Name: _____

Introduction to the Web Soil Survey

Introduction

This lab will introduce key functionalities of the NRCS Web Soil Survey, including the creation of areas of interest and determination of soil pedological, chemical, and physical properties within those areas. The Web Soil Survey (WSS) is an online database and resource designed by the USDA Natural Resources Conservation Service (NRCS). The WSS consists of digitized records of soil surveys made throughout all the contiguous U.S. These records are searchable by location, zip code, state, county, or manually and contain information regarding soil type, horizons and depths, texture, chemical properties, parent materials, physical properties, hydraulic function, and management.

Lab Exercise

Complete the instructions below, responding to each question using complete sentences. For calculations, show all your work circle or draw a box around your final answer.

1. Using a computer, navigate to the Web Soil Survey website (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm). You can also search for "Web Soil Survey" in Google.

2. Once you have reached the Web Soil Survey home page, click the green button that says "Start WSS."

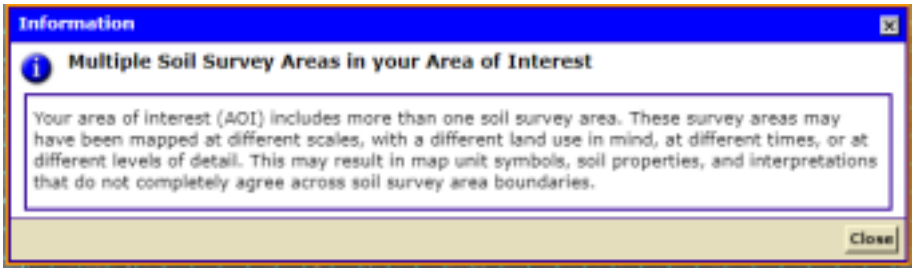
3. Navigate to an area on the map of your own interest or use the Quick Navigation panel on the left-hand side to narrow your search to a specific location. The best results will be found for rural areas with less urban land cover.

4. If you do not know of a rural area to use, use the Quick Navigation panel to select "Forest Service" then choose Texas in the first drop-down box and "Davy Crockett National Forest" in the second drop-down box. This is an area southwest of College Station that you can use as an example.

5. Once you have found a suitable area, zoom in so that the scale bar at the bottom of the map shows a length of approximately 6,000 feet.

6. At the top of the Areas of Interest Interactive Map window, select this button: 

7. Drag and drop the cursor to select an area of land approximately ¼ of the size of the map display. This will create an area of Interest (AOI) for which soil parameters are displayed. If the window below appears, click "Close".



8. Information about the AOI you selected is on the left side of the page, including the area, counties included, and survey date of the soil information for that area. Report below the names of all counties and the total number of acres included in your AOI

Counties: _____

Total number of acres: _____

9. Next, click on the Soil Map tab above the map.

10. On the left-hand side, the different soil map units in your AOI will be displayed. Choose one of the map units shown and click on the Map Unit Name to see the full Map Unit Description. Record the map unit name and all the soil horizon depths and soil textures as given in the Typical Profile section below:
Map Unit Name: _____

H1: _____

H2: _____

H3: _____

H4: _____
Note: If you zoom in enough on your AOI, the map unit symbol will also be displayed on the map like this:

11. Close the Map Unit Description window.

12. Click on the Soil Data Explorer tab

13. Browse through the various tabs in the Suitabilities and Limitation Ratings panel. Select one category that interests you and click the “View Rating” button. This will cause the ratings of each map unit to appear on the map and in a table below the map. A legend can be viewed by clicking the “Legend” tab on the upper left-hand side of the map.

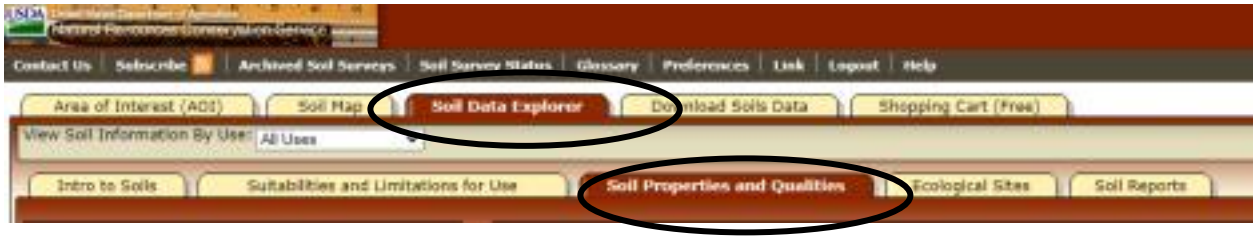
14. Record the Suitability category and sub-category that you chose along with the suitability rating given for the same map unit used for question 10 above. For example, you could choose category “Water Management” and sub-category “Irrigation, General”.

Category: _____

Sub-category: _____

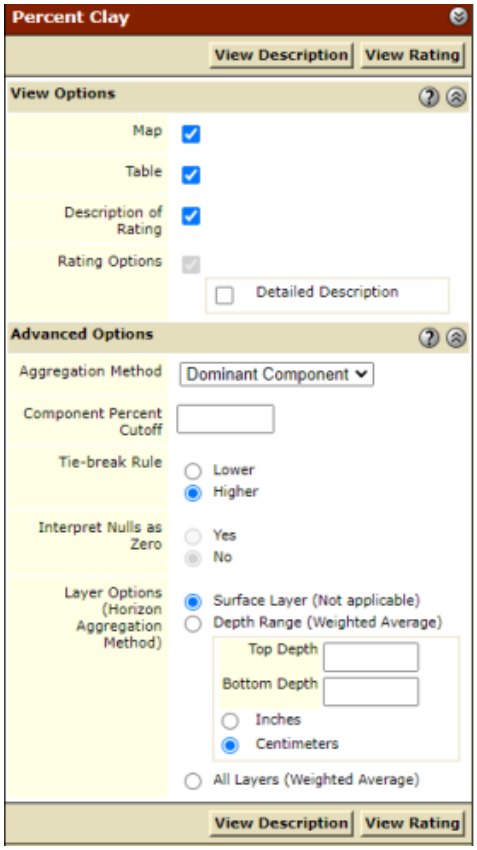
Rating: _____

15. Click on the “Soil Properties and Qualities” Tab



16. In the “Properties and Qualities Ratings” panel on the left, select “Soil Physical Properties”.

17. Click “Percent Clay” and change the Layer Options (Horizon Aggregation Method) to “Surface Layer”.



18. Click “View Rating” and report below (Step 20) the percent clay for the same map unit used for question #10 above.

19. Repeat this process for the percent sand and percent silt categories.

20.
Percent clay: _____

Percent sand: _____

Percent silt: _____

21. Return to the “Soil Map” tab. In the upper right-hand corner, click the “Printable Version” button.

22. Without changing any settings, click “View”. This will create a detailed PDF which includes a map of your AOI and the descriptions of the soils found there.

23. Save the PDF file, print it, and attach it to your lab report.

24. Feel free to continue exploring the capabilities of the Web Soil Survey!

SoilWeb:

1. Go to SoilWeb™ (http://casoilresource.lawr.ucdavis.edu/soilweb/) Enter your zip code in the Zoom to Location field in the upper left corner of the page under Menu.

2. You will see a satellite image with soil types identified; in the right box, a map unit legend will give the acreage associated with each soil type that appears on type your map. From your legend, select the dominant soil by area fraction (greatest number of acres) that is not unspecified (e.g. don't choose "urban land;" choose "Eldean urban land"). If your soil does not provide you with a profile (i.e it's all black), then select the other soil type.

Write the name of the soil here: _____

3. A generalized soil profile will appear showing distinctions between soil horizons. Soil horizons mark transitions in composition from the lowermost regolith (parent rock) to the uppermost organic layer. These transitions can be seen by changes in color. Soil horizons are identified by capital O, A, B, C, R but may be subdivided into sub-horizons as noted with additional letters. Note that the uppermost organic horizon (O), where plant matter mixes with soil, is not shown in SoilWeb™. The O horizon is not present in cultivated landscapes. Similarly, the R layer, or regolith/bedrock layer, is not shown.

a. In the left panel below, diagram the soil profile and label the depths of changing horizons. Use a ruler to make sure that your horizons are drawn to scale. (e.g. 1:20, 1 cm on paper = 20 cm of soil) *Draw your scale on the vertical line.*

Soil Profile drawn to scale

Percent Soil Organic Matter drawn to scale

Click on the soil name and you will see additional soil properties including profiles showing physical and chemical properties of your soil.

b. Draw the percentage of organic matter in the right panel next to your diagram of the horizons. *Line up depth increments so that the 2 diagrams can be compared*. Label depths where transitions in organic matter occur.

c. Do changes in the percent organic matter concentrations correspond to soil horizons? Compare and contrast the two profiles.

d. Based on the percentage of soil organic matter, which horizon is the most fertile? And how thick is this horizon?

OR If you don't see any transitions in soil organic matter in your soil, what does that mean about the health of your soil?

Conclusions:

1. What role does each component (sand, silt, clay) play in the structure of soil?

2. Why does soil vary so much in a small area?

3. Explain the meaning of the statement "Soils are at the interface of biogeochemical cycles." Use at least 5+ sentences in your response.

4. Problem Scenario:

You are a soil scientist who has been asked to assist the local police in solving a mystery. Someone has vandalized the local farm stand, destroyed all the display items, and robbed the establishment of hundreds of dollars. The police arrive at the scene quickly since the silent alarm at the farm stand was triggered thus alerting them to the crime. They noted the clues in the parking area and quickly called for detectives to gather evidence. While the police sped away in hot pursuit of the perpetrators, the

detectives made impressions of the tire treads and shoe prints and gathered soil samples to be analyzed back at your lab.

The police noticed the car ahead of them driving erratically and pulled the car over. They ask the driver to get out of the car and notice something peculiar about his behavior. Upon asking the driver to walk a straight line, they realized that they may have their farm stand thief when they saw the soil on his shoes and then in the treads of his tires. They called for back-ups along with the detectives they left at the crime scene. The detectives took soil samples from the shoes and tire treads to be analyzed with the samples from the farm stand.

As a soil scientist, how are you going to analyze the samples? Create a plan and describe what might be found using this analysis plan.