



RIVER REACH

CLASSROOM GUIDEBOOK

5735 Kellogg Ave. Cincinnati, OH, 45230
(513) 231 7719
www.riverlearning.org

As a 501c3 Nonprofit, FORE is required to complete annual reporting . If you utilized our resources in your classroom, please complete this [brief survey](#) so that we can accurately capture our participation numbers.

Thank you!

Table Of Contents

- 1. About Foundation for Ohio River Education**
- 2. Fish**
- 3. Most Common Fish**
- 4. Macroinvertebrates**
- 5. Macroinvertebrate PTI**
- 6. Adult Macroinvertebrates**
- 7. Plankton**
- 8. Plankton PTI**
- 9. Water Chemistry**
- 10. Watershed Model**
- 11. Give us Feedback**

ABOUT THE FOUNDATION FOR OHIO RIVER EDUCATION (FORE)

- The Foundation for Ohio River Education was originally formed as the ORSANCO Educational Foundation on March 30, 2004 as a 501c3, non-profit organization. We changed our name to the Foundation for Ohio River Education (FORE) in 2009, to better reflect our organization's purpose.
- FORE was formed under the Ohio River Valley Water Sanitation Commission (ORSANCO), a pollution control agency for the Ohio River made up of representatives from eight states and the federal government.
- Although FORE is affiliated with ORSANCO, it does not receive state or federal funding and is responsible for sustaining itself through grants, corporate and foundation sponsorships, and through the support of individuals. FORE also collects and administers Ohio River Sweep funds, that are raised by ORSANCO each year, to conduct basin-wide clean-up events along the mainstem of the Ohio River and its tributaries

About the **OHIO RIVER**

- The Ohio River is 981 miles long, starting in Pittsburgh, PA and ending in Cairo, IL where it flows into the Mississippi River in Cairo, IL.
- The Ohio River runs along the borders Pennsylvania, West Virginia, Ohio, Kentucky, Indiana, and Illinois.
- It is home to about 160 species of fish as well as multiple macroinvertebrate and plankton species
- Approx. 30 million people live in the Ohio River Basin

FISH

- Modified lesson plans
 - Ecosystem Dynamics, Biotic and Abiotic Factors
 - Fish Adaptations
 - Complies with **NGSS LS2** standard
 - Flashcards
 - Activities for students
 - Build your own Fish
 - Fins Form and Function Worksheet
-

MOST COMMONLY CAUGHT SPECIES

NOTABLE CAUGHT SPECIES



GIZZARD SHAD

A member of the herring family, Gizzard Shad are native to the Ohio River Basin. They are very abundant in the Ohio River, and are an important part of the resource's trophic cascade. The Gizzard Shad gets its name as it possesses a gizzard—a small, rock or sand-filled sack—as part of its GI tract that helps it break down food.



RIVER REDHORSE

A somewhat sensitive species, River Redhorse are not as frequently encountered in ORSANCO biological surveys. Their presence is indicative of good stream health, and a sign of favorable habitat conditions. Easily distinguished by its red dorsal and caudal fins, River Redhorse are important to the Ohio River ecosystem.



CHANNEL SHINER

Observed in large numbers, Channel Shiners are members of the minnow family and are very common within the basin, particularly in medium to large rivers, including the Ohio.



SILVERJAW MINNOW

Minnows are the most speciose fishes in North America, and the Silverjaw Minnow is another member of the minnow family present in the Ohio River. These are notable catches in the Ohio River as they typically prefer smaller stream habitats with riffles and constant flow, and are not typically observed in large, slower moving rivers.



EMERALD SHINER

Present in nearly every Ohio River Survey in 2022, Emerald Shiners are native to North America and are very common in large rivers and lakes. The Emerald Shiner gets its name from the silvery-emerald color along its sides.



MISSISSIPPI SILVERSIDE

Rarely encountered in the Ohio River, Mississippi Silversides are most often observed in shallow lakes and reservoirs. These hardy individuals prefer low-flow waters, and their range extends only into the lowest portions of the Ohio River.



FRESHWATER DRUM

Native to North America and the sole member of the genus *Aplodinotus*, they are an important species within the Ohio River ecosystem. Their diet includes macroinvertebrates, including small mussels. Their full scientific name is *Aplodinotus grunniens*—from Greek for "single back", and Latin for "grunting"—referring to a grunt sound that mature males make.



BLACK BUFFALO

These important members of the deep-bodied suckers are listed as species of special concern in multiple states. Having to compete with exotic species for food sources makes this native species one of note, as management practices continue to evolve to protect their habitat and ensure their success.



LONGNOSE GAR

A very unique member of the Ohio River ecosystem, the Longnose Gar features an ancient appearance. It is believed that the species may have been present in North America for nearly 100 million years. Longnose Gar are piscivorous and can grow to nearly 6 feet (1.8m) and over 50 lbs (~25kg).




























Electrofishing sampling took place during the index period July–October of 2022.

Surveys are conducted at night beginning just after dusk to take advantage of increased foraging activity and diurnal movements of fishes that occur along the shoreline in the evening hours. *Results reflective of 2022 Pool Reports

MACROINVERTEBRATES

- Modified lesson plans
 - Macroinvertebrates as Indicator Species
 - Human Impacts and Pollution
 - Aquatic Food Chains and Food Webs
 - Complies with **NGSS ESS3** standard
 - Flashcards
 - Activities for students
 - Macroinvertebrate Sampling Activity
 - Macroinvertebrates Hindrances Game
 - Metamorphosis Matching Game
 - Collecting Live Macroinvertebrates
 - Leaf Litter Collection Method
 - RiverWatchers Sampling Procedures
 - Pages 58-69
-

Stream Quality Index

Group 1 Very Sensitive	Group 2 Sensitive	Group 3 Pollution Tolerant
<input type="checkbox"/>   Water Penny	<input type="checkbox"/>  Crane Fly Larva	<input type="checkbox"/>  Black Fly Larva
<input type="checkbox"/>  Stonefly Nymph	<input type="checkbox"/>  Diving Beetle Larva	<input type="checkbox"/>  Aquatic Worm
<input type="checkbox"/>  Caddisfly Larva	<input type="checkbox"/>  Crayfish	<input type="checkbox"/>  Midge Larva
<input type="checkbox"/>  Dobsonfly Larva	<input type="checkbox"/>  Scud	<input type="checkbox"/>  Mosquito Larva
<input type="checkbox"/>  Mayfly Larva	<input type="checkbox"/>  Damselfly Nymph	<input type="checkbox"/>  Other Fly Larva
<input type="checkbox"/>  Riffle Beetle	<input type="checkbox"/>  Dragonfly Nymph	<input type="checkbox"/>  Leech
<input type="checkbox"/>  Gilled Snail	<input type="checkbox"/>  Clam	<input type="checkbox"/>  Pouch Snail
<input type="checkbox"/>  Shrimp	<input type="checkbox"/>  Isopod	<input type="checkbox"/>  Other Snail
	<input type="checkbox"/>  Diving Beetle	<input type="checkbox"/>  Planaria
Number of checks in this column: _____ x3	Number of checks in this column: _____ x2	Number of checks in this column: _____ x1
Total: _____	Total: _____	Total: _____
Excellent >22 Good 22-17 Fair 16-12 Poor 11-0		Total from all three groups: _____ Result: _____



Water Penny



Stonefly



Caddisfly



Dobsonfly



Mayfly



Riffle Beetle



Gilled Snail
(Right-Handed)



Shrimp



Crane Fly



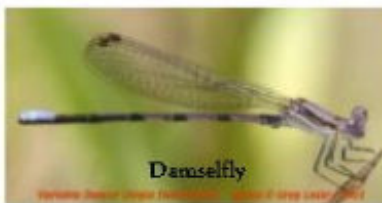
Diving Beetles



Crayfish



Scuds



Damselfly



Dragonfly



Clams



Isopod



Black Fly



Aquatic Worm



Midge



Mosquito



Flies



Leech



Pouch Snail
(Left-Handed)



Other Snails

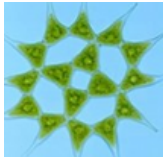


Planaria

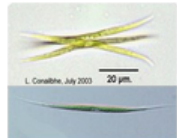
PLANKTON

- Modified lesson plans
 - Phytoplankton and Zooplankton Distinctions
 - Plankton's Role in Aquatic Food Chains
 - Water Pollution and Harmful Algal Blooms
 - Complies with **NGSS LS1** and **NGSS LS2** standards
 - Flashcards
 - Activities for students
 - Food Chain Activity
 - Plankton Sink Off
 - Collecting live plankton
 - Plankton Tow Sampling Method
 - Grow your own Phytoplankton
 - Plankton Viewing and Identification
 - Plankton ID sheets
-

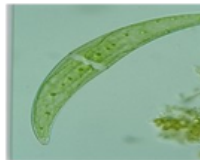
COMMON OHIO RIVER ALGAE



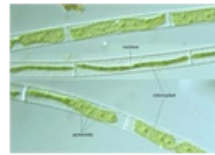
Pediatrum (G)



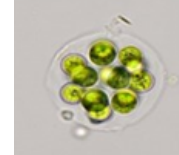
Ankistrodesmus (G)



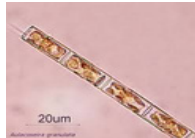
Closterium (G)



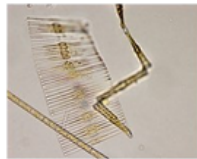
Mougeotia (G)



Sphaerocystis (G)



Aulacoseira (D)



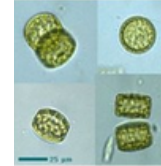
Fragilaria (D)



Navicula (D)



Surirella (D)

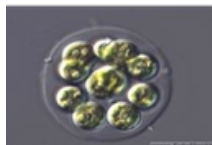


Cyclotella (D)

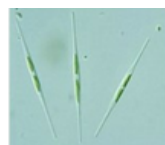
ALGAE FOUND IN POLLUTED WATER



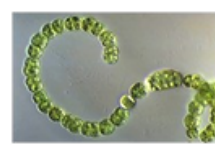
Golenkinia



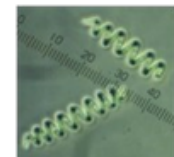
Planktosphaeria (G)



Nitzschia (D)



Anabaena (BG)



Spirulina (BG)



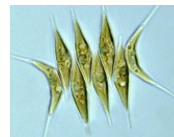
Tetradron (G)



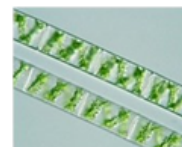
Euglena (E)



Planktothrix (BG)



Scenedesmus (G)

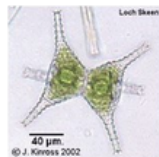


Spirogyra (G)

COMMON TASTE AND ODOR CAUSING ALGAE



Dinobryon (GB)



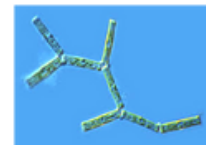
Staurastrum (G)



Hydrodictyon (G)



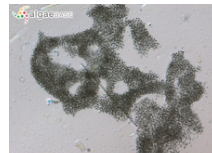
Ceratium (DF)



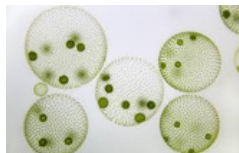
Tabellaria (D)



Gomphospaeria (BG)



Microcystis (BG)



Volvox (G)



Asterionella (D)



Peridinium (DF)

COMMON ZOOPLANKTON



Diffugia



Rotifer



Hydra



Copepod



Vorticella



Zebra Mussel Larvae



Cladoceran



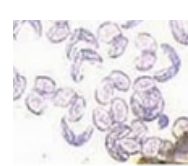
Ostracod



Nauplius



Nematode



Unionid Larvae

WATER CHEMISTRY

- Modified lesson plans
 - Visual Observations
 - Chemical Tests including PH, DO, Nitrates, Phosphates and E.coli
 - Water Quality Grade
 - Complies with **NGSS PS1** and **NGSS PS2** Standards
 - How to collect water samples
 - Testing Instructions and Analysis
 - Resources for free Chemistry Test Kit
-

WATERSHED MODEL

BUILD YOUR OWN WATERSHED

The land we live on is divided into watersheds. A watershed is a land area whose runoff drains into any river, stream, lake, or ocean. Small watersheds, such as the watershed for the creek behind your house, or...

US
EPA [www3.epa.gov /](http://www3.epa.gov/)

- Materials
 - 1 large Tupperware container
 - Modeling clay
 - Sand
 - Aquarium gravel
 - Wax paper/tin foil
 - Cocoa mix iced tea mix, or other flavored drink mix
 - 1 spray bottle or bucket full of water
 - Simple option
 - Alternate option
-

Share your classroom experience with us on
social media!



As a 501c3 Nonprofit, FORE is required to complete annual reporting. If you utilized our resources in your classroom, please complete this [brief survey](#) so that we can accurately capture our participation numbers. Thank you!

Interested in our other programs?

Visit www.riverlearning.org or contact Nick Callahan for more information!