Soil pH and Nutrients

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Introduction

- We wanted to see if a relationship, if any, could be established between soil pH, the levels of potassium, nitrogen, and phosphorus in the soil and plant growth in that area.
- We also wanted to determine if proximity to the water line had any effect on plant growth.
- To do this, we took measures of all variables at one meter intervals starting at the shore line and moving outwards as well as measures at sites where vegetation growth was prevalent.
- Through this study we can gain knowledge of how plants thrive in different environments and it is important because plants are an essential key to the global ecosystem

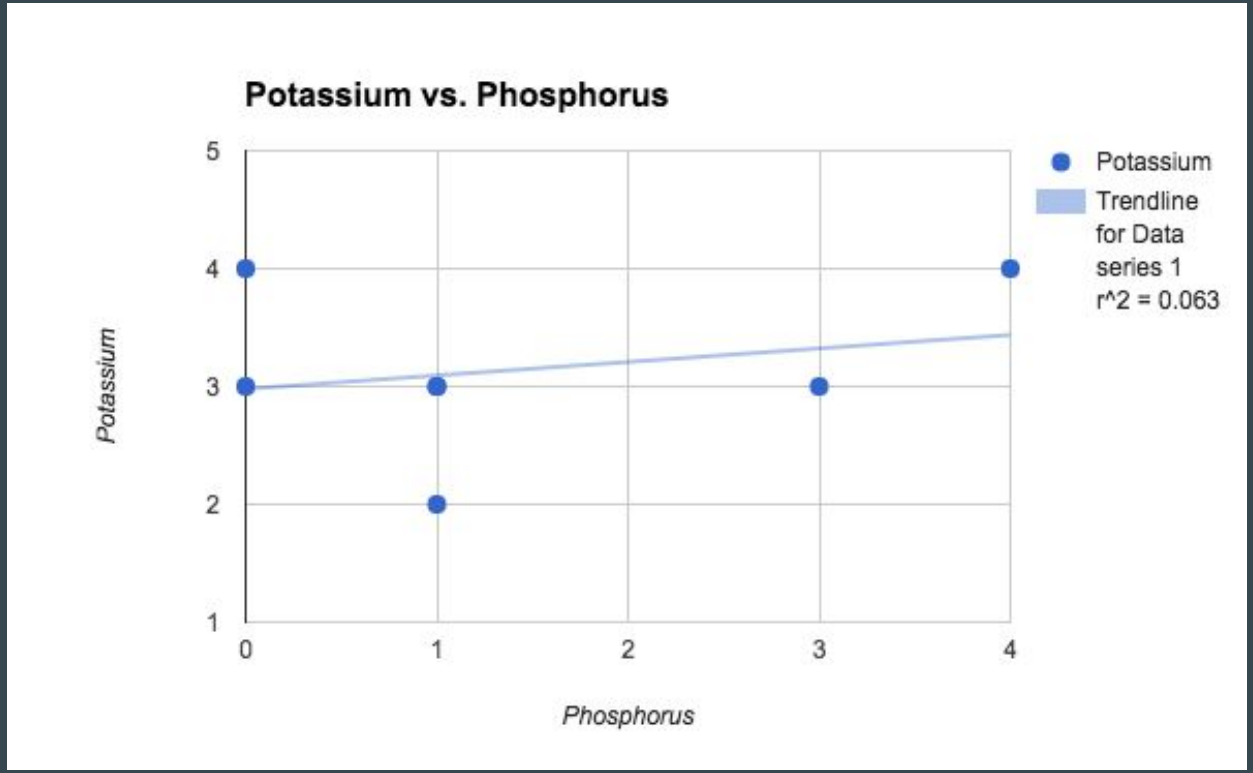
Question and Hypothesis

Question:
What is the relationship between proximity to water and soil health?

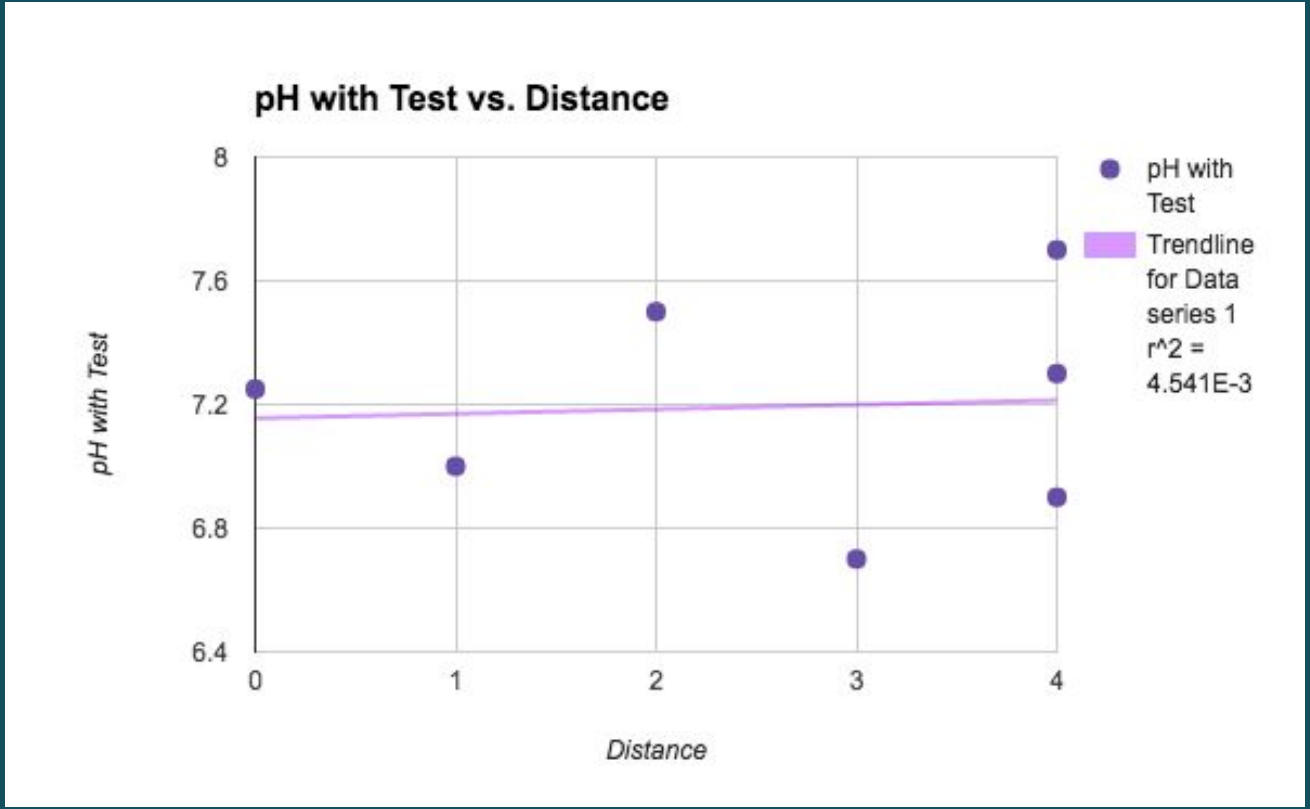
Hypothesis:
As the distance from the shoreline increases the overall soil health and prevalence of vegetation will decrease.

Methods

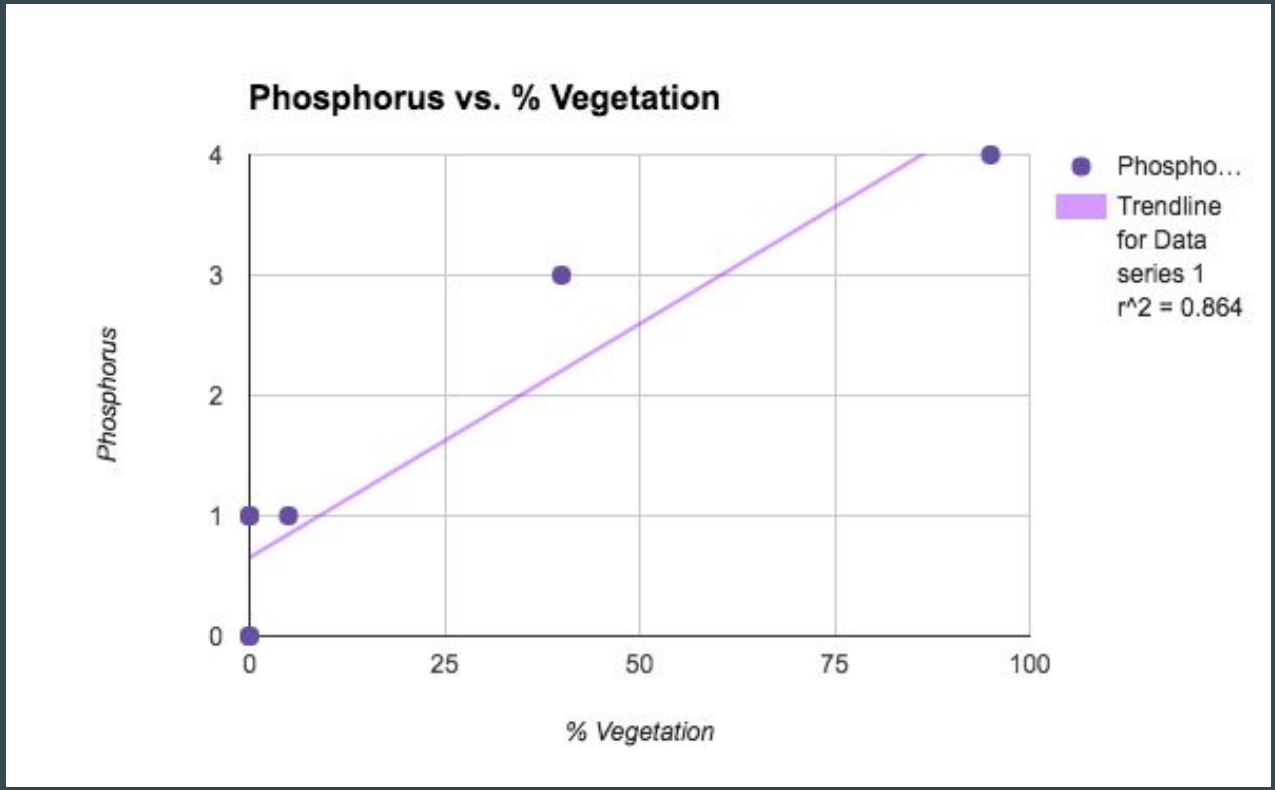
1. Starting at the shoreline, small marks were made on the ground at one meter intervals until five marks had been made.
2. At each site a small amount of soil was dug up, using the spade, and placed in a labeled plastic bag.
3. For each site, directions were followed on each pH test to obtain a pH for that soil site.
4. Five parts of distilled water were placed in each of the plastic bags for the five sites and shaken for one minute and left to settle.
5. To complete nutrient tests for each, the directions were followed for each individual test.
6. Information for pH and nutrient levels were obtained for two additional sites, one with grass and one with bushes.
7. Directions were followed to complete nitrogen tests at each of the individual sites.



Relationship Between Phosphorus and Potassium



Relationship Between Soil pH and Distance



Correlation Between Phosphorus and Vegetation

Hypothesis Testing

Vegetation vs. Phosphorus Content

An unpaired t-test yielded a p-value of 0.0019.

A 95% confidence interval resulted in an interval from -4.15 to -1.65.

This gives us sufficient evidence to conclude that there is a correlation between phosphorus content and vegetation.

pH vs. Vegetation

An unpaired t-test yielded a p-value of 0.6968.

A 95% confidence interval resulted in an interval from -0.6793 to 0.9393.

This gives us insufficient evidence to conclude that there is a correlation between pH level and the prevalence of vegetation

Discussion of the Results

There doesn't appear to be a relationship between soil health and proximity to the shore line, but there are several relationships that can be observed between individual variables. This could possibly be because of the location of the study, which was located in a dense human area and had geological features heavily manipulated by humans. One example of this is that 5 of the samples were taken on a beach-like area that was highly impacted by humans. Additionally it is possible that lack of nutrients on the shoreline was due to seasonal weather patterns and served as an indicator of long term river erosion and fluctuation.

Future Studies

- Larger scope
- Collect data from area less disturbed by humans
- Utilize larger size of test kits, enabling for more data points
- Repeat sampling method
- More precision when handling dirt and water mixtures