Species Status Assessment

Common Name: Bog buckmoth **Date Updated:** May 2025

Scientific Name: *Hemileuca maia menyanthevora* **Updated By:** Kathy O'Brien

Class: Insecta

Family: Saturniidae

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

The bog buckmoth, formerly named *Hemileuca sp. 1*, is a silk moth under the genus *Hemileuca*, of which there are 20 species in North America (Gradish and Tonge 2011). It is also commonly known as bogbean buckmoth. Years of debate about the sorting of species within the *Hemileuca maia* species complex resulted in the naming of the bog buckmoth as a separate species, *Hemileuca maia menyanthevora = H. Iroquois.* The ecological differences between bog buckmoth and other *Hemileuca* species are significant and are the basis for its species recognition and protection (Rubinoff and Sperling 2004).

The bog buckmoth is found on the northeastern margin of the *H. maia* complex distribution, with known populations in central New York and eastern Ontario, Canada. In New York this species once occupied six wetlands in New York, all within Oswego County. The species is limited to wetlands with an abundance of its sole food plant *Menyanthes trifoliata.*

I. Status

a. Current legal protected Status

i. **Federal:** Endangered **Candidate:** _____

ii. **New York:** Endangered

b. Natural Heritage Program

i. **Global:** G5T1

ii. **New York:** S1 **Tracked by NYNHP?:** Yes

Other Ranks:

New York State: High Priority SGCN

-IUCN Red List: None

Canada: Endangered

-Northeast Regional SGCN:

Status Discussion:

The bog buckmoth is a very rare moth, with New York populations occurring only in Oswego County. This moth species is susceptible to invasive plants, which crowd out its preferred food plant (NatureServe 2013).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Declining			(blank)
Northeastern US	Yes	Declining	Declining			Yes
New York	Yes	Declining	Declining		E	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	Yes	Stable	Stable			(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):*

New York DEC conducts annual visual surveys for adult bog buckmoths during their fall flight season. Presence/absence surveys with pheromone lures have been done by DEC and partners at sites where visual surveys have not detected adults for many years. Dr. Karen Sime has done some egg mass surveys connected to her parasitism research.

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

Populations appear to display a boom-and-bust cycle but have now been reduced to being detected at only one location. The global population is estimated to be 2,500-10,000 individuals, with populations in serious decline of 10-90% (NatureServe 2013). A survey of individuals in Ontario is estimated to have a total population of roughly 3,000 individuals (COSEWIC 2009).

As of 2015, the status of the six sites in New York, all in Oswego County, were as follows:

At one site, flying adults have not been sighted since 2003, despite annual surveying. Moths were abundant at this site in 1994 and 1996, crashed in 1996 and were very sparse through 2003. This site appears to have been extirpated.

A second site has shown the most extreme fluctuation pattern. Stanton (2000) considered this location to be an overflow site, which has supported a regular low-abundance population.

Another site was first surveyed in 1992, when 11 larvae were found. The largest number of individuals found in subsequent surveys is six.

Three additional sites support fluctuating but persistent populations
(Bonanno and White 2011). In 2013, mean five-minute counts were very low, ranging from 0.0 to 1.0.

Figure 1. Conservation status of *Hemileuca maia menyanthevora* in North America (NatureServe 2024).

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

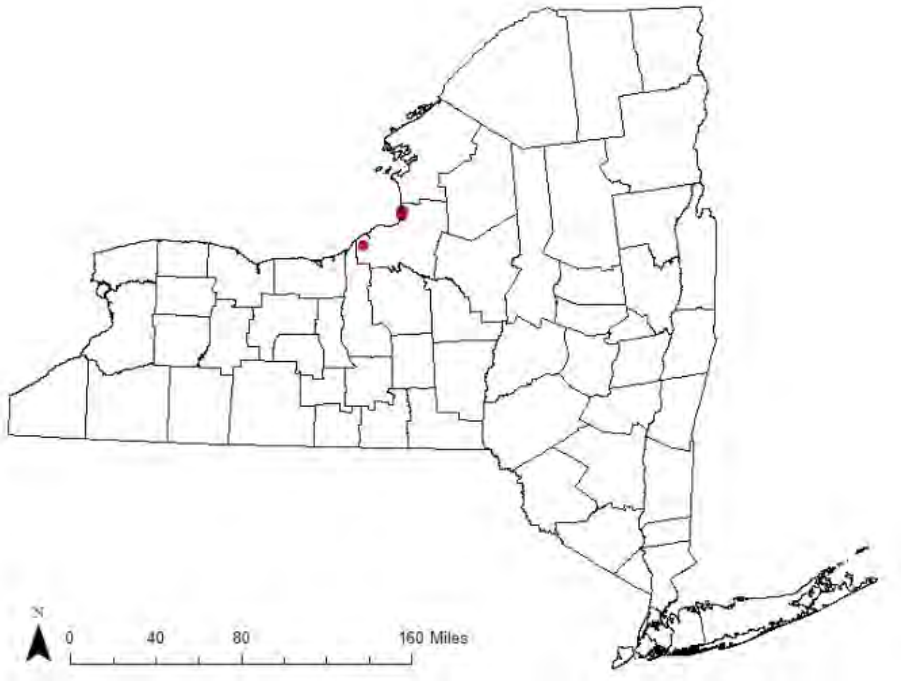

Figure 2. Known location of populations of bog buckmoth in New York State (NYNHP 2013).

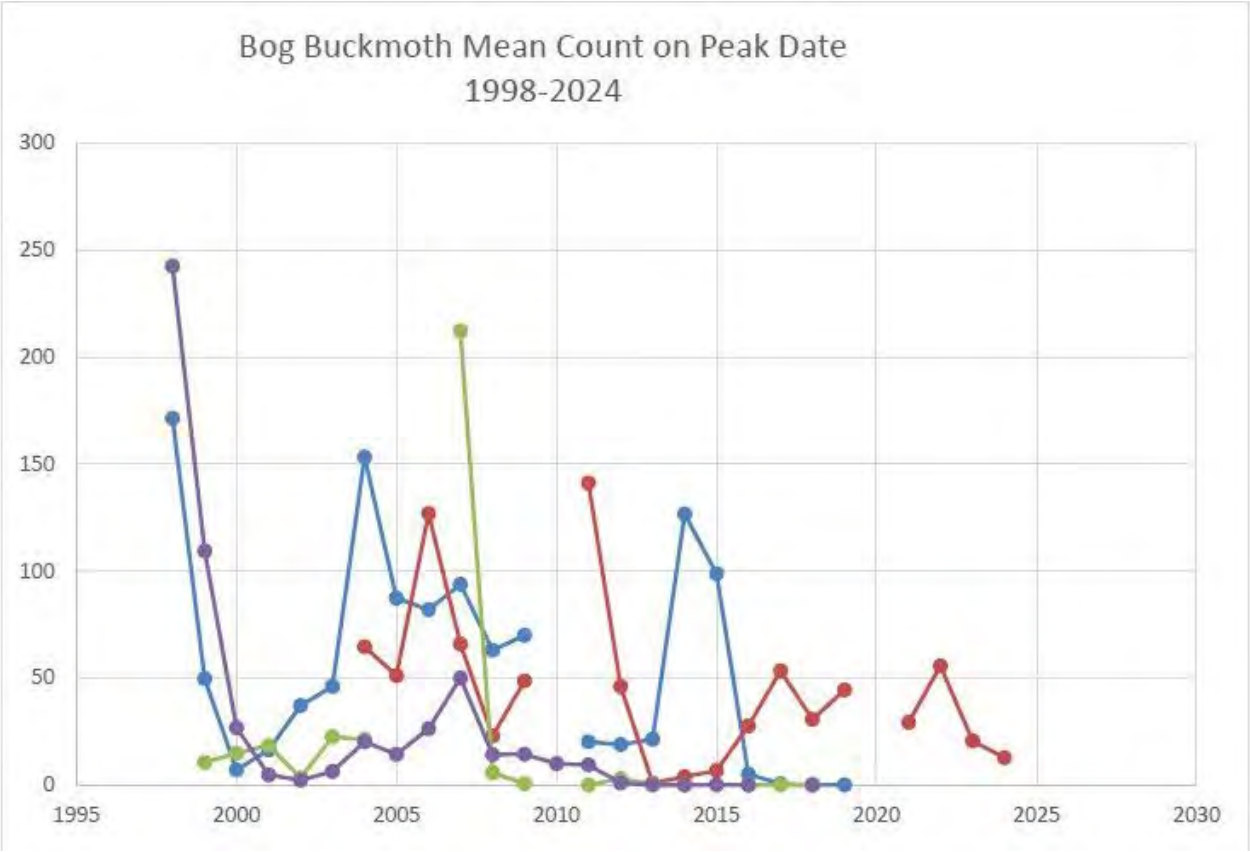

Figure 3. Bog buckmoth 24-year survey results (Parton, 2024)

Details of historic and current occurrence:

The first New York population of bog buckmoth was discovered in Oswego County in 1977. Additional populations were discovered in 1978, 1979, 1987 and 1992, all in Oswego County (NYNHP 2013).

There is currently only one location in New York where bog buckmoth is known to persist. Two sites in Canada also support small populations of this species.

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. Open acidic peatlands with an abundance of *Menyanthese trifoliata*

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Pollinator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	Yes	No	Declining	Declining for decades, with site extirpations since 2018

Column options
Habitat Specialist, Indicator Species and Pollinator 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 characterized as medium fen with "…sedge –dominated floating peat mats on lake edges to low shrub-dominated backwater peat mats behind barrier dunes in the Lake Ontario basin" (Olivero 2001, Stanton 2004). The preferred host plant for bog buckmoth is *Menyanthes trifoliata*, a shade intolerant species (Bonanno and White 2011).

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):*

Eggs are laid in clusters on woody branches in the fall and hatch out in the spring. Young hatch between April-June and develop into larvae between May-July. Larvae feed in clusters on Menyanthes leaves and stems, often swimming across small water gaps to fresh leaves. Older larvae may feed separately. Pupation and overwintering takes place in the sphagnum substrate. Adult are diurnal and emerge from mid-September through mid-October, with a peak flight around September 26-28 (Stanton 1998). Females emerge in early fall and climb up vegetation and release pheromone. Males fly upwind following the pheromone trail to the females.

Females usually mate with the first male to reach them and then oviposit eggs on the same day in clumps on shrubs and in rings around stems on a variety of plants (Tuskes et al. 1996, Stanton 1998). Early instar larvae have been observed feeding on the foliage of the closest plant until the preferred host plant, *M. trifoliata* emerges (Pryor 1998). Gravid females have a limited dispersal and move less than 10 m between potential oviposition sites, but up to 500m after ovipositing (Stanton 1998). Mark-recapture studies of adults in New York showed no dispersal between adjacent fens through forested habitat. Adults were found to travel up to 500m within the same fen (Stanton 2003). Life expectancy averages 3.7 days, with a maximum of 9 days for adult females and 12 days for males (Stanton 1998).

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

The bog buckmoth's poor dispersal ability and specialized habitat and food plant make it particularly vulnerable to increased water level fluctuations from Lake Ontario and flashy drainage from uplands into the fens that cause flooded or dried out conditions affecting larval food and pupae in the sphagnum. Encroachment of woody vegetation and invasive plant species into the fens replaces food plants and pupation sites.

Eutrophication of the fens and invasive species may change the vegetative make-up of the fens. Larval and egg parasitoids are thought to play a role in population regulation. Stanton (2000) found 45% of eggs at one site to be parasitized in 1999. Pesticides in runoff or spongy moth spraying may kill buckmoths.

Changes in temperature or precipitation regimes affecting the timing of emergence of larvae or adults may cause result in larvae on the landscape before food is available, or male flights occurring when females are not available. Changes in the timing or amount of precipitation could negatively alter water levels in the fens. Other impacts that would be minor for a larger population, such as egg or larval parasites, may have a greater impact on this species in its reduced state.

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
7. Natural System Modifications	7.3 Other Ecosystem Modifications	7.3.2 Vegetation succession	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
8. Invasive & Other Problematic Species	8.1 Invasive Non-Native Plants & Animals	8.1.4 Aquatic plants	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.3 Agricultural & Forestry Effluents	9.3.3 Herbicides & pesticides	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.1 Habitat Shifting & Alteration	11.1.2 Phenological mismatch	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.3 Changes in Temperature Regimes	11.3.3 Gradual temperature change	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.4 Changes in Precipitation & Hydrological Regimes	11.4.4 Increase in fluctuations in precipitation regime	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.5 Storms & Severe Weather	11.5.1 Storms & severe weather	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 1. Threats to *Hemileuca maia menyanthevora*

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

Yes: X **No: _____** **Unknown: _____**

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

The assumed sole remaining population is located on protected conservation land with the other most recent population located on property owned in part by a conservation organization. Protected ownership of the population sites is not adequate to protect the species without appropriate management.

The bog buckmoth 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.

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

It is not clear if habitat succession/decline is the main reason for the recent sharp declines of the populations, but it has contributed to long slow loss of habitat such as at two formerly occupied sites in Oswego County. The lone known existing site and potentially restorable sites need to be managed to reduce invading woody and herbaceous species. Changes in the watershed of the recently occupied sites have had detrimental effects such as flashy stream events and eutrophication due to development upstream of the fens. Beaver activity has also caused water rise counter to the normal stream levels, or sudden drops from dam failure. Management needs to include reduction of eutrophication, reduction of extreme water level fluctuations, and control of successional plant species such as red maple, cattail and glossy buckthorn.

An experimental captive rearing program for bog buckmoth has had some success in rearing larvae on alternate food source to pupation and should be continued to help maintain moth numbers in the short term.

Action Category	Action	Description
A.2 Direct Species Management	A.2.3.1.1	Captive rearing for eventual release
A.1 Direct Habitat Management	A.1.1.1	Control invasive plants; manage native plant succession
A.1 Direct Habitat Management	A.1.2.1	Manage water levels to reduce harmful hydrological fluctuations
B.3 Outreach	B.3.1	Increase public awareness

Action Category	Action	Description
C.7 Legislative and Regulatory Framework or Tools	C.7.2	

Table 2. Recommended conservation actions for *Hemileuca maia menyanthevora*

VII. References

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