5-7-2004

An Initial Study of Town Brook, West Yarmouth, MA

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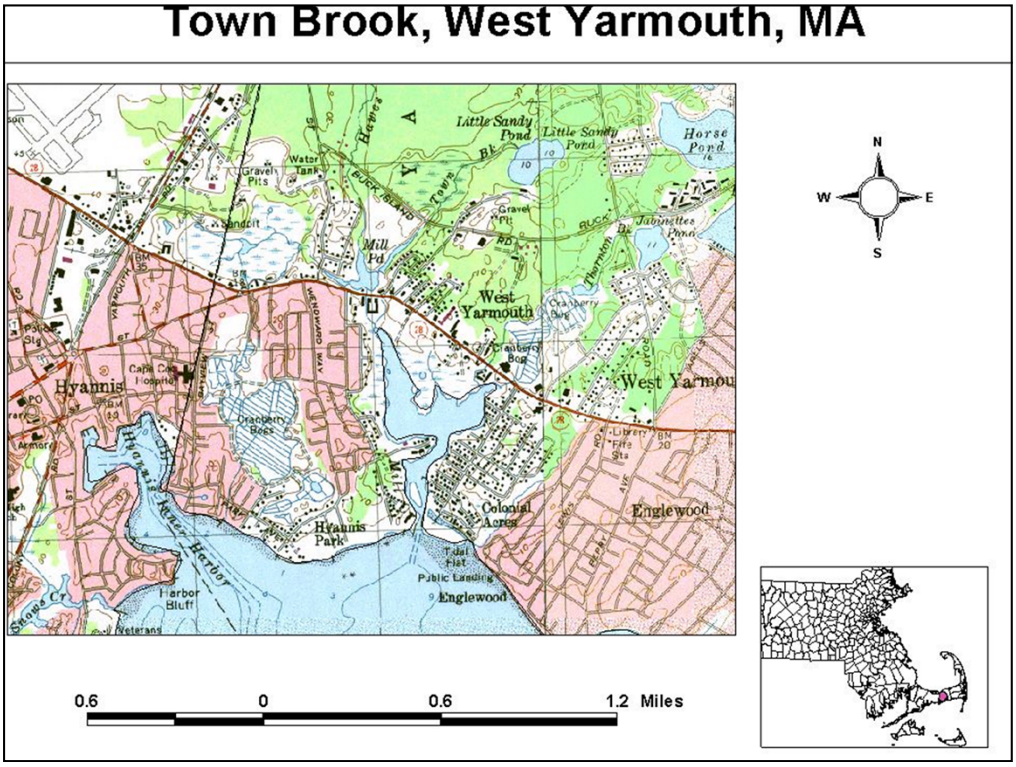
By Students of the
Dennis-Yarmouth Regional High School
South Yarmouth, MA

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**

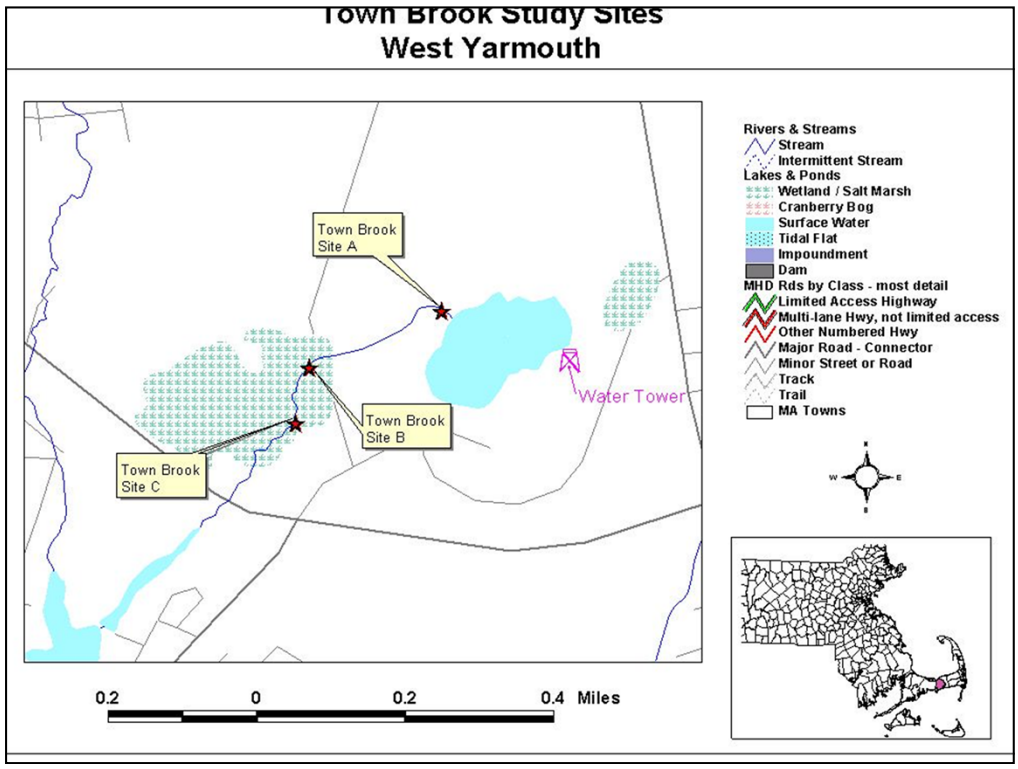
The town conservation administrator has contributed to the information provided in this study.

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



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:

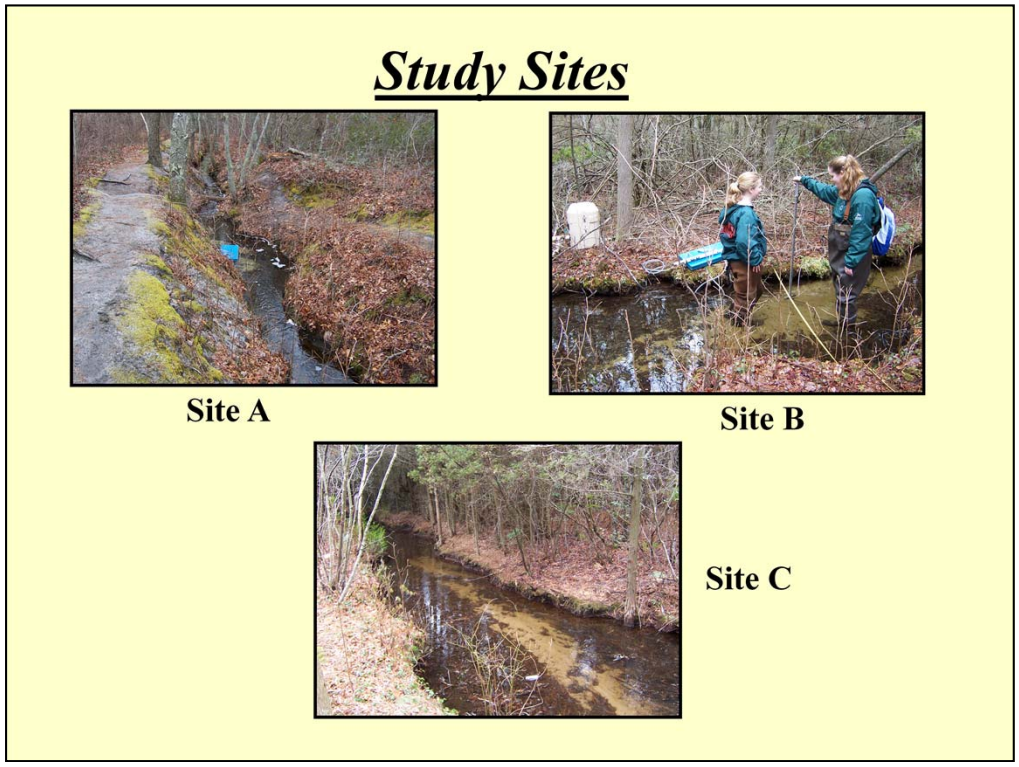
Site A – 12 meters from pond

Site B – 200 meters from pond

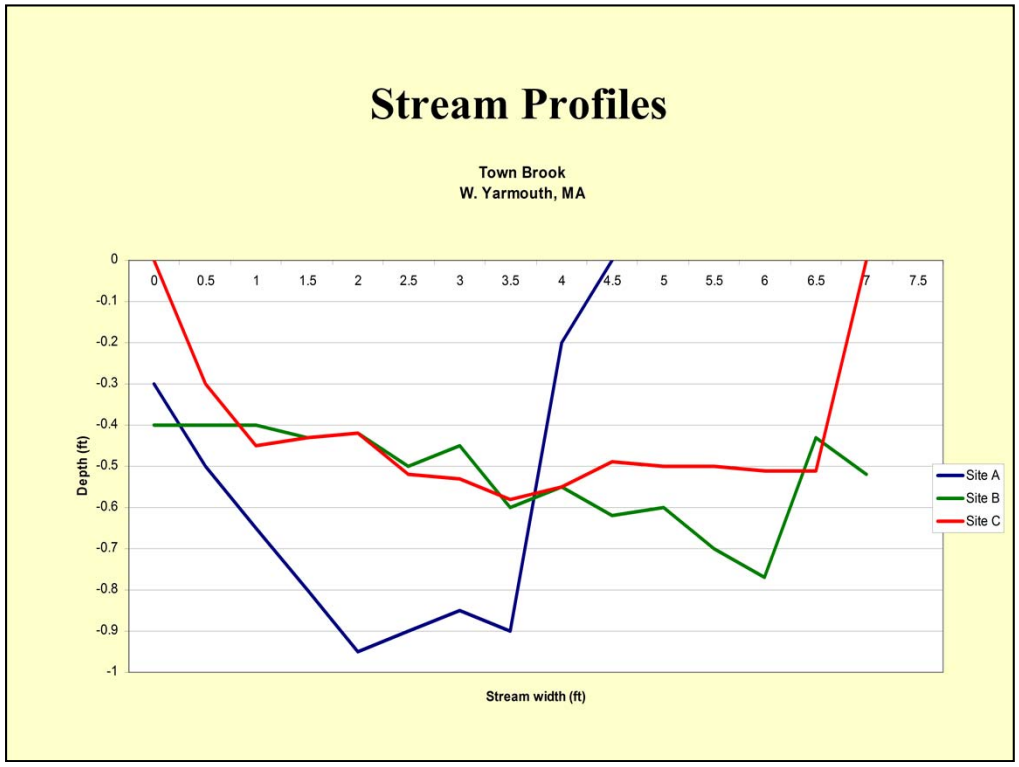
Site C – 300 meters from pond

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.



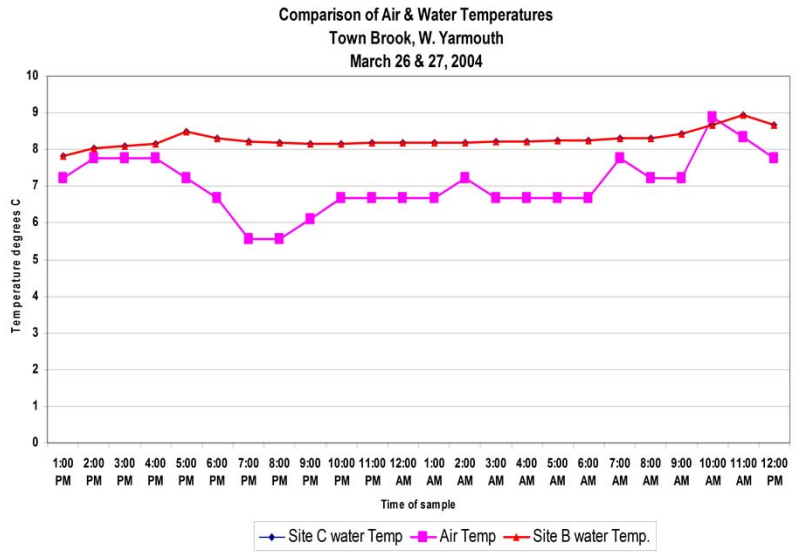
Site A is near the start of Town Brook. Site B is just before a section of sphagnum moss. Site C is deep within the dense growth of Atlantic White Cedar trees.



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

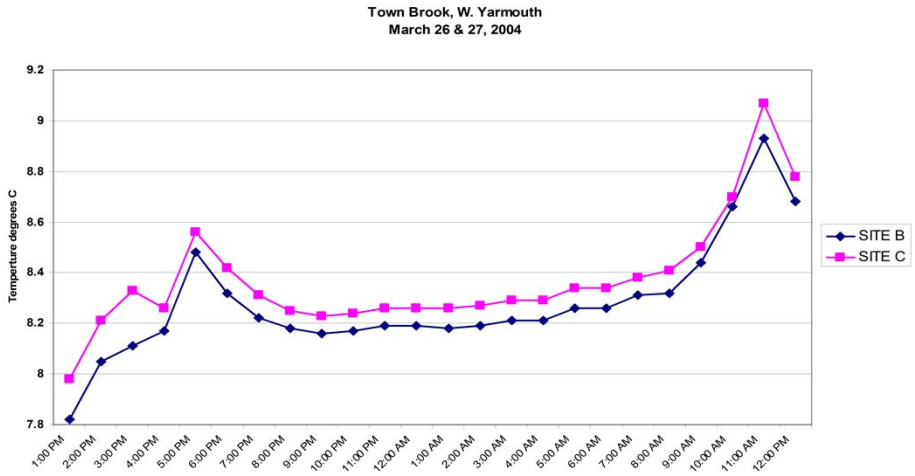
Site A has an obviously narrower gauge but deeper profile indicating faster moving water (higher erosion)

Atmosphere & Water

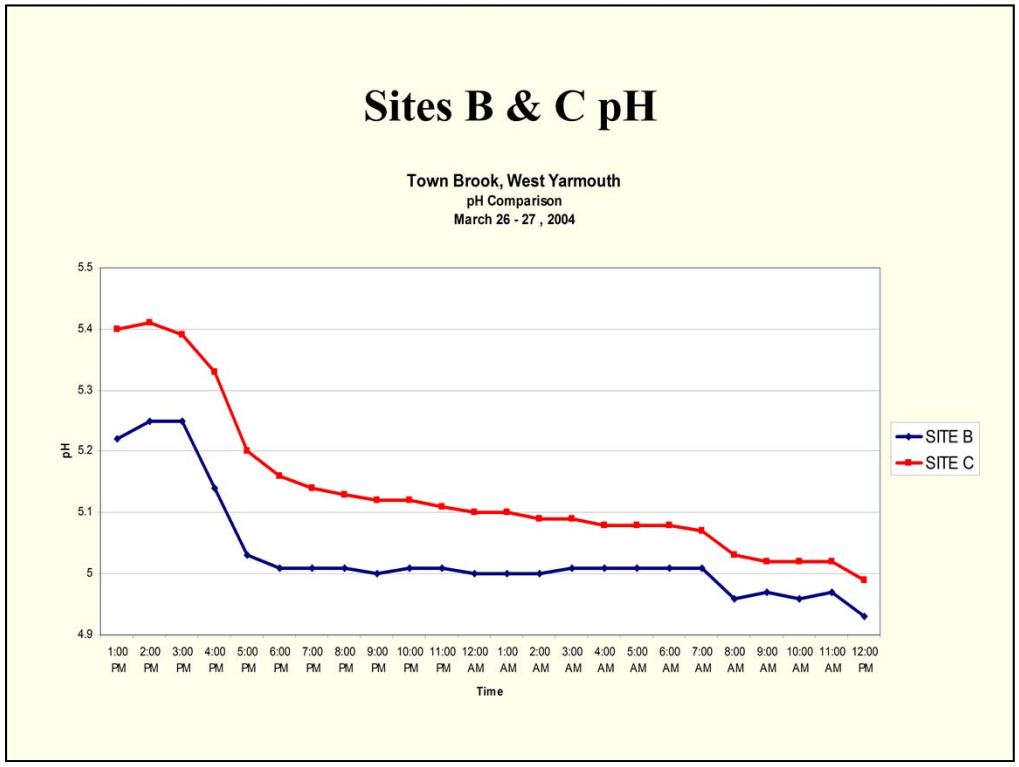


The air temperature fluctuates much more than the water. The time that the samples were taken was a cloudy, foggy, cool day. Rain fell over night.

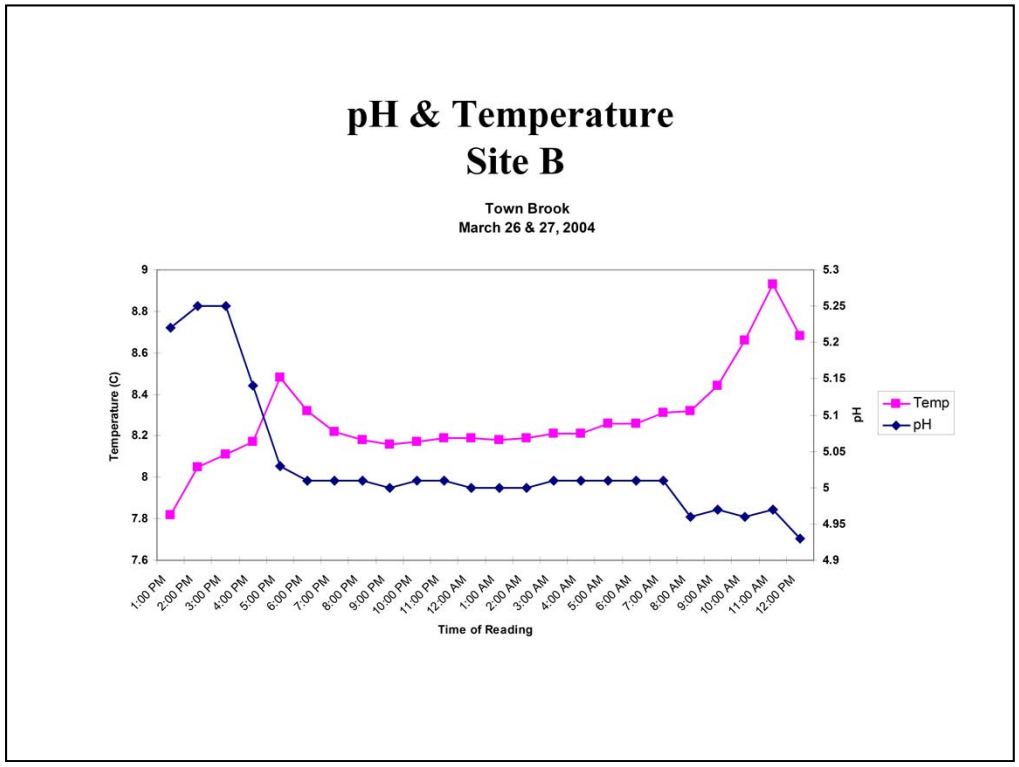
Water Temperature Comparisons



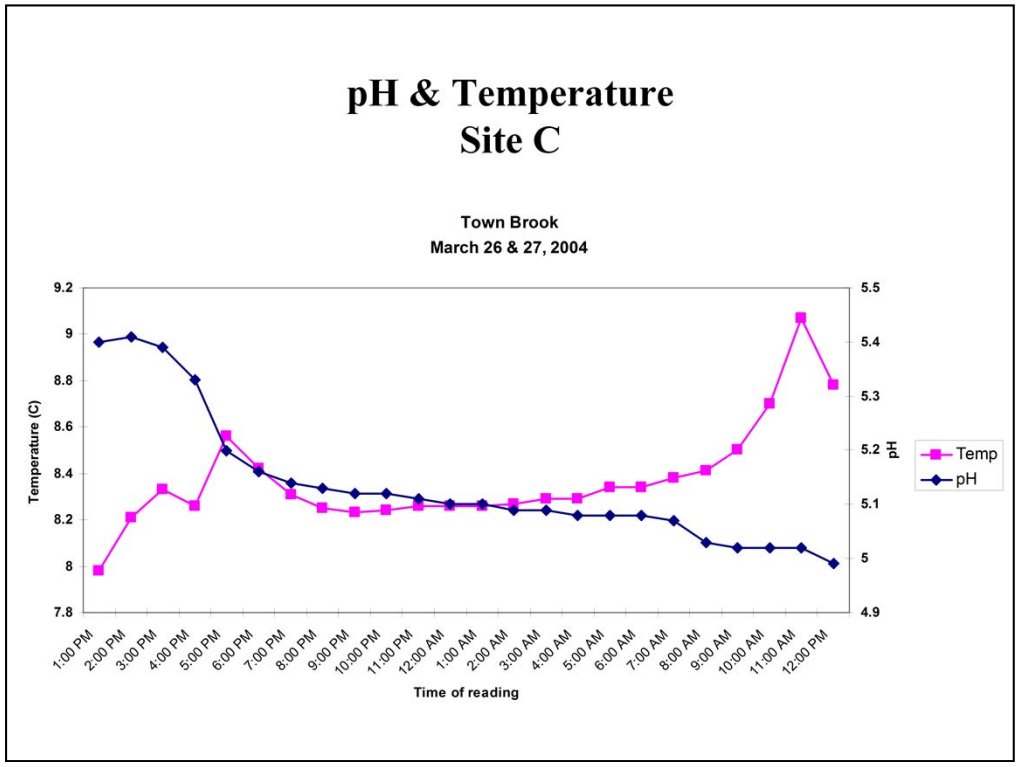
Both sites B and C have very similar readings and trends. The increase at the end of the sampling indicates the effect of the daylight.



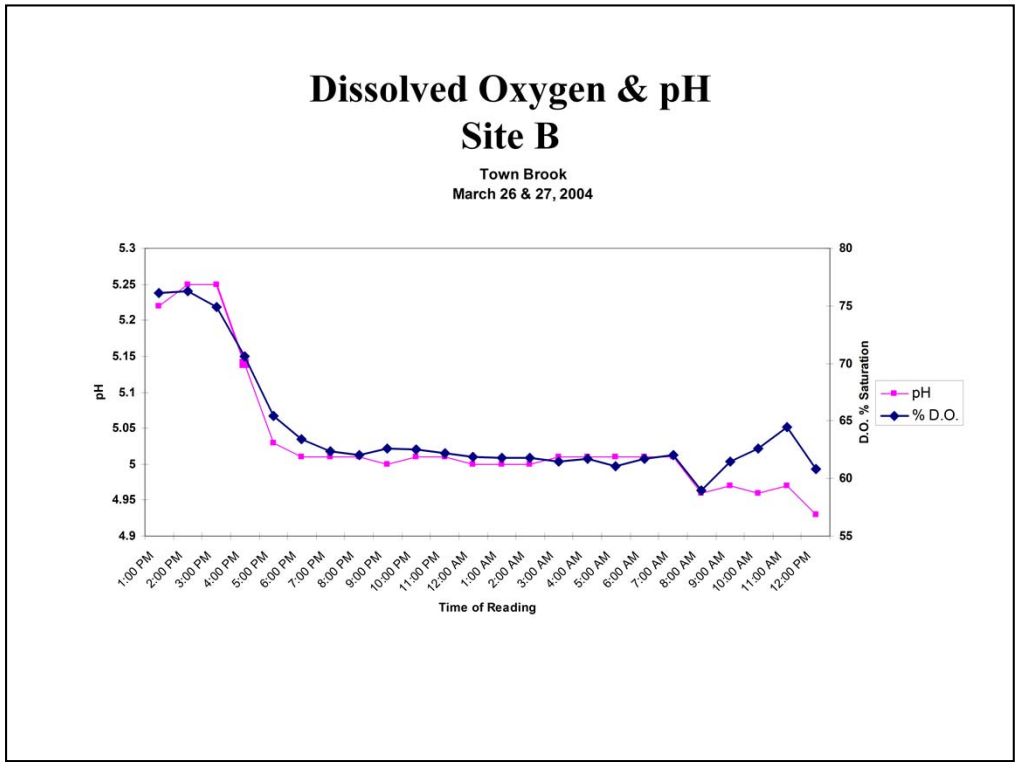
Both sites appear to have similar trends. Both sites have acidic conditions. Site B is more acidic than site C.



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

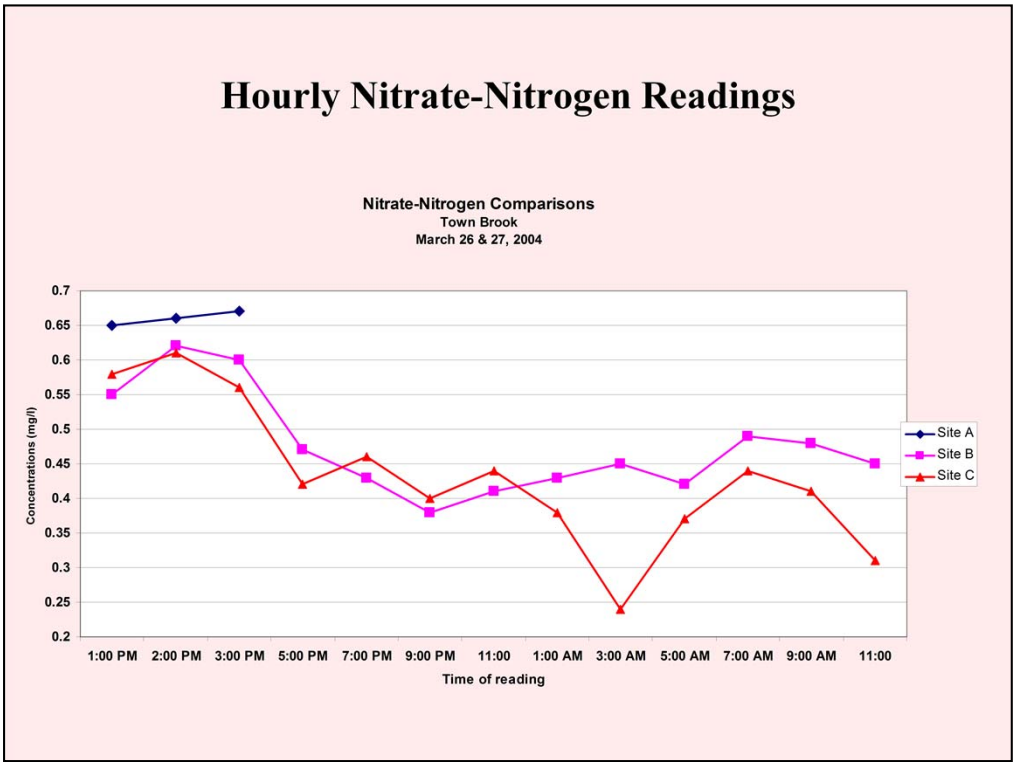


The same trends are seen in site C as seen in the previous slide of site B.

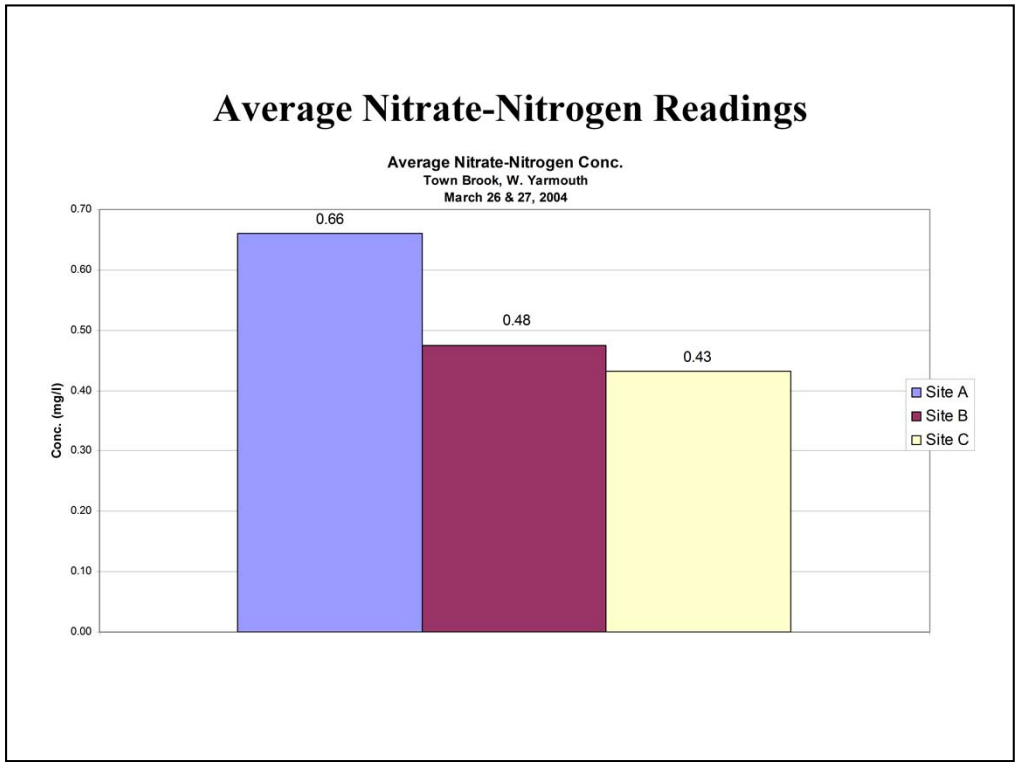


The dissolved oxygen and pH values both dropped at the same time. This could be because of increased bacterial activity creating a loss of oxygen along with an increase in acidity (lower pH).

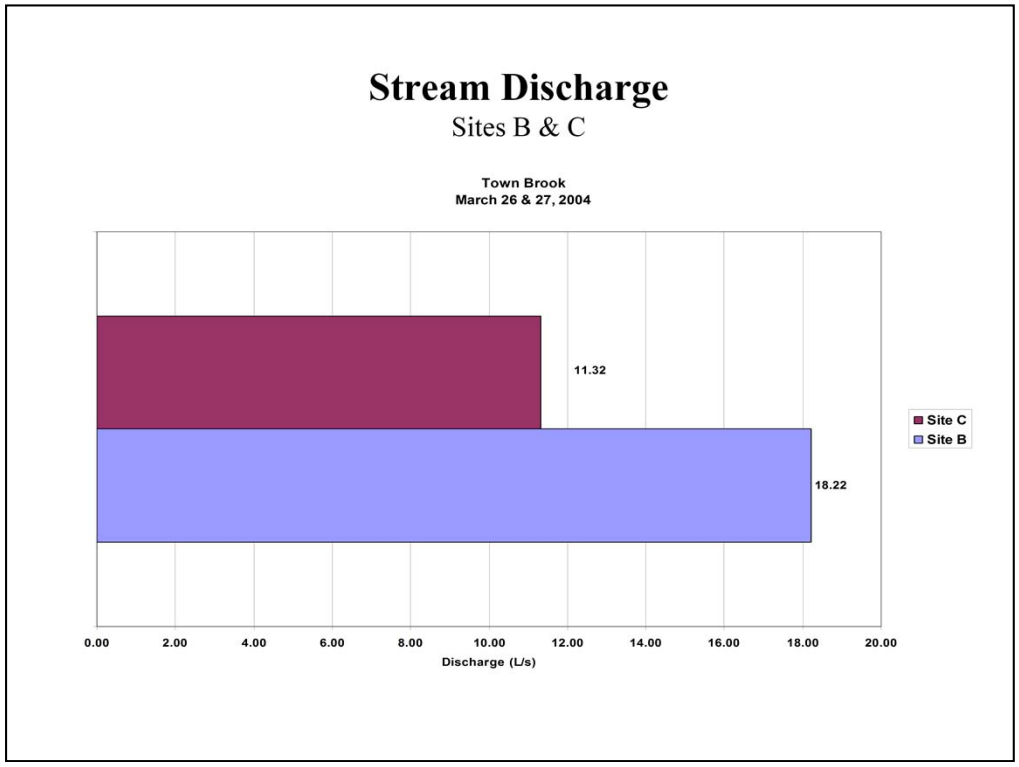
Hourly Nitrate-Nitrogen Readings



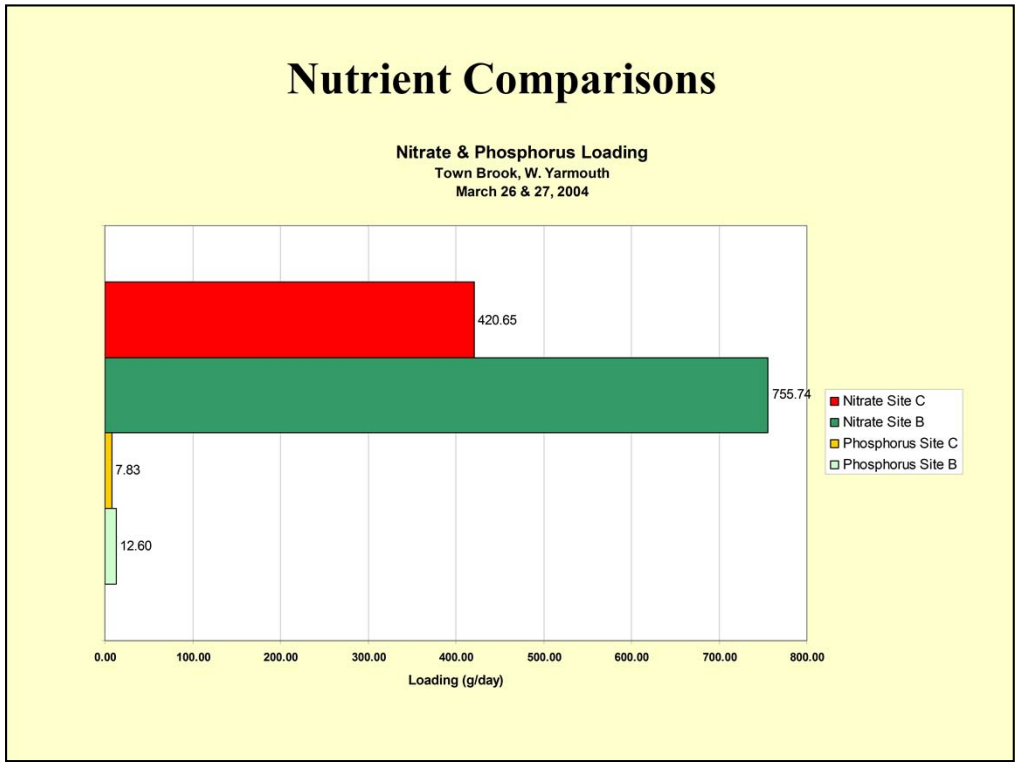
Nitrate readings from sites B and C show a drop in late afternoon readings and then relatively stable readings throughout the night. The drop in readings after 3 PM could be related to the damming of the stream. The readings at 3 AM is of question.



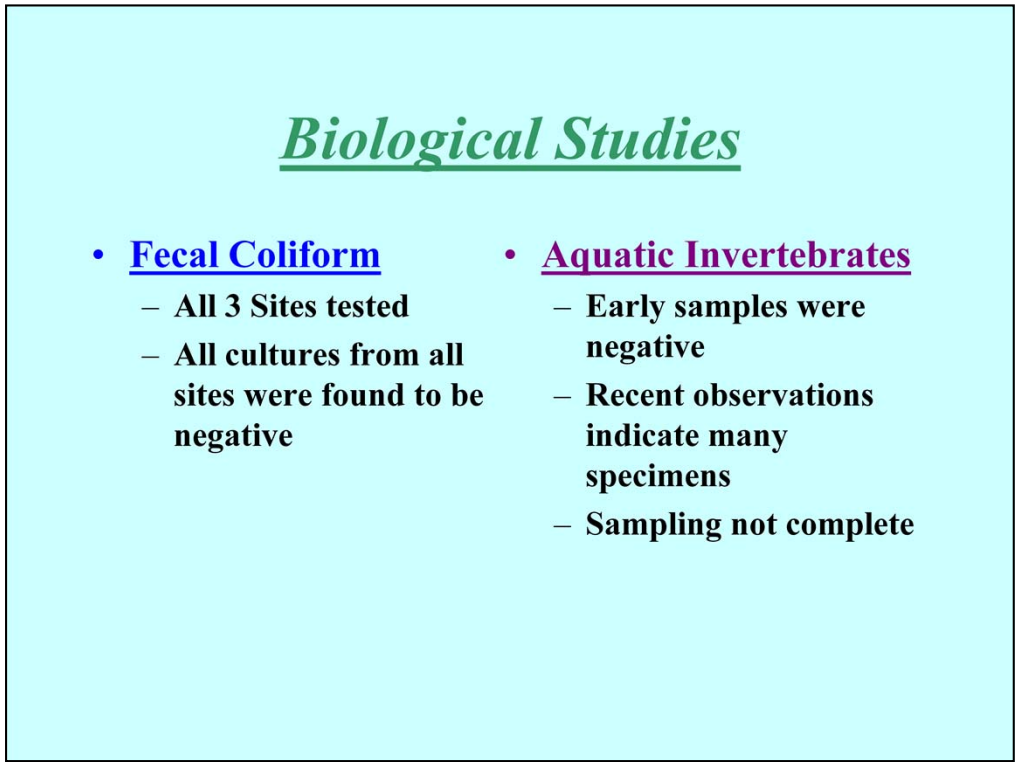
Average nitrate values indicate a higher concentration in site A near the pond. Sites B and C have similar readings to one another (less than site A). Site C could be less due to the large growth of cedar trees absorbing the nitrates.



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



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



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.