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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 ¹**
- **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**

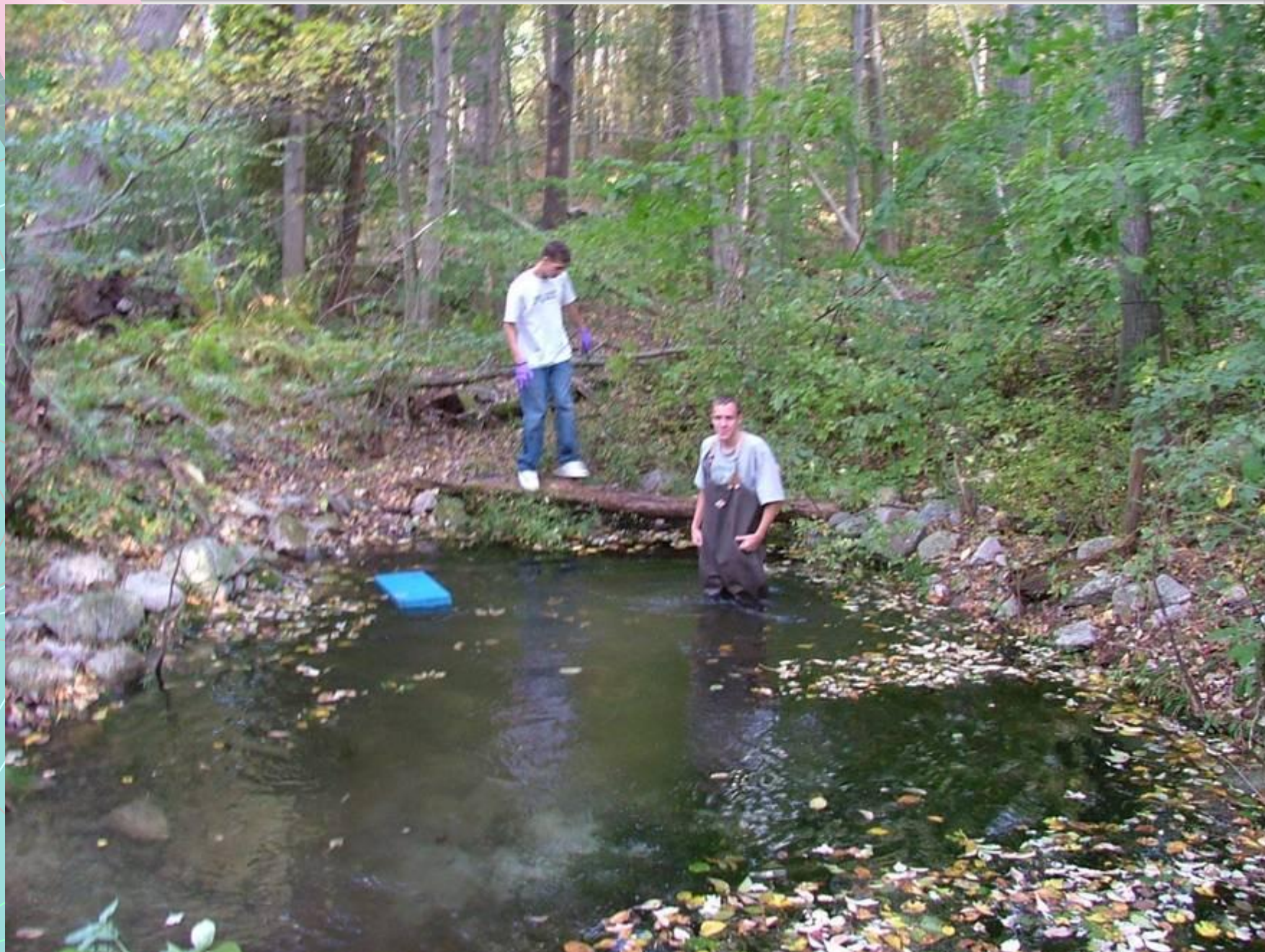


Physical features of the Spring

- **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.**


[illegible]











AVERAGE FLOW RATE OF STREAM FROM THE SPRING

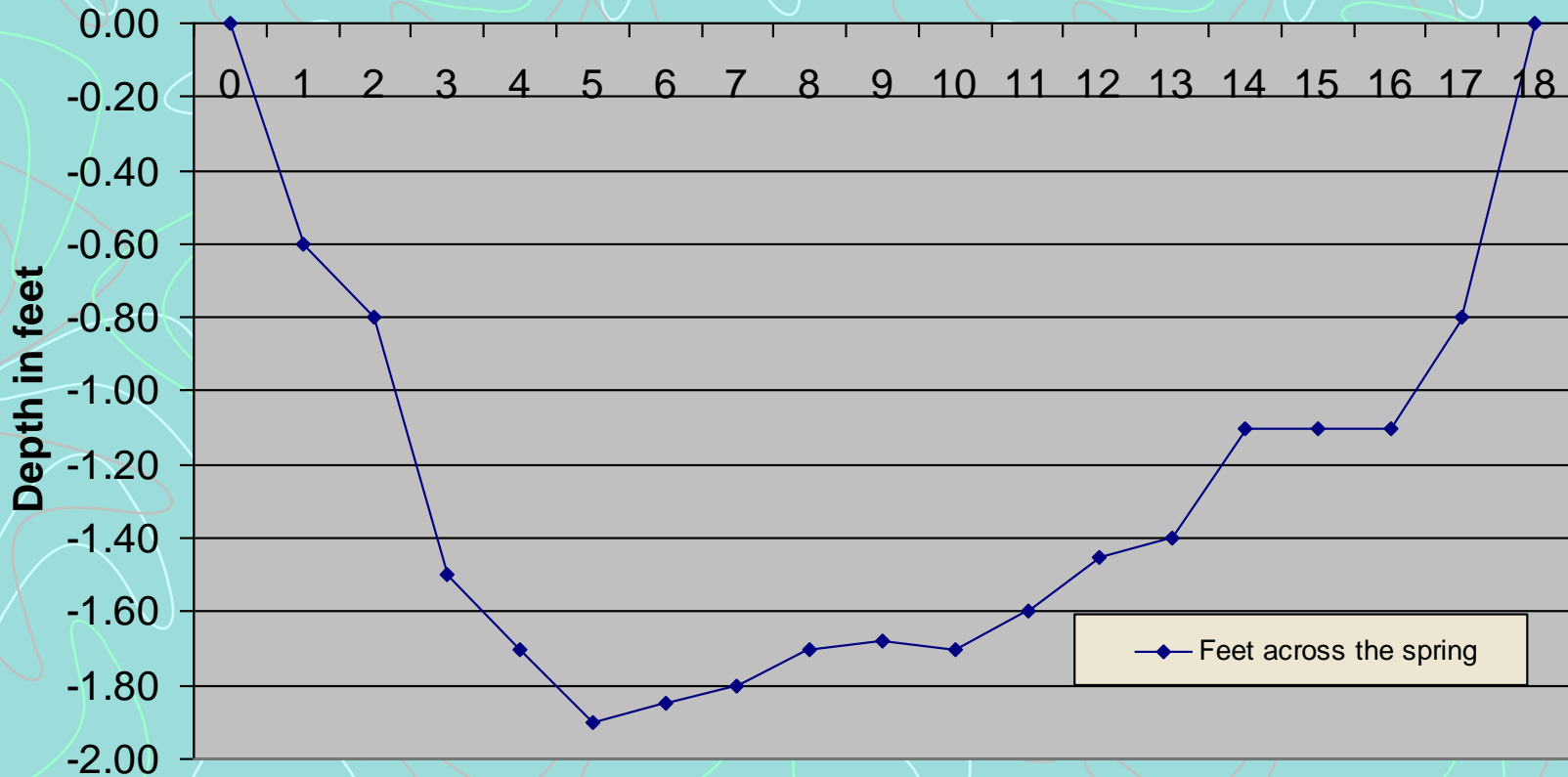
- No flow in the spring but flow into the brook
- We used flow meter:

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





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














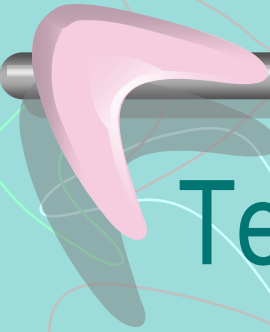
Average Flow Rate Using an Orange

- 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

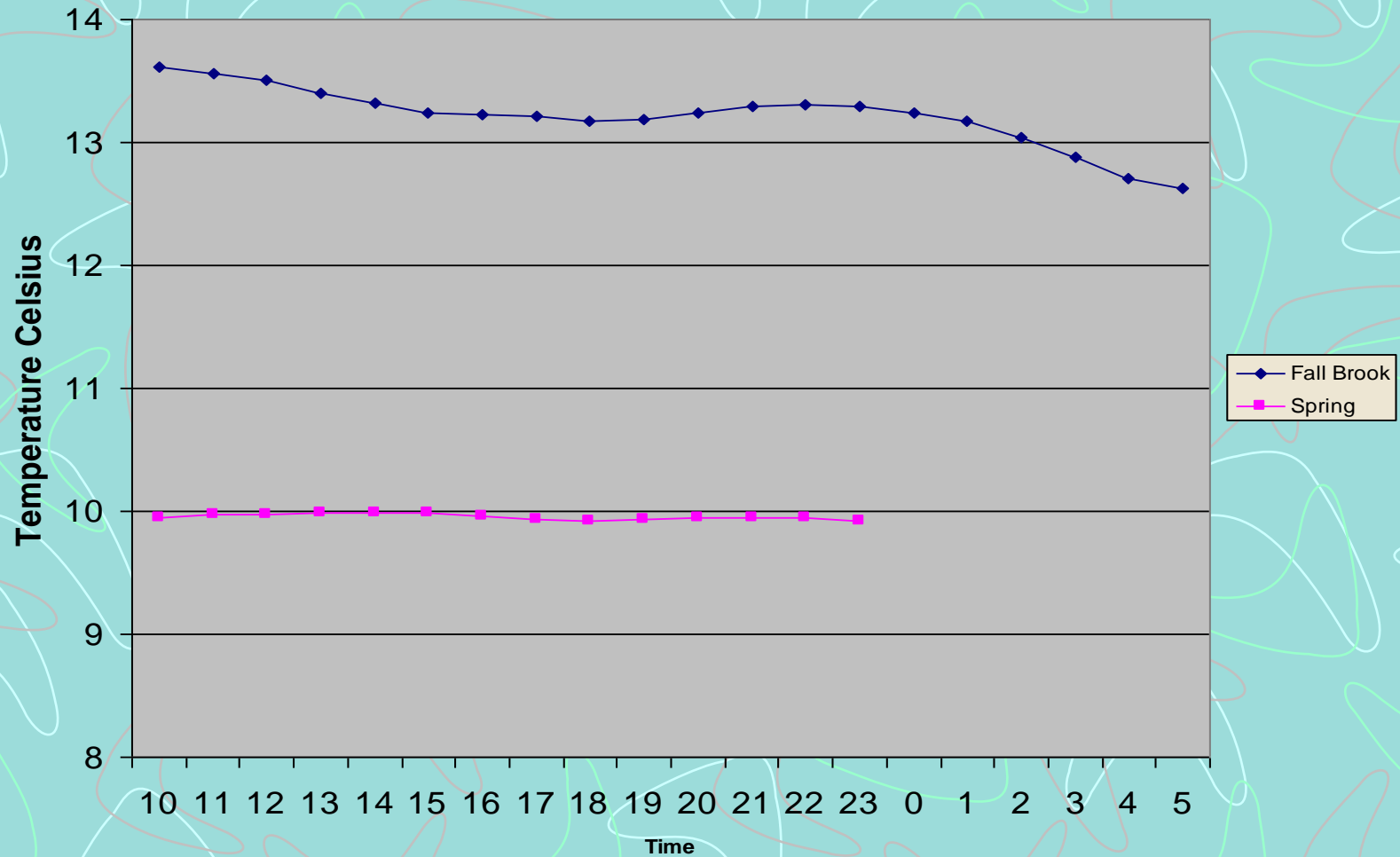


HYDROLAB PROBE DATA Comparison

- Temperature
- pH
- DO
- % DO
- Ions / Conductivity
- Grab samples: Nitrates & phosphates



Temperature

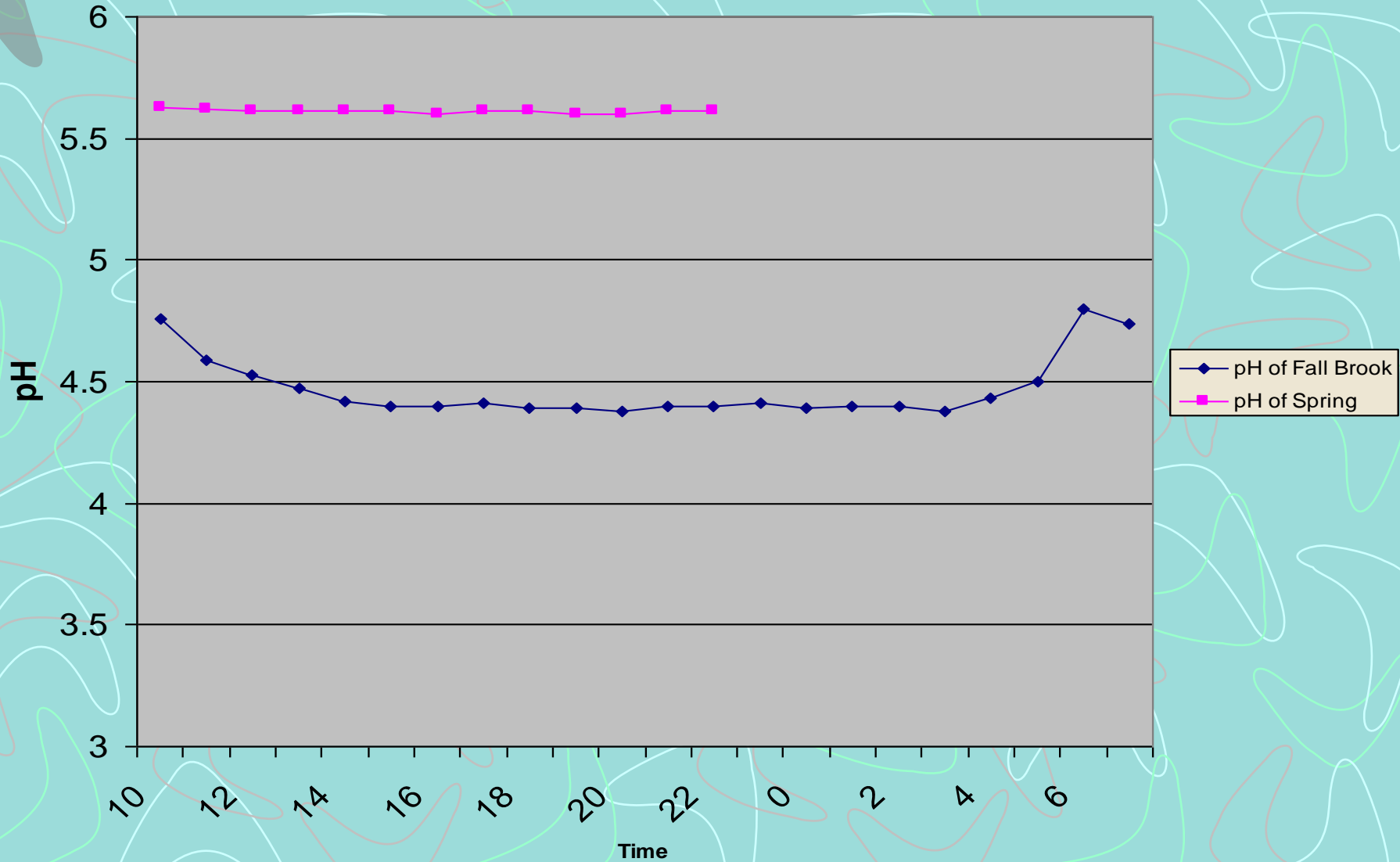




Observations & Inferences

- 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



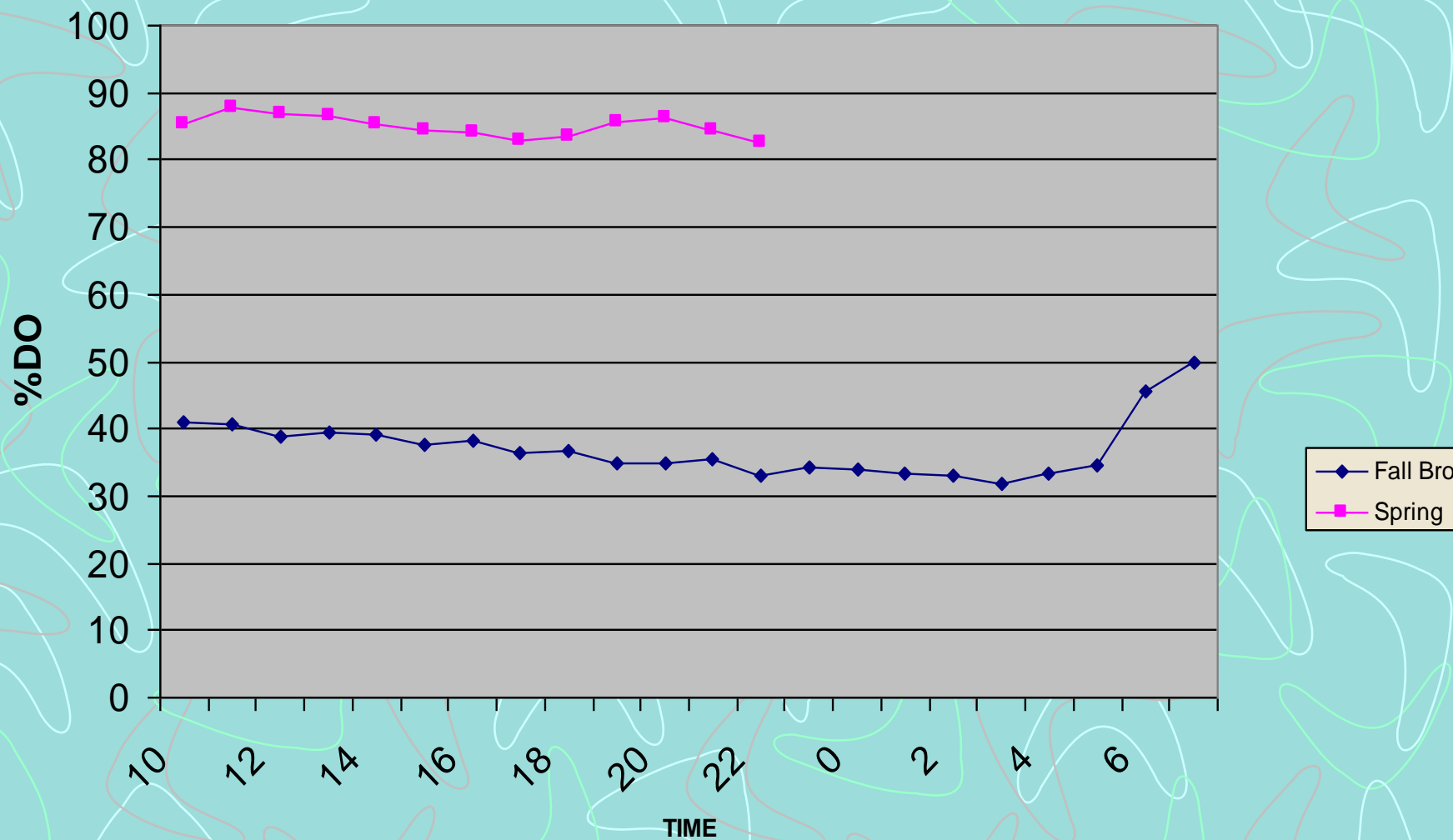


Observations & Inferences in pH

- 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**

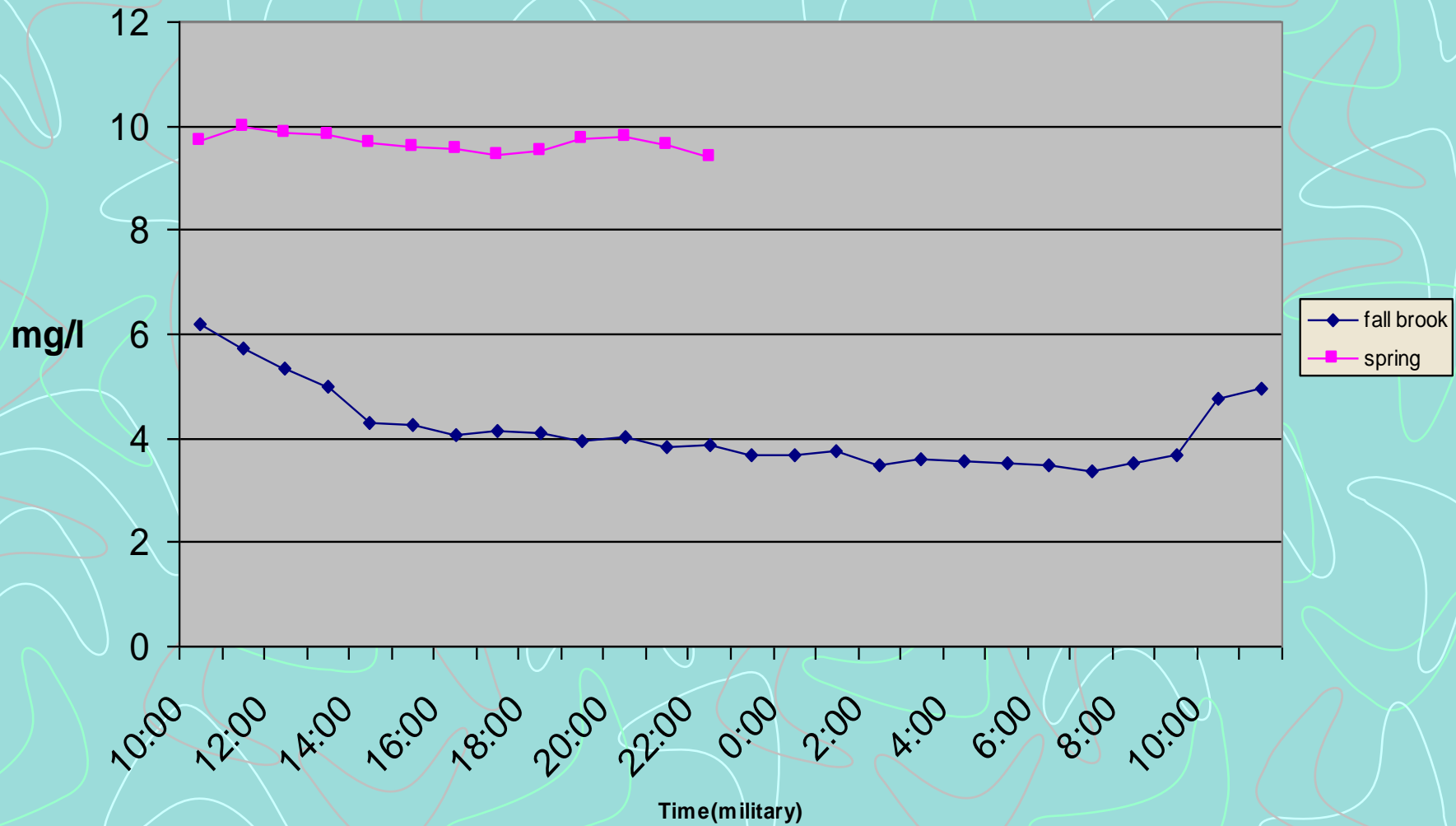


% DO





DO mg/l

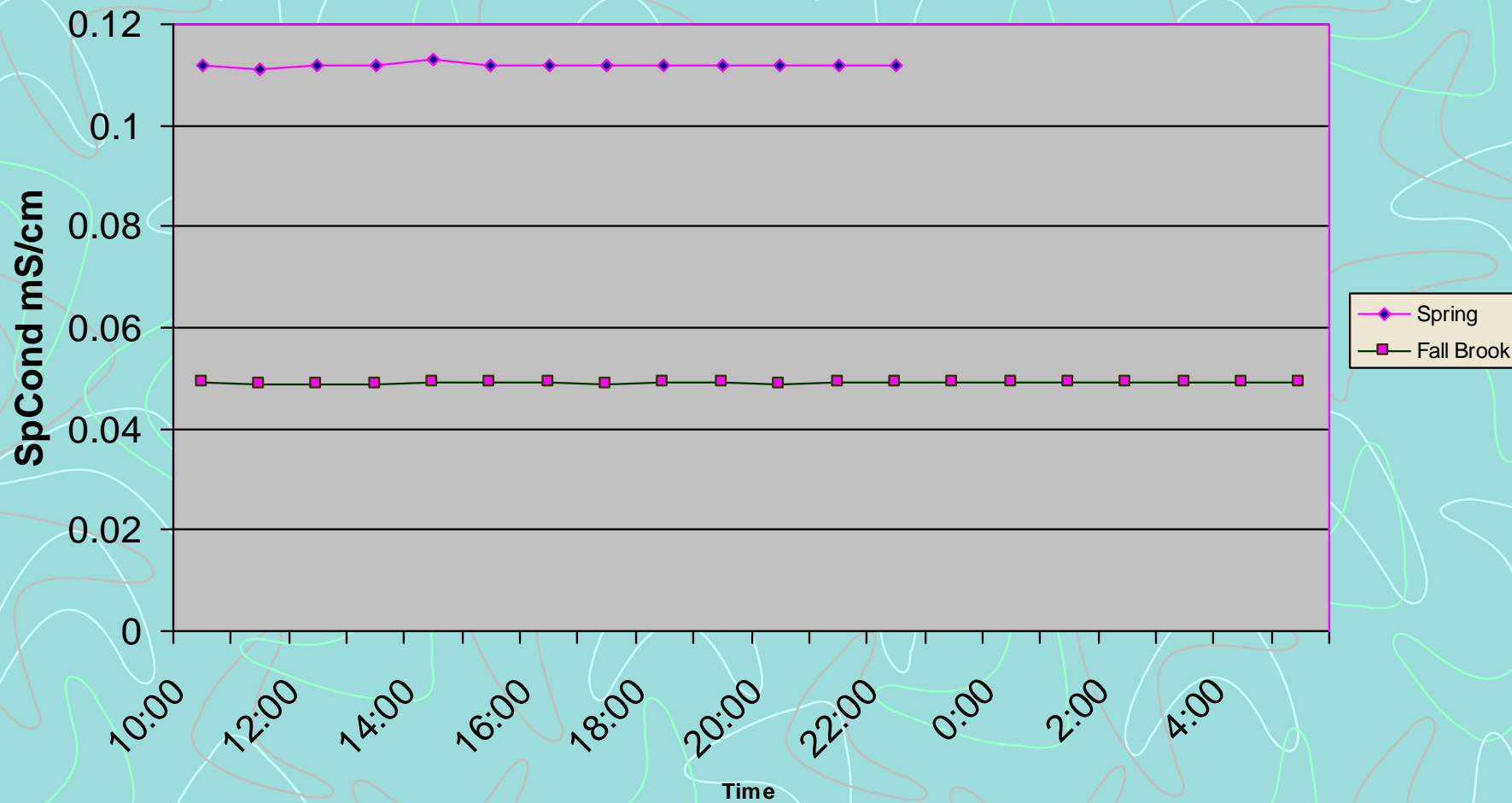




Observations & Inferences

- 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**

Conductivity





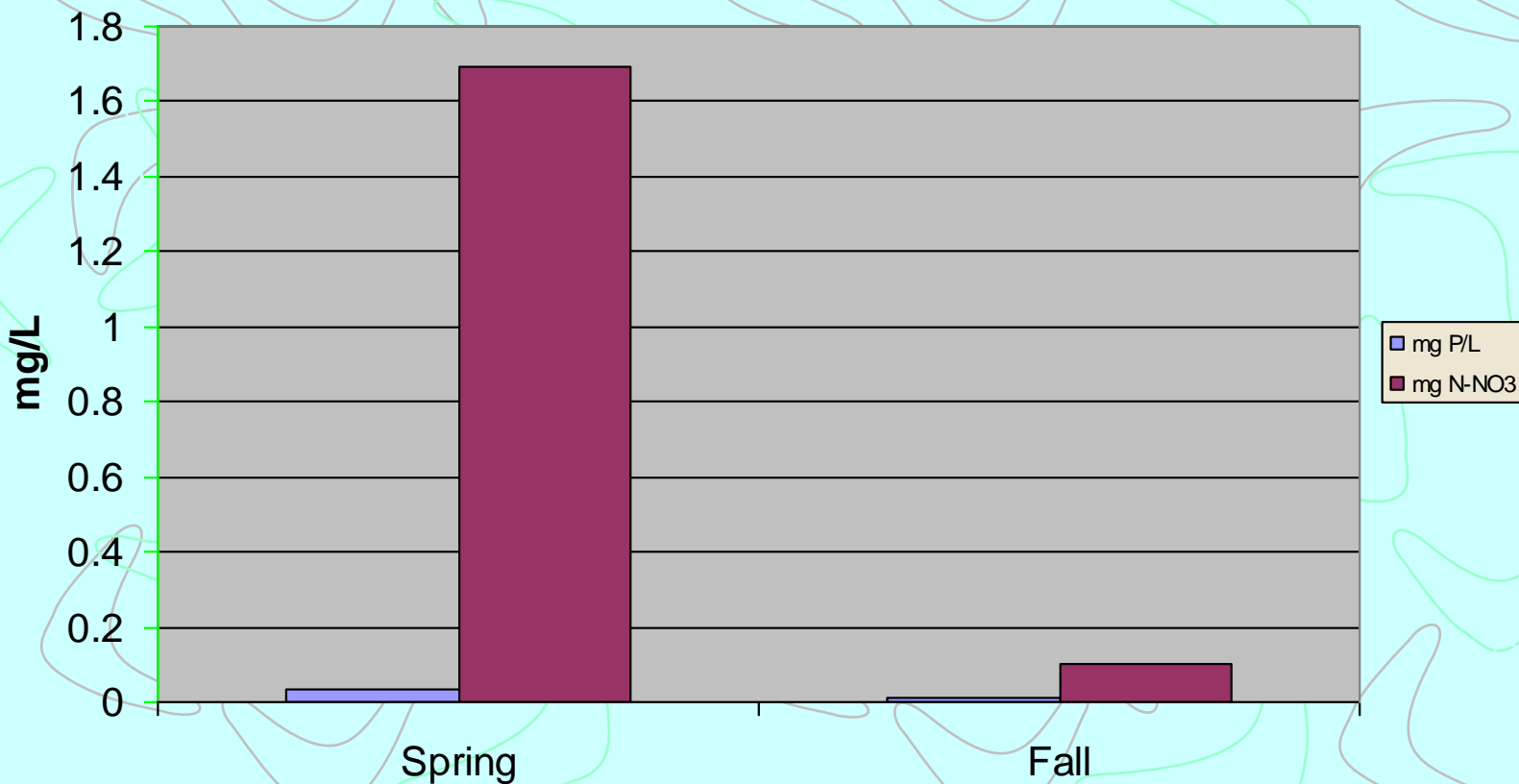
Observations & Inferences

- 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

