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### Water Quality Project: Mashpee River Study

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# Water Quality Project

A group of four students are posing in a wooded area with autumn foliage. One student is sitting on a blue cooler, holding a handheld device. Another student is holding a clipboard. A third student is holding a white container. A fourth student is standing behind them. Various equipment like a white bucket, a blue cooler, and a black bag are on the ground.

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Jasmine McCall.



# Where Were We?

**Both sites were along the Mashpee River.**

The first site we tested was the locally known, Herring Run. It is at the head of the river.

The second site was South of Rt. 28. It was downstream of an ancient road.



A topographic map of Mashpee, Massachusetts, showing the Mashpee River flowing from north to south. The river is depicted in blue, winding through the landscape. Key features include Mashpee Pond, Washburn Pond, and several bogs (Cranberry Bog, Amos Pond). Roads are shown in red, with Route 28 running horizontally across the middle. Contour lines indicate elevation. Labels for 'Athletic Field', 'Cem.', 'Gravel Pit', 'Old Indian Ch. Cem.', 'Substa.', and 'Pine Tree Corner' are visible. The map is oriented with North at the top.

**Herring  
Run Site**

**The Mashpee  
River flows  
from the N. to  
the S. It starts  
at the  
Mashpee-  
Wakeby Lake  
and ends at  
Popponeset  
Bay**

**S. of Rt. 28**



# Herring Run

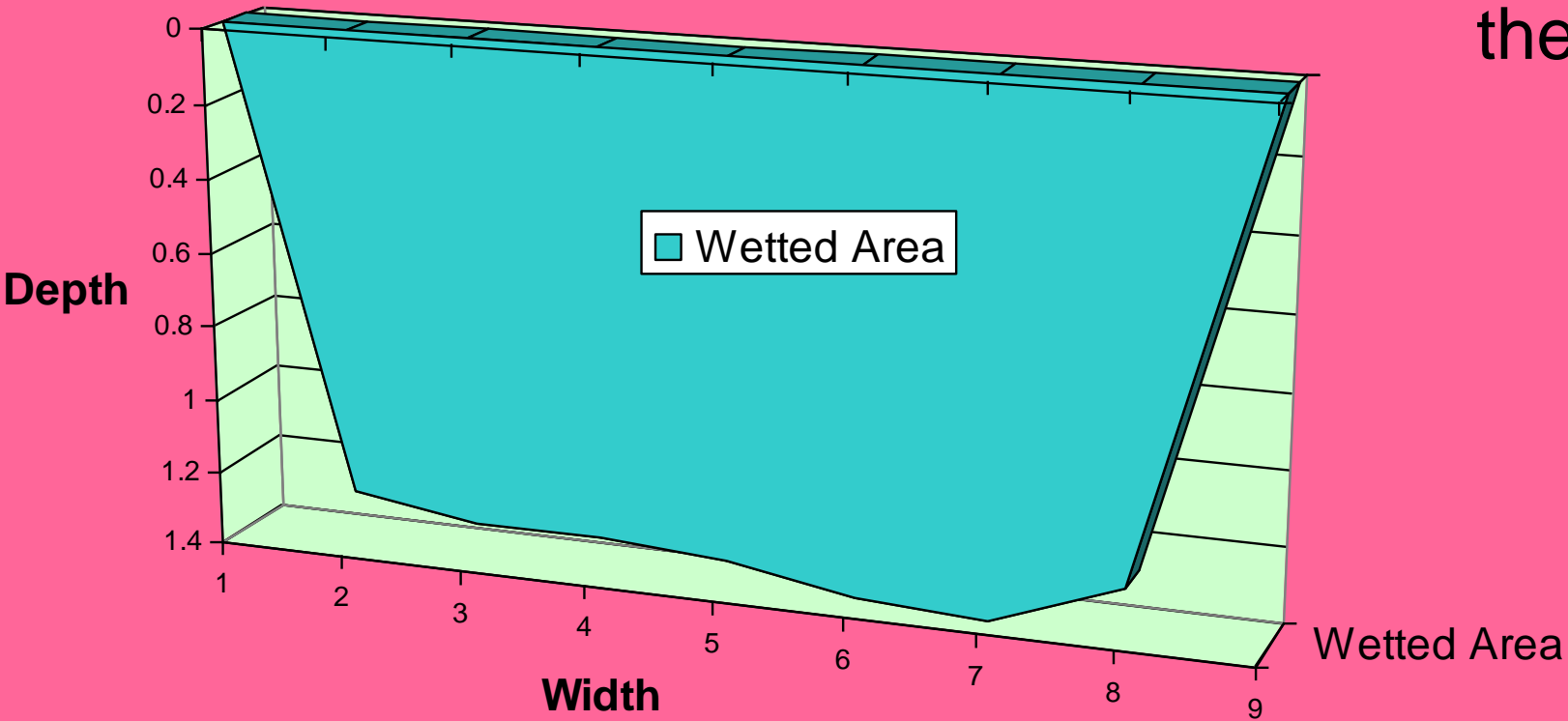


Habitat here includes a concrete fish ladder, gravel, and sand substrate and no forest overstory.



## Profile of Herring Run

This is the  
width and  
depth of  
the Herring  
Run



The  
average  
depth is  
1.3 feet.



# South of Rt. 28

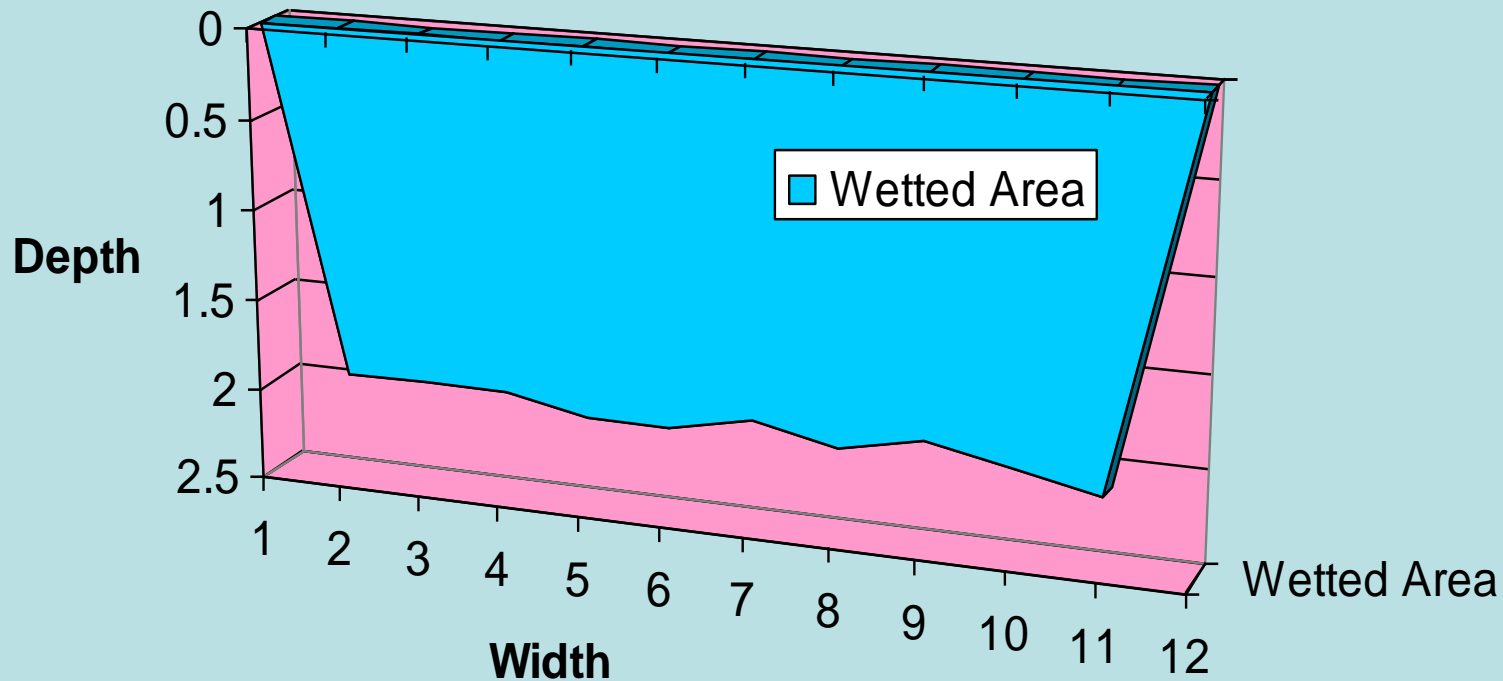
A photograph showing three students engaged in a field study. A young woman in a white hoodie and glasses is crouching on a concrete bridge, holding a yellow measuring tape. A young man in a black hoodie and a Boston Red Sox cap is standing in the water, holding a vertical measuring device. Another young man in a red cap and blue shirt is also in the water, looking towards the camera. The stream is surrounded by trees with autumn foliage. The text 'South of Rt. 28' is overlaid in large white letters at the top.

Habitat here includes an old concrete bridge, gravel, sand, and mud substrate and a complete forest overstory.



## Profile at S. Rt.28

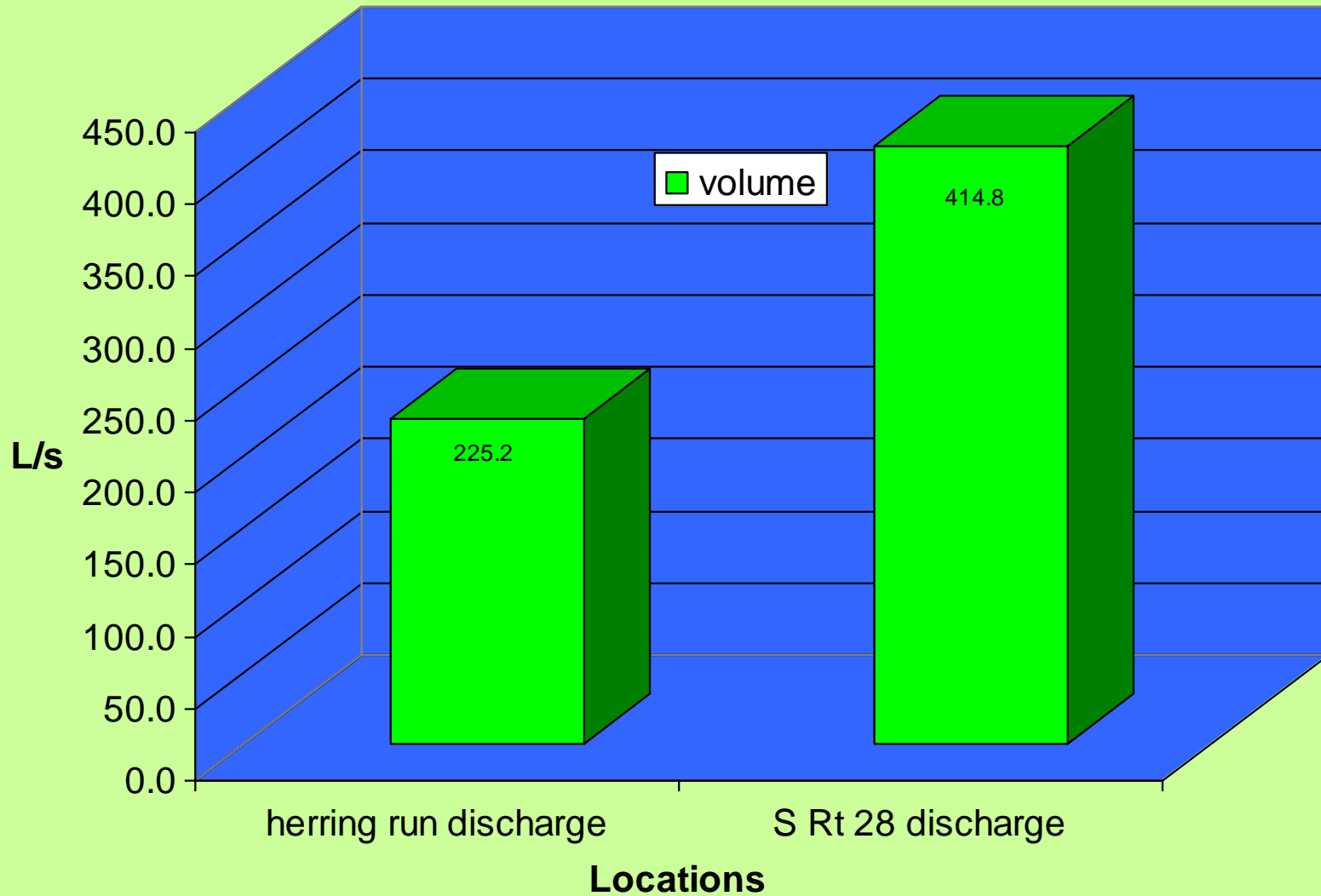
This is the width  
and depth of our  
site: South of Rt. 28



The  
average  
depth is  
1.96 feet



## Total Discharge



There is more discharge at Rt. 28., it's lower in the river system. It carries almost twice the volume of the upper site.



# Sampling for Water Quality Field

- Boots
- Long gloves
- Tweezers
- Buckets
- Stadia Rod
- Flow meter
- PH meter
- Clipboards
- Fine Mesh Net
- YSI Dissolved Oxygen Meter
- HACH Colorimeter
- 100 ft. tape measure



# Educational Objective

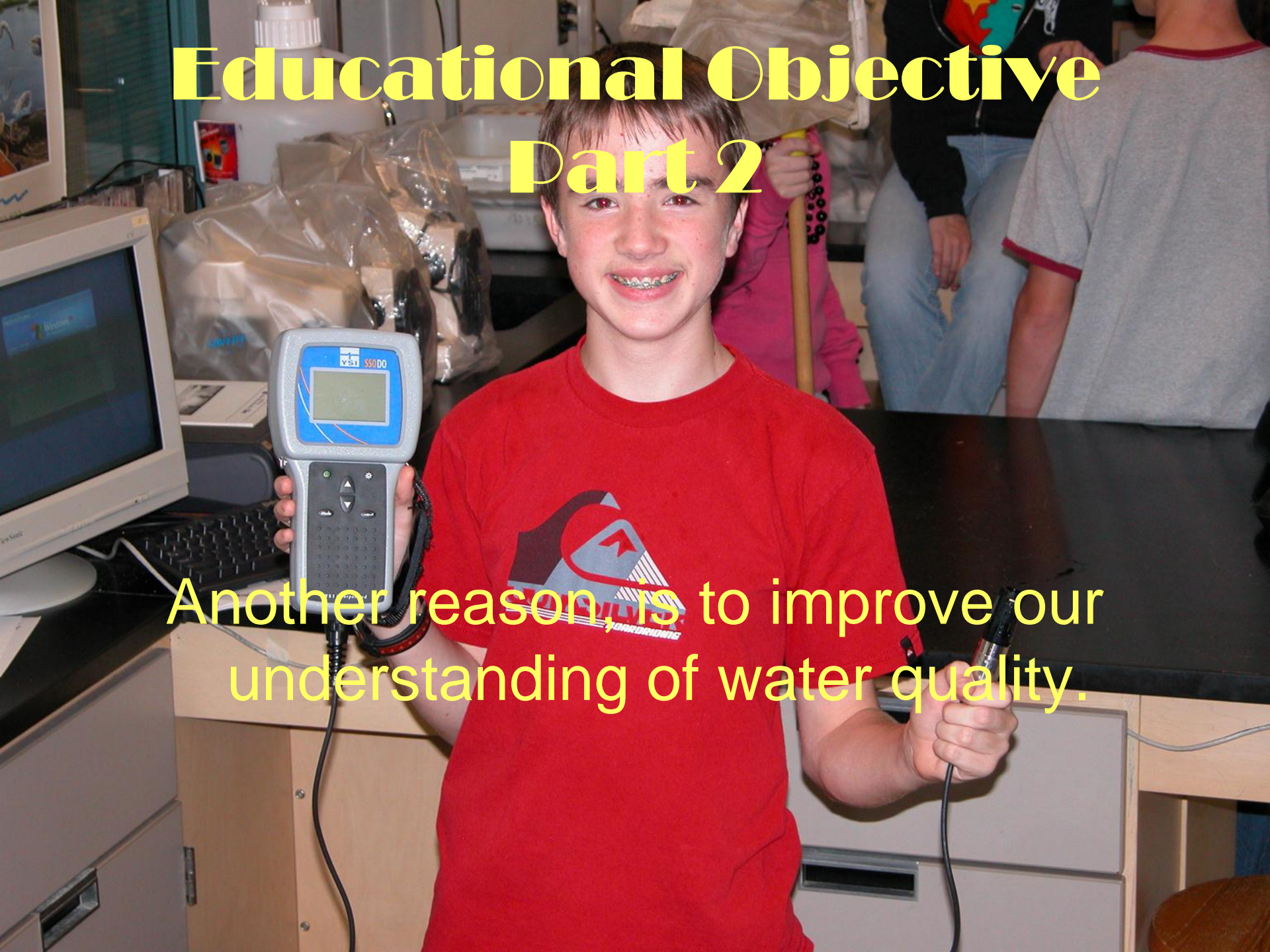
We tested the sites to have a better understanding of ecological relationships.





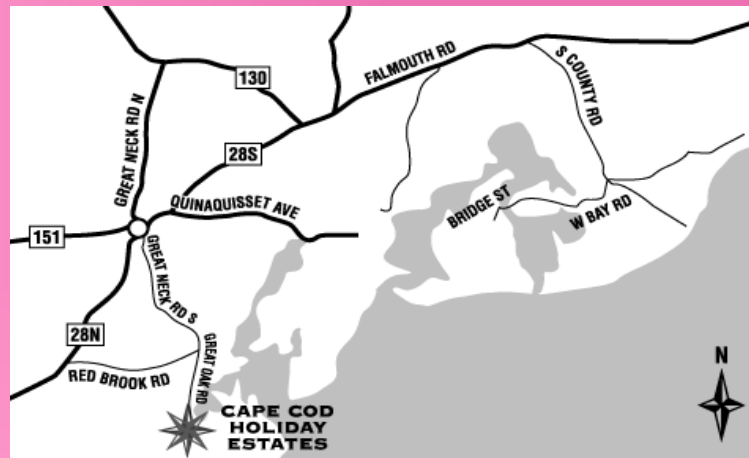
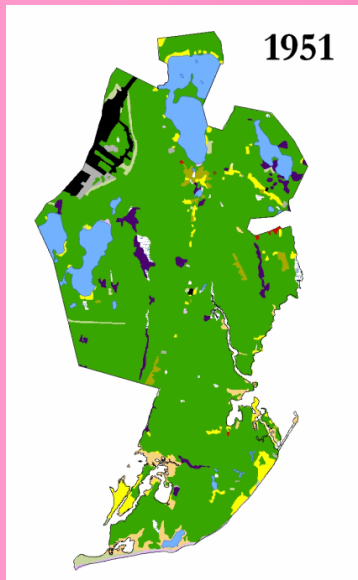
# Educational Objective Part 2

Another reason, is to improve our understanding of water quality.



# Environmental Objectives

To collect relevant water quality data in order to assist our town.



Our town has experienced rapid growth over the past 55 years.



# **Environmental Objectives**

## **Part 2**

Another reason is to identify potential threats, hazards, or stressors to our water.

# Our Water Chemistry

1. Turbidity was higher at the lower site: South of Rt. 28
2. Dissolved Oxygen was higher at the upper site: Herring Run
3. Temperature was higher at the upper site: Herring Run
4. Nitrates were higher at the lower site: South of Rt. 28



# Use of Chemistry Equipment

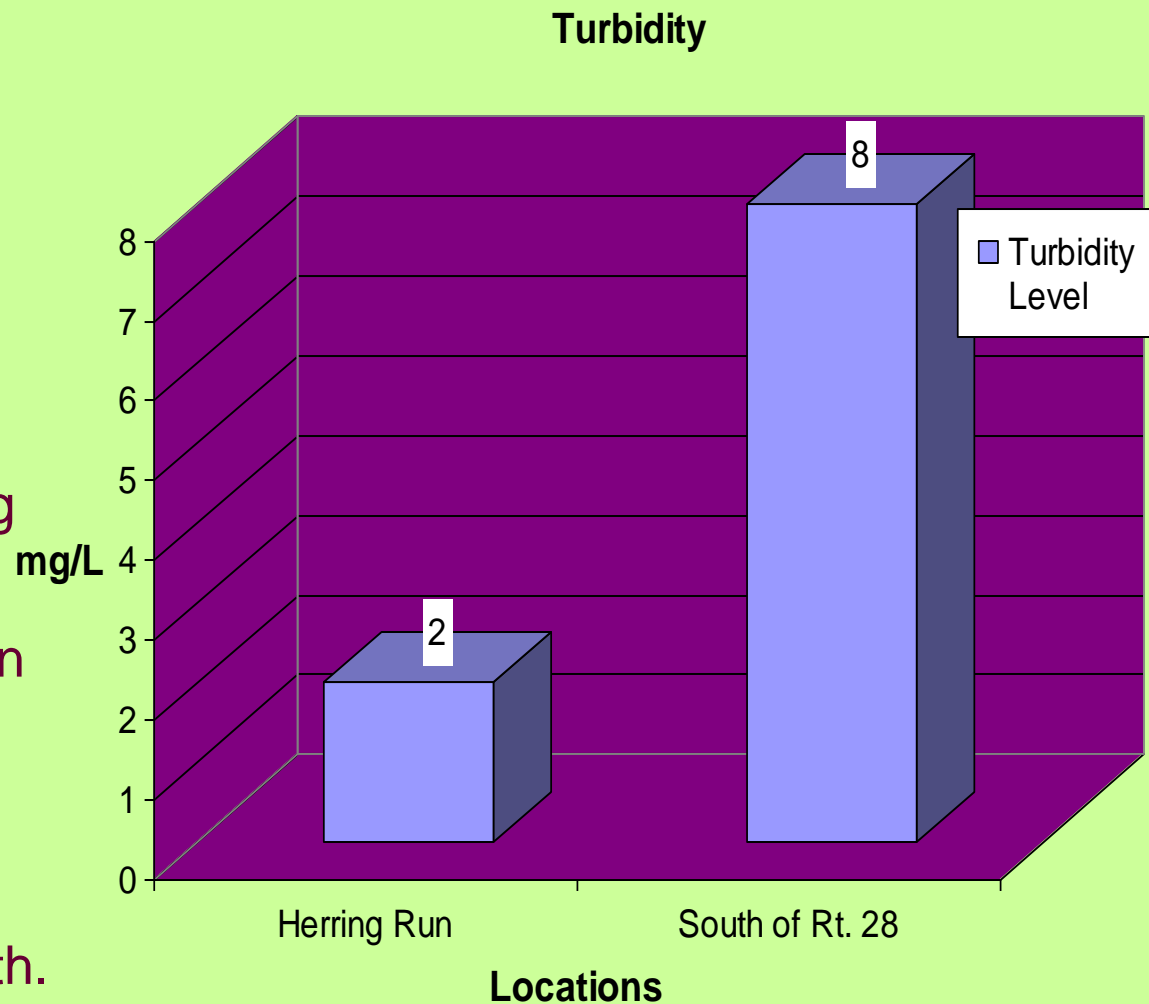


**We wore boots to go into the water and measure the;**

- **PH**
- **Turbidity**
- **Dissolved Oxygen**
- **Nitrates**
- **Temperature**

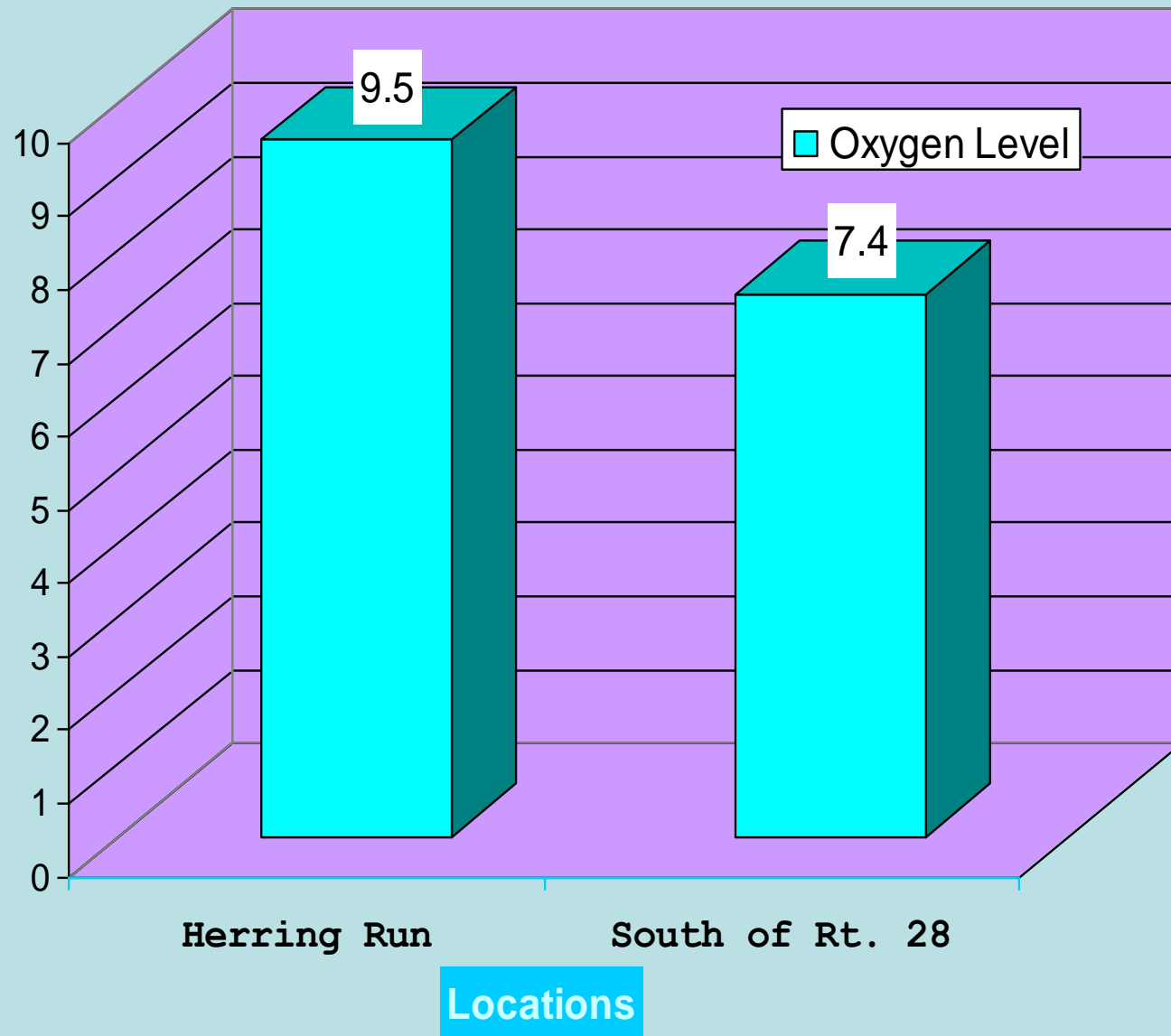


The Herring Run was clearer, possibly because there was less floating algae. The reduced algae could have been associated with lower nitrate levels which is a nutrient that stimulates plant growth.



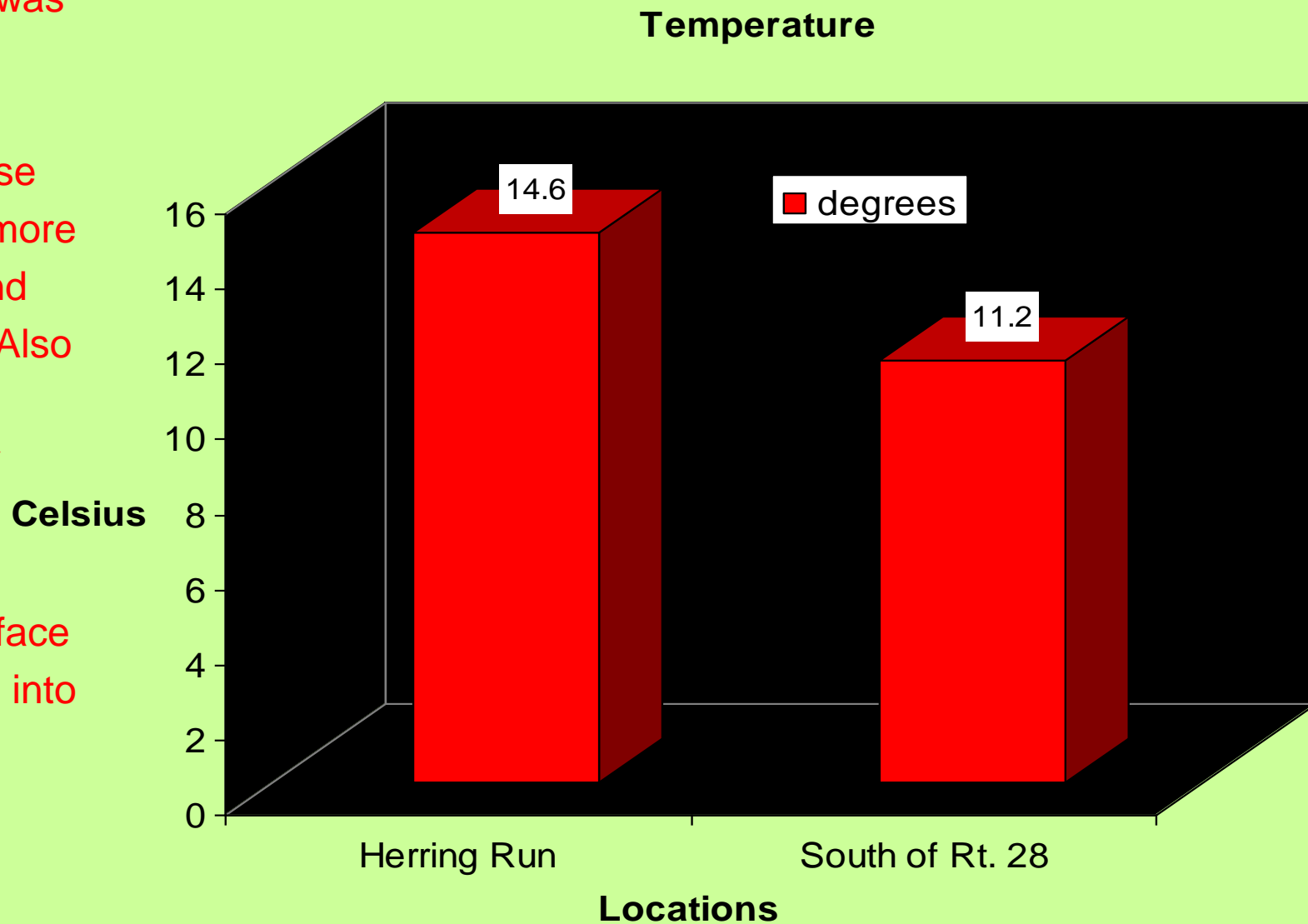


## Disolved Oxygen Levels



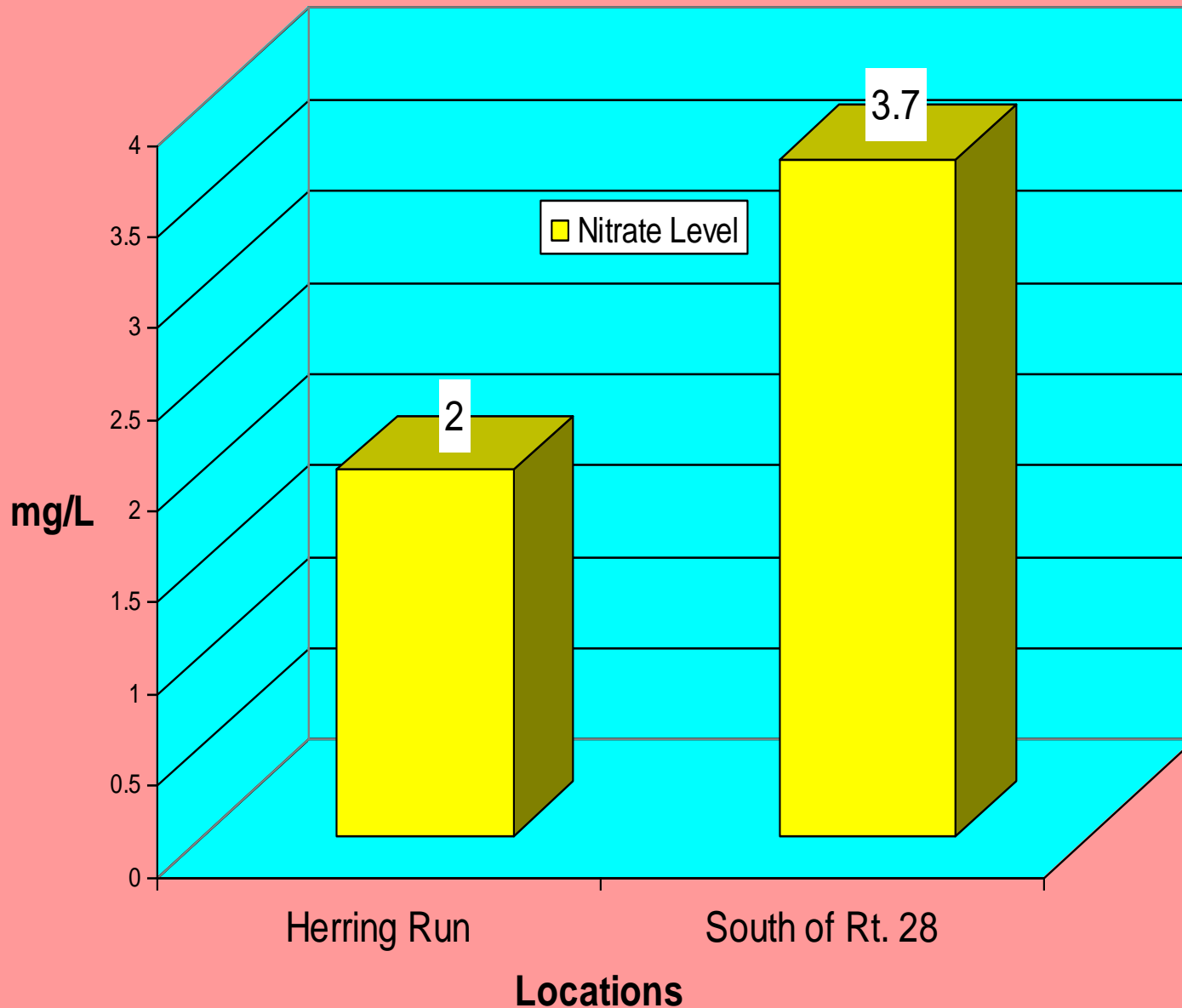
Possibly it was higher at the Herring Run because of the fish ladder. Water was tumbling down the concrete ladder. Another possibility is that rooted plants were producing more oxygen in the water at the open Herring Run site.

Possibly It was Warmer at the Herring Run because there was more sunlight, and less trees. Also the Herring Run is very close to a large lake whose surface water flows into the river.





## Nitrates



Nitrates may be higher further down the river due to contributions from runoff and/or septic systems. Another possibility is that rooted plants were producing more oxygen in the water at the open Herring Run site.

In addition to water chemistry we looked at macroinvertebrates





# Use of Macroinvertebrate Sampling

We examined the macroinvertebrates that we collected, in class. We put them into the groups that they belonged to. The bugs not only tell us what lives in the water, but also something about the water quality.



# Lab Analysis Equipment

We preserved the macroinvertebrates by keeping them in alcohol. Then we picked them out with tweezers and pipettes. We then, examined them through microscopes.

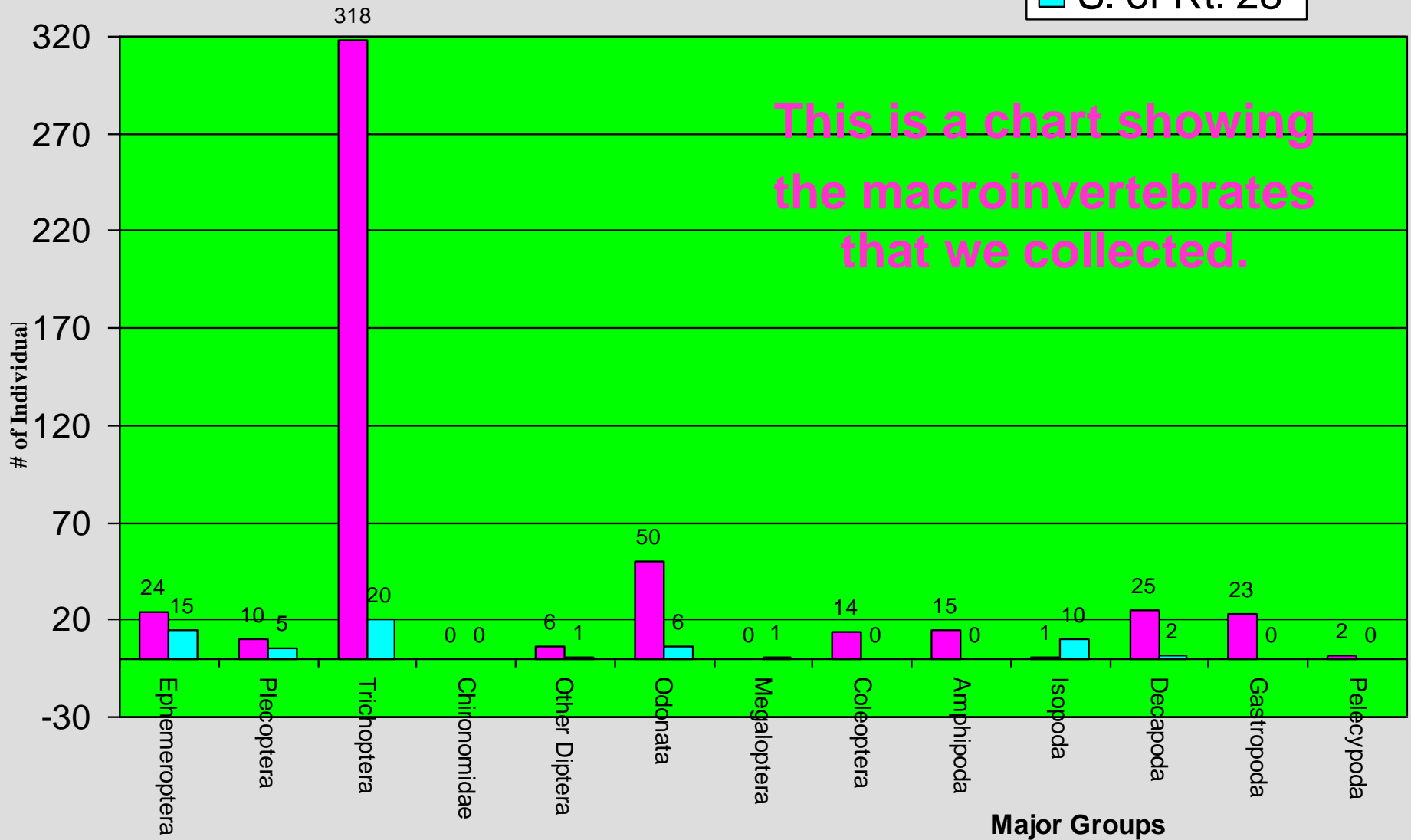
- Materials
- Tweezers
- Pipettes
- Microscopes
- Sample trays
- Alcohol





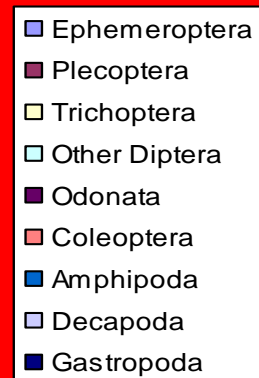
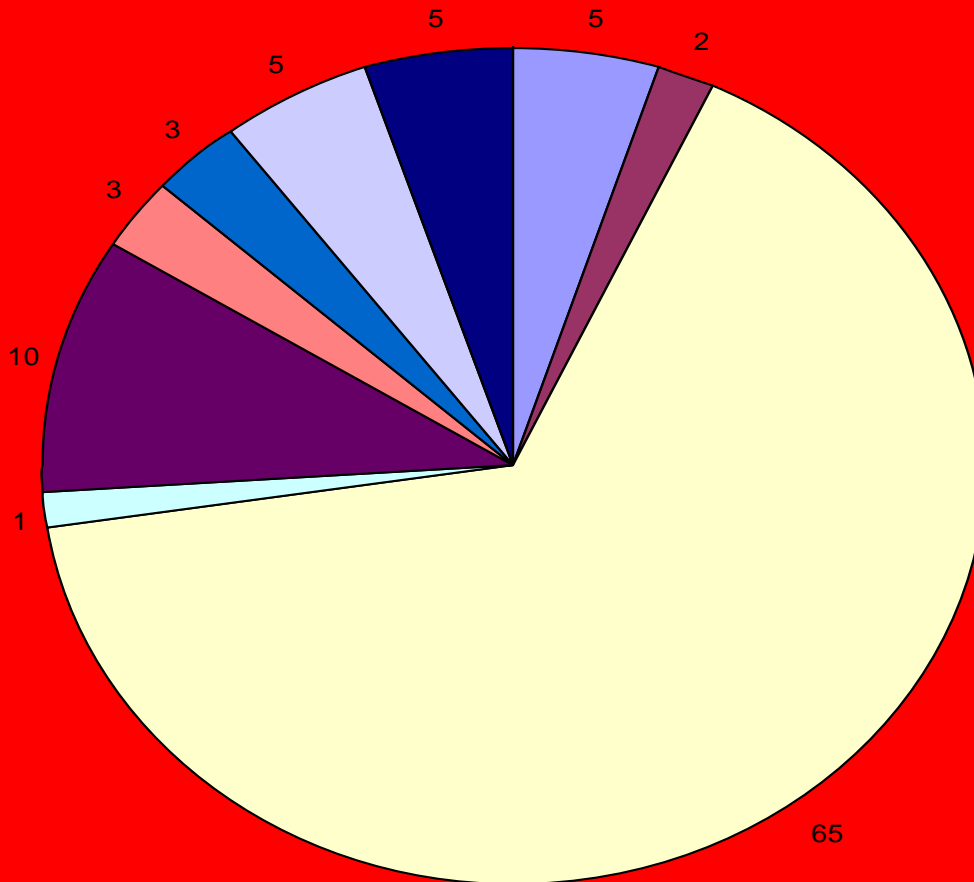
# Organism Density

■ Herring Run  
■ S. of Rt. 28



# Percent Composition at Herring Run

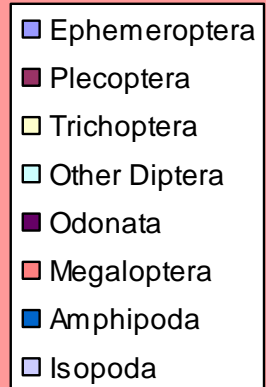
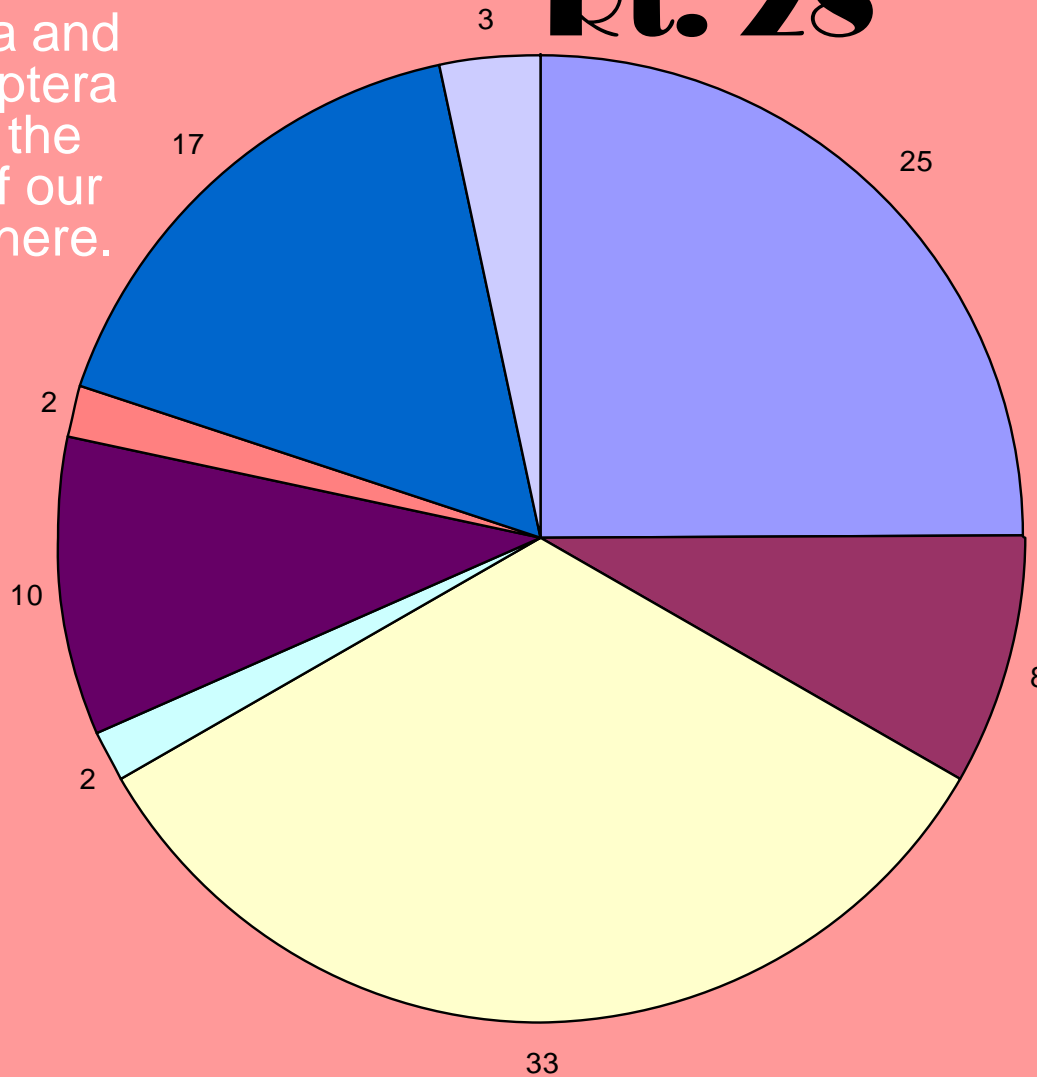
The Trichoptera made up the majority of our collection here, but we also found quite a few Odonata as well as other interesting organisms.



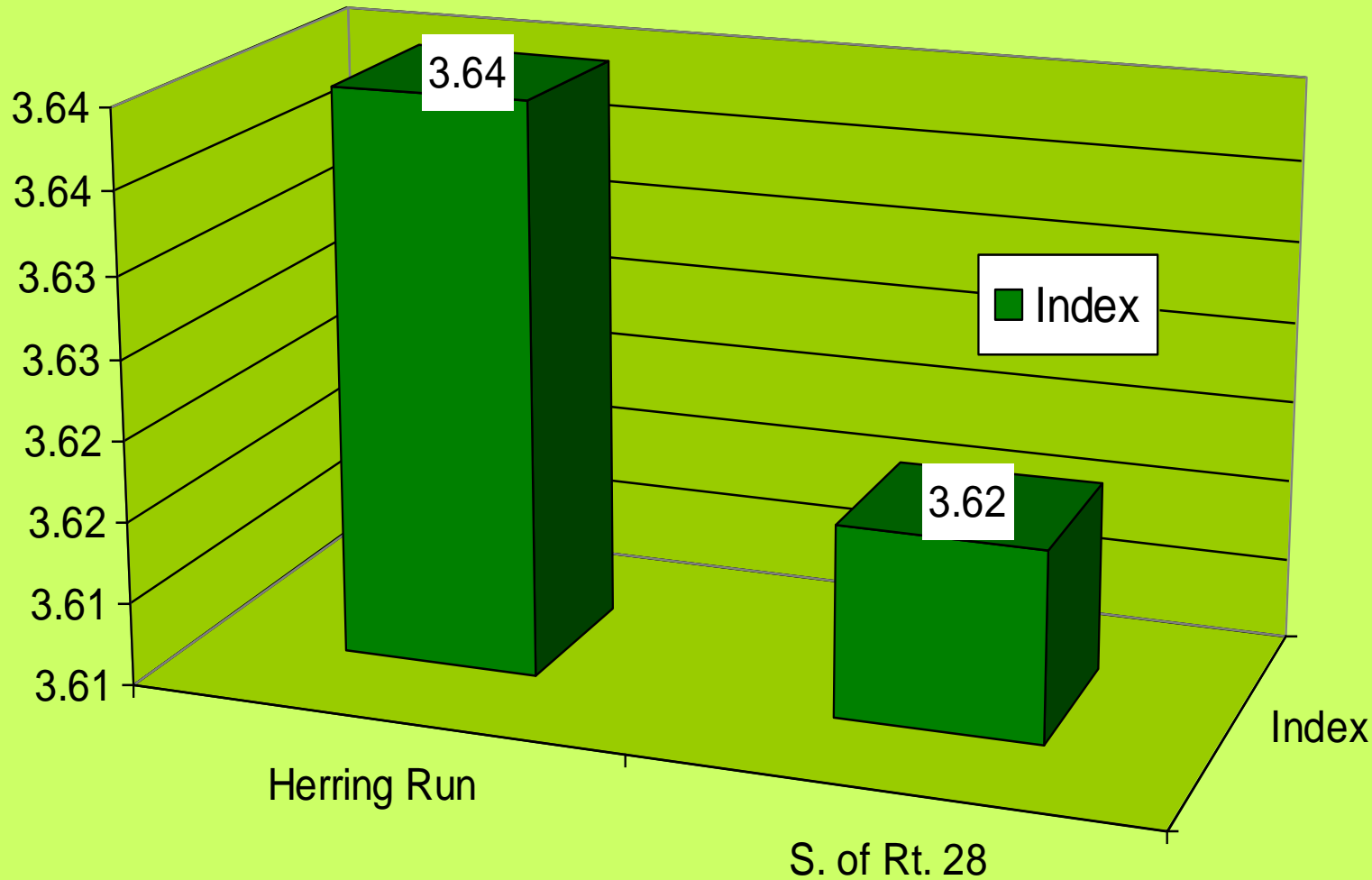


# Percent Composition of Rt. 28

Trichoptera and  
Ephemeroptera  
made up the  
majority of our  
collection here.



## Major Group Biological Index

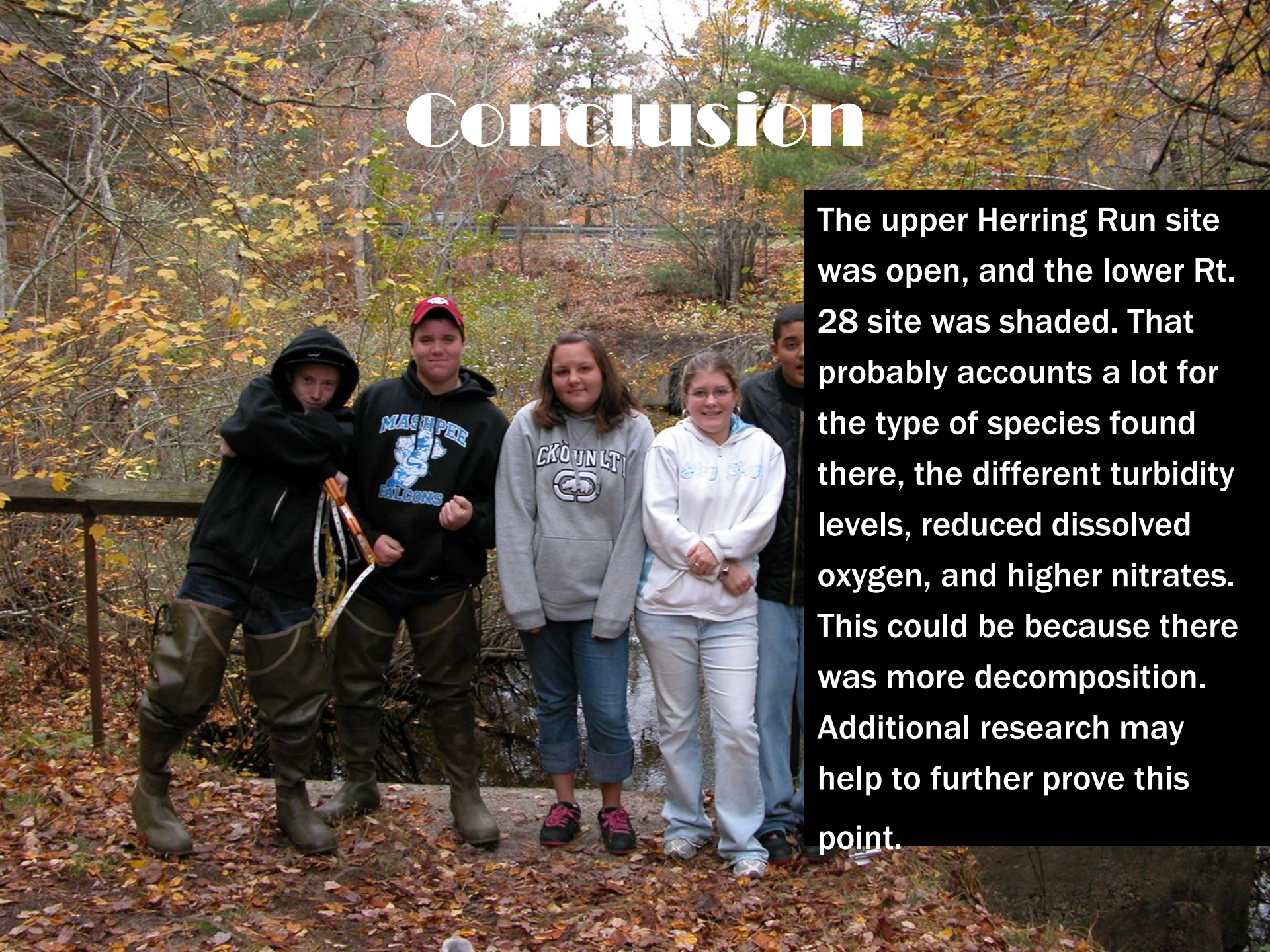


The two were very close. The upper site did have more pollution tolerant species. This may account for the differences



# Conclusion

The upper Herring Run site was open, and the lower Rt. 28 site was shaded. That probably accounts a lot for the type of species found there, the different turbidity levels, reduced dissolved oxygen, and higher nitrates. This could be because there was more decomposition. Additional research may help to further prove this point.



# **Additional Questions**

**Would we end up with better data if we:**

- **Sampled more sites**
- **Studied longer hours**