

# Artificial vs Natural Construction: A Case Study of the Beaver Ponds in Vernay Lake

Lukas Glist

Pelham Memorial High School

Grade 11

# Introduction

- Manmade dams' effect on water quality
  - Disruptive to an ecosystem, fragmentation
  - Numbers increasing over time, their effect must be investigated further (Ecke, 2017)
- Beaver dams' possible similar effects, especially when older
- Parameters used to measure water quality
  - Turbidity
  - pH
  - Conductivity
  - Dissolved Oxygen (DO)
  - Temperature
  - Chlorophyll

# Review of Literature

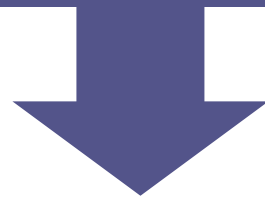
- Net effects of beaver dams were small in contrast to those of artificial dams (Ecke, 2017)
- Possible effects (Ecke, 2017)
  - Dissolved oxygen higher upstream of beaver dam
  - Temperature increased in beaver ponds
  - Turbidity higher downstream of beaver dam

# Gap In Research

- Past studies have compared artificial dams to beaver dams in separate water systems, but no research has been done on both dams in the same system

# Purpose

To assess the effects of increased turbidity and construction on the water quality of an ecosystem

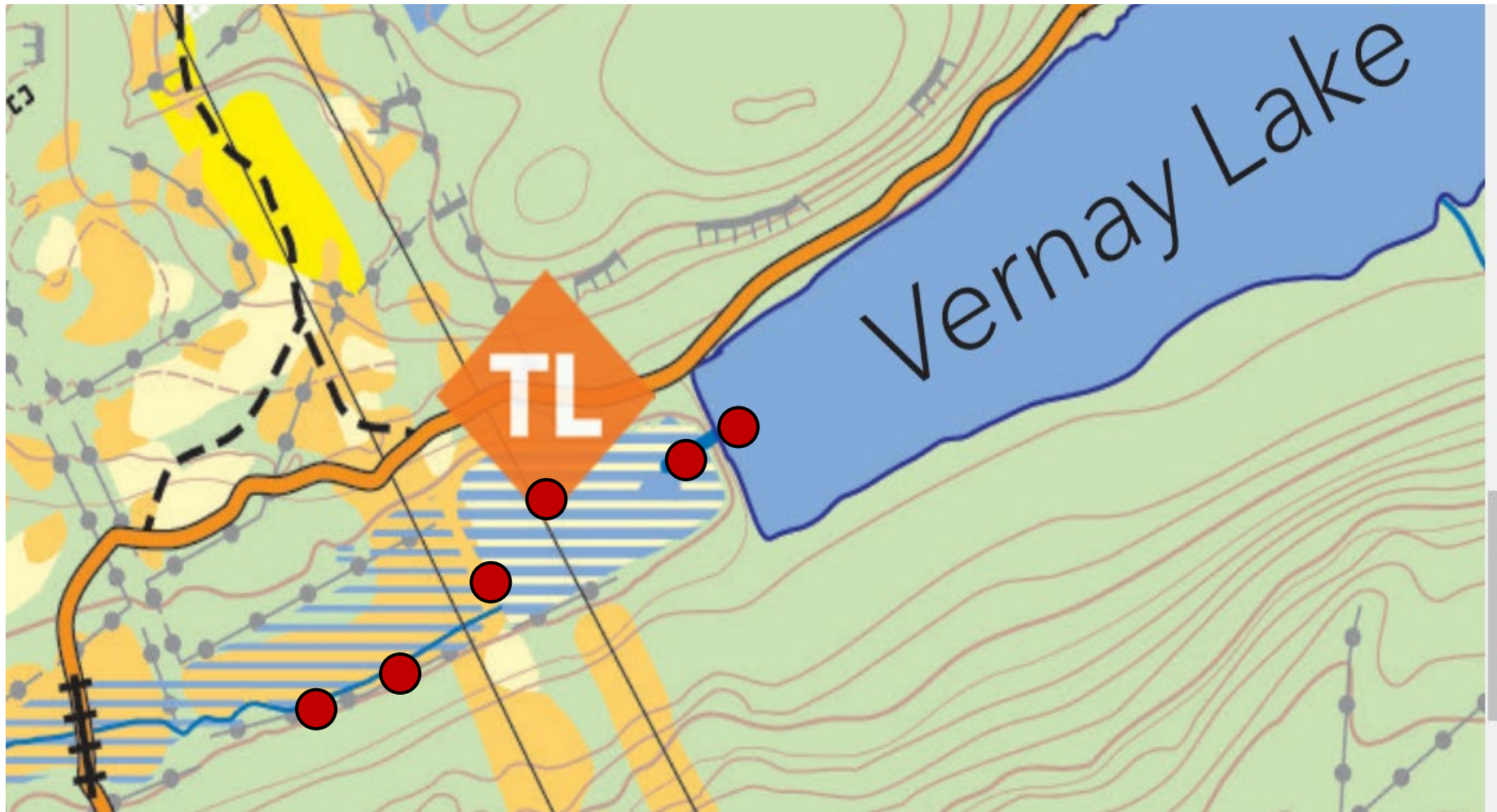


- Compare the water quality of beaver ponds and the source water that fills it
- How turbidity, conductivity, pH, temperature, chlorophyll, and dissolved oxygen are affected

# Hypothesis

- The beaver pond will have an overall worse water quality than Vernay Lake
  - Higher turbidity, temperature, conductivity
  - Lower pH, chlorophyll, dissolved oxygen
- Sites closer to the beaver dam will be more turbid, more suspended solids

# Methodology



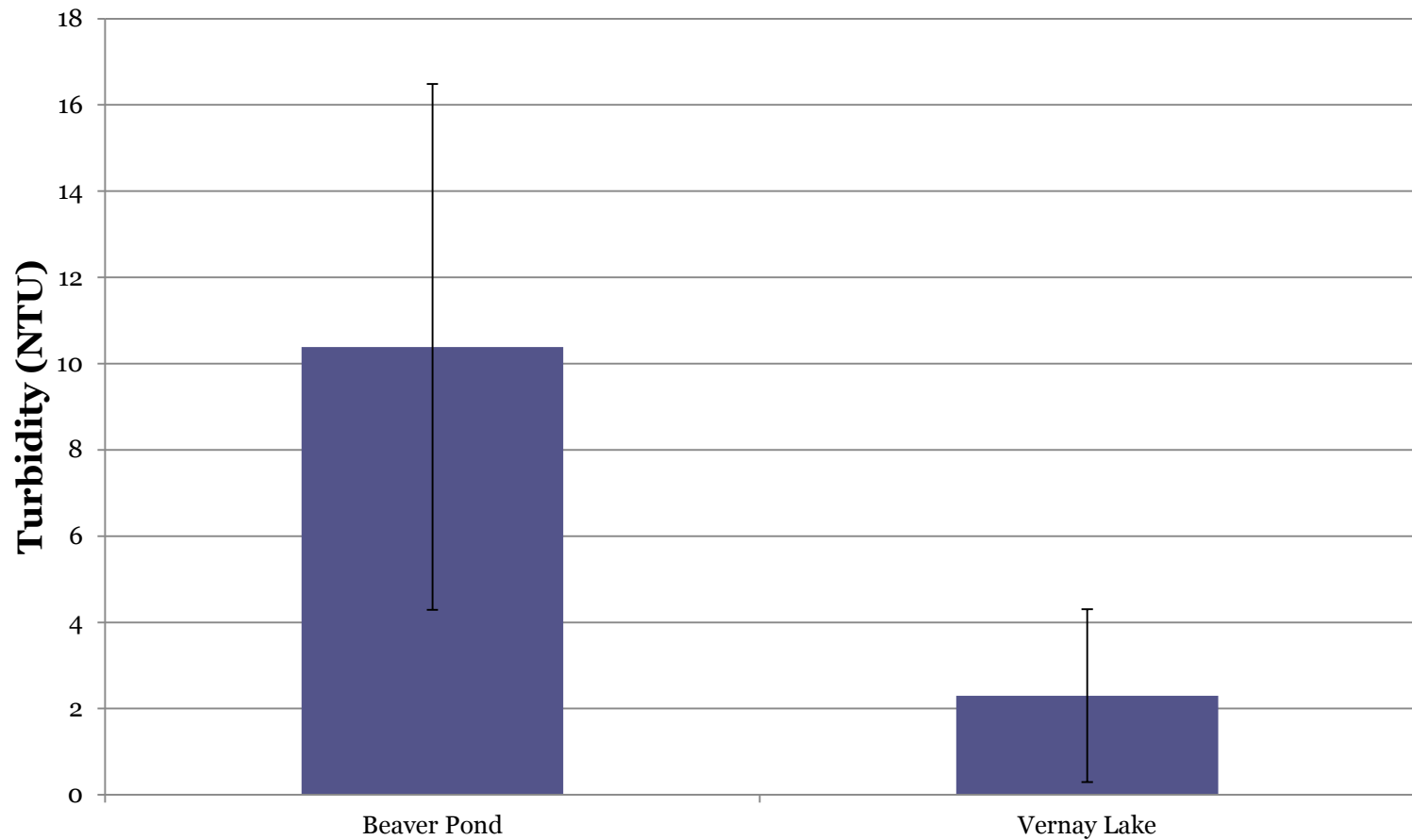
# Methodology

- Meters used
  - Vernier Turbidity Sensor
  - Combo HI98129 pH/EC/TDS Tester
  - YSI ProODO Sensor
  - Turner Designs FluoroSense Handheld Fluorometer
- 6x Sample Cups



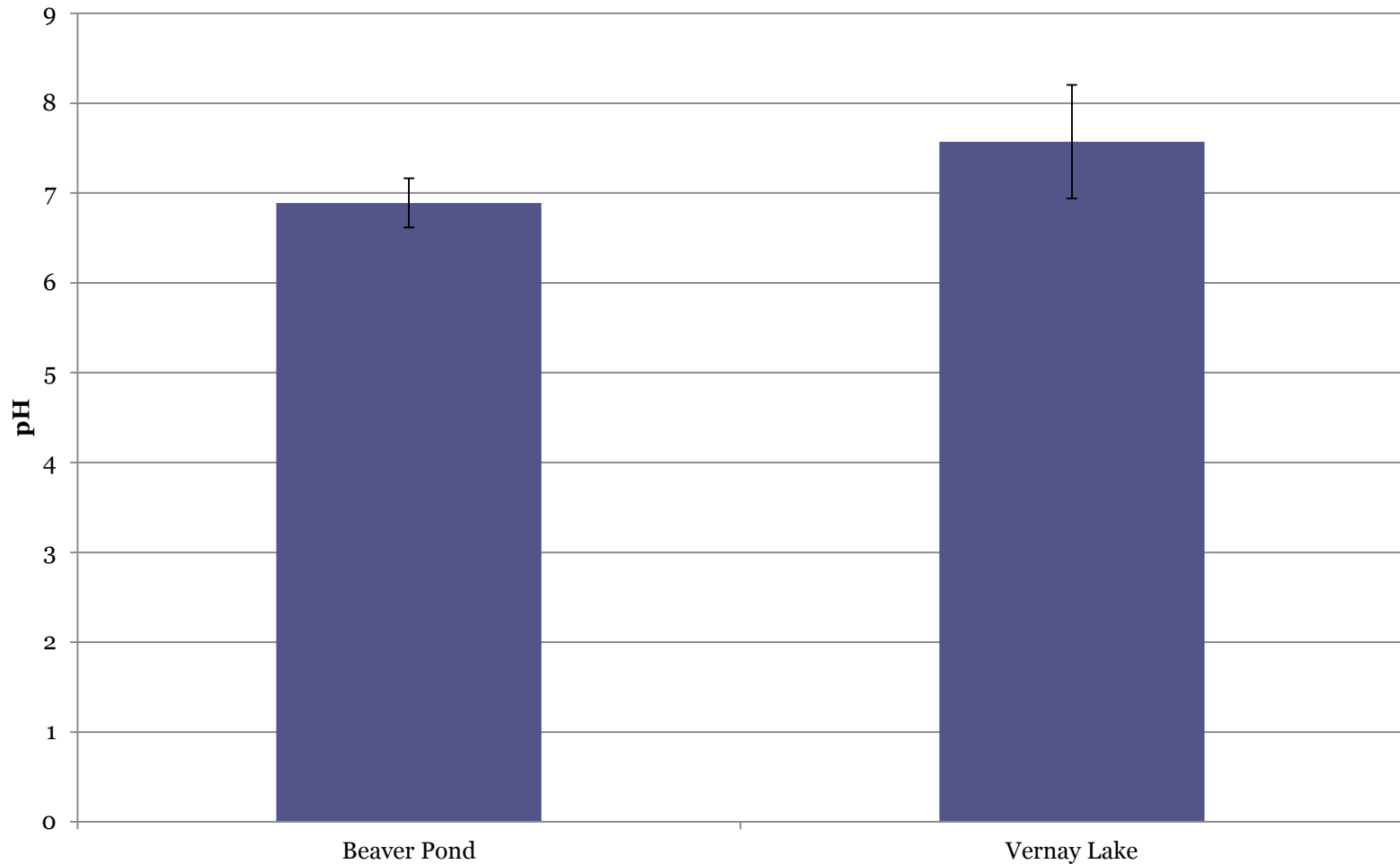
# Results: Beaver Pond vs Vernay

## Beaver Pond vs Vernay Lake: Turbidity



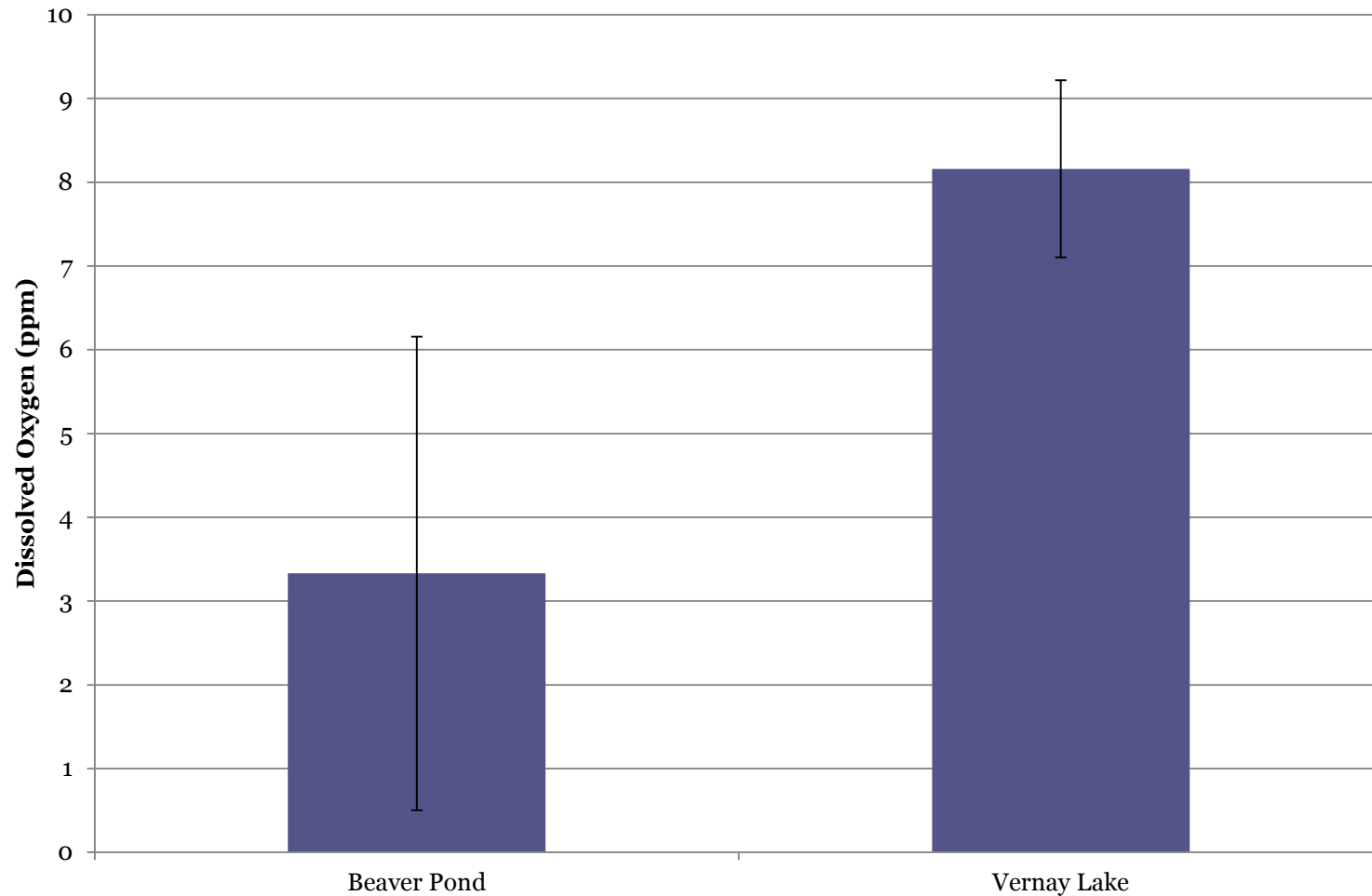
# Results: Beaver Pond vs Vernay

## Beaver Pond vs Vernay Lake: pH



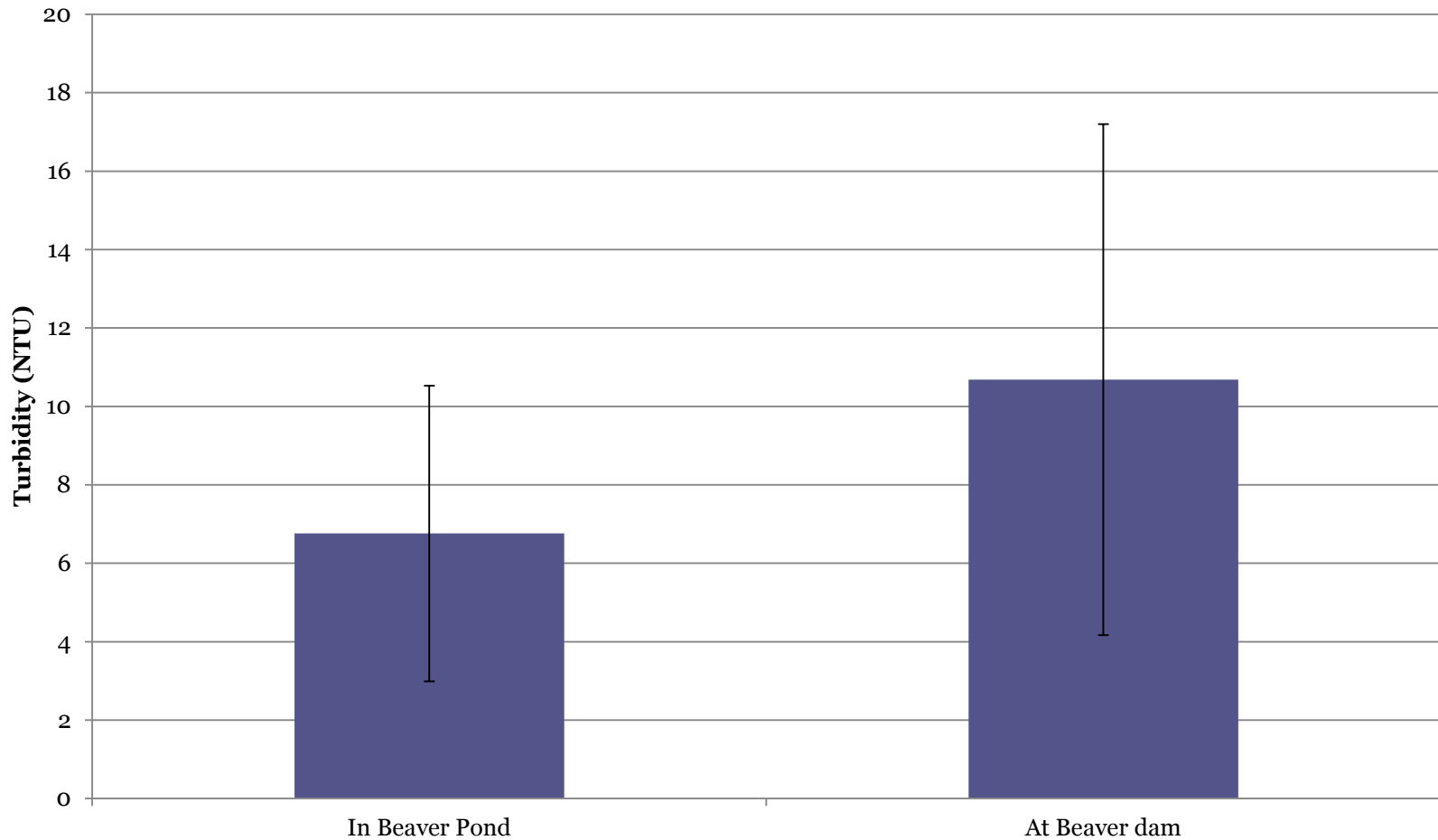
# Results: Beaver Pond vs Vernay

## Beaver Pond vs Vernay Lake: DO



# Results: Beaver Pond vs Beaver Dam

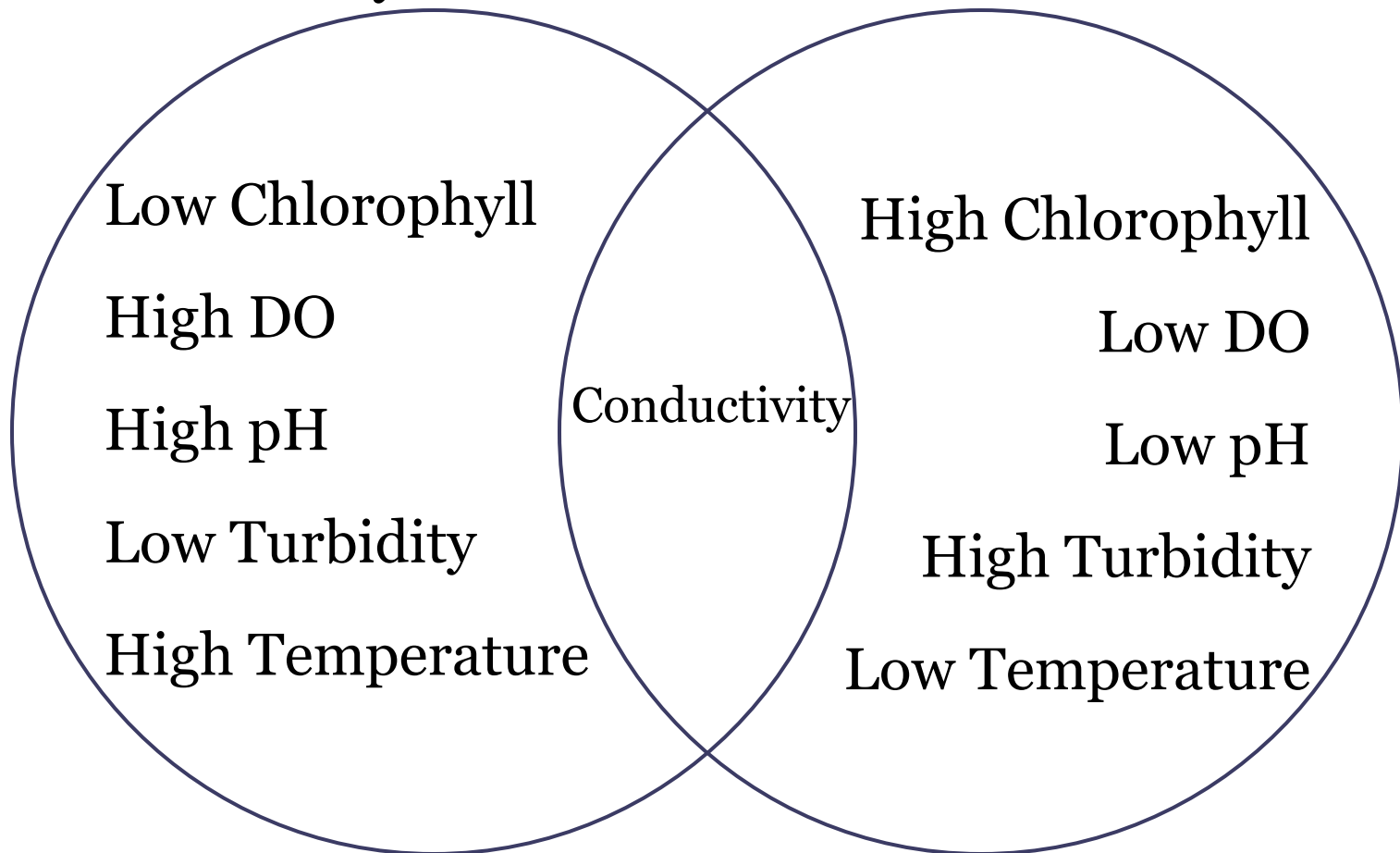
## Beaver Pond vs At Dam: Turbidity



# Discussion

## Vernay Lake

## Beaver Pond



# Conclusion

Low  
Chlorophyll in  
Vernay Lake,  
not predicted



Mesotrophic  
lake, not many  
nutrients

Low DO in  
beaver pond



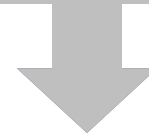
More algae  
and plant life  
in water

Low pH in  
beaver pond



Increased leaf  
litter in water

High  
temperature  
in Vernay, not  
predicted



Open area,  
less canopy  
cover than  
beaver pond

Higher  
turbidity near  
beaver dam  
and pond



Water passes  
through and  
carries  
sediments

# Limitations

- Conductivity readings possibly inaccurate, did not correlate with turbidity
- Limited timeframe, conducted over a week

# Future Work

- Conduct testing around human construction projects during construction to see how water quality is affected
- Investigate how turbidity affects other parameters in isolated environments in order to limit outside influence



# Significance

Amount of artificial dams is increasing over time, can have negative impacts

Demonstrates the adverse affects of construction on a watershed by comparing different sites around dams

Beavers are new to Teatown and the negative effects they may have on the ecosystem must be investigated further

# Acknowledgements

- Dr. Amy Karpati and Charlie Luisi
- Leigh for showing me how to get to the beaver pond
- My family for driving me here (sometimes)
- My science research director, Mr. Beltecas, for teaching me how to make a PowerPoint

# Artificial vs Natural Construction: A Case Study of the Beaver Ponds in Vernay Lake

By: Lukas Glist

A decorative graphic consisting of several horizontal lines of varying lengths and colors (teal, white, and light blue) extending from the right side of the slide towards the center.