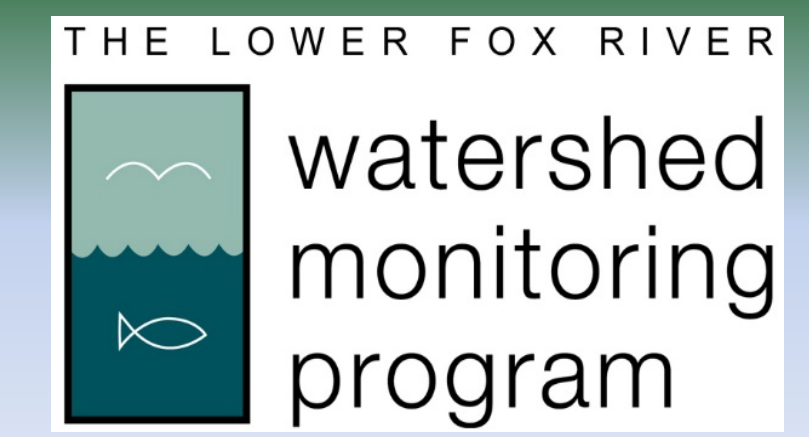# Dutchman's Creek

Effects of Water Quality Indicators on Fish Reproduction

Ashwaubenon High School: Dan Albrent and Dan Newel

THE LOWER FOX RIVER watershed monitoring program

ASHWAUBENON JAGUARS

Problem?

Dutchman's Creek has had some macro invertebrate species (2.1 – Fair Range) but during the three testing periods, there are rarely has any fish species living within the creek. We wondered if there was a chemical imbalance associated with our stream and as a result certain species of fish were unable to thrive.

About the Site:

Schools: Ashwaubenon High School and Green Bay School District
Teachers: Dan Albrent and Dan Newel
Stream Monitored: Dutchman's Creek
Student Participants: Environmental Science Classes

What are healthy water quality indicators for most fish to survive?

Temperature: Most fish prefer from 9^C to 25^C for spawning and the water temperature maximum for most fish ranges from 24^C to 35^C

pH: Most fish can thrive in a pH of 6.5 - 8.0

Conductivity: Most fish can thrive in 150-500 µS.

Turbidity: Higher turbidity creates conditions of low oxygen and high temperatures, resulting in low fish diversity

Dissolved Oxygen: Needs to be between 7-11 mg/L.

Nitrate: Over 10mg/L is not good. For some sensitive fish it needs to be less than 0.06 mg/L.

Phosphate: As little as 0.05 mg/L will have an impact on streams by creating algal blooms, which temporarily increase oxygen levels but then vastly decrease as algal blooms die and decompose.

Hidden Valley

Temperature: $6.5 – 22.4^C$

pH: 7.84 – 8.85

Conductivity: 245 – 1870 µS

Turbidity: 60 cm

Dissolved Oxygen: 8-12 mg/L

Nitrate: .02-.26 mg/L

Phosphate: >0.82 mg/L

Associated Bank

Temperature: $7.6-21.9^C$

pH: 7.65 – 8.54

Conductivity: 998 – 1292 µS
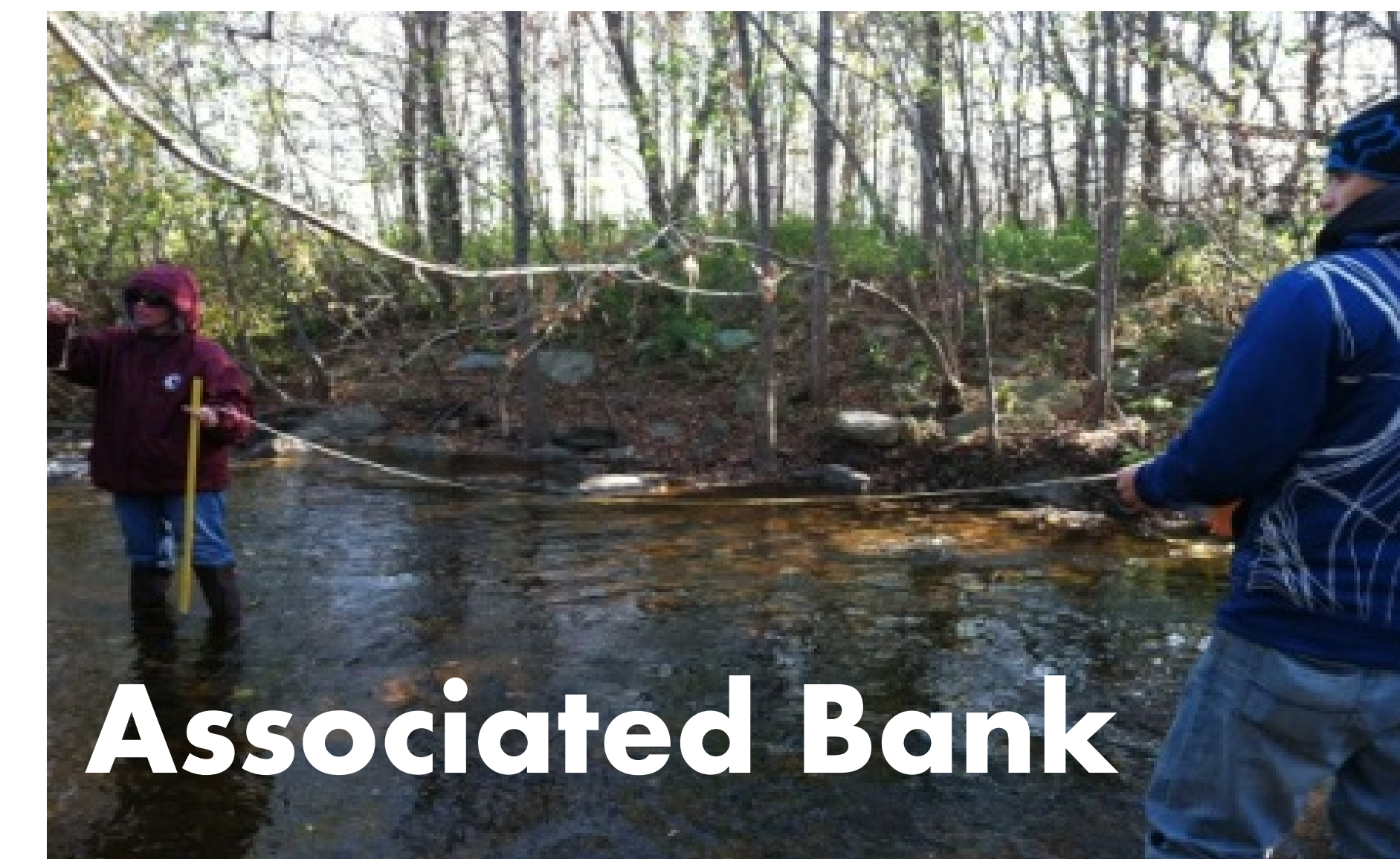
Turbidity: 60 cm

Dissolved Oxygen: 4-15 mg/L

Nitrate: .07-.17 mg/L

Phosphate: >0.82 mg/L

Associated Bank: Off of Hansen Road, near Highway 41. Downstream of Hidden Valley Park. Urban Area.

Hidden Valley Park: On the corner of Packerland Drive and Waube Lane. Downstream from agricultural fields. Surrounded by park with hiking trails.

Associated Bank

Hidden Valley Park

Conclusion

There are a few indicators, highlighted in red, which are outside the range for fish survival while the ones in black are within range for a healthy stream population of fish. About half of our indicators are out of range suggesting that our creek must have some chemical imbalances that do not allow for fish life.

Another factor looked at was the habitat assessment data. Our streams lack a lot of banks/ridges where fish and other organisms could reproduce. Dutchman's creek ranks in the middle of the pack in terms of assessment scores as seen on the graph to the left. Both Trout creek and Baird creek have higher habitat assessment scores, as well as higher macroinvertebrate scores. While Dutchman's creek has a lower habitat score and a lower macroinvertebrate score. We suspect that habitat is an important factor in supporting healthy fish populations. Therefore, we infer that creeks with a higher habitat assessment score would have larger and more diverse fish populations than Dutchman's Creek. Future studies should perform a comparative analysis between streams and their habitat assessments relative to their fish biodiversity.

Habitat Assessment Data

LFRWMP Habitat Assessment

Average Habitat Score

Apple, Ashwaubenon, Baird, Duck, Spring Brook, Dutchman, Trout

■ Downstream Site AVG   ■ Upstream Site AVG