A Comparison Study: Fall Book and a Natural Spring; Focus: Water Chemistry

Follow this and additional works at: https://vc.bridgew.edu/wal_projects
Part of the Environmental Monitoring Commons, and the Natural Resources and Conservation Commons

Recommended Citation

This item is available as part of Virtual Commons, the open-access institutional repository of Bridgewater State University, Bridgewater, Massachusetts.
COMPARISON STUDY: FALL BROOK & A NATURAL SPRING
FOCUS: WATER CHEMISTRY

ARHS
Investigating Earth Science Class

October 19-20, 2005

Presenters: Alex Humphreys,
Bryan Andrews, Steve Rodriguez, Billy Mason, & Andrew McGovern

Pictures taken by Ashley Ternullo &
Ms. Bebis
A NATURAL SPRING

- Spring = a pool of water reaching the surface from an opening in the aquifer & /or rock
- Located in Lakeville, MA
- Latitude 41° 47’ 04” N
- Longitude 70° 54’ 38” W
- Across from Morgan Reserves off Long Point Road between Little & Great Quittacas Ponds (reservoirs to NB)
- Located near horse trails through the woods
Physical features of the Spring

- Water originated from the Spring then flowed into a small brook then into Little Quitticas pond
- Located in the woods about 100 yards
- A lot of trees around the Spring
- Pristine environment
- Spring measured 18 ft across
- Brook measured 6 ft 6 inches across
- Bottom of spring was sandy with a few rocks
- Brook was very rocky.
TOPOGRAPHIC MAP OF SPRING
AVERAGE FLOW RATE OF STREAM FROM THE SPRING

- No flow in the spring but flow into the brook
- We used flow meter:
  - 2 feet across  1.65 ft/s
  - 4 feet across  1.60 ft/s
- Difficult to take because of the rocky bottom
CROSS SECTIONAL DEPTH OF NATURAL SPRING (Brook was about 1 ft deep)

Cross-Sectional Depth of the Spring

Depth in feet

Feet across the spring
FALL BROOK

- Located in Freetown, MA
- On Gurney Road near Still Waters Factory for fasteners
- Historic road bridge crosses the river
- Bottom of river was murky and muddy.
  - Shawn Sullivan “We didn’t make it across the river too far.”
  - Steve Silvia “The mud stuck to me.”
- Latitude 41° 46’ 21” N
- Longitude 70°58’05” W
TOPOGRAPHIC MAP of Fall Brook
Average Flow Rate Using an Orange

- Flow about 5 feet from shore
- Shawn and Steve stood 12 feet from each other
- 3 trials conducted
- Orange traveled 12 ft / 49 seconds average
- Flow = .25 ft/sec
HYDROLAB PROBE DATA

Comparison

• Temperature
• pH
• DO
• % DO
• Ions / Conductivity
• Grab samples: Nitrates & phosphates
Observations & Inferences

- Temperature at the Spring was colder by about 3 degrees Celsius.
- Slight changes in the temperature at Fall Brook
- **WHY?**
- Groundwater from the Spring is colder.
- Fall Brook is affected more by sunlight.
- Maybe discharge from bogs or factory into river warms the river
pH Comparison

The graph shows the pH levels of Fall Brook and Spring over time. The pH of Fall Brook remains relatively constant, while the pH of Spring shows a slight increase over time.

- **Fall Brook**: pH levels around 4.5 remain steady throughout the observed time period.
- **Spring**: Initially stable, pH increases towards the end of the observed period.
Observations & Inferences in pH

- Fall Brook’s pH of 4.5 average significantly lower than the Spring’s pH of 5.6 average

- WHY?
- Discharge from factory into Fall Brook
- Increased rainfall
- Maybe bogs & wetlands located downstream from Fall Brook adds to acidity
- Maybe pollution from the road adds to acidity
- Decomposition adds to acidity of the river
Observations & Inferences

• Higher percentage & mg/l of DO at the Spring than Fall Brook

• WHY?
• More consumption of DO by oxygen consuming (aerobic) bacteria for decay at Fall Brook
• Slight increase of DO at Fall Brook during daylight due to photosynthesis
Observations & Inferences

• Higher conductivity at the Spring (ave=0.115) than Fall Brook (ave= 0.05)

• WHY?

• Spring water comes from the ground or aquifer and may have more ions in it.
Grab Samples: Nitrates & Phosphates

Detection limit P = .008 mg/L; Detection Limit N = .10 mg/L
High detection P = .326 mg/L
Observations & Inferences

• Minimal phosphates in both locations but noticeable increase of nitrates at the Spring (1.69 mg N-NO3/L)
• WHY?
• Spring is located in the woods with horse trails thus more leaves &/or animal feces deposited there.
THE END