GERALD C. CORCORAN EDUCATION GRANT REPORT
SHOWCASING BIOLOGICAL RECOVERY OF STREAMS IN SOUTHEAST OHIO AFFECTED BY HISTORICAL COAL MINING

Amy Mackey

Raccoon Creek Watershed Coordinator, Raccoon Creek Partnership, Athens, Ohio

PROJECT SUMMARY

Southeast and Eastern Ohio streams are severely impacted by historical coal mining in the region. Impacts include erosion, sedimentation, and acid mine drainage (AMD). These combined impacts have resulted in degraded stream conditions, poor habitat, and lack of species diversity. Fortunately, there are several active watershed groups and agencies working to reclaim and treat these waters. The Raccoon Creek Partnership (RCP) 501(c)3 is one of these groups. The Mission of RCP is: *to work toward conservation, stewardship, and restoration of the watershed for a healthier stream and community*. RCP, officially formed in 2007, started in the 1980s as a group of concerned citizens in Gallia County, near the mouth of Raccoon Creek, at the confluence with the Ohio River. Folks saw the pollution issues with the creek, and wanted to do something, but aside from stream clean-ups and tree plantings, they didn't have the financial resources to make big changes. In the decades to follow, additional counties, as well as local, county, state, and federal agencies, joined the restoration efforts. To date, in Raccoon Creek alone, we have 20 completed AMD treatment and reclamation projects installed in the watershed. Now 82 miles of Raccoon Creek have been restored that were once described by a longtime watershed supporter as being "dead as a bag of hammers." These 82 stream miles now meet biological health criteria (fishes and macroinvertebrates) and 110 of 117 stream miles sampled regularly now meet a pH target of at least 6.5.

Raccoon Creek is not alone in this journey; we work closely with Monday Creek, Sunday Creek, Leading Creek, Huff Run, and other southeastern and eastern Ohio watershed groups. Each year, the Voinovich School of Leadership and Public Affairs at Ohio University compiles a Stream Health Report, which documents water quality improvements (acid and metal load reductions), as well as biological health, for these five watersheds. According to the most recent completed report (2016), over $30 million in state and federal funding has been spent on 66 treatment and reclamation projects in these watersheds. These funds have been used to recover 93.5 miles of streams to meet Warmwater Habitat (WWH) criteria and have reduced 10,441 pounds/day of acidity from entering these streams. These successes are impressive, and though realized internally within the watershed groups and agencies, the goal of this project was to spread the word of our achievements and recovery throughout the region!

Utilizing NANFA Gerald C. Corcoran Education Grant funds, we were able to purchase equipment and supplies to enhance our environmental outreach program in order to "Showcase the Biological Recovery of Streams in Southeast Ohio affected by Historical Coal Mining."

GOALS AND OBJECTIVES

The goals of this project were really quite simple:

1. To educate local youth and adults about the restoration efforts and recovery of impacted streams and ecosystems that are often right in their own back yards.
2. To give the public the opportunity to assist with biological monitoring activities in the Raccoon Creek Watershed.
3. To teach residents about the local fishes and macroinvertebrates in the region (pollution tolerance, habitat preference, food webs, collection techniques, identification, and interactions).

These goals were achieved by hosting a public float on Raccoon Creek, conducting biological field trips and classroom visits with local schools, hosting a Family Outdoor Day at the RCP-operated Waterloo Aquatic Education Center (WAEC), and purchasing/creating an assortment of travelling and stationary display items to showcase the restoration and recovery of the Raccoon Creek Watershed.

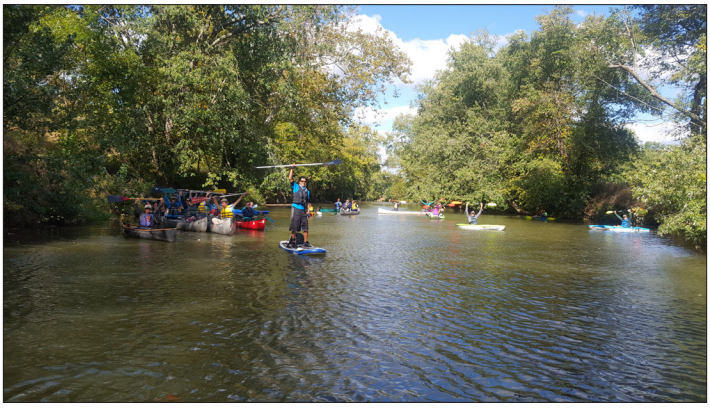
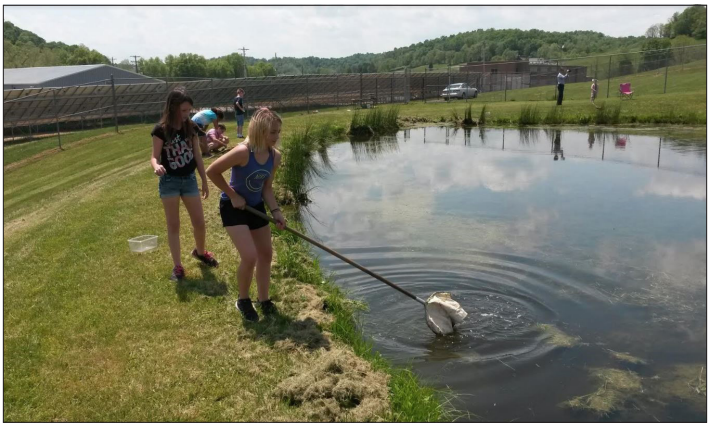
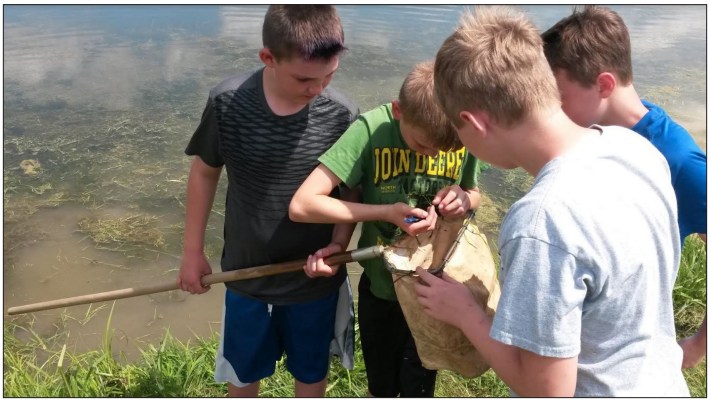


Figure 1. Participants in September 30, 2017, Raccoon Creek Public Float as they reach the confluence with the Ohio River. (Photo by Sarah Cornwell)

Public float on Raccoon Creek

On September 30th, 2017, RCP held a public canoe/kayak float on Raccoon Creek in Gallia County, near the confluence with the Ohio River, as part of National Public Lands Day. The event was free and open to the public with canoes, kayaks, and all safety gear provided by RCP. Raccoon Creek staff and AmeriCorps members were present to discuss the restoration efforts and biological recovery in the watershed, including the invasive Bighead Carp (*Hypophthalmichthys nobilis*) and state-threatened Paddlefish (*Polyodon spathula*) recently documented (2016) in the Raccoon Creek Watershed. Gerald C. Corcoran Grant funds were used for event signage (Figure 1).

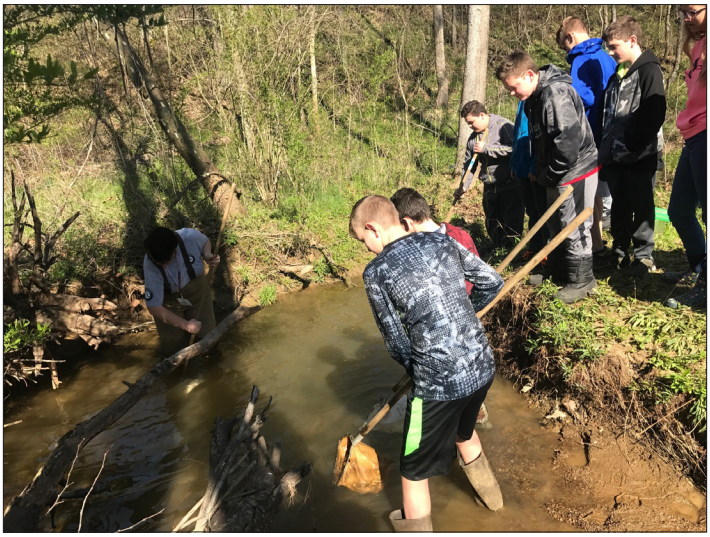


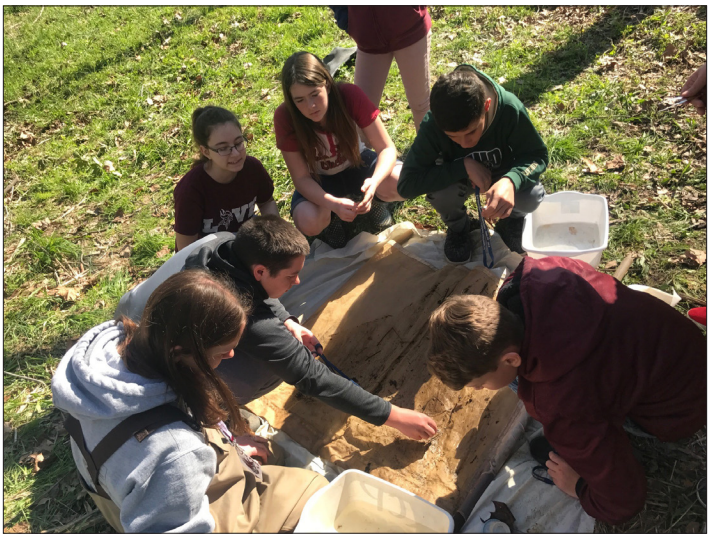


Figures 2–3. Students at Green Elementary School in Gallia County, Ohio, exploring the school pond. (Photos by Emily Keil-Loudner)

Biological Field Trips and Classroom Visits at Local Schools

Over 1,800 youth were educated during biological field trips and classroom presentations throughout southeast Ohio (and one school in Nashville, Tennessee). The goal of these field trips and classroom presentations was to get kids out in the creek to learn about what lives in the ponds, lakes, and streams right in their own back yards! At locations where a field trip was not possible (or when weather did not cooperate), live and preserved fishes and macroinvertebrates were brought into the classroom.





Figures 4–5. Vinton County Middle School Students exploring Puncheon Fork, a tributary to Raccoon Creek that runs behind the middle school. (Photos by Emily Keil-Loudner)

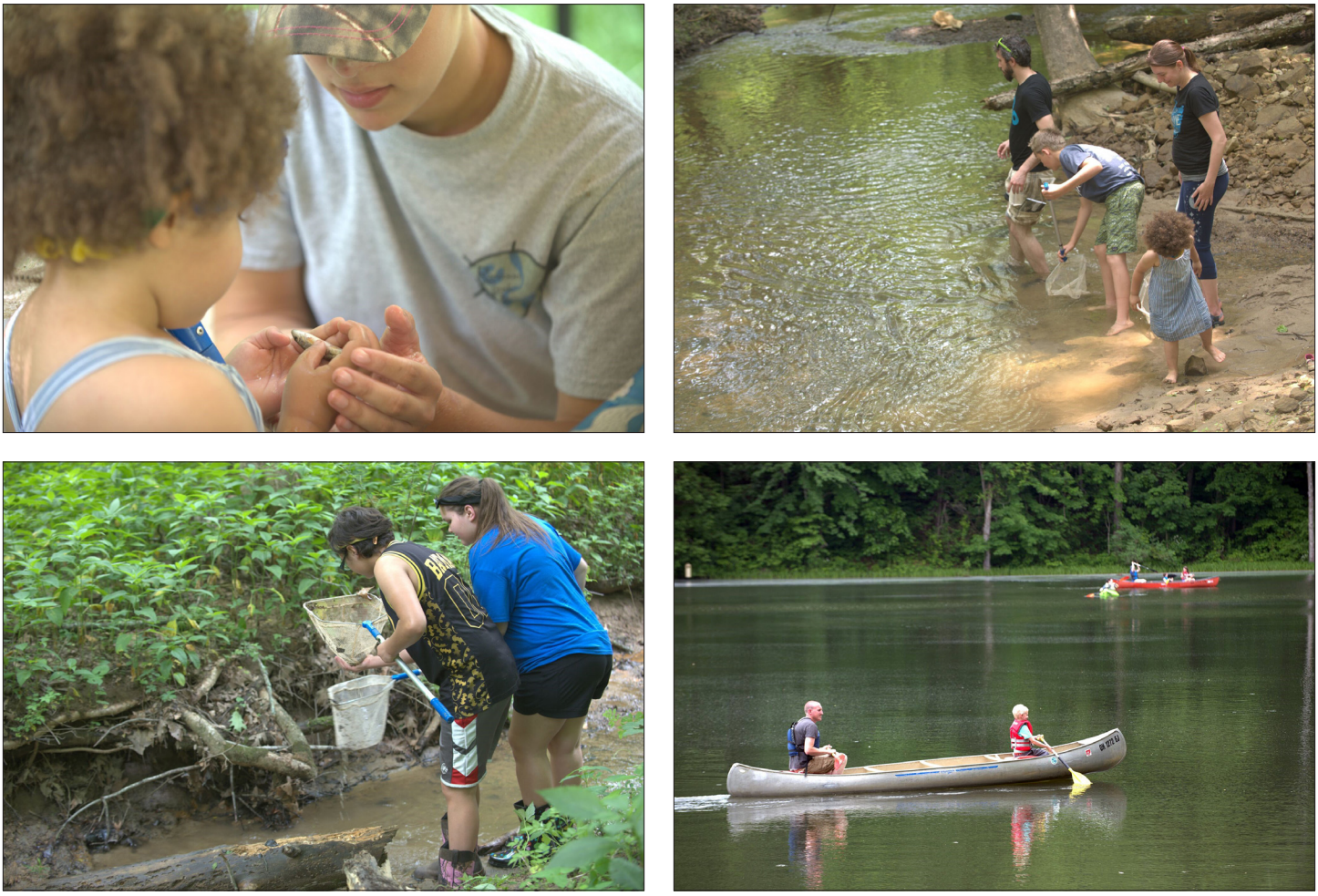


Figure 6. Aquatic explorations at 2018 Family Outdoor Day. (Photos by Theo Peck-Suzuki)

Grant funds were used to purchase dip nets, small aquariums, battery-powered air pumps and lights, and other supplies for collecting and presenting aquatic inhabitants (Figures 2–5).

Family Outdoor Day at the Waterloo Aquatic Education Center

Family Outdoor Day was held on May 26t, 2018 at the WAEC. The WAEC is operated by the RCP and is located on the Waterloo Wildlife Area (managed by the Ohio Department of Natural Resources, Division of Wildlife). The event was well attended (77 attendees, not including volunteers), and gave families the opportunity to experience a variety of outdoor recreational and educational activities (fishing, canoeing, kayaking, archery, pond/stream study, nature hikes, skins and skulls, zero waste and recycling, augmented reality watershed sandbox, live stream table, macroinvertebrates, etc). Grant funds were used to purchase event signs to use during Family Outdoor Day and other RCP events. The NANFA-funded native fish aquarium and display materials were also used at this event (Figure 6).

Stationary and Travelling Display Items

Gerald C. Corcoran Education Grant funds were used to purchase and install a 75-gallon native fish aquarium at the WAEC. WAEC was historically an Ohio Division of Wildlife research lab, and RCP has operated an Education Center on the site since 2007. Our annual summer watershed camps, meetings, events, and trainings are held at this facility. WAEC sits on the banks of Hewett Fork, a tributary to Raccoon Creek that was once devoid of life as a result of AMD and now attains exceptional fish scores at its confluence with Raccoon Creek. This recovery is the result of a successful calcium oxide doser located in the headwaters of Hewett Fork. The aquarium was decorated with materials (gravel, rocks, root wads) from the Raccoon Creek watershed and houses native species found in the watershed. Laminated fish ID cards are displayed on the aquarium to give information about the current aquatic residents. A 10-gallon aquarium and supplies were also purchased to use when taking fishes and macroinvertebrates to events (Figure 7).

RCP AmeriCorps members, Abby Costilow and Emily Keil-Loudner, used grant funds to create portable macro-

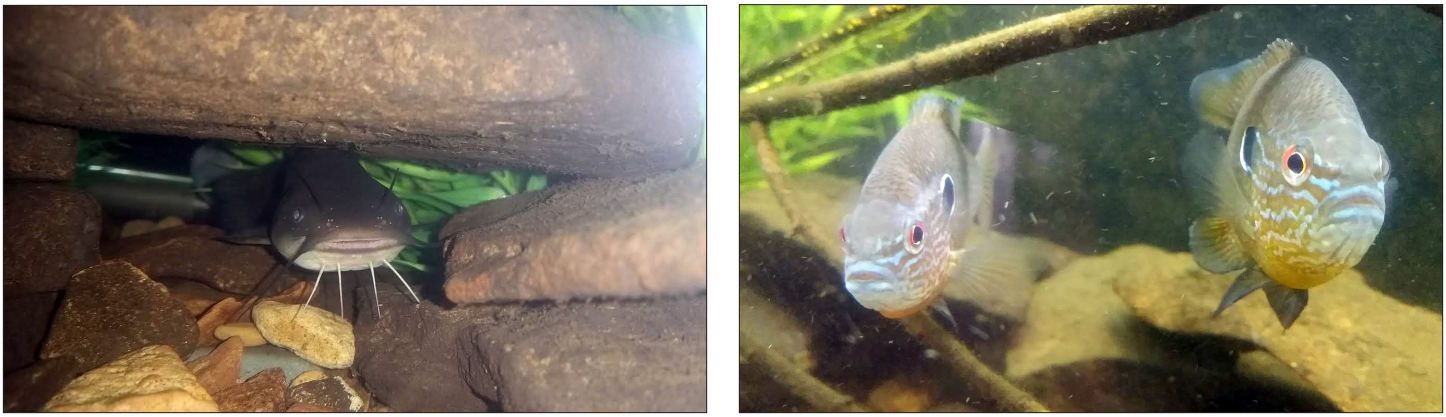


Figure 7. Yellow Bullhead (left) and Longear Sunfish in 75 Gallon Native Fish Aquarium at the Waterloo Aquatic Education Center. (Photos by Amy Mackey)

invertebrate displays that utilize preserved macroinvertebrates to illustrate how different habitats are inhabited by different taxa, as well as providing a visual of tolerant, moderately tolerant, and sensitive taxa. These displays are available for use by watershed groups and agencies in the area and were used during classroom presentations at local schools (Figure 8).

A poster to highlight restoration efforts and recovery in the Raccoon Creek watershed was designed by Ohio University Environmental Studies student Jennie Brancho. This poster is on display with the native fish tank at the WAEC and is laminated to travel with the macroinvertebrate displays (Figure 9).

SUCCESS AND TESTIMONIALS

The display materials, collection equipment, and signage purchased with the Gerald C. Corcoran Education Grant will be valuable educational tools for the Raccoon Creek Partnership for many years to come! The current AmeriCorps members that assisted with the development of the display items are working on lesson plans that can be used by future educators in the watershed. Feedback from local schools where field trips and classroom visits took place was outstanding, and some schools have already inquired about programs for next year!

Feedback on the event included the following:

"Thanks so much for coming and teaching my students about stream health and conservation efforts. They had a blast! They're still talking about it today. I asked them if they had any comments or suggestions and they said to be sure and tell you it was a nice time, and they went home and told their families about it—that is a win!!!"

Jennifer Wells (Vinton County Middle School) sent us after our visit.

"The students really enjoyed seeing what scientific conservation looks like. They especially enjoyed the bug display!"

Ben Keil, 8th grade science teacher at Rose Park Middle School, Nashville, TN

The 2018 Raccoon Creek Partnership Family Outdoor Day was very well attended and all feedback was positive.

"We had a great time and will definitely attend again next year if you have it again!"

Sean Lambert, ODNR Division of Wildlife Fisheries Biologist

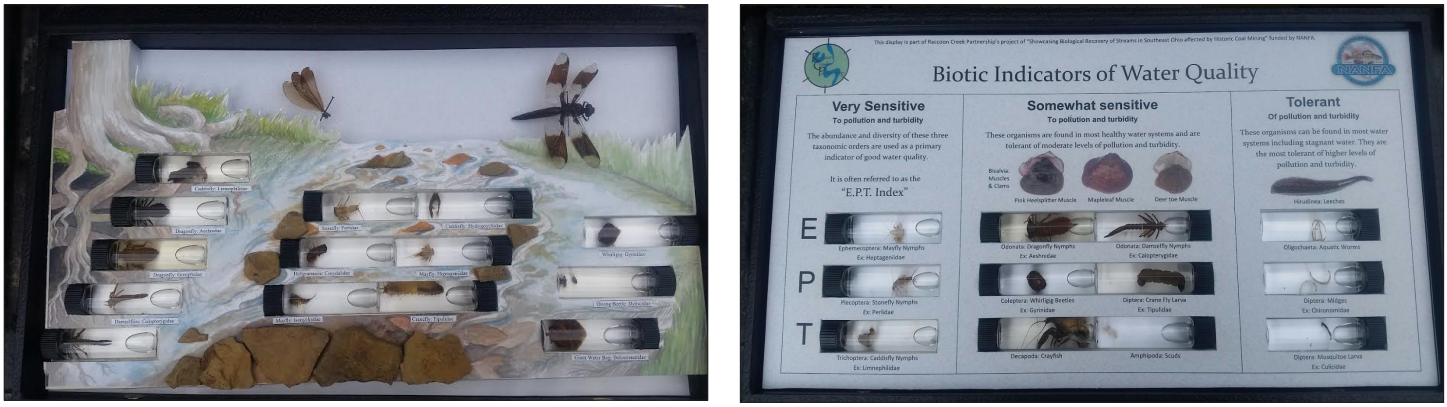


Figure 8. Portable Macroinvertebrate Displays Assembled by Raccoon Creek Partnership AmeriCorps Members. (Photos by Amy Mackey)

THANK YOU, NANFA!

A huge thank you to NANFA from all of the Raccoon Creek staff, AmeriCorps members, students, volunteers, board members, and watershed residents! The 2017 Gerald C. Corcoran Education Grant has helped us to spread the word about the watershed restoration and recovery efforts that our partners (Ohio Department of Natural Resources – Division of Mineral Resources Management, Ohio Environmental Protection Agency, Office of Surface Mining, Ohio University, and many more) have made possible over the past 20 years.

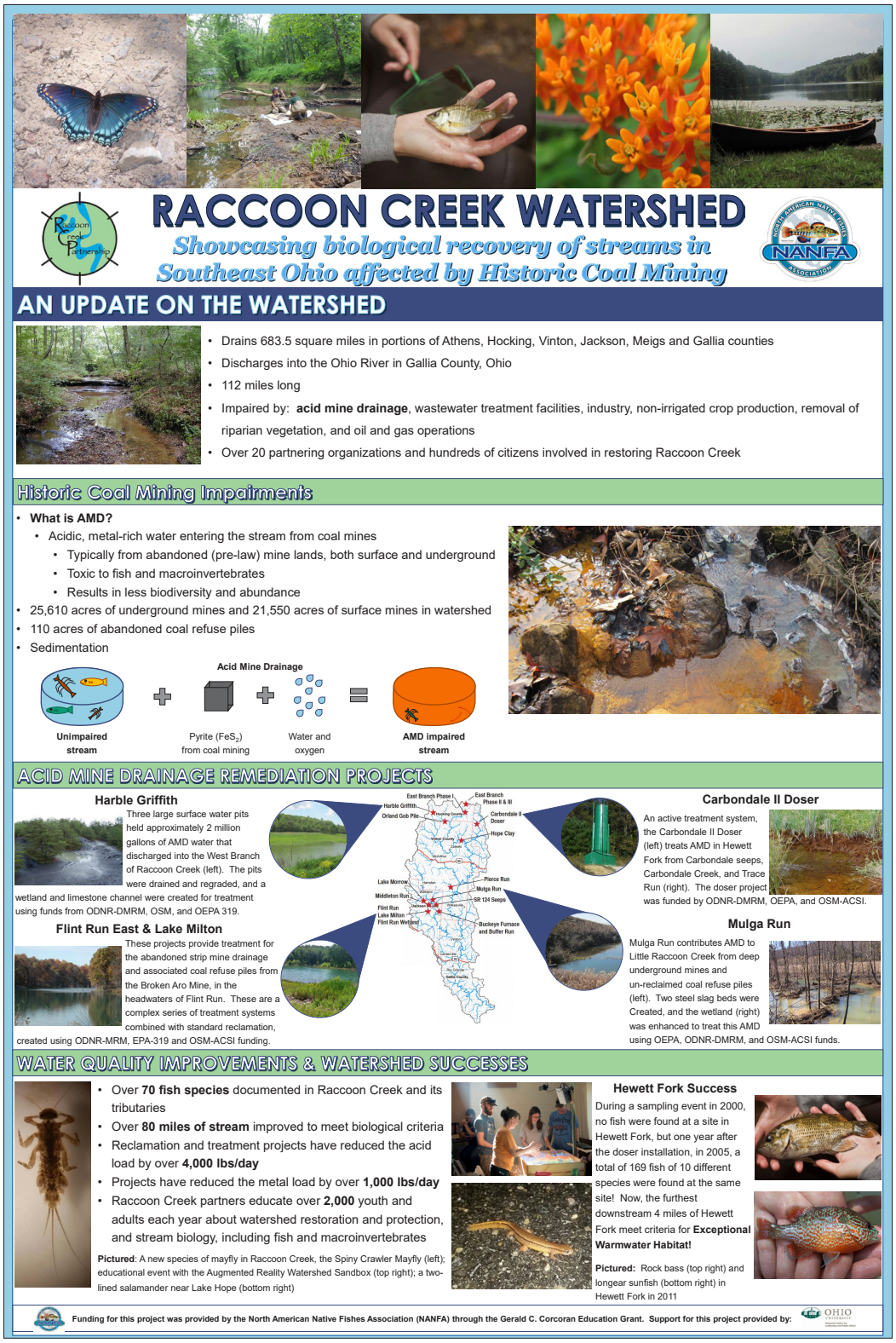


Figure 9. Raccoon Creek restoration poster designed by an Ohio University Environmental Studies student.