Species Status Assessment

Common Name: Mocha emerald **Date Updated:** 2025-01-10

Scientific Name: *Somatochlora linearis* **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):*

Central Kentucky in the central U.S. Hardwood forest ecoregion, ranging south to Florida and Texas, and north to Michigan and Massachusetts, forms the distributional center of the mocha emerald (*Somatochlora linearis*). Unlike most New York *Somatochlora*, *S. linearis* is a southern species that inhabits hardwood forests. Rangewide, *S. linearis* inhabits small (3-9' wide) intermittent, shaded streams with fine gravel and/or sandy substrates in deciduous forests (Dunkle 2000). The most complete habitat descriptions are from eastern Massachusetts, where large numbers were found in habitats where small intermittent forest streams crossed open areas. *S. linearis* was especially prevalent at utility easement sites and areas where the substrate was muck-bottomed or boggy, often choked with sphagnum and smartweed (SaintOurs 2004). Individuals can also be found away from watercourses at forest ecotones, such as a site in Rockland County, which is a low-gradient intermittent section of forested stream flowing from a sedge meadow with vegetated banks containing sedge and sphagnum moss (White *et al.* 2010).

A distribution model developed by the NY Natural Heritage Program (NHNHP) indicated that *S. linearis* may be temperature-limited, as it is not predicted to occur north of the lower Hudson Valley or southwestern New York. A few locations in Putnam County, especially near Philipse Brook, Sprout Brook, and Canopus Creek, as well as small watercourses in and around Allegany State Park (Sawmill Run, Quaker Run, Chipmunk Creek, Limestone Brook), may hold populations yet undiscovered (New York Natural Heritage Program 2005, White *et al.* 2010).

I. Status

a. Current legal protected Status

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

ii. **New York:** Unprotected

b. Natural Heritage Program

i. **Global:** G5

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): R3R4 vulnerability and Shared Responsibility

Status Discussion:

White *et al.* (2010) calculated a revised draft S-rank S1 from S2S3. Due to an oversight, this was never changed in the Element occurrence database and the 2015 SWAP mistakenly used S2S3 for the species state rank. Using current information in 2025, the rank is still an S1. Mocha Emerald is known from nine counties historically (White et al. 2010) and none of the western and central NY counties have been reconfirmed in recent years. Their range appears to have retracted to southern NY and Staten Island where they are known from 5-6 counties (Abbott 2025, iNaturalist 2025).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Unknown	Unknown			-
Northeastern US	Yes	Unknown	Unknown			No
New York	Yes	Unknown	Declining		S2S3	Yes
Connecticut	Yes	Unknown	Unknown		S2S3	No
Massachusetts	Yes	Unknown	Unknown		S2	Yes
New Jersey	Yes	Unknown	Unknown		SNR	No
Pennsylvania	Yes	Unknown	Unknown			Yes
Vermont	No	-	-			
Ontario	Yes	Unknown	Unknown		S2	-
Quebec	No	-	-		SX	-

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 (NYDDS) 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.

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

Mocha Emerald is known from nine counties historically (White et al. 2010) and none of the western and central NY counties have been reconfirmed in recent years. Their range appears to have retracted to southern NY and Staten Island where they are known from 5-6 counties (Abbott 2025, iNaturalist 2025).

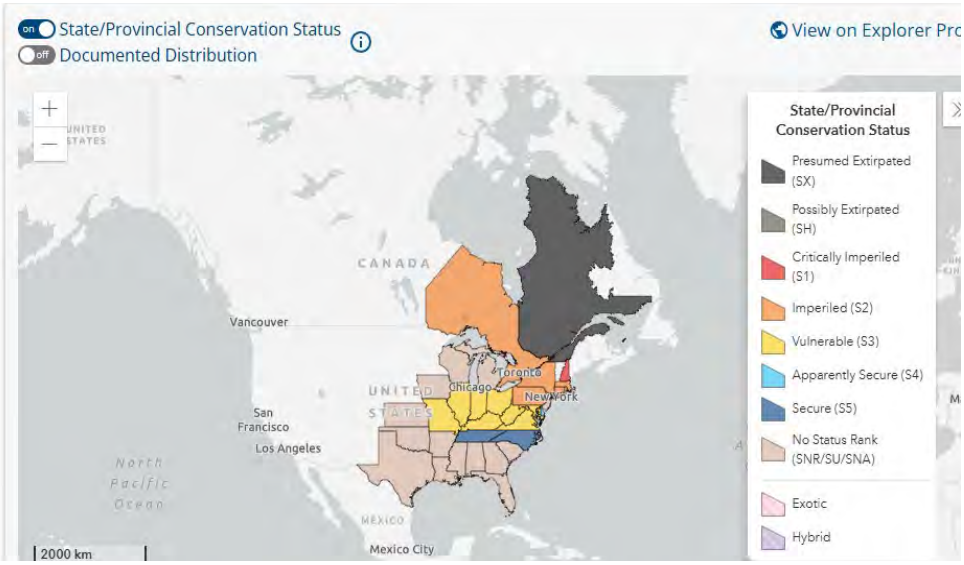

Figure 1. Conservation status of the mocha emerald in North America (NatureServe 2025).

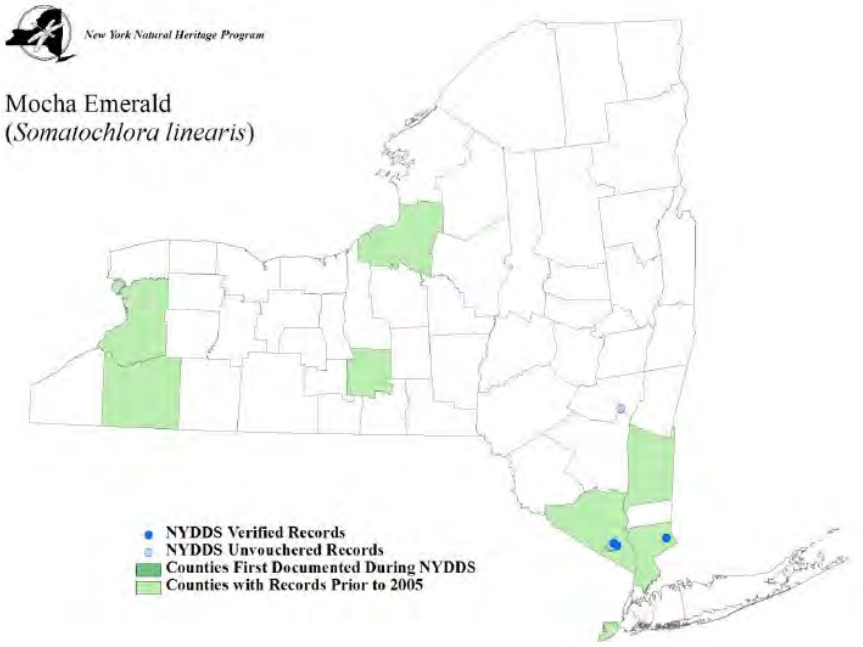

Figure 2. Occurrence records of the mocha emerald in New York (White *et al.* 2010).

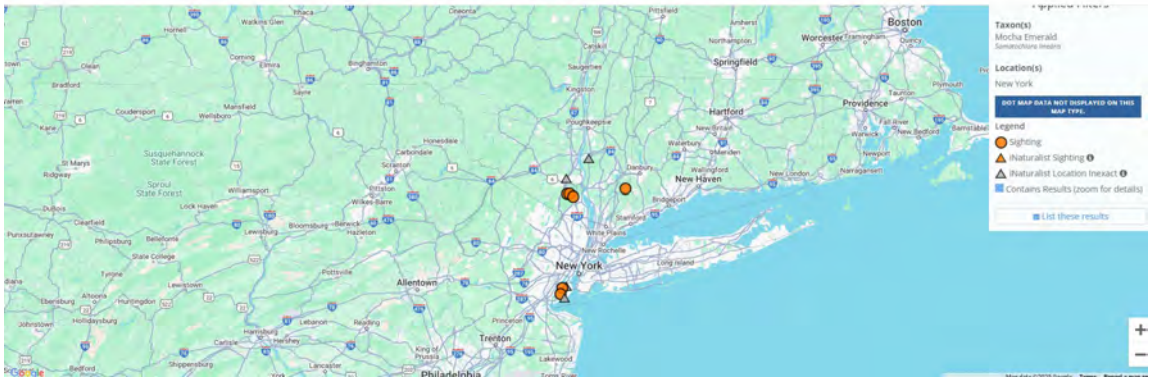

Figure 3. Distribution of mocha emerald in New York (Abbott 2025).

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

Good numbers were reported in eastern Massachusetts (SaintOurs 2004) and *S. linearis* appears to be expanding its range in the Midwest (The Ohio Odonata Society 2000, Johnson 2003). Data by Purdue *et al.* (1999) found high genetic variation among the species from Illinois and Arkansas, and suggested that occupied areas to the north (i.e. New York) that were covered in ice during the last glacial maximum were likely colonized by the more southerly populations of the lower Midwest.

While recent observations of Mocha Emeralds have been made from the early-1990s to 2002 in Westchester, Rockland, and Orange counties, they are known to occur in Cattaraugus, Dutchess, Erie, Oswego, and Tompkins counties, as well as New York City based on earlier observations (Donnelly 2004, New York Natural Heritage Program 2007). Since the full extent and size of the populations have not been determined, long-term trends are unclear. While new location information on *S. linearis* in New York may reflect heightened interest in surveying for this species rather than a population increase or a range expansion, it should be noted that few participants in the NYDDS were familiar with this species or its habitat and with the exception of Red House Brook, most historical locations were probably not surveyed during the NYDDS (P. Novak, pers. comm.)

Table 1. Records of (species) in New York

Years	# of Records	# of Counties	% of State
Pre-2004	9	9	14.5
2005-2009	4	2	3.2
2010-2023	6-7	3-4	4.8

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

Details of historic and current occurrence:

Mocha Emerald is known from nine counties historically (White et al. 2010) and none of the western and central NY counties have been reconfirmed in recent years. One location in Westchester county and two locations in Rockland County were confirmed during the New York Dragonfly and Damselfly Survey, 2005-2009 (White *et al.* 2010). Since 2010, they have been documented in an additional location in Westchester County, at least five locations in Rockland, at least two locations in Richmond, one location in Putnam County, and at least one location in Dutchess, with a possible record in Orange County (Abbott 2025, iNaturalist 2025).

Other details:

Erie County, Grand Island – 1926 – Historically confirmed

Richmond County, Staten Island – 1926 – Historically confirmed

Tompkins County, Varna and Ithaca – 1926 – Historically confirmed

Cattaraugus County, Red House Brook – 1981
Dutchess County, Swamp River – 1990s – Recently confirmed

Oswego County, location not reported – 1926 – Historically confirmed
Also, Orange (1994), Rockland, and Westchester Counties pre-2004

An older record (pre-1926) from Oswego County is the northernmost occurrence of *S. linearis* in New York (Needham 1928, Donnelly 2004).

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	~900 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):*

Small River, Low Gradient, sand and gravel substrate

Small River, Low Gradient, muck substrate

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:

S. linearis inhabits small, shaded streams in forested areas that are about 1-3 yards wide with sand, gravel, or rocky substrates (Dunkle 2000, Nikula *et al.* 2003). In eastern Massachusetts, habitat was described as small intermittent forest streams crossing open areas, with muck-bottomed or boggy substrate (Saint Ours 2004). Larvae are aquatic and found in the water during this life stage, whereas adults are terrestrial and are found in habitats surrounding forested streams (New York Natural Heritage Program 2011).

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):*

The reported flight season in New York is from mid-June to mid-September (New York Natural Heritage Program 2007), which is similar to other states in the northeast (Massachusetts NHESP 2008, Bagman and Barlow 2010). However, newer phenology data, both from NY Natural Heritage database records and newer NYDDS sightings, support a more protracted seven-week flight season from July 22 to September 12 in New York, with most records in August (White *et al.* 2010).

Corbet (1999) estimated the average distance traveled for a commuting flight (between reproductive and roosting or foraging sites) to be less than 200 m but sometimes greater than one km. Distance traveled is generally greatest for river-breeding odonates, but can vary considerably between taxa (Nature Serve 2025).

Little has been published about the life cycle of *S. linearis*, but information documented for other dragonfly species is most likely applicable. The nymph of *S. linearis* may be found clinging to the roots of sedges and other plants growing in the water. Full development time of this species is unknown. When fully developed, eclosion occurs on grasses or other emergent vegetation, usually no more than a foot above water. The adult will then fly into surrounding forests or other areas away from water, where it spends time maturing and feeding. Adult *S. linearis* can be found in fields and forests clearings feeding on aerial insects. It takes approximately one week to acquire adult coloration and become sexually mature, before returning to the breeding habitat (Massachusetts NHESP 2008).

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

SCOPE: Spatial proportion of the distribution that is expected to be affected in the next 10 years (**narrow**= 1-10%; **restricted**=11-30%; **widespread**=31-70%; **pervasive**= 71-100%).

SEVERITY: The degree of population reduction in the next 10 years that can be reasonably expected from the threat given the current circumstances and trends (**low**=degrade/reduce population by 1-10%; **medium**=d/r population by 11-30%; **high**=d/r population by 30-70%; **very high**=d/r population by 71-100%).

IRREVERSIBILITY: The degree to which the effects can be reduced and the species restored (**low**=easily reversed, at a low cost, and/or within 0-5 years; **medium**=can be reversed with a reasonable commitment of resources and/or within 6-20 years; **high**=can technically be reversed, but not practicably affordable and/or it would take 21-100 years; **very high**=cannot be reversed and species not likely to be restore and/or it would take >100 years).

Threats to NY Populations				
Threat Category	**Threat**	**Scope**	**Severity**	**Irreversibility**
1. Natural System Modifications	Dams & Water Management/Use (change in natural hydrology)	N	L	H
2. Biological Resource Use	Logging & Wood Harvesting (siltation of streams)	N	H	L
3. Climate Change & Severe Weather	Droughts	N	M	H
4. Climate Change & Severe Weather	Storms & Flooding	N	L	H

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:

Article 15 of Environmental Conservation Law provides protection of rivers, streams, lakes and ponds through the Protection of Waters Program. 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 activity that might lead to water contamination or the alteration of natural hydrology could impact *S. linearis* (New York Natural Heritage Program 2011). Such threats might include chemical contamination from agricultural run-off, changes in dissolved oxygen content, flow alteration, increases in sediment load, development near their habitats, and the building of dams (Novak 2006, Natural Heritage Endangered Species Program 2003, New York Natural Heritage Program 2011). Distribution could actually increase with climate change.

Any measures to reduce water contamination or hydrological alteration such as agricultural run-off, upland development, and damming that would affect flow of small forested streams should be considered when managing for this species (New York Natural Heritage Program 2011).

Conservation actions following IUCN taxonomy are categorized in the table.

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 (species)

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