



FIREFLY CONSERVATION

A Guide to Protecting the Jewels of the Night

Fireflies are some of our most beloved insects: celebrated in art, music, and literature, and contributing to numerous advances in medicine and our understanding of evolution, genetics, and ecology. For many people, their incredible bioluminescent light shows bring up fond memories of childhood.

While they are well loved, fireflies appear to be declining. Fireflies—also known as lightningbugs or glow-worms—face many of the same threats as other insects, including habitat loss and degradation, light pollution, exposure to pesticides, invasive species, and climate change.

By carefully considering the needs of fireflies and how our actions could affect these animals, we can take steps to ensure that their lights continue to shine for future generations.

What Are Fireflies?

Fireflies are actually beetles. They fall into three categories—flashing fireflies, day-active fireflies (which communicate with pheromones), and glow-worms (whose females glow to attract mostly nonluminescent males). More than 2,000 species have been described globally, with about 170 known from the United States and Canada. Anecdotal reports of local declines are growing, and while monitoring data are scarce, researchers believe some firefly species may be at risk of extinction.

What Fireflies Need

In general, fireflies need food, shelter, moisture, dark nights, and protection from pesticides. Fireflies spend most of their lives as larvae, hunting for soft-bodied invertebrates such as snails, slugs, and earthworms. Firefly larvae are voracious predators, although the adults of many species do not feed. Practices that affect firefly prey—such as using pesticides in your yard to combat slugs or grubs—can diminish firefly food sources and harm their populations. Pesticides can also kill fireflies directly or damage their habitat. Larvae and glow-worm females are not able to fly, making them especially vulnerable to ground disturbances such as trampling. For species that are active at night, dark skies are especially important—artificial light can interfere with their communication and reduce their ability to mate successfully. Leaf litter, vegetation, and rotting logs can provide important shelter for fireflies at all life stages. Perhaps most critical is the presence of moisture; although fireflies are found in many different habitats, from riparian forests to desert canyons and overgrown lots, moisture is the key element. Both fireflies and their prey depend on it.

What You Can Do

Protect, enhance, or create habitat for fireflies.

- Avoid pesticide use. Seek nonchemical pest-management options.
- Minimize activities that could cause trampling of larvae and flightless females, which live underground and at ground level.
- Set aside natural areas of your yard that provide important habitat features, such as downed wood, leaf debris, and unmowed vegetation.

- Plant native grasses, shrubs, and trees of varying heights.
- Enhance moisture availability by planting for shade or adding a water feature.
- Use paths to avoid trampling fireflies.

Eliminate unnecessary lighting that contributes to artificial light at night, and reduce the effect of lights that must stay on.

- Use motion detectors or timers to limit the amount of time lights shine.
- Shield lights so they only illuminate the intended area, such as a pathway.
- Switch out bright outdoor lighting for red bulbs or cover existing bulbs with red filters.
- Close curtains at night to reduce the amount of indoor light that spills outdoors.

Contribute to a community science project, which can help researchers identify where fireflies occur.

- Help researchers track flashing firefly populations by adopting a site and monitoring it all summer through Firefly Watch, hosted by Massachusetts Audubon: www.massaudubon.org/get-involved/citizen-science/firefly-watch.
- Submit observations of flashing *Pyrrhopyga* fireflies in the West through the Western Firefly Project, a program with the Utah Museum of Natural History: nhmu.utah.edu/fireflies.
- Record your firefly sightings and get help with identification through the Fireflies of the USA and Canada iNaturalist project, an initiative of Fireflyers International Network: www.inaturalist.org/projects/fireflies-of-the-usa-and-canada.

Advocate for fireflies and their needs in your community.

- Work with your municipality to pass policies that promote firefly-friendly practices.
- Work with local parks and natural areas to protect firefly habitat.
- Join or start a local chapter of the International Dark Sky Association: www.darksky.org.
- Ensure firefly-watching sites are protected from artificial light at night, trampling, and other negative impacts.

For More Information

Xerces Society Firefly Resources

The Xerces Society has a number of resources that provide guidance on firefly conservation and management, including the publication [*Conserving the Jewels of the Night: Guidelines for Protecting Fireflies in the United States and Canada*](#).

Read more about Xerces' firefly conservation campaign at xerces.org/endangered-species/fireflies.

Other Resources

Fireflies, Glow-Worms, and Lightning Bugs by Lynn Faust (2017) provides identification and natural history of the fireflies in the eastern and central United States and Canada.

Silent Sparks: The Wondrous World of Fireflies by Sara Lewis (2016) offers an introduction to the science and wonder of fireflies, with a key to the most commonly encountered genera in North America.

Will you support our work? Make a tax-deductible donation to the Xerces Society today! To learn more, visit xerces.org/donate.



Established in 1971, the Xerces Society is an international, donor-supported nonprofit dedicated to protecting the natural world by conserving invertebrates and their habitat. The Society uses hands-on conservation, advocacy, education, and applied research to protect the life that sustains us.

The Xerces Society for Invertebrate Conservation
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1. Not all flashes are friendly—female *Photuris* fireflies mimic the flash of other species to lure males as prey.
2. All firefly larvae, like this juvenile *Pyrausta*, are voracious predators of soft-bodied invertebrates, including snails, slugs, and earthworms.
3. Leaf litter, underground burrows, rotting logs, and even stones provide important microhabitat for firefly larvae and flightless adult females such as this California pink glow-worm (*Microphotus angustus*).
4. Moisture is critically important to fireflies, whether in the form of permanent water sources like streams or more ephemeral sources such as puddles and dew.

5. Diverse vegetation of differing heights increases moisture retention and provides places to perch for fireflies like this Douglas fir glow-worm (*Pterotus obscuripennis*).
6. Fireflies that are active at dusk or after dark, like the blue ghost firefly (*Phausis reticulata*), need dark nights to communicate with each other.
7. The big dipper firefly (*Photinus pyralis*), which is active at dusk with a distinct J-shaped flash pattern, is one of the most commonly encountered species.
8. Trees with deeply furrowed bark provide summer shade and winter habitat to the day-active winter firefly (*Ellychnia corrusca*), which overwinters as an adult.

