Species Status Assessment

Common Name: Incurvate Emerald **Date Updated:** December 14, 2023

Scientific Name: *Somatochlora incurvata* **Updated By:** Erin L. White

Class: Insecta

Family: Corduliidae

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

The center of distribution for incurvate emerald (*Somatochlora incurvata*) lies in southeastern Ontario in the Eastern Great Lakes lowland forest ecoregion and ranges westward to Wisconsin, eastward to Nova Scotia and southward to Ohio (Donnelly 2004). New York lies near this center, but the species is exceedingly rare and only known from a handful of northern bogs. This species (all adults; exuviae have not been reported in New York) was not discovered in the state until the early-mid 1990s. In New York, *S. incurvata* inhabits large, open, forest-bordered bogs, poor fens, and peatlands with widely scattered tamarack and black spruce, and ericaceous bog shrubs interspersed with sedges and Sphagnum, with abundant shallow, pooled water and rivulets (White *et al.* 2010). It was not documented in NY until 1993 (NYNHP 2023).

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:** S1 **Tracked by NYNHP?:** Yes

Other Ranks:

-NYS 2025 SGCN Status: High Priority Species of Greatest Conservation Need

-IUCN Red List: Least Concern

-Northeast Regional Rank (White et al.2015): R3, primary concern

Status Discussion:

White *et al.* (2010) calculated a revised draft S-rank of S1 from S1S3.

II. Abundance and Distribution Trends

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

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
				US 1998; Canada 2012		
Northeastern US	Yes	Unknown	Declining	Pre and post-2000	R3; RSGCN	Yes
New York	Yes	Unknown	Stable	Pre and post-2005	S1; HPSGCN	Yes
Connecticut	No	-	-			-
Massachusetts	Yes	Unknown	Unknown	Since 1980s	E; SGCN	Yes
New Jersey	No	-	-			-
Pennsylvania	Yes	-	-		S1	Yes
Vermont	Yes	-	-		S1	No
Ontario	Yes	-	-		S3	-
Quebec	Yes	-	-		S2	-

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

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

The New York State Dragonfly and Damselfly Survey was conducted from 2005-2009, but there are no organized, regular monitoring or survey activities directed toward this species or to sites where it has been documented, although two of the known sites for the species have been visited by experienced surveyors a number of times since their initial discovery.

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

Records for this species are too few and infrequent to accurately assess population trends. There is some suggestion that the species may be ephemeral at some sites (White *et al.* 2010). The populations at Massawepie Mire and Bloomingdale Bog have persisted and remain present from the mid-1990s to 2018; it is uncertain whether populations persist at two other sites since observations 20 years ago. Two additional sites were documented in 2018. Franklin and St. Lawrence counties contain the only known NY occurrences over time.

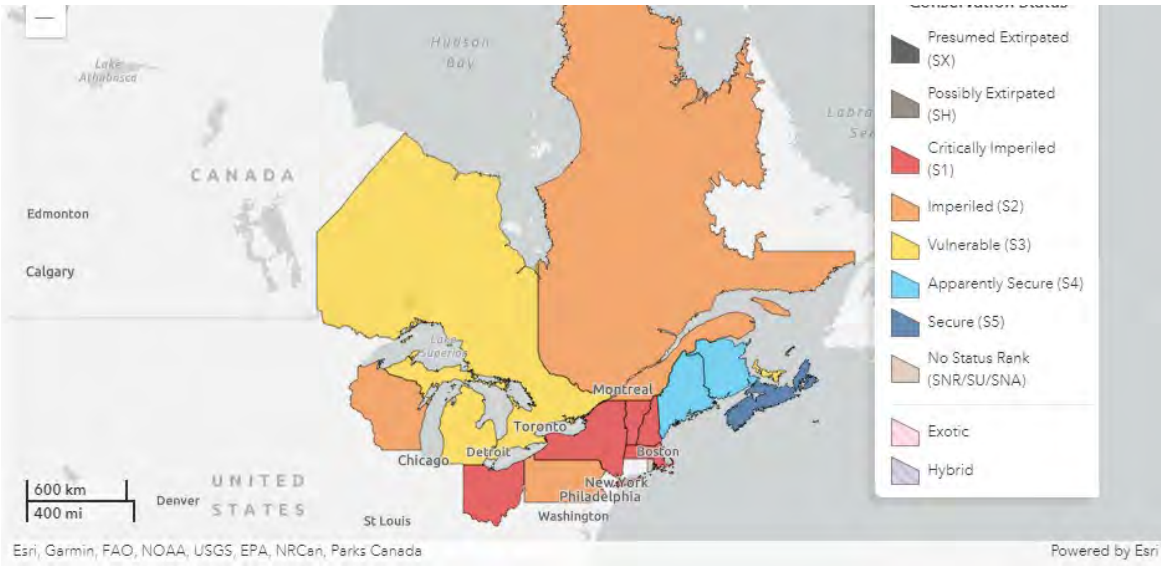

Figure 1. Conservation status of the Incurvate Emerald in North America (NatureServe 2023).

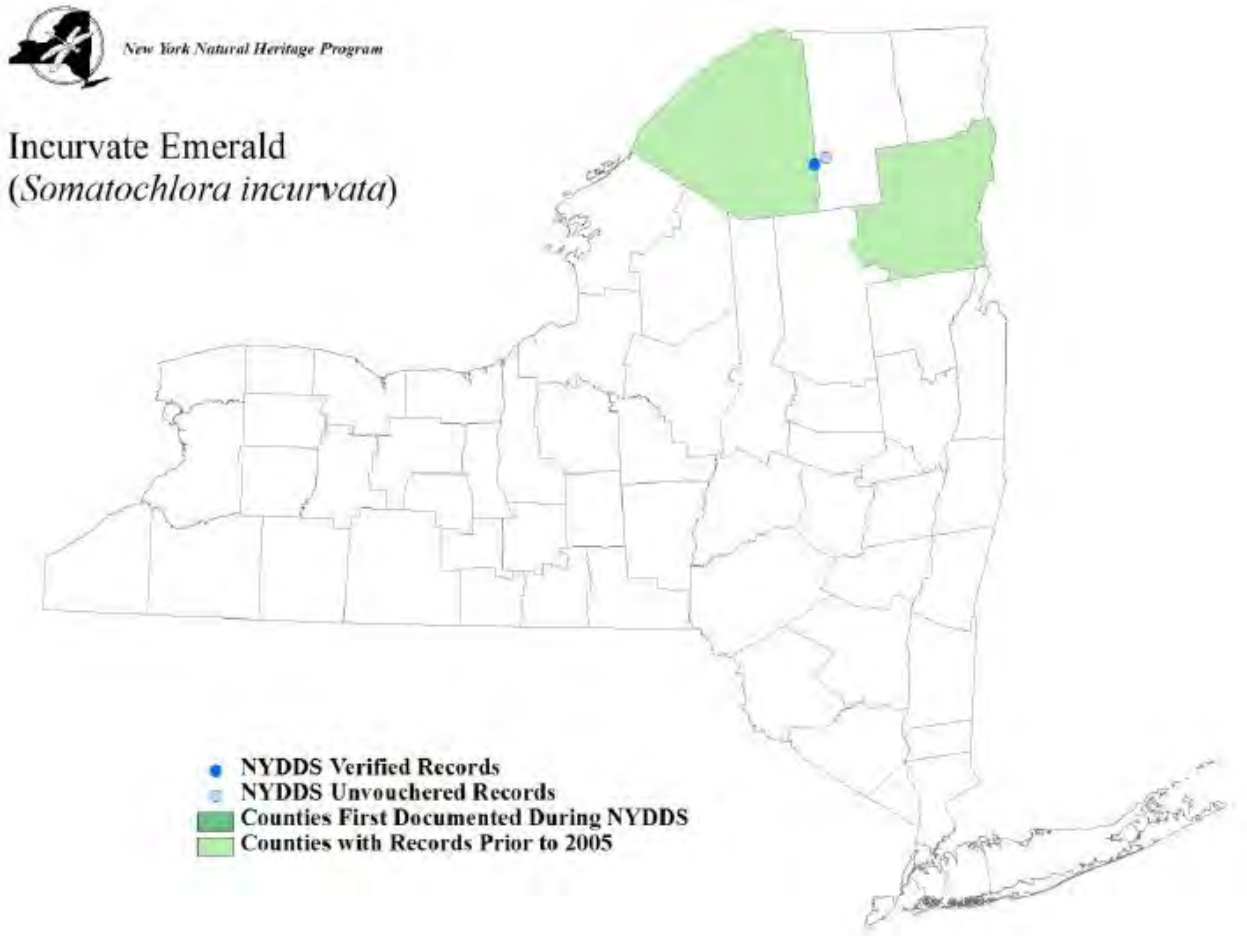

Figure 2. Occurrence record of the Incurvate Emerald in New York during the NYDDS (White *et al.* 2010).

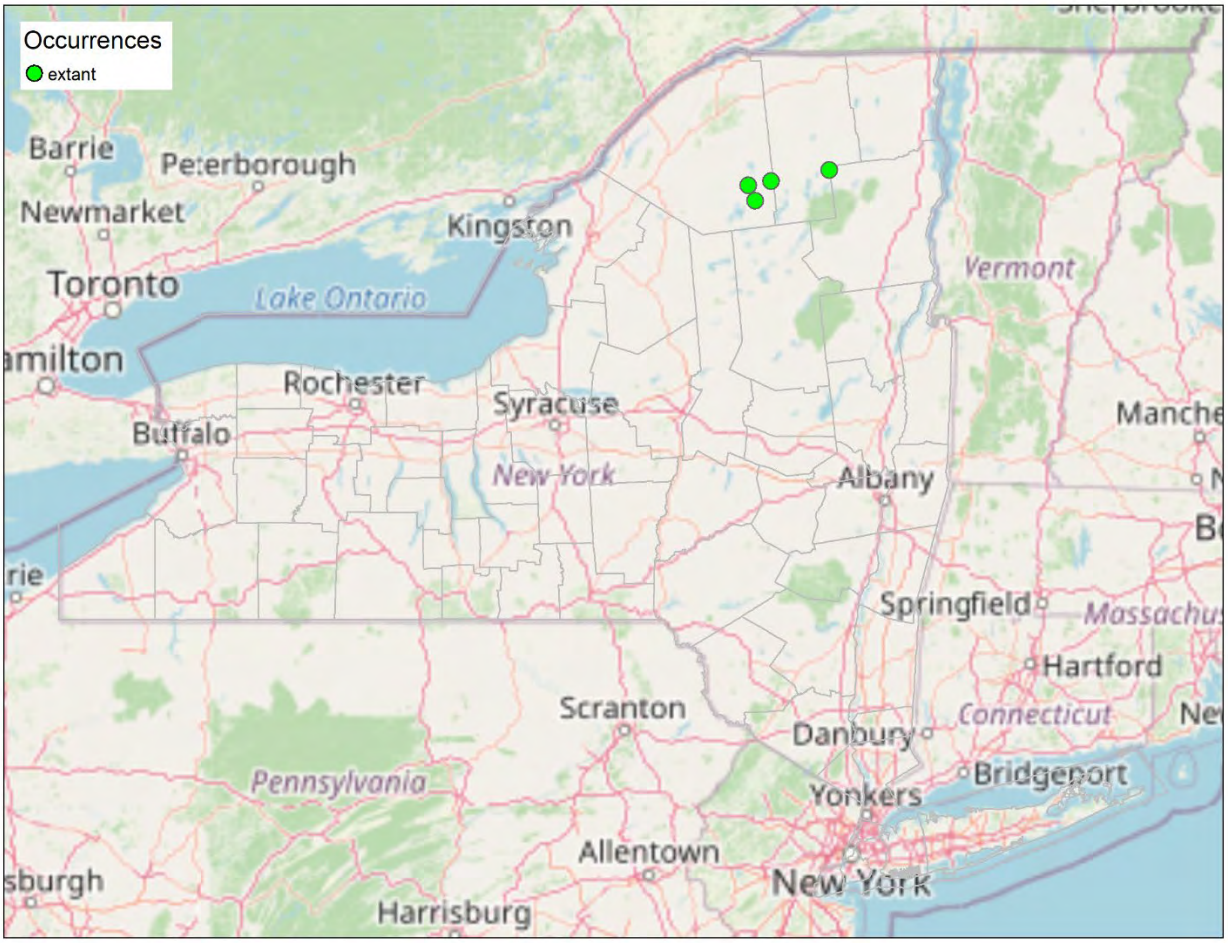

Figure 3. NYNHP element occurrence records for the incurvate emerald in New York (NYNHP 2023a).

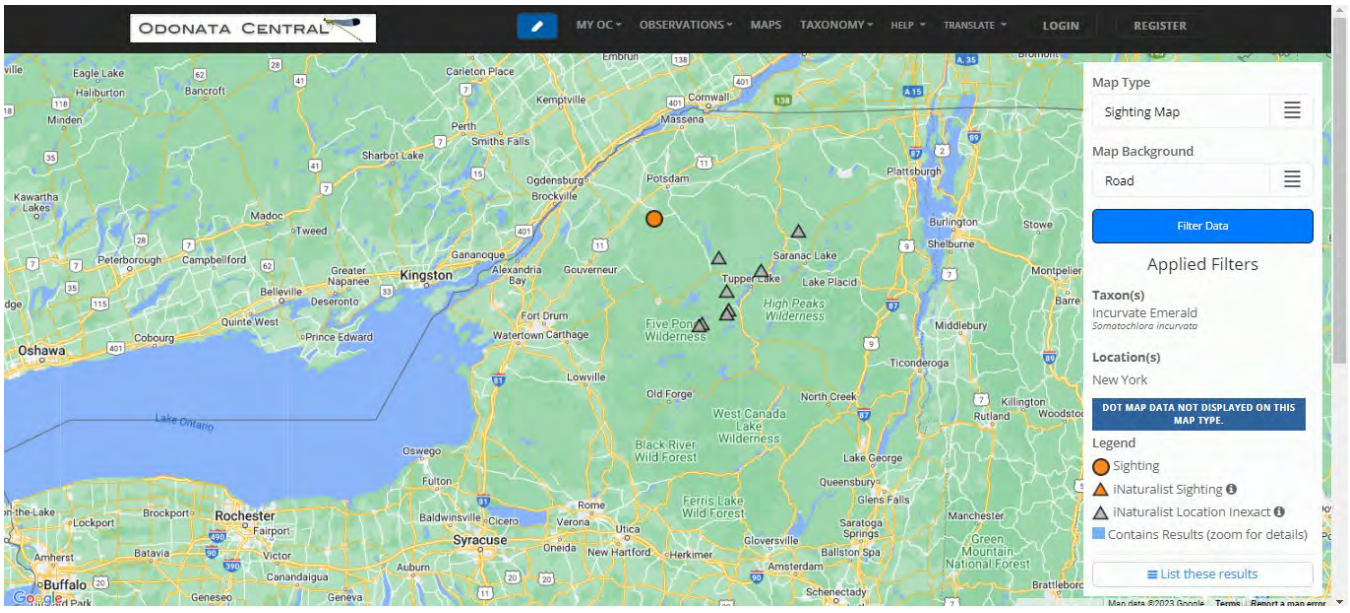

Figure 4. Distribution of the Incurvate Emerald in NY (Abbott 2023).

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

Other large bogs similar to those where this species has been documented occur within the Adirondacks, and while it is most certainly a rare and localized species of specific habitat, it is likely that additional sites will be discovered in New York (Paul Novak, pers. comm.).

Years	# of Records	# of Counties	% of State
Pre-2004	2	2	1-3%
2005-2009	1	1	<1%
2010-2023	4	2	1-3%

Table 1. Records of incravate emerald in New York.

Details of historic and current occurrence:

This species has been documented at six sites in New York, two between 1993 and 1995 (Massawepie Mire 1993, Bloomingdale Bog 1995), two between 2004 and 2005 (Sevey Bog 2004, Bear Brook or Jordan River Bog 2005), and two in 2018 (Hitchens Pond bog and Spring Pond Bog). The populations at Massawepie Mire and Bloomingdale Bog have persisted and remain present; it is uncertain whether populations persist at the two other sites. Franklin and St. Lawrence counties are the only known occurrences over time. The last observations by site and year are: Sevey Bog 2004, Bear Brook Bog 2005, Bloomingdale Bog 2018, Massawepie Mire 2018, Hitchens Pond Bog 2018, and Spring Pond Bog 2018 (NYNHP 2023a, iNaturalist 2023).

If it occurs in 2/62 counties, that is very roughly about 3 % of the state, though the occupied area of those counties is rather small. There are likely additional undocumented populations in northern NY and the % of the state can be estimated to be 1-3% currently.

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	~300 mi.

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):*

1. Open Acidic Peatlands – where occurrences are; other potential habitats:
2. Boreal Forested Peatland
3. Open Alkaline Peatlands

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	Declining	Decline long-term, stable short-term

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, *S. incurvata* inhabits large, open, forest-bordered bogs, poor fens, and peatlands with widely scattered tamarack and black spruce, and ericaceous bog shrubs interspersed with sedges and Sphagnum, with abundant shallow, pooled water and rivulets. The water in these pools is clear and cold and moves almost imperceptibly through the sphagnum mat (Shiffer 1993). In Michigan, *S. incurvata* can be found in patterned peatlands and northern fens associated with flowing alkaline groundwater that contains marl or peat (Lee 1999). Wisconsin habitats are large wetland complexes on old glacial lake beds, often adjacent to sandy pine uplands. Larvae have only recently been described and were found clinging to the underside of sphagnum mounds at pool edges in partially decomposed dark brown sphagnum and sedges (Wisconsin Natural Heritage Inventory Program 2010). Boreal *Somatochlora* nymphs take at least 4 years to develop and occupy shallow water meadows, sedge-filled pools, and sedge-filled shallows of small ponds. During this time, they are drought resistant and can survive dry conditions for up to 4-9 months through certain physiological adaptations and by actively burrowing in mud and seeking out sheltered locations in moss, cracks in mud, crevices in rotting logs, and sedge root clumps (Wiley and Eiler 1972). Males fly low and erratically over vegetation and occasionally perch on tree branches or hover over open pools (White *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	-	-	Yes	Yes	-

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

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

S. incurvata has been observed from mid-July to mid-Sept in NY (NYNHP 2023a, iNaturalist 2023). This is similar to the flight season in Michigan (Lee 1999), but significantly shorter than in the other parts of the range and in the northeast where it has been observed from late June to early October (Walker and Corbet 1975; Shiffer 1993; Nikula *et al.* 2003; Brunelle and deMaynadier 2005).

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

Little published information is available citing specific cases of negative impacts to bog/fen odonates, but any activities which degrade the sensitive hydrology of these habitats would threaten populations of these species. Examples include peat mining, ditching, filling, eutrophication and changes in dissolved oxygen content, direct effects of pesticides (e.g. for mosquito control or from agricultural runoff), and increases in the sediment load of the wetland (such as might result should logging occur down to the wetland edge). Natural succession could also threaten some sites as shallow pools fill in with vegetation over time (Novak 2006).

As a species of the far north near at the southern edge of its range in New York, both emergence rates and/or species ranges may shift for odonate species as a result of climate change (Corser et al. 2014).

Threats to NY Populations	
Threat Category	**Threat**
1. Climate Change & Severe Weather	Habitat Shifting & Alteration
2. Climate Change & Severe Weather	Temperature Extremes
3. Pollution	Industrial & Military Effluents (acid rain, mercury)
4. Climate Change & Severe Weather	Droughts

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

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

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

The Freshwater Wetlands Act provides protection for wetlands greater than 12.4 acres in size under Article 24 of the NYS Conservation Law. The Adirondack Park Agency has the authority to regulate smaller wetlands within the Adirondack Park.

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

Any efforts to reduce siltation from forestry disruption of habitats, reduce alteration of the bogs in activities such as peat mining, salt run-off from roadways, chemical pollution, and any ditching and filling activities should be considered when managing for this species (Massachusetts Natural Heritage Endangered Species Program 2023, NYS DEC 2006, New York Natural Heritage Program 2023b).

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2006) includes recommendations for the following actions for odonates of bogs, fens, and ponds, and for the incurvate emerald in particular.

Habitat monitoring:

____ Support and encourage habitat monitoring efforts that would complete the baseline assessment of habitat quality and threats.

Habitat research:

____ Support and encourage research projects that will help define preferred habitat in order to guide future monitoring, restoration and habitat protection efforts.

New regulation:

____ Recommendations for official state endangered, threatened, and special concern listing are an anticipated result of the statewide inventory. It is expected that at least a few species will be recommended for listing and officially adding these species to the list would constitute a specific action.

Population monitoring:

____ Conduct surveys to obtain repeatable, relative abundance estimates for these species at known sites and newly discovered sites where access permission to conduct surveys is obtained (as indicated in the State Wildlife Grant Odonate Inventory Project).

Conservation Actions	
Action Category	**Action**
1. Land/Water Protection	Resource and habitat protection
2. Land/Water Protection	Site/area protection
3. Land/water management	Site/area management
4. Land/water management	Habitat & natural process restoration
5. Land/water management	Invasives/problematic species control
3. Education and Awareness	Awareness & Communications
3. Education and Awareness	Training
4. Law and Policy	Policies and Regulations

Table 3. Recommended conservation actions for incurvate emerald

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