Species Status Assessment

Common Name: Cattail Flash-train Firefly **Date:** 2024-10-07

Scientific Name: *Photinus consimilis* **Updated By:** Katie Hietala-Henschell

Class: Insecta

Family: Lampyridae

Species Synopsis

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

Photinus consimilis, also known as the Cattail Flash-train Firefly, is a wetland habitat specialist and typically occurs near rivers and streams. In New York, this species is typically active from June through July (Faust 2017). This species is member of the *ardens/consimilis* group and is closely related to the Synchronous firefly. *P. consimilis* is known from the eastern U.S. from Florida to as far north as Ottawa, and westward to Oklahoma and into the Midwest. Across its range, this species has been assessed as having an unknown population trend (Walker and Pérez Hernández 2021). The type locality and other known populations of *P. consimilis* appear to be extirpated and this species is listed as Data Deficient by the IUCN Red List Firefly Specialist Group (Fallon et al. 2021, Walker and Pérez Hernández 2021).

Lloyd (2018) observed this species in 1966 in Jefferson and Oneida counties, however specific location information is unavailable. Preliminary results suggest the possibility of *P. consimilis* occurring in Saratoga and Orange County (NYNHP 2024). *P. consimilis* is on the Proposed RSGCN Watchlist due to taxonomic uncertainty in this group (Terwilliger Consulting, Inc. and the Northeast Fish and Wildlife Diversity Technical Committee 2023).

In 2021, the International Union for Conservation of Nature (IUCN) Red List conducted baseline conservation assessments for nearly 80% of described firefly species in the United States and Canada. The IUCN Red List found approximately 14% of fireflies are threatened with extinction and more than half of the species (53%) could not be evaluated due to lack of data (Fallon et al. 2021). Future firefly work including monitoring and protecting populations of at-risk species, preserving, and restoring habitat, and gathering data to fill critical information gaps (e.g., population trends) for species suspected to be rare or at risk, like *P. consimilis*, will help inform conservation efforts.

I. Status

a. Current legal protected Status

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

ii. **New York:** Unprotected

b. Natural Heritage Program

i. **Global:** GU

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

Other Ranks:

-New York 2025 SGCN status: Species of Greatest Conservation Need
-COSEWIC: Not listed in Canada
-IUCN Red List: Data Deficient
-Northeast Regional SGCN: Proposed Watchlist [Assessment Priority]

Status Discussion:

Photinus consimilis has been assessed by the IUCN Red List Firefly Specialist Group as Data Deficient (DD) and as having an unknown population trend (Walker and Pérez Hernández 2021). This species is a habitat specialist of wetland habitats including bogs, marshes, swamps, fens, and peatlands. In New York, this species appears to be restricted to the southern and western parts of the state and is currently known from at least two counties. West Virginia is the only state with a state conservation rank and *P. consimilis* has been assessed as Imperiled (S2) (NatureServe 2023).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status or S-Rank	SGCN?
North America	Yes	Unknown	Unknown	Unknown		
Northeastern US	Yes	Unknown	Unknown	Unknown		Proposed Watchlist [Assessment Priority]
New York	Yes	Unknown	Unknown	Unknown	SNR	No
Connecticut	No	-	-	-		
Massachusetts	No	-	-	-		
New Jersey	Yes	Unknown	Unknown	Unknown	SNR	No
Pennsylvania	Yes	Unknown	Unknown	Unknown	SNR	No
Vermont	Yes	Unknown	Unknown	Unknown	SNR	
Ontario	No	Unknown	Unknown	Unknown	S4	
Quebec	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

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

The Dark Skies for Fireflies project (2023-2025), a partnership between New York Natural Heritage Program (NYNHP) and the Office of Parks, Recreation, and Historic Preservation (OPRHP), is an effort to survey fireflies in New York State Parks; however, there are no systematic monitoring efforts directed toward this species.

Trends Discussion

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

Walker and Pérez Hernández (2021) assessed the conservation status for *P. consimilis* as Data Deficient because it is no longer found at the type locality and other previously known locations. Furthermore, it is a wetland habitat specialist and wetlands have declined in the U.S. While large scale data sets are currently unavailable to confidently estimate trends several case studies are available. For example, a firefly survey effort at Mammoth Cave National Park in Kentucky was unable to redetect *P. consimilis* in an area where it was previously documented (Dodd and Faust 2013). Fireflies that are restricted to specialized habitats tend to be more likely to be threatened by some level of extinction and should be included as SGCN (Fallon et al. 2021).

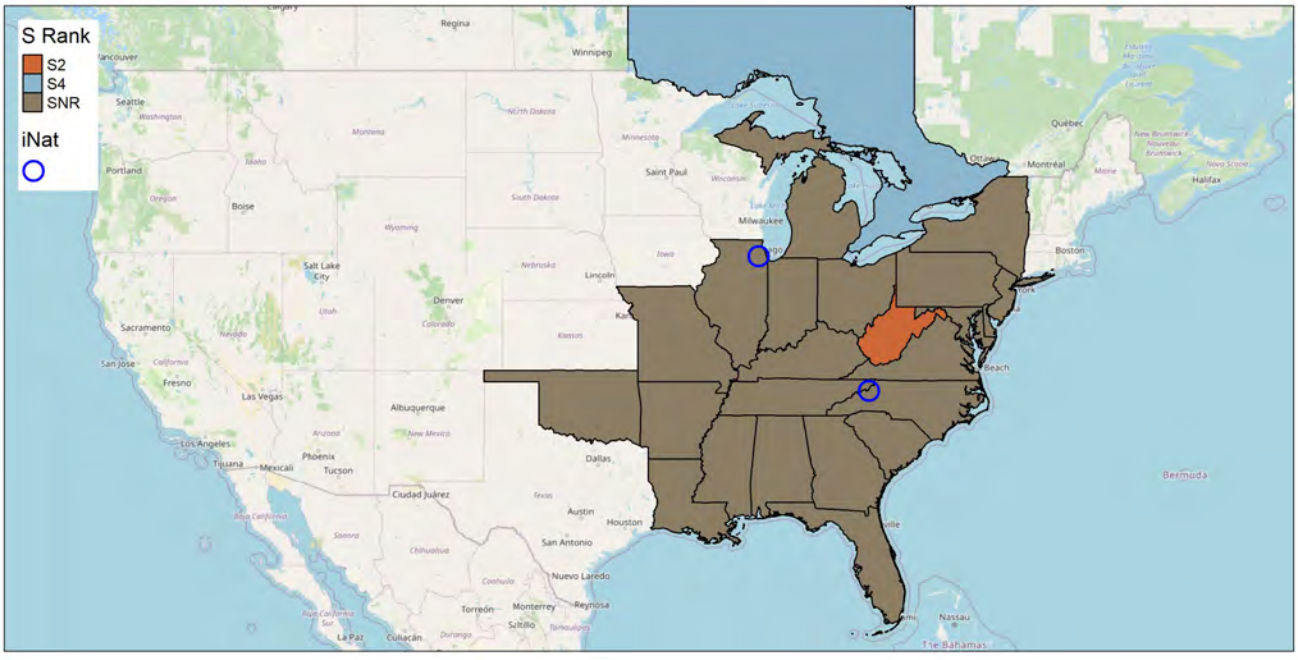

Figure 1: *Photinus consimilis* North American distribution. Points show research-grade iNaturalist observations (iNaturalist 2023, NatureServe 2023).

Figure 2: *Photinus consimilis* North American distribution as reported by IUCN 2020. Photinus consimilis. The IUCN Red List of Threatened Species. Version 2023-1.

Figure 3: *Photinus consimilis* regional distribution as reported at https://northeastwildlifediversity.org/rsgcn .

III. New York Rarity

(provide map, numbers, and percent of state occupied)

Within its range, *P. consimilis* prefers habitat adjacent to streams and riverbanks, wetlands, and marshy areas (Faust 2017). Currently, there are no records of *P. consimilis* in the NYNHP element occurrence database. Available records suggest that this species occurs in approximately 3% of New York (NYNHP 2024). This species is part of the *Photinus ardens/consimilis* complex which can be difficult to differentiate. Lloyd (2018) observed *P. consimilis* in 1966 from Jefferson and Oneida counties. Preliminary data from the Dark Skies for Fireflies project suggest that *P. consimilis* may occur in Saratoga and Orange Counties (NYNHP 2024). Flash pattern data and voucher specimens were collected in 2023 and 2024. Species determinations and verifications are currently underway.

Figure 4: NYS distribution of *Photinus consimilis* based on historic records (pre-1999) primarily from Lloyd 1969. These points represent low accuracy from georeferenced locations based on county level descriptions (NYNHP 2024).

Years	# of records	# of Counties	% of counties in State
Pre-1999	2	2	3.2
2000-present	NA	NA	NA

Table 1. Number of observations of *Photinus consimilis* grouped by the dates known to be extant (repeat observations (element occurrences) include the years spanning first observation to last observation) and the number and percent of total of counties these observations fall within for New York State.

Details of historic and current occurrence:

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):

NatureServe (2023) broad habitat types: Scrub -shrub Wetland, Forested Wetland, Bog/fen, Herbaceous Wetland, Subterrestrial

Habitat or Community Type Trend in New York

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

IUCN Red List (Walker and Pérez Hernández 2021):

Photinus consimilis has been observed in a variety of wetland habitats in proximity to streams, riverbanks, and marshy areas (Faust 2017).

V. Species Demographics and Life History

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

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):

IUCN Red List (Walker and Pérez Hernández 2021):

Male flashing activity begins about 45 minutes after sunset and continues for about an hour (Lloyd 1966). Males fly slowly, one to two metres off the ground and emit a four to nine pulsed flash pattern (Lloyd 1966). Each pulse is about 0.2 seconds in duration, at intervals of about 0.5 seconds, depending on temperature (Lloyd 1966). The interval between flash trains is about 10 seconds and it is at this point that females respond with double pulsed flashes at a three second delay, from low lying vegetation nearby (Lloyd 1966). Typically, *Photinus* larvae are suspected to be subterranean, probably feeding on earthworms and other soft bodied invertebrates at or below the soil surface (Buschman and Faust 2014).

VI. Threats

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
6. Human Intrusions & Disturbance	6.1 Recreational Activities	6.1.8 Wildlife observation/photography	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
7. Natural System Modifications	7.3 Other Ecosystem Modifications	(habitat loss/ degradation)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.3 Agricultural & Forestry Effluents	9.3.1 Nutrient loads	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 (runoff)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.6 Excess Energy	9.6.1 Light pollution	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.1 Habitat Shifting & Alteration	-	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	11.4.2 Droughts	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 2. Threats to *Photinus consimilis.*

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:

Threats to *P. consimilis* include light pollution, soil and air pollution, pesticides, habitat fragmentation and destruction, and climate change (Lewis et al. 2024). Minimizing these key threats are needed to conserve at-risk firefly species. In addition, Reed et al. (2020) found that fireflies have numerous risk factors that can contribute and make them more susceptible to various threats, including specialized diets, poor dispersal abilities, and unique mating signals and behaviors.

Artificial lights can impair firefly communication resulting in reduced courtship and mating (Faust et al. 2012). *P. consimilis* becomes active after dark (Faust 2017), potentially making it more sensitive to light pollution. Even low levels of light pollution can reduce reproductive success (Owens et al. 2022). Light pollution can be managed by turning off unnecessary lights and planting hedgerows or trees around occupied sites to block trespassing light. Pesticide exposure can reduce fitness and cause mortality, especially in the long-lived, ground-dwelling larval life stage. Runoff or direct exposure of insecticides, herbicides, and fertilizers may degrade firefly habitat and can have lethal and sublethal effects on fireflies (Lewis et al. 2024). Sublethal effects can include changes in the midgut, body convulsions, persistent glow, and other physiological changes (Wang et al. 2022). Indirect effects include contaminating and reducing available prey.

Habitat loss and degradation is another leading threat to firefly populations. While some fireflies are generalists, like the common *Photinus pyralis* (Big Dipper Firefly), others are habitat specialists and are restricted to specific conditions. Once unique habitats – such as wetlands and mature forests – are lost, fireflies may experience direct mortality or be unable to recolonize an area that has been converted or developed. Climate Change can result in more droughts, wildfires, floods, sea-level rise, etc. all of which can potentially negatively impact fireflies in all life stages. Maintaining the natural hydrology of a site will benefit firefly populations.

Overtourism can lead to development and trampling. Impressive firefly light shows can draw large crowds that may increase onsite light pollution or trample individuals and habitat (Lewis et al. 2024). While programing and education/outreach surrounding these species can increase insect conservation and awareness, care should be taken at known sites to limit access areas and light use during breeding.

Additional conservation actions to support at-risk firefly populations include reducing light pollution that spills into parks or other sensitive areas, eliminate the use of broad-spectrum insecticides, modify mosquito control programs to minimize risk to fireflies, and protect wetland and riparian habitat from recreational activities (Lewis et al. 2024).

Table 3. Recommended conservation actions for *Photinus consimilis*.

Action Category	Action	Description
A.1 Direct Habitat Management	A.1.0.0.0 Direct Habitat Management	Site/Area management
A.2 Direct Species Management	A.2.0.0.0 Direct Species Management	Invasive/problematic species control
B.3 Outreach	B.3.1.0.0 Outreach, communication, and distribution	Awareness & Communications
C.6 Design and Plan Conservation	C.6.0.0.0 Design and plan conservation	Site/Area protection
C.6 Design and Plan Conservation	C.6.0.0.0 Resource and habitat protection	Resource/Habitat protection
C.6 Design and Plan Conservation	C.6.5.1.3 Develop a conservation, management, or restoration plan for protected private lands	Habitat and natural process restoration
C.7 Legislative and Regulatory Framework or Tools	C.7.1.3.0 Create, amend, or influence regulation	Regulations
C.7 Legislative and Regulatory Framework or Tools	C.7.2.1.0 Create or amend policies	Policies
C.9 Education and Training	C.9.2.0.0 Training and individual skill development	Training

VII. References

This SSA drew heavily from these resources:

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