

## *Soil Properties Project Spring 2013*

### **Instructions**

For this project, you have been assigned a soil that is common to some region of the US. You will be given a both a Soil Series name and a Lab Pedon Number. These will then be used to access information about this soil from the Natural Resources Conservation Service (NRCS) database. The soil series name can be used to access an official description of the soil profile and associated site information. Go to:

<https://soilseries.sc.egov.usda.gov/osdname.asp>

Enter the soil series name in the box and click **Find Series** – you will then be given a choice of 2 boxes to click on. If you click on **View Extent Map**, you will see a map showing counties in the US where the soil is found. Use this information to answer Question 1 on the project report sheet (see next page). Click on **View Description** to see a detailed description of the soil. You will find a description of a typical profile of this series as well as a lot of information about site characteristics, soil classification, climate, and land use. This information will be used to answer Questions 2-5 on the report sheet.

Next, you will obtain chemical and physical laboratory data for the soil. This information can be found at:

<http://ncsslabdatamart.sc.egov.usda.gov/querypage.aspx>

Select the box labeled *Lab Pedon Number* and type in your soil's number in the box to the right. Click **Execute Query**. In the screen that opens, you should see the number you entered in the field below **pedon\_number** – make sure the number is correct and then check the box to the left. Make sure **Generate Report** is selected and click **Continue**. In the field that appears in the new screen, highlight **Primary Characterization Report** and click **Get Report**. The new screen that appears contains all of the laboratory analyses that have been performed on this soil. Use this information to answer Questions 6-8 on the project report sheet.

These reports can be difficult to read – there is a lot of information, so make sure you carefully read the column headings. In some cases, an analysis might be run using several different methods, so here are some things to help with your data interpretation:

texture – use 'Lab Texture' column

% sand, silt, clay – use 'Total Sand, Silt, and Clay' columns

bulk density – use column with highest values

COLE – use 'Cole Whole Soil' (next to Bulk Density)

pH – use 'pH H<sub>2</sub>O 1:1' column

exchangeable bases – use 'NH<sub>4</sub>OAC Extractable Bases'

exchangeable acidity – use 'Acidity' (next to NH<sub>4</sub>OAC Extractable Bases)

exchangeable Al – use 'Extr Al' (next to 'Acidity')

CEC – use 'CEC7 NH<sub>4</sub>OAC' column

% base saturation – use 'Base Saturation Sum' column

electrical conductivity – use 'Elec Cond'

exchangeable Na<sup>+</sup> % – use 'Exch Na %'

In most cases, if an analysis is not run for a soil, it means that particular property is not a problem. For example, if no value for electrical conductivity is given, you can assume that salinity is not a problem for that soil. If you are not sure about something or where to find this information, **ask!** Once you have made an effort to answer the questions, it's recommended that you check with the instructor to ensure you are on the right track.

**Report Sheet**

By signing below, you acknowledge that you have made a substantive contribution to this project and preparation of the report. If you do not sign, you will not receive any points for this project.

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**Soil Series Name** \_\_\_\_\_

**Lab Pedon Number** \_\_\_\_\_

***Soil Morphology (from Official Series Description)***

1. In what state(s) does this soil series occur?
2. In general terms, describe the climate where this soil is found?
3. This soil belongs to which soil *order*?
4. How deep is this soil (use centimeters)?
5. Does this soil (or site) have any features (i.e. those described in the field) that would adversely affect the growth of most plants or interfere with many types of land use? If so, list them and briefly describe their impacts. Examples of such features might include shallow depth to bedrock or a restricting layer, high water table, steep slope, slow permeability, etc.

***Soil Chemical and Physical Properties (from Soil Characterization Database)***

6. Make a table that shows the soil horizons and depths – these will likely be somewhat different than those given in the Official Soil Series description. Then include what you think are the most important soil properties. These might include but are not necessarily limited to: texture; bulk density (if available); COLE (coefficient of linear extensibility); pH; extractable (exchangeable) acidity; CEC; % base saturation; exchangeable Na percentage; electrical conductivity (EC). Be sure to include appropriate units.

7. What are the dominant exchangeable cations in this soil? Based on the laboratory data, what can you say about the overall fertility of this soil?

8. Based on the laboratory data and the knowledge you have gained in this course, are there any physical or chemical properties that might have a direct impact on the suitability of this soil for plant growth and/or engineering purposes? If so, specify what these are and what their effects might be. Such properties might include those listed above.