

BioBlitzes: Citizen Science for Biodiversity in Florida¹

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This document is the first of a series designed to help Extension faculty and others interested in hosting citizen-science events known as BioBlitzes. Together, these documents will assist organizers in launching events in their region, recruiting participants, and sustaining the program over time. This document will focus on the background and purpose of BioBlitzes to help these hosts understand and share with potential participants and other stakeholders the importance and value of the events. Other documents will focus on the details of organizing the event and, for participants, why and how they can get involved.

How can citizen science help biodiversity?

Biodiversity, or the variety of life in a given area, is under serious threat as a result of human activities. Human population and resource consumption are still growing and are accompanied by climate change, habitat loss, and invasive species. The main purpose of a BioBlitz is to conduct a biodiversity inventory of a site at a given time to document existing flora and fauna. Most places on Earth lack detailed information about local biodiversity.

What is citizen science?

Citizen science is public participation in scientific research. It encourages broad participation of non-professionals in scientific research activities. Originally, citizen science helped professional or academic scientists gather a great

deal of data over time and across space, data that could not have been collected with traditional small research teams. Today, citizen science has expanded in scope. No longer only data collection, it spans a spectrum of projects across almost all scientific topics and involves public participation throughout the entire process of research, from conceptualizing problems and questions for investigation to raising money for projects through crowdfunding and analyzing, using, and sharing the results.

What is a BioBlitz?

A BioBlitz is an intensive citizen-science biodiversity survey. We can define a BioBlitz using three features that are essential to its success.

First and foremost, a BioBlitz is a biodiversity survey.

Experts and volunteers alike work together to conduct an intensive field survey to record as many species (generally plants and animals) as possible living in a designated area. By field survey, we mean an actual tally on the ground of the biodiversity observed and encountered in this area during the time period. BioBlitzes are often organized in natural areas and parks but can be set in any area where there is a demand or a need to monitor biodiversity. Conducting a BioBlitz in a human-dominated area can also document the impact of human activities on biodiversity. The first BioBlitz in the United States was a [24-hour event held at Kenilworth Park and Aquatic Gardens](#) in Washington, D.C., on May 31

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and June 1, 1996, that allowed scientists and volunteers to identify more than 1,000 species. It was organized by the U.S. Geological Survey in partnership with the National Park Service (NPS), the National Biological Service, Anacostia Watershed Society, and New Columbia Audubon Society. Later on, NPS and National Geographic Society (NGS) collaborated from 2007 to 2016 to organize annual BioBlitzes in national parks. This collaboration culminated in 2016 in a countrywide BioBlitz across national parks as part of the National Park Service Centennial Celebration. Altogether during these ten years, NPS/NGS BioBlitzes have involved more than 50,000 participants in nearly 150 parks and helped identify more than 22,000 species. BioBlitzes can even take place under water: in 2007, New Zealand hosted the first marine BioBlitz on the Wellington south coast, which led to the discovery of four new species, including an anemone (Figure 1).



Figure 1. A new species of tube anemone discovered during the marine BioBlitz on the Wellington south coast of New Zealand. Several 5- to 10-cm-long anemones with 32 spotted tentacles were found by Malcolm Francis, a scientist from the National Institute of Water and Atmospheric Research.

Credits: Malcolm Francis, National Institute of Water and Atmospheric Research

Second, a BioBlitz is a citizen-science event.

BioBlitzes are open to public participation. Volunteers are essential to detect local flora and fauna but can also be instrumental in identifying species, entering the data so it can be scientifically used, and even validating and discussing others' findings. As a matter of fact, volunteers are critical for a successful BioBlitz because they bring many pairs of eyes and a lot of enthusiasm. Enrolling a large group of volunteers with varied interests is the best way to produce a survey that is as exhaustive as possible and representative of an area's true biodiversity. For instance, the BioBlitz organized by NPS/NGS in Golden Gate National Recreation Area (California) in 2014 involved more than 9,000

people—including scientists, students, and volunteers—and found 2,350 species. BioBlitzes are led by plant and animal specialists, often researchers and naturalists trained to recognize fauna and flora. Specialists guide volunteers who can use their cellphones to actively participate in the survey by documenting the presence of biodiversity, contributing pictures, and identifying geographic coordinates

Third, a BioBlitz is an intensive survey.

BioBlitzes are designed on a short time frame to give an exact snapshot of existing biodiversity at a given time. They are typically conducted over a 24-hour period to find biodiversity around the clock. They can be organized for shorter periods of time (for instance 12 hours during daylight) to attract more volunteers or for longer periods to accommodate the specificities of a particular survey. For instance, the marine BioBlitz organized on the Wellington south coast of New Zealand lasted over a month due to the constraints of the marine environment.

Have BioBlitzes occurred in Florida?

The 2010 NPS/NGS BioBlitz, a marine BioBlitz organized in southeast Florida's Biscayne National Park (April 30–May 1, 2010), was the biggest BioBlitz held in Florida. Two hundred scientists led the event with more than 2,500 participants, including 1,300 school children from Miami-Dade County. Eight hundred species were identified, including a number of species rare to the park such as the silver-banded hairstreak (*Chlorostrymon simaethis*), mangrove cuckoo (*Coccyzus minor*), bay-breasted warbler (*Setophaga castanea*), and nesting roseate spoonbills (*Platalea ajaja*) (Figure 2). Divers observed three species of groupers (black grouper *Mycteroperca bonaci*, red grouper *Epinephelus morio*, and gag grouper *Mycteroperca microlepis*) on a night dive on the park's reefs. Participants also identified 11 species of lichens, 22 species of ants, and one tardigrade species—also known as a “water bear”—that had not been previously documented in the park. Most importantly, highly invasive lionfish, two species of which are present in Florida (red lionfish *Pterois volitans* and the common lionfish *Pterois miles*), were not observed during the event, which provided baseline data to track the invasion of these species, now common throughout the western North Atlantic, Caribbean Sea, and Gulf of Mexico. Biscayne National Park BioBlitz was not the only one organized in Florida though, and many local BioBlitzes have been held in the past decade (Table 1). Wildlife Ecology and Conservation professor and state Extension specialist Mathieu Basille is

leading a collaboration between UF/IFAS Extension and Broward County to set up a BioBlitz program in the county. Since the end of 2018, BioBlitzes are held twice a year in local parks where Floridians can get involved. Basille is also looking for people from other areas and organizations who are interested in getting involved and helping to expand efforts around Florida.



Figure 2. Examples of terrestrial species documented during the NPS/NGS BioBlitz of 2010 in Biscayne National Park, FL. From left to right, silver-banded hairstreak (*Chlorostymon simaethis*); mangrove cuckoo (*Coccyzus minor*); bay-breasted warbler (*Setophaga castanea*); and roseate spoonbills (*Platalea ajaja*).

Credits: First photo by Anne Toal, <https://commons.wikimedia.org/w/index.php?curid=6495496>. Second photo By <http://www.birdphotos.com>. Third photo by <https://commons.wikimedia.org/w/index.php?curid=2080607>. Fourth photo by Josh Wickham, UF/IFAS.

How can BioBlitzes make a difference to science?

BioBlitzes enable ongoing monitoring of biodiversity.

While already invaluable as one-time events, BioBlitzes can also be conducted at regular intervals and at the same location and thus provide repeated measurements of biodiversity over time. By accounting for the monitoring effort, it is possible to show how biodiversity changes over time and thus to document trends and assess conservation successes and current threats.

BioBlitzes contribute to biodiversity atlases.

A biodiversity atlas is a repository of plant and animal occurrences. Several of these are now available online. Some of them are global in scope (e.g., the [Global Biodiversity Information Facility](#), GBIF, which recently went over one billion records from the entire world); others have a specialized purpose (such as the [Early Detection and Distribution Mapping System](#), EDDMaps, for invasive species). Online atlases allow extensive research on biodiversity and species distributions and can be easily complemented by the data collected in the BioBlitzes.

BioBlitzes find rare and invasive species.

BioBlitzes are unique tools to keep track of both rare and invasive species. When volunteers and scientists work together, they are able to identify uncommon or special habitats for protection and management, and rare species may be uncovered. Specifically, BioBlitzes can help assess the presence of Threatened and Endangered species, and contribute to the evaluation of their status. For instance, during the NPS/NGS BioBlitz of 2015 in Hawai'i Volcanoes National Park, volunteers documented 73 species at risk, including the Kamehameha butterfly (*Vanessa tameamea*), and the federally endangered nēnē (*Branta sandvicensis*), also known as the Hawaiian goose (Figure 3). On the other hand, many alien species are categorized as invasive when they have a detrimental impact on an ecosystem. Appropriate response to invasions is only possible with early detection of those unwanted plants and animals, and BioBlitzes offer a way to monitor these threats to biodiversity. For instance, the National Park Service organizes a “Weed Blitz” each year in Glacier National Park to identify noxious weeds and infested areas. In 2016, 99 volunteers spent the morning learning how to identify and control five invasive plant species and in the afternoon pulled a total of 620 pounds of invasive weeds, about the weight of a cubic yard of mulch, or half the weight of a polar bear.

How can BioBlitzes make a difference to participants?

Scientists get input from local residents.

Not only do BioBlitzes allow scientists and the BioBlitz organizers to get the data on the local species, but the events offer valuable chances to interact with people from the area. These people may be interested in a variety of things related to the event, including a particular endangered or well-known species, a group of species such as fungi or birds, the importance of local natural areas, or the environment and

science in general. Public participants may also be simply participating with a particular group such as their church or school as a service activity. Scientists and Extension faculty or other event organizers therefore have a relaxed way to interact with these stakeholders and both share their expertise as well as understand more about their stakeholders and the stakeholders' interest in biodiversity.

BioBlitzes offer people a chance to explore and map natural areas.

BioBlitzes are also great opportunities to explore natural areas. In addition to the pleasure of discovering places in parks that are seldom visited, volunteers can also help their favorite park map the site, with all its trails and treasures. For instance, simply by walking along trails with their cellphones or hand-held GPS units recording their tracks and using collaborative project software such as [OpenStreetMap](#), people can help improve the maps of the parks. Similarly, marking remarkable items (e.g., the biggest, tallest, or oldest trees, or features such as shelters, boardwalks, or statues) also helps parks to correctly map and document their trails and eventually provide guides for the public that are more complete and accurate.

BioBlitzes encourage awareness of nature.

Finally, BioBlitzes are a special chance for the public to engage in a scientific event to help preserve biodiversity and reconnect to flora and fauna in their natural habitats. During an exciting day people can enjoy their local parks and discover biodiversity in their backyards. BioBlitzes are open to all volunteers, whether adults or children, amateur naturalists or experts, or simply people who like to try new things. They give the public an opportunity to meet and learn from working scientists. If you are interested in BioBlitzes in your area, contact your [Extension County Offices](#), or directly contact Mathieu Basille.

Further Reading

Lundmark, C. 2003 BioBlitz: "Getting into Back-yard Biodiversity." *BioScience*, 53:329–329. DOI: 10.1641/0006-3568(2003)053[0329:bgibb]2.0.co;2



Figure 3. Two species at risk documented during the NPS/NGS BioBlitz of 2015 in Hawai'i Volcanoes National Park, HI: Top, Kamehameha butterfly (*Vanessa tameamea*), and bottom, nēnē or Hawaiian goose (*Branta sandvicensis*).

Credits: *Vanessa-tameamea_Public-Domain.jpg*, <https://commons.wikimedia.org/w/index.php?curid=110682>; *Branta_sandvicensis_CC-BY-SA.jpg* and Jörg Hempel - Own work, CC BY-SA 3.0 de, <https://commons.wikimedia.org/w/index.php?curid=45026917>

Table 1. Examples of local BioBlitzes in Florida.

<p>In Manatee County, annual BioBlitzes are held every spring since 2007, rotating among the county's parks and preserves during 12-hour surveys.</p>
<p>The Florida Museum of Natural History in collaboration with the University of Florida Natural Area Teaching Laboratory held their first BioBlitz in April 2012 to locate, identify, and inventory local plant and animal species found in their conservation area.</p>
<p>The Florida Museum organized a second BioBlitz in 2012 in Seahorse Key off the coast of Cedar Key in which they recorded nearly 100 species of moths and spiders during the 24-hour BioBlitz.</p>
<p>The University of West Florida has organized a BioBlitz in the Baars-Firestone Wildlife Sanctuary on their main campus in Pensacola once or twice a year since 2014.</p>
<p>In February 2015, the Florida Invasive Species Partnership set up a statewide non-native fish BioBlitz during the National Invasive Species Awareness Week to raise awareness and identify solutions to invasive species.</p>
<p>In 2017, for the 75th anniversary of Florida's Wildlife Management Areas (WMA) system, the Florida Fish and Wildlife Conservation Commission organized a series of BioBlitzes throughout the state in Chassahowitzka Wildlife Management Area (WMA) in Hernando County, Aucilla WMA in Jefferson County, Watermelon Pond Wildlife and Environmental Area in Alachua County, and J. W. Corbett WMA in Palm Beach County.</p>
<p>From June till November 2018, US Fish and Wildlife Service organized the Southeast Region Refuge and Hatchery iNaturalist Bioblitz. A different kind of BioBlitz, as it lasted 6 months in 130 National Wildlife Refuges and 14 National Fish Hatcheries, this long-term BioBlitz gathered 730 participants who contributed over 16,000 observations.</p>
<p>In 2018 UF/IFAS Extension and Broward County launched the BioBlitz program in the county, which started in Tree Tops Park on November 3. During the day, participants contributed 278 observations of 143 different species, which added 50 newly documented species in the park on iNaturalist. A second BioBlitz was conducted in Quiet Waters Park on March 30, 2019, and 351 observations of 172 species, including 160 previously undocumented in the park, were contributed on iNaturalist.</p>