

EECONEWS

...a focus on Ohio Geology

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Issue 1



The Seas of Ohio

Kim Mullen, Ohio Department of Education

Ohio's geologic history can be traced by analyzing the rocks, minerals, and fossils found in the rock record. All of the surface bedrock in Ohio is sedimentary. Far beneath the sedimentary formations there is igneous basement rock. Metamorphic and igneous rocks that are present on the surface of Ohio came from the north and were deposited by glaciers; they did not originate in Ohio. The ages of the sedimentary surface formations range from the Ordovician Period, approximately 505 million years ago (in the western part of Ohio) to the Permian Period, approximately 248 million years ago (in the eastern part of Ohio).

Ohio's climate and environment was quite different when these sedimentary rocks began to form. Ohio was located near the equator and was tropical. During this time Ohio fluctuated between having areas of dry land and being covered by warm, shallow seas. Eventually brackish water and freshwater swamps developed on the dry land. The thick beds of sand that became the sandstone in much of eastern Ohio came from the ancient Appalachian Mountains as they weathered and eroded. As the shallow seas began to evaporate and stagnate, evaporite minerals formed, such as gypsum and halite.

In the eastern section of Ohio, where there is an abundance of permeable sandstone, some of the salty brine from these early seas was trapped within the sand and layers of rock and did not evaporate. Some of the brine was also formed as groundwater traveled through the evaporite mineral formations, dissolving the salt.

This saline water is found today in the subsurface rock in the southern and eastern part of the state. It is known to come to the surface in the form of seeps and springs. Many of these seeps and springs were aptly named using descriptive terms such as salt licks, salt springs, brines, licks, or even salines.

Prehistoric mammals used these salty springs to supplement their diets. Early humans had hunting camps near the salty springs and seeps because they attracted the mammals. Fossils and bones from mammals such as mammoths, mastodons, bison, and deer have been found in these areas. Prehistoric Indian camps and villages have been excavated and also have been documented in these areas.

The early settlers drew barrels of the brine and boiled it in large kettles to evaporate the water, leaving behind the crystallized salt. They discovered that drilling wells to reach the deeper subsurface provided a higher quality brine that provided more salt. Companies were formed near the salty brine areas to boil the brine and sell the salt. This continued through the 1800's into the 1900's. Towns such as Jackson and McConnelsville had large salt operations. The salt brine can infiltrate and contaminate drinking water wells today.

Just look at a map of Ohio and find the names that are related to salt. It is clear the importance that salt brine had in the history and development of Ohio. These include names such as: Salt Lick Township (Perry County), Salt Lick Creek (Jackson County) Scioto Salt

Continued on page 2

Save the Date

101 Conference
YMCA Camp Kern
October 3-5, 2008

Winter Snow
Camp Nuhop
February 6-8, 2009
*More information on page 10

EECO Annual Conference
Deer Creek State Park
April 30-May 3, 2009
*More information on page 3

Language of Nature
Cuyahoga Valley National Park
June, 2009

For more information on any of these events,
visit www.eeco-online.org

“Enoughness”

Erv Ball, EECO President

Is there importance to Ohio's geology and is there a continuing evolution of our knowledge and utilization of our geology? Annually Ohio emits more than 200 million metric tons of CO² into the atmosphere. Various sources contribute to this output- power generation, industrial processes, as well as transportation venues. The basics: Ohio's power is predominantly produced from one aspect of our geology, namely coal.

Our geology then may serve us as we explore geologic sequestration of carbon dioxide. Improved knowledge may enable us to utilize resources within our geology, namely coal, natural gas, and oil in the most environmentally effective manner while sustaining our growing demand for energy.

Ohio's geology serves to contain the volumes of materials we produce in our homes, our commercial operations, our industries. Without geologic knowledge, we would be prone to misplace the location and construction of such disposal facilities, possibly impacting other aspects of our geology such as our significant ground water aquifers. Our common goal, subsist and grow while preserving the environmental integrity of our geology.

In the early seventies, British economist E.F.Schumacher published “Small is Beautiful”, one of the earliest books promoting sustainability. Within his writing, Schumacher refuted the idea that “bigger is better”. His take on sustainable environmental existence was a belief of his philosophy of “enoughness”.

Schumacher believed mankind's greatest material resource is our land. The future of a society could be determined by studying how they utilized their land. Beyond material resources, it was Schumacher's contention that our greatest resource is education. Mankind has always had the same primary resources at hand, and how we use those resources for the betterment of society comes from the mind. EECO: knowledgeable individuals, assuring “enoughness” for current and future generations.

EECO can earn a donation every time you search the Internet and shop online!!!

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FEATURED IN

The New York Times CBS NEWS THE OPRAH MAGAZINE THE WALL STREET JOURNAL FORTUNE

The Seas of Ohio, continued

Springs, Scioto Saline, Saline Township, Buffalo Lick found in Licking County, the Licking River, Elk Lick, (Clermont County), Salt Fork State Park (Guernsey County), and Blacklick (Columbus Area).

Understanding that the salty brine that was so important to the early settlers of Ohio came from the warm shallow seas that once covered Ohio millions of years ago, makes the history and geology of Ohio even more interesting.

Age of Ohio's Surficial Geology



Resources for Additional Information regarding Ohio's Geology:

*Camp, Mark. (2006). *Roadside Geology of Ohio*, Mountain Press Publishing.

*Feldman, Rodney, et. al. (1996). *Fossils of Ohio*, Ohio Department of Natural Resources, Division of Geological Survey, Bulletin 70.

*Herdendorf, Charles E., PhD. (March 4, 2008), from Ohio Academy of Science Website:

<http://www.obiosci.org/OHIOSCIENCE200.APPENDIX.htm>

*Ohio Department of Natural Resources, (May 14, 2008) Website:

<http://www.dnr.state.oh.us/Home/gdefault/tabid/7105/Default.aspx>

*U.S. Department of the Interior, U.S. Geological Survey (January, 2006) Website: <http://oh.water.usgs.gov/reports/pub-biblio.html>

*Graphic from:

<http://www.ohiohistorycentral.org/entry.php?rec=1379>

*For a full color image visit www.eeco-online.org

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Save the Date!

Mark your calendars today!

EECO

**Environmental Education Council of Ohio
42ND ANNUAL CONFERENCE**

EASY TO BE GREEN

**Deer Creek State Park
April 30 - May 3, 2009**

**Call for Presenters
available online**

Something for everyone who is going "green" at work or at home!

GREEN BUILDING & GREEN ENERGY: Buildings and the structures associated with them can impact the environment in many ways from energy use to urban heat island effect. New developments in green technology and operations can help us in our goal to be environmentally sustainable. This strand will explore the implementation of green principles in the design, construction, and maintenance of buildings and associated green spaces.

GREEN CONSUMER: As consumers, we strive to use the power of our purchasing dollars to support companies whose products and practices are "green." From green events and green products to energy efficiency, water conservation, and transportation, this strand explores ways to help individuals, organizations, and companies make truly sustainable purchasing decisions.

GREEN ENVIRONMENT: Land Use management is more than managing renewable resources on a government level. Land Use pertains to people and communities working together in developing and maintaining green spaces and green beltways. Exposure to nature is known to have health benefits for adults and children. Sessions in this strand will help you learn more about how you can increase, protect and enjoy the "greenness" of your community.

GREEN EDUCATION STRAND: As awareness of the need to think and act "green" spreads through our communities, educators have an important role in facilitating environmental literacy. Formal and non-formal educators will give presentations on how to learn about and investigate the environment, and offer teaching strategies to help you guide students to make intelligent, informed decisions to create and maintain a "greener" environment.

GREEN HEALTH STRAND: Quality of life, both within and outside of the home, school, workplace & community. How does being green and sustainable have a healthy impact on our lives? Learn how active healthy living can be achieved through effective use of our built and natural environment and what effects living green can have on asthma, diabetes and obesity. This strand examines the role that green health factors into physical activity, mental health, healthy eating habits and tobacco free, walk-able environments.



www.eeco-online.org

Being "green" used to mean being different - apart from the mainstream. But as awareness of the importance of everything from energy use to water conservation has increased, we find that green design, practices, and products are becoming more common. Join us to celebrate the emergence of a future in which it is "Easy to be Green."

CEU's and Graduate Credits (up to two semester hours, \$264 per hour) available through Ashland University

Sessions aligned to the Ohio Academic Content Standards will be available in the Green Education Strand



Online registration begins January 15, 2009

More conference information will be posted soon!

www.eeco-online.org

Naturally Nelson

Nelson Strong, Contributing Editor



The first question I would ask if I were reading this would be either, “Who is Nelson?” or “Why is there a page in my EECO Newsletter called ‘Naturally Nelson?’”

Fair enough. For those who don’t know me, by the time you are reading this I will be retired from the Ohio Department of Natural Resources – Division of Soil and Water Conservation after 29+ years, mostly as administrator of the education-information program. I’m also a long-time EECO member and edited this newsletter for eight-odd years (some of them odder than others). I am a naturalist at heart and an avid photographer. I love to garden, suffer from wanderlust, and hate to write stuff about myself...so that’s enough for now.

As for “why” there is a page called “Naturally Nelson” in your newsletter...Well, I was offered the opportunity to contribute a column to the newsletter on a regular basis: anything I cared to write about. Not wanting to fade into the mists of retirement too quickly, I took the bait.

So here it goes...

20 Years of Environmental Education Excellence

Congratulations to the Ohio Envirothon – which celebrated its 20th Anniversary this year. Congratulations also to the Chardon High School Envirothon team for winning the state event and placing 5th among the 54 competing teams from across the US and Canada at the Canon Envirothon in Arizona in early August.

In Ohio, the Envirothon is sponsored by Soil and Water Conservation Districts and ODNR. A team event for high school age students that tests their knowledge of soils, aquatic ecology, wildlife, forestry and environmental issues, Envirothon is a great outdoor-based learning experience.



Learn more about Envirothon at www.envirothon.org. Click on “Local Programs” to find a link to the Ohio Envirothon site.

Meet Magnolia acuminata



Some time back I began writing profiles of native Ohio plants and animals for the naturalists among us and to encourage their study. I plan to continue the tradition in this column.

The cucumber magnolia or cucumbertree is the northernmost-occurring magnolia in North America, ranging into southern Ontario. It is also the largest magnolia, and Ohio (North Canton in Stark County) is home to the biggest known individual, with a trunk circumference of 288 inches, a height of 79 feet, and an 88-foot spread.

Cucumbertree leaves are huge (10” or longer) and pointed (or acuminate) at both ends. Its flower is similar to that of the tulip tree, which is also in the magnolia family. In July and August search the ground for the 2-3 inch, bright-red oblong cucumber-like seedpods. The seeds provide a food source for many wildlife species. A stately forest, cucumber magnolia usually occurs singly in association with American beech, sugar maple, tulip tree, basswood, oak, hickory and other northeastern species.

We observed several cucumber magnolias during the EECO-sponsored Language of Nature workshop in the Cuyahoga Valley NP this past July. If you have not attended one of these workshops, it’s a great way to practice your nature writing skills and meet other “native Ohioans.”

*Insert and funding for this newsletter is generously provided by
Ohio Environmental Education Fund (OEEF)*



Ohio Environmental Education Fund Grant Writing Workshops 2008

Monday October 27, 2008: Grant Writing 103 (OEEF peer reviewer training), 4:00 – 7:00 p.m. at the Cincinnati Zoo, Frisch's Theater, 3400 Vine Street, Cincinnati, OH 45220, sponsored by the Cincinnati Zoo and Botanical Garden, Environmental Education Council of Ohio Region 5, and Ohio EPA Office of Environmental Education.

To register, contact Suzanne.Magness@hamilton-co.org or 513-946-7736.

Tuesday, October 28, 2008: Grant Writing 101/102 (full-day workshop), 10:00 a.m. – 5:00 p.m. at the Cincinnati Zoo, Frisch's Theater, 3400 Vine Street, Cincinnati, OH 45220, sponsored by the Cincinnati Zoo and Botanical Garden, Environmental Education Council of Ohio Region 5, and Ohio EPA Office of Environmental Education.

To register, contact Suzanne.Magness@hamilton-co.org or 513-946-7736.

Additional workshops are planned for 2008-2009, dates and locations TBA. Please check back at www.epa.state.oh.us/oeeef for other possible dates. If your organization would be interested in hosting a local workshop, please contact oeeef@epa.state.oh.us

OEEF offers several different workshops:

Grant Writing 101: Finding the Right Funder

(format: one hour presentation or three-hour interactive workshop)

Prospecting tips to help you identify foundations, corporations, and government grant programs, and how to approach different kinds of grantmakers.

Grant Writing 102: Writing a Winning Proposal

(format: one hour presentation, or three-hour interactive workshop)

How to avoid common mistakes applicants make, and develop realistic objectives, activities and budgets.

Grant Writing 103: What's She Got That I Ain't Got?

(format: three hour interactive workshop)

Want to write better grants? Compare weak and strong proposals side-by-side and get a funder's perspective on what makes for a winning application. The Ohio Environmental Education Fund will share examples from 17 years of grant making to show why one education project is more likely to be successful than another, and which proposal is more likely to be funded. One of the best ways to become a better grant writer yourself is to review others' proposals. Practice scoring online applications, using OEEF's preferred characteristics for projects targeting a K-12 or adult audience. Participants will be certified as OEEF volunteer peer reviewers. It is recommended, but not required, to take 101-102 before taking 103.

OEEF grant writing workshops are generally offered for free, or for a small fee to cover the cost of a box lunch. The Ohio Environmental Education Fund provides approximately \$1 million annually in grants for environmental education projects targeting pre-school through university students and teachers, the adult general public, and the regulated community. For more information, contact the Ohio EPA Office of Environmental Education, oeeef@epa.state.oh.us or (614) 644-2873.

New Water Activities for Grades 3-5 from US EPA

A Day in the Life of a Drop is a set of activities designed to help students in grades 3-5 understand the connections between the source of the water they use and the ways their water use habits affect the environment and human health. Students also learn how to reduce their impacts and engage family members. The learning materials include a teachers guide, two student worksheets, a spreadsheet to track water use at home, and a pledge for students and their families to filter out bad water habits and save water for the future. The new curriculum can be found on U.S. EPA's Web site at www.epa.gov/watersense/water/drop.htm

Recent OEEF Grants for K-12 and University Education

Ohio University, Environmental Studies Program, "The Kanawha Education Project (KEEP)," \$49,500, Athens, Belmont, Fairfield, Lawrence, Muskingum, Pike, and Ross Counties, Audience: University. Contact: Michelle Morrone, morrone@ohio.edu, 740-593-9549.

Expands a faculty development program to integrate environmental sustainability issues into undergraduate curricula, particularly in disciplines that are not traditionally environmentally focused. Builds on a successful pilot project conducted at Ohio University during the 2007-2008 academic year and expands the outreach to five regional campuses in Chillicothe, Ironton, Lancaster, St. Clairsville, and Zanesville. Project will modify at least 20 courses to incorporate the environment as an integrating theme, and increase the environmental literacy of at least 600 undergraduate students who participate in the revised classes. Collaborators include the Monday Creek Restoration Project, Rural Action, and Sunday Creek Associates, as well as multiple departments within the university.

Miami Valley Career Technology Center, "Biodiesel Production and Use at a Career Center in Southwest Ohio," \$14,898, Montgomery County, Audience: High School. Contact: Michael Buchanan, mbuchanan@mvctc.k12.oh.us, 937-854-6385.

Provides a compact automated biodiesel processor to be installed and operated by MVCTC students to produce biodiesel for use in a variety of engines and vehicles including diesel school buses, and agricultural and construction diesel equipment operated by students. Students will study the sources, industrial manufacturing processes, uses and benefits of biodiesel and other renewable fuels, perform maintenance and diagnostics on the diesel equipment, test for carbon monoxide emissions and measure fuel consumption. Agriculture Technology students will harvest, grind and press soybeans for oil feedstock to the biodiesel process. Multi-media Tech Prep students will produce a video and Web-based graphics documenting the project, for distribution to other schools and career centers statewide. The Regional Air Pollution Control Agency is collaborating.

Mill Creek Restoration Project, "Mill Creek Green Schools/Green Infrastructure Program- Pilot Year," \$45,000, Hamilton County, Audience: Middle and High School. Contact: Lora Alberto, lora@millcreekrestoration.org, 513-731-8400.

Supports efforts at nine Cincinnati public schools to involve 6th-12th grade students in Green Infrastructure projects to reduce storm water runoff from the school properties. Students will participate in site assessment, installation, maintenance and monitoring of projects such as reforestation, rain gardens, vegetated swales, wetlands and green roofs that use soils and vegetation to filter and absorb rainfall, evaporate it back to the atmosphere, and reuse it onsite. After the one-year pilot project, the program will extend to 50 schools over the next five years. Collaborators include the Cincinnati Public Schools, Cincinnati Storm Water Management Utility, Civic Garden Center, Master Gardeners Program, Metropolitan Sewer District of Greater Cincinnati, and Rain Garden Alliance.

Black Swamp Bird Observatory, "Ohio Young Birders Club (OYBC) Field Training Program," \$25,355, Clark, Delaware, Erie, Franklin, Holmes, Huron, Lorain, Lucas, Ottawa, Sandusky, Union and Wayne Counties, Audience: Middle and High School, S08G-056. Contact: Kimberly Kaufman, kimberly1kaufman@aol.com, 419-898-4070.

Provides field trips for youth ages 12-18 for outdoor laboratory experiences with naturalists and researchers, to increase their field observation and data collection skills, and their understanding of how changes to the environment affect the health and survival of plants and wildlife. Collaborators include the Black River Audubon Society, Greater Mohican Audubon Society, Kirtland Bird Club, Lake Erie Science and Nature Center, Ohio Ornithological Society, Ottawa National Wildlife Refuge, Time & Optics Limited, Toledo Naturalists Association, Wild Ohio Magazine, and Woodmore Schools.

Delaware City Schools, David Smith Elementary School Arts Council, "Impact of Waste on the Olentangy River Through Arts Learning," \$4,988, Delaware County, Audience: Elementary School. Contact: Susanne Mussenden, susanne287@aol.com, 740 833-1350.

Provides funding for guest artists, bus transportation, water quality monitoring and paper-making supplies for a program at an arts-integration school on how recycling and waste handling practices impact the Olentangy River Watershed. Over 400 K-4th grade students will be participating. Collaborators include the Delaware General Health District, Delaware Soil and Water Conservation District, and the Wexner Center for the Arts.

St. Marys City Schools, Memorial High School, "Project BLUE: Building Local Unpolluted Environments," \$4,570, Auglaize County, Audience: High School. Contact: Tami Golliday, tami.golliday@smriders.net, 419-394-4011.

Forty high school students will research local environmental issues and develop presentations about them for other science classes and local civic groups, using advanced technologies. Topics include climate change, water and air resources, solid waste and recycling. Grant funds provide audio/visual equipment to support the project. The St. Marys Rotary Club and local chapter of Soroptimist International are collaborating.

Simon Kenton Council, Boy Scouts of America, "Environmental Science Merit Badge," \$4,956, Licking and Vinton Counties (plus 15 other central and southeastern counties), Audience: High School. Contact: Brian Asbury, basbury@skcbsa.org, 614-436-7200 Ext. 216.

Provides testing equipment, supplies and instructional support to implement an Environmental Science Merit Badge at two summer camps (Licking, Vinton County) for scouts from 17 Ohio counties. To complete the requirements, scouts will conduct experiments, complete activities and keep journals on issues related to ecology, air pollution, water pollution, land pollution, endangered species, pollution prevention and resource conservation. Participating scouts will also explore careers in environmental science, and the components of an environmental impact statement for a construction project. Experimental activities include water quality monitoring and testing for airborne particulates, ozone levels, and acid rain.

Ohio River Foundation, "Ohio River Watershed Outreach Program," \$5,000, Clermont and Hamilton Counties, Audience: Elementary-High School. Contact: Erin Crowley, educator@ohioriverfdn.org, 513-377-1408.

Supports a traveling classroom program bringing river education to students (grades 2 - 10) in the Ohio River Watershed. Three standards-based classes will be offered: Wonderful World of Watersheds, Macroinvertebrates, and The Water Cycle. Hands-on lessons will incorporate live specimens, the EnviroScape Watershed Model, and lesson plans adapted from Project WET.

After School Discovery, Inc., "Waterways Outdoor Adventure," \$4,800, Ashtabula County, Audience: Elementary School. Contact: Patricia Seymour, pseymour@afterschooldiscovery.com, 440-993-1060.

Provides a new soil, rock and mineral component, student transportation, field trip fees, teacher professional development and staff support for an ongoing after-school science and math program organized around environmental issues. Two hundred fifty students in grades 3-6 will participate in an Outdoor Learning Day on Lake Erie, with additional classroom and outdoor learning activities throughout the year, culminating in a symposium where they present their findings to their peers. Collaborators include Ashtabula Area City Schools, Buckeye Local Schools, the City of Ashtabula, 4-H Camp Whitewood, and Grand Valley Local Schools.

Ohio Farm Bureau Foundation, "Environmental, Economic and Social Awareness of Ohio Livestock Production," \$5,000, Statewide, Audience: Elementary and Middle School. Contact: Larry M. Antosch, lantosch@ofbf.org, 614-246-8264.

Provides bus transportation and supplies to support a 2-day tour for 25 teachers to experience an up-close view of animal agriculture in Ohio. The tour will include stops at livestock farms or production facilities to give teachers a hands-on approach to livestock farming, production practices and environmental controls. Columbus and Franklin County Metro Parks and the Ohio Livestock Coalition are collaborating.

Ashland County Park District, "Park Packs for Students and Families," \$800, Ashland County, Audience: Pre-Kindergarten – University. Contact: Louise Fleming, lfleming@ashland.edu, 419-289-2657.

Equips four topical backpacks that may be checked out free of charge by families or school classes, with binoculars, magnifying lenses, field guides, children's books, and craft supplies related to trees, birds, wildflowers, and butterflies. Ashland City Division of Parks and Recreation is collaborating.

Recent OEEF Grants for Adult Education

Highlands Nature Sanctuary, "Appalachian Forest Museum Interpretive Displays," \$49,760, Highland County. Contact: Bruce Lombardo, museum@highlandssanctuary.org, 937-365-0101.

Provides a series of interpretive exhibits on the environmental and economic importance of Appalachian deciduous forests and their role in maintaining healthy waterways and biodiversity. The exhibits will be housed in a former visitor center for the Seven Caves and Rocky Fork Gorge, with the goals of increasing public understanding of forest ecology, and increasing attendance by 20% a year for the next five years. Wilderness East and the Highland County Convention and Visitors Bureau are collaborating.

Lawrence Soil and Water Conservation District, "What You Should Know About Your Septic System," \$4,000, Lawrence County. Contact: Carrie Yaniko, carrie.yaniko@oh.nacdnet.net, 740-867-4737.

Provides a one-day field day event for residents on the installation, operation and maintenance of home sewage treatment systems. Leaking septic systems are a significant source of water pollution in Ohio. With new rules from the Ohio Department of Health in the works, it is important for people to understand how important it is to have a properly installed and operating septic system. The seminar will feature a demonstration of a new system being installed, with local experts on hand to answer questions. Seminar attendees will also receive a binder or CD of reference information. The Lawrence County Health Department and Union-Rome Sewer District are collaborating.

Carroll Soil and Water Conservation District, "Agriculture – Natural Resource – Conservation Expo," \$4,736, Carroll County.
Contact: Linda Yeager, linda.yeager@oh.nacdnet.net, 330-627-9852.

Provides logistical support for a one-day conservation expo. The event will include a keynote on sustainable agriculture and buying locally, as well as demonstrations and activities on management of soil, water, forests, wildlife, energy and mineral resources, and children's activities. Multiple local agencies and organizations are collaborating.

Adams Soil and Water Conservation District, "Adams SWCD Watershed Stewardship Project," \$5,000, Adams and Scioto Counties.
Contact: William Wickerham, bill.wickerham@oh.nacdnet.net, 937-544-5121.

Provides 8 additional canoes to supplement ongoing stream cleanup and watershed education programs in the Ohio Brush Creek, Scioto Brush Creek and Ohio River watersheds, including two science camps. Canoe trips include demonstrations of the impacts of soil erosion, litter, and other pollutants, as well as watershed functioning, the importance of wooded riparian zones, and endangered and threatened species. Collaborators include Adams Brown Recycling and Litter Prevention, Adams County Ohio Valley Local Schools, The Edge of Appalachia Preserve, and Friends of Scioto Brush Creek.

Madison Soil and Water Conservation District, "Prairie Oaks Rain Garden Workshops," \$1,150, Madison County. Contact: Susan L. Stanford, susan.stanford@oh.nacdnet.net, 740-852-4004.

Provides supplies for a series of workshops to educate residents on planning, designing, and installing rain gardens on their properties for backyard conservation and storm water retention. Franklin Soil and Water Conservation District and the Prairie Oaks Metro Park are collaborating.

Ohio EPA-EECO Partnership Regional Priorities



- Region 2: high school, environmental careers
- Region 3: social studies, environmental careers
- Region 4: urban/multicultural, environmental careers
- Region 5: pre-service teachers
- Region 6: language arts
- Region 7: adult education
- Region 8: urban/multicultural, environmental careers
- Region 9: pre-service teachers, high school
- Region 10: high school, environmental careers
- Region 11: adult education, environmental careers
- Region 12: early childhood, urban/multicultural

Ohio's Natural Arches

Lynn White

Arches National Park in Utah is a sight to see, but we do not have to travel that far to see natural arches: you can find them right here in Ohio! The Ohio Natural Arch Survey has recorded over 60 arches so far, and there are likely more just waiting to be discovered.

The criterion for a rock arch is a narrow, continuous archway of rock commonly spanning a ravine or valley. The term "bridge" has been used to refer to a span that has a natural stream flowing beneath it.

These natural features can form in a variety of ways. They are the product of erosion and weathering of resistant rocks, such as sandstone or limestone, that possess layers exhibiting different resistance to erosion. All arches are temporary features in the landscape and all will eventually succumb to the forces of gravity, erosion and weathering. A spectacular example of this occurred when Wall Arch, one of the largest and most photographed natural sandstone arches in



Rockhouse in Hocking Hills, Ohio's longest natural bridge

Southern Utah, collapsed. While the geologic forces that created the arches are still very much underway, in human terms it's rare to observe such dramatic changes.

The Division of Natural Areas and Preserves maintains a list of natural rock bridges as well as other natural features and the Division of Geological Survey maintains an informal record. "New" arches and bridges are still being discovered in Ohio. Even locally, many people are unaware of the existence of some of Ohio's natural arches and bridges. Some smaller features have never been recorded and have fallen through the cracks because most people are simply unaware that they are of any particular interest to anyone.

For more information please visit The Division of Natural Areas and Preserves, www.dnr.state.oh.us/tabid/1692/default.aspx or the Division of Geological Survey, <http://www.dnr.state.oh.us/geosurvey/>

Erratic Behavior: Clues to Ohio's Glacial Geology

Cheryl Mattevi, EECO Region 12

Are you ready for a treasure hunt? For most Ohioans, a visit to the local sand and gravel supplier will yield a bucket of colorful treasures. Some people might just call them rocks. However, these rocks are the very essence of scientific investigations and clues to Ohio's glacial and geologic history. Just a rock, you say? Let's look closer!

Most of us know that Ohio was once glaciated, but have you ever wondered how geologists know that? Simple, they've consulted that treasure trove of rocks brought in by the glacier. Glacial erratics are by definition different in composition than the bedrock on which they were deposited. Since all of Ohio's bedrock belongs to the sedimentary group, when we find igneous and metamorphic rocks we know right away that some agent of erosion and deposition has carried them in. Mapping the position of large glacial erratics was one way early geologists sketched Ohio's glacial boundaries. Among other ways, they also looked at the distinctive landforms made by glacial deposition, and the obvious glacial striations (such as the grooves exposed in Kelleys Island State Park).

You can find just about any kind of rock in the glacier's collection. My personal favorites are the pink granites hauled in all the way from Canada. They are so distinct you can identify them as you drive along the highway. Coarse crystals of pink feldspar, gray quartz, and tiny black flakes of mica sparkle and clearly show the interlocking crystal structure so characteristic of the igneous rock group. Closely related to the pink granites are a group of metamorphic gneisses with the same minerals, but arranged in distinct bands because of the intense metamorphic pressure involved in their history. Although the crystalline igneous and metamorphic rocks are sometimes the most obvious, sedimentary rocks can also be erratics. Where the local bedrock is dominated by late Paleozoic shales and sandstones, a Devonian limestone from only a couple counties north is still an erratic, and adds the possibility of finding fossil treasures in the glacial collection. Very rarely, even gold and diamonds have been found in Ohio's glacial deposits!



The glaciers also picked up Ohio rocks and soil, and mixed everything together to make that huge layer of sediment of all sizes and types that we call glacial till. Ohio's sedimentary rocks are more easily pulverized and broken apart, so look more closely at the smaller pebbles, sands, silts and clays in those deposits and you will see the shattered remains of all those rocks. Most are drab gray or tan, and are the bulk of the material in the sediment. Lucky for us, those gently rolling piles of sediment are now weathered which makes our productive agricultural soils easy to farm and provides a landscape suitable for highways and house construction. Still, those big erratic boulders get in the way of digging foundations, so they often end up pushed to the edge of the drive or along the back property line. Take a look and see what treasures are in your own backyard!

You can find a list of fun and interactive glacial activities and resources on page 11



2009 Winter Snow Eco-Arts & Sustainability Conference



February 6-8, 2009
Camp Nuhop

1077 Hanover Twp. Rd. 2916
Perrysville, OH 44864



The winter themed conference will be geared to how arts in different mediums are linked to ecology as well as the sustainability and conservation of our natural world. Many sessions will be aligned to the academic content standards. CEU and one semester hour of graduate credit from Ashland University (\$264) will be available.

Visit www.eeco-online.org

- *Call for Presenters
- *Conference details
- *Online registration (coming soon!)

Camp Nuhop—located near Perrysville, Ohio midway between Cleveland and Columbus, and just south of Mansfield—is a residential summer camp for all children with learning disabilities, attention deficit disorders and behavior disorders. Surrounded by the 3,000-acre Mohican Forest and Pleasant Hill Lake Park and nearby Malabar Farm State Park, these natural areas provide excellent venues for boating, primitive camping, canoeing, tubing, and hiking.

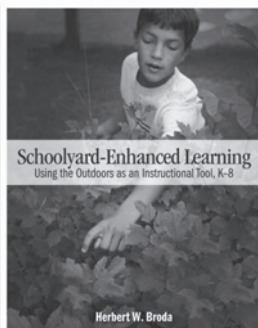
Facilities include a large dining room and lodge, a smaller lodge used as a classroom, 10 cabins, four shower areas and a staff dormitory.

Wholesome meals are provided by the camp's kitchen staff who are especially attentive to the individual dietary needs of our guests. Special diets must be planned with the Director of Operations prior to the conference.

Schoolyard-Enhanced Learning Using the Outdoors as an Instructional Tool, K-8

Herbert W. Broda

2007 | 192 pp/paper | ISBN: 978-157110-729-9 | \$17.50



"This is a practical, enthusiastic, and optimistic book aimed at helping teachers include outdoor learning time as an instructional strategy in their courses....This book is relevant for classroom teachers, school administrators, preservice teachers in training as well as those interested in education, social, and environmental issues."

-Education Book Reviews, April 2008

**Signed copies will be available for purchase when you attend the Winter Snow Conference.*

Visit www.stenhouse.com to preview the book and order online, or call 1-800-988-9812 to order by phone.

EECO Celebrates 5 Years!



In addition to celebrating the beginning of a new academic year, EECO is celebrating the five-year anniversary of service of our Executive Director, Brenda Metcalf. At the September 6 board meeting, a (dark chocolate, of course!) cake was part of a blatant effort to lure Brenda into reenlisting for five more. Brenda's tenure has included many accomplishments, improving EECO's administrative and accounting procedures, realigning the EECO-OEEF partnership and federal EETAP grant priorities to reinforce one another, strengthening the network of regional directors, diversifying EECO's funding sources, and raising EECO's visibility at events and conferences around the state. She is recognized nationally as a leader in environmental education, chairing the NAAEE state affiliates network and generously offering her time and expertise to mentor EE organizations in other states and Canadian provinces. Since this issue focuses on geology, we say, You Rock, Brenda!



Glacial Resources and Fun Activities!

- If you live in the glaciated part of Ohio, have a contest to find the largest glacial erratic sitting in a neighborhood driveway or along a country road. Measure in three directions and see who can find the specimen with largest single dimension.
- A good math activity is to figure the total volume of your best find, then calculate its weight. The best way to do that is to actually measure the density of a small piece of a similar type of rock, but a good average estimate is that a typical granite has a density of about 2.9 grams/cubic centimeter.
- Take an empty bucket to Lake Erie beaches or to most large streams in the glaciated area of Ohio (that would be all of western Ohio and northeastern Ohio to a line just south of Canton). You'll find an assortment of pebbles and cobbles that originally were part of the glacier's load.
- If you live in southeastern Ohio beyond the glacial border, another source of those treasures would be the gravel piles of your local landscape supplier. Streams, including the Ohio River, have carried pebbles and cobbles away from the glacial deposits and built up coarse deposits along their valleys. These deposits have been quarried for construction fill, aggregate, and landscape stone, and suppliers are conveniently located near most large cities. Although you won't find the huge boulders past the glacial front (the stream's water doesn't have near as much energy as the glacier's ice, so the heaviest materials can't be moved by the stream), there will still be a fun assortment to sort and describe.

The Ice Age in Ohio, 1997, by Michael Hansen, is one of the Educational Leaflets available at no cost from the Ohio Geological Survey. A free pdf file of this and a wealth of other Educational Resources about Ohio geology and glaciers can also be downloaded from their web site (<http://www.ohiodnr.com/geosurvey>).

Glacial Erratics, or What's the Biggest Rock in Ohio? Winter, 1984, Ohio Geology Newsletter. Ohio Geology is a quarterly publication of the Ohio Geological Survey. All issues as well as an index are available on their web site. The Spring, 1988 issue has an article on the Glacial Grooves.

Roadside Geology of Ohio, 2006, Mark J. Camp, Mountain Press Publishing Company.

Ohio's Natural Heritage, 1979, Michael Lafferty, Editor, Ohio Academy of Science. Recently reprinted and also available in a searchable CD-ROM and Educator's Edition (funded in part by an OEEF grant, it includes links to Ohio's Science and Social Studies Academic Content Standards and inquiry-based lesson plans in each chapter).

Under Ohio: The Story of Ohio's Rocks and Fossils, 2007, Charles Ferguson Barker, Ohio University Press, Athens, Ohio. This recently published book describes the geology of Ohio for an Elementary School audience.

Stone Wall Secrets, 1998, Kristine and Robert Thorson, Tilbury House Publishers, Gardiner, Maine. Also available: *Stone Wall Secrets Teacher's Guide*, by Ruth Deicke.

More activities

- Have a glacier race! Put a ball of Gak on a flat surface and tilt it slightly. Experiment with the angle, different weights on top, or place some small bits of gravel on the sheet and watch as the glacier flows along and picks them up.
- Make an icy glacier model. Show how glacial grooves are made by freezing a mixture of sand, small pebbles, and water in a margarine container and experimenting with how the ice moves across a layer of soil in a shallow pan. This glacier model is good to show glacial grooves and striations, but is brittle and not really comparable to the way the large glacier actually moves.
- Use a sprinkling can to gently rain down on the ice mass and form "streams" as well as glacial landforms. The streams will be able to sort the sediment by size and carry away only the finer materials.

Gak substitute recipe

Gak, a sort of goo made by the Mattel Toy Corporation, is a perfect model for a big mass of thick glacial ice, which behaves like a plastic, flowing in a way very different than the brittle small ice cubes that we get out of the freezer. This substitute for the commercial Gak was originally published by Dave Katz in the Flinn Scientific Catalogue, 1994, and is included in *Stone Wall Secrets: Teacher's Guide*, by Ruth Deicke.

Measure 5 ml (1 level teaspoon) of talcum powder into a zip lock bag. Add 25 ml (5 teaspoons) Elmer's glue, and 20 ml (4 teaspoons) water. Add up to 5 drops food coloring to the water if desired. Stir well.

Add 5 ml (1 teaspoon) of borax solution (made by dissolving 1 level tablespoon of borax in 1 cup of water), and knead. It will dry out with handling. Add a drop of water if too dry or a dusting of talcum powder if too gooey. It keeps fairly well in the plastic bag in the refrigerator.

Be sure to wash hands after handling (borax is toxic if swallowed), clean up all surfaces promptly, and dispose of any remains in the trash.

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Submit news articles, columns, or photos to khachp@hotmail.com
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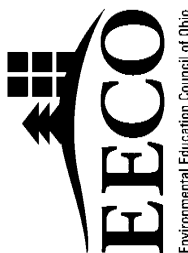
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For membership application, please contact
Josh Flory, Membership Manager.
For information about EECO's programs and services,
please contact Brenda Metcalf, Executive Director.

Visit EECO online at www.eeco-online.org

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