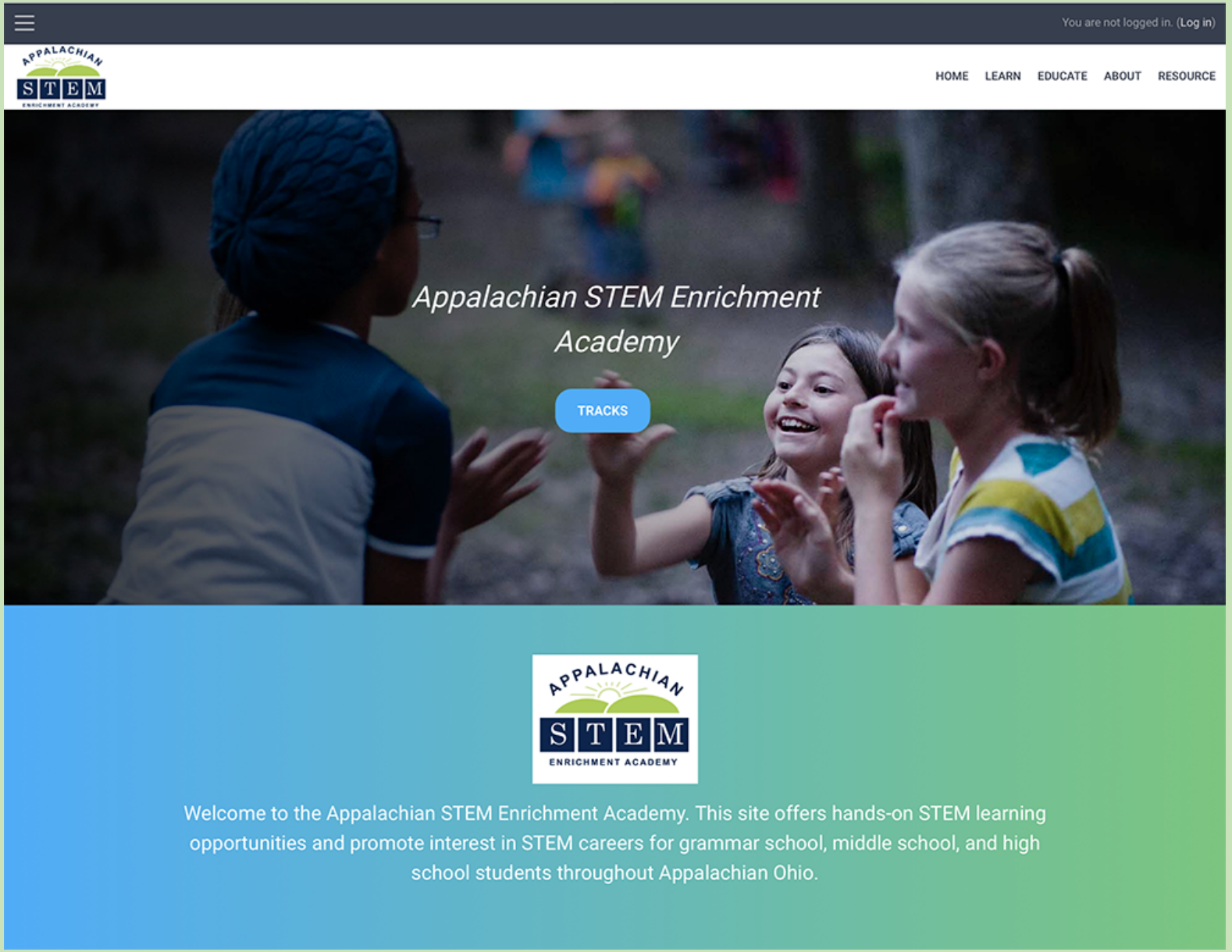
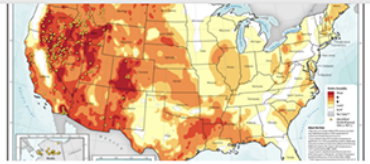
Appalachian STEM Enrichment Academy Online and In Person K-12 Curriculum

Jen Bowman
Natalie Kruse Daniels

In Appalachian Ohio, we are connected to the land, communities, history, and spaces around us. At Ohio University, we are proud of our history of encouraging students to be stewards of Appalachia, and of the entire world, by connecting them with skillsets and career pathways for creating a more sustainable future.


You are not logged in. (Log in)
HOME
LEARN
EDUCATE
ABOUT
RESOURCE
Appalachian STEM Enrichment Academy
TRACKS
Welcome to the Appalachian STEM Enrichment Academy. This site offers hands-on STEM learning opportunities and promote interest in STEM careers for grammar school, middle school, and high school students throughout Appalachian Ohio.


Geothermal Energy Grades 9-12
Coming Soon! Build a Solar Trac...
Geothermal Energy Grades K-4
Intro to STEM:
Geothermal Ene
PORTS 06: Enviro
Water Quality Gra
Aquatic Biology Grades K-4
Aquatic Biology Grades 5-8
Aquatic Biology Grades 9-12
Description
APPALACHIAN
STEM
ENRICHMENT ACADEMY
The Academy is free and open to the public for use from any internet-abled device at home or on the go



Geothermal Energy Grades 9-12

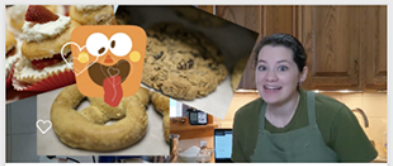
Description

Coming Soon! Build a Solar Trac...

Description

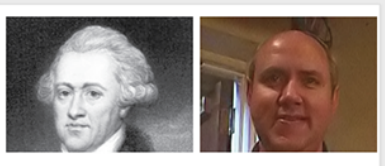
Geothermal Energy Grades K-4

Description



Intro to STEM: STEM is Fun!

Description



Intro to STEM: STEM Citizens

Description

Intro to STEM: STEM Careers

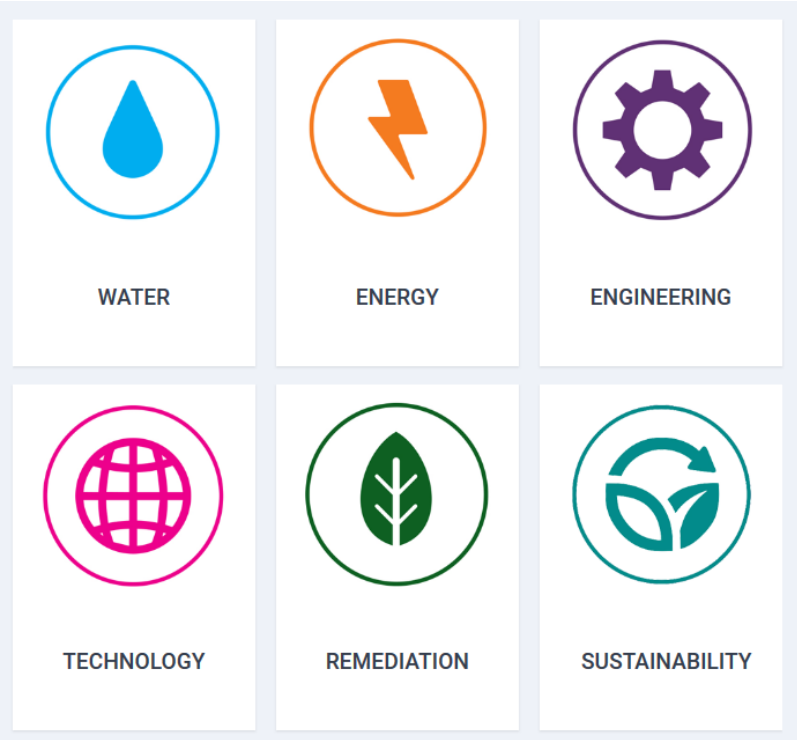
Description

APPALACHIAN STEM ENRICHMENT ACADEMY

- Science, Technology, Engineering, and Mathematics (STEM) academic disciplines are tied to future career opportunities in well-paying, enduring jobs
- Vital to engage our youth early
- Students with experience in STEM topics early on are more aware of STEM career opportunities
- Can be better prepared for planning their paths to preparing for future STEM jobs

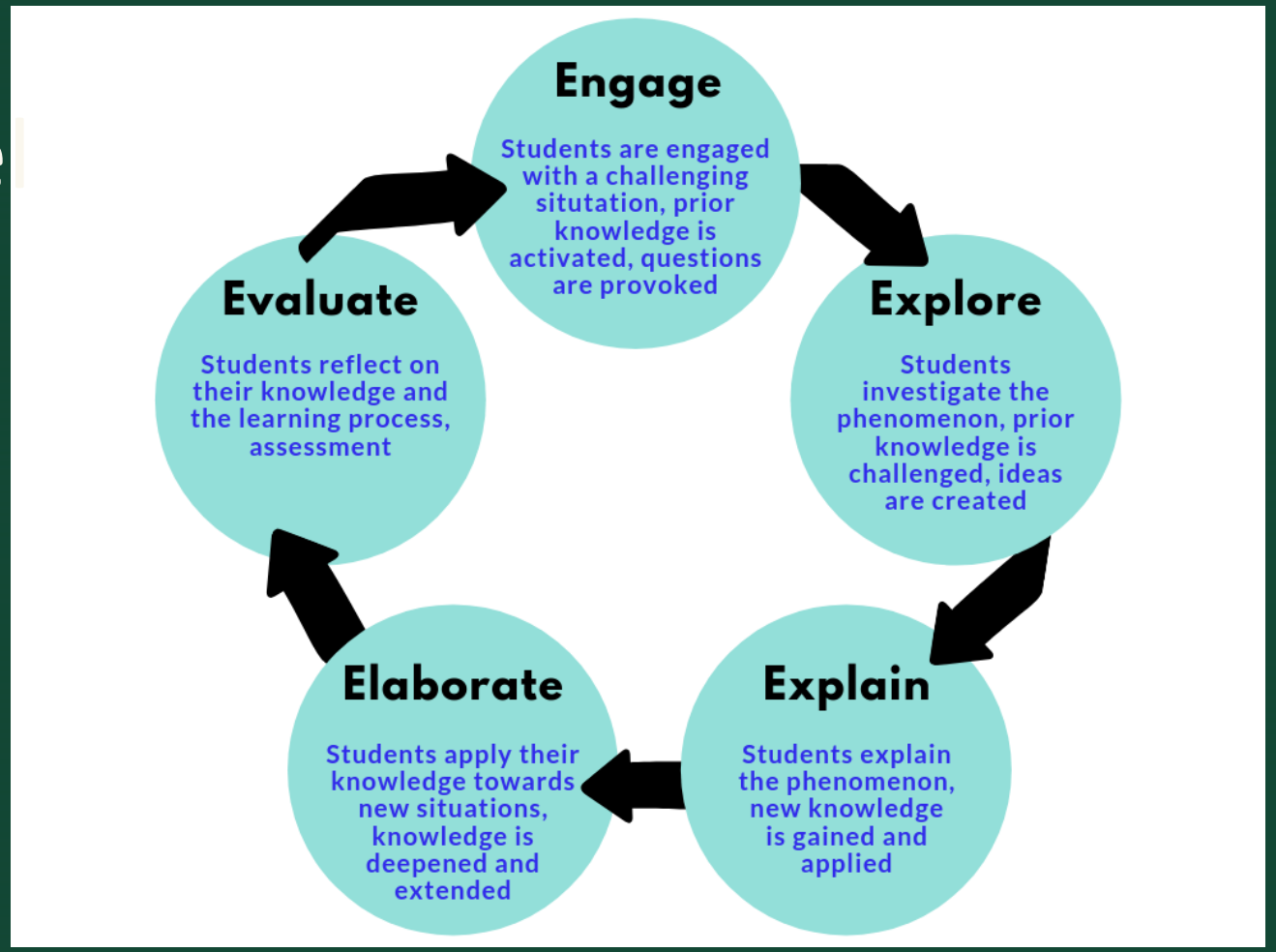
- The Academy serves as an online resource for ongoing STEM learning year-round
- Available 24/7/365.
- It can be utilized by teachers, after school groups, summer camps, parents/grandparents/caregivers, and students
- Six career tracks include water, energy, engineering, technology, remediation, and sustainability
- Lessons follow a "5E instructional model" to enable topical connections through engagement, exploration, explanation, elaboration, and evaluation
- Provides virtual hands-on STEM learning opportunities and career track development for K-12 students throughout Appalachia Ohio and beyond

APPALACHIAN STEM ENRICHMENT ACADEMY



5E Instructional Model

- Attributed to Rodger Bybee (1987)
- Based on the premise – Students construct knowledge from their experiences
- Engage, Explore, Explain, Extend, Evaluate
- Student –centered
- Hands-on/Collaborative



APPALACHIAN STEM ENRICHMENT ACADEMY

- Academy developed/implemented by a team of faculty and professional staff and students
- Along with contributions from external partners and subject matter experts.
- Learning modalities include a blending of seminars and interactive online sessions; hands-on learning activities, many of which can be carried out with items found at home; career videos; and student sharing via their online postings, videos, and social media interaction.
- In-person classroom presentations can be provided as well upon request and dependent on available resources.

A collaboration across several programs at Ohio University with joint funding and/or resource support from:

PORTSFUTURE
IMAGINING THE OPPORTUNITIES, GATHERING YOUR IDEAS
THE FACILITY AT PIKETON, OHIO

U.S. DEPARTMENT OF ENERGY

AMERICAN ELECTRIC POWER FOUNDATION℠

OHIO Museum Complex

constellation

Ohio Environmental Protection Agency

Ohio STEM Learning Network

OHIO UNIVERSITY
Voinovich School of Leadership and Public Service

Cross promotion and leverages funds across regional STEM efforts to expand reach and impact

Voinovich School STEM Partnerships and Programs

- Appalachian STEM Enrichment Academy (ASEA)
- American Electric Power Ohio Fund of the Columbus Foundation
- Constellation
- US Department of Energy Office of Environmental Management
- District Science Fair
- Fluor BWXT
- Jackson County Department of Job and Family Services
- Ohio Academy of Sciences
- Ohio Environmental Protection Agency Ohio Environmental Education Fund
- OHIO Museum Complex
- Ohio STEM Learning Network (OSLN)
- Pike, Jackson, Scioto, and Ross Counties Libraries
- Sugar Bush Foundation
- Soil and Water Conservation Districts and Watershed Groups
- The Nature Conservancy
- Various public schools in the region

Webmetrics

Date	Page Views	Visits	Date	Page Views	Visits
April 2022	7,651	1,730	November 2022	5,835	2,192
May 2022	4,766	1,876	December 2022	5,313	2,348
June 2022	4,802	1,724	January 2023	13,960	2,618
July 2022	11,456	3,574	February 2023	10,804	2,632
August 2022	24,490	7,249			
September 2022	13,216	3,115			
October 2022	15,627	2,719			

Site Demo

https://www.appalachianstemacademy.org/

Water Quality

Lesson Objectives

Student should be able to:
•Compare characteristics of healthy and impacted streams
•Describe how stormwater affects water quality and how to limit its impact
•Understand the impact that different pollutants have on water quality and where those pollutants tend to originate from
•Analyze maps and draw conclusions on water quality trends

This enrichment lesson is geared towards grades 9-12

Intro to Arduino

Lesson Objectives

Students should be able to:

- Explain how an Arduino may be used
- Describe components used with an Arduino
- Build a simulated circuit to use with pre-written code
- Modify Arduino code

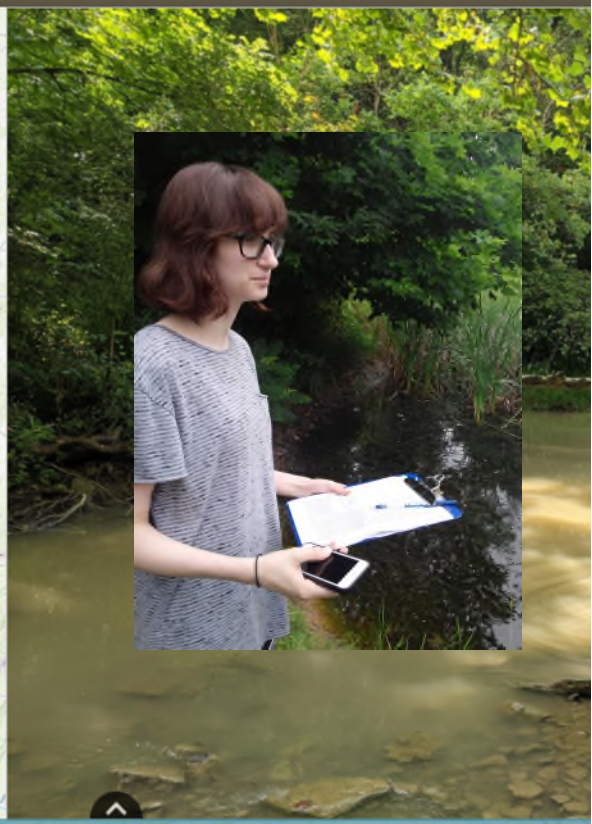
This enrichment lesson is geared towards grades 5-8

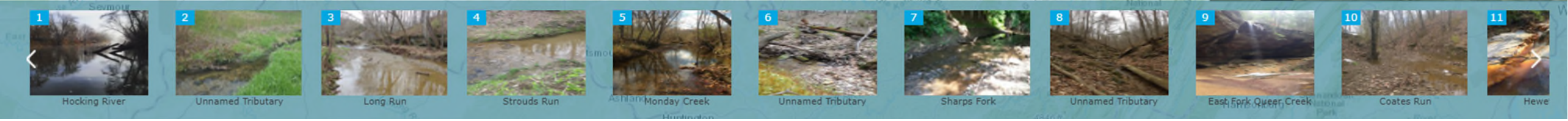
Ohio Watershed Data **My Backyard Stream**

OHIO UNIVERSITY

Home | Surface Water | Groundwater | Reports & Tools | HydroVIEW | Contact | Education | Log In | DMRM

My Backyard Stream





AMERICAN ELECTRIC POWER FOUNDATION

OHIO UNIVERSITY
Voinovich School of Leadership and Public Service

OHIO Museum Complex

Ohio STEM Learning Network

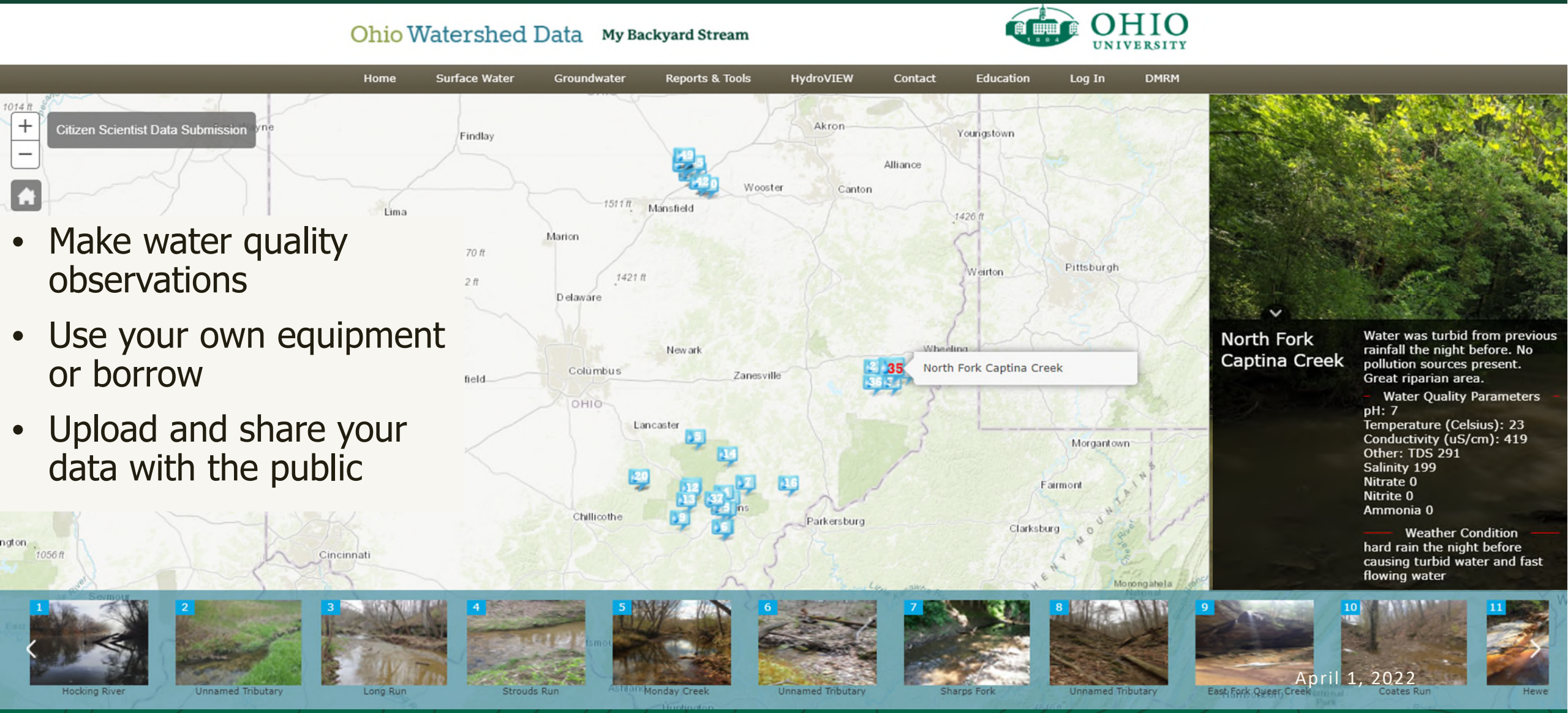
Ohio Environmental Protection Agency

U.S. DEPARTMENT OF ENERGY

OHIO UNIVERSITY

My Backyard Stream

https://www.watersheddata.com/Education/BackyardStreamCode.aspx



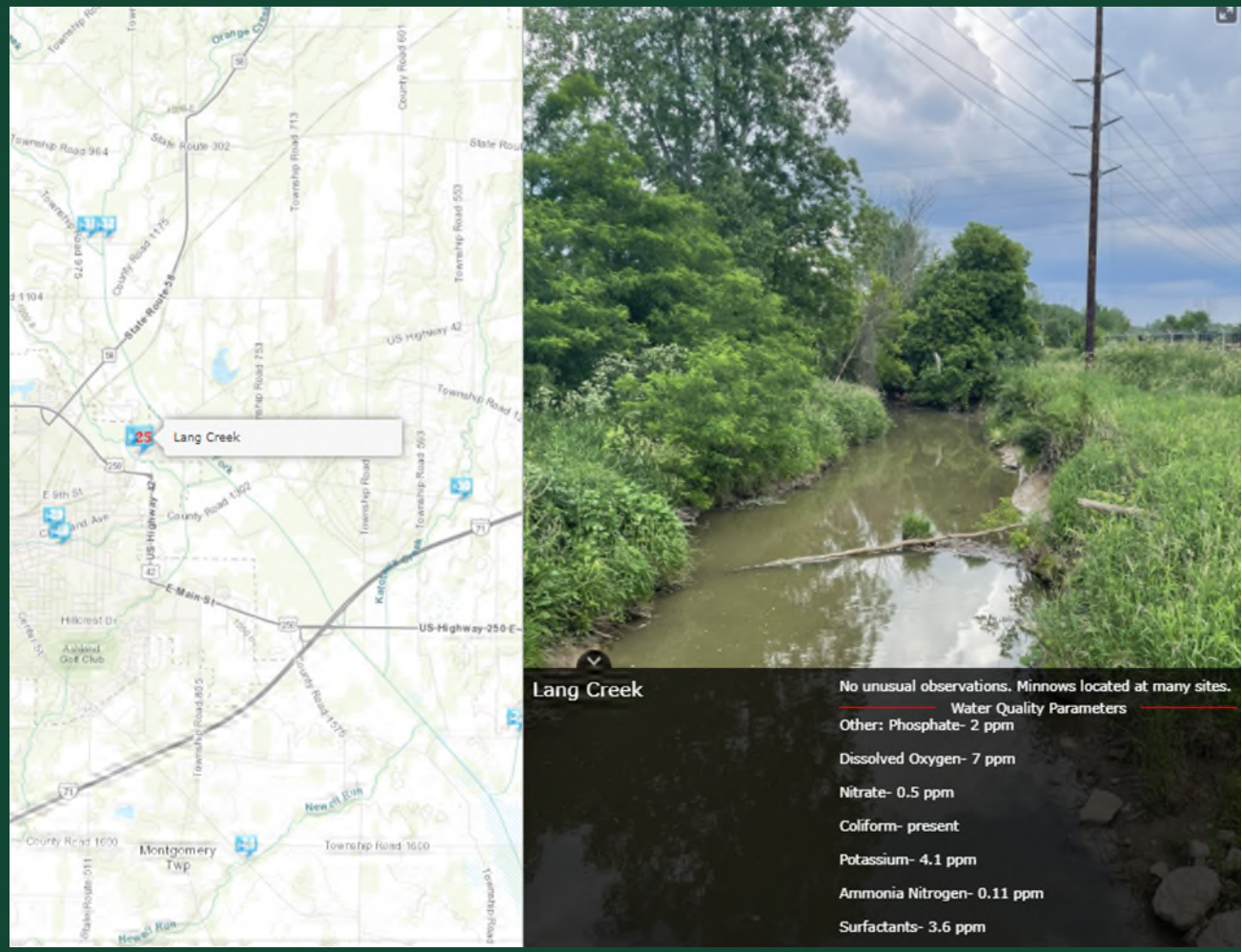
- Make water quality observations
- Use your own equipment or borrow
- Upload and share your data with the public

OHIO UNIVERSITY

My Backyard Stream

Objectives

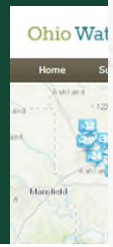
- To promote citizen science and volunteer monitoring in Ohio
- To engage public in water quality issues
- To promote understanding of watershed connections (i.e., drainage patterns, upstream/downstream)
- To provide a resources to educators

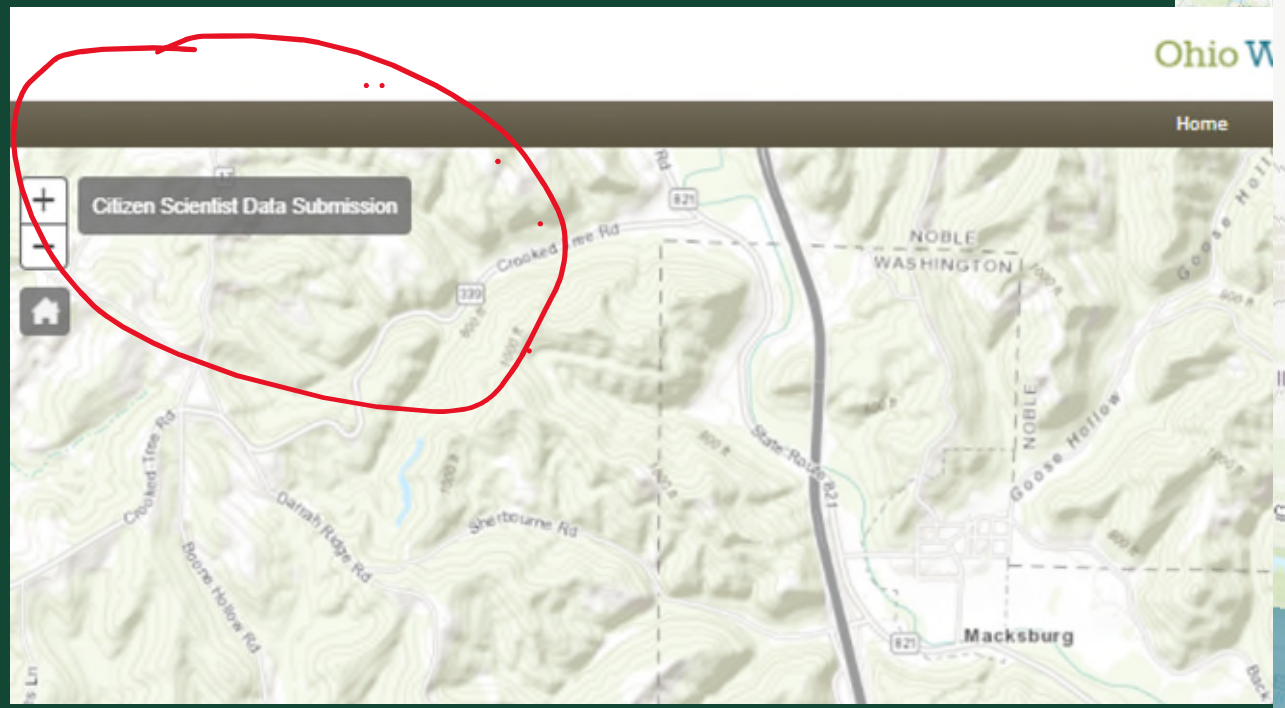


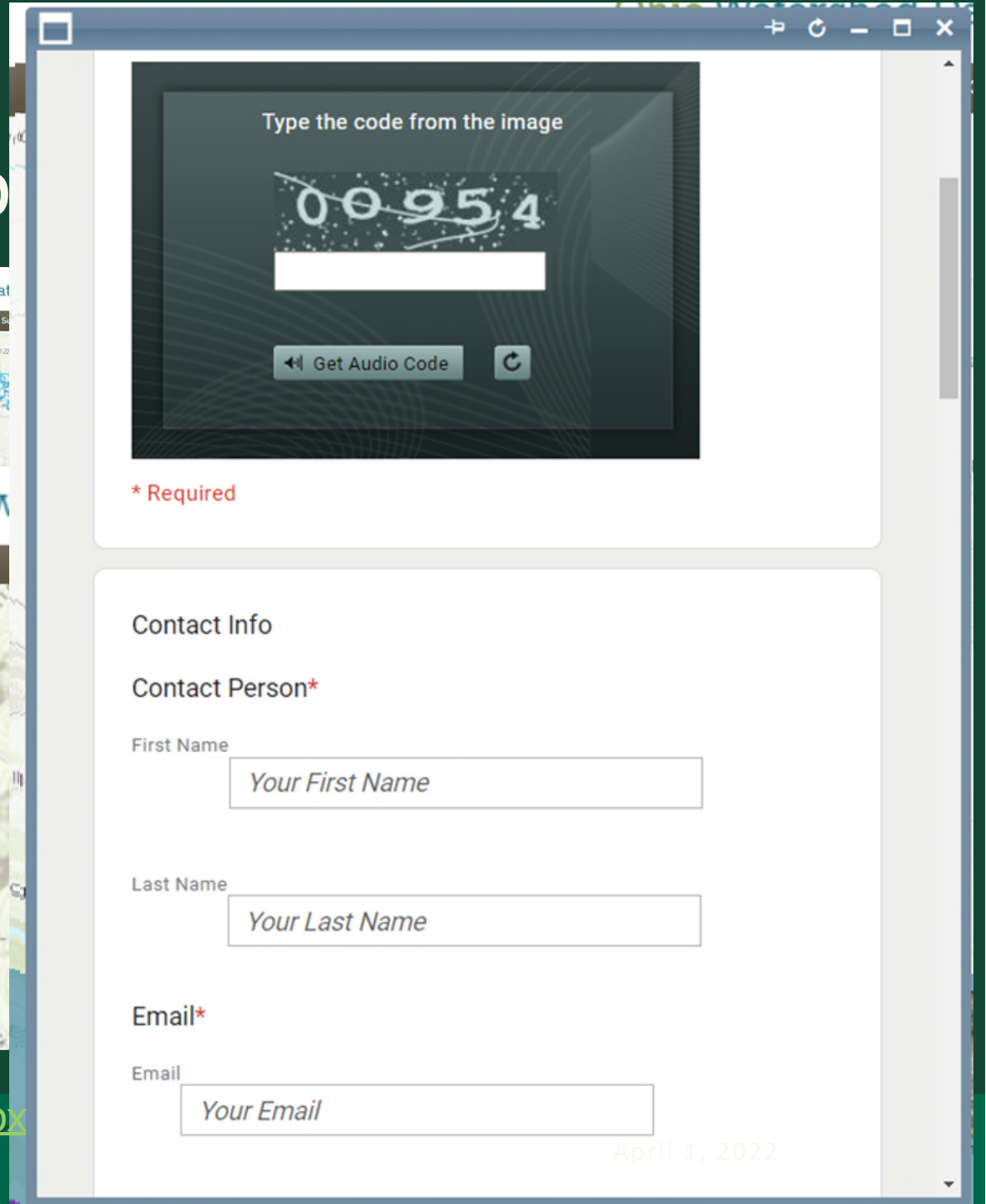
OHIO UNIVERSITY

My Backyard Stream Citizen Scientist Data Sub

- http://watersheddata.com/Education/BackyardStreamCode.aspx



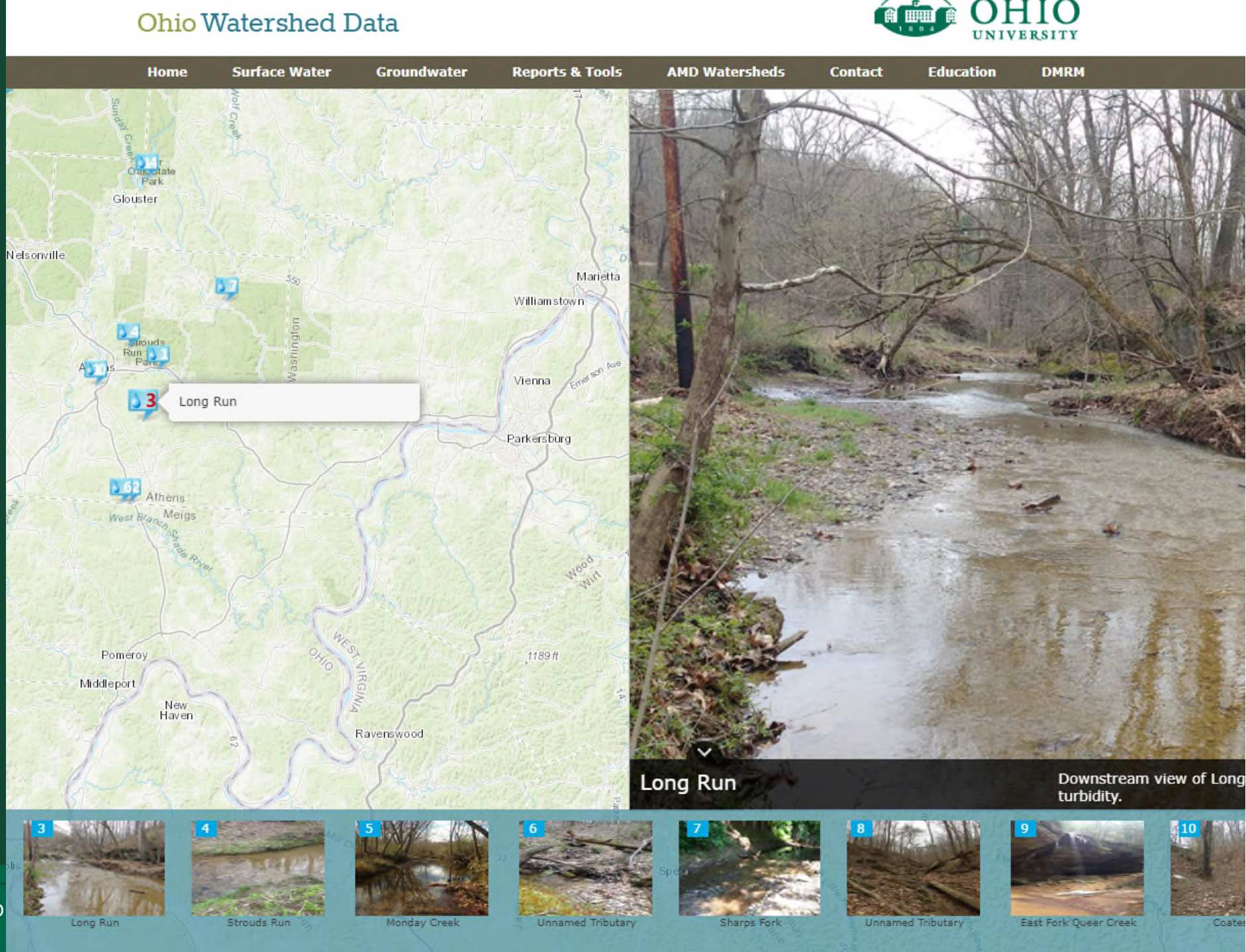




https://watersheddata.com/Education/BackyardStreamCode.aspx

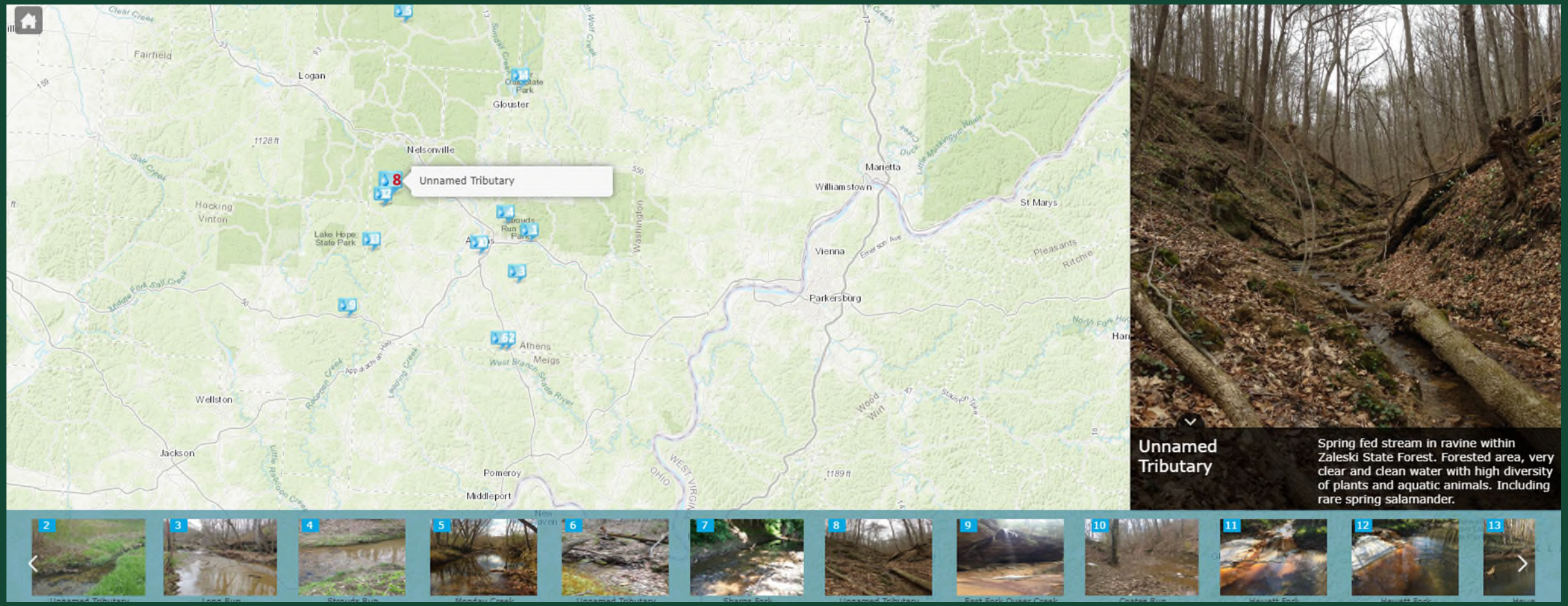
OHIO UNIVERSITY

My Backyard Stream



OHIO UNIVERSITY

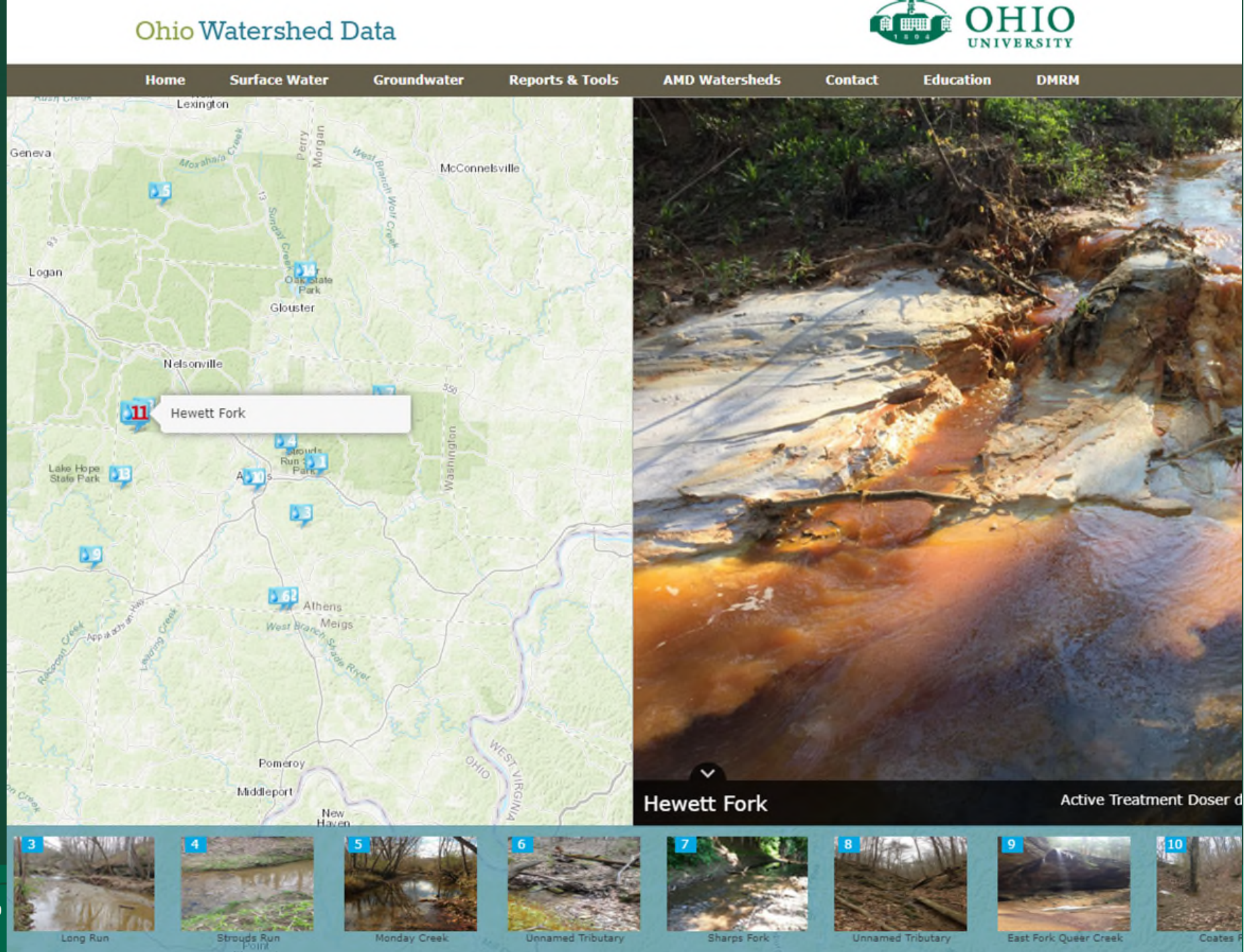
My Backyard Stream



FOREVER OHIO

OHIO UNIVERSITY

My Backyard Stream



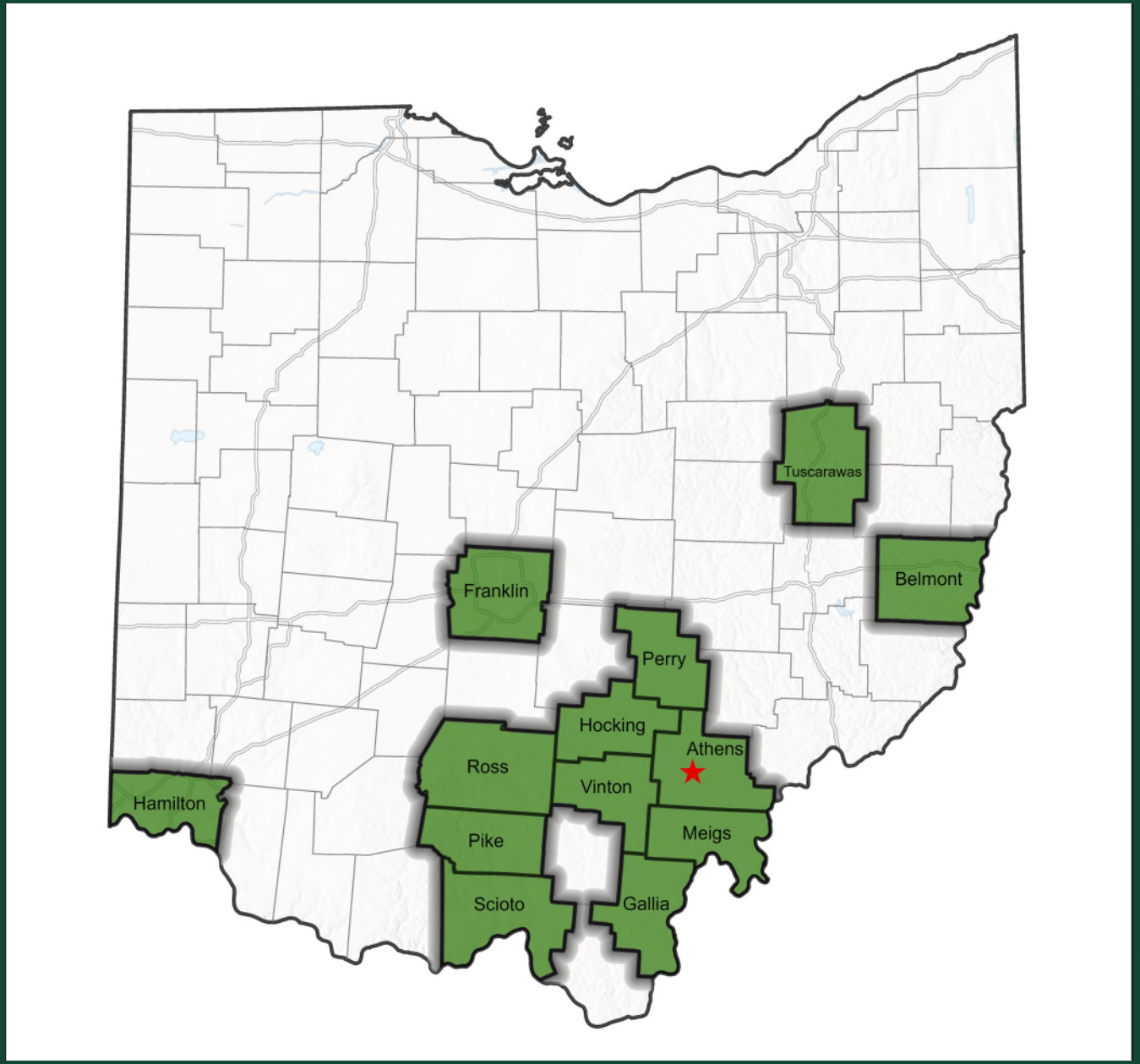
OHIO UNIVERSITY

Ohio Environment Education Fund (OEEF) grant– My Backyard Stream Program

- To promote citizen science and volunteer monitoring in Ohio
- 15 collaborators – Water Quality Kits
  - 4 sets of materials in each kit, groups of up to 20 people
  - Chemical Water Quality – 5 in 1 test strips, conductivity sensor, calibration solution, thermometer
  - Biological Aquatic Organisms – macroinvertebrate dip net, LaMotte flash card, fish net, sorting tub, forceps, and magnifying viewer
  - Physical Habitat – Transparency tube, substrate caliper, stopwatch, and measuring tape
  - Content list and field collection sheets
- Trainings and streamside demonstrations for families and educators

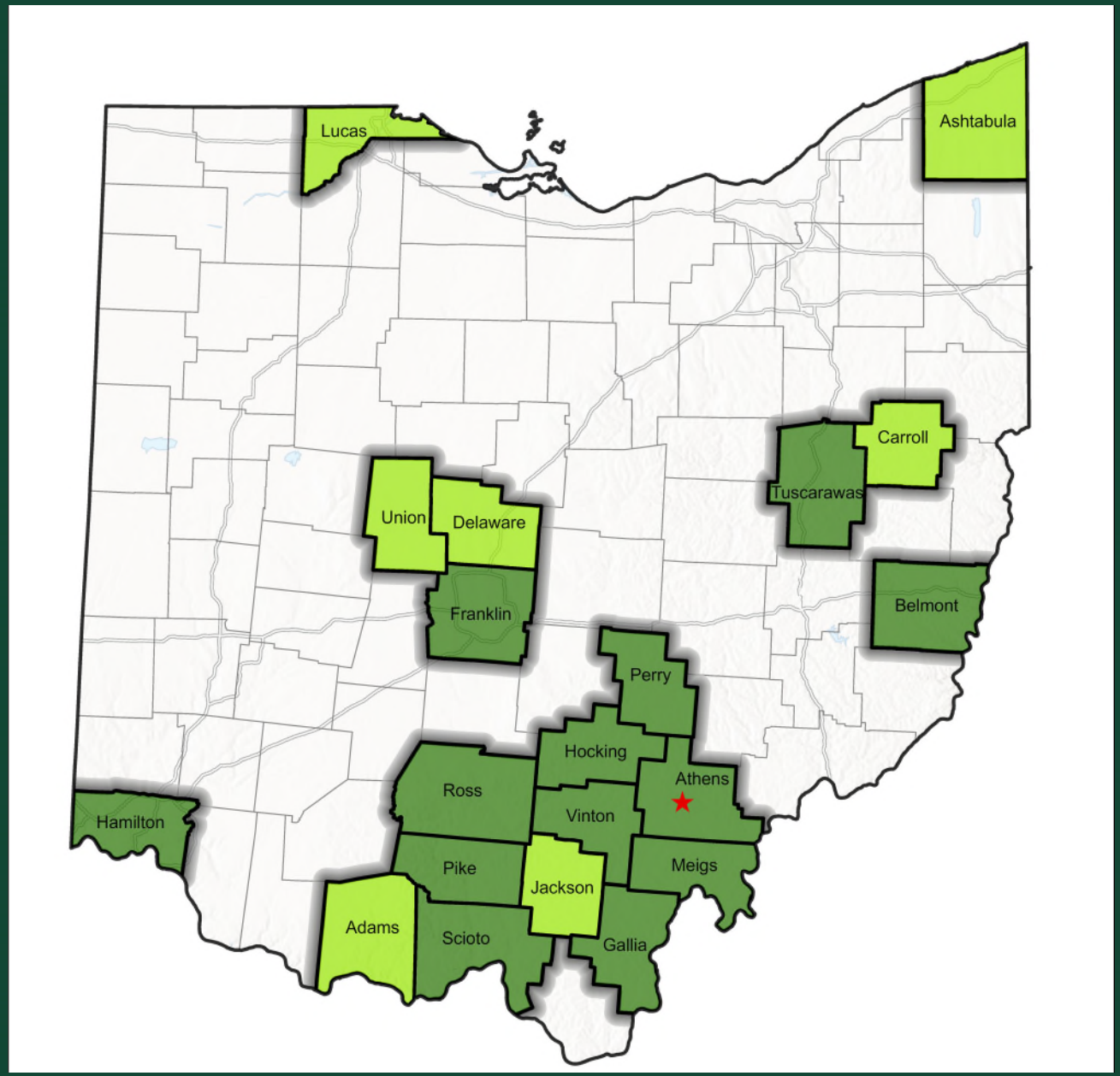
OHIO UNIVERSITY

Map of collaborators



OHIO UNIVERSITY

Map of collaborators



Instructional Videos

- https://youtu.be/urayNxEN3z0
- https://youtu.be/7FUDPZw11mg
- https://youtu.be/0AlNpLHkr3o

Thank you to our MBYS funders!

This project was funded in part by a grant from Ohio EPA Environmental Education Fund, U.S. Department Of Energy EM PPPO, American Electric Power (AEP) Ohio Foundation, Ohio STEM Learning Network, and Ohio University's Voinovich School of Leadership And Public Service.

APPALACHIAN STEM ENRICHMENT ACADEMY

U.S. DEPARTMENT OF ENERGY

AMERICAN ELECTRIC POWER FOUNDATION℠

PORTSFUTURE
IMAGINING THE OPPORTUNITIES, GATHERING YOUR IDEAS
THE FACILITY AT PIKETON, OHIO

OHIO UNIVERSITY
Voinovich School of Leadership and Public Service