

E E C O

Environmental Education Council of Ohio

Issue Focus:

..Citizen Science Fall 2013

Come on Citizens...Get Involved!

By Dennis Clement, Ohio EPA

Citizens who get involved in protecting their natural environment or volunteering for a good cause have a sense of ownership. Getting involved with a local water quality monitoring group could be as easy as contacting your local soil and water conservation district (SWCD) or an already established monitoring group through the Ohio Watershed Network at www.ohiowatersheds.osu.edu.



Many Ohio SWCDs employ watershed coordinators who organize monitoring days and/or workshops to educate the public about water quality monitoring. Kick seining for macroinvertebrates can be fun and educational. Macro -- being able to see with the naked eye and invertebrate -- having no backbone. Macroinvertebrates are divided into three taxa groups ranging from stoneflies, which are pollution sensitive species, to pollution tolerant rat-tail maggots.

Seining involves three to five people, a kick seine, a collection tub and identification keys. Collection is done within a stream riffle, moving the net up-stream along the substrate (bottom) and having two people "kick" (moving toward the net) the substrate (about the length of the seine). The invertebrates are caught in the seine.

Collectors then move the seine to the stream bank and remove the invertebrates from the seine, placing them in the stream water-filled collection tubs. It may be obvious that some specimens are trying to eat other specimens, so they need to be moved in order to ensure their would-be dinner is counted.

Identification sheets are used to identify the invertebrates. After collection and identification, the Ohio Stream Quality Assessment Form can be used to describe your location, stream characteristics (e.g., weather, site location, width of riffle, temperature and bed composition) and to record the invertebrates. Once recorded, taxa are multiplied by an assigned index value. The three index values are added together for a cumulative number, which provides a stream assessment or overall health of the stream.

Remember to be safe. Wear good boots or waders, latex gloves, and sun screen. Make sure you have a landowner's permission before using private property to access a stream, or use a stream that flows through public property. Invertebrates must be released back into the stream after collection and identification.

If collecting for preservation, education or research, an education permit, scientific collecting permit or a letter permit from the Ohio Department of Natural Resources, Division of Wildlife is required. Additional macroinvertebrate monitoring information can be found on the Ohio Environmental Protection Agency, Office of Environmental Education website at <http://epa.ohio.gov/oee/EnvironmentalEducation.aspx> under the Healthy Water, Healthy People link or ODNR, Division of Soil and Water Resources <http://ohiodnr.com/Default.aspx?alias=ohiodnr.com/soilandwater>.

Training Op's

More Information available about each opportunity at www.eeco-online.org

PLT: Public benefits from Ohio's Forests
November 19, 9 am - 4:30 pm at Glen Helen Ecology Institute in Yellow Springs. Meet state and national education standards, all while conducting fun, hands-on activities for youth of all ages!

Researching Climate Change: Glacial Balance
December 5, 7 - 9 pm at COSI, Columbus. Free. Screening of a documentary that explores glacial research and the local impacts of the melting of the Andean glacier reserve. The film will be followed by a presentation and question-and-answer session with renowned climate expert Dr. Lonnie Thompson.

Winter Snow
February 7-9, 2014 at Camp Nuhop, Perrysville, Ohio
The conference focuses on Schoolyard Enhanced Learning, Arts and Environmental Literacy, 21st Century Skills, Careers and the Environment.

EECO's Annual Conference
March 27-30, 2014 at Deer Creek State Park Lodge, Mt Sterling, Ohio.

Phenology and Citizen Science—It's in the Details

By Jen Dennison, ODNR Division of Wildlife

Citizen Science programs are an excellent way for students, retirees, any nature enthusiast really, as well as nature organizations and communities to take notice of their local environment and contribute real data to the field of science. One such way is through the study of phenology and the USA National Phenology Network (USA-NPN). NPN monitors the influence of climate on the phenology of plants, animals, and landscapes.



Black Swallowtail

So, you're probably thinking "What in the world is phenology?" According to NPN, phenology is the study of key seasonal changes in plants and animals from year to year – such as flowering, emergence of insects and migration of birds – especially their timing and relationship with weather and climate. The study and practice of phenology is not by any means a new thing. Humans have used phenological events to help coordinate travel and harvest plans for thousands of years. Native Americans in the Pacific Northwest timed the picking of certain berries by when the salmon would start their spring runs in the rivers. Weather predictions are often made by when certain events occur, such as if ash trees leaf out before oaks, the summer is going to be dry. Vice versa, the summer will be wet. Even celebrations and festivals are timed around these events, such as the cherry blossoms in Japan and now Washington D.C.

Why is phenology important? Studying the timing of these natural events and how they relate to climate is a large part of what helps scientists understand climate change. Phenology can also give clues to why plant and animal species populations may be changing. An example is in what's referred to as migratory mismatch. Some European species of songbirds are beginning to decline in numbers. One reason could be because as northern climates are coming out of winter sooner, plants are budding sooner. Because plants are budding sooner and leaf matter is available sooner, caterpillars are hatching out of eggs sooner to eat the leaves. However, some bird species such as warblers, of which caterpillars make up a large percentage of their diets, are not migrating sooner. So, by the time the birds arrive, the caterpillars have already be-

gun to pupate, making them unavailable to eat. This causes a reduction in available food and increases competition for other food sources in the forests. Too much competition and bird species populations could begin to decline. Or it could be an additive factor to other problems such as habitat loss and disease. There is much research being conducted on these types of mismatches in nature.

How can you get involved in phenology? NPN has developed a program called Nature's Notebook. Nature's Notebook gathers information on plant and animal phenology across the U.S. to be used for decision-making on local, national and global scales to ensure the continued vitality of the environment. Scientists alone cannot collect enough data: They need our help. Over 6,000 naturalists, volunteers and students across the country contribute to Nature's Notebook each year using scientifically-vetted observation guidelines, developed for over 900 species, to ensure data are useful to researchers and decision-makers. Nature's Notebook also helps develop tools and techniques to support a wide range of decisions made routinely by citizens, managers, scientists, and others, including decisions related to allergies, wildfires, water, and conservation. You can find out more about NPN and Nature's Notebook at www.usanpn.org



Yellow Warbler

In Ohio on a smaller scale, the Ohio State University hosts a program called the Phenology Garden Project. There are around 40 such gardens across the state that contribute data to OSU about seasonal changes in their gardens with specific species. This information can be used to help predict insect activity to inform gardeners and farmers on best practices for insect management. You can find more information online at <http://phenology.osu.edu/default.asp>

Photos Courtesy of ODNR: Division of Wildlife

Great Resource

The Cornell Lab of Ornithology, in partnership with NSTA Press, has published a new book called **Citizen Science: 15 Lessons that Bring Biology to Life** that helps educators engage students through citizen science.

Ohio Environmental Education Fund



OEEF grant guidelines and funding priorities have undergone substantial revision. Please read the guidelines carefully before beginning an application. The requests for OEEF general grant and mini grant proposals are now open in the eBusiness Center. The Letter of Intent to Apply must be submitted prior to submitting a grant.

The Ohio Environmental Education Fund grant program is administered by Ohio EPA and awards general grants of up to \$50,000 and mini-grants between \$500 and \$5,000. The grants are funded by half of the civil penalties OEPA collects for air and water pollution control violations. Eligible recipients include environmental groups, public and private schools, colleges, local governments, among others.



For more information, please contact the Ohio EPA Office of Environmental Education

Phone: 614-644-2873

Email: oeef@epa.state.oh.us

Web: www.epa.ohio.gov/oeef

Welcome to New OEEF staff members

On November 18, Ohio EPA's Office of Environmental Education will welcome two new grant coordinators, Jeff Montavon and Kristopher Weiss. Jeff is a long-time EECO member and former Regional Director for Region 7 while he was working with the Scioto Soil and Water Conservation District. Kristopher has been a Public Information Officer working with local citizen groups in Ohio EPA's Public Interest Center.

Recent General and Mini Grant Awards, 2013

Urbana University – College of Arts and Sciences, “Collaborative Outreach to Increase Public Awareness of Environmental Issues in Champaign County” \$45,378

Champaign County, Audience: General Public. Contact: Tingting Cai, tcai@urbana.edu, (937) 484-1379.

Provides a variety of programs on local water quality issues and sustainable resource use for the residents of Champaign County. Interpretive signs will guide visitors through six demonstration ecosystems, a rain garden for storm water retention, and energy efficiency features of buildings on the campus. Hands-on family activities from Project WET, Project Learning Tree and the Healthy Water, Healthy People program will introduce at least 485 families (1,500 people) the first year to the linkages between local ecosystems, water quality, and human health. A mobile lab will bring these activities to events sponsored by collaborating partners including the Champaign County Library, Champaign Family YMCA, Girl Scouts, Johnny Appleseed Museum, and Urbana University Library. dominant plants releasing pollen in the area. They will record observations and upload data collected to the Camp's Website. Franklin Soil and Water Conservation District's successful Project will install two bicycle shelters with roofs composed of live vegetative plant panels, to raise the visibility on campus of this method of storm water retention. Interpretive signage will explain the design and function, and encourage bicycle ridership to reduce air emissions. The racks will also be featured in actual and virtual campus tours, and included in course curriculum for environmental studies and sustainable architecture classes.



City of Groveport, “City of Groveport Rain Garden and Rain Barrel Program” \$43,800

Franklin County, Audience: General Public. Contact: Jennifer Ponchak, followtheriver@ymail.com, 614-325-9954.

Supports a city-wide program encouraging at least 5,300 residents to install rain gardens and rain barrels to prevent stormwater pollution in the Walnut, Blacklick and Big Walnut Creeks and tributaries. Three demonstration rain gardens with interpretive signage will be installed at highly-visible municipal facilities. The Central Ohio Rain Garden Initiative model program previously funded by the OEEF will be adapted to help residents understand how to design their rain gardens and select plants for water retention. Residential rain garden locations will be added to the City's GIS maps for an online rain garden “tour of homes” to show a visual connection between these best management practices and receiving streams in the City. Three rain barrel installation workshops, incentives and an online course will be offered, adapting the Franklin Soil and Water Conservation District's successful residential rain barrel program.



Grants Continued...

Camp Oty'Okwa, Big Brothers Big Sisters of Central Ohio, Inc, "Discovery Center" \$35,029

Hocking County, Audience: Preschool-University. Contact: David Schirner, dschirner@bbbscentralohio.org, 614-839-2447. The seven ecosystems on the site will illustrate how the geology, climate, plant and animal communities in a protected watershed contribute to healthy streams. Water cycle panels will show how rain gardens and rain barrels at homes and schools can slow storm water runoff to protect water quality in urban watersheds. A Waste to Food exhibit will feature decomposition, photosynthesis and energy transfer in the nutrient cycle, "botany on a plate" lessons about food served at the facility, and composting and recycling in natural and human systems. A bird observation area will feature species characteristics and adaptations, as well as scientific study and data collection methods being used in Citizen Science and school programs such as the Cornell Ornithology Lab's Classroom Feeder Watch. Test kits and equipment will enable participants to monitor weather conditions; soil, water and air quality; pollen levels and the predominant plants releasing pollen in the area. Observations and data will be uploaded to the Camp's Web.



Big Brothers Big Sisters
of Central Ohio

Cincinnati Nature Center, "Nature in the Classroom - Teacher Training Program" \$5,690

Clermont County, Audience: Preschool- University. Contact: Connie O'Connor, coconnor@cincynature.org, 513-965-4891.



This project provides 24 teachers in grades 1-8 with basic knowledge of local natural history as well as methods for integrating science-based nature interpretation into state teaching standards. A three-day summer session will show teachers how their students can use inquiry to investigate nature in the schoolyard. Two hours of hands-on nature training will prepare twelve classroom parents to volunteer for at least five hours each during the school year. The grant will also provide the teachers with field guides, bird feeders and other supplies.

Bowling Green State University- Campus Sustainability, "Green Roof Bike Racks" \$50,000

Wood County, Audience: Preschool-University, Contact: Nicholas Hennessy, nickjh@bgsu.edu, 419-372-9949.

Project will install two bicycle shelters with roofs composed of live vegetative plant panels, to raise the visibility on campus of this method of storm water retention. Interpretive signage will explain the design and function, and encourage bicycle ridership to reduce air emissions. The racks will also be featured in actual and virtual campus tours, and included in course curriculum for environmental studies and sustainable architecture classes.



Bowling Green State University

The Ohio State University- Facilities, Operations & Development, "OEEF Bike Shelter Grant" \$50,000

Franklin County, Audience: Preschool-University. Contact: Robert Osterfeld, Osterfeld.5@busfin.osu.edu, 614-688-8482.

Project will install two bicycle shelters with roofs composed of live vegetative plant panels in the northern and southern districts of campus, to raise the visibility of this method of diverting storm water runoff. Interpretive signage will explain the design and function, and encourage bicycle ridership to reduce air emissions. Information about storm water runoff and vehicle emissions will be added to the University's Sustainability Websites, and bike shelter locations will be added as stops on the University's Sustainability Tours.



Grow Youngstown, "Compost Creation Campaign" \$7,194

Mahoning and Columbiana Counties, Audience: Regulated Community. Contact: Elsa Higby, elsa@growyoungstown.org, 330-286-0688.

Provides a year-long Compost Campaign to engage more farmers, businesses and community gardens in recycling organic matter, utilizing organic waste streams, and maintaining aerobic conditions in windrows and backyard composting. Project includes a two-day "Life in the Soil" class, a five-day advanced compost course using non-anima-based feedstocks, two on-farm compost workshops for produce farmers and urban market gardeners, and an event bringing together stakeholders that would benefit from a composting system in the Mahoning Valley. Collaborators include Goodness Grows, the Mahoning Soil and Water Conservation District, Mill Creek MetroParks, and Trumbull Neighborhood Partnership.



West Liberty-Salem Schools, "Trout in the Classroom Mad River" \$2,834

Champaign and Logan Counties, Audience: Pre-K - University, Contact: Carrie Smith, csmith@wlstigers.org, 937-465-1060. Provides two 55-gallon brown trout tanks and supplies to maintain them according to the guidelines of the national Trout in the Classroom (TIC) program. High school environmental science and Future Farmers of America classes and Boy Scout



Troop 11 (Urbana) will maintain the tanks and monitor water quality in the Mad River and its tributary Mac-A-Cheek Creek, which flows through the school's land lab. Elementary students will study the trout life cycle, Mad River ecology, and agricultural and human impacts on stream habitat. Students will compare the simulated Mad River cold water ecosystem in these tanks with already established tropical and marine ecosystem tanks. After a year of study, the students will release the trout to the River in a community event. Roughly 1,200 students will participate.

Grants Continued...

Scioto Soil & Water Conservation District, “CSI: Shawnee” \$4,749

Adams, Brown, Highland, Pike, and Scioto Counties, Audience: Pre-K – University, Contact: Kate Sowards, katesowards@sciotoswd.org, 740-259-9231.

CSI: Shawnee is an inquiry- and standards- based science camp that will take place over two days and two nights at Camp Oyo and Shawnee State Park and will continue yearly beginning in July 2013. The camp will accommodate 48 students in grades 5-7 each year, offering at minimal cost to students the opportunity to experience the science, technology, and skills used in field research, and to explore natural resources careers. The grant will provide water quality test kits, nets, handheld GPS units and microscopes. The equipment will also be available for use by the collaborating agencies throughout the year for various school and public programs. Collaborators include the Ohio State University Extension, Shawnee State University, Bloom-Vernon Local School District, Simon Kenton Council of the Boy Scouts of America and the Adams and Brown County Soil and Water Conservation Districts.



Carroll-Columbiana-Harrison Solid Waste District, “Environmental Education Academy” \$4,500

Carroll, Columbiana, and Harrison Counties, Audience: Pre-K – University, Contact: Eric Matthews, mathesonman@gmail.com, 330-627-7311.



Provides workshops on water quality, nutrient runoff, and wetlands for teachers from a three-county area. National curricula such as Project WET, Healthy Water, Healthy People, the Wonders of Wetlands and NASA/NOAA/s GLOBE (Global Learning and Observations to Benefit the Environment) program will be featured, along with rain gardens and rain barrels as best management practices for reducing storm water runoff. The

budget includes: substitute teachers, rain barrels, grow boxes, rain barrel diverters, and potting soil. Brown Local Schools, Columbiana County Educational Service Center, Conotton Valley Union Local School District, Lisbon Exempted Village School District, and Harrison Hills North Elementary School are all collaborating.

Fernald Community Alliance (FCA), “Roadmap to Resolution: Communities, Government and Corporations Solving Complex Challenges” \$4,150

Butler and Hamilton Counties, Audience: General Public, Contact: Joyce Colleen Bentle, joycebentle@fuse.net, 513-348-0213.

Supports a series of in-depth video interviews documenting how productive, collaborative relationships evolved between government, regulators, and community members during the 20-year clean-up of the heavily contaminated Fernald uranium processing facility in southwest Ohio. Ultimately, this project will incorporate a Website including videos, training sessions, written materials and focused team-building exercises to help stakeholders forge trusting, productive relationships that are integral in successfully solving complex environmental, public health, community planning and resource development challenges. Collaborators include the U.S. Department of Energy, Miami University, F-CHEC, and F.R.E.S.H., Inc.



Graham Local Schools – Graham Elementary School, “Graham Local Schools Trout in the Classroom (TIC)” \$5,000

Champaign and Logan Counties, Audience: Pre-K – University, Contact: Emily Kay Shreve, shreeve@grahamlocalschools.org, 937-663-4449.

Provides national Trout in the Classroom program supplies, water quality monitoring equipment and two 55-gallon tanks to enable 150 students in grades 1-12 to study the trout life cycle and raise brown trout from eggs to fingerlings for eventual release to the Mad River. Students will be learning about trout

habitat requirements and local water quality issues, and be responsible for raising the trout and testing water conditions in the aquarium daily. The project will include two field trips to the River for local sampling. Students will present their findings through a district-wide community night and at other events. Trout Unlimited’s Madmen Chapter is collaborating.

Ohio Corn Marketing Program, “Feeding the World: Sustainable Practices in Agriculture and Water Quality” \$4,230

Statewide, Audience: Pre-K – University, Contact: Jeanne Gogolski, Jeanne@educationprojects.org, 614-436-4171.

Provides water quality monitoring equipment for 30 western Ohio teachers and their students to conduct kick-seining and bioassessment investigations of local water quality. At a two-day summer workshop, the teachers will learn about sustainable agriculture practices and issues related to crop production, including research and seed development, soil science, sediment control, water quality and drainage water management systems. They will learn to use biocriteria to identify impaired waters and causes of impairments such as Harmful Algal Blooms (HABs). Students will collect data in local streams and share their results using an app such as “River on the Web” developed by Northern Kentucky University. Parameters to be tested include biochemical oxygen demand, coliform bacteria, dissolved oxygen, nitrate, pH, and phosphate. A sample kit was tested by science teachers at the Science Education Council of Ohio (SECO) Conference in February 2013. EP&P, Upper Arlington School, Findlay High School, and Green County Career Center are collaborating.



Grants Continued...

Ohio River Basin Consortium for Research and Education, “*Environmental Education Demonstration Rain Garden in Marietta*” \$5,000

Athens and Washington Counties, Audience: Pre-K – University, Contact: Wilson Tabor, chang@ohio.edu, 740-593-1462.

The Friends of the Lower Muskingum River (FLMR) watershed group and Ohio University’s Russ College of Engineering and Technology are collaborating to design and construct a rain garden in Marietta, and measure the quantity and quality of the water retained. The data collection methods and effectiveness of the rain garden as a storm water management tool will be demonstrated to the local community and to 2000 high school students participating in the Boat of Knowledge water quality project funded by the National Science Foundation at Ohio University.



Project Learning Tree – Ohio, “*Forest Community Issues & Project Learning Tree*” \$5,000

Statewide, Audience: Pre-K – University, Contact: Sue Wintering, sue.wintering@dnr.state.oh.us, 614-265-6657.



Supports six regional workshops for 90 teachers on current issues affecting public and private forests in Ohio. The six themes selected by the ODNr Division of Forestry include Fragmentation and Urbanization; Soil and Water Conservation; Forest Health; Forest Public Benefits; Biological Diversity; and Sustainable Forest Management. Workshop participants will help PLT design a poster to be distributed statewide for classroom use on environmental issues impacting forests. Berkshire Local School District, ODNr Division of Forestry, USDA Wayne National Forest, Muskingum Valley Park District, and Geauga Soil and Water Conservation District are all collaborating.

Heartland Outdoor School, “*From College to Kids: A Stream Monitoring Research Partnership*” \$5,000

Statewide, Audience: Pre-K – University, Contact: Joe Hughes, joe@heartlandretreat.com, 740-747-0220.

Provides water quality monitoring meters and macro-invertebrate sampling equipment to an outdoor education program serving 8,000 students a year from various districts. This project expands the stream study class at Heartland Outdoor School to partner with university-level research projects so students can participate in actual scientific studies. Equipment includes dip nets, kick seines, Hester-Dendy samplers, dissolved oxygen meters, a flow plankton splitter and a flow velocity meter. The Ohio State University College of Food, Agriculture, and Environmental Sciences is collaborating.



Akron Water Supply, “*Upper Cuyahoga River Watershed Sign Project*” \$3,368

Portage County, Audience: General Public, Contact: Jessica Glowczewski, jglowczewski@akronohio.gov, 330-678-0077.



Promotes awareness of the Upper Cuyahoga River Watershed by strategically placing signage where tributaries of the Cuyahoga River intersect with high traffic roadways. This project is coordinated with a similar effort in the adjacent Tinker’s Creek watershed. Signs will be accompanied by targeted educational mailings to local residents as an ongoing effort by Akron Water Supply to educate the public about environmental protection and encourage a greater sense of community and connection with the environment. The project includes 40 signs at 20 locations along the Cuyahoga River, Harper Ditch, Eckert Ditch, Yoder Ditch, Shalersville Ditch, Elliman Run, and one unnamed tributary, which is being petitioned at the USGS for naming.

Ohio City Bicycle Co-Op, “*Bike Corral Service at Underserved Public Events*” \$800

Cuyahoga, Geauga, Lake, Lorain, and Medina Counties, Audience: General Public, Contact: Jim Sheehan, jim@ohiocitycycles.org, 216-830-2667.

Supports a successful program encouraging bike transportation to replace car trips in congested situations by providing a free, secure, guarded bike corral at large public events. This project will make “valet bike parking” available at events that have not been able to contract for this service in the past, and at targeted events that have not previously considered it. Grant will provide pre-event outreach and educational materials about the air quality benefits of bicycle use for distribution to the general public at these events, with the potential to reach an estimated 103,000 people. Youth Outdoors, Bike Cleveland, and Slavic Village Development Corporation are all collaborating.



Ohio Hispanic Coalition, “*Air Quality Outreach to Hispanic Communities*” \$4,549

Franklin County, Audience: General Public, Contact: Virginia Nunes, virginia@ohiohispaniccoalition.org, 614-840-9934.



In 2012 there were 21 air quality alert days in Franklin County. The OHC will translate information about the health effects of ozone and soot pollution, and ways to reduce exposures and emissions, for targeted outreach to the 57,761 residents of Latino-Hispanic communities in Franklin County. Air quality brochures and fact sheets will be distributed at events, and public service announcements will be broadcast on Spanish-language radio. A special initiative will target at least ten Latino-owned/operated small businesses to discuss the impact of poor air quality on the community, economic impact, and ways to reduce exposure. Ohio Environmental Concern and the Mid-Ohio Regional Planning Commission are collaborating.

Community Water Quality Monitoring

By Donna McCollom, Miami University and
Amy Cameron, Butler Soil and Water Conservation District

If you're interested in creeks and rivers, you might be interested in working with a local water quality monitoring group. In SW Ohio, the Butler County Stream Team is an education and outreach program that builds public awareness and involvement in protecting water resources around the world by engaging citizen scientists to conduct basic monitoring of their local water bodies.

Stream Team volunteers collect water samples once a month from about 120-140 sites around the County. Volunteers also help with the analysis of the samples, so if you'd like to "explore your inner geek", we would welcome you with open arms as I'm sure any local monitoring group would!

Explore your INNER GEEK!



Become a citizen scientist

Currently, we have around 50 volunteers who dedicate time on the second Saturday of every month to collect baseline data on local streams, some collecting samples, some working in the lab, and some doing both. Other activities the group help with are manning booths at various outreach events or picking up and transporting sample coolers to the lab.

Volunteers give their time to Stream Team for a variety of reasons. Some have always been interested in streams, remembering childhood days spent in creeks in their back yards. Their personal connection with stream communities has lasted a lifetime, and collecting samples lets them get out and re-experience the beauty and wonder of our local streams. Other volunteers know that our streams are hurting and like to use their "free" time to help in whatever way they can to make a difference. Some folks come for the experience of collecting samples or working in the lab. Others relish spending time with like-minded people – people who like streams or lab science and find hanging out in the lab a few hours once a month just the kind of thing they enjoy.

These citizen scientists also have varied backgrounds, from Charlie, a retired microbiologist, through Nathaniel a local high school student who has gotten his entire family involved, including the dog. One thing that the group has in common is their love for the water and their need to know more. So far this year, our scientists have come together to learn about wetlands, rain gardens, and macroinvertebrates,

and have participated in canoe trips and field trips to visit water quality best management practices.



Stream Team has been in operation since 2006, and performs the valuable function of monitoring long term surface water quality trends in a watershed (where Ohio EPA may not have the resources to frequently revisit a particular area). During the first few years the group built the volunteer base and clarified procedures in the lab and field. We now have almost 6 years of good data, which sounds like a lot, but with sampling just once a month in conditions of high variability, we're really just beginning to see what "normal" is for our streams. A good summary of our streams might be that we see the normal problems associated with urban and rural areas – high bacterial counts, high nutrients that cause

excess algal growth (nitrogen and phosphorus), and occasionally high salts from road runoff or fertilizer use. Many of these issues can be partially corrected if people change behaviors on their own land – being careful with cooking fats, picking up pet wastes and disposing of them properly, being careful about fertilizer application, etc.



With the varied backgrounds and interests of the community of volunteers,

the group wants to expand into new areas and will soon hopefully be delving into biological and habitat assessment to further complete the picture of the health of our streams.

For more details, check out the Stream Team at www.butler-countystreamteam.org.

Get Involved:

**Find a Water Monitoring
Group Near You**

<http://yosemite.epa.gov/water/volmon.nsf/VST!Open-View&Start=30>

Participating in the Ohio Long-Term Butterfly Monitoring Project

By Lori Rotman, The Dawes Arboretum

The Dawes Arboretum has participated in the Ohio Lepidopterists Long-term Butterfly Monitoring Project since 1999. This state-wide, multi-partner, effort gathers information on Ohio's butterflies utilizing transect trails. The project is overseen by Ohio Lepidopterists, ODNR Division of Wildlife, Ohio Biological Survey and Cleveland Museum of Natural History. Long-term data can provide a wealth of information including: fluctuations in numbers due to short-term and long-term effects; colonization and extinction as habitats undergo progression; expansions and contractions of range; migrations, immigrations of non-native species; flight periods of butterflies; season variation in abundance and overall health of the butterflies of Ohio. The long-term survey is completed once a week from April 1st to October 31st, weather permitting.

Dawes attended the first state-wide workshop held in late winter 1998 and made the decision to begin a transect trail on one of our outlying properties. The first season a transect trail was laid out at the Red Barn area and was an experiment of sorts and the data collected was not submitted to the database. From that point on, it has been annual, on-going participation in the state-wide project with The Arboretum's data submitted to Cleveland Museum of Natural History, the keepers of the state-wide database. The Arboretum added a second transect trail in 2009 after restoring the Dutch Fork wetlands and installing close to 50 acres of warm season grasses and forbs.

A transect trail is a fixed route along which walks are made weekly during peak butterfly times. Once a transect trail is chosen or laid out, the route should not be altered if at all possible. If altered, the new path description is documented and sent along with the data. Comparisons are dependent upon continuity from week to week and year to year.

Butterflies are insects and therefore, cold blooded creatures. Since they cannot regulate their body temperature, they are most active on warm, sunny days and during the hottest part of the day. In Ohio that is between 11am-5pm. The Dawes Arboretum's transect trail monitors usually monitor between noon and 2pm. Monitoring transect trails is a very weather dependent activity and the volunteers who check trails closely monitor the weekly weather forecast and plan their transect checks accordingly. If the air temperature is less than 60°F then they don't monitor. If windspeed is greater than 19mph, they don't monitor. If the air temperature is above 70°F the volunteers can monitor anytime, provided it is not raining.

To monitor a transect trail, one walks the trail and keeps track of the species of butterflies observed and the highest number of that species on each section of the transect trail. The Arboretum transect trails are loop trails and encompass as many different habitats as possible. To do this, one walks in an imaginary "box" — 7.5' on either side (i.e. 15' across), 15' overhead and 15' in front of one self.

It is widely believed that some kinds of butterflies and moths are in danger of disappearing from Ohio (or have already disappeared). Proposed reasons for declines in abundance include habitat changes and pesticide use. More recent threats include climate change. With this threat it seems to make sense Ohio will begin to see an influx of butterfly species that are normally more southern ranging species and a decline in Ohio's "usual" species. Long-term data that track regional and local trends in abundance are essential to revealing population declines BEFORE their final stages. Declines are hard to detect when they occur slowly and/or lag years behind their causes.



Dainty Sulphur
Photo courtesy of Bobbi Meldahl

The Dawes Arboretum's participation in this research "citizen science" project is due to a tremendous core of volunteers who have made a commitment to checking the two transect trails weekly, April through October. Volunteers Bobbi Meldahl and Phyllis Bundy have been part of The Arboretum's participation in the effort from the on-set. Bobbi coordinates the other trail monitors for the two trails.

Why is Citizen Science important? Citizen scientists enlist the help and support of amateur naturalists, scientists and other volunteers in collecting field data that can be used to monitor population trends of wildlife (birds, salamanders, toads and frogs, fireflies, dragonflies, butterflies, etc.). Having an "army" of trained observers in the field can provide a wealth of information that would be impossible for professional scientists, field biologists alone to obtain. To find more information about the Ohio Long-term Butterfly Monitoring project, go to: www.ohiolepidopterists.org Click on the checklist of Ohio's butterflies & skippers and see that The Dawes Arboretum is credited with compiling the first checklist.

Continued on next page

Butterflies Continued...

The Arboretum has also been fortunate enough to be the first institution to host not one, but two Long-term Butterfly Monitoring Workshops held in March 2002 and April 2008.

The Dawes Arboretum has been able to add five “new” species to our butterfly list due to the diligence and hard work of our committed volunteer butterfly monitors. Just this season the volunteers netted a new species not only for The Arboretum but also it proved to be a new record for Licking County, Ohio.



Red-Banded Hair Streak
Photo courtesy of Bobbi Meldahl

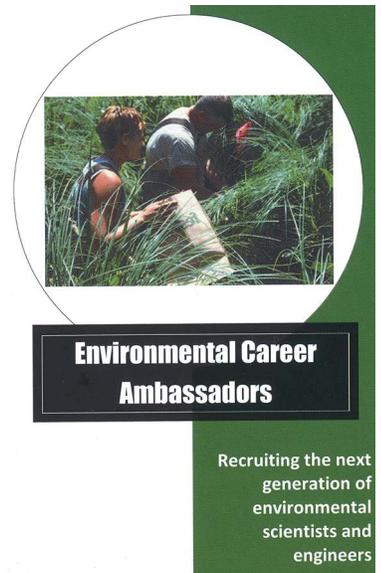
It was a red-banded hairstreak. Last season Jim McCormac’s blog of June 2012 highlights another one of those species Bobbi Meldahl and volunteer butterfly monitors found on one of The Arboretum transect trails.

The Dawes Arboretum thanks all the volunteer butterfly monitors who are contributing greatly to this fabulous citizen science project and to The Dawes Arboretum’s efforts to survey and document wildlife populations. Special thanks to Bobbi Meldahl, Phyllis Bundy, Jim Erickson, Patsy Mason, Ann Lighthiser and Jane Weiland. I encourage anyone who has an interest in the natural world and natural history to get involved in a nearby citizen science project. Know your efforts are truly helping professional scientists and biologists understand what is happening with wildlife population trends and the causes.

EECO’s New Career Ambassador Initiative

The Environmental Career Ambassador Initiative was created by the Environmental Education Council of Ohio (EECO) and the Ohio Environmental Protection Agency with the assistance of the Ohio State University School of Environmental and Natural Resources.

This career initiative was created to address various needs in Ohio. For instance, there is an emerging need to prepare students in fields emphasizing Science, Technology, Engineering and Mathematics (STEM) for careers in today’s high-tech economy. This initiative will also aid employers looking to ensure the next generation of professionals in environmental science and engineering will be available. Requests have also been made from schools and career centers looking for business professionals to provide role models and diverse work-place experiences for their students.



A promotional graphic for the Environmental Professionals Network (EPN). It features the Ohio State University logo and the text "ENVIRONMENTAL PROFESSIONALS NETWORK". Below this is the tagline "Connecting our community. Online, in person, or both. You choose!". The graphic includes several small images: a wind turbine, a person in a field, and a person in a boat. At the bottom, it lists various actions: Share, Query, Network, Learn, Innovate, Collaborate, Recruit, Volunteer, Inspire, Be inspired. The website "epn.osu.edu" is also mentioned, along with the slogan "Sign up today! It's free!".

Environmental professionals willing to make school presentations about their careers, or provide field trips, internships and shadowing opportunities, are being recruited as Career Ambassadors through OSU’s existing online Environmental Professionals Network at <http://epn.osu.edu/>. Once enough Ambassadors have volunteered, the network will be advertised to educators looking for career speakers. EECO’s regional directors will also be working with local career and technical centers around the state to promote the initiative.

The Environmental Professionals Network (EPN) is an online community connecting Ohio professionals in

- Air quality
- Environmental Health and Policy
- Energy, Materials and Sustainability
- Land Use and Conservation
- Water resources and water quality
- Wildlife and ecosystems

EPN members share information, announce events and training opportunities, post/seek jobs, internships and volunteer opportunities, and find collaborators for projects.

Citizen Science: Great Online Resources

Bird Sleuth from Cornell University's Lab of Ornithology

www.birdsleuth.org/

The Great Sunflower Project

www.greatsunflower.org/

The Lost Ladybug Project

www.lostladybug.org/index.php

The U.S. Phenology Network

www.usanpn.org/usa-national-phenology-network

SciStarter

<http://scistarter.com/index.html>

Cicada Tracker

<http://scistarter.com/project/776-Cicada%20Tracker>

Dragonfly Migration

<http://scistarter.com/project/640-Dragonfly%20Migration>

Leafsnap

<http://scistarter.com/project/614-Leafsnap>

Precipitation I.D. Near the Ground (PING)

[http://scistarter.com/project/756-Precipitation%20ID%20Near%20the%20Ground%20\(PING\)](http://scistarter.com/project/756-Precipitation%20ID%20Near%20the%20Ground%20(PING))

Great Lakes Worm Watch

<http://scistarter.com/project/333-Great%20Lakes%20Worm%20Watch>

Monarch Watch

www.monarchwatch.org/

Frog Watch USA

www.aza.org/frogwatch/

Journey North

www.learner.org/jnorth/

NEON Citizen Science Academy

<http://citizenscienceacademy.org/>

Citizen Science in the Classroom

By Sarah Foltz, AIP Student with the Cincinnati Zoo

In recent years citizen science has become a popular trend in science classrooms. Not only does participation in citizen science engage students in science content but it also helps them to apply science concepts to real world situations (Jenkins, 2011). There are many programs that encourage involvement from students including Cornell University's Project Feeder-Watch (<http://www.birds.cornell.edu/pfw/>). Teachers can sign their class up and then collect data about the different bird sightings on their feeder. Participants receive a research kit and instructions detailing how often data needs to be collected. Data is then entered on Project FeederWatch's website.

Participation in citizen science projects such as Project FeederWatch opens the door to many discussions about habitats, migration, bird species, and even data collection methods. Involving students in real world applications of science not only helps them to learn science content but also gives them real life science experiences (Jenkins, 2011).

Last year my first grade class participated in a citizen science project that included counting birds on various feeders around our school campus. The goal of our project was to see if birds preferred more populated areas like the front of school or less populated areas like the school courtyard so that we could install more feeders. Though we did not have many discussions beyond hypothesizing where they thought more birds would be the students were excited to begin the project. I was amazed to see how engaged my six and seven year old students were in the data collection process. Handing out clipboards and data collection sheets helped make them feel like real scientists. A few of the days we did not see any birds. The students were disappointed but it led into a great discussion about why that might be happening. One student suggested that the birds might be migrating south since it was fall. Another thought they may not like to eat birdseed and preferred digging for worms. Each data collection session led to more in depth discussion about the habitat and behaviors of birds.

By the end of the three week study my students were bird experts. They checked out books about birds from the library and did research about the migration patterns of birds and what they eat. They drew pictures about what they saw and as a class we made graphs of our data. They were fully engaged and thinking critically. The most exciting part is that they felt like real scientists and were excited about learning.

I have seen the success of incorporating citizen science into classroom learning. The main struggle is finding the time to devote to a project. I can attest that it is well worth the time to get students thinking critically, asking high level questions, and engaged in learning about science.



Citizen Science: Great Journal Articles

Bonter, D. N., & Cooper, C. B. (2012). **Data validation in citizen science: a case study from Project Feeder Watch**. *Frontiers In Ecology & The Environment*, 10(6), 305-307.

Cooper, C. B., Dickinson, J., Phillips, T., & Bonney, R. (2007). **Citizen Science as a Tool for Conservation in Residential Ecosystems**. *Ecology & Society*, 12(2), 1-11.

Cooper, C. B., Dickinson, J., Kelling, S., Phillips, T., Rosenberg, K. V., Shirk, J., & Bonney, R. (2009). **Citizen Science: A Developing Tool for Expanding Science Knowledge and Scientific Literacy**. *Bioscience*, 59(11), 977-984.

Dickinson, J. L., Shirk, J., Bonter, D., Bonney, R., Crain, R. L., Martin, J., & ... Purcell, K. (2012). **The current state of citizen science as a tool for ecological research and public engagement**. *Frontiers In Ecology & The Environment*, 10(6), 291-297.

Dickinson, J., Zuckerberg, B., & Bonter, D. N. (2010). **Citizen Science as an Ecological Research Tool: Challenges and Benefits**. *Annual Review Of Ecology, Evolution & Systematics*, 41(1), 1.

Henderson, S. 2012. **Citizen science comes of age**. *Frontiers in Ecology and the Environment* 10: 283-283

Miller-Rushing, A., Primack, R., & Bonney, R. (2012). **The history of public participation in ecological research**. *Frontiers In Ecology & The Environment*, 10(6), 285-290.

Newman, G., Wiggins, A., Crall, A., Graham, E., Newman, S., & Crowston, K. (2012). **The future of citizen science: emerging technologies and shifting paradigms**. *Frontiers In Ecology & The Environment*, 10(6), 298-304.

Pandya, R. E. (2012). **A framework for engaging diverse communities in citizen science in the US**. *Frontiers In Ecology & The Environment*, 10(6), 314-317.

Winter Snow – Schoolyard Enhanced Learning Call For Conference Proposals

Presentation topics are diverse and may or may not relate to winter, but should relate to Schoolyard Enhanced Learning, Arts and Environmental Literacy, 21st Century Skills, Careers and the Environment. We encourage possible session topics that include ways of getting students reconnected to nature, interested in Environmental Careers as well as using the outdoors as a teaching tool. Please fill out the presenter form (found at www.eeco-online.org) completely and return BY December 15, 2013 to: Heather Quinones preferably by email at otigmia@gmail.com, or if need be by snail mail at: 32031 Densmore Road, Willowick, Ohio 44095.



EECO Annual Conference *Environmental Education: It's Our Nature* March 27-30 Deer Creek State Park, Mt Sterling, Ohio

Thursday Forums

One of the Thursday forums will be devoted to “citizen science” and getting individuals or groups involved in stream and lake monitoring across Ohio. The forum will include presentations by Chris Yoder, owner and operator of the Midwest Biological Institute (MBI), Ric Queen, OEPA, Division of Surface Water Wetland Mitigation Unit; Dan Dudley (or designee), OEPA, Division of Surface Water Volunteer Credible Data Program; Ann Lyon, GreenAcres Foundation, featuring a previous Outstanding Ohio Environmental Education Fund (OEEF) Grant (now closed) called “Saturday Stream Snapshot”; and Dana Oleskiewicz and volunteers from the Ohio Lake Management Society with a “State of the Lakes Report” featuring another recently-funded OEEF Grant training volunteers to collect samples from lakes that have a history of algal blooms, for analysis for algal ID, cell counts and microcystin.

Main Conference

Friday, Saturday and Sunday of the Conference will include field trips, sessions, workshops, keynote speakers and much more. Conference strands include:

Natural History

Environmental Careers

Using the Outdoors as a Classroom

Program and Learner Assessment

Citizen Science

More details will be posted as they become available on the EECO website www.eeco-online.org

What region of EECO are you In? And, who is your local contact?



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