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Quashnet River Survey

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Mashpee High School, Mashpee, Massachusetts (2006). *Quashnet River Survey*. In Watershed Access Lab Projects. Project 53.

Available at: https://vc.bridgew.edu/wal_projects/53

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3-7532 Mashpee, MA John's & Ashumet Pond
Aerials Only Gallery 508-295-5551 (c)skypic.com

Quashnet River Survey

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Educational Objectives

- Our objectives as a class were to learn about Mashpee's water quality, so that we could better understand it.
- We learned to use professional technology to survey and study Mashpee's water quality of the Quashnet River.
- We also got a better understanding of ecological relationships.

Our Environmental Goals

- Our goals as “professional” water surveyors were to test the Quashnet Rivers water quality.
- We tested the Nitrates, flow, temperature, turbidity, D.O. (Dissolved Oxygen), and pH.
- We also investigated the bottom habitat for macroinvertebrates.

Environmental Objectives

- We collected water to study the quality so that we could assist the town of Mashpee.
- Therefore we could identify potential threats or potential hazards that may become more dangerous over time.

Supplies Used

1) Discharge

- Stadia Rod
- 100 ft tape measure
- Flomate model 2000 portable flow meter

Continued

2) Water chemistry

- LaMotte pH5 digital meter
- HACH DR/820 Colorimeter (Nitrates, Turbidity)
- YSI 550 DO Digital dissolved oxygen & temperature meter

Continued (materials)

3) Macro invertebrates: Bioindicators

- Approximately ½ meter rectangular Sweep net with 500 micron mesh
- Nylon bristle brush
- Hip boots
- Buckets
- Sorting trays
- Pipets and forceps
- Rubber gloves

Experimental Methods

- During the survey we used a variety of technological tools to receive information on the sites about water chemistry, flow, and macroinvertebrates.
- We used the Stadia Rod to assist with water flow and determine the depth. We connected the Stadia Rod to the Flomate model 2000 portable flow meter and obtained our information.
- We found pH by using the LaMotte pH5 digital meter. The meter's temperature probe and electrode were submerged in the river providing instant information.

Experimental Methods (part 2)

- We used the HACH DR/820 Colorimeter to test the Turbidity and the Nitrates of our sites. This required us to collect water in sample bottles and analyze the water following HACH guidelines on the river's banks.
- We also used the YSI 550 DO Digital dissolved oxygen meter to determine the Dissolved Oxygen levels in our river.
- And we used a 100 Foot Tape Measure for finding the width of the sites

- At each site we used a rectangular sweep net with 500 micron mesh to catch macroinvertebrates. This required two people working together in the river, one with the net and the other stirring the substrate in attempt to dislodge unsuspecting macroinvertebrates.
- We also used a nylon bristle brush, hip boots, buckets, sorting tray, pipets, forceps and rubber gloves to help collect macroinvertebrates.

Experimental Methods

Quashnet River Map

Red boxes show
approximately where we
surveyed





Results

- We found many Trichoptera at the Headwaters Site
- We also found many of these at the Martin Rd site.

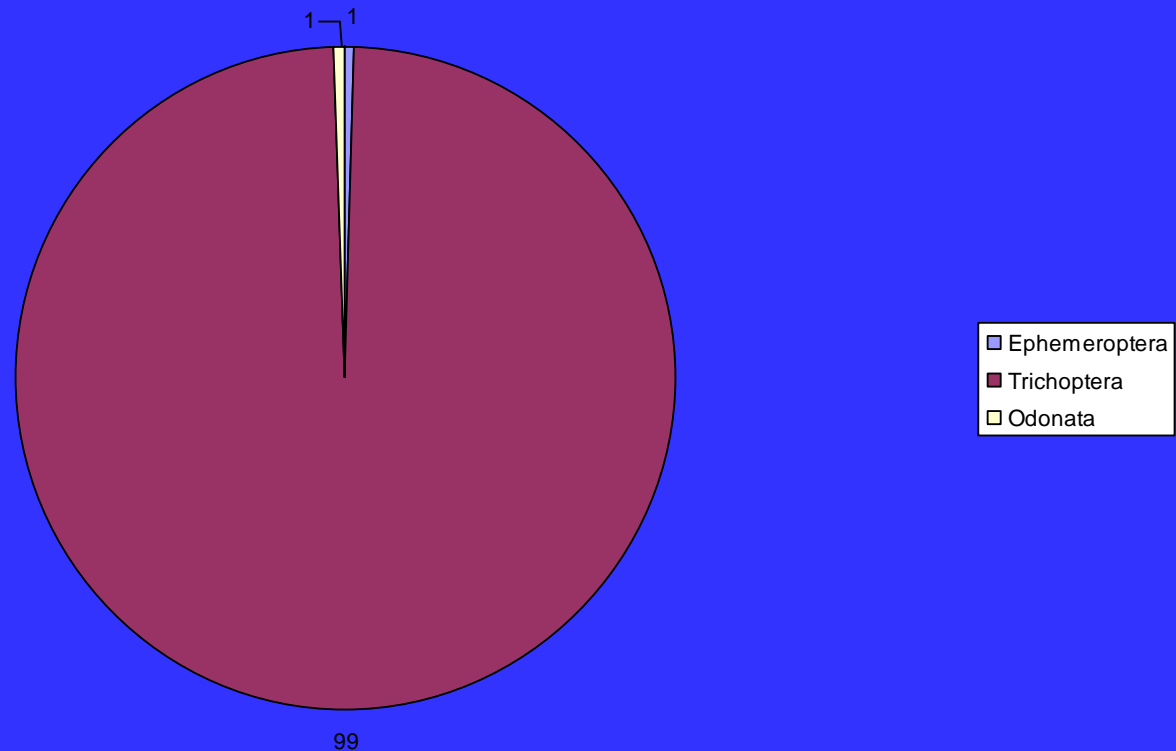


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Isopoda

Major Group Composition of Headwater Site

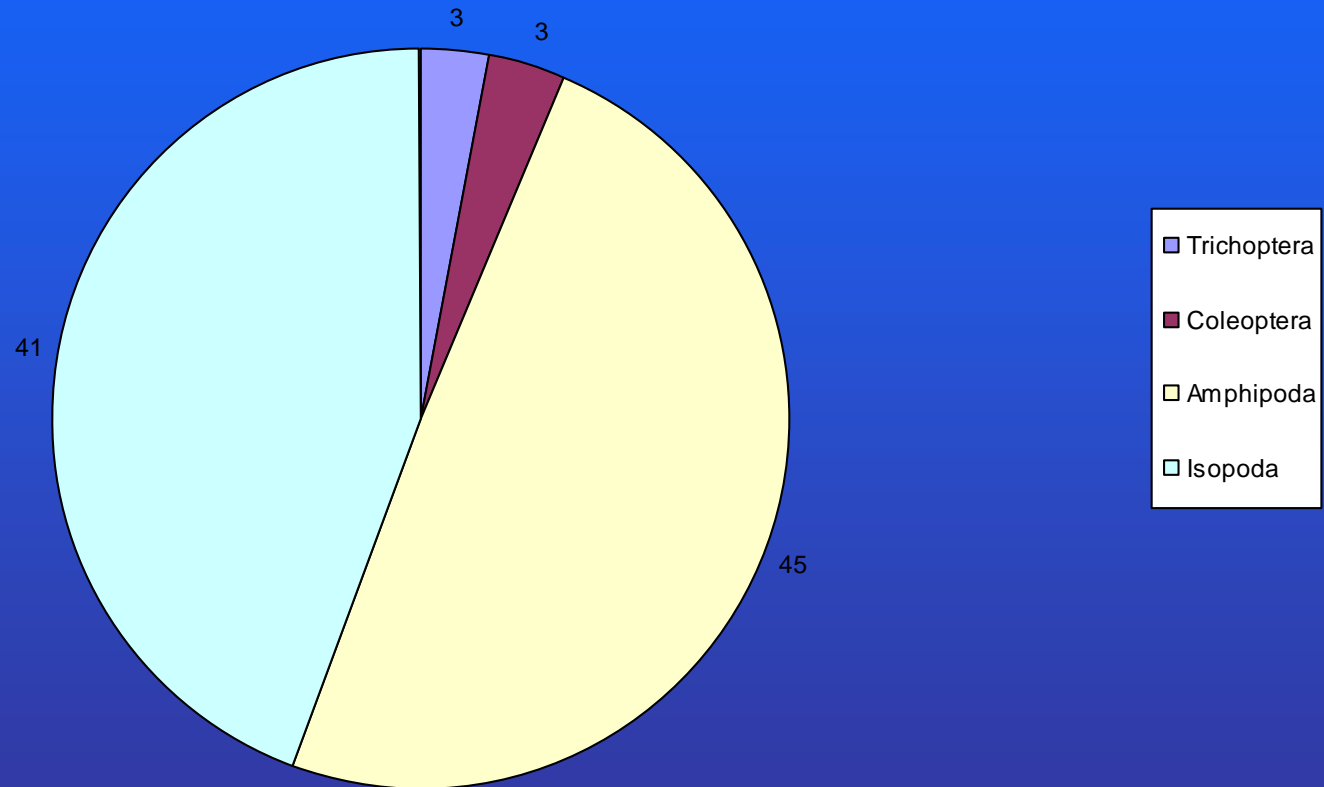
Major Group %Composition



This is a graph of the major group composition of the headwaters site, as you can see Trichoptera make up the majority.

Major Groups Composition of Martin Rd Site

Major Group Composition of Martin Road Site



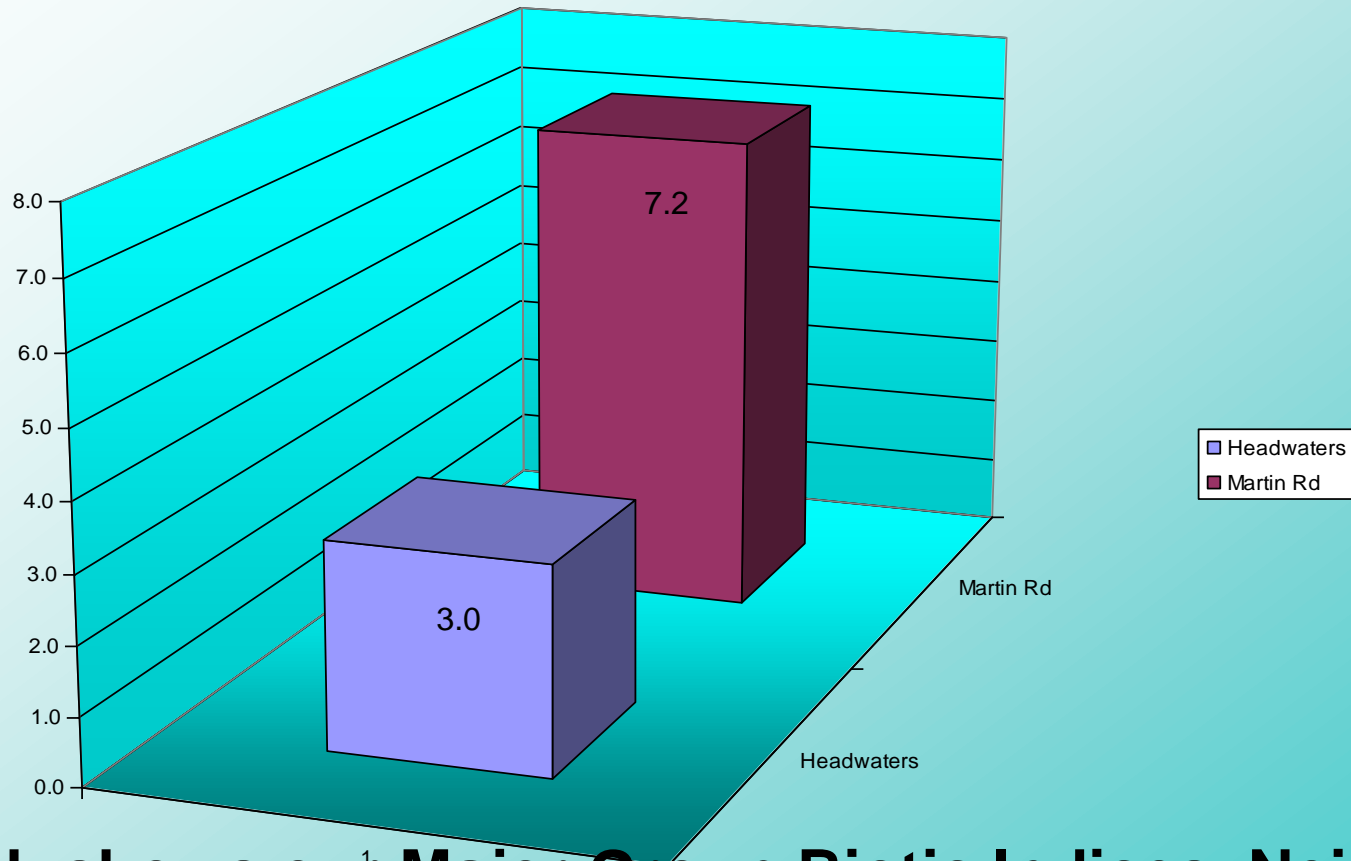
This is a graph showing the group composition of the river by Martin Road, as you can see Isopoda and Amphipoda make up the majority of the graph

Biotic Index

Head Waters	Martin Road
3.0	7.2

The numbers are expressions of the water quality based on the organisms that we found; 3.0 is very pure, while 7.2 is considered impaired.

Major Group Biotic Index



This graph shows our Major Group Biotic Indices. Neither site supported a wide variety of groups, and the Martin Rd. site was mostly composed of groups that are considered pollution tolerant, thus the index there is higher.

Habitat Introduction

- The habitat at the Headwaters included a concrete fish ladder, shallow water flowing over sand and gravel. Overhead shade was abundant.
- The river near Martin road was swampy, it was bound by spongy well vegetated banks, and overhead shade was not as abundant as the Headwaters site.

Depth results

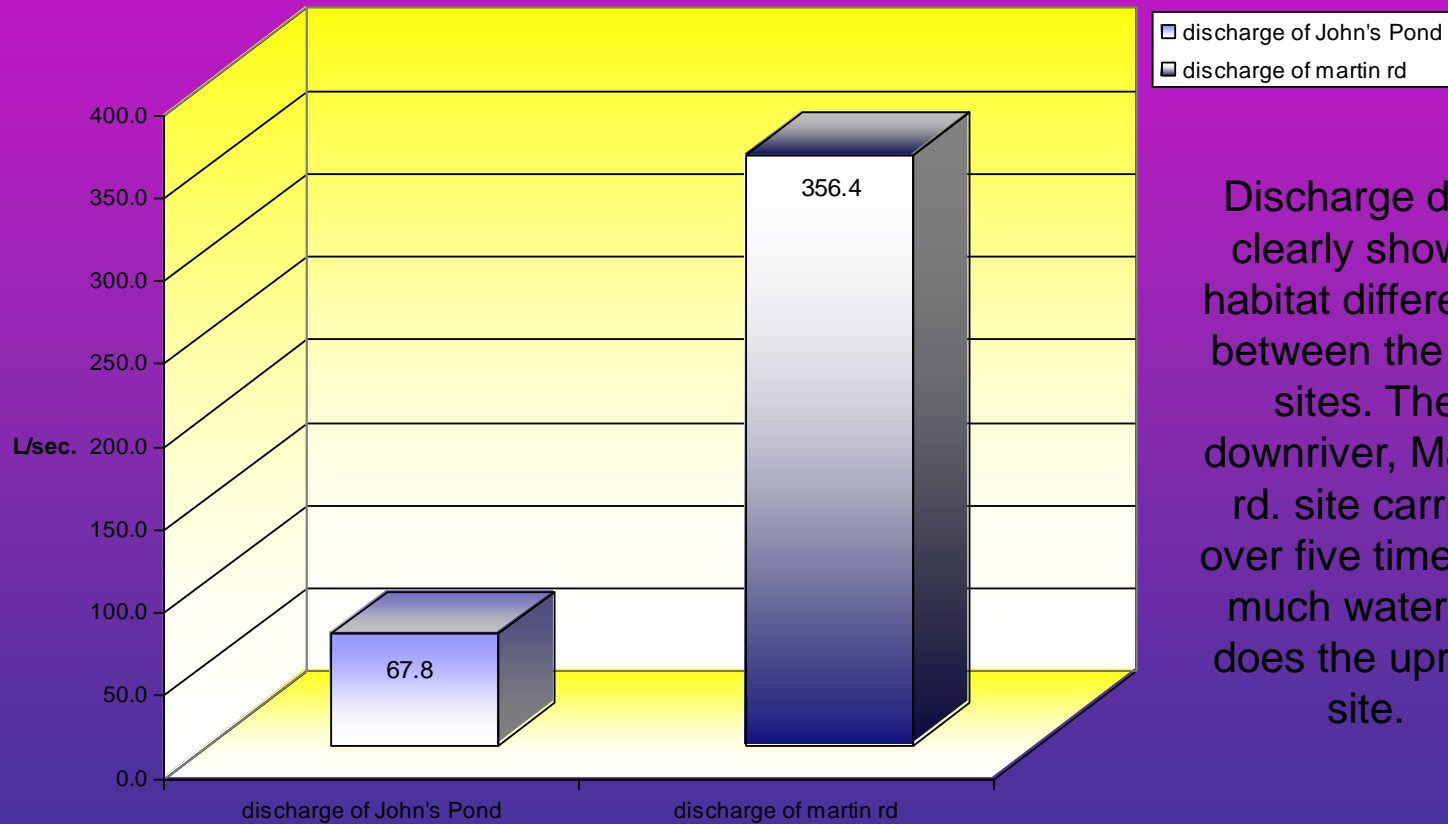
- The results show that the river near Martin Rd. was about 2.5 feet deep.



- While at the Headwaters site data suggest the average depth is about $\frac{9}{10}$ of a foot.

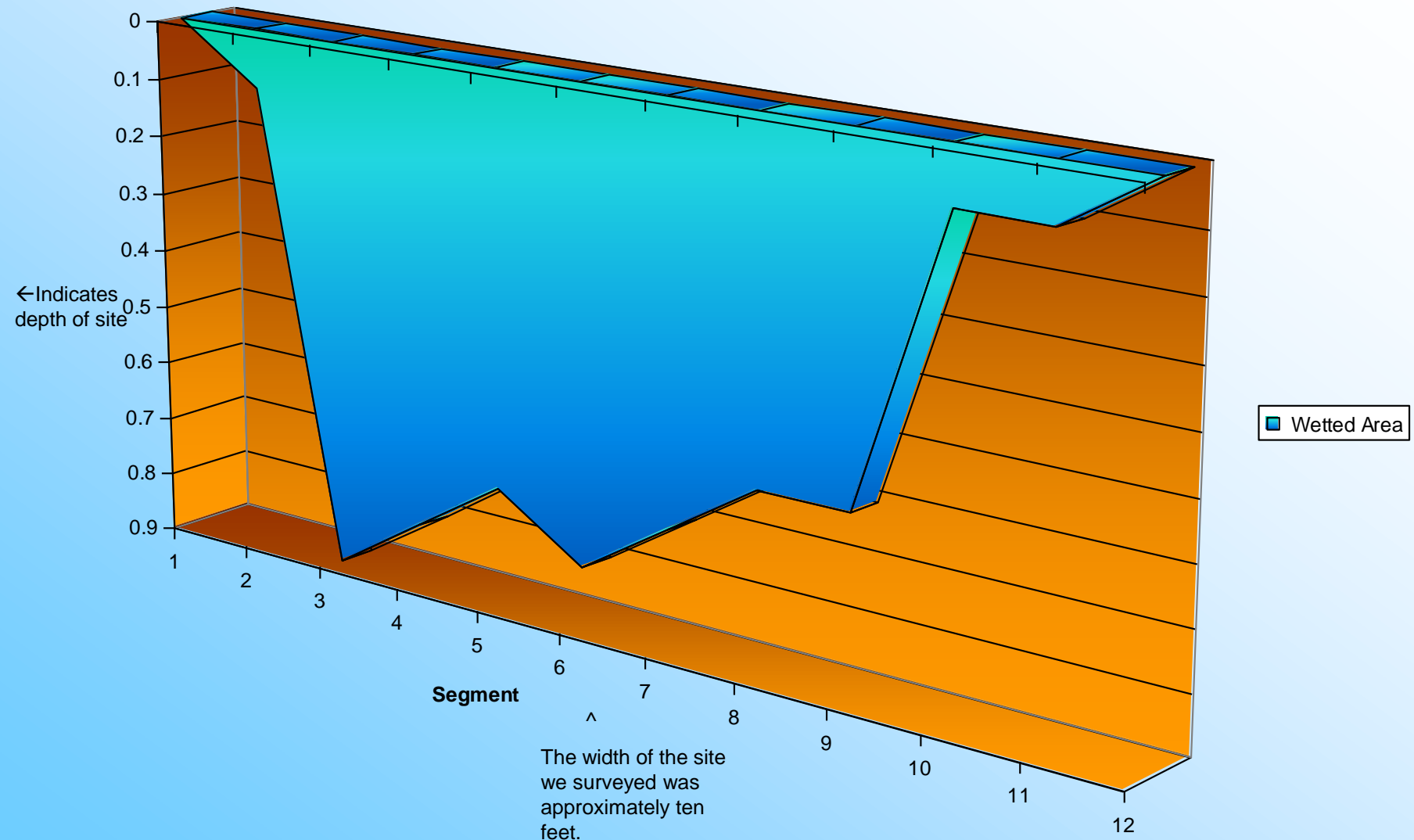
Discharge Comparison

Comparitive Discharge



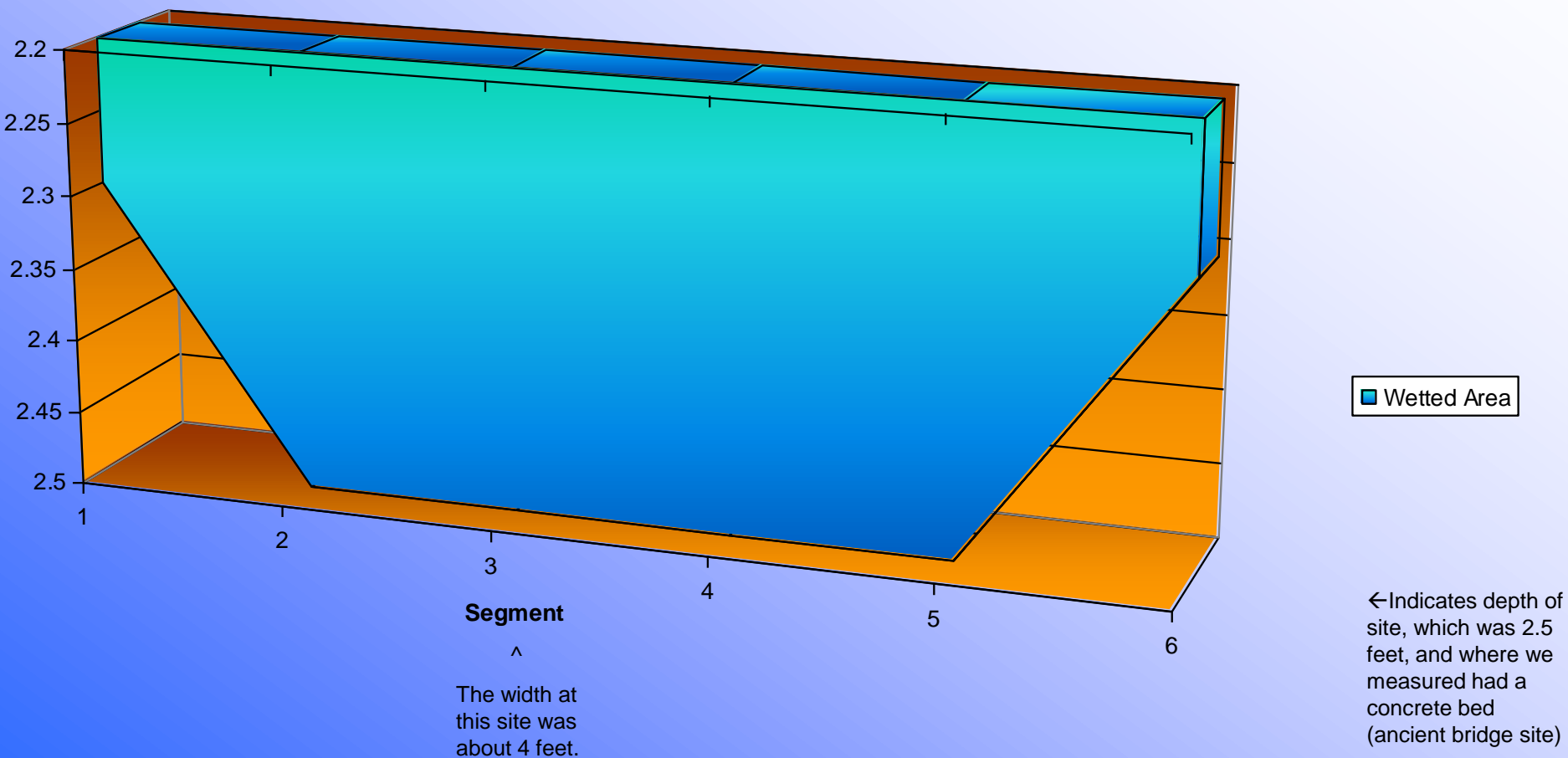
Discharge data clearly show a habitat difference between the two sites. The downriver, Martin rd. site carries over five times as much water as does the upriver site.

Stream Profile: Headwaters



This is a graph representing the width and depth data collected at the headwaters site.

Stream Profile: Martin Rd



This is a graph representing the width and depth data that was collected at Martin Road.

Water Quality Data

Headwaters Martin Road

Ph

6.2

5.6

D.O

8.1

7.3

Nitrates

2.2

1.1

Turbidity

0

4

The pH for the Headwaters is closer to 7 than pH of the Martin Rd site. This may be because of increased volume and/or decomposition at the Martin Road site. D.O. is higher at the Headwaters Site probably because of the amount of turbulence associated with a fish ladder there. Also, the D.O. at the Martin rd. site may be lower because of the amount of plant decomposition. Nitrates were higher at the Headwater site. This may be because there are less plants at the headwaters rather than the large amount of plant life at the Martin Rd site which use the nitrates for growth. The turbidity may be 0 because of the reduced algae and less runoff at the Headwaters. The Martin Rd site has a higher turbidity perhaps due to siltation from runoff and/or the increased plant growth and decomposition.

Data Conclusions For Headwaters Site

- By testing the macroinvertebrates, turbidity, nitrates, DO, and PH we can conclude that the Headwaters site is a relatively healthy part of out-flowing water from John's Pond and the Quashnet River System.

Data Conclusions For Martin Road Site

- By testing the macroinvertebrates, turbidity, nitrates, DO, and pH we can conclude that the Martin Road site isn't as clean as it should be. It may have poorer water quality than the Headwaters site.

Additional Questions

- What else could “WE” have done to further improve our knowledge of the Johns Ponds water Quality?
- If the same quality of the water continues, will the condition of the water grow worse or better over time, or will it stay the same?
- Could the Martin Rd site ever improve if acted upon quickly?

THE END