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An Initial Study of Town Brook, West Yarmouth, MA

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*An Initial Study of
Town Brook
West Yarmouth, MA*

By Students of the
Dennis-Yarmouth Regional High School
South Yarmouth, MA

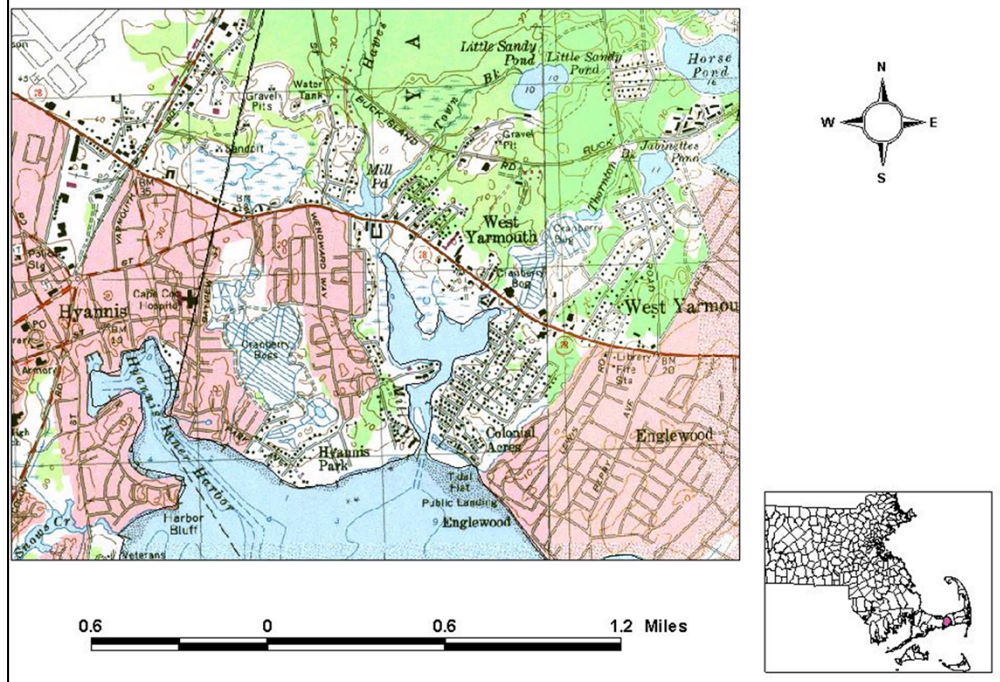
Purpose of the Study:

- **Begin to gather data concerning the water quality of Town Brook, West Yarmouth**
- **Contribute to an analysis of whether the brook can support the re-introduction of herring**
- **Work in conjunction with town and county agencies to study the brook and pond**
- **Learn how to conduct a field study**

The town conservation administrator has contributed to the information provided in this study.

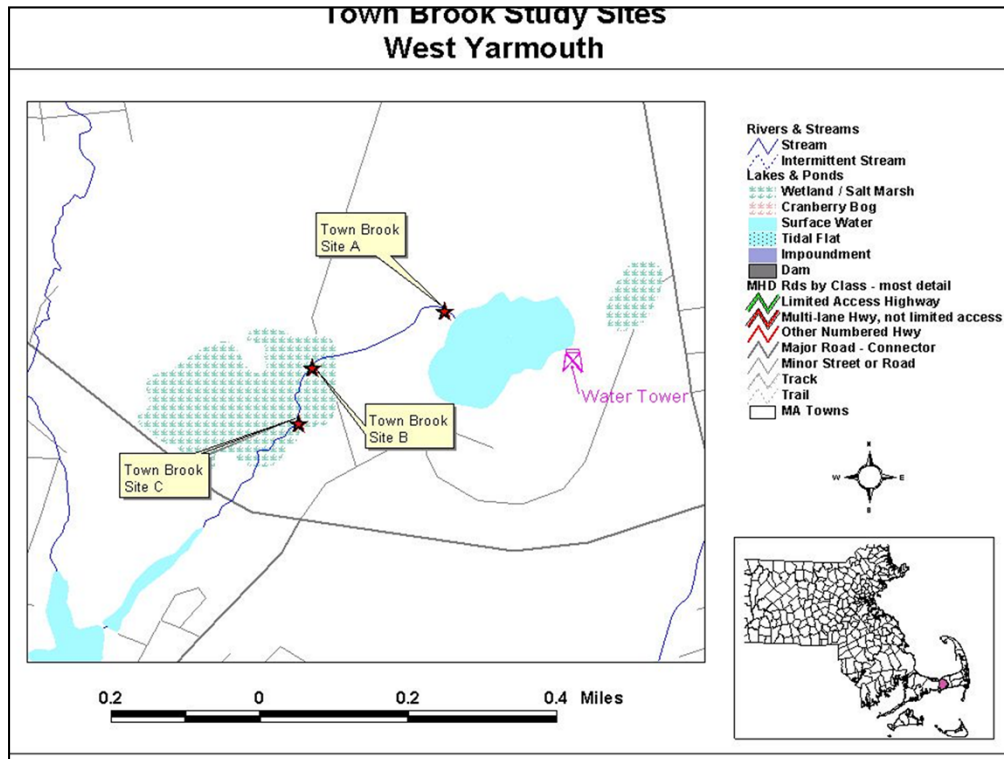
The high school, town conservation administrator and cape cod commission can share data in the study of the area.

Town Brook, West Yarmouth, MA



Little Sandy Pond leads into Town Brook which then leads to Mill Pond.

The lower basin of Mill Pond is brackish water. Mill Pond then drains into Mill Creek which is tidal. Mill Creek then drains into Nantucket Sound.



The general location of the study sites is:

Site A – 12 meters from pond

Site B – 200 meters from pond

Site C – 300 meters from pond

***Little Sandy Pond
as seen from Town Brook***



This is a view of Little Sandy Pond when seen from the start of Town Brook. The entire area is conservation and recreation land.

Study Sites



Site A



Site B

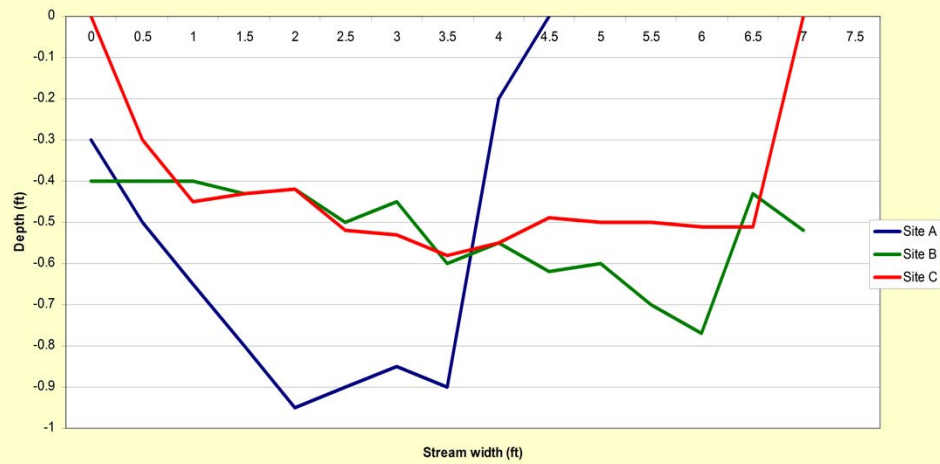


Site C

Site A is near the start of Town Brook. Site B is just before a section of sphagnum moss. Site C is deep within the dense growth of Atlantic White Cedar trees.

Stream Profiles

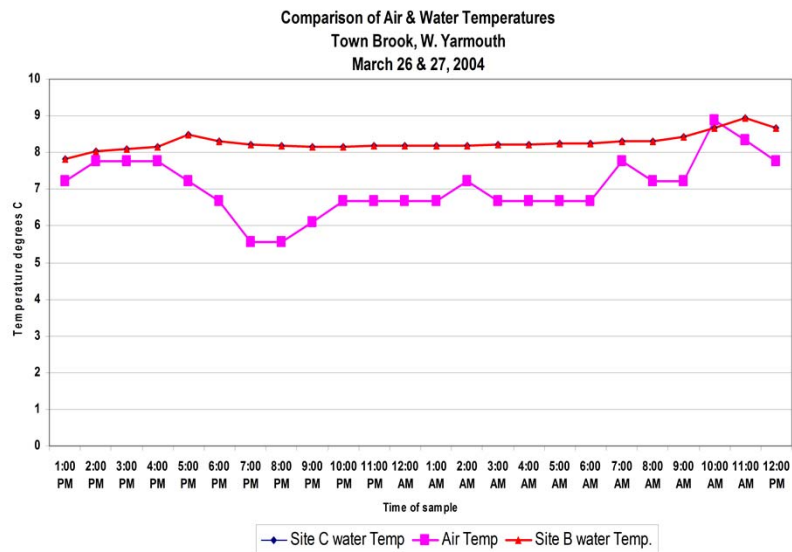
Town Brook
W. Yarmouth, MA



Sites B and C indicate slightly deeper readings on the right side possibly due to current distribution of sediment and detritus

Site A has an obviously narrower gauge but deeper profile indicating faster moving water (higher erosion)

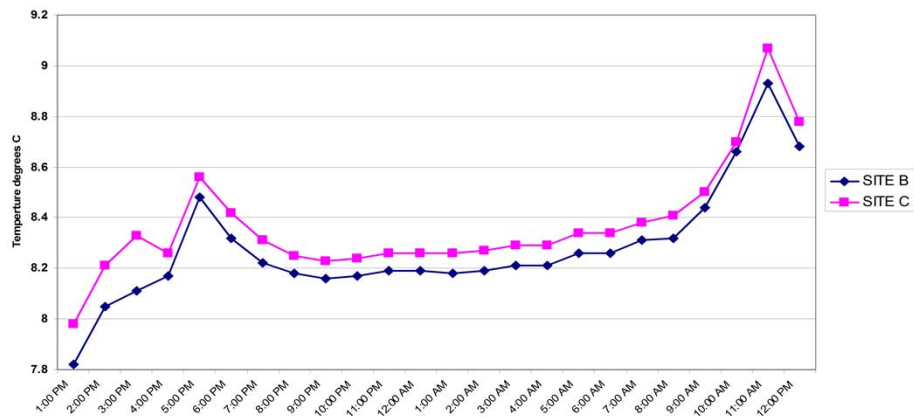
Atmosphere & Water



The air temperature fluctuates much more than the water. The time that the samples were taken was a cloudy, foggy, cool day. Rain fell over night.

Water Temperature Comparisons

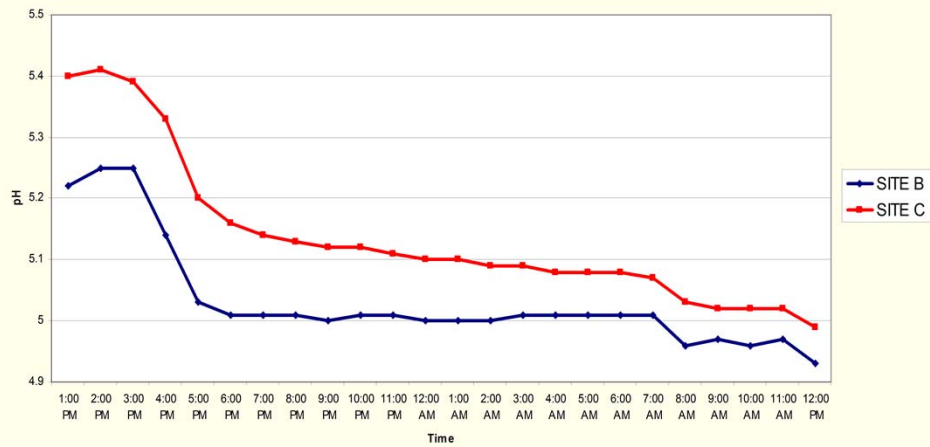
Town Brook, W. Yarmouth
March 26 & 27, 2004



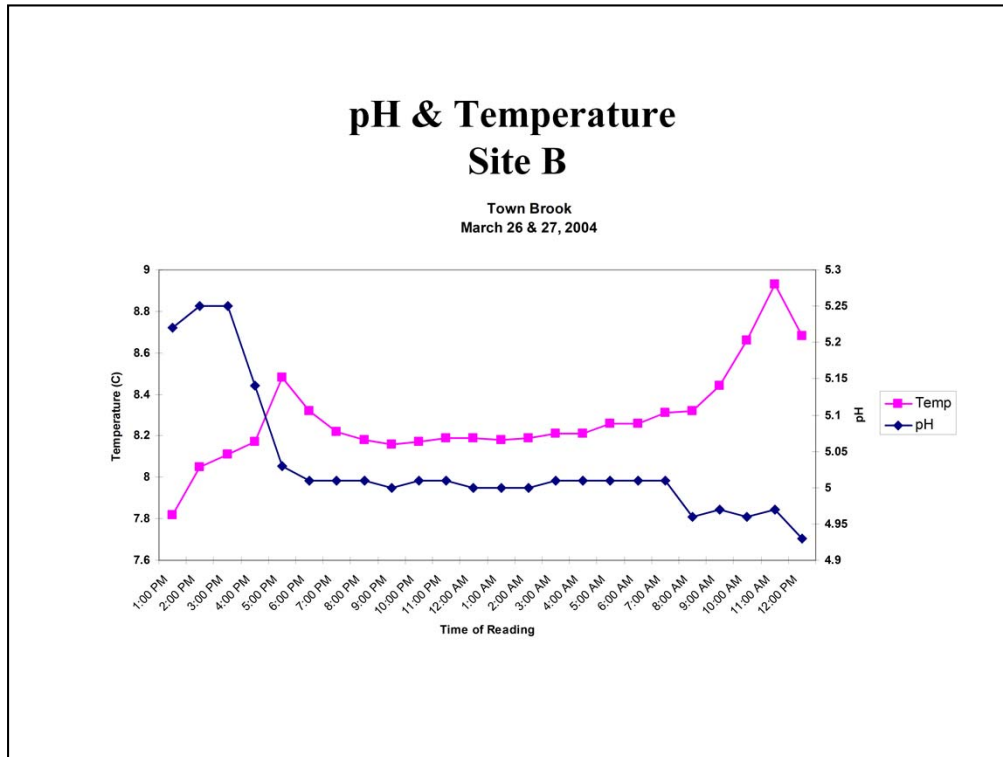
Both sites B and C have very similar readings and trends. The increase at the end of the sampling indicates the effect of the daylight.

Sites B & C pH

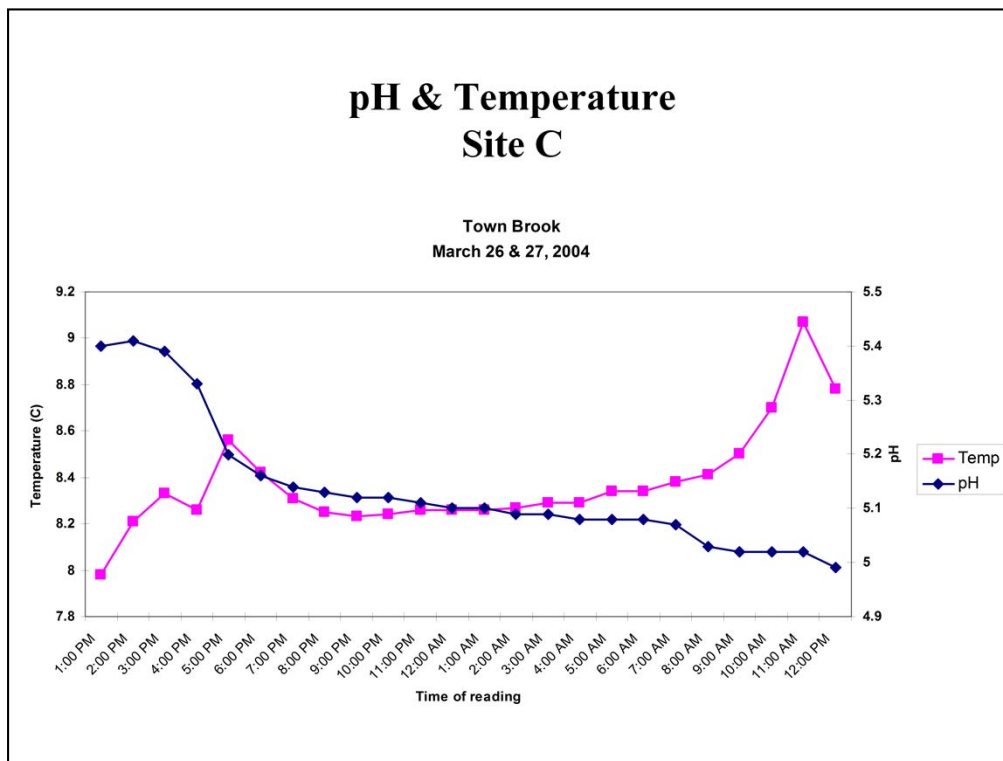
Town Brook, West Yarmouth
pH Comparison
March 26 - 27, 2004



Both sites appear to have similar trends. Both sites have acidic conditions. Site B is more acidic than site C.



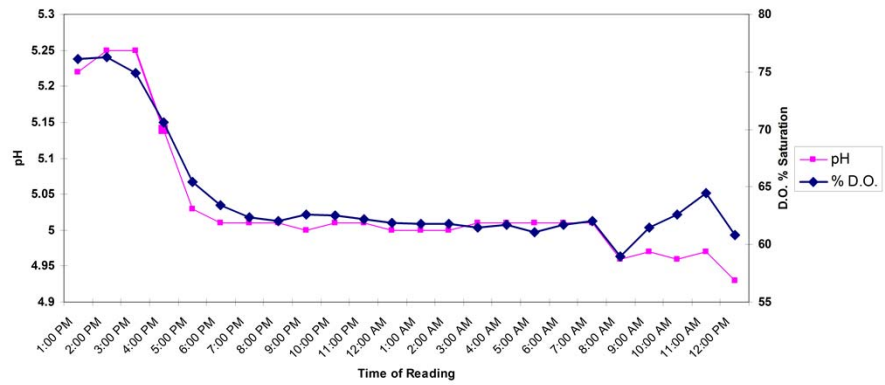
As the temperature rose, the pH dropped possibly due to increases bacterial activity. Bacterial metabolism creates acidic by products.



The same trends are seen in site C as seen in the previous slide of site B.

Dissolved Oxygen & pH Site B

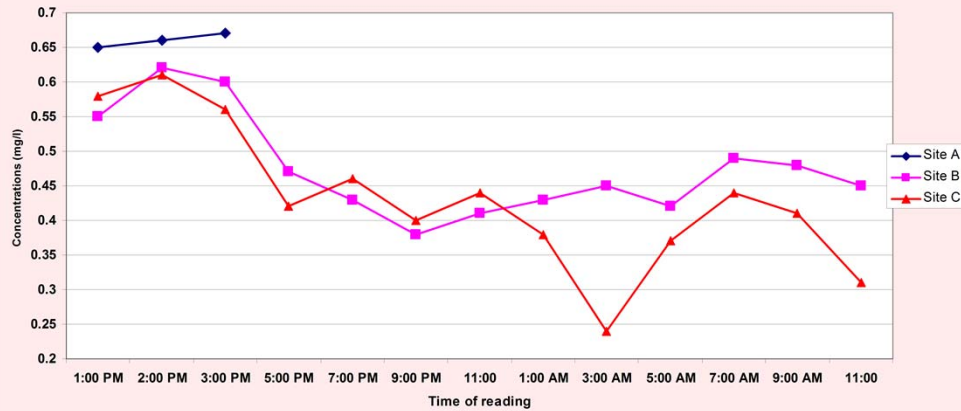
Town Brook
March 26 & 27, 2004



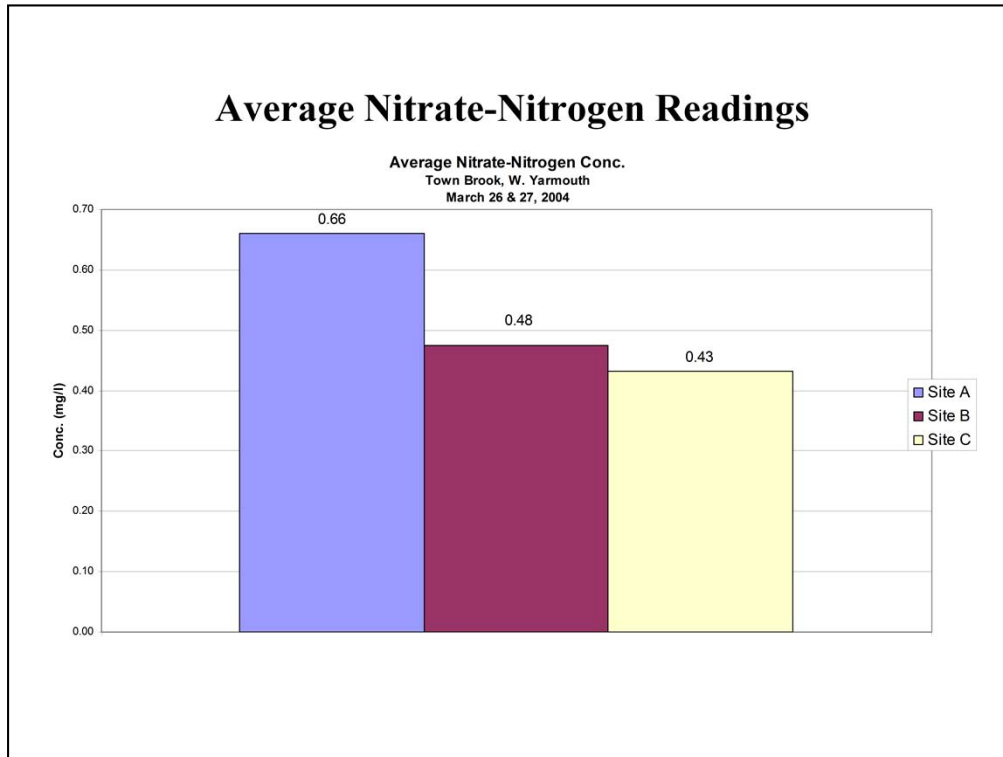
The dissolved oxygen and pH values both dropped at the same time. This could be because of increased bacterial activity creating a loss of oxygen along with an increase in acidity (lower pH).

Hourly Nitrate-Nitrogen Readings

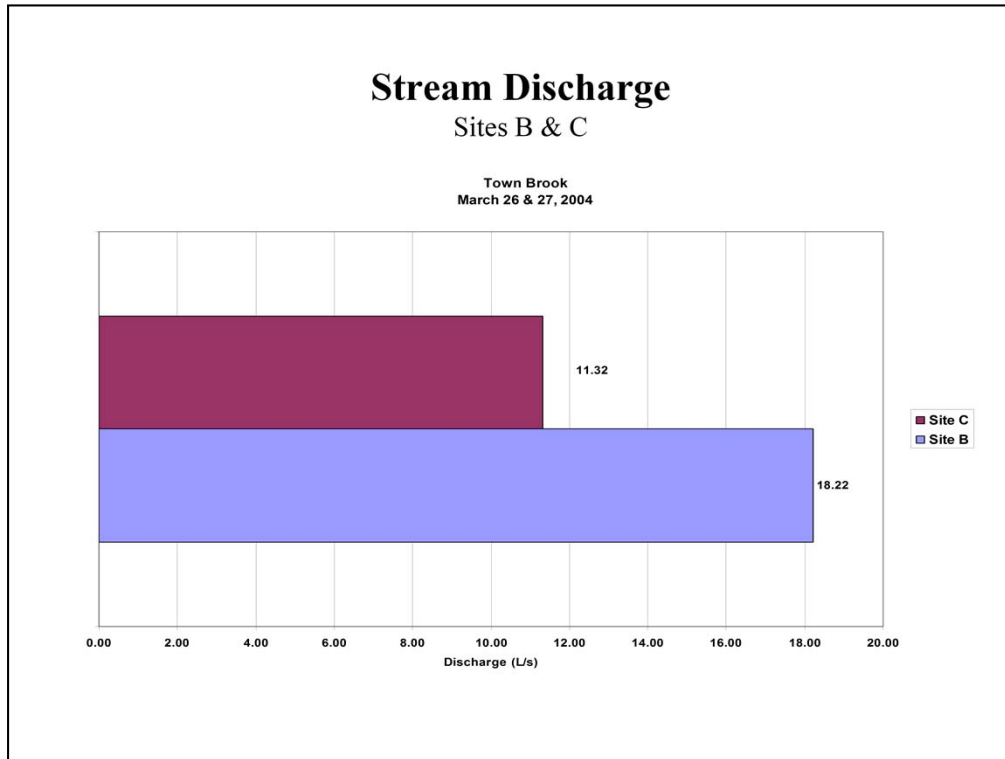
Nitrate-Nitrogen Comparisons
Town Brook
March 26 & 27, 2004



Nitrate readings from sites B and C show a drop in late afternoon readings and then relatively stable readings throughout the night. The drop in readings after 3 PM could be related to the damming of the stream. The readings at 3 AM is of question.



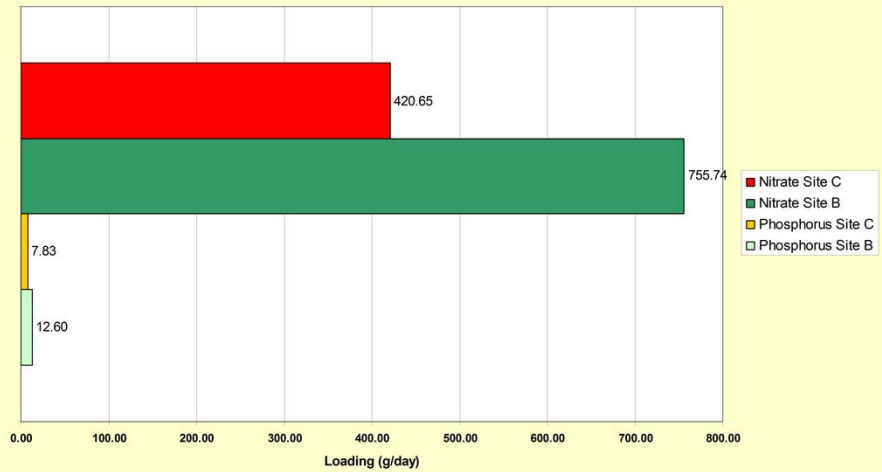
Average nitrate values indicate a higher concentration in site A near the pond. Sites B and C have similar readings to one another (less than site A). Site C could be less due to the large growth of cedar trees absorbing the nitrates.



Site B has greater discharge of water from the site. Site C has less discharge.

Nutrient Comparisons

Nitrate & Phosphorus Loading
Town Brook, W. Yarmouth
March 26 & 27, 2004



Site B nitrate loading is much higher than site C. Site C may be losing nitrates to the heavy cedar vegetation. The phosphorus levels are very low at both sites. Phosphorus levels were all below the detection limit .

Biological Studies

- **Fecal Coliform**
 - All 3 Sites tested
 - All cultures from all sites were found to be negative
- **Aquatic Invertebrates**
 - Early samples were negative
 - Recent observations indicate many specimens
 - Sampling not complete

Fecal coliform tests indicated no presence of that bacteria. Observations along the trail on the edge of the brook indicate that some f.c could have been present. Aquatic macroinvertebrates were not collected in the warmer weather. This study still needs to be completed.

A Window to the Future



Expanded Studies

- More Sites
- More frequent testing (seasonal)
- Aquatic Invertebrates
- Sandy Pond Data
- Sediment % organics

No clear conclusions can be formed from the limited amount of data. The recommendations indicated here would be for an extended study of the area.