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Partners:

Point Park University
Allegheny Land Trust
Latodami Nature Center (North Park)
Pittsburgh Parks Conservancy
Allegheny County Parks Foundation

CITIZEN SCIENTIST MANUAL

Purpose

Project Bee Watch is a citizen science program, which was established in 2018 to assess the population status of pollinators in Allegheny County. The scientific data is collected by citizen scientists, analyzed by scientists, and shared with conservation organizations and the community to assist in the protection of pollinators and improvement to their habitat.

Why protect pollinators?

Pollinators include bees, butterflies, beetles, and many other organisms. They play a vital role in the pollination of flowers (transfer of pollen from male to female). In a United Nations global assessment report on pollinators, they reported that 75% of our food crops and nearly 90% of wildflowers depend on pollinators to reproduce.

Pollinators are declining worldwide due to factors that threaten biodiversity. Loss of habitat is the principal reason, followed by pesticides, pollution, and invasive species. More than 40% of invertebrate pollinators are facing global extinction.

Action is required to prevent the continued decline of pollinators. The first step is establishing long term, systematic monitoring for trends in pollinator abundance and diversity. Project Bee Watch is the first program of its type to attempt to fill the data gap on pollinators in this region.

Bee Identification

Bees and wasps are similar in appearance, which causes confusion in their identification.

The most telling differences between bees and wasps are their mannerisms. Most important among the behavioral differences is that bees are pollen eaters. Wasps are meat eaters. While both visit flowers for nectar, bees also visit flowers to collect pollen to feed their young. This dietary preference has resulted in physical differences. Bees are hairy and their bodies are bulky, which aid in the gathering of pollen. Quite the opposite of the furry bee, wasps have fine transparent hairs, skinny waists, and long spindly legs.

Though not close relatives to bees the way wasps are, many flies mimic the bee look. Flies are best distinguished from bees by their short stubby antennae, fine transparent hairs, larger eyes, and they have only two wings compared to the four wings of a bee.

Honey bees and bumble bees make up less than 1% of all bee species. There are more than 4,000 native bees in North America.



Sampling Methods

Where?

Sampling sites are specifically chosen in coordination with our partners to ensure continuity in property management, availability of open meadows, and an interest to improve habitat for pollinators. Refer to the supplemental handouts for the location of sampling sites. You can survey anywhere within the meadows identified in the supplemental handouts.

Once you arrive at your sampling site, choose a random location within the meadow to conduct your survey. Flowers must be present at your sampling location. If you are conducting multiple surveys, try to spread out your sampling locations and survey different flowers.

When?

Sampling may occur any day from May through October and between 10 a.m. and 4 p.m. Pollinators will be most active in the afternoon on calm, sunny days. Do not sample on rainy or windy days. The more times you sample, the better we can assess the status of pollinators so please try to visit different sampling locations at different days and times.

You have arrived at your sampling location, now what?

You will be surveying pollinators using a stationary method of observation. Upon arriving at your sampling location, sit or stand as still as possible for the next 10 minutes. Walking around or sitting and standing repeatedly will scare the pollinators away. Each time you survey a sampling location, you must commit exactly 10 minutes to recording flowers and pollinators. If you wish to spend additional time at a location, use a different data sheet for each 10 minutes.

Once you have chosen a location, lay your sampling plot on the ground or over the top of the vegetation. The plot measures 3.3 feet by 3.3 feet (11 ft²). Before starting your 10 minutes, fill out the top of the data sheet.

Begin your 10 minutes. During the 10 minutes, record the names of flowers in your sampling plot and estimate how much area the flowers are covering within the plot. When estimating your percent cover, ignore the leaves and stems, only estimate the percent cover of the flowers. Estimate percent cover in intervals of 5% (5, 10, 15, ...).

Keep in mind that your focus should be on pollinators. If there are numerous pollinators visiting your plot when you first arrive, identify the pollinators first. For each species of flower, record the name of the pollinator and how many visit the flower in a 10-minute period. Only count a specific type of pollinator once when it visits a particular species of flower. For example, if a honey bee visits a goldenrod flower, leaves the sampling plot, and returns to the plot to visit another goldenrod flower the bee should only be counted once. However, if that same bee visits both a goldenrod and a calico aster in the same plot, then count the bee once for having visited the goldenrod and once for having visited the calico aster. Make a note on the data sheet when a bee visits more than one species of flower.

Do the best you can identifying the species of flowers and types of pollinators. In most cases you will not be able to identify a bee to species level but you can identify them by their common names such as the honey bee. Refer to the supplemental identification guide to help in identifying common flowers and pollinators. There are additional identification resources provided in this manual.

Example of completing the top-half of the data sheet

The top-half of the data sheet requests information on sampling observer, date, time, weather, and sampling location. This information is used to catalog your data by date, weather, and location for showing comparisons of pollinator abundance and diversity to our partners and communities.

Observer's Name: John Smith Date: 5/20/2020 Start Time: 2:00 AM or **(PM)**

Weather (circle one choice in each category)

1. Sky: **(Clear)** Partly Cloudy Overcast
2. Rain: Overnight/Yesterday Rain **(Dry)**
3. Wind: **(Calm)** Light Breeze Windy
4. Temperature (F): 50 60 **(70)** 80 90 100

Sampling Location (place an X next to the sampling location and circle the field sampled)

Audubon Greenway [Field A Field B Field C Field D]
 Latodami Nature Center [North Field **(Walter Field)** Pigeon Field]
 Schenley Park
 Frick Park
 Boyce Park

Example of completing the bottom-half of the data sheet

| Name of Flower and Percent Cover of Flower in Sampling Plot | Name of Bee and Number of Individuals of Each Type of Bee | Name of Other Pollinator and Number of Individuals of Each Type of Pollinator |
|---|---|---|
| 1. Queen Anne's Lace - 30% | Blue/Green Sweat Bee - 5 | Cabbage White Butterfly - 1 |
| | | |
| 2. Butterfly Weed - 10% | Honey Bee - 3 | Lady Beetle - 2 |
| | Unknown Bee - 1 | |
| 3. Crownvetch - 50% | | |
| | | |

Submitting your data sheet

You can submit data sheets by scanning or taking a photo of them and sending them to Matthew Opdyke via mopdyke@pointpark.edu. They can also be mailed to Matthew Opdyke, Point Park University, Department of Natural Sciences, Engineering and Technology, 201 Wood Street, Pittsburgh, PA 15222.

Additional data sheets are available from Project Bee Watch's website at <http://www.opdyke-environlab.com/pollinators.php>.

Education and Identification Resources

iNaturalist

iNaturalist is a free app that allows anyone to record his or her observations in nature. It can be downloaded to your phone so that you can take pictures of pollinators and post them on iNaturalist for later identification. You can also search for the identification of a species using a photograph from your phone while in the field.

A project page has been established under iNaturalist to support this study. You must first sign up to use iNaturalist and join the project. When iNaturalist is downloaded to your phone, you can "add observations to this project." The project website is <https://www.inaturalist.org/projects/project-bee-watch>. When you add an observation, include a brief description of your sampling location and upload your photo.

Project Bee Watch website (extra copies of data sheets, supplemental materials, etc.)

<http://www.opdyke-environlab.com/pollinators.php>

Education website about pollinators

U.S. Department of Agriculture: <http://www.fs.fed.us/wildflowers/pollinators>

Wildflower identification guides

National Audubon Society Field Guide to North American Wildflowers – Eastern Region

Peterson Field Guide to Wildflowers – Northeastern and North-central North America

Bee identification guides

Bees: An Identification and Native Plant Forage Guide by Heather Holm

The Bees in Your Backyard: A Guide to North America's Bees by Joseph Wilson and Olivia Carril

BugGuide by Iowa State University, Department of Entomology: <https://bugguide.net>

Identification Atlas of the Vespidae (Wasps) of the Northeastern Nearctic Region by University of Guelph, Canada:
http://cjai.biologicalsurvey.ca/bmc_05/key_vespidae.html

Butterfly and moth identification guides

Kaufman Field Guide to Butterflies of North America

Peterson Field Guide to Moths of Northeastern North America

Beetle identification guide

Beetles of Eastern North America by Arthur Evans