Welcome to Riverwatchers!!!

A FORE citizen science program sponsored by EQT

Outline

- Ohio River and ORSANCO
- RiverWatchers Overview
- Chemistry
- Data Reporting
- Biological Monitoring

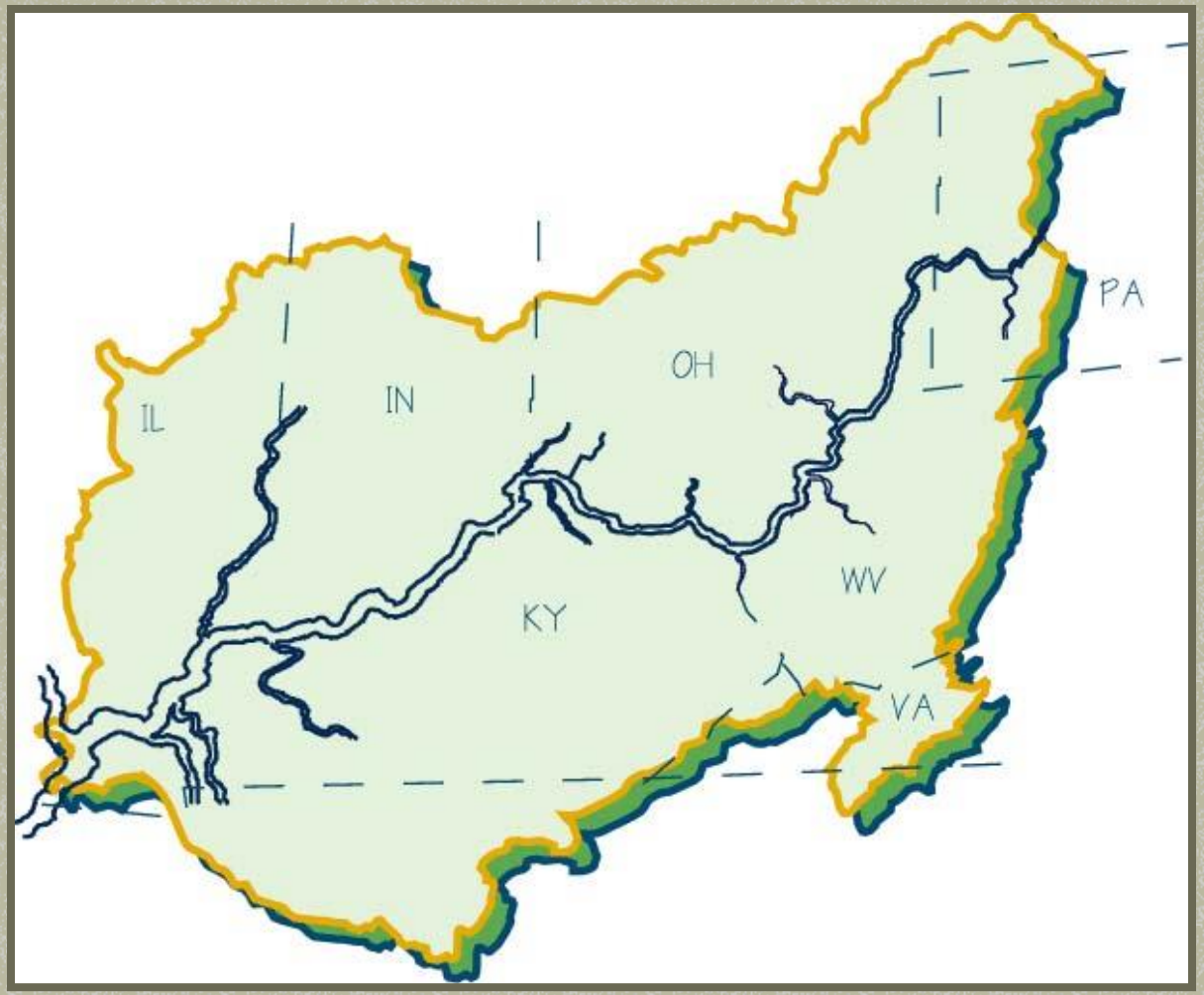
Ohio River Watershed

-981 miles

-7th longest river in U.S.

-150+ species of fish

-5 million citizens' water



What is ORSANCO?

- *Interstate* water pollution control agency
- Compact signed in 1948…
  - "…control and abate water pollution in the Ohio River Basin."
  - Created the Foundation for Ohio River Education in 2004

What is FORE?

- a 501(c)(3) non-profit education organization
- teaches people of all ages in the Ohio River Basin to become environmental stewards through hands-on programs
- Committed to getting people on the water and engaged in preserving the cultural, ecological, and economic value of our rivers.

River REACH Program

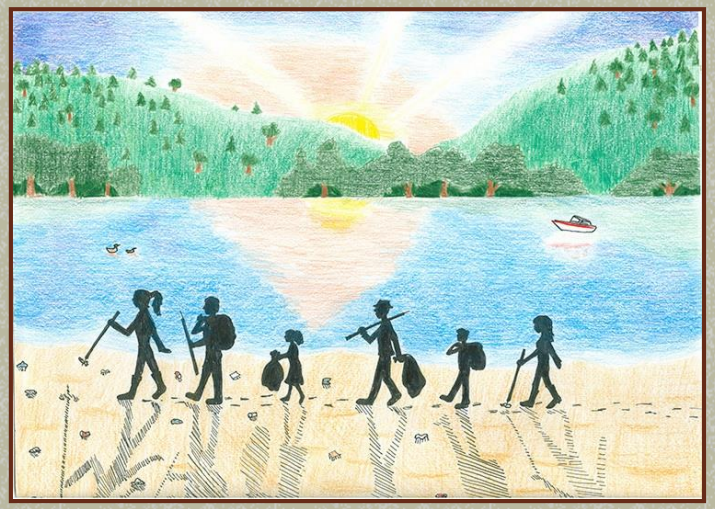
F·O·R·E
FOUNDATION for OHIO RIVER EDUCATION

Life Below the Waterline

F·O·R·E™

FOUNDATION for OHIO RIVER EDUCATION

Other Education Programs…



Ohio River Sweep

F·O·R·E™

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RiverWatchers

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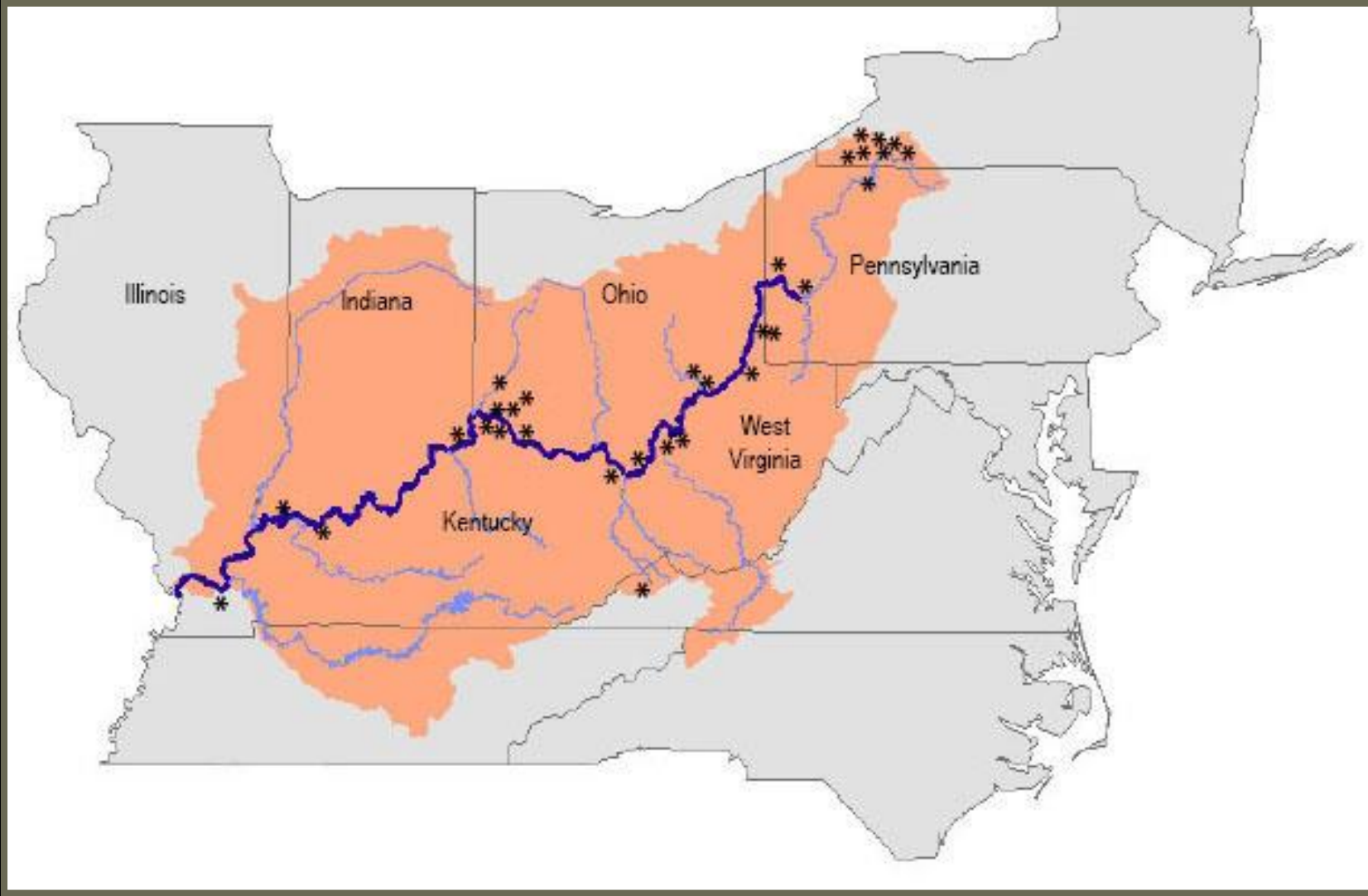
Sponsored by:

EQT

Role of RiverWatchers

- "Watchdogs" for ORSANCO
  - Created in 1992 with 5 groups
- Sampling Ohio River AND tributaries
  - Water chemistry for river "check-up"
  - Monitor 5 times each year and enter data online
  - REAL SCIENCE!
- We need YOUR help to make sure our waters are safe for all creatures

Historical RiverWatchers Locations



What do you think of the Ohio River?

- Is your perception more positive or negative and why?

Why is the River valuable?

- Recreation

- Transportation

- Drinking Water

- Aquatic Life

What jobs does the river provide?

- Tourism and recreation
- Shipping
- Public health- water utilities
- Fish & Wildlife, EPA, ORSANCO (Science!!)

- Are any of these careers you would be interested in?

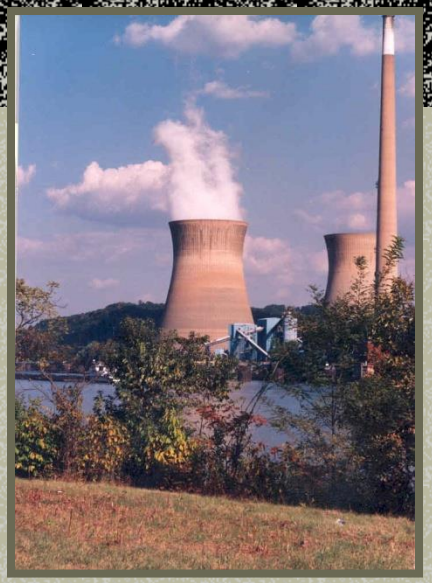
ORSANCO's Role…

"control & abate water pollution in the Ohio River Basin…"

- Chemical Tests
  - Dissolved Oxygen
- Spill Detection
  - Predict movement of pollutants
- Bacteria
  - Measuring fecal coliform & *E. coli*
- Fish Surveys
  - Over 130 species!
- Education Programs
  - You can help too!

Water Quality Issues

- Point Source Pollution
- Non-point Source Pollution
- Invasive Species

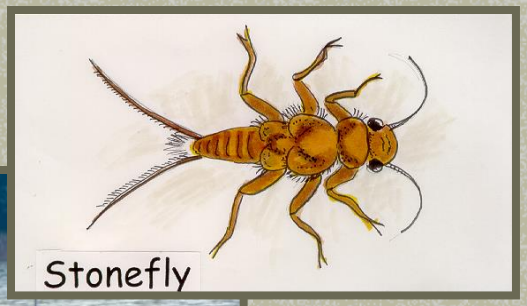


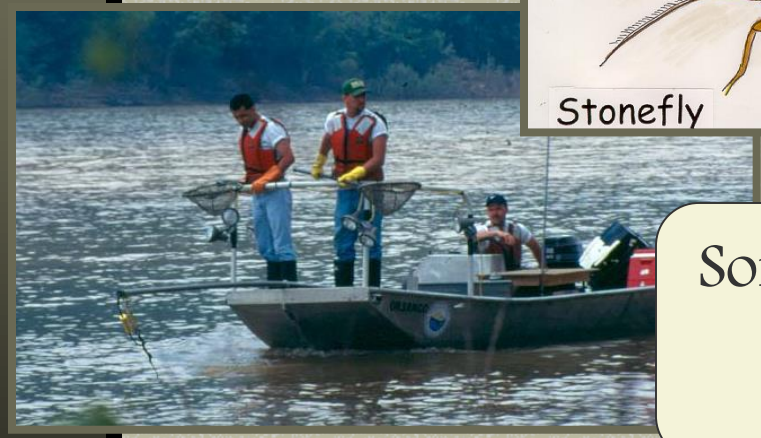
Locating point-sources…

- Methylene chloride spill detected in Wurtland, KY (April 2007)

What about biology?

- Aquatic Life Bioassessments
  - Fish Populations
  - Macroinvertebrates

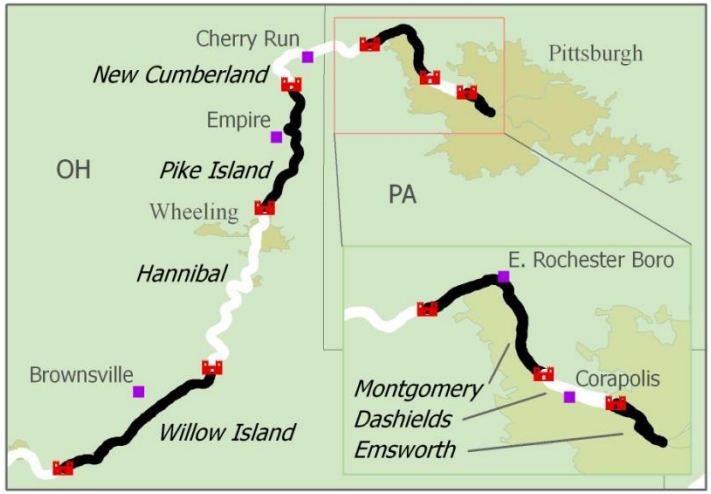




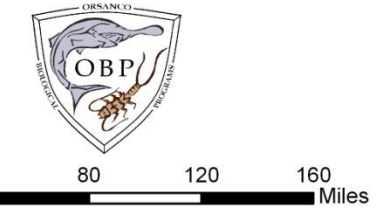
Some are sensitive to pollution!

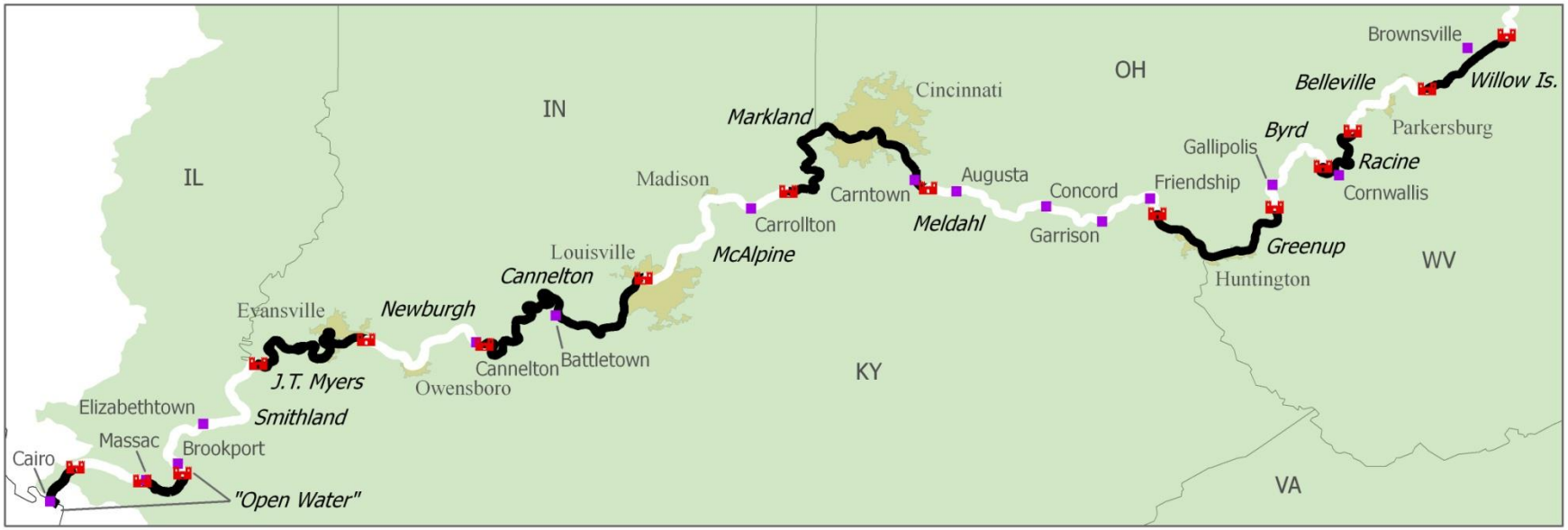
Electrofishing

Which Pool Is in Your Backyard?



Eighteen lock and dam structures divide the Ohio River into 19 individual segments or pools. Each year the ORSANCO Biological Survey Crews sample fish, macroinvertebrates, and various water quality parameters in several of these pools. Data from these surverys is assessed, and a report is prepared for each pool to describe its overal condition. Use this map to find the pools you are interested in. Then you can click on the report cover and a link will take you to the full report for that pool.





Water Chemistry

- 8 Parameters (Parts)
  - Biochemical Oxygen Demand (BOD-5)
  - Dissolved Oxygen
  - Total Phosphate
  - Nitrate
  - Turbidity
  - *E. coli*
  - pH
  - Water Temperature Change

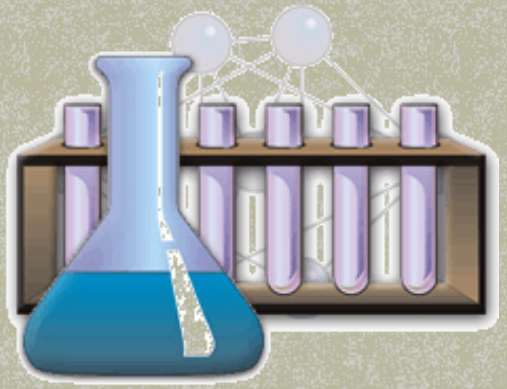
WQI Score

Excellent

Good

Medium

Bad or Very Bad

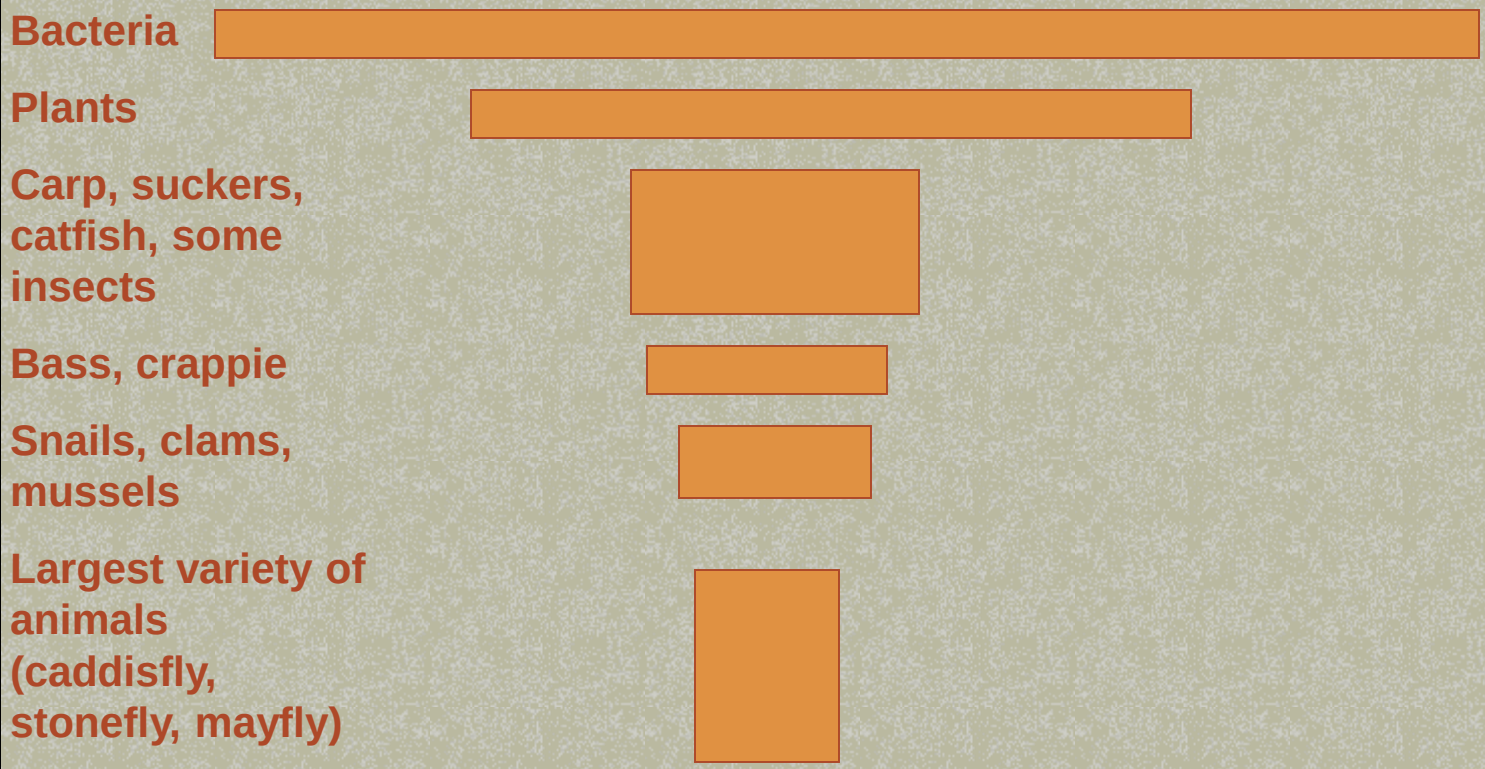


Dissolved Oxygen Requirements for Fish

pH Requirements for Fish & Macroinvertebrates

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Most Acidic Neutral Most Basic



Nitrates

- Excessive amounts → *eutrophication*
- **Algae makes oxygen less available for fish**
- Main source = Sewage
- Additional sources include:
  - Fertilizers / runoff from agricultural areas

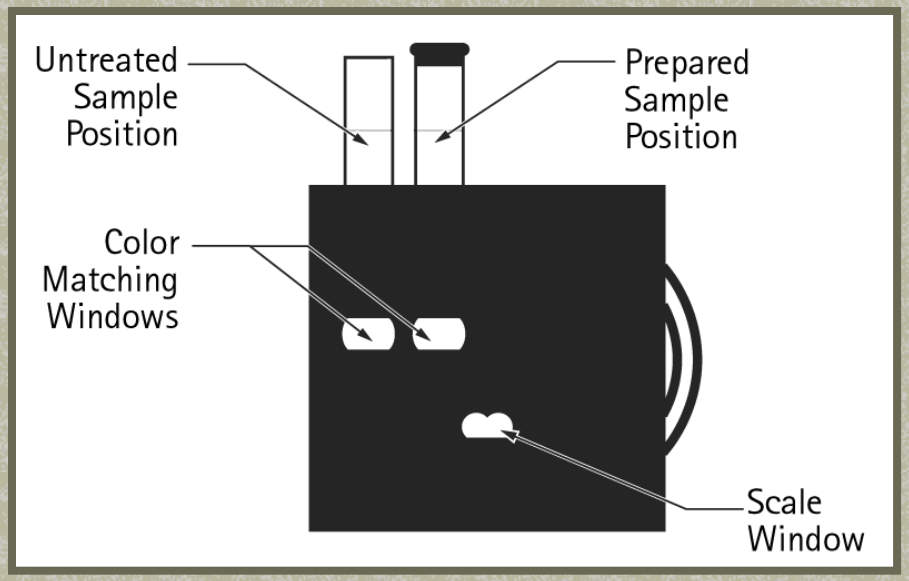
Ohio River Norms = 0-13 mg/L

Phosphate

- Excessive amounts → *eutrophication*
- Main source= agricultural runoff, urban runoff
- Additional sources include:
  - Erosion, natural soil sources

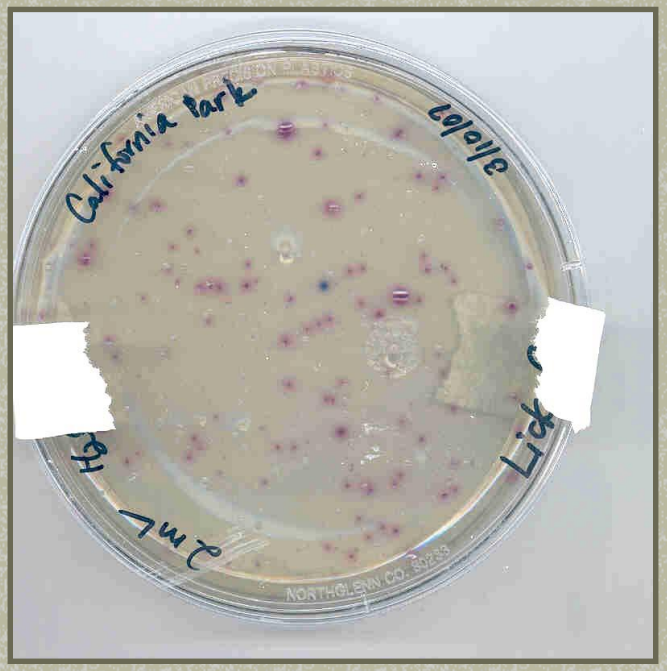
Phosphate and nitrate

- Read number on the color wheel
  - Look at the light for best results
- Nitrate = red color
- Phosphate = blue color

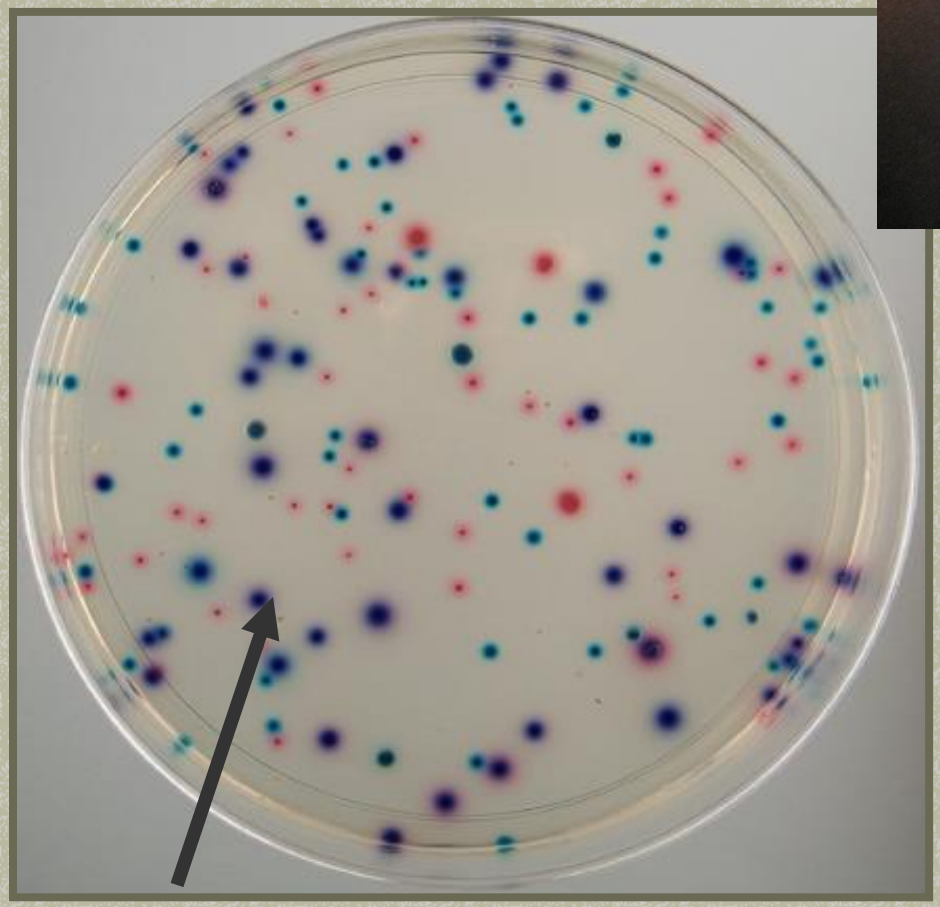


E. coli

- Excessive amounts → unsafe drinking water
- Main source = Sewage overflow
- Can make humans very sick



Reading *E. coli* plates



Count dark blue or dark purple colonies only.

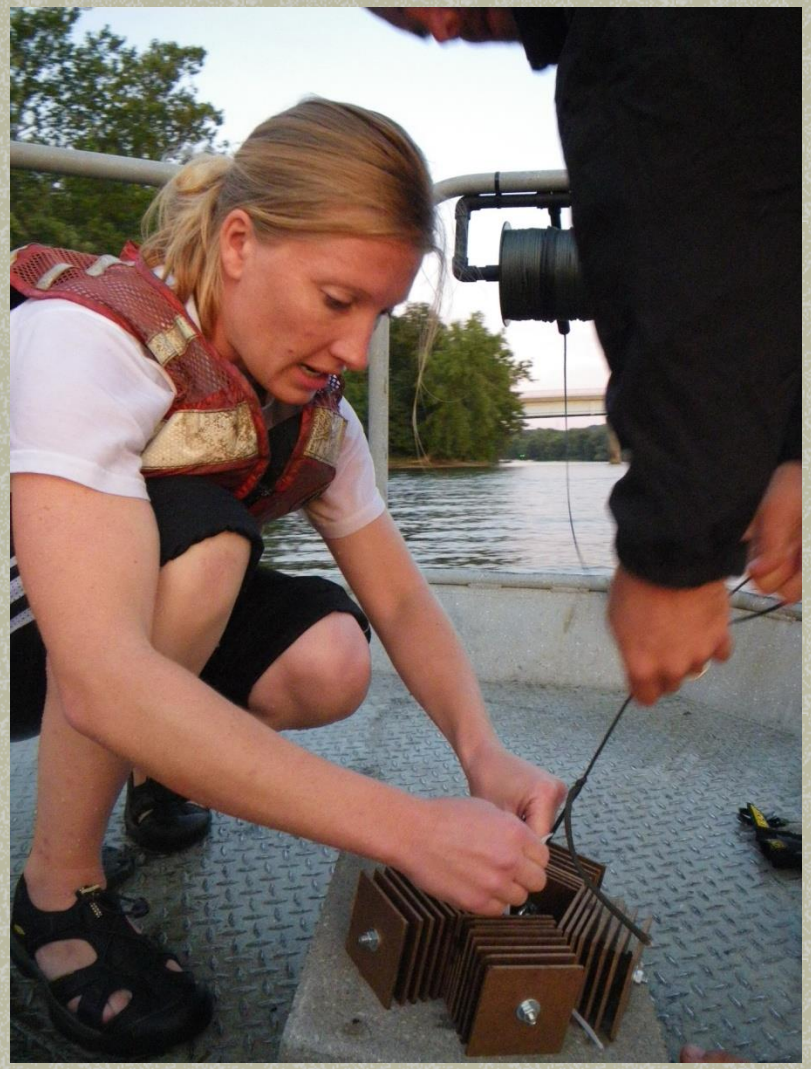
Color Guide

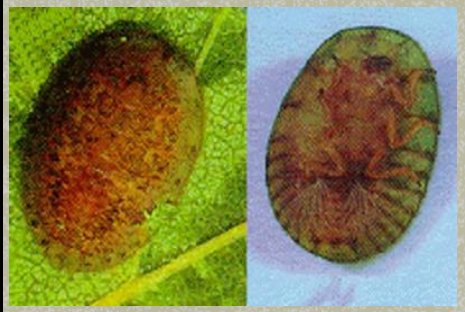
Interpreting the Plates

What to count as *E. coli*	What not to count as *E. coli*
Purple, no halo	White
Purple with pink halo	Pink, no halo
Purple with purple halo	Pink with pink halo
Blue or dark blue, no halo	Teal green
Blue with purple or pink halo	Pinpoints
Dark blue with teal halo	Teal with teal halo
Actual size of countable colonies = 1-2 mm.	*E. coli*/100 ml = $\frac{(\#\text{ colonies counted x } 100)}{\text{size of sample in ml}}$

Ecolichart.cdr
hp5500psdriver

Macroinvertebrates





Stream Quality Index

Group 1 Very Sensitive	Group 2 Sensitive	Group 3 Pollution Tolerant
☐ Water Penny 	☐ Crane Fly Larva 	☐ Black Fly Larva 
☐ Stonefly Nymph 	☐ Diving Beetle Larva 	☐ Aquatic Worm 
☐ Caddisfly Larva 	☐ Crayfish 	☐ Midge Larva 
☐ Dobsonfly Larva 	☐ Scud 	☐ Mosquito Larva 
☐ Mayfly Larva 	☐ Damselfly Nymph 	☐ Other Fly Larva 
☐ Riffle Beetle 	☐ Dragonfly Nymph 	☐ Leech 
☐ Gilled Snail 	☐ Clam 	☐ Pouch Snail 
☐ Shrimp 	☐ Isopod 	☐ Other Snail 
	☐ Diving Beetle 	☐ Planaria 
Number of checks in this column: _____ x3 Total: _____	Number of checks in this column: _____ x2 Total: _____	Number of checks in this column: _____ x1 Total: _____

Excellent >22 Good 22-17 Fair 16-12 Poor 11-0	Total from all three groups: _____ Result: _____

Putting it all together…

You help keep our rivers clean!

Questions?…