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185/200

Soil Lab 2021

I Intro

The physical and chemical makeup of soil changes depending on the location sampled. Soil layers vary based on the surrounding ecosystem and its properties. Laymens that would be interested in this experiment include gardeners,homeowners,farmers, and florists . Professionals such as environmental scientists and pedologists would benefit from this project because they could use the research to support other findings and experiments. Results of this experiment will add to the repository of data concerning soil horizons and properties of different layers of soil.The data collected at Jupiter High school sites and home sites will be similar to the web soil survey.

II Lit Review

Soil Horizons/Layer

Certain soil horizons are the result of processes within the soil and serve as evidence of the direction of water movement within the soil and physical makeup.Soil contains six distinct horizons/layers.Horizons are the parallel layers of soil that contain different properties than those directly underneath or above the layer. The first of these is known as the O horizon (Thornton, 2021). The O horizon is mostly organic matter such as decomposing leaves.The O horizon may be thick, like in a tropical hammock. Following the O horizon is A, which is considered topsoil. Top soil is minerals from parent material with organic matter incorporated (Chapman 2021). This layer serves as a good area for organisms and plants to live. Next is the E layer which is leached of clay, minerals, and organic matter, leaving a concentration of sand and silt particles of quartz or other resistant materials (Thornton 2021). Subsoil, horizon B is beneath which is Rich in minerals that leached. Parent material, horizon c is just below and is the location of soil development. Bedrock is not considered soil but it is just beneath horizon B (Chapman 2021).

Soil Colors

Soil colors play an important role in determining properties, such as organic matter content, soil minerals and the seasonal high water table. The Munsell color chart is used to identify

the specific soil color and keep uniformity within the scientific community when making comparisons and observations. Scientists compare the colors found in the soil with color chips on the chart. Soil color can indicate the composition of the soil and give clues to the conditions of the soil. Redoximorphic features are soil colors formed by the repeated chemical oxidation of iron and manganese compounds; they are useful in predicting the depth of water tables. Each color presented in a sample shows different properties that each layer has whether it be texture or consistency. Darker shades of soil often have more organic matter than those with a lighter appearance. The lack of color indicates that Anaerobic environments occur when a soil has a high water table or water settles above an impermeable layer (Thornton 2021).

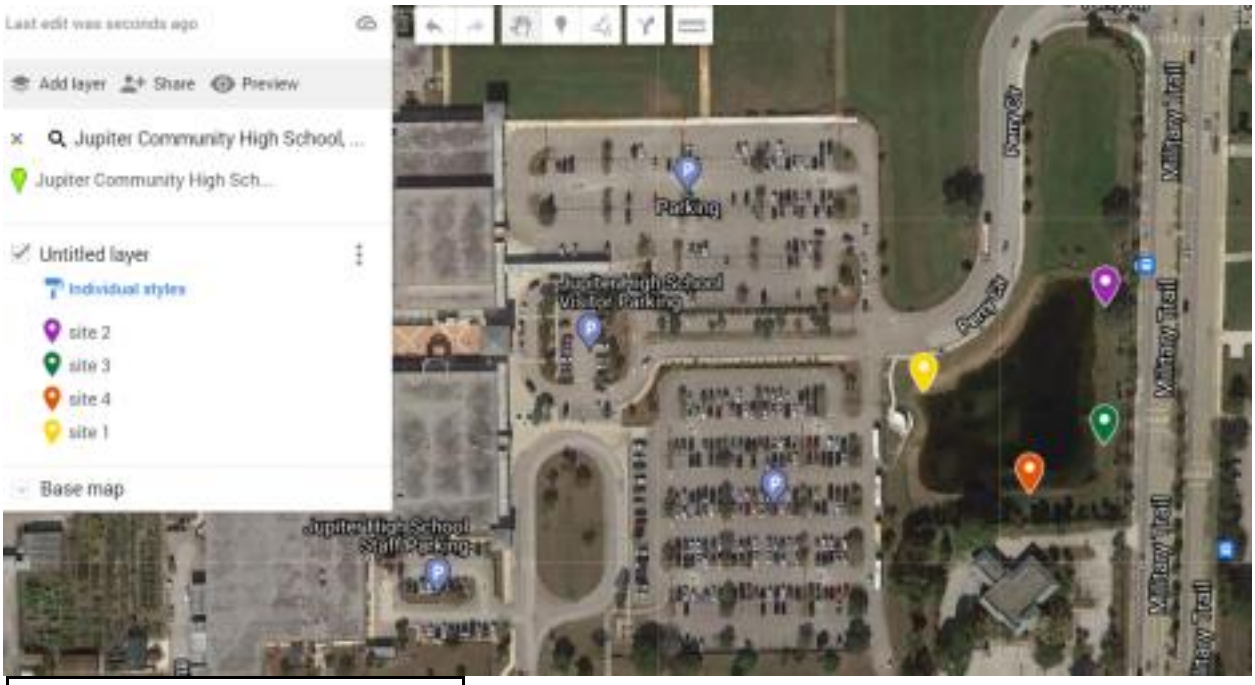
III. Methods and Materials

Methods for JERFSA Pond Study

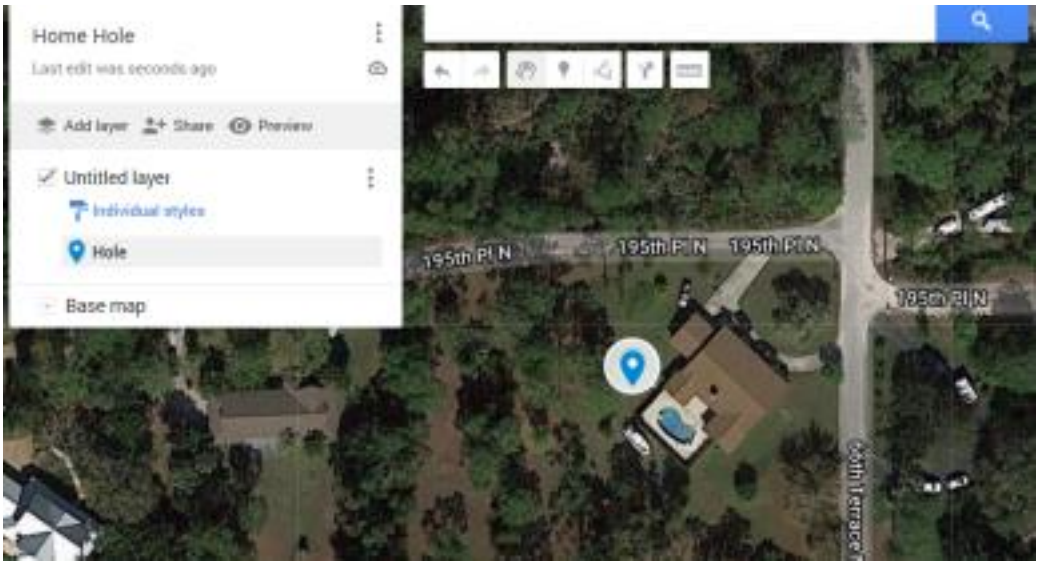
All types of soil were researched. Sampling the different soil layers and colors at Jupiter Community High School (Refer to map 1). Gather all materials needed for experiment (Shovel, Yard stick, Munsell chart, camera). Go to JERFSA Pond and select four different sites (north,east,south,west). Dig holes 2-3 feet deep. Place the yard stick on the flat side of the hole and measure. Observe the soil layers and colors. Select a piece of dirt from the hole to compare using the munsell chart. Take pictures of the holes and fill them back in. Record findings in a notebook. Go to the web soil survey and select the area of interest. Select the appropriate location where the hole was dug and compare the information to that of the chart and in person findings.

Methods for at Home Hole

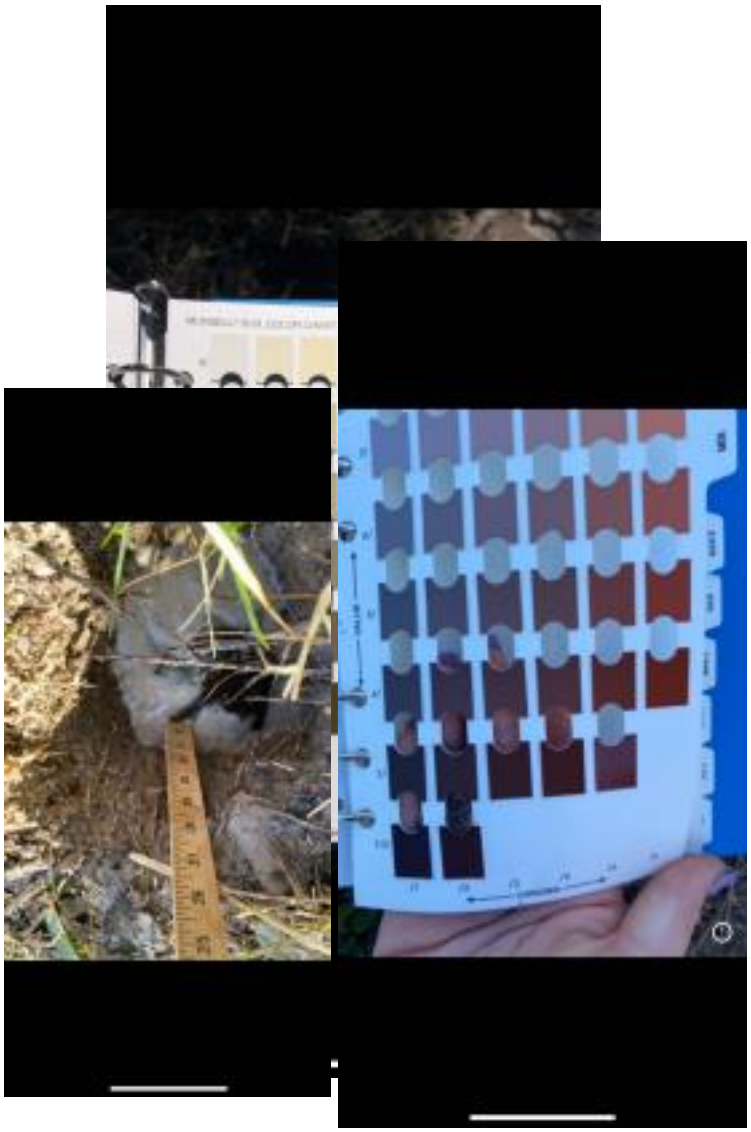
All types of soil were researched. Sampling the different soil layers and colors at 6670 North 195th Place, Jupiter Florida (Refer to map 2). Gather all materials needed for experiment (Shovel, Yard stick, Munsell chart, camera). Dig holes 2-3 feet deep in the selected area of the backyard. Place the yard stick on the flat side of the hole and measure. Observe the soil layers and colors. Select a piece of dirt from the hole to compare using the munsell chart. Take pictures of the holes and fill them back in. Record findings in a notebook. Go to the web soil survey and select the area of interest. Select the appropriate location where the hole was dug and compare the information to that of the Munsell chart and in person findings.



Map 1 : Location of Jupiter High School and Sites 1-4


Home Hole
Last edit was seconds ago
Add layer
Share
Preview
Untitled layer
Individual styles
Hole
Base map
195th Pl N
195th Pl N
195th Pl N
195th Pl N
60th Terrace

Map 2 : Location of site 5 (Home Hole, 6670 North 195th Place Jupiter FL)



Munsell Chart

Site Descriptions

Image 1 Site 1 JERFSA Pond :

Closest proximity to the JERFSA pond, lowest elevation, the hole was 8 and a half inches deep and there are two layers visible. The hole filled with water due to the closeness of the pond. Soil was sticky and had a mud consistency. Small roots were present and other grasses around the

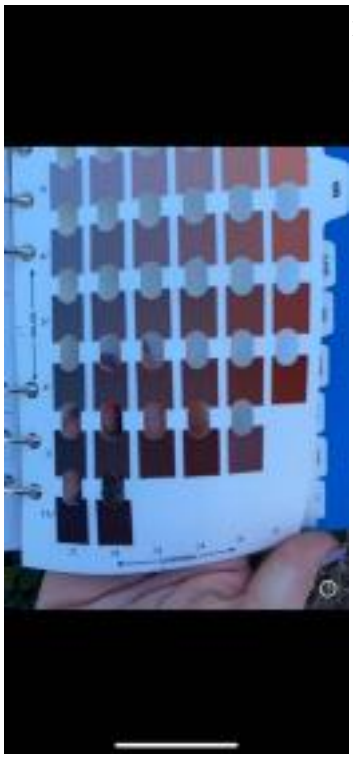
edges.

Image 2 Site 2 JERFSA Pond: Leaching visible between layers, mid-elevation (about 2-3 feet above the pond), there were a lot of roots and vegetation after the surface about 3 feet down. North visible.

layer, and it reached water Location. Three horizons

Site 3 JERFSA Pond: Deepest hole, higher elevation (about 4 feet above the pond), about 3 layers that are visibly defined and we did

not reach water after digging.

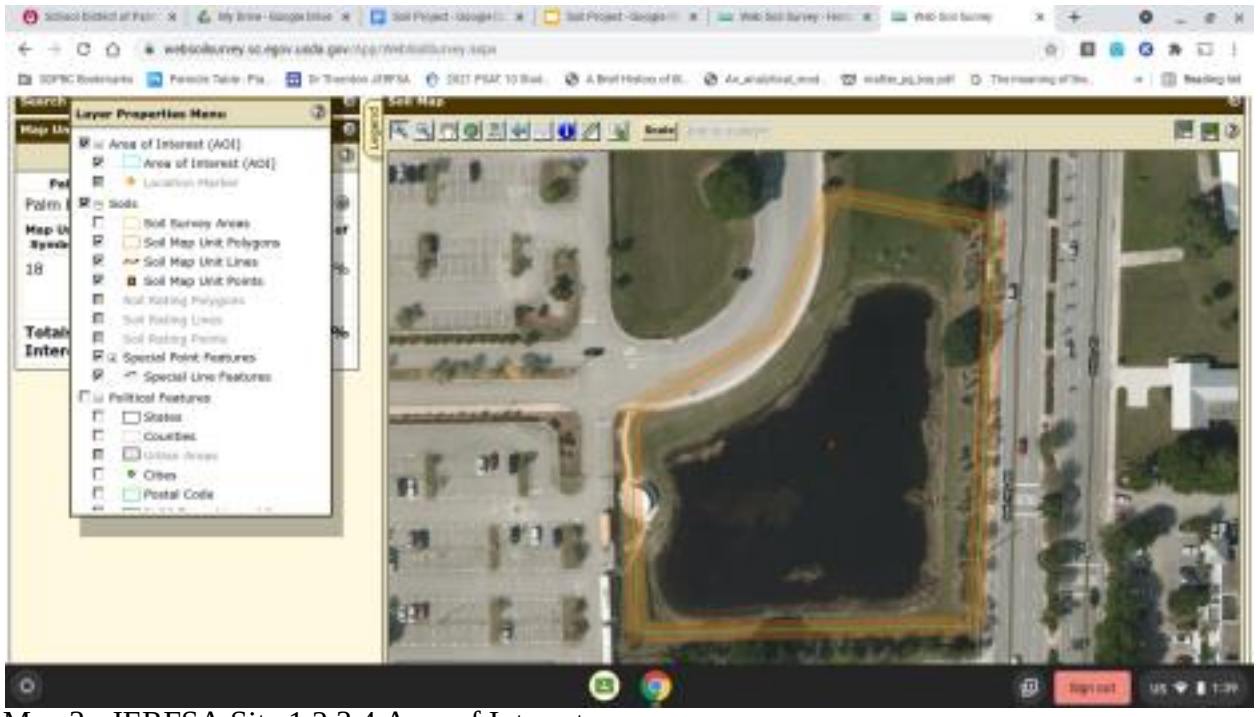


Site 4 JERFSA Pond: 3 layers visibly defined and leaching between them, this had the highest elevation above the pond and was also dug 1 foot deep. Soil was a grey color and smooth.

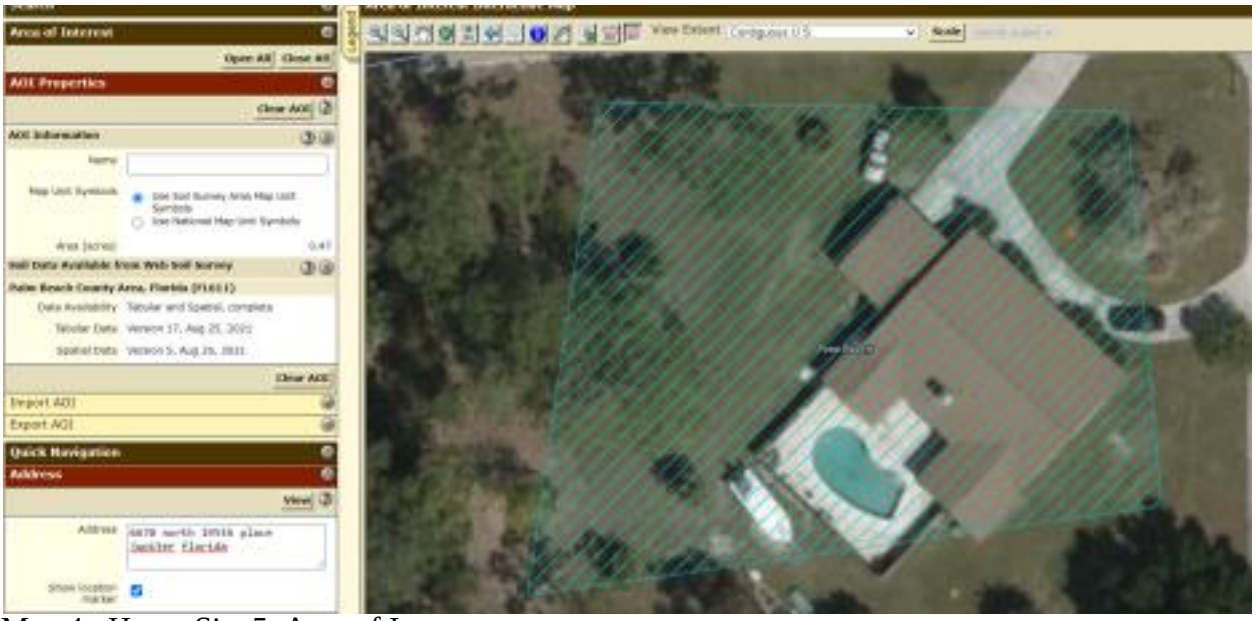
Site 5 (House) : This hole is located next to an oak tree west of the house. There is an abundance of vegetation surroundings. A pool is located to the east as well as a filtration system to the north. There were two layers of soil visible. This site also had an abundance of roots present .

Site 6 (Friends House, Extra Site) : The hole has two horizons visible and is not close to a lot of vegetation. It was dug about 1 foot deep.

WebSoil Photos (Area of Interest)



Map 3 : JERFSA Site 1,2,3,4 Area of Interest



Map 4 : Home Site 5, Area of Interest

Map 5 : Friends House Site 6 , Area of Interest

IV. Web Soil Results (Sites 1,2,3,4 JERFSA Pond)

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

Web Soil Results (House, Site 5)

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
- *Runof 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

Web Soil Results (Friends House, Site 6)

Palm Beach County Area, Florida

39—Sanibel muck

Map Unit Setting

- *National map unit symbol:* 1j7dr
- *Elevation:* -20 to 100 feet
- *Mean annual precipitation:* 48 to 56 inches
- *Mean annual air temperature:* 70 to 77 degrees F
- *Frost-free period:* 358 to 365 days
- *Farmland classification:* Farmland of unique importance

Map Unit Composition

- *Sanibel and similar soils:* 85 percent
- *Minor components:* 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Sanibel

Setting

- *Landform:* Depressions on marine terraces
- *Landform position (three-dimensional):* Dip
- *Down-slope shape:* Concave
- *Across-slope shape:* Concave
- *Parent material:* Thin organic material over sandy marine deposits

Typical profile

- *Oa - 0 to 12 inches:* muck
- *A - 12 to 18 inches:* sand
- *Cg - 18 to 72 inches:* sand

Properties and qualities

- *Slope:* 0 to 1 percent
- *Depth to restrictive feature:* More than 80 inches
- *Drainage class:* Very poorly drained

- *Runof class:* Negligible
- *Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
- *Depth to water table:* About 0 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* Frequent
- *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:* Moderate (about 6.5 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 7w
- *Hydrologic Soil Group:* A/D
- *Forage suitability group:* Organic soils in depressions and on flood plains (G156AC645FL) ● *Other vegetative classification:* Organic soils in depressions and on flood plains (G156AC645FL)
- *Hydric soil rating:* Yes

Minor Components

Okeelanta, drained

- *Percent of map unit:* 4 percent
- *Landform:* Depressions on marine terraces
- *Landform position (three-dimensional):* Dip
- *Down-slope shape:* Concave
- *Across-slope shape:* Concave
- *Other vegetative classification:* Organic soils in depressions and on flood plains (G156AC645FL)
- *Hydric soil rating:* Yes

Holopaw

- *Percent of map unit:* 4 percent
- *Landform:* Drainageways on marine terraces
- *Landform position (three-dimensional):* Dip
- *Down-slope shape:* Linear
- *Across-slope shape:* Concave
- *Other vegetative classification:* Sandy soils on flats of mesic or hydric lowlands (G156AC141FL)
- *Hydric soil rating:* Yes

Anclote

- *Percent of map unit:* 4 percent
- *Landform:* Drainageways on marine terraces, flats on marine terraces
- *Landform position (three-dimensional):* Dip, talf

- *Down-slope shape:* Linear
- *Across-slope shape:* Concave
  - *Other vegetative classification:* Sandy soils on flats of mesic or hydric lowlands (G156AC141FL)
- *Hydric soil rating:* Yes

Tequesta

- *Percent of map unit:* 3 percent
- *Landform:* Depressions on marine terraces
- *Landform position (three-dimensional):* Dip
- *Down-slope shape:* Concave
- *Across-slope shape:* Concave
  - *Other vegetative classification:* Organic soils in depressions and on flood plains (G156AC645FL)
- *Hydric soil rating:* Yes

V.Discussion

The results show that the data collected at JERFSA Pond and at home does not match the findings of the web soil survey. The layers of soil shown at the exact locations have altered overtime, and do not align with past findings. Images/sites 2 and 3 show that these holes displayed O soil horizon. From the web soil survey there is sod in both locations. However, images 2 and 3 clearly show that there is no sod present. The deposit of organic matter forms the O horizon of these two holes. Web Soil Survey had sites 1,2,3, and 4 listed as 18 immokalee fine sand. However images 1-4 show that the soil horizons are different and do not align with one another. Site 3 has more of an orange color than site 4 that is a darker grey, this is due to the fact that site 3 was the deepest hole dug (Refer to map 3). Similarly sites 5 and 6 were different from the web soil survey as well. Site 6 on the web soil survey was categorized as sanibel muck but looked like and felt like the same soil as site 5 (refer to image 5 and 6). Using the Munsell chart the color of the soil at site 6 appeared to be a more light grey tone, whereas the web soil survey had it listed as a smooth dark grey soil.

VI.Conclusion

The results did not support the thesis because the collected data contrasted with the web soil survey. In order to improve this process for further research, there needs to be better photographs to more precisely determine the layers. The measuring stick should also be laid right up against the flat side of the hole to get the best outcome.There should also be an increased

number of sites and. Limitations include not having enough time to properly analyze the soil samples using the Munsell chart. The results of this experiment could be used in the future by using the same methods but with added sites . Furthermore, scientists could repeat the methods to add to the data and do more in depth analysis.

Bib

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