

Nature in the Neighborhood – September 2026 – Fireflies

Where have all the fireflies gone?

*“Here come real stars to fill the upper skies / And here on earth come emulating flies”
from “Fireflies in the Garden” by Robert Frost*

I am of an age that remembers chasing fireflies – or lightning bugs as we called them – across the lawn on warm summer evenings. My backyard twinkled with these tiny stars that I captured and put in a mason jar with holes punched in the lid.

But it's been many years since I've seen fireflies in the neighborhood night skies. It's as though they have been slowly blinking out.

A 2024 study by the University of Kentucky, *Fading lights: Multiple threats to North America's firefly populations*, found that “as cities grow, they encroach on firefly natural habitats reducing their populations.” In addition to habitat loss, fireflies face threats from climate change, pesticide and chemical use, and light pollution, all leading to their decline.

Worldwide there are about 2,400 different species of fireflies (which, it turns out, are actually not flies, but of the beetle family). Estimates vary, but there are 150 – 270 species in North America, with the Common Eastern Firefly (*Photinus pyralis*) being the most prevalent firefly found in Massachusetts.

Fireflies use their ability to light up not only to help them find potential mates, but also as a defense mechanism to warn predators to stay away. While generally harmless to humans, many fireflies are chemically toxic to birds and other predators.

Fireflies produce light through a chemical reaction in their lower abdomen, a phenomenon known as bioluminescence. Technically speaking, this reaction occurs when the organic compound luciferin reacts with oxygen in the presence of the bioluminescent enzyme luciferase, both of which are produced by the firefly. The non-technical explanation, as anyone who has witnessed them transforming the night into something ethereal and enchanting, is that it's pure magic.

The timing and patterns of the flashes of light produced is unique to each species. This ensures that mating occurs within that species. Males typically fly through the air producing species-specific flash patterns, while females perched on vegetation respond with their own signal. On Massachusetts Audubon's webpage “Go Wild for Fireflies,” you can download a flash pattern guide to help you decode their display.

Interestingly, in certain parts of the world, the fireflies in an area all light up at the same time, a phenomenon known as simultaneous bioluminescence. The synchronous

flashing of the *Photinus carolinus* firefly can be viewed in Elkmont in the Great Smoky Mountains – but, because of the high demand for this viewing opportunity, you have to be lucky enough to win the National Park Service's annual lottery! (nps.gov/grsm/learn/nature/fireflies.htm).

Firefly Decline Due to Light Pollution

As mentioned, human light pollution is one of the reasons for firefly decline. That's because artificial light from cars, homes, and streetlights can disrupt their mating communication and make it difficult for males and females to find each other. Depending on the species and environmental conditions, one source reports that light pollution can reduce firefly reproductivity by over 50 percent

There is an international campaign aimed at reducing light pollution and preserving and restoring the nighttime environment. The leading organization in this movement, Dark Sky International (darksky.org), has a goal of ensuring that natural darkness is preserved for both people and nature. It works to inform the public and policymakers about the harmful effects of light pollution and benefits of responsible lighting. In addition to lowering environmental impacts, responsible outdoor lighting can also avoid wasting energy and significantly reduce energy costs.

Massachusetts is moving toward a statewide dark skies policy that will set strict standards that aim to reduce light pollution. The Dark Skies Bill (Senate Bill S.3145) passed the Massachusetts Senate unanimously in July and is now making its way to the House. If enacted, it will apply to all new installments and replacements of publicly funded outdoor lighting in the state (malegislature.gov/Bills/194/S3145).

While most towns and cities have zoning laws for outdoor lighting for public safety and community aesthetics, some communities have also passed local laws or policies that address the environmental concerns of light pollution by explicitly referencing wildlife protection as a goal.

What can you do?

Homeowners can also take actions to protect fireflies by reducing the light pollution they produce, planting firefly natural habitats, and avoiding insecticides and pesticides, and lawn chemicals that can kill fireflies and their larvae (see: firefly.org/how-you-can-help.html).

- You can start with turning off unnecessary exterior and garden lights, especially during firefly season, and replacing inefficient, poorly installed, or unnecessary outdoor lights with those that have the "DarkSky Approved" seal. Also make sure light fixtures are downward-facing and consider putting in motion sensors.

- As studies suggest, exposure to insecticides and many pesticides may negatively impact firefly populations – as well as other wildlife. Fireflies spend the majority of their life, up to two years, in the soil, leaf litter, or rotting wood, where their eggs, larvae, and pupae develop. This leaves them exposed to the damaging effects of these chemicals. So, one of the best things you can do is to stop using broad spectrum pesticides and lawn chemicals (see: [23-022_01_Protect-Fireflies-at-Home-Factsheet.pdf](#)). And it should be noted that firefly larvae eat other undesirable insects, so they are part of nature's built-in pest controls.
- The National Wildlife Foundation (NWF) recommends "replacing areas of lawn (which provide little habitat for fireflies) with native plant beds. These beds are an excellent way to create the basis of a healthy habitat for fireflies – as well as hundreds of other wildlife species like butterflies, bees, and songbirds (see: blog.nwf.org/2024/07/5-ways-to-support-fireflies-in-your-yard/). NWF also suggests leaving leaves and logs as even a single untamed corner will produce healthier fireflies than a uniformly clipped yard. (For other gardening ideas see: nwf.org/Native-Plant-Habitats/Plant-Native/Habitat-Essentials/Firefly-Friendly-Gardening).

It is sad to think that children in our neighborhood today have less of a chance to chase fireflies on warm summer nights, and that the children of the future may have none at all.

It's up to all of us to help keep the fireflies' lights turned on for the next generation.