

Species Status Assessment

Common Name: Ignited Firefly

Date: 2024-10-13

Scientific Name: *Photinus ignitus* **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 ignitus, also known as the Ignited Firefly, is a habitat specialist of grasslands. In New York, this species is typically active from late-June through July (Faust 2017). This species is a member of the *ignitus/consanguineous* group and can be challenging to differentiate (Green 1956). It is more commonly known from the northeastern U.S. but occurs as far south as North Carolina and Alabama. Across its range, this species has been assessed as Least Concern by the IUCN Red List Firefly Specialist Group; however, its population trend is unknown due to a lack of data (Fallon 2021). *P. ignitus* appears to occur in open habitats, such as fields and pastures, and can be locally abundant.

Historic records from the early and mid-1900s are from western, central, and southern New York. Some records from New York City area and Long Island may be extirpated due to the development and growth in these densely populated areas. The loss of meadow and grassland habitat within its range and the decline in quality of fields and pastures may negatively impact this species.

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 potentially rare or at-risk species, like *P. ignitus*, 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:** G5
- ii. **New York:** SNR **Tracked by NYNHP?:** No

Other Ranks:

- New York 2025 SGCN status: Species of Greatest Conservation Need
- COSEWIC: Not listed in Canada
- IUCN Red List: Least Concern
- Northeast Regional SGCN: Not listed

Status Discussion:

This species prefers open areas including fields and pastures. Based on historic New York records, this species appears to occur in central, western, and southeastern parts of the state and it is currently documented from eight counties. This species does not currently have a state conservation rank in any part of its range (NatureServe 2023). This species can be locally abundant within suitable habitat; however, the loss and decline of suitable habitat may threaten populations.

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		
New York	Yes	Unknown	Unknown	Unknown	SNR	No
Connecticut	Yes	Unknown	Unknown	Unknown	SNR	No
Massachusetts	Yes	Unknown	Unknown	Unknown	SNR	No
New Jersey	Yes	Unknown	Unknown	Unknown	SNR	No
Pennsylvania	Yes	Unknown	Unknown	Unknown	SNR	No
Vermont	Yes	Unknown	Unknown	Unknown	SNR	No
Ontario	Yes	Unknown	Unknown	Unknown	SU	No
Quebec	Yes	Unknown	Unknown	Unknown	SNR	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):

The conservation status for *P. ignitus* is currently Least Concern; however, the IUCN Red List Firefly Specialist Group was not able to assess the population size and trend for *P. ignitus* due to the paucity of data (Fallon 2021). This species can be locally abundant within suitable habitat; however, the loss and decline of suitable habitat may threaten populations.



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

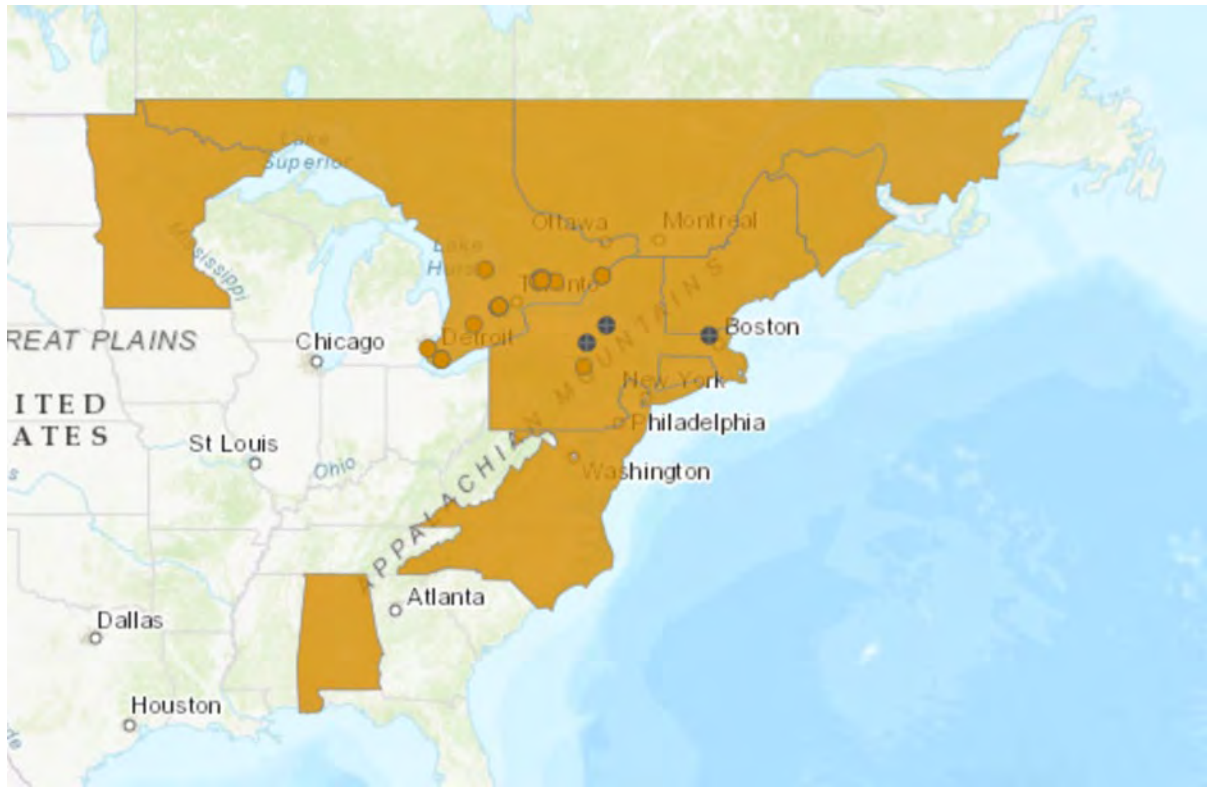


Figure 2: IUCN Red List map of *Photinus ignitus* North American distribution (Fallon 2021).

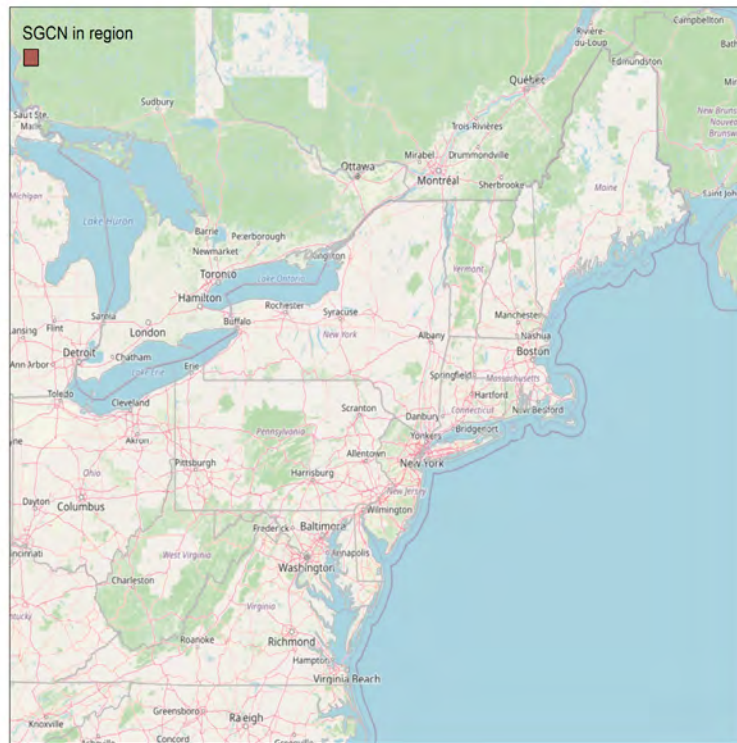


Figure 3: *Photinus ignitus* regional distribution as reported at <https://northeastwildlifediversity.org/rsgcn>.

III. New York Rarity

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

Currently, there are no records of *P. ignitus* in NYNHP element occurrence database. Historic records have documented *P. ignitus* in eight counties including Tompkins, Madison, Chemung, Westchester, Oswego, Kings, Rockland, and Suffolk. Available records suggest that this species occurs in nearly 13% of New York state. Preliminary data from the Dark Skies for Fireflies project may have confirmed this species presence in Suffolk County (NYNHP 2024). Flash pattern data and voucher specimens were collected in 2023 and 2024. Species determinations and verifications are currently underway.

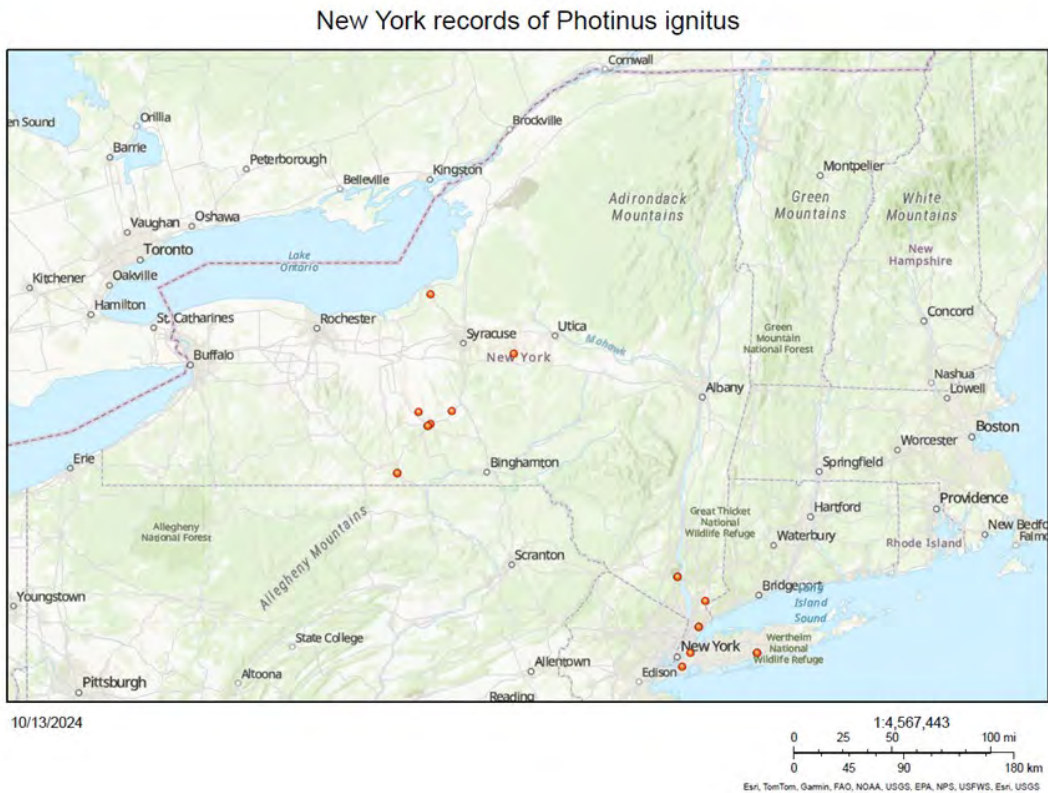


Figure 4: NYS distribution of *Photinus ignitus* based on historic records (pre-1999) primarily from Green 1956 and Lloyd 2018. These points represent low accuracy from georeferenced locations based on site, city, and county level descriptions (NYNHP 2024).

Table 1. Number of observations of *Photinus ignitus* 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.

Years	# of records	# of Counties	% of counties in State
Pre-1999	12	8	12.9
2000-present	NA	NA	NA

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%		

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: Old field, Grassland/herbaceous, Subterrestrial

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/ Increase
Unknown	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 (Fallon 2021):

Photinus ignitus fireflies prefer open areas like pastures, meadows, and old fields (Lloyd 1969, 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 (Fallon 2021):

Larvae of this genus live underground and are likely earthworm specialists (Lloyd 2018), although they probably also prey on other soft-bodied organisms including snails and slugs). Adults, which have a life span of about two weeks, do not feed (Lewis and Cratsley 2008). This species is active at night, with males flashing one quick yellow flash every five seconds or so, starting about 40 minutes past sunset and continuing for two hours or more (Lewis and Cratsley 2008, Faust 2017). They tend to fly in a straight line, 1 to 1.5 meters off the ground, searching for the single response flashes given at 4-6 sec delays by females perched on ground vegetation (Faust 2017). Females respond differentially to males based on the duration of the male's single-pulse courtship signal, which may be correlated with male nuptial gift size (Cratsley and Lewis 2003). *Photinus ignitus* adults have been found to contain steroidal pyrones called lucibufagins, which may help deter predators such as birds and some spiders (Eisner et al. 1978).

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 ignitus*.

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. ignitus* 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. ignitus* typically flashes between late dusk to complete dark (Faust 2017), potentially making it less 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 programming 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 ignitus*.

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 Design and plan conservation.	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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Template populated on	3/7/2024

Originally prepared by	Katie Hietala-Henschell
Date first prepared	10/13/2024
First revision	
Last revision	