

Firefly Community Science: A Guide to Hosting Your Own Firefly Blitz



Firefly surveyors at an event at the Marine Discovery Center, FL (photo courtesy of Carley Metcalf).

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About this guide

This guide has been developed to help you plan and host a firefly blitz that works for your specific location, focal species, and audience. The goal is to enable park staff, educators, researchers, and other enthusiasts to engage in community science, collect meaningful data, and promote interest in fireflies and their conservation.

What is a firefly blitz?

Modeled after a standard bioblitz, in which participants find and identify as many species as possible in a specific area over a specific period of time, a firefly blitz entails finding and identifying as many firefly (Lampyridae) species as possible in a specific area over a defined period of time. Similar to a bioblitz, a firefly blitz can be held in a variety of locations, from a city or state park to a neighborhood open space or even an entire region. It can last for just a few hours up to several days or even weeks.

Why create a firefly blitz?

With so many bioblitzes to choose from, why make it firefly-specific? There are a couple reasons you may choose to do this. For one, many bioblitzes tend to take place during the day, so they don't capture the majority of firefly species, which are active at night. General bioblitzes also tend to lack the type of documentation needed to correctly identify flashing fireflies to species. For example, without flash pattern details, it may be difficult or impossible to identify some species that physically look very similar. For bioblitzes that do take place at night (for example, those targeting moths), blacklighting is a common technique used to draw in a greater variety of invertebrates. While this can certainly attract some firefly species, it again leaves out any flash pattern details. Furthermore, during blacklighting, participants tend to take photos of insects as they cling to sheets stretched under the lights. This means they only get images of the insect's upper (or dorsal) side, rather than both sides, which can help with identification.



Figure 1. Left: Flash pattern descriptions are important clues for species identification (photo: Richard Joyce/Xerces Society). Right: Blacklighting can attract quite a diversity of species to an area, including fireflies, but may be best used for glow-worms that do not need flash pattern details for positive species identification (photo: Candace Fallon/Xerces Society).

How do you host a Firefly Blitz?

Phase I: Planning

Define your goals and desired outcomes

Before you get started, identify what it is you want to achieve with a firefly blitz. Are you primarily interested in learning what species occur in a certain location? Do you want a single 24-hour snapshot, or are you planning to run the blitz for several weeks to get a better sense of the seasonal firefly fauna? Are you hoping for broad community engagement? Is education an important aspect of your event? What are your desired outcomes? By defining these from the outset, you will be better prepared to develop the structure, timing, and scope of your blitz.

Identify and reach out to potential partners

Working with partners is highly encouraged for a successful blitz. Consider the following and determine whether or not you already have these resources in-house, or if it makes sense to partner with other organizations and individuals that do:

1. partner organizations with strong advertising channels,
2. a partner land manager that is able and willing to welcome participants onto their property at night,
3. local experts, naturalists, or other enthusiasts who can help with finding and identifying species,
4. volunteers who are excited to help with the planning and implementation of your blitz.

Once you have identified some key partners, reach out to them to gauge their interest and availability. Ideally, these partners will be involved in the rest of the planning process for your firefly blitz.

Decide on your blitz structure

The structure of your firefly blitz will depend largely upon your defined goals and the activity periods of your focal firefly species. Some questions to ask yourself include:

- Will your firefly blitz take place at one location (like a park) or will it cover more ground (like a city-wide or region-wide nature challenge)?
- Will it be an in-person event, self-guided and virtual, or some combination of the two?
- Will it take place over a few hours, a full 24 hours, or multiple days or weeks?
- Will it target fireflies broadly or a certain group of fireflies, or will it be one element of a broader wildlife bioblitz?

To give you some ideas, here are some potential structures to choose from:

- A single-night, single-location event where organizers provide training and guidance.
- A multi-night series (either at the same site or multiple sites), where organizers continue to accompany participants (providing guidance and coordinating site access). For

example, this could be weekly firefly walks led by naturalists, in which the group records all of their firefly observations.

- A multi-day, virtual event where organizers provide a list of sites where access is allowed after dark. Self-guided participants in pairs or small groups look for and report any fireflies they see. With these types of events, organizers should frequently check and comment on submitted sightings to keep people engaged. For example, you could create a series of regional firefly challenges and post them to iNaturalist—such as this one focused on [Microphotus glow-worm fireflies of the Southwest](#).
- A firefly walk incorporated into the evening portion of a broader 24-hour bioblitz. For example, at a [24-hour bioblitz at Bean Blossom Preserve in Indiana](#), organizers included a firefly walk to ensure the site’s rare fireflies were included.

You want the duration to match the goals of your blitz. For example, multiple nights on-site, with the first night dedicated to presentations and practicing of skills and later nights dedicated to doing actual surveys in small groups with leader guidance, could be more effective for building confidence and preparing participants to collect more data on their own. However, a single night on-site could still be effective for generating some data and providing education.

If you decide to do an in-person event, it will be helpful to establish a base camp. This is an area with tables, tents, and tools that can be lent out to participants (such as red headlamps, nets, and holding containers). This is the meeting ground for the start and end of the firefly blitz, and gives participants a place to check in, share findings, get help with ID, look at resources, grab a snack, or even get help with basic first aid or bigger emergencies.

Select a location

Choose a suitable habitat with known or suspected firefly populations. Depending on where you are, adult fireflies may be active from early spring through late summer. Fall and spring are also good times to find larval fireflies. If there is a particular species that you know you want to include during the blitz, ensure that the location you select has the appropriate habitat for that species. In general, locations for firefly blitzes could include wet meadows, riparian areas, wetlands, or fields.



Figure 2. Fireflies can be found in many different habitats across the US, as long as there is moisture (photos: Candace Fallon/Xerces Society).

You will also want to consider site access and safety. How easy is it to navigate the site? What about in the dark? Are there any safety concerns, such as open water, difficult footing, or nocturnal wildlife? Do you have permission from the land owner or manager to access the site for the event? Are permits required? Is cell service (for example, for getting help during an emergency) available? Ideally, your location will have ample parking for participants, a restroom, and some kind of shelter that can double as your base camp.



Figure 3. Making use of existing roads and trails can be helpful for conducting surveys after dark—it ensures the surrounding habitat does not get trampled by many feet, while acting as a navigation guide for participants (photo: Candace Fallon/Xerces Society)

Choose a date and time

Fireflies are typically most active in late spring through summer. Nocturnal (night-active) and crepuscular (dusk-active) species are best observed just after sunset up to several hours after sunset. Diurnal (day-active) species can be seen any time of day. If there are particular species you would like to target with your firefly blitz, consider their activity periods and choose a date or time series that includes the peak of that activity period. Think back to your goals and blitz structure. Will your blitz be confined to a single date or time, or will it span multiple days or weeks? A short blitz works well for an in-person event, but virtual blitzes lend themselves well to longer efforts.

Determine how you will evaluate the success of your event

How will you know if your event is successful? Will it be once you reach your goal (e.g., documenting a particular number of species, or engaging a specific number of participants)? Will it be if you contribute new information to inform a rare species' distribution or range? Don't forget to assess everyone's experience as well. Can you solicit feedback from participants and volunteers on how things went, lessons learned, and suggestions for future events? How will you do so?

Phase II: Prepare for your event

Apply for permits, if needed

Some locations require permits to handle wildlife such as fireflies or access the site after sunset. Ensure you are aware of any permits or other permissions that are needed for your event, and apply for them well ahead of time.

Gather all necessary equipment

If you are hosting the event in-person, gather all of the equipment you plan to provide to participants. If the event is virtual, provide a list of recommended equipment to participants. The following items are helpful for most types of firefly blitzes:

- Field guides for the local firefly fauna
- Firefly Atlas data sheets or notebook and pencils
- Cameras or smartphone for documenting firefly observations
- Flashlights or headlamps with red filters for visibility while navigating the site
- Insect nets
- Plastic vials or bags for briefly holding, observing, and photographing fireflies
- Thermometer for capturing temperature data

You may also want to consider things like canopies or tents, snacks, water, first aid supplies, reflective vests, and other safety items.

Decide on your data collection method

These days, bioblitz efforts often utilize crowd-sourcing platforms such as [iNaturalist](#) to gather photos and spatial data. This is especially valuable because the spatial data are extremely precise (often within a few meters' accuracy) and photo records can be examined and verified by a community of users and species experts. We recommend using one of these platforms to gather data during your blitz. If you have structured your blitz to be more of a targeted survey, the [Firefly Atlas](#) is the best choice. But if you are asking participants to mark every location for every individual observation, iNaturalist is the better tool. Just be sure to encourage participants to take notes on the habitat, weather conditions such as temperature and humidity, and any firefly flash patterns they observe, and include these in the Notes section of their observation.

For anyone using a digital camera, it is helpful to have GPS tagging, date, and time enabled so the precise location and time of the observation is captured.

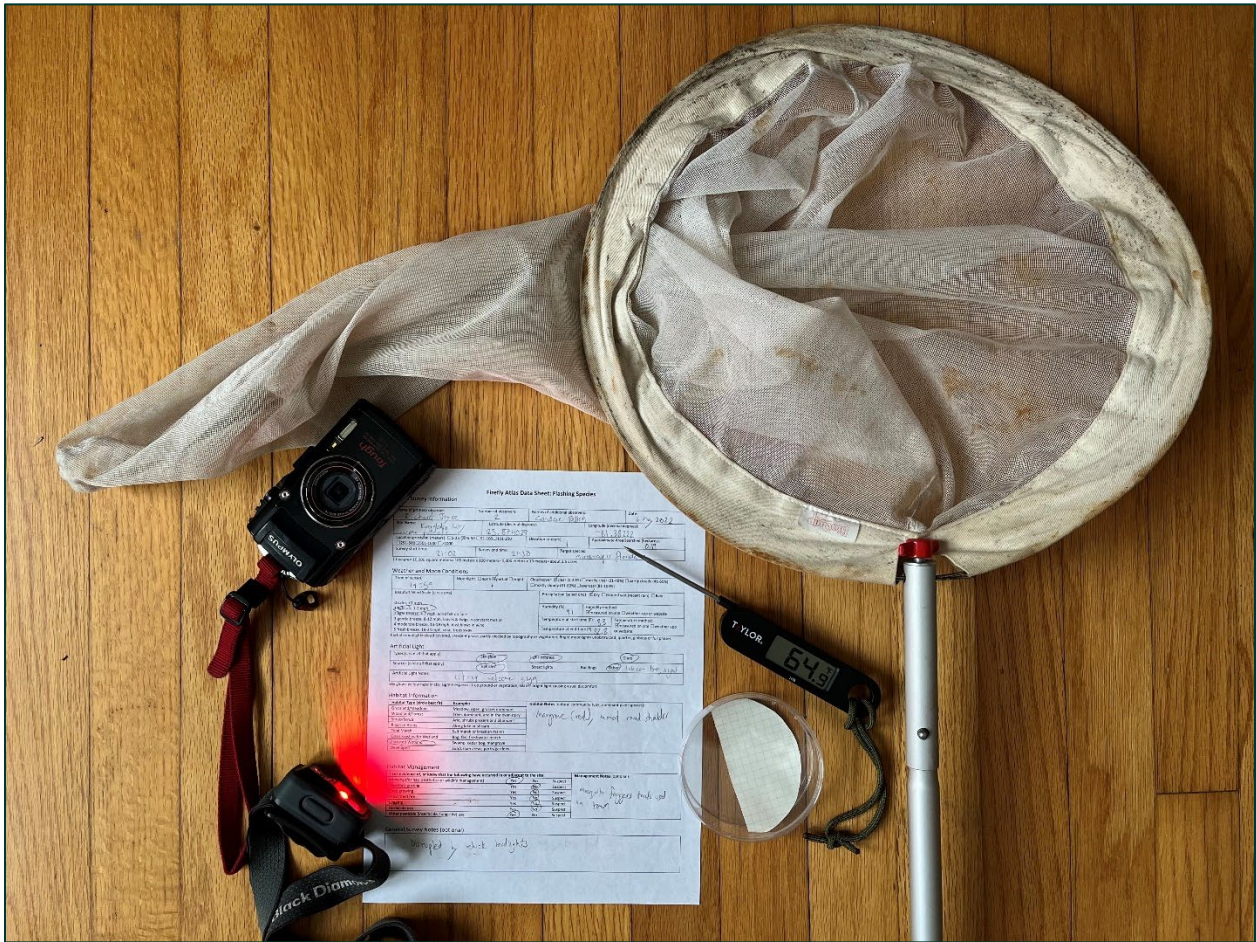


Figure 4. Basic equipment for a firefly blitz includes an insect net, thermometer, red headlamp, camera or smartphone, small dish or plastic bag to temporarily hold captured fireflies, and a data sheet and pencil (photo: Richard Joyce/Xerces Society).

Gather or create educational materials

For in-person events where you plan to have a base camp, consider providing additional educational resources for participants. This can include flyers or brochures about fireflies, their life cycle, and ecological importance, as well as recommended best practices for helping fireflies at home. The Xerces Society has a variety of [firefly publications](#) available, all of which can be printed or shared virtually, and some of which are available to be shipped upon request. Regardless of the type of blitz, it is recommended to provide tips on how to observe and document different firefly species, and instructions on how data will be collected and shared. For larger events, you could consider including educational activities for folks who plan to stick around base camp.

Advertise your event and recruit participants

Several weeks to months prior to your firefly blitz, begin to recruit participants and advertise your event. Engage local schools, naturalist groups, community members, or land managers. Keep in mind that safety and quality of the experience can suffer when the event gets too big (especially if your event takes place after dark), so limiting the group size to 5-10 people per leader for in-person events can help ensure everyone has a good time and is adequately supported. Utilize your network of partners to get the word out via social media, newsletters, and listservs.

Phase III: During the event

In-person events

At the beginning of your event, brief all participants on safety, firefly observation etiquette, and the goals of firefly blitz. Divide participants into groups, with a leader for each group (either someone with firefly knowledge or familiarity with the site). Encourage them to spread out to cover more ground, while remaining mindful of the habitat they are moving through. Remind everyone to turn their lights off when not navigating through the space, and to use red light whenever light is needed in order to minimize the negative impacts to fireflies. Consider using a strict check-in, check-out procedure (collecting names and phone numbers) to ensure everyone is accounted for at the end of the event.

Group leaders will ideally be able to help with spotting fireflies, recording flash pattern details, demonstrating the use of nets, and briefly holding fireflies in viewing vials or plastic bags in order to photograph them and show them to others. Depending on the skills and interests of attendees, group leaders can have participants try out different methods for capturing data, including direct observation, photography (both of individual fireflies and time-lapse images of their flash patterns), and video recordings of their flashes and behavior.

There should be at least two people at base camp at all times to assist with any needs that arise during the blitz, and to offer general advice, encouragement, and tips to participants.

Virtual events

Similar to an in-person event, you will want to provide all participants with information on safety, firefly observation etiquette, and the goals of firefly blitz prior to its start. For virtual events that take place over multiple days or weeks, it can be helpful to have regular communication via an iNaturalist journal or project page. If possible, identify observations as they are reported during the blitz time period, and offer feedback on photography techniques or data reporting as needed to ensure good identifications can be made.



Figure 5. Small groups like the one pictured here are ideal for in-person events (photo: Richard Joyce/Xerces Society).

Phase IV: After the event

After the event is over, whether virtual or in-person, thank everyone involved, from the participants to your fellow organizers, partners, and volunteers. Ask all participants to submit their data via the desired method (e.g., Firefly Atlas, iNaturalist). If possible, work with local firefly experts to verify or identify all firefly species that were recorded during the event. Create a report or presentation summarizing the findings and share this with everyone involved. Consider hosting follow-up workshops or talks to discuss the results of the firefly blitz, what was found, and how those results will be used. You could even use this event to continue conducting outreach to participants about firefly-friendly practices and the importance of conservation efforts. Assess how things went and, depending on your goals and needs, consider establishing an ongoing or annual firefly blitz event, applying the lessons you learned in this one.

Resources

Firefly identification guides

- *Fireflies, Glow-worms, and Lightning Bugs: Identification and Natural History of the Fireflies of the Eastern and Central United States and Canada*, by Lynn Faust
- [Guide to Fireflies of the Southwest](#), by Anna Walker
- [North American Firefly ID Course](#), by Oliver Keller

Firefly reporting websites and apps

Firefly Atlas: If you would like to conduct a full Firefly Atlas survey as part of your firefly blitz, visit <https://www.fireflyatlas.org/get-involved/how-to-participate> to learn more. Full survey data will include information like the air temperature, habitat details, and the level of search effort that was spent looking for fireflies. Data sheets can also be found on this website: <https://www.fireflyatlas.org/get-involved/data-sheets>.

iNaturalist: For step-by-step instructions on how to use iNaturalist, visit: https://static.inaturalist.org/wiki_page_attachments/363-original.pdf. For video tutorials, see: <https://www.inaturalist.org/pages/video+tutorials>.

Photography tips

Firefly Atlas: <https://www.fireflyatlas.org/learn/firefly-photography-tips>.