

Species Status Assessment

Common Name: Chain fern borer moth **Date Updated:** March 7, 2025

Scientific Name: *Papaipema stenocelis* **Updated By:** Annie Stupik

Class: Insecta

Family: Noctuidae

Species Synopsis

Papaipema stenocelis occurs along the Atlantic coast from Maine to Florida, though the species has been documented at approximately 30 places within its range (NatureServe 2025). It is found in wetland habitats, including bogs, fens, coastal swamps, and vernal pools. Its larval foodplant is Virginia chain fern (*Woodwardia virginica*). While more information is needed to better understand this species, it appears to require large swathes of contiguous habitat occupied by *Woodwardia virginica* to persist (Weldy and Werier 2010). This species seems to occur patchily within its range despite high availability of potential habitat for unknown reasons (D. Schweitzer, personal communication). It may be that variation in water levels within its habitat limit its distribution (New York Natural Heritage Program 2012). There are two occurrences of this species in New York, both on Long Island.

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

Other Ranks:

-NYS 2025 SGCN Status: SGCN

-Northeast Regional SGCN: Watchlist [Assessment Priority]

-IUCN Red List: Not listed

Status Discussion:

There is not enough data available on this species to accurately assess trends, but it has not been recorded in much of its range in the most recent decades, suggesting a long term decline (NatureServe 2025, New York Natural Heritage Program 2012). However, there are 5 documented occurrences within the past 5 years in the northeastern United States (iNaturalist 2025). The status of this species in New York 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			Yes
New York	Unknown	Unknown	Unknown			Yes
Connecticut	No data	Unknown	Unknown			No

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
Massachusetts	Yes	Unknown	Unknown		Threatened	Yes
New Jersey	Yes	Unknown	Unknown			Yes
Pennsylvania	No data					No
Vermont	No data					No
Ontario	No data					No
Quebec	No data					No

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

No monitoring is being conducted for this species in New York.

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



Figure 1. Conservation status of *Papaipema stenocelis* in North America (NatureServe 2025).

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

The species was documented on Long Island in 1987 and 2013 (H. McGuinness, iNaturalist 2025).

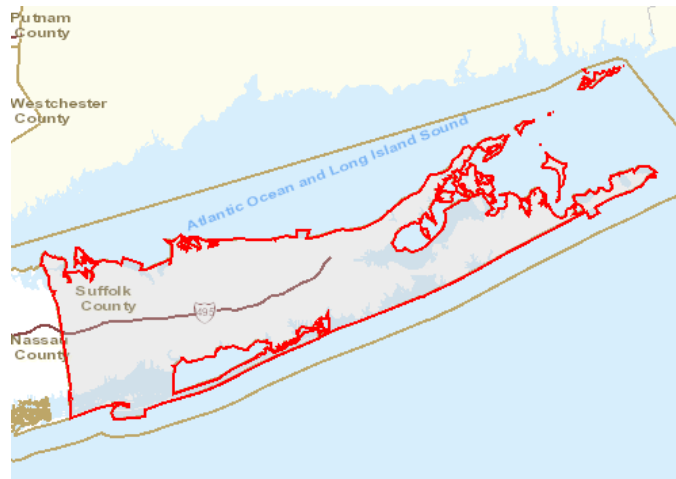


Figure 2. *P. stenocelis* distribution/status in New York (New York Natural Heritage Program 2012).

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

Table 1. Records of *Papaipema stenocelis* in New York.

Details of historic and current occurrence:

Suffolk County, 1987 and 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%	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. Open acidic peatlands
- b. Wet meadow & shrub swamp
- c. Freshwater marsh

Habitat or Community Type Trend in New York

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

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:

The species occupies a variety of wetland habitats where its host plant is found (NatureServe 2025). In New York, the observation from Long Island in 1987 occurred in a swale containing a nearly pure, dense stand of *Woodwardia virginica* (New York Natural Heritage Program 2012).

V. Species Demographic, and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/Catadromous?
Yes	No	(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

Adults of *Papaipema stenocelis* fly in September and October. Eggs are laid to overwinter, and larvae hatch in the spring. The larvae then bore into the host plant *Woodwardia virginica*, feeding on the stems and pupating by late August. Prepupal larvae usually aestivate, probably for more than a month. On rare occasions, larvae skip the prepupal aestivation and may pupate and produce adults as early as late July or August (New York Natural Heritage Program 2012).

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

Threats to *Papaipema stenocelis* include pesticide application for mosquitoes, and decline of host plant populations due to herbicide applications, hydrologic changes, and prescribed burning (NatureServe 2025, New York Natural Heritage Program 2012, D. Schweitzer 2011). Where this species is occupying multiple small habitat patches as a metapopulation, artificial lights (including bug zappers) operating in the early fall could disrupt necessary movements between these patches (Eisenbeis 2006, Frank 2006). This could cause fern patches where a local colony dies out to remain unoccupied, and this could eventually eliminate the entire population.

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
7. Natural System Modifications	7.3 Other Ecosystem Modifications	7.2.1 Water level management using dams	Unknown	Unknown	Long-term	Choose an item.	Choose an item.
11. Climate Change	11.1 Habitat Shifting & Alteration	11.1.1 Changes in vegetation communities	Unknown	Unknown	Long-term	Choose an item.	Choose an item.
9. Pollution	9.3 Agricultural & Forestry Effluents	9.3.3 Herbicides & pesticides	Unknown	Unknown	Near-term	Choose an item.	Choose an item.

Table 2. Threats to *Papaipema stenocelis*

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 Tidal Wetlands Act protects all tidal wetland habitats and adjacent areas under Article 25 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:

Occupied wetlands should be evaluated to minimize encroachment and fragmentation by development. This is because 1) several species in the genus *Papaipema* tend to not occupy small habitat patches and 2) surrounding natural areas serve as buffers that reduce the impact of sediments, nutrients, and pollutants entering wetlands in stormwater runoff. A general recommendation for species in the genus *Papaipema* is that five to ten hectares of habitat should be conserved at a site to safeguard a population against assumed events, human disturbance, or intense localized predation in some places in some years, which tends to vary from season to season. For species that are not prone to severe disturbances, such as the chain fern borer moth, which is relatively less prone to deer herbivory of its larval foodplant, smaller habitats that contain dense stands of the foodplant can support viable populations (NatureServe 2012). In occupied areas, the following practices would be beneficial: 1) maintaining the natural hydrology, 2) restricting herbicide and insecticide spraying, and 3) conducting forestry practices, and transportation and utility corridor maintenance practices, in a way that minimizes negative impacts to occupied wetlands. In areas where artificial lighting is necessary, using sodium lights or other low ultraviolet lamps would be beneficial. Controlling invasive plants that threaten *Woodwardia virginica* would be beneficial. Monitoring deer herbivory in more upland habitats may also be beneficial. Although deer generally do not severely impact ferns, they sometimes do eat the young fronds in May. If they eat a lot of the fronds in the spring, they might be significant predators on young larvae (NatureServe 2012). Additional surveys are needed to better understand the status and distribution of this moth in New York State.

Action Category	Action	Description
A.1 Direct Habitat Management	A.1.0.0.0 Direct Habitat management	Site/Area Management
B.3 Outreach	B.3.0.0.0 Outreach	Awareness & Communications
C.6 Design and Plan Conservation	C.6.0.0.0 Design and Plan Conservation	Site/Area Protection

Action Category	Action	Description
C.6 Design and Plan Conservation	C.6.0.0.0 Design and Plan Conservation	Resource/Habitat Protection
C.7 Legislative and Regulatory Framework or Tools	C.7.0.0.0 Legislative and Regulatory Framework or Tools	Policies and Regulations
C.8 Research and Monitoring	C.8.1.5.1 Species Monitoring	Research and Monitoring

Table 3. Recommended conservation actions for *Papaipema stenocelis*.

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for other moths, and for the chain fern borer moth in particular.

Easement acquisition:

_____ Where appropriate, acquire easements to promote moth protection and conservation.

Fact sheet:

_____ Create fact sheets covering moths.

Habitat management:

_____ Determine best management regime for moth species, including fire and other forms of management.

Habitat monitoring:

_____ Develop standardized measures of habitat parameters for each species of listed moth.

_____ Investigate threats to food and host plants.

_____ Monitor land development projects.

Habitat research:

_____ Examine role of light pollution as threat to moths.

_____ Determine host/ food plant.

Life history research:

_____ Investigate the metapopulation dynamics of those species which warrant it.

_____ Examine role of introduced parasites and predators in threats to moths.

Other action:

_____ Develop standard definition of what is needed for "viable" populations of moths.

_____ Research the role of pesticide use in threats to moths.

Population monitoring:

- _____ Inventory of species within historical range.
- _____ Develop standardized survey protocols for moths.

Private fee acquisition:

_____ Where appropriate, encourage/assist private entities to acquire land for moth protection and conservation.

State fee acquisition:

_____ Where appropriate, acquire land essential to moth protection and conservation.

State land unit management plan:

_____ Incorporate needs of moths into state land management plans.

VII. References

- Eisenbeis, Gerhard. 2006. Artificial night lighting and insects: attraction of insects to streetlight in a rural setting in Germany. Pp. 281-304 in Rich, Catherine and Longcore, Travis (eds.) Ecological Consequences of Artificial Night Lighting.
- Frank, Kenneth. 2006. Effects of artificial night lighting on moths. Pp. 305-344 in Rich, C. and Longcore, T. (editors.) Ecological Consequences of Artificial Night Lighting. Island Press, Washington, D.C., London. 458 pp.
- iNaturalist. *Papaipema stenocelis* Dyar, 1907 in Bánki, O., Roskov, Y., Döring, M., Ower, G., Hernández Robles, D. R., Plata Corredor, C. A., Stjernegaard Jeppesen, T., Örn, A., Pape, T., Hobern, D., Garnett, S., Little, H., DeWalt, R. E., Ma, K., Miller, J., Orrell, T., Aalbu, R., Abbott, J., Adlard, R., et al. (2025). Catalogue of Life (Version 2025-02-13). Catalogue of Life, Amsterdam, Netherlands. <https://doi.org/10.48580/dgnfb>.
- NatureServe. 2025. NatureServe Explorer. Page last published 2/28/2025. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.108257/Papaipema_stenocelis. Accessed March 6, 2025.
- New York Natural Heritage Program. 2012. Online Conservation Guide for *Papaipema stenocelis*. Available from: <https://guides.nynhp.org/chain-fern-borer-moth/>.
- 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
- Weldy, T. and D. Werier. 2010. New York flora atlas. [S.M. Landry, K.N. Campbell, and L.D. Mabe (original application development), Florida Center for Community Design and Research <http://www.fccdr.usf.edu/>. University of South Florida <http://www.usf.edu/>]. New York Flora Association <http://newyork.plantatlas.usf.edu/>, Albany, New York

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