Become a Citizen Scientist

By Janet Allen

It was quite an experience. We watched Red Admiral butterflies enter our yard from the southwest and exit northeast. Not whole flocks, but a steady stream of one or two, all following the same path, only rarely stopping to refuel. This went on for days and days. But no one else in our neighborhood had noticed! Why had we? Because we had recently learned about the Vanessa Migration Project, which had asked people to report "directional flight" of any of the Vanessa butterflies. "Directional flight?" I had wondered at the time. Don't butterflies just flutter around? But here it was, directional flight happening right in our own backyard.

Becoming more observant and aware of nature around us is one of the many benefits of becoming a citizen scientist. What is citizen science? I like the Cornell Lab of Ornithology's description: *"projects in which volunteers partner with scientists to answer real-world questions."*

Don't underestimate the "citizen" part of citizen science. Participating in these projects is an important way we can participate as citizens to protect our natural resources.

Citizen science is especially appropriate for long-term or large-scale research. Although there are citizen science projects in fields as varied as astronomy and medicine, here I'll describe projects about the natural world, especially those in which we can participate in our own yards.

History of citizen science

Citizen science isn't new. Wells Cook created the first project in the 1880s when he asked people to collect information about bird migration: when birds first arrived, when they became most abundant, and when they left. This project continued until the 1970s, and over the years thousands of volunteers created 6,000,000 records. (More about this project later.)

A better-known project, having just completed its 113th year, is the National Audubon Society's Christmas Bird Count, started in 1900. But apparently it was not until Cornell Lab of Ornithology's Project FeederWatch, originating in Canada in the 1970s, that the term "citizen science" was used.

With the advent of the internet, mobile devices, and social media, the number and kinds of projects has exploded. Most are fairly straightforward with simple protocols (that is, rules for collecting data), though people looking for more challenge can find more advanced projects. Although some projects necessitate visiting specific kinds of sites (for example, fields or wetlands), many can be done in your own yard or even just at your computer.

Is citizen science real science?

When comparing "real" scientists with citizen scientists, Sam Droege of USGS Patuxent Wildlife Research Center said, "Just because you paid them doesn't mean their data are better." He points out that volunteers often stay around for years, providing valuable consistency in data;

they're often more mature and motivated than interns; and they bring the kind of dedication that a paycheck can't buy.

Information collected by citizen scientists has already been the basis of published research. But the bottom line is that many of these projects simply could not be done were it not for the participation of citizen volunteers. Collecting the necessary data would be financially and logistically impossible.

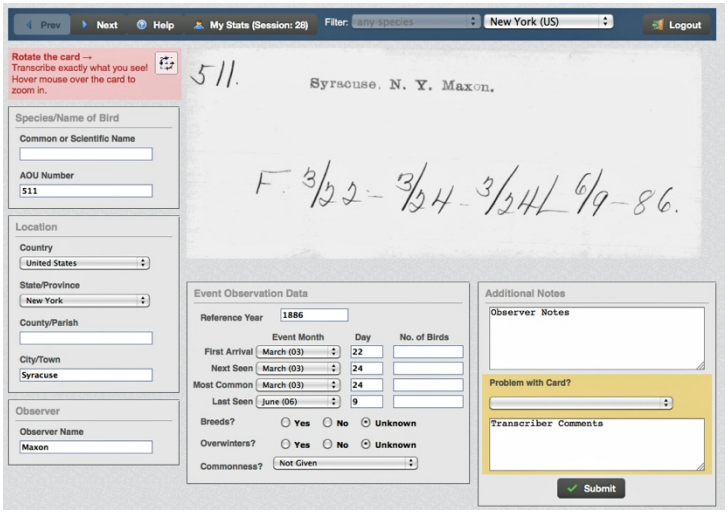
Children as citizen scientists

Children, young and old, are welcome to participate, and citizen science can be an important part of their science education. Instead of reading **about** science, students **do** science – learning to observe, follow protocols, and to reason about their results. Many projects provide curricula, activities, and resources specifically designed for education. And, of course, families can also use these resources for informal learning.

Besides learning about science, though, these projects give children a reason to observe nature – something few children do these days – and develop a sense of stewardship of the natural world.

My experience as a citizen scientist

My first experience as a citizen scientist was participating in a bird survey a Syracuse University professor conducted through his bird column in our local newspaper. This led me to Cornell Lab of Ornithology's Project FeederWatch – still my favorite project, and the one I've been most faithful to, missing only four weeks in the past fifteen years. In fact, I started as a novice birder, and learned to identify birds by participating in these projects.



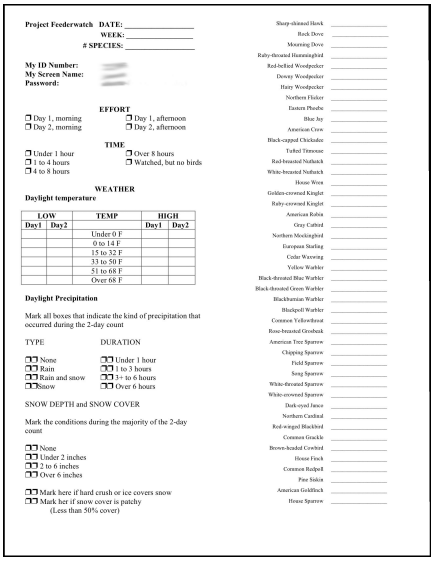
My favorite computer-based project is the North American Bird Phenology Program, which holds the historic bird migration cards mentioned above. Those 6,000,000 records cannot be used in research until they're digitized. My role as a citizen scientist is to transcribe those old handwritten cards (scanned by on-site volunteers so they're available online) into a standard digital format (see photo). It's quite interesting and not as tedious or boring as it might sound. It creates a bond between us transcribers and those people long ago who faithfully recorded their observations, trusting that their data would be useful in the future. This legacy data, combined with historical weather data, will be invaluable as scientists track the effects of climate change on birds.

Some of the other projects I have participated in – all at home -- are FrogWatch USA, eBird, Monarch Tagging, Project BudBurst, Great Sunflower Project, Firefly Watch, and Help Build

Merlin[1]. Participating in these projects has added immeasurably to my enjoyment of my yard and increased my knowledge of the natural world.[2]

Some tips

Everyone is busy these days, so part of the challenge of being a citizen scientist is remembering to make your observations. Scheduling data collection on my online calendar or reminders list works well for me, but the important thing is to create something to jog your memory. Other projects, such as the Bird Phenology Program, can be done anytime you have a few moments.



Project Feederwatch DATE: _____
WEEK: _____
SPECIES: _____

My ID Number:
My Screen Name:
Password:

EFFORT
❒ Day 1, morning ❒ Day 1, afternoon
❒ Day 2, morning ❒ Day 2, afternoon

TIME
❒ Under 1 hour ❒ Over 8 hours
❒ 1 to 4 hours ❒ Watched, but no birds
❒ 4 to 8 hours

WEATHER
Daylight temperature

LOW		TEMP	HIGH	
Day1	Day2		Day1	Day2
		Under 0 F		
		0 to 14 F		
		15 to 32 F		
		33 to 50 F		
		51 to 68 F		
		Over 68 F		

Daylight Precipitation

Mark all boxes that indicate the kind of precipitation that occurred during the 2-day count

TYPE
❒❒ None
❒❒ Rain
❒❒ Rain and snow
❒❒ Snow

DURATION
❒❒ Under 1 hour
❒❒ 1 to 3 hours
❒❒ 3+ to 6 hours
❒❒ Over 6 hours

SNOW DEPTH and SNOW COVER

Mark the conditions during the majority of the 2-day count

❒❒ None
❒❒ Under 2 inches
❒❒ 2 to 6 inches
❒❒ Over 6 inches

❒❒ Mark here if hard crush or ice covers snow
❒❒ Mark her if snow cover is patchy
(Less than 50% cover)

Sharp-shinned Hawk _____
Rock Dove _____
Mourning Dove _____
Ruby-throated Hummingbird _____
Red-bellied Woodpecker _____
Downy Woodpecker _____
Hairy Woodpecker _____
Northern Flicker _____
Eastern Phoebe _____
Blue Jay _____
American Crow _____
Black-capped Chickadee _____
Tufted Titmouse _____
Red-breasted Nuthatch _____
White-breasted Nuthatch _____
House Wren _____
Golden-crowned Kinglet _____
Ruby-crowned Kinglet _____
American Robin _____
Gray Catbird _____
Northern Mockingbird _____
European Starling _____
Cedar Waxwing _____
Yellow Warbler _____
Black-throated Blue Warbler _____
Black-throated Green Warbler _____
Blackburnian Warbler _____
Bluelpoll Warbler _____
Common Yellowthroat _____
Rose-breasted Grosbeak _____
American Tree Sparrow _____
Chipping Sparrow _____
Field Sparrow _____
Song Sparrow _____
White-throated Sparrow _____
White-crowned Sparrow _____
Dark-eyed Junco _____
Northern Cardinal _____
Red-winged Blackbird _____
Common Grackle _____
Brown-headed Cowbird _____
House Finch _____
Common Redpoll _____
Pine Siskin _____
American Goldfinch _____
House Sparrow _____

Of course, projects with phone apps are the easiest of all since you can enter your observations in real time. But your project doesn't yet have an app, they usually provide datasheets to print. I like to create my own custom datasheets. For example, I created a document for Project FeederWatch (see photo) that lists just the birds I've seen in my yard from November through April, in the same order Project FeederWatch lists them so it's easy to tally the birds and enter the results online. I also include on the sheet the other information needed, as well as my username and password. It was worth the time to create this template since I use this sheet five months of the year every year.

Some advice: Start small and give yourself time to become comfortable with your chosen project's procedures. It's better to become comfortable with the requirements of one project than to get overwhelmed with many. Learning how to participate may take a bit of effort at the beginning – especially because submitting accurate data is important -- but with experience it becomes second nature.

The real secret to getting involved in citizen science is finding a project that resonates with your interests and inclinations. Not everyone is interested in bees; maybe you like birds instead. Not everyone enjoys traveling to a field to collect data; maybe you prefer collecting data in your own yard. Some are time- dependent, such as after sundown as with Firefly Watch; some are season-dependent, such as in the winter as with Project FeederWatch; some can be done any time of the day or year, such as the Bird Phenology Project. There's such a wide variety of projects that everyone should be able to find one or more projects that are right for them.

Citizen science for the future

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[1] I'm especially proud of participating in Help Build Merlin since it helped produce the free Merlin app, an extremely useful and effective tool for bird identification, suitable for novice and for more advanced birders.

[2] Read more about my citizen science projects on the *Our Habitat Garden* website at http://www.ourhabitatgarden.org/act/citsci.html

We face so many challenges: loss of wildlife habitat, invasions by exotic species, dangerously low populations of pollinators, climate change, and more. We simply don't know enough about many of these problems to craft the most effective solutions. In our rapidly changing world, the more information we have, the better we will be able to meet the challenges ahead.

I enjoy participating in citizen science projects, but the biggest benefit to me is knowing I'm helping collect the information we need to leave a living planet to our children and grandchildren.

Karen Oberhauser and Michelle Prysby of the Monarch Larva Monitoring Project refer to citizen scientists as "a research army for conservation." So join me in this "research army." Choose a project[3] and become a fellow citizen scientist!

An earlier version of this article appeared in the Wild Ones Journal (Vol 26 # 4, 2013)

[3] Some projects are listed in SciStarter at https://scistarter.com/ or at Zooniverse at https://www.zooniverse.org/.