, May 23, 2008, 1 male, 1 female, L. Myers, B. C. Kondratieff, and R. W. Baumann (NYSM); Same location, May 23, 2008, 4 exuvia, L. Myers, B. C. Kondratieff, and R. W. Baumann (NYSM); Same location, May 23, 2008, 2 exuvia, L. Myers, B. C. Kondratieff, and R. W. Baumann (CSUC).

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%	Core	

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. Riverine, coldwater stream

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

Small to medium sized streams and rivers (Myers et al. 2010).

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	(blank)	(blank)	(blank)	(blank)	(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):*

Although the nymphal biology of this species has not been studied it is likely that it requires several years to complete its life cycle. Other members of this genus have been observed to mature in 1-4 years depending on the species and geographic location of the study (Nelson 2000). During the field surveys in eastern New York mature nymphs of this species were collected in the spring months from large woody debris in the main stream channel of the Boquet River. Removal of large woody debris from stream channels and riparian areas could be detrimental to populations of this species. Larvae reportedly feed on detritus but can be facultative predators (Myers, pers. comm.).

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Pteronarcys comstocki*)

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for spiny salmonfly in particular.

Habitat management:

____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other

rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

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Needham, J. G. and P. W. Claassen. 1925. A monograph of the Plecoptera or stoneflies of America North of Mexico. Entomological Society of Americaca, Thomas Say Foundation 2: 1-397.

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New York State Department of Environmental Conservation (NYSDEC). 2005 New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Stark, B. P., R. W. Baumann and R. E. DeWalt. 2010. Valid Stonefly Names for North America. Available http://plsa.inhs.uiuc.edu/plecoptera (Accessed: January 27, 2010).

Originally prepared by	John Shea
Date first prepared	December 21, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Anomalous flat-headed mayfly **Date Updated:** 1/9/24

Scientific Name: *Rhithrogena anomala* **Updated By:** B. Denoncour

Class: Insecta

Family: Heptageniidae

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

Rhithrogena anomala is a species of mayfly about which little is known in New York. There are four recorded occurrences for this species in the state: two in the Lake Champlain watershed (Clinton Co.), one in the NE Lake Ontario – St. Lawrence watershed (St Lawrence Co.), and one in the SE Lake Ontario watershed (Onondaga Co.) (Traver 1935, Jacobus and McCafferty 2001, Myers et al. 2010). Previous distributional accounts of this species range from the Canadian Maritime Provinces south along the Appalachians to Alabama (McDunnough 1928, Harris et al. 1996). Adult collection dates in New York range from early June to early July. The habitat for this species is described as high gradient, medium-sized rivers (Myers et al. 2010).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G3G4

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

Other Ranks:
Northeast Regional SGCN: Watchlist

Status Discussion:

Status information for this species is unknown.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			No
New York	Yes	Unknown	Unknown			Yes
Connecticut	Yes	Unknown	Unknown		Not listed	(blank)
Massachusetts	Yes	Unknown	Unknown			(blank)
New Jersey	No	N/A	N/A			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Pennsylvania	No	N/A	N/A			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No data	Unknown	Unknown		Not listed	(blank)
Quebec	No data	Unknown	Unknown			(blank)

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):*

There are no current monitoring activities for this species.

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

Trend information for this species is unknown.

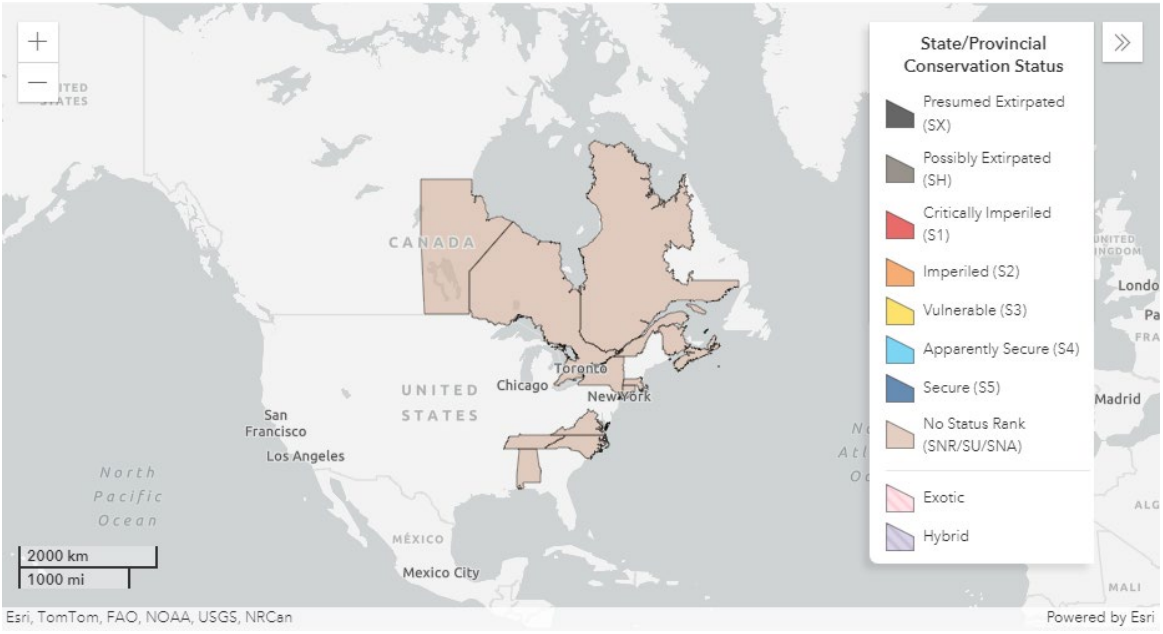

Figure 1. Conservation status of *Rhithrogena anomala* in North America (NatureServe 2023)

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

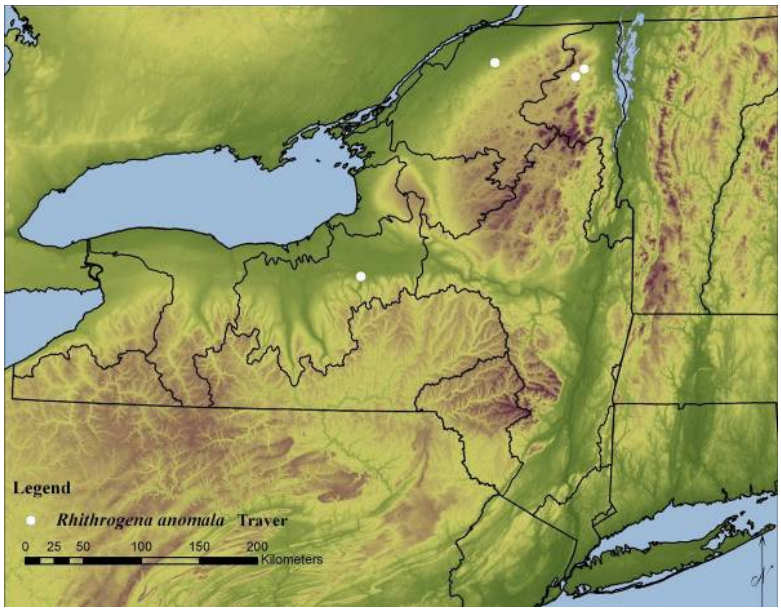

Figure 2. Records of *Rhithrogena anomala* (McDunnough) in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000		3	
2000- 2023		1	0-5%

Table 1. Records of *Rhithrogena anomala* in New York.

Details of historic and current occurrence:

Clinton Co., Saranac (Traver 1935). **Onondaga Co**., Syracuse, June 9, 1933 (Jacobus and McCafferty 2001); **St. Lawrence Co**., Fort Jackson (Traver 1935).

Clinton Co., S. B. Saranac River, Silver Lake Rd., 44.5913N 73.8394W, July 3, 2005, 2 mals, L. Myers (CSUC).

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%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

The habitat for this species is described as high gradient, medium-sized rivers (Myers et al. 2010).

V. Species Demographic 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):*

Adult collection dates in New York range from early June to early July (Myers et al. 2010).

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (road maintenance)
8. Pollution	Household Sewage & Urban Wastewater

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Rhithrogena anomala*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Rhithrogena anomala* in particular.

Habitat management:

____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Harris, S. C., B. C. Kondratieff and B. P. Stark. 1996. New records of Ephemeroptera, Plecoptera and Trichoptera from Alabama. Entomological News 107: 237-242.

Jacobus, L. M. and W. P. McCafferty. 2001. The mayfly fauna of New York State (Insecta: Ephemeroptera). Journal of the New York Entomological Society 109: 47-80.

McDunnough, J. 1928. Ephemerid notes with description of a new species. Canadian Entomologist 60: 238-240.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 1/5/2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.110975/Rhithrogena_anomala Accessed January 9, 2024.

New York State Department of Environmental Conservation (NYSDEC). 2005. New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Traver, J. R. 1935. Part II: Systematic. pp. 237-739. *In* J. G. Needham, J. R. Traver, and Y. C. Hsu. The biology of mayflies, with a systematic account of North American species. Ithaca, Comstock Publishing.

Originally prepared by	John Shea
Date first prepared	December 16, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: A mayfly **Date Updated:** 1/11/2024

Scientific Name: *Rhithrogena uhari* **Updated By:** B. Denoncour

Class: Insecta

Family: Heptageniidae

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

Rhithrogena uhari is a species of mayfly about which little is known in New York. There is only one historical occurrence of this species in New York, from the Lake Champlain watershed (Essex Co.) (Jacobus and McCafferty 2001). This report was based on larvae and should be considered tentative until an adult is examined (Myers et al. 2010). This infrequently collected species has been reported from Alabama, Georgia, North Carolina, South Carolina, and Maine (Traver 1933, Berner 1977, Burian and Gibbs 1991). The habitat for this species is described as swift streams and rivers. Burian and Gibbs (1991) reported this species from pool outlets and erosional areas of small streams.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
None

Status Discussion:

This species is globally ranked vulnerable due to lack of information regarding occurrences.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			(blank)
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	No	N/A	N/A			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No	N/A	N/A			(blank)
Quebec	No	N/A	N/A			(blank)

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):*

There are no monitoring activities or regular surveys for this species.

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

Trend information for this species is unknown.

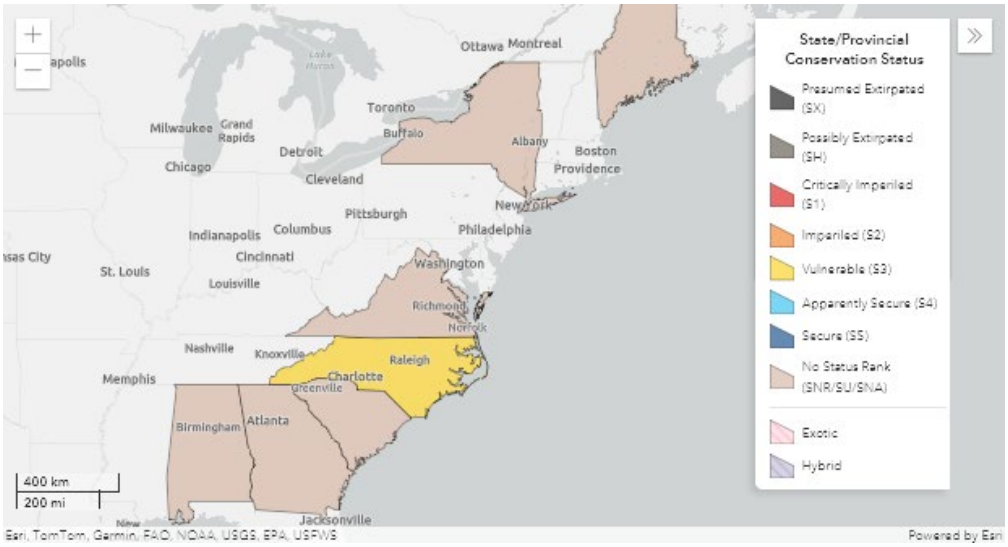

Figure 1. Conservation status of *Rhithrogena uhari* in North America (NatureServe 2023

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

Rarity information for this species in New York is unknown.

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

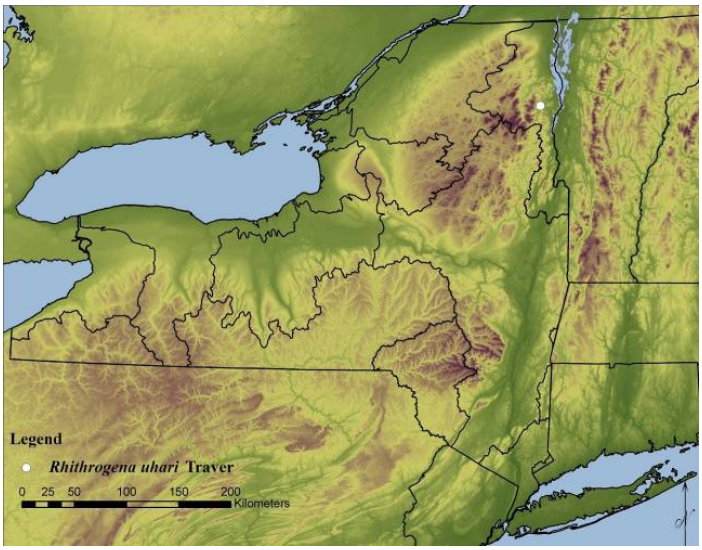

Figure 2. Records of *Rhithrogena uhari* (Traver) in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Rhithrogena uhari* in New York.

Details of historic and current occurrence:

Essex Co: Lewis, at Lee Bridge, June 18, 1952, larvae, E. I. Coher (Jacobus and McCafferty 2001).

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%	Disjunct	

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. Riverine, coldwater stream, mud bottom

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

The habitat for this species is described as swift streams and rivers (Myers et al. 2010).

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Unknown	Unknown	Unknown	Unknown	(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 information is unknown.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agriculture & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Droughts
6. Climate Change & Severe Weather	Storms & Flooding

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter

aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

Myers et al. (2010) recommends that this species be removed from the SGCN list due to uncertainties of the single historic record in New York. Reared material is required for positive species identifications (Burian and Gibbs 1991).

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

Conservation Actions	
Action Category	**Action**

1.	
2.	

Table 2. (need recommended conservation actions for *Rhithrogena uhari*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Rhithrogena uhari* in particular.

Habitat management:

____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites within the historical ranges of these species.

VII. References

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Originally prepared by	

Date first prepared	
First revision	
Latest revision	

Species Status Assessment

Common Name: Tomah mayfly **Date Updated:** 12/28/23

Scientific Name: *Siphlonisca aerodromia* **Updated By:** B. Denoncour

Class: Insecta

Family: Siphlonuridae

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

The Tomah mayfly (*Siphlonisca aerodromia*) is currently listed as an Endangered species in New York and is known to occur only in New York and in northern Maine. It was first collected in 1907 along the Sacandaga River; that population was subsequently lost when the Sacandaga Reservoir was constructed in the 1930s. Still without a common name, this mayfly was not reported in the United States again until 1978 when it was found in Tomah Stream in northern Maine. Several new occurrences of this species have been documented in Maine since then, and in New York since 1995.

Surveys of the Black River indicate that this species is locally abundant where suitable habitat exists on lower reaches of the river in Lewis and Jefferson counties. Surveys of the Sacandaga River were unsuccessful in locating any remnant populations of Tomah mayfly. Potential habitats were located on the East Branch of the Sacandaga River; however surveys of these habitats were likely too late in the season to encounter this species (Myers et al. 2010).

This species has also been reported historically from several locations in Quebec, Newfoundland, Labrador, and Nova Scotia (Needham 1908, Magnin and Harper 1970, Fiance 1978, Hutchinson 1989, Burian and Gibbs 1988, Burian and Gibbs 1991, Jacobus and McCafferty 2001).

McCafferty and Edmunds (1997) suggest that this species is not as rare as others have suggested, and that there are many other species of mayflies that are known from fewer locales.

I. Status

a. Current legal protected Status

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

ii. **New York:** Endangered; SGCN

b. Natural Heritage Program

i. **Global:** G2G3

ii. **New York:** S1 **Tracked by NYNHP?:** Yes

Other Ranks:

-Northeast Regional SGCN: RSGCN

Status Discussion:

New locations have been identified in New York recently (2009) due to increased surveys (Myers et al. 2010).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Unknown		Endangered	Yes
Connecticut	No	Choose an item.	Choose an item.			Choose an item.
Massachusetts	No	Choose an item.	Choose an item.			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	No	Choose an item.	Choose an item.			Choose an item.
Vermont	Yes	Unknown	Unknown			Choose an item.
Ontario	No	Choose an item.	Choose an item.			Choose an item.
Quebec	No data	Choose an item.	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):*

None.

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

Tomah mayfly was first discovered in New York in 1909 along the Sacandaga River in Fulton County. The location was destroyed by the construction of the Conklingville Dam in 1930s and the species was thought to have been extirpated. In 1978, the species was found in Tomah Stream in northern Maine. Extensive surveys following this discovery led to more than 15 additional locations in northern Maine.

Tomah mayfly was rediscovered in New York in 1986 along areas of the Black River in Jefferson and Lewis counties. Surveys conducted in 2009 revealed more new locations along the Black River (Myers et al. 2010).

Surveys of the Sacandaga River were unsuccessful in locating any remnant populations of Tomah mayfly. Potential habitats were located on the East Branch of the Sacandaga River; however surveys of these habitats were likely too late in the season to encounter this species (Myers et al. 2010).

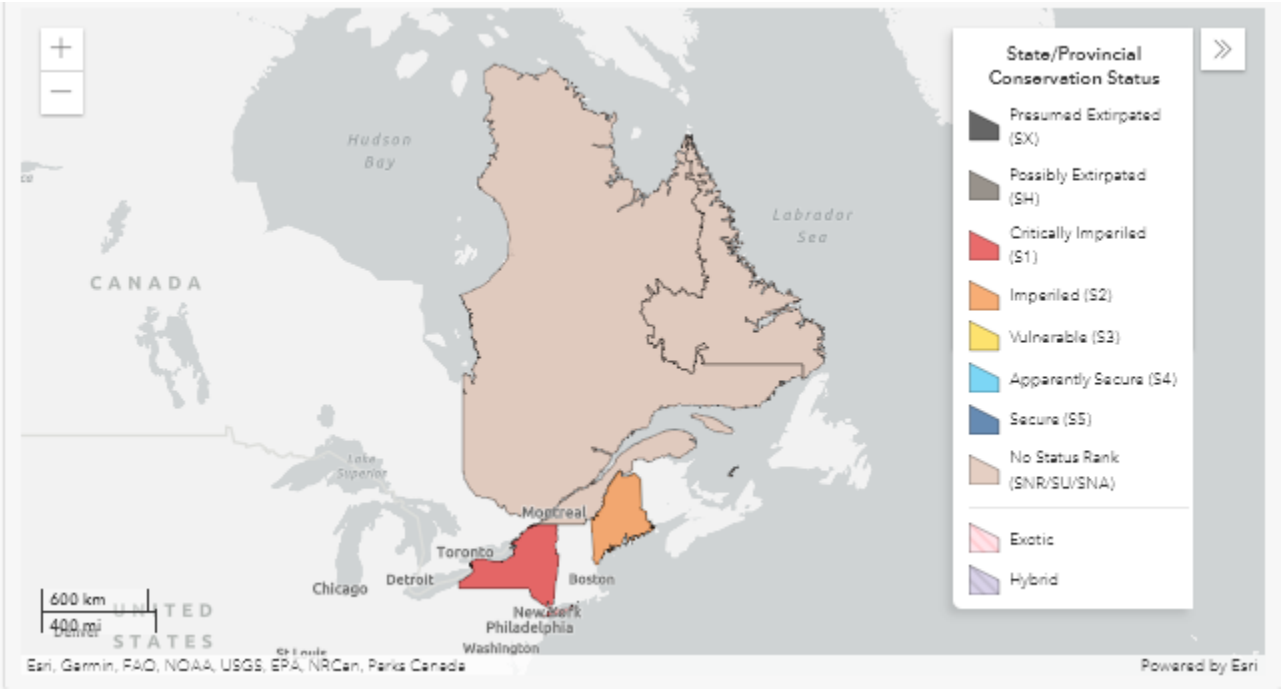

Figure 1. Conservation status of *Siphlonisca aerodromia* in North America (NatureServe 2023)

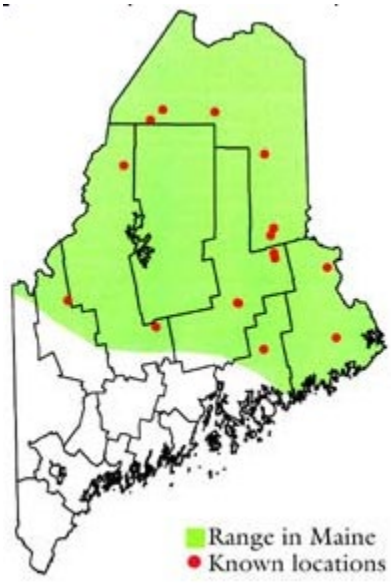

Figure 1. Distribution of *Siphlonisca aerodromia* in the state of Maine

(www.maine.gov)

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

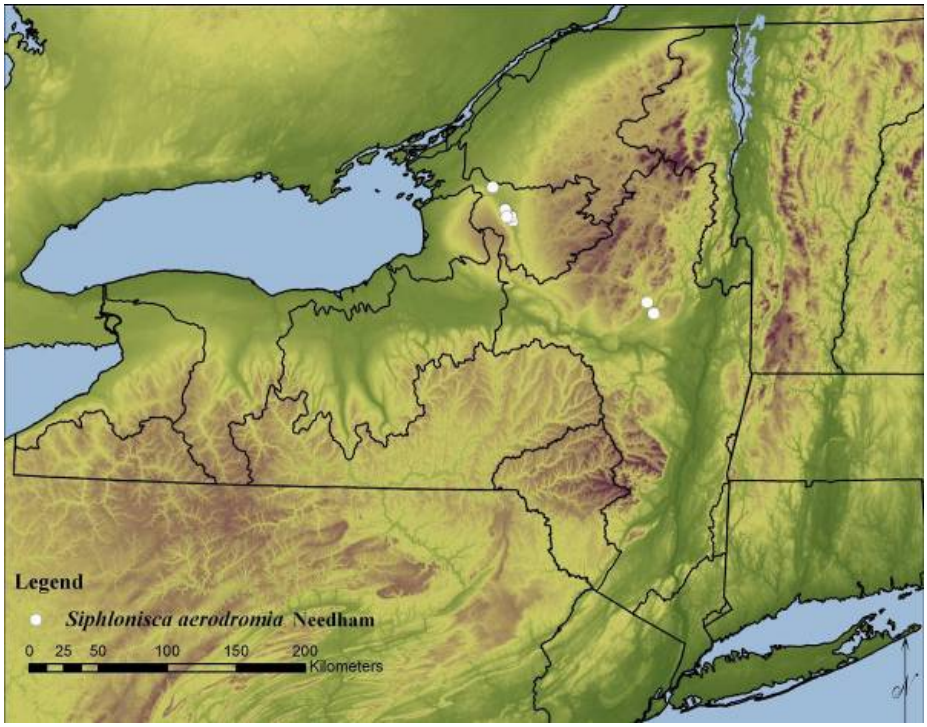

Figure 3. Distribution of *Siphlonisca aerodromia* (Needham) in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	2	0-5%
2000- 2023	_____	11	_____

Table 1. Records of *Siphlonisca aerodromia* in New York.

Details of historic and current occurrence:

Historic occurrence: **Fulton Co**., North Hampton, Fish House, May 25, 1914 (Needham 1908); Sacandaga Park, June 6, 1909 (Needham 1908)

Current occurrence: One location in Jefferson County and ten locations in Lewis County.

Tomah mayfly is found only in northern Maine and in two counties in New York. In Maine, it is considered abundant at one site, common at seven sites, and rare at five sites.

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done

throughout the rest of the state to get a more complete understanding of abundance and distribution.

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
26-50%	Disjunct	

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. Riverine, cold water stream, sand and gravel bottom

b. Palustrine, mineral soil wetland, meadow

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	Declining	

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:

In Maine the Tomah mayfly inhabits small rivers and streams bordered by extensive areas of seasonally flooded sedge meadow. This is a dynamic habitat, characterized by a short period of flooding from snow and ice melt during April-May, followed by receding water from the floodplain during summer months. Standing water often remains until May or June as pools, channels, or isolated ponds. Tussock sedge and rushes are typically the dominant vegetation in these habitats. The inundated, decomposing sedge provides shelter, bottom surface, and abundant food for an unusually diverse and abundant aquatic invertebrate community (Maine Dept. of Inland Fisheries and Wildlife).

In New York this species has been reported from similar floodplain habitats on the Black River on the flanks of the Adirondack Mountains and the Tug Hill Plateau. This particular river is much larger in size than streams inhabited by *S. aerodromia* in Maine. This area receives some of the highest snowfall totals in the state and despite a number of flood control structures, is still prone to annual spring flooding (Carter 1980).

V. Species Demographic and Life History:

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

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):*

The life history and ecology of Tomah mayfly has been studied extensively (Gibbs and Mingo 1986, Gibbs 1993, Gibbs and Siebenmann 1996, Gibbs et al. 1998, Huryn 2002). Descriptions of both larvae and adults have been provided by numerous authors (Needham 1908, Clemens 1915, Traver 1935, Burks 1953, Edmunds et al. 1976, Burian and Gibbs 1988).

Larvae migrate from the stream channel to sedge dominated (*Carex spp.*) floodplain habitats during the spring snowmelt in March and April. Once in the floodplain, larvae prey heavily on other aquatic insects present in the temporarily available habitats. It is during this time period that a majority of the larval growth is achieved. Adults emerge in late May and early June. Eggs are deposited in the water column where they eventually attach to submerged sand and gravel substrates (Myers et al. 2010).

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (road maintenance)
8. Climate Change & Severe Weather	Droughts (reduced water run in floodplains)
9. Pollution	Household Sewage & Urban Waste Water (salt application)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

Tomah mayfly 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).

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Tomah mayfly is listed as an endangered species in New York and is protected by Environmental Conservation Law (ECL) section 11-0535 and the New York Code of Rules and Regulations (6 NYCRR Part 182). A permit is required for any proposed project that may result in a take of a species listed as Threatened or Endangered, including, but not limited to, actions that may kill or harm individual animals or result in the adverse modification, degradation or destruction of habitat occupied by the listed species.

The Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need new recommended conservation actions for *Siphlonisca aerodromia*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for the Tomah mayfly.

Habitat monitoring:

____ Review development or other proposals that could impact the flow, water quality, or other factors that could threaten the population in the Black River.

Habitat research:

____ Support and encourage research that would increase knowledge of the impact of poorly known threats to this species (e.g. water quality degradation, removal of forested riparian buffers, hydrological flow alterations from existing or new dams).

____ Conduct more complete surveys of the Black River to define larval and adult mayfly habitat usage and ecology in the Black River and any new sites that may be located as a result of statewide surveys.

Population monitoring:

____ Conduct more complete surveys of the Black River to completely define the extent of the occurrence and develop and apply a standardized sampling scheme that will result in long-term monitoring of the population.

Statewide baseline survey:

____ Identify rivers and streams with the necessary spring inundated sedge meadow habitat and conduct surveys for new locations including in the vicinity of the historical Sacandaga River occurrence (the exact historical location is inundated, but suitable habitat may exist elsewhere in the watershed).

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Originally prepared by	John Shea
Date first prepared	December 21, 2011
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Wild primitive minnow mayfly **Date Updated:** 12/28/23

Scientific Name: *Siphlonurus barbaroides* **Updated By:** B. Denoncour

Class: Insecta

Family: Siphlonuridae

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

Siphlonurus barbaroides is a species of mayfly about which little is known in New York. There is only one historical occurrence in New York, from the SE Lake Ontario watershed (Tompkins Co.) (Traver 1935), but it is not likely extirpated. Outside of New York, this seldom reported species occurs in Nova Scotia and New Brunswick (McDunnough 1929, Whiting 1992, Jacobus and McCafferty 2001). The habitat for this species is described as overflow areas and in-stream habitats (Myers et al. 2010).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
Northeast Regional SGCN: Proposed Watchlist

Status Discussion:

This species is globally ranked as Vulnerable due to lack of information and occurrence records and it has yet to be ranked in New York. It is rare but not likely to be extirpated (L. Myers, personal communication).

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	Choose an item.	Choose an item.			Choose an item.
Massachusetts	No	Choose an item.	Choose an item.			Choose an item.
New Jersey	No	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	Unknown	Unknown	Unknown			Choose an item.
Vermont	No	Choose an item.	Choose an item.			Choose an item.
Ontario	No data	Unknown	Unknown			Choose an item.
Quebec	No data	Unknown	Unknown			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 monitoring activities or regular surveys are conducted for this species in New York.

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

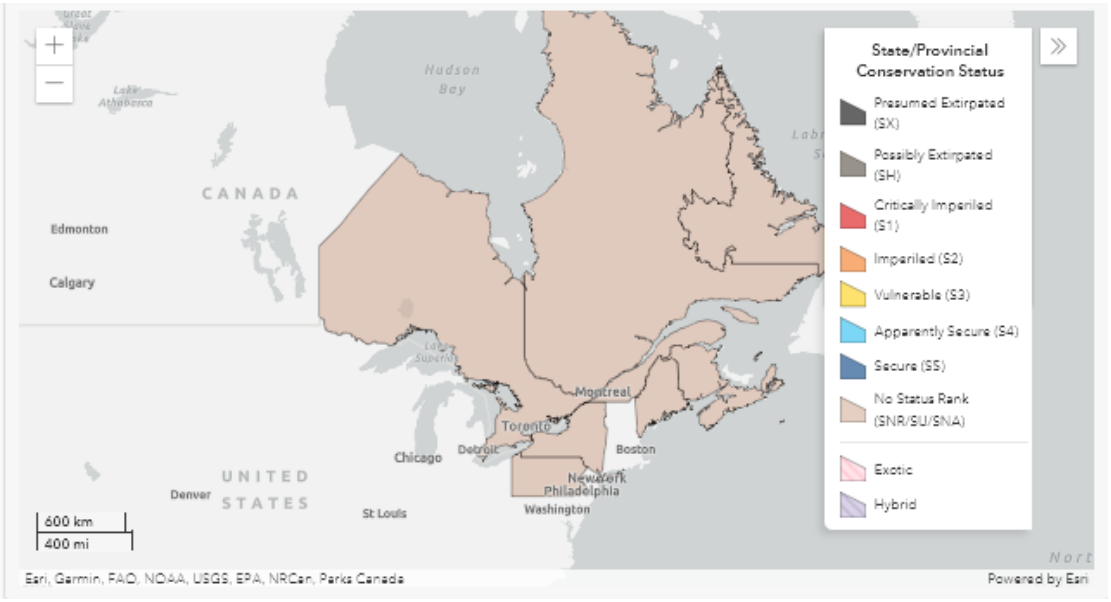

Figure 1. Conservation status of *Siphlonurus barbaroides* in North America (NatureServe 2023)

There is no trend information available for this species.

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

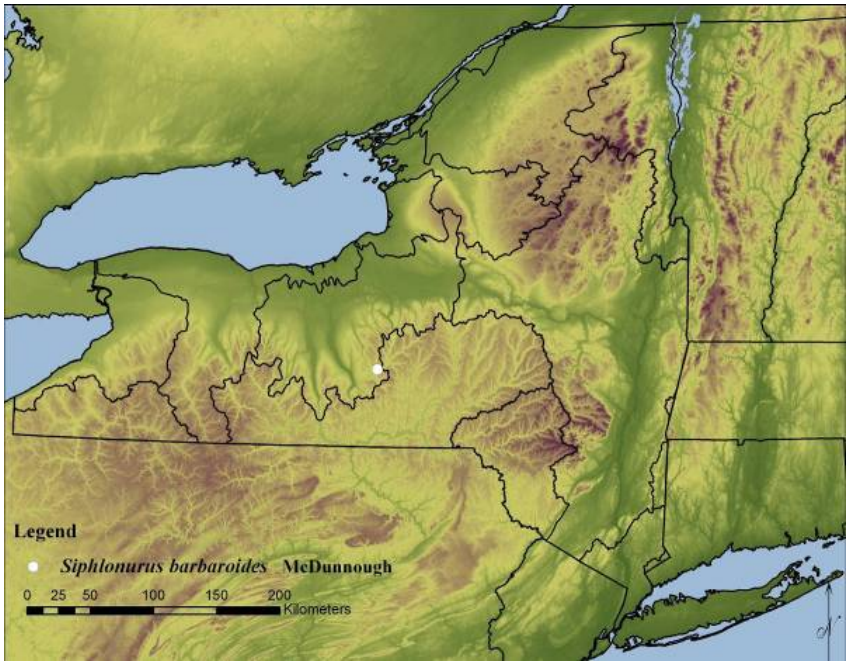

Figure 2. Distribution of *Siphlonurus barbaroides* (McDunnough) in New York State (Myers et al. 2010).

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%

2000- 2023	_____	_____	_____

Table 1. Records of *Siphlonurus barbaroides* in New York.

Details of historic and current occurrence:

There is one historical occurrence record from Tompkins County (Traver 1935).

There are no current occurrence records for this species in New York.

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. Lacustrine, cold water shallow, SAV

b. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	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:

The habitat for this species is described as overflow areas and in-stream habitats (Myers et al. 2010).

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Choose an item.	Choose an item.	Unknown	Unknown	Choose an item.

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):*

Very little is known regarding the life history of this species. Populations of this species are likely sensitive to changes in the natural flow regime. Larvae of this genus often migrate into seasonally inundated habitats in the stream/river floodplain (Myers pers. comm.).

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Climate Change & Severe Weather	Droughts

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are

significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	
3.	
4.	

Table 2. (need recommended conservation actions for *Siphlonurus barbaroides*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lentic waters, and for *Siphlonurus barbaroides* in particular.

Habitat management:

____ Control the timing and intensity of activity in the riparian zone of historical waters.

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites outside the historical range of the species that may contain potential habitats.

____ Survey potential sites in the historical range of the species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Jacobus, L. M. and W. P. McCafferty. 2001. The mayfly fauna of New York State (Insecta: Ephemeroptera). Journal of the New York Entomological Society 109: 47-80.

McDunnough, J. 1929. Notes on North American Ephemeroptera with descriptions of new species, II. The Canadian Entomologist 61: 169-180.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.112310/Siphlonurus_barbaroides Accessed December 28, 2023.

New York State Department of Environmental Conservation (NYSDEC). 2005. New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Traver, J. R. 1935. Part II: Systematic. pp. 237-739. *In* J. G. Needham, J. R. Traver, and Y. C. Hsu. The biology of mayflies, with a systematic account of North American species. Ithaca, Comstock Publishing.

Whiting, E. R. 1992. New records of mayflies (Ephemeroptera) from Nova Scotia and New Brunswick, Canada. Entomological News 103: 185-192.

Originally prepared by	John Shea
Date first prepared	December 19, 2011
First revision	February 10, 2014 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Barbarus primitive minnow mayfly **Date Updated:** 12/28/23

Scientific Name: *Siphlonurus barbarus* **Updated By:** B. Denoncour

Class: Insecta

Family: Siphlonuridae

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

Siphlonurus barbarus is a species of mayfly about which little is known in New York. There is only one historical occurrence for this species, from the Upper Hudson watershed (Ulster Co.) (McDunnough 1924). This infrequently collected species has been reported previously from limited collections in Maine, Nova Scotia, and Quebec (McDunnough 1932, McCafferty and Randolph 1998, McCafferty 2009). Myers et al. (2010) did not encounter this species during recent field surveys of Big Indian Hollow in Ulster County; however, he states that the species is not likely extirpated in New York. The habitat for this species is described as overflow areas and in-stream habitats (Myers et al. 2010).

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G2

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

Other Ranks:
Northeast Regional SGCN: RSGCN

Status Discussion:

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			Choose an item.
Northeastern US	Yes	Unknown	Unknown			Choose an item.
New York	Yes	Unknown	Unknown			Yes
Connecticut	Choose an item.	Choose an item.	Choose an item.			Choose an item.
Massachusetts	Choose an item.	Choose an item.	Choose an item.			Choose an item.
New Jersey	Choose an item.	Choose an item.	Choose an item.			Choose an item.
Pennsylvania	Unknown	Unknown	Unknown			Choose an item.
Vermont	Choose an item.	Choose an item.	Choose an item.			Choose an item.
Ontario	No data	Unknown	Unknown			Choose an item.
Quebec	No data	Unknown	Unknown			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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is unknown.

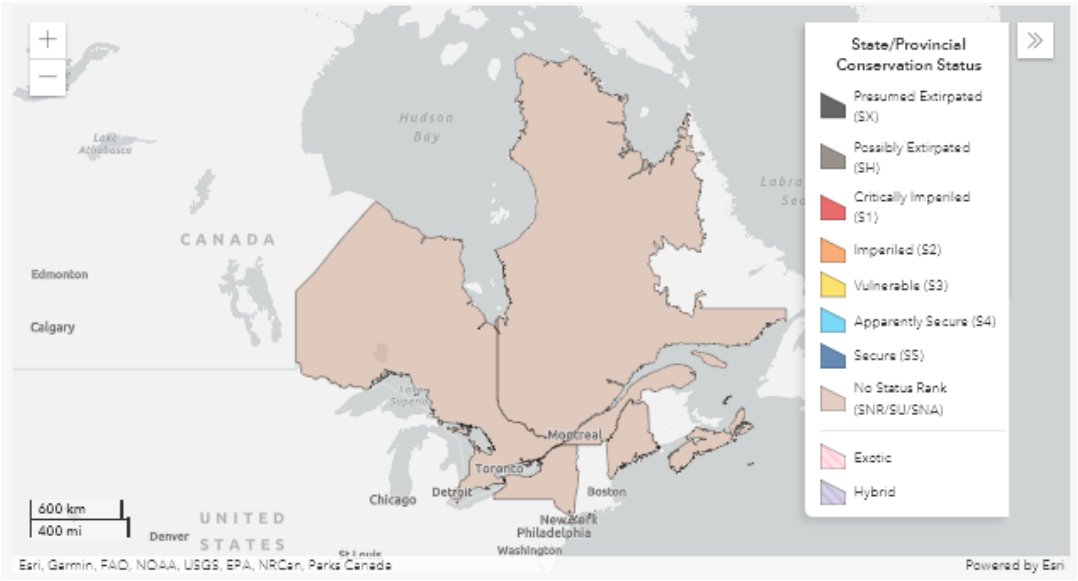

Figure 1. Conservation status of *Siphlonurus barbarous* in North America (NatureServe 2023)

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

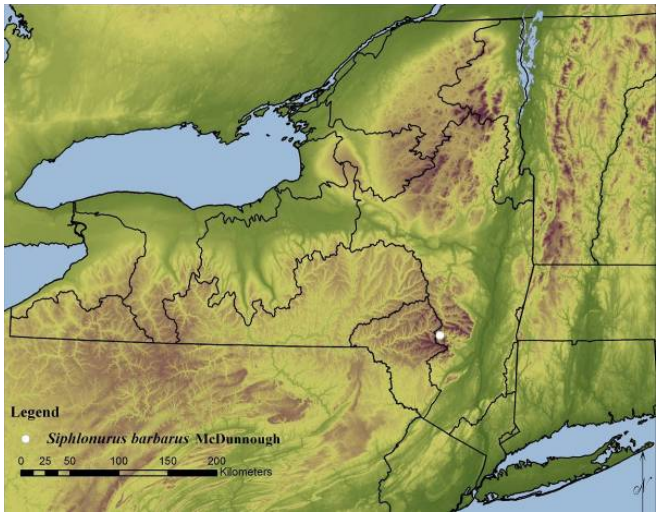

Figure 3. Distribution of *Siphlonurus barbarous* (McDunnough) in New York State (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	1	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Siphlonurus barbarus* in New York.

Details of historic and current occurrence:

There is one historical record of this species from Ulster County, Big Indian Valley, Catskill Mountains (McDunnough 1924).

There are no current records available for this species in New York.

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. Lacustrine, coldwater shallow

b. Riverine, coldwater stream

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	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:

The habitat for this species is described as overflow areas and in-stream habitats (Myers et al. 2010).

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Unknown	Choose an item.	Choose an item.	Unknown	Unknown	Choose an item.

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):*

Populations of this species are likely sensitive to changes in the natural flow regime. Larvae of this genus often migrate into seasonally inundated habitats in the stream/river floodplain (Myers, pers. comm.).

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agriculture & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Droughts
6. Climate Change & Severe Weather	Storms & Flooding

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions and have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	
3.	
4.	

Table 2. (need recommended conservation actions for *Siphlonurus barbarus*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Siphlonurus barbarus* in particular.

Habitat management:
_____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).
Habitat research:
_____ Determine the critical habitat of the species.
Population monitoring:
_____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

McCafferty W. P. and R. P. Randolph. 1998. Canada mayflies: a faunistic compendium. Proceedings of the Entomological Society of Ontario 129: 47-97.

McCafferty, W. P. 2009. New state and provincial records for 100 Ephemeroptera species. Transactions of the American Entomological Society 135: 353-368.

McDunnough, J. 1924. New Canadian Ephemeridae with notes, II. Canadian Entomologist 56: 90-98.

McDunnough, J. 1932. New species of North American Ephemeroptera II. Canadian Entomologist 64: 78-81.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

NatureServe. 2023. NatureServe Explorer. Page last published 12/1/2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.117626/Siphlonurus_barbarus Accessed December 28, 2023.

New York State Department of Environmental Conservation (NYSDEC). 2005. New York State Comprehensive Wildlife Conservation Strategy. Albany, NY. https://extapps.dec.ny.gov/docs/wildlife_pdf/cwcs2005.pdf

Originally prepared by	John Shea
Date first prepared	December 19, 2011
First revision	July 22, 2013 (Samantha Hoff)
Last revision	

Species Status Assessment

Common Name: Maculated small square-gilled mayfly **Date Updated:** 1/12/2024

Scientific Name: *Sparbarus maculatus* **Updated By:** B. Denoncour

Class: Insecta

Family: Caenidae

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

Sparbarus maculatus is a species of mayfly which is known to occur in New York. This species was recently reclassified to the new genus *Sparbarus* (Sun and McCafferty 2008); it was formerly known as *Brachycercus maculatus*. There are two known occurrences of this species, both in the Upper Hudson watershed (Saratoga Co. and Saratoga/Warren Co.) (Myers et al. 2010). This species has an apparent widespread distribution from Alabama, Florida, Georgia, Indiana, Maine, Maryland, New York, North Carolina, Virginia, and Wisconsin with recently documented occurrences from Ontario and Tennessee (Sun and McCafferty 2008, McCafferty 2009). In the Northeast, this species has been reported primarily from large depositional rivers (Sun and McCafferty 2008). It is recommended for de-listing due to its widespread range (SGCN expert meeting, November 2013).

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:** SNR **Tracked by NYNHP?:** Yes

Other Ranks:
None

Status Discussion:

This species is globally listed as Secure due to its widespread distribution and recently documented occurrences and is recommended for delisting in New York due to its widespread range (NatureServe 2013, expert meeting).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Northeastern US	Yes	Unknown	Unknown			(blank)
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	Choose an item.	Choose an item.			(blank)
Massachusetts	No	Choose an item.	Choose an item.			(blank)
New Jersey	No	Choose an item.	Choose an item.			(blank)
Pennsylvania	No	Choose an item.	Choose an item.			(blank)
Vermont	No	Choose an item.	Choose an item.			(blank)
Ontario	No data	Choose an item.	Choose an item.			(blank)
Quebec	No	Choose an item.	Choose an item.			(blank)

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 monitoring activities or regular surveys are conducted for this species in New York.

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

Trend information for this species is unknown.

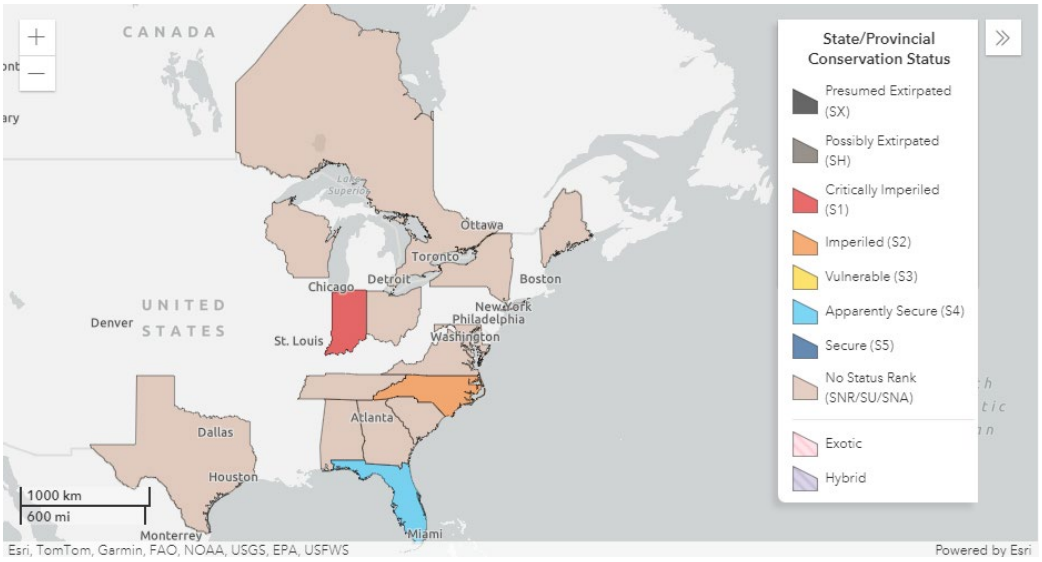

Figure 1. Conservation status of *Sparbarus maculatus* in North America (NatureServe 2023)

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

Stoneflies, mayflies, and caddisflies are difficult to fully document, and thus abundance and distribution remain largely uncertain despite the confirmed occurrences that exist. The recent surveys done by Myers et al. (2010) of the Upper Hudson, Lake Champlain, and NE Lake Ontario watersheds provided a wealth of new information on mayflies, but surveys should be done throughout the rest of the state to get a more complete understanding of abundance and distribution.

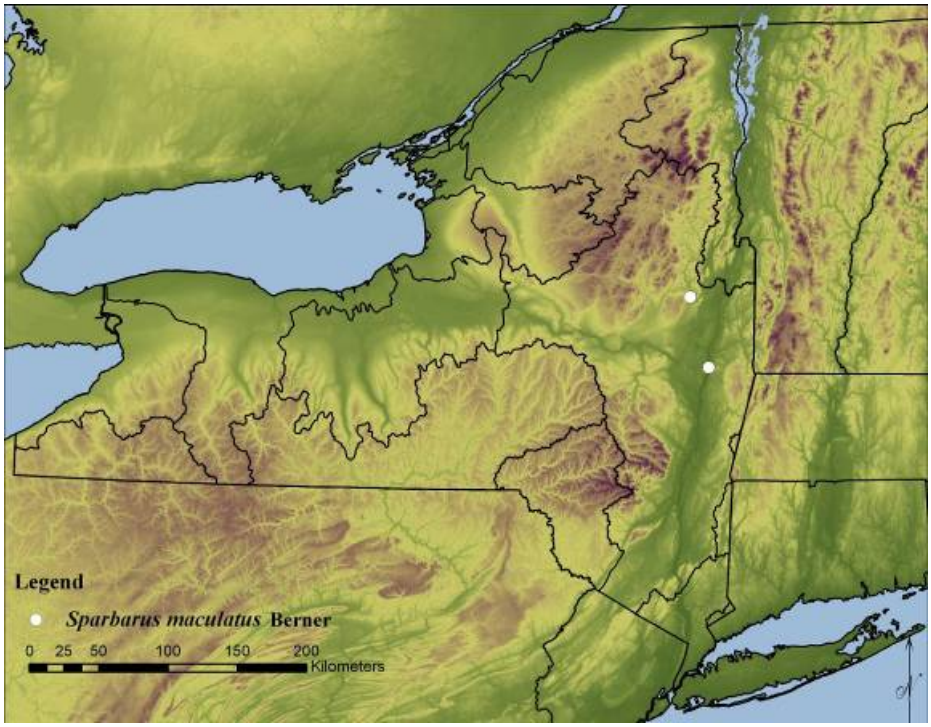

Figure 2. Records of *Sparbarus maculatus* (Berner) in New York (Myers et al. 2010)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	2	0-5%
2000- 2023	_____	_____	_____

Table 1. Records of *Sparbarus maculatus* in New York.

Details of historic and current occurrence:

Saratoga Co., Hudson River, Waterford, Milepoint 157, July 7, 1994 (Burian et al. 1997);
Saratoga/Warren Co., Upper Hudson River, 43.2486N, 73.8325W, July 7, 1994, 18 larvae (NYSDEC);
Upper Hudson River, 42.7886N, 73.6772W, July 7, 1994, 6 larvae (NYSDEC).

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%	Disjunct	

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. Riverine

Habitat or Community Type Trend in New York

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

In the Northeast, this species has been reported primarily from large depositional rivers (Sun and McCafferty, 2008).

V. Species Demographic 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):*

Very little is known regarding the life history of this species.

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

Threats to NY Populations	
Threat Category	**Threat**
1. Natural System Modifications	Dams & Water Management/Use (altered hydrology)
2. Pollution	Agricultural & Forestry Effluents (nutrient runoff, pesticides)
3. Pollution	Industrial & Military Effluents (heavy metals)
4. Pollution	Excess Energy (artificial light)
5. Climate Change & Severe Weather	Temperature Extremes
6. Invasive & Other Problematic Species & Genes	Invasive Non-Native/Alien Species (Didymo)
7. Transportation & Service Corridors	Roads & Railroads (salt & road maintenance)

Stoneflies, mayflies, and caddisflies are usually only found at high quality, minimally-polluted sites. They are sensitive to pollution and vulnerable to any activity that affects water quality and are commonly used indices of aquatic ecosystem health. Their presence in an aquatic ecosystem is a strong indicator of a healthy body of water.

Poor water quality and the acute and chronic effects of contaminants in aquatic habitats as a significant threat to stoneflies, mayflies, and caddisflies. Water quality can be degraded by siltation, nutrient runoff, temperature increases, toxics (e.g., pesticides, heavy metals), lowered dissolved oxygen, and altered hydrology (dams, water withdrawal, ground water extraction). Additionally, contaminants that enter aquatic and terrestrial systems through atmospheric depositions have both habitat and population-level effects.

Altering the flow of riparian habitats with dams and bridges, and for flood control, agriculture and development (roads, residential, commercial) can directly and indirectly stoneflies, mayflies, and caddisflies. Movement of populations of aquatic species are inhibited, and habitat for all species dependent on lotic systems is lost outright or degraded through decreased conveyance and increased sedimentation.

Populations could be adversely affected by disturbance of the benthos including dredging and channel modifications. Stream and road bank erosion of coastal soils, and erosion from agricultural fields are significant sources of sand/sediment. Larvae are particularly intolerant of stream pollution. Adults may be adversely affected by light pollution (Myers, pers. comm.).

Climate change poses a threat to aquatic species. By virtue of the small and isolated populations of this species, it is particularly vulnerable to storms that cause erosion and flooding. Winter storm events with excessive ice and heavy snowfall result in spring meltwater flooding and erosion.

From 1993 to 2002, the NYSDEC Stream Biomonitoring Unit sampled macroinvertebrates at 1,532 sites on 917 streams in New York. Of the sites determined to have some impact, nonpoint source nutrient enrichment was the dominant impact, affecting 52% of sites (Bode et al. 2004).

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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Environmental Conservation Law.

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

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

Conservation Actions	
Action Category	**Action**
1.	
2.	

Table 2. (need recommended conservation actions for *Sparbarus maculatus*).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for stoneflies and mayflies of lotic waters, and for *Sparbarus maculatus* in particular.

Habitat management:

____ Monitor activity in the riparian zone and actual waters where these mayflies and stoneflies are found (or will potentially be found).

Habitat research:

____ Determine the critical habitat of the species.

Population monitoring:

____ Survey sites within the historical ranges of these species.

VII. References

Bode, R.W., M.A. Novak, L.E. Abele, D.L. Heitzman, and A.J. Smith. 2004. 30 year trends in water quality of rivers and streams in New York State.

Burian, S. K., M. A. Novak, R. W. Bode and L. Abele. 1997. New record of *Brachycercus maculatus* Berner (Ephemeroptera: Caenidae) from New York and a key to larvae of Northeastern species. Great Lakes Entomologist 30: 85-88.

McCafferty, W. P. 2009. New state and provincial records for 100 Ephemeroptera species. Transactions of the American Entomological Society 135: 353-368.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

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Sun, L. and W. P. McCafferty. 2008. Cladistics, classification and identification of the brachycercine mayflies (Insecta: Ephemeroptera: Caenidae). Zootaxa 1801: 1-239.

Originally prepared by	John Shea
Date first prepared	December 22, 2011
First revision	February 10, 2014 (Samantha Hoff)
Latest revision	

Species Status Assessment

Common Name: Gaspe sallfly **Date Updated:** 1/9/24

Scientific Name: *Utaperla gaspesiana* **Updated By:** B. Denoncour

Class: Insecta

Family: Chloroperlidae

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

The Gaspe sallfly (*Utaperla gaspesiana*) is a species of stonefly that occurs in New York. There are twelve recorded occurrences of this species in the state within the Lake Champlain, Upper Hudson, Delaware, and Susquehanna watersheds (Myers et al. 2010). This relatively rare species has been reported from Quebec and Maine, and southward to Maryland and West Virginia (Surdick 1985, Surdick 2004, Stark et al. 2010). Harper et al. (1991) examined the life history of *U. gaspesiana* in Quebec, suggesting that it has a two-year life cycle similar to that of *Sweltsa onkos* (Ricker). In New York, adults have been collected from larger rivers and medium-sized streams lined with bedrock, boulders, and large cobble. Adult collection dates range from early May to mid-September. The above collections represent significant new records of this species.

I. Status

a. Current legal protected Status

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

ii. **New York:** Not listed; SGCN

b. Natural Heritage Program

i. **Global:** G3

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

Other Ranks:
Northeast Regional SGCN: RSGCN

Status Discussion:

Status of this species is unknown in New York, and global rank of Vulnerable is due to its rarity throughout its range.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			(blank)
Northeastern US	Yes	Unknown	Unknown			Yes

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
New York	Yes	Unknown	Unknown			Yes
Connecticut	No	N/A	N/A			(blank)
Massachusetts	No	N/A	N/A			(blank)
New Jersey	No	N/A	N/A			(blank)
Pennsylvania	Yes	Unknown	Unknown			(blank)
Vermont	No	N/A	N/A			(blank)
Ontario	No	N/A	N/A			(blank)
Quebec	No data	Unknown	Unknown			(blank)

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):*

There are no current monitoring activities for this species.

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

Trend information for this species is unknown.

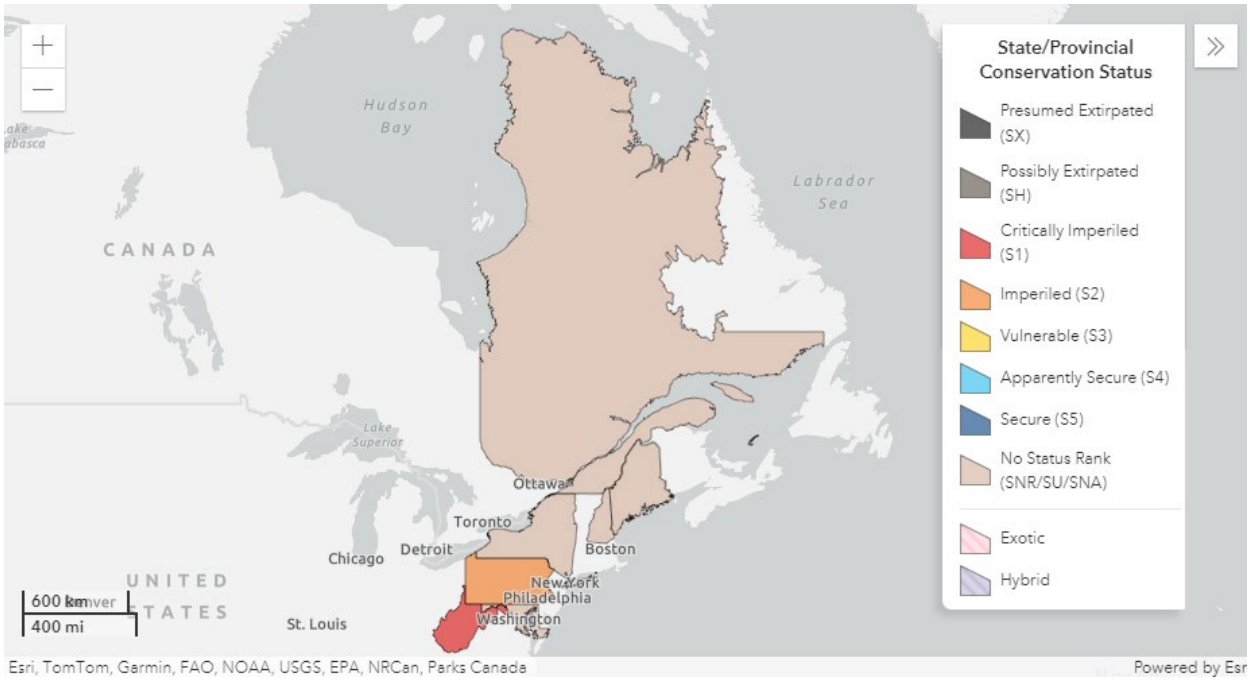

Figure 1. Conservation status of *Utaperla gaspesiana* in North America (NatureServe 2023)

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

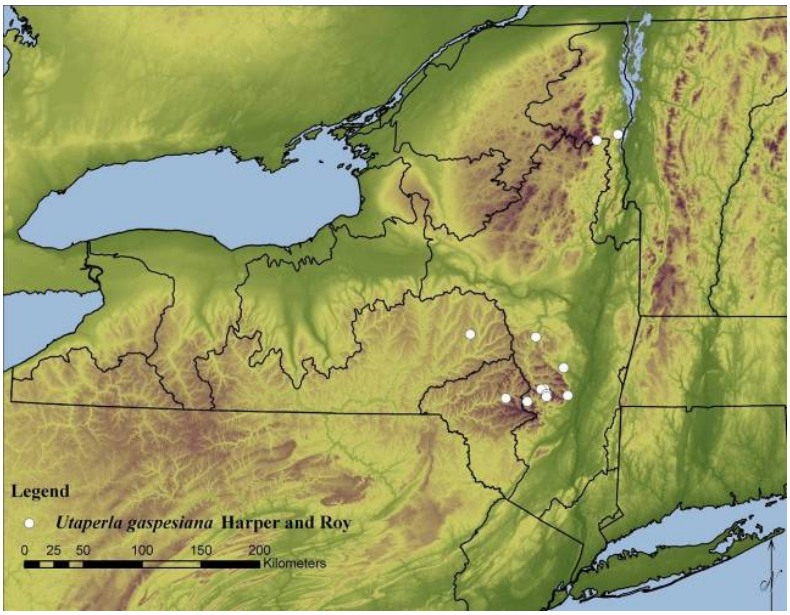

Figure 2. Records of *Utaperla gaspesiana* (Harper and Roy) in New York

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	5	_____
2000- 2023	_____	6	0-5%

Table 1. Records of *Utaperla gaspesiana* in New York.

Details of historic and current occurrence:

Chemung Co., McCorn Creek, Van Etten TWP, June 5, 1975, N.J. Lamb (CUIC)

Greene Co., Lanesville, 412 meters, June 11, 1978, 1 female; West Kill, HWY 42, Catskill Mountains, May 5, 1981, 2 males, R.W. Baumann and S. Wells (BYUC); Diamond Notch, September 21, 1978, 1 female, T.L. McCabe (NYSM)

Ulster Co., Esopus Creek, HWY 47, South of Big Indian, May 5, 1981, 1 male, R.W. Baumann and S. Wells (BYUC).

Delaware Co., E. B. Delaware River, Rt. 28, SW Margaretville, 42.1242N, 74.6726W, May 27, 2009, 10 males, 13 females, 3 larvae, L. Myers and B. C. Kondratieff (CSUC)

Greene Co., T.L. McCabe (NYSM); West Kill Creek, Spruceton Rd., 42.1948N, 74.2718W, June 25, 2007, 2 females, L. Myers and B. C. Kondratieff (CSUC); Bowery Brook, Rt. 145 nr. E. Durham, 42.3545N, 74.0713W, May 21, 2008, 1 male, R. W. Baumann (BYUC)

Essex Co., Stacy Brook, Spring Rd., SW Westport, 44.1475N, 73.4704W, May 23, 2008, 1 female, L. Myers, B. Kondratieff and R. W. Baumann (CSUC); S. F. Boquet River Rt. 73, 44.1039N, 73.6913W, May 21, 2006, 1 female, L. Myers (CSUC)

Otsego Co., Pleasant Valley Brook, Pleasant Valley Rd., Hartwick, 42.6163N, 75.0386W, May 27, 2009, 1 male, 1 female, L. Myers and B. C. Kondratieff (CSUC)

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%	Core	

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. Riverine

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
(blank)	Yes	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:

In New York, adults have been collected from larger rivers and medium-sized streams lined with bedrock, boulders, and large cobble (Myers et al. 2010).

V. Species Demographic and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	(blank)	(blank)	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):*

Nymphs of this species are often difficult to locate and are likely associated with the hyporheic zones of streams. Harper et al. (1991) examined the life history of *U. gaspesiana* in Quebec, suggesting a two-year life cycle similar to that of *Sweltsa onkos* (Ricker).

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

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Action Category	**Action**
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2.	

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Harper, P. P., M. Lauzon and F. Harper. 1991. Life cycles of sundry stoneflies (Plecoptera) from Quebec. Revue d'entomologie du Québec 36: 28-42.

Myers L.W., T.B. Mihuc and B.C. Kondratieff. 2010. Mayflies (Ephemeroptera), Stoneflies (Plecoptera), and Caddisflies (Trichoptera) of the Upper Hudson, Lake Champlain, and Northeastern Lake Ontario Watersheds: A baseline inventory with management considerations for SGCN and other rare and possibly imperiled species. Final Report to the New York State Department of Environmental Conservation.

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Originally prepared by	John Shea
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