



# A GRAVE FOR THE FIREFLIES?

## The firefly population decline: Explained

Fireflies glowing across wide open fields offer more than just a beautiful sight. These soft-bodied insects belong to the Lampyridae family, which includes over 2,000 species. Many of them can produce light through bioluminescence – the light emitted by living things through chemical reactions in their bodies.

Originally, the glow served as a warning to predators. Over time, this light evolved into a key part of mating rituals. Irrespective of the purpose, the firefly's glow remains one of nature's most captivating phenomena. And it is perhaps one of our greatest misfortunes that the population of these insects lighting up our world is on the decline.

Discussions surrounding the decline in population and eventual extinction of fireflies have been going on for quite some time. These discussions started gaining momentum once again when various scientific and news publications asked their audiences a rather jarring question: Are we the last generation to see fireflies?

### Why ask this question in the first place?

A 2024 study published in the journal *Science of The Total Environment* paints a concerning picture. Through studying over 24,000 surveys collected through Firefly Watch – a citizen science programme – the research reveals a steady decline in firefly populations across North America.

Something similar was noted in a 2019 study conducted by a researcher from the National Centre for Coastal Research (NCCR) in Tamil Nadu. As per the study, there was a drastic decline in the population density of a species of firefly in Barrankula village in Andhra Pradesh. The population density had dropped sharply from over 500 individuals over a 10 square-metre area in 1996 to only 10-20 in 2019.

### Factors that are contributing to this decline

Typically found in temperate and tropical regions, fireflies thrive in moist habitats like wetlands, marshes, and damp woodlands. Such environments offer the cool, dark, and nutrient-rich conditions that firefly larvae need to grow before emerging as adults.

Unfortunately, rapid urbanisation, deforestation, and the expansion of agriculture have drastically altered these natural spaces. As habitats are destroyed or broken into smaller fragments, firefly populations struggle to find the resources they need to survive and reproduce.

Light pollution is another pressing threat fireflies face. Fireflies use natural bioluminescence, which are short bursts of light, to find mates. But artificial light from streetlights, car headlights, homes, and billboards can overwhelm these delicate flashes.

That, in turn, makes it difficult for fireflies to locate each other and find mates. In fact, studies suggest that light pollution is becoming a more immediate danger than habitat loss in certain areas, dimming not just the night sky but also the fireflies' chances of survival. The study published in the *Science of The Total Environment* we mentioned earlier also suggests that certain fireflies tend to avoid areas with more artificial light.

Chemical use in agriculture further complicates the picture. Pesticides not only kill fireflies directly but also target the small creatures, like worms, that firefly larvae feed on. When these prey populations shrink, firefly reproduction slows. Contaminated water sources and soil also weaken the ecosystems that support their entire life cycle.

Adding to the crisis is climate change. Rising temperatures can cause fireflies to emerge too early or out of sync with the

availability of mates and food. Shifts in rainfall and humidity disrupt the moist environments they need, drying up wetlands or flooding key breeding grounds.

### There's still hope

In an article published on WSET, Eric Day, an entomologist with Virginia Tech, was quoted saying, "It is extreme to say that this is the last generation that is going to see fireflies. I think we're going to see them for many more generations. We have to always be aware that they are threatened by human activities and development, and hopefully, we can have a balance between that development and protecting fireflies."

Hence, for our future generations to witness these glowing insects thriving in the wild, humans must step up their efforts to protect the environment.

Limiting light pollution, using more environmentally friendly pesticides, and preserving their habitats can help fireflies exist for generations to come.

The firefly population is another reminder of the broader environmental challenges that humans and our planet face at the moment. The disappearance of these insects is a sign that our ecosystems are degrading, and without proper conservation and environment protection, fireflies, as well as many other species, including humans, will be at risk of extinction.

### References:

1. Discover Magazine (June 13, 2025). *Are We Really the Last Generation to Enjoy Twinkling Fireflies in the Summer?*
2. Science of The Total Environment (June 14, 2024). *Illuminating patterns of firefly abundance using citizen science data and machine learning models.*
3. WSET (June 18, 2025). *Firefly extinction rumors debunked: Experts say sightings likely for generations to come.*