To What Extend Does Human Intervention Affect the Fertility of the Soil

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INTRODUCTION

"Humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history"
–Gary Larson

- Is the former ecologist, right? If so, what affects does this have?
- The notion of "human destruction to our ecosystems" has picked up momentum in the last decade, as our climate is starting to warm due to actions committed by humans. Humans are subjected to deforestation, pollution, burning of fossil fuels, soil erosion, and many more. But there hasn't been many issues surrounding human effects (even if that is just walking/stepping on it) specifically pertaining to soil quality
- But there are a variety of different methods of testing the soil quality. But one of the most representative tests would be testing three key nutrients found in the soil, Nitrogen, Phosphorus, and Potassium. The quantities of these three nutrients, should consequently dictate the overall health of the soil. But also, testing the pH of the soil allows another measure of fertility

OBJECTIVES

The main objective of this project is to investigate the affects of humans on the soil quality. This will be done by testing Nitrogen, Phosphorus and Potassium and the pH

- We will be conducting experiments in two different locations. We will be incrementally moving away from that specific location to see the affects of distance on places that have been acted on my humans
- This should allow for a graph to be created, showcasing the soil quality in the same location, but the only difference is its proximity to a specific sight that has been influenced by humans
- Details regarding the specific location:
  - We started with a location that is next to concrete and ended in a different location that had concrete as well (Schematic 1).
  - 5 different holes were dug to make the data collection process more representative (Figure 1).
  - We will be extracting soil that is bordering concrete, and we will be taking 13 samples, moving 10 meter away from the soil that is closest to the concrete.

Schematic 1 Map Detailing the Different Spots Samples Were Taken

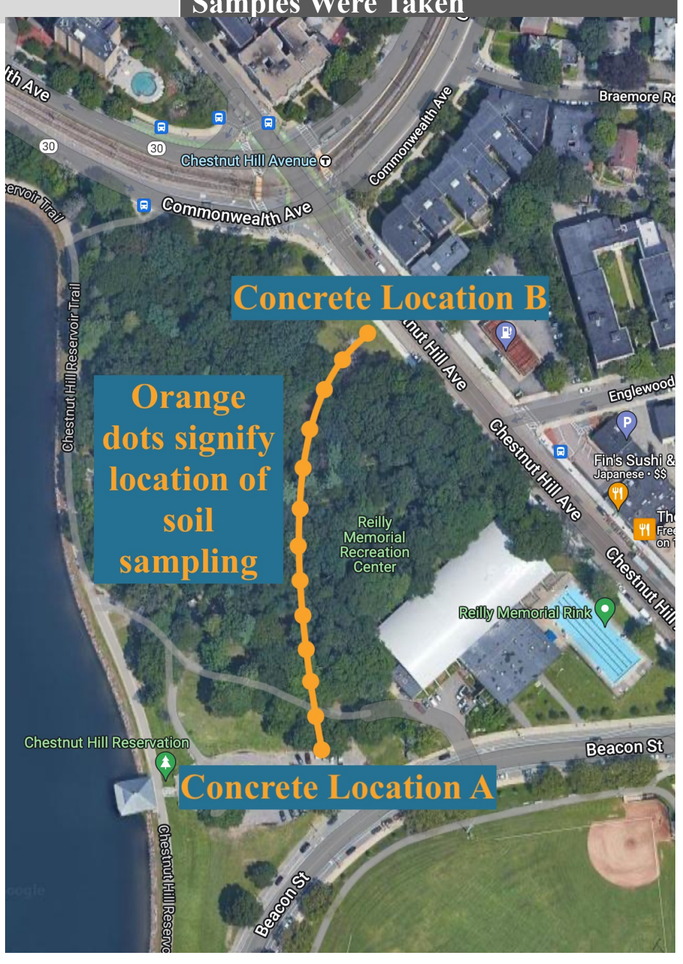
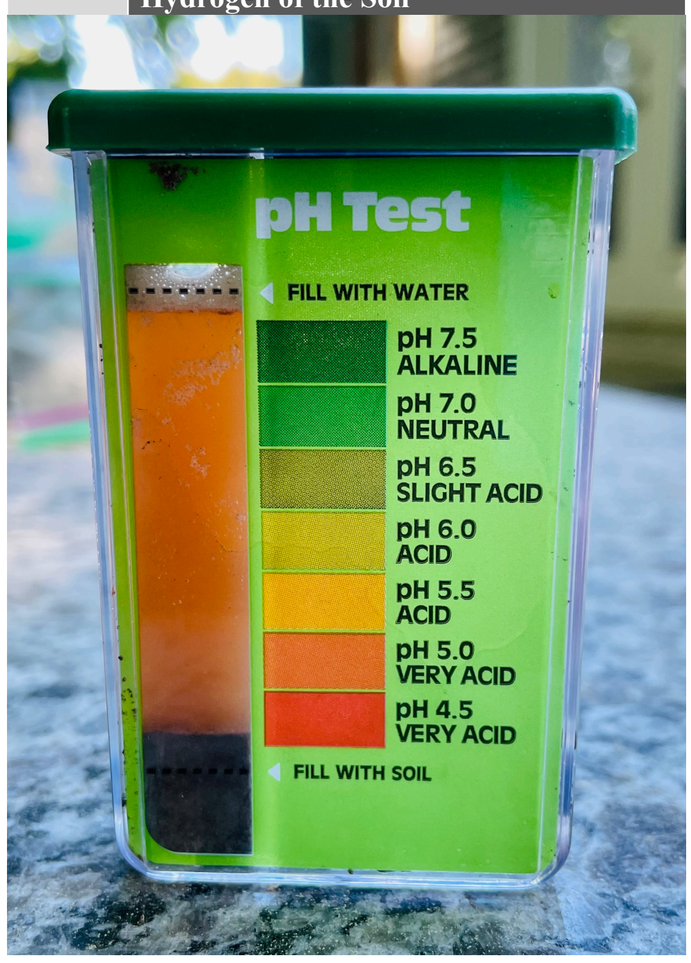


FIG. 1 5 Different Holes Dug in a Designated Place

METHODS: POTENTIAL HYDROGEN

- Dig 4-6 inches deep and extract half a cup of soil
- Use the pH measuring tube, and fill the soil till the fill line
- Break a capsule and place its contents in the measuring tube
- Fill water until the fill line
- Wait 5-10 minutes and compare the color of the liquid to the key provided to determine the pH of the soil (Figure 2)

FIG. 2 Image Of Liquid Showing Potential Hydrogen of the Soil



METHODS: NUTRIANTS

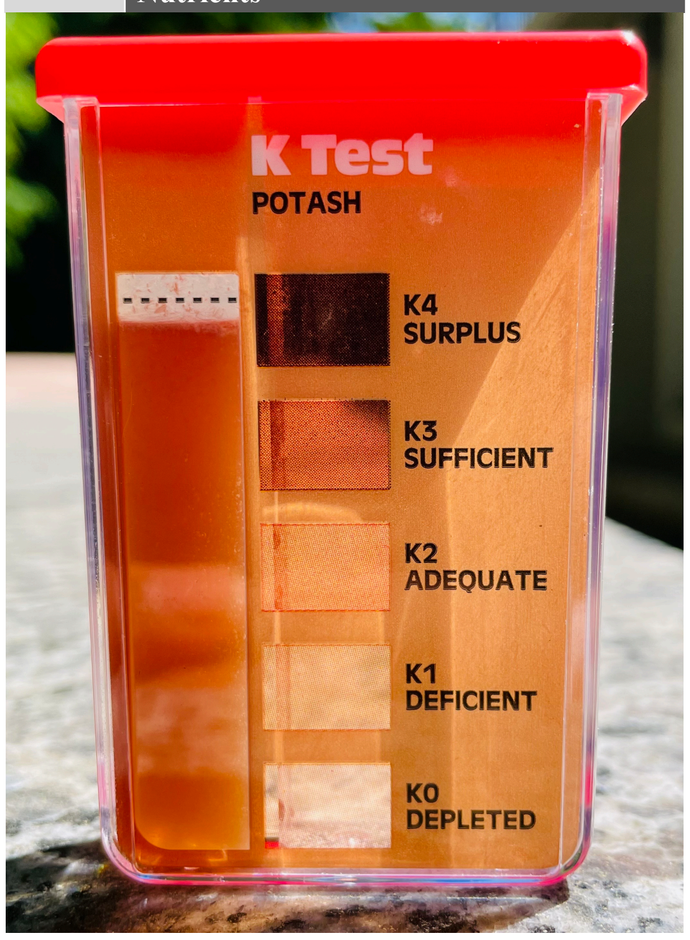
Testing for Nitrogen:

- Dig 4-6 inches deep in specific location and extract 1 cup of soil
- Put it in a 2-liter container and add 5 cups of distilled water
- Shake vigorously for 1 minute and let this settle for 24 hours
- By using a pipet, take the liquid in the 2-liter container and fill it to the fill line in the nitrogen testing tube
- Break the nitrogen capsule in this testing tube and shake for 30 seconds
- Let this settle for 3 minutes
- Match the color of the liquid with the key to then calculate the amount of the nitrogen
- Repeat these steps for 2 trials

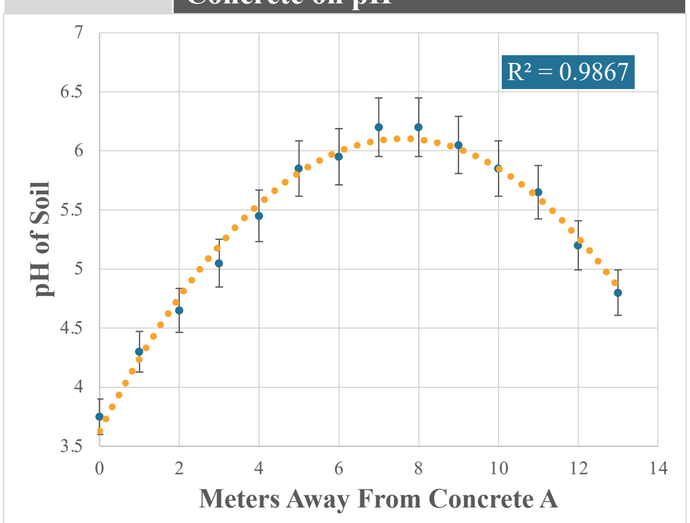
Testing for Phosphorus and Potassium:

- Use the same method above, but use the appropriate mineral testing tube, and mineral capsule (Figure 3)

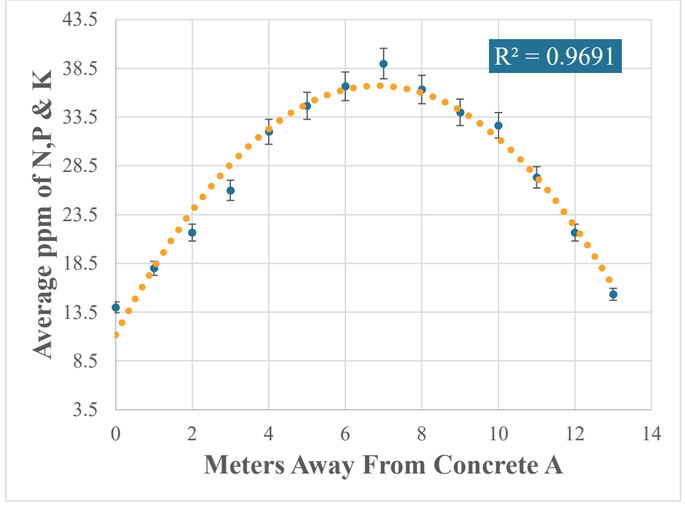
FIG. 3 Image Of Liquid Showing Quantity of Nutrients



GRAPH 1 Affects of Distance Away From Concrete on pH



GRAPH 2 Affects of Distance Away From Concrete on pH



CONCLUCION

- Human intervention and its proximity to concrete and pollution, affect the quality of the soil.
- Both graphs show a convex parabola that peaks at the highest distance away from concrete A and B locations.
- Due to the R^2 value being greater than 0.95, the trendlines were accurately chosen
- The error bars were chosen as being a fixed percentage (4%). This was because in order to identify the value, I would compare the color of the solution to a key, and in this case, the perception of the solution would consequently affect the result, thus having a fixed percentage to indicate error would be most accurate
- The arc of the parabola further adds reliability that the distance away from the concrete affects the soil quality, as 2 different locations of concrete were tested
- Concrete changes the composition of nutrients, and the pH of the soil, which would hinder plant growth