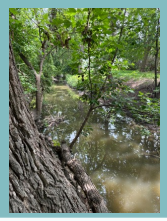
Seasonal Variations in Select Quality Parameters in a Southeastern Michigan River

Jana Ibrahim, Yasmin Rammal, Aya Soubra, Layal Zbib

Introduction

The Northern branch of Ecorse River, spanning over 25 kilometers, drains an area of nearly 12,000 acres. It intersects with the South branch before merging with the Detroit River. The health of Ecorse Creek impacts wildlife habitat in Wayne County's 43 square mile watershed. Preserving the creek is vital for biodiversity and requires effective landowner management strategies to reduce flooding risks. Research on Ecorse Creek is crucial to protect homes and enhance community resilience against climate change. Conservation efforts not only benefit the environment and wildlife but also improve the quality of life for surrounding communities. Threats to water quality, such as sewage overload and flooding, must be addressed to maintain the creek's ecosystem integrity.



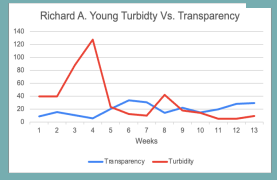
Acknowledgments

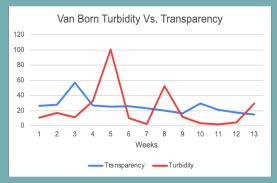
Thank you to our teacher and mentor, Mrs. Johns, for providing us with the knowledge and materials to conduct this research. Thank you to the Dearborn Heights Watershed Commission for all the support and assistance given.

Abstract

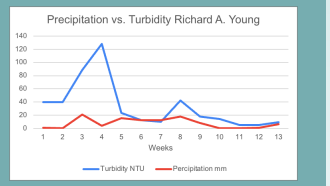
This study monitored water quality at two sites along Ecorse Creek in Dearborn Heights, Michigan, near Metropolitan Detroit, one near a recreational area and the other in a light industrial and residential area. Parameters tested included nitrates, transparency, turbidity, temperature, and dissolved oxygen, following GLOBE protocols. Data collection began in July 2023 and continued until mid-November, with a significant rainstorm in August 2023 causing flooding and increased turbidity levels, showing a correlation between precipitation and turbidity. Future research aims to expand to include more parameters and data collection in different seasons, potentially comparing water quality across various parts of Ecorse Creek.

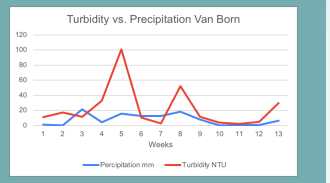
Results





The research found a correlation between high amounts of precipitation and increased turbidity levels. Such high turbidity levels associated with low transparency causes less light to penetrate Ecorse creek overall leading to a lower level of photosynthesis produced by underwater vegetation.





Research Questions

1. To what extent does the time of year affect turbidity, total solids, transparency, and nitrate levels at each of the two locations tested along Ecorse Creek?
2. How do rain events affect each of the water quality parameters tested at each site along Ecorse Creek?

Null Hypothesis

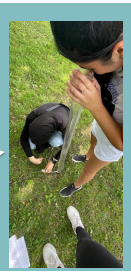
1. There is no significant difference between transparency, turbidity, nitrates and dissolved oxygen tested and rainfall events.
2. There is no significant difference in turbidity levels following major rain events.

Conclusion

During week 9 of fall 2023, changes in water parameters were observed, including decreased temperature, nitrates, and turbidity, alongside increased transparency and dissolved oxygen. Over 13 weeks, significant variations in these parameters were noted at both sites, emphasizing the impact of seasonal changes. The study highlighted the correlation between high precipitation and increased turbidity levels, affecting light penetration and photosynthesis in Ecorse Creek, suggesting a need for further research on the effects of changing seasons on water parameters.

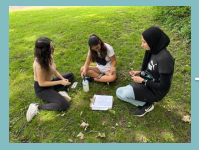
Methodology

The two selected research sites were located within Southeast Michigan's city of Dearborn Heights, one on McKinley St., and one on Van Born Rd.



A transparency tube with a Secchi disk at the bottom with around 32 oz of sampled water to test.

After this, a sample of another 32 oz of water from each site was collected to test for dissolved oxygen, nitrates, total solids and turbidity.



Testing for dissolved oxygen using vernier probes

Finding nitrate levels using NitraVer 5 Nitrate Reagent Powder Pillow and the HACH DR 300 Pocket Colorimeter

Measuring beakers using Ohaus PX85 Pioneer Semi-Micro Balance for total solids

A sample was inserted into the Hach 2100N laboratory turbidimeter to test for turbidity