Soil Analysis Project

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I. INTRODUCTION

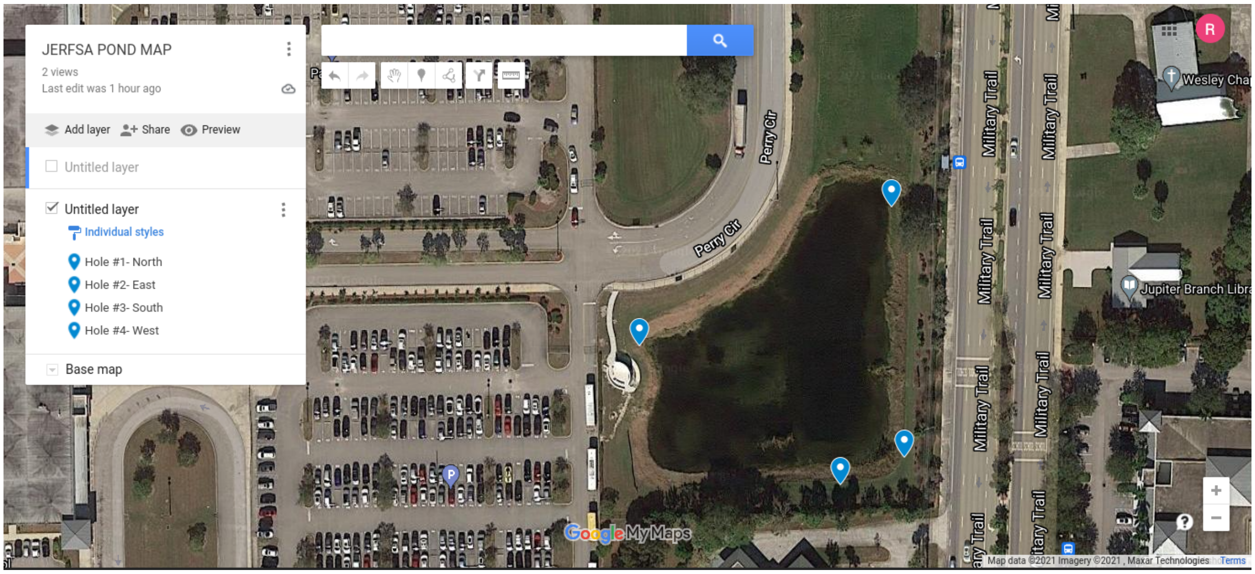
Soil has varying layers that indicate the many different soil properties. Specific properties include color, texture, structure, permeability, infiltration, and more (IGCSE Soil Profile, n.d). Different horizons can be viewed starting with the top humus/organic layer, followed by the eluviated horizon, subsoil, patent material, leaching layer, and finally bedrock. Soil with a red hinge indicates the presence of iron and is the least dense layer of soil in the horizon. The following layer of magnesium is black in color and is the most dense layer. Among these layers are different textured soils including sand, silt, clay, and rocks. The first layer is the organic matter layer. Here, roots from vegetation can be viewed at a side profile. Following that is the leaching layer. Light in color, there are low amounts of nutrients as the water easily seeps through this layer of soil, carrying nutrients as well (Agnito, 2020). Homeowners throughout Palm Beach County may find an interest with this study as the soil may have an impact on their land and home. Agricultural companies may also find this study to be important as the soil type may indicate how well a crop can grow in that specific area. The data collected from this research will add to the repository results of soil chemistry. Soil color indicates important information regarding the soils organic material and mineral composition. To identify soil colors, a Munsell Color Chart was used where a clump of soil can be held up behind the page of colors and matched.

II. METHODS

Four holes were dug around the JERFSA Pond in order to analyze the varying soil layers and identify. The locations were selected from a relative distance from the pond. The soil was placed in a pile next to the hole and a yard stick was used to record depth. Photos were then taken and marked based on site location. As seen in the images, the varying layers could then be identified. The Munsell Chart is a universal soil identification system that was used on site. The chart was held next to the pile of soil to identify the layer by color. The following week, another hole was dug in Egret Landing of Jupiter, Florida. All steps listed above were repeated and photos were taken. Finally, all five sites were compared with one another along with the information provided on the Web Soil Survey.

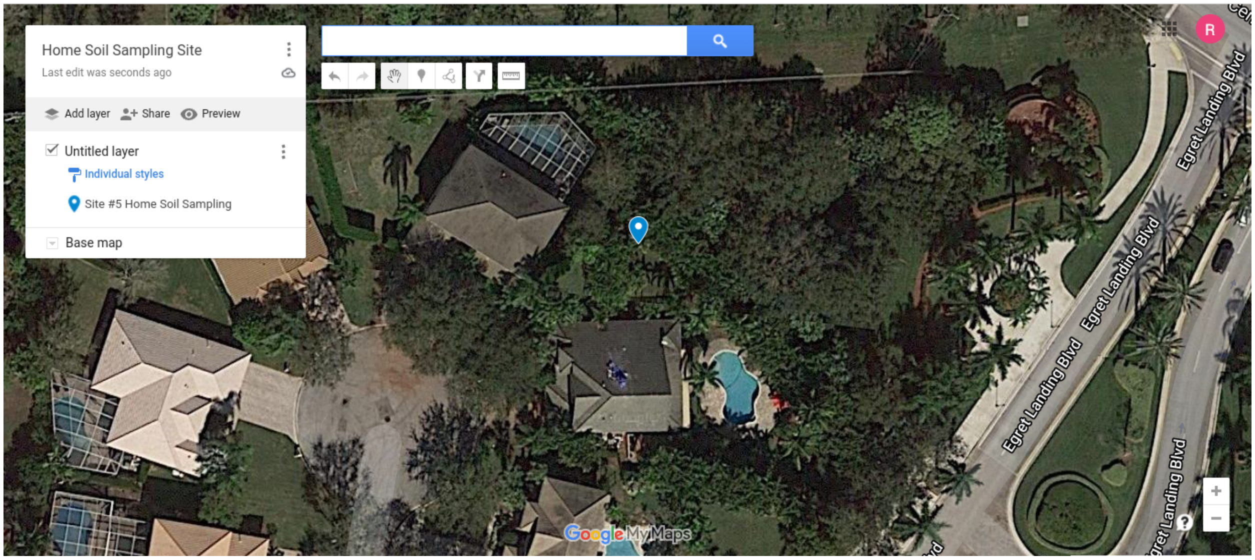
Map 1- JERFSA POND

Four holes were dug, one



at the North end of the pond, one at the East side of the pond, one at the South end, and finally at the West side.

Map 2- HOME SITE



Map 2 is located in Egret Landing at 216 Anhinga Ln Jupiter, Florida 33458. The hole was dug from the NorthWest corner of the yard.

Table 1

Soil Site	Site Description	Soil Description
Site 1	North side of pond- littoral zone of pond- close to the water	Slow draining, slippery, filled with water and an organic top layer
Site 2	East side of pond- on dry land	Gritty, slow draining soil with an organic top layer

Site 3	South side of pond- on dry land	Gritty, slow draining with a large leaching layer
Site 4	West side of pond- dry land- near shrubs and bushes	Gritty, slow draining with a small leaching layer

Table 1 describes different soil characteristics at each location at the JERFSA Pond.

Table 2

Home Site	Site Description	Soil Description
216 Anhinga Ln Jupiter, Florida 33458	Egret Landing backyard- many tree roots	Organic top layer, dry, and peaty

Table 2 describes the soil characteristics at the home site.

WEB SOIL SURVEY RESULTS: JERFSA POND

Map Unit Description

Printable Version

Report — Map Unit Description

Palm Beach County Area, Florida

18—Immokalee fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2s3lk
Elevation: 0 to 130 feet
Mean annual precipitation: 42 to 68 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Immokalee and similar soils: 90 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Immokalee

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 35 inches: fine sand
Bh - 35 to 54 inches: fine sand
BC - 54 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Basinger

Percent of map unit: 4 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Wabasso

Percent of map unit: 2 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Placid

Percent of map unit: 1 percent
Landform: Depressions on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Jenada

Percent of map unit: 1 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Description — Map Unit Description

WEB SOIL SURVEY RESULTS: HOME

Map Unit Description

Printable Version

Report — Map Unit Description

Palm Beach County Area, Florida

17—Holopaw fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2vbpd
Elevation: 0 to 130 feet
Mean annual precipitation: 4 to 62 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Holopaw and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holopaw

Setting

Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, convex
Across-slope shape: Linear, concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
Eg - 6 to 42 inches: fine sand
Btg - 42 to 60 inches: fine sandy loam
Cg - 60 to 80 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 6 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Oldsmar

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Cypress lake

Percent of map unit: 3 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Riviera

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Image 1 (Site 1)

Image 2 (Site 2)

Image 3 (Site 3)

Image 4 (Site 4)

Image 5 (Site 5)

III. DISCUSSION

Site 1 located at the North end of the pond was located in the pond's littoral zone which was filled with water but was slow draining. There was no leaching layer but had a top layer rich in nutrients. Site one has the most water present of all five holes and was the most difficult to view the varying layers due to the water that filled the hole and the nutrient filled soil. The Web Soil Survey reported the same results at Site 1.

Site two on the East side of the pond was located further up on the bank in comparison to site one. As recorded in the chart, there was a large leaching layer with different layers visible. The top layer being the organic topsoil followed by the leaching layer which appears as a lighter, nutrient deprived layer. Below the leaching layer was a layer of iron which appears as a reddish color and is the least dense layer. Magnesium layer follows and is black in color and is the most dense of the layers. The deepest layer seen in the images above is the sand- parent material layer. The soil at site two was observed as gritty and did not drain quickly. The Web Soil Survey failed to indicate the distinct layers of magnesium and iron that could be viewed when the hole was dug.

Site three was in the closest proximity to site two and reflected many of the same traits in regards to soil description. Although, site three did have the largest leaching layer that is present in Image three above. This location was slightly shaded which explains why the organic layer/topsoil was rich in nutrients also indicating why the leaching layer was the largest at this location. While The Web Soil Survey did indicate most of these characteristics at this location, there were some varying factors.

Site 4 was located nearest to the pond's entrance. The soil layers were classified as gritty, slow draining, with a small leaching layer. The top soil is susceptible to disturbances caused by people walking on the path the hole was dug on.

Lastly, site five's hole was dug at a different location than site 1-4. Dug in the backyard of Egret Landing in Jupiter, Florida, the soil still reflected many of the same characteristics of the soil that was analyzed at the JERFSA Pond at the Jupiter Community High School campus. The organic top layer yet dry, peaty soil made it ideal for plant growth and supported many tree roots and weeds that are present in Image five.

IV. CONCLUSION

In conclusion, there are variations between the JERFSA Pond site and home site compared to The Web Soil Survey results. While The Web Soil Survey was a convenient way to uncover soil characteristics, it was not entirely accurate compared to the results that were recorded at the JERFSA Pond and the home site. Oftentimes, the soil analysis on Web Soil Survey was merely characterizing the soil type into one group, rather than considering all varying layers. Different soil layers could be viewed and analyzed at all sites except for Site 1 located on the North end of the pond. Limitations at the home site were tree roots that prevented the hole from being dug deeper. Site 1 located on the North end of the JERFSA Pond was the hole that was located closest to the pond; therefore, water was present at the bottom of the hole and the different layers could not be easily viewed. Furthermore, Web Soil Survey lacked all aspects to define soil types accurately and further knowledge on soils would be required to ensure accurate findings. Research should be continued in order to publish and share information with the community.

V. BIBLIOGRAPHY

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