Water Pollution in the Brickyard Bayou

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Abstract

This research investigates the combined effects of pollution and drought on the biotic community of Brickyard Bayou. While initially focused on water chemistry, our scope expanded to include physical pollution after drought conditions revealed significant debris, including broken school equipment, obstructing the waterway. Our primary objective is to facilitate ecosystem restoration by identifying these barriers and assessing water habitability. We utilized standard protocols—including transparency, dissolved oxygen, pH, atmospheric conditions, and water temperature—to determine ecosystem viability. Our findings indicate that Brickyard Bayou is facing critical water level issues. The combination of drought and physical trash has created stagnant conditions, forcing organisms to migrate due to habitat loss. In conclusion, this problem can lead to permanent ecological degradation and a significant loss of local biodiversity. Without intervention, the stagnation will likely cause hypoxia, making the environment uninhabitable. Our research highlights the urgent need for physical debris removal to restore natural flow and health for both the community and the aquatic ecosystem.

Research Question

What is water pollution?
What types of water pollutants are found in Mississippi water?
What type of organisms are found in the Brickyard Bayou?
How does water pollution in Mississippi water affect the organisms that are found in the water?
What is the cause of water pollution?
Why is the Brickyard Bayou an important place to inspect the water pollution?

Introduction

Water pollution has become a big problem around the world, specifically in Mississippi. According to the article "Water Pollution: Everything You Need To Know" by NRDC, "Water pollution occurs when harmful substances—often chemicals or microorganisms—contaminate a stream, river, lake, ocean, aquifer, or other body of water, degrading water quality and rendering it toxic to humans or the environment.(1974)" Water pollution can be caused by sewage water, oil spills, household and industrial waste, and many other substances.

The Brickyard Bayou is located near Bayou View Middle School and has many different types of fish including largemouth bass, redfish, bluegill, channel catfish, black drum, southern flounder, speckled trout, Atlantic croaker, and white crappie. The last time data was collected in this area for Inorganics, Major, Nonmetals, Nutrients, and Physical was in 1974. This area is used for fishing and there are many family-friendly activities around that many go to.

Water pollution in The Brickyard Bayou is an important issue. When the water in the Brickyard Bayou is polluted then it poses risks to public health, the local ecosystem, and economy. Water pollution can cause respiratory problems, skin infections, and many other health diseases for humans. It can also cause a disruption in the food chain when aquatic life dies from it. Another impact is loss of biodiversity, loss of tourism, damage to fisheries, and many more.

In conclusion, the Brickyard Bayou is the habitat of many different organisms which means that pollution in the Bayou affects many things. The drought that the Brickyard Bayou is currently having caused changes in water quality and availability, which can affect the habitat of countless creatures that live there.People also use the Brickyard Bayou as a source of fishing, meaning humans are also affected. Water pollution is an issue that can be solved with the help of the community. If we work together to solve this problem, we can enjoy the Brickyard Bayou to fish without having to worry about the risks it may present. All in all, the pollution in water can affect many different organisms that live there, including humans.

Research Methods

Will test Brickyard Bayou water once a week, if conditions are allowable. Will test for transparency, pH, Dissolved Oxygen (DO), and will make observations of the state of the water and possible organisms.

Water Transparency Protocol:
1. Collect a surface water sample.
2. Stand with your back to the sun so that the transparency tube is shaded.
3. Pour sample water slowly into the tube using the cup. Look straight down into the tube with your eye closed to the tube opening. Stop adding water when you cannot see the pattern at the bottom of the tube.
4. Rotate the tube slowly as you look to make sure you cannot see any of the pattern.
5. Record the depth of water in the tube on your Hydrosphere Investigation Data Sheet to the nearest cm.
6. Pour the water from the tube back into the sample bucket or mix up the remaining sample.
7. Repeat the measurement two more times with different observers using the same sample water.

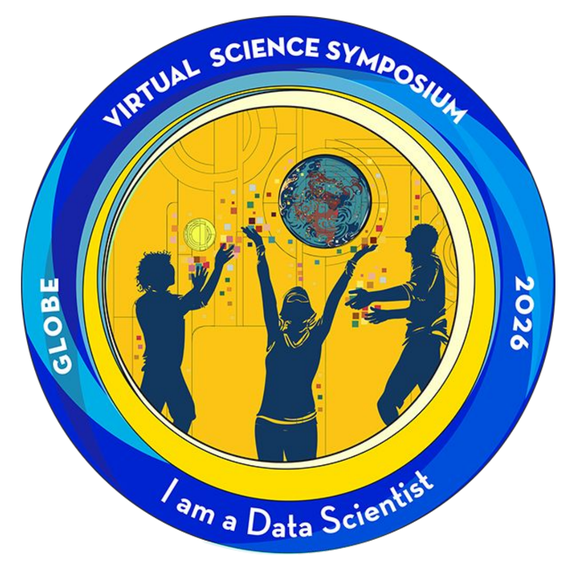
Dissolved Oxygen Protocol:
1. Place the cap on the empty sample bottle.
2. Submerge the sample bottle in the sample water.
3. Remove the cap and let the bottle fill with water. Move the bottle gently or tap it to get rid of air bubbles.
4. Put the cap on the bottle while it is still under the water.
5. Remove the sample bottle from the water. Turn the bottle upside down to check for air bubbles. If you see air bubbles, discard this sample. Collect another sample.
6. Follow the directions in your Dissolved Oxygen Kit to test your water sample.
7. Record the dissolved oxygen in your water sample on the Data Sheet as Observer 1.
8. Have two other students repeat the measurement using a new water sample each time.
9. Record their data on the Data Sheet as Observers 2 and 3.
10. Calculate the average of the three measurements.
11. Each of the three measurements should be within 1 mg/L of the average. If one of the measurements is not within 1 mg/L of the average, find the average of the other two measurements. If both of these measurements are within 1 mg/L of the new average, record this average.

PH Protocol:
1. Fill the beaker halfway with sample water.
2. Follow the instructions that come with your paper for testing the pH of the sample.
3. Record your pH on the Data Sheet as Observer 1.
4. Repeat steps 4-6 using new water samples and new pieces of paper. Record the data on the Data Sheet as Observer 2 and Observer 3.
5. Find the average of the three observations.
6. Check to make sure that each observation is within 1.0 pH units of the average.

If they are not within 1.0 units of the average, repeat the measurements. If your measurements are still not within 1.0 pH units of the average, discuss possible problems with your teacher.

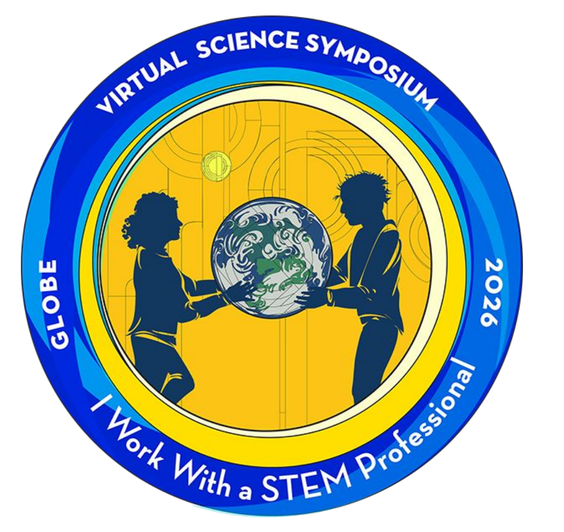
Picture of Area studied.

GLOBE Badges



I am a Data Scientist

We collected data, compared our data to past students data, and data collected from conservation agencies to determine if our waterway had improved or changed in any way over time helping us decide what issues needed to be addressed.



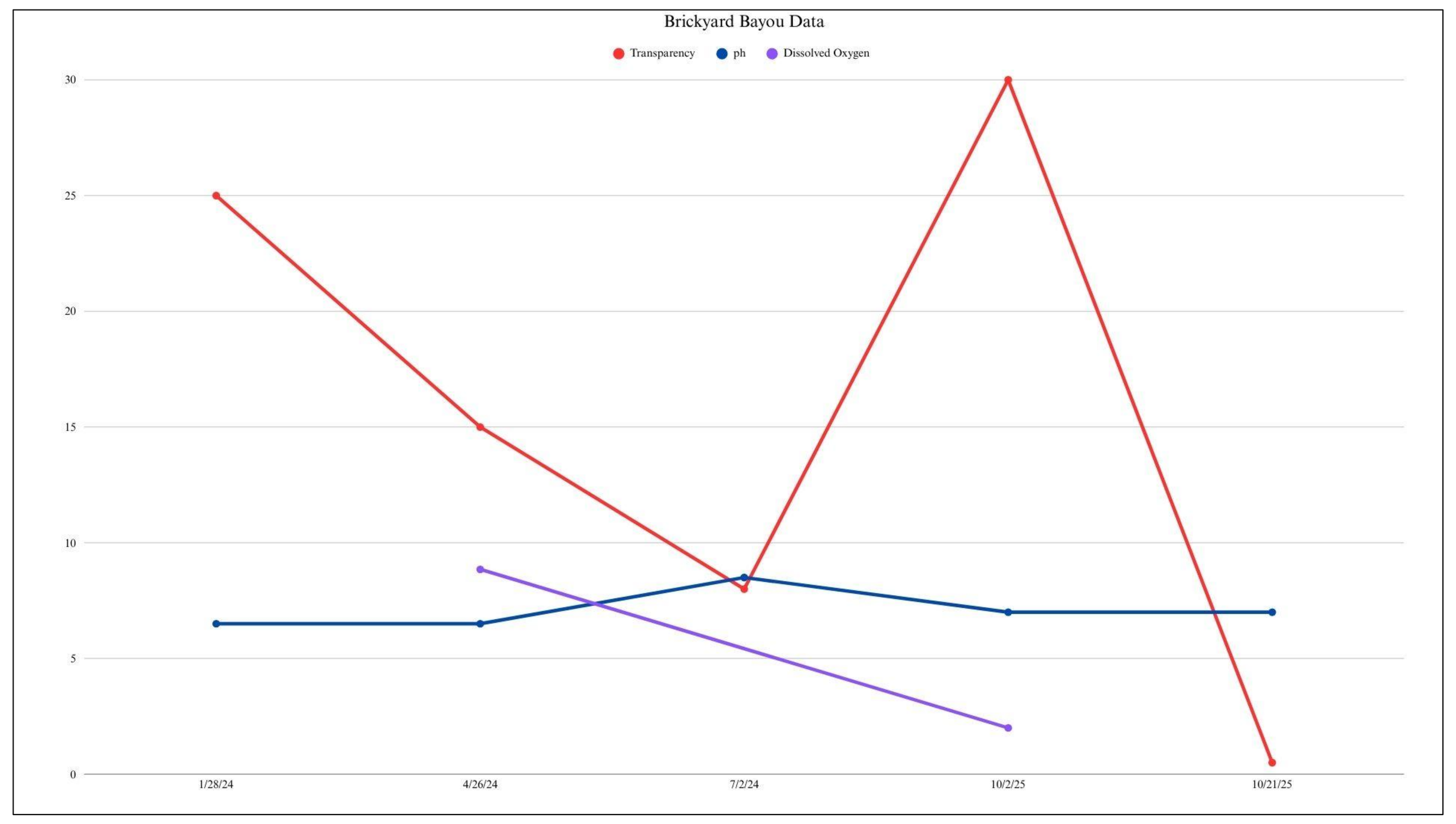
I worked with a STEM Professional

We worked with the Walter Anderson Museum, MSU Extension, MDR, Nicholas Enwright a Research Geographer, Sabrina Cummings a Conservationist Biologist, and John A. Tupy a Fish & Wildlife Biologist to help us understand our environment, limitations and possible solutions.

Results

As shown in the figure 1, pH levels remained the most consistent metric, regardless of drought conditions. However, transparency fluctuated significantly; while constant flow maintained clear water, the drought caused high turbidity and muddy conditions. We also observed a surface film and mosquitoes, which further reduced water clarity. The drop in dissolved oxygen to 2.0 explains the absence of tadpoles and other aquatic life, leaving only mosquitoes. Overall, the lack of consistent flow—whether due to drought or blockages from trash and fallen trees—appears to be forcing fish and other organisms to relocate to find suitable breeding grounds.

Figure #1



Field Photos

Pictures showing how much debris and trash are blocking the waterflow.

Discussion

To restore the Brickyard Bayou to its original state, we propose a three-phase cleanup plan. We will begin by removing large objects and fallen trees that are currently blocking water flow. Once the flow improves and water levels rise, we will target smaller trash and debris throughout the area. Finally, to ensure long-term sustainability, we recommend a check-in every six months to evaluate the effectiveness of the cleanup and determine if future maintenance is required. These measures are essential for revitalizing the ecosystem and maintaining a healthy environment at our school.

Conclusions

In conclusion, the Brickyard Bayou faces critical challenges regarding water pollution and obstructed flow. Debris blocking the water near our school has degraded the habitat, forcing aquatic life to relocate, while accumulated trash further pollutes the remaining water. To address these issues, we propose a comprehensive cleanup followed by bi-annual check-ins to monitor the ecosystem's recovery. By taking these steps, we can effectively solve these problems and restore the bayou to a healthy state.

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