

The Impact of Watershed Inputs on Lake Water Quality

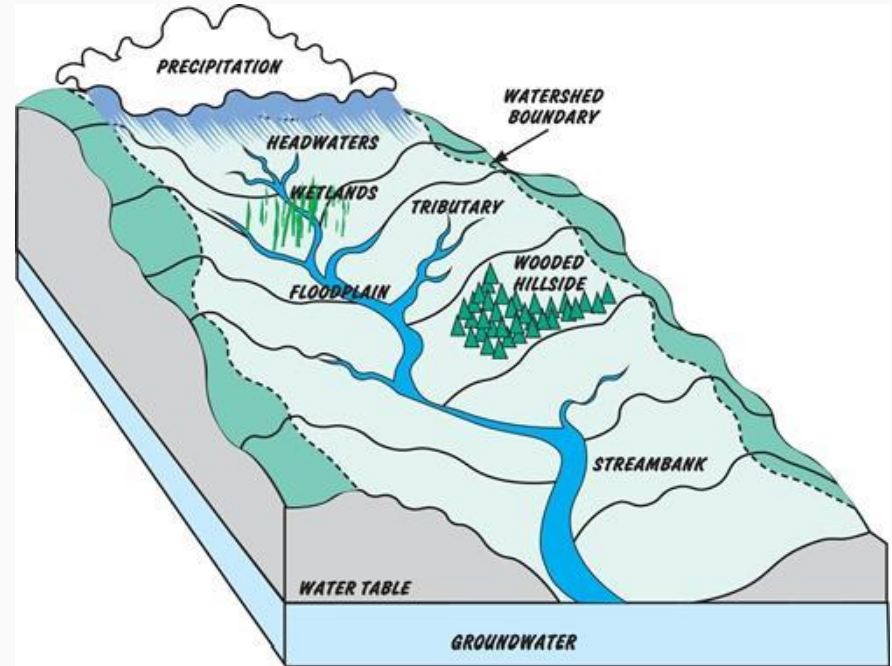
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Why is this important?

- Extremely important resource
 - Used in every aspect of life
 - Only 1% of water on Earth available for direct use
 - Supplies decreasing
- Eutrophication of lakes occurring at an increasing rate
 - Understanding cause can help with finding the solution

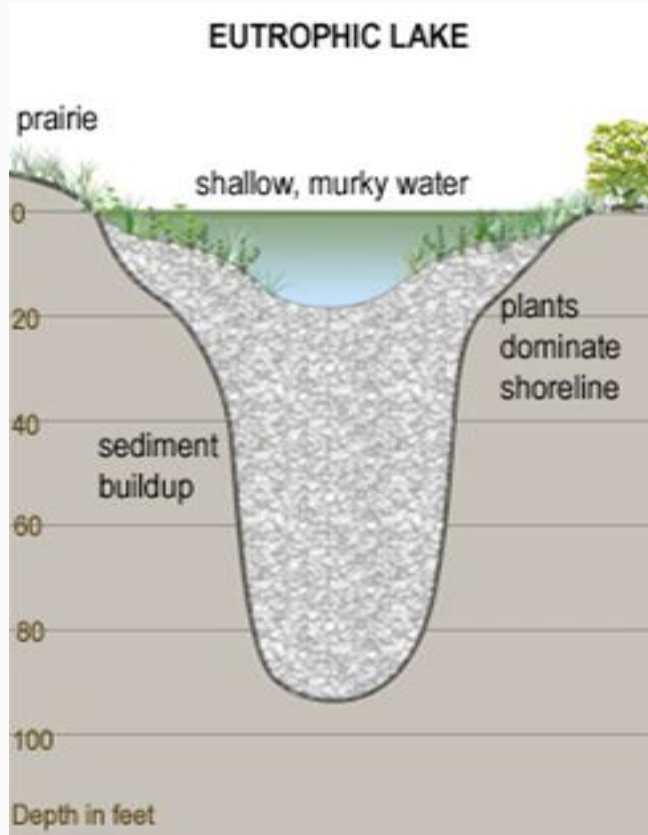
Background

- Watersheds
- Point Source vs. Non-Point Source Pollution
- Eutrophication
 - What is it?
 - Effects
 - How does it happen?
- Macroinvertebrates and Indicator Species

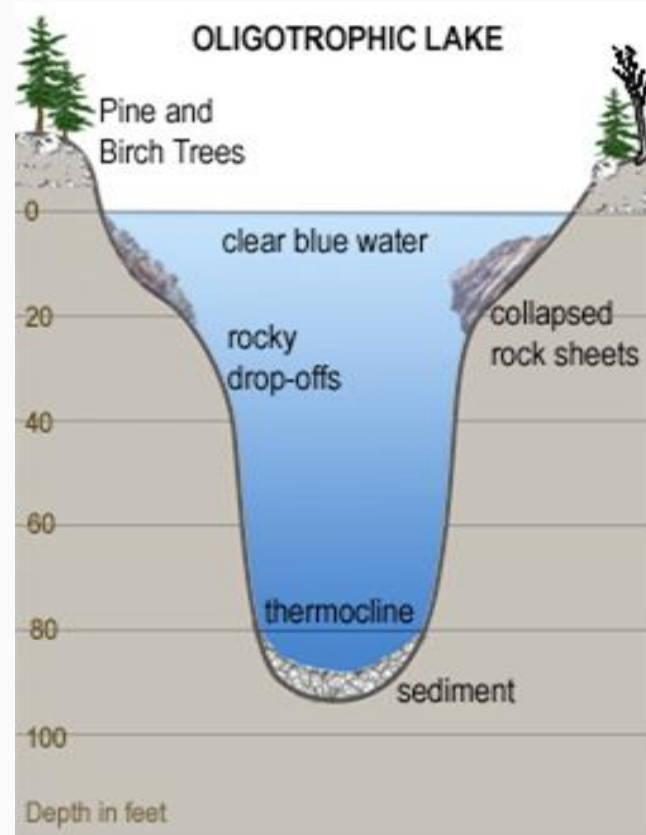


<http://www.accdpa.org/conservation-solution-center/watershed/>

Background Continued



<http://rmbel.info/lake-trophic-states-2/>



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Goal

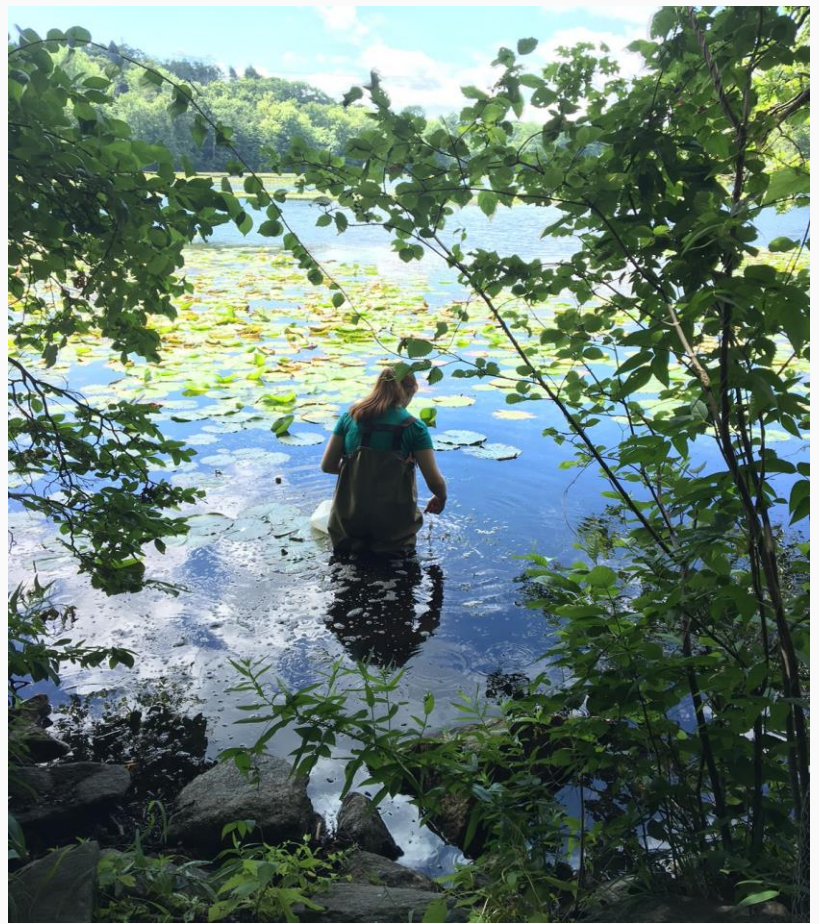
To compare the difference between overall water quality, nutrient levels, and macroinvertebrate presence in Teatown Lake's stream inputs and areas of the lake without inputs.

Methods

- Collect samples at 4 input streams
- Collect samples at 4 lake sites
- Measure dissolved oxygen (DO), algae content, pH, conductivity, temperature, phosphate levels, nitrate levels
- Place leaf packs in sample sites
 - Collect after 1 week
 - Examine for macroinvertebrate and indicator species presence



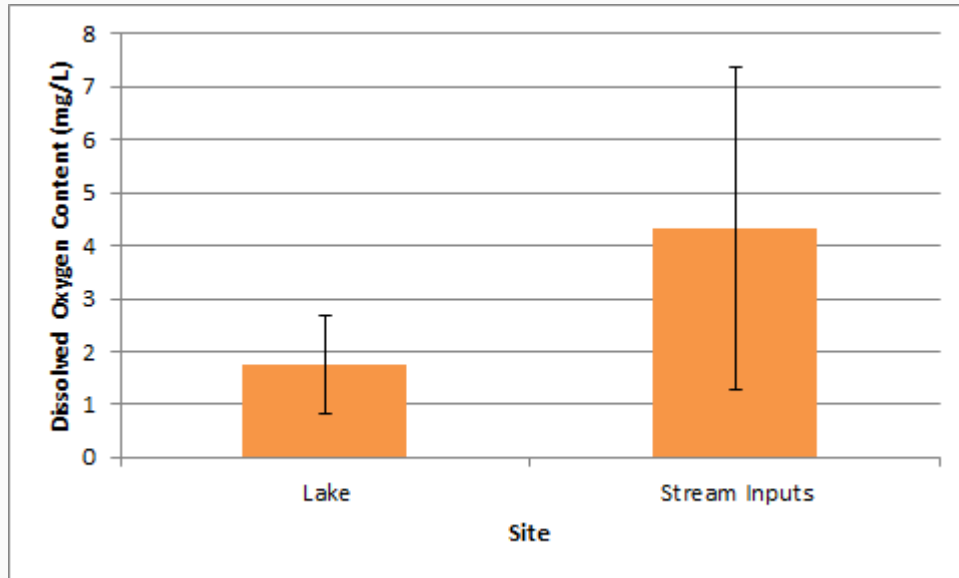
Leaf Packs Used



Placing Leaf Packs

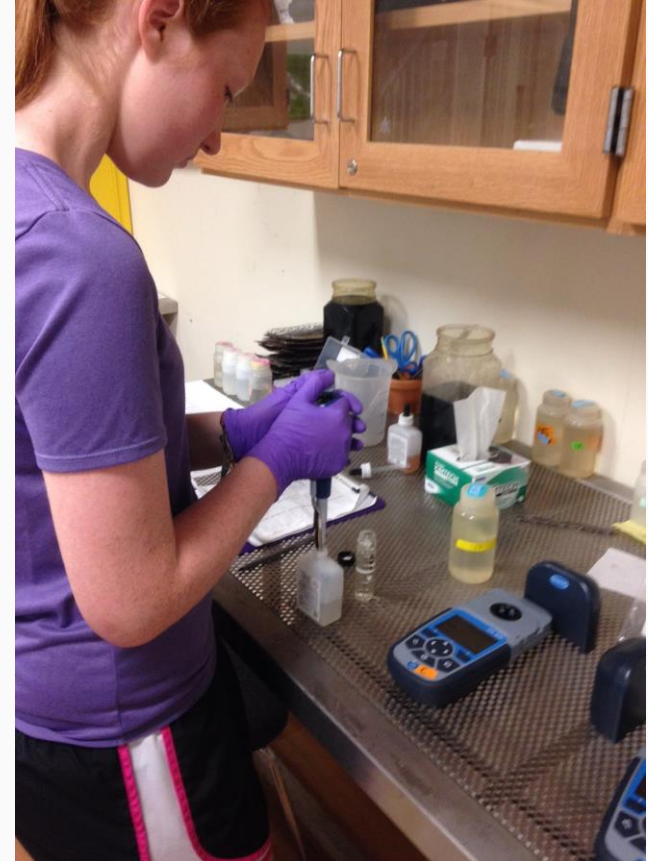
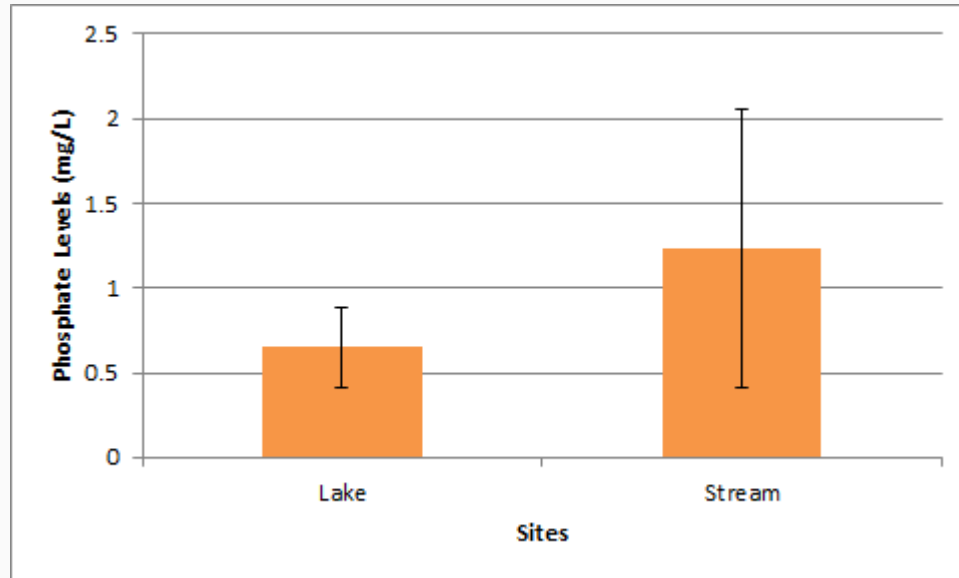
Results and Discussion - DO

| Sample Sites | Avg DO Level (mg/L) | StdDev of DO |
|---------------|---------------------|-------------------|
| Lake | 1.7525 | 0.930067201873069 |
| Stream Inputs | 4.3075 | 3.04454430087657 |



Results and Discussion - Phosphates

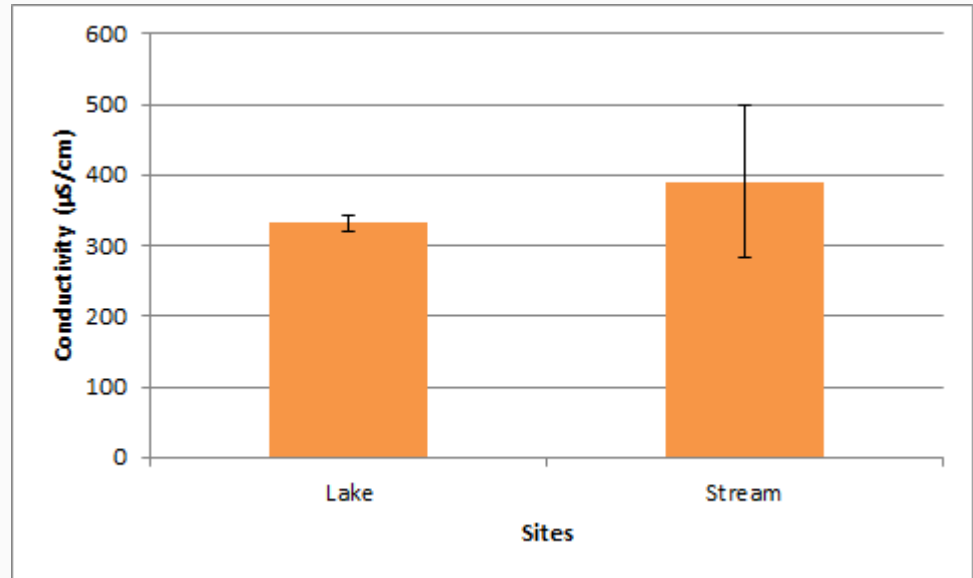
| Sample Sites | Avg Phosphate Level (mg/L) | StdDev of Phosphate Levels |
|---------------|----------------------------|----------------------------|
| Lake | 0.65 | 0.238047614284762 |
| Stream Inputs | 1.2375 | 0.821040280898047 |



Results and Discussion

- Conductivity higher in streams
- Algae levels, pH, temperature about equal
- Nitrate levels about equal
- Macroinvertebrates insignificant

| Sampling Sites | Avg Conductivity ($\mu\text{S}/\text{cm}$) | StdDev of Conductivity |
|----------------|--|------------------------|
| Lake | 331.5 | 10.6301458127346 |
| Stream | 390.375 | 107.806622510599 |



Discussion

- Problems
 - Lack of rain
 - Time
 - Supplies available

Conclusions

- Higher DO in streams
 - Why
 - What does this do for the ecosystem?
- Higher phosphate levels, conductivity in streams
 - Contributes to continued eutrophication of Teatown Lake

Future Research

- Make changes to original study
 - Over longer time period
 - Different times of the year
 - More data points
- Expand study to different areas
- Study plant health/type around lakes and streams
 - Would certain plants help alleviate stress on ecosystems from pollutants?

Acknowledgements