River Science: pH and TDS

Brought to you by Jaysen, Cielo, Yuvasri, Fariha

Introduction

For our project we wanted to know the different pH levels of different areas in the Truckee river in relation to the shore line.

the normal range for pH in a water surface is 6.5 to 8.5. So if the river is between this range the river water quality is not hazardous to life around the river.

As we got closer to the shoreline the vegetation increaseD so we thought it might have more dissolved solids and more acidity which can affect living organisms near the shoreline.

Question

Is there an association between proximity to the shoreline and the pH and TDS measures of samples of water from the Truckee River?

HYPOTHESIS

If we near the shoreline, then the pH and TDS measures will increase due to the increase in vegetation and decrease of heavy current!

Materials

- (15) Plastic bags
- (1) pH meter/measurer
- (1) Total dissolved solids (TDS) meter/measurer
- (1) Graduated cylinder
- (1) 330ft measuring tape
- (4) very good attitudes!!!

Procedure

1. While one person stands on the edge of the shore holding one end of a 330ft measuring tape, another person must walk approx. halfway into the river holding the other end
2. Divide the measured distance into three intervals of equal size
3. Take a sample of 50mL of water from each interval
4. Repeat until there are 7 samples of water from the interval closest to the shore, and 7 samples from the second interval closest to the shore (only 1 sample is used from the farthest interval, as it was very hard to obtain for this study)
5. From each sample, measure and record the pH and TDS
6. Analyze data
7. And most importantly....

Here's whatchu gettin' Result-wise, ya herd?

|	35 ft AFS		23.4ft AFS		11.6ft AFS	
	pH	TDS	pH	TDS	pH	TDS
Sample #1	8.3	73	8.8	62	8.5	64
Sample #2			8.4	64	8.4	64
Sample #3			8.3	62	8.2	61
Sample #4			8.2	59	8.6	65
Sample #5			8.7	59	8.3	59
Sample #6			8.5	56	8.5	58
Sample #7			8.4	57	8.3	58
Average	8.3	73	8.471428571	59.85714286	8.4	61.28571429

Statistical Analysis of Data

We compared all the pH measurements vs. all TDS measurements (Linear Regression)

We compared pH of Interval 2 to pH of Interval 3 (T-Test)

We compared TDS of Interval 2 vs TDS of Interval 3 (T-Test)

TDS vs. All pH samples

Legend:
- TDS
- Trendline for Data series 1 r^2 = 1.913E-3
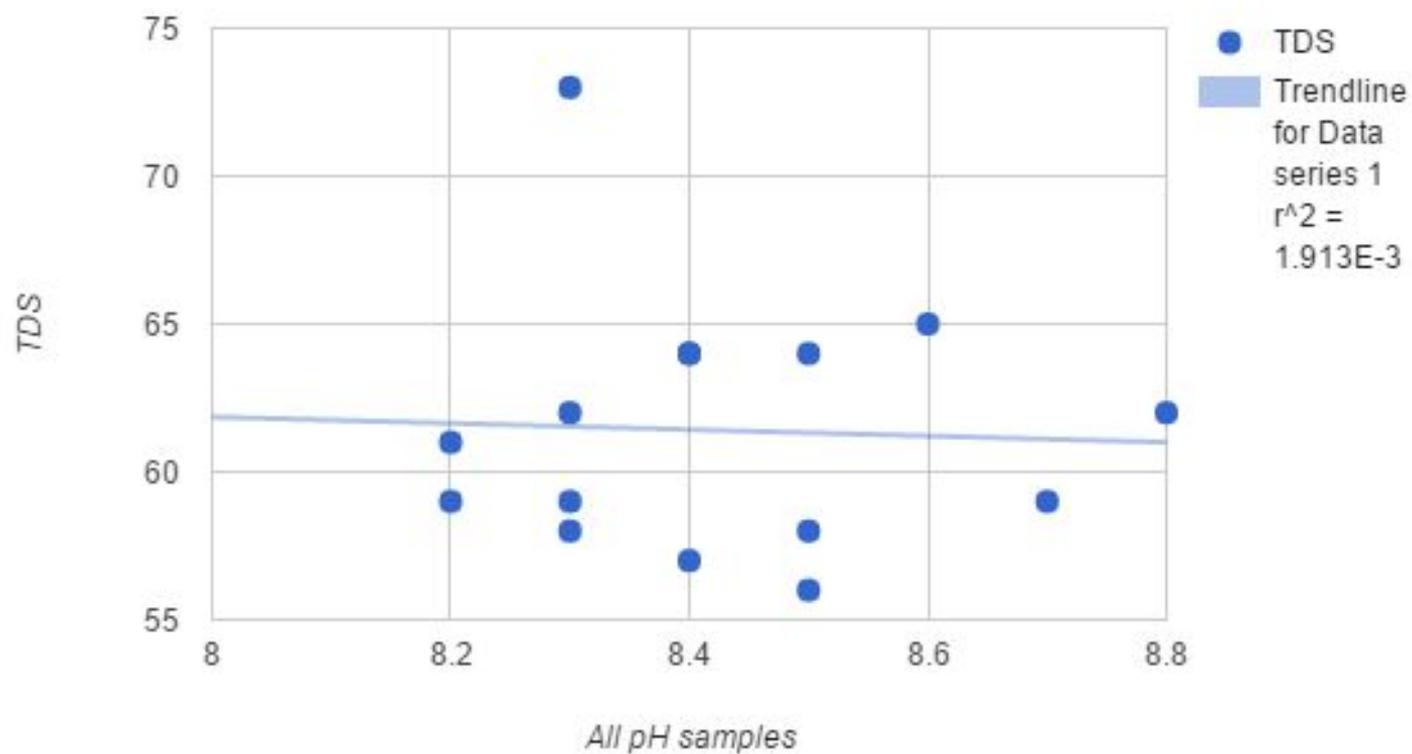
	pH of Interval 2 (23.4 ft away)	pH of Interval 3 (11.6 ft away)
Mean	8.471	8.4
SD	0.214	0.141
t=.7372		
p= .4752		
df=12		
SE=.097		

	TDS of Interval 2	TDS of Interval 3
Mean	0.5986	0.6129
SD	0.0291	0.0304
t=.8980		
p=.3868		
df=12		
SE=.016		

What does this mean???

pH was an average of 8.4

TDS was an average of 61.4

No significant difference between I2 and I3 (pH)

No significant difference between I2 and I3 (TDS)

No linear relationship between TDS and pH

Conclusion

There is insufficient evidence to conclude that I2 and I3 had any significant difference between each other when it comes to Total Dissolved Solids and pH level in relation to the shore line. Also there is no relationship between pH and TDS in relation to the shore line.

Our research resulted in the truckee river's average pH in this particular area to be 8.4 which means the river is basic. Usually river water is between 6.5 to 8.5 but optimal river water pH is 7.4.

Future Research

In the future we would like to gather more samples since we were really only able to get 15 samples.

We also would like to test samples in different sites of the river, not just one spot.

This experiment could be further advanced to see whether the p varies in different parts of the entire truckee river, and how that correlates with the surrounding environment it is in. For example: cites, forest, lakes etc…