



Earth Science Education Activity

How Soil Texture Varies Across the Southern United States

Background: Soil is a naturally occurring mixture of minerals, water, air, and organic material. The minerals in soil are different sized particles of sand (the largest), silt, and clay (the smallest). The relative amounts of sand, silt, and clay make up what is called **soil texture**. The texture is one thing that influences how soil behaves, how water moves through it, and what soil can be used for.

Get hands-on with soil and explore soil texture by assessing a local soil qualitatively with the [Soil Texture Test](#) or quantitatively with the [Soil in a Jar](#) test.

Key Question: How does soil texture compare between soils found near different bodies of water?

STANDARDS

NGSS: [MS-ESS2-2](#)

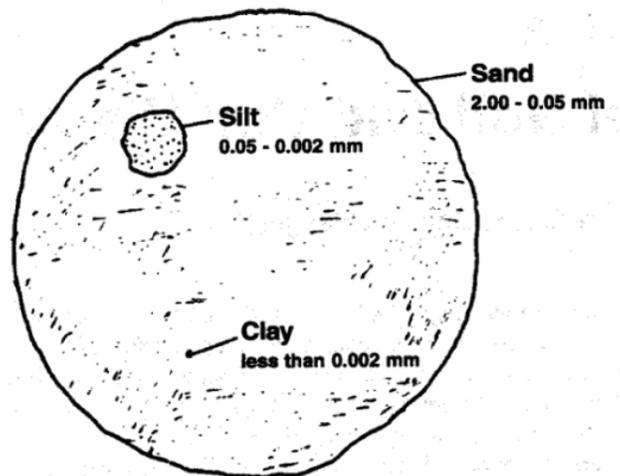
SDG 2: [Zero Hunger](#)

SDG 11: [Sustainable Cities and Communities](#)

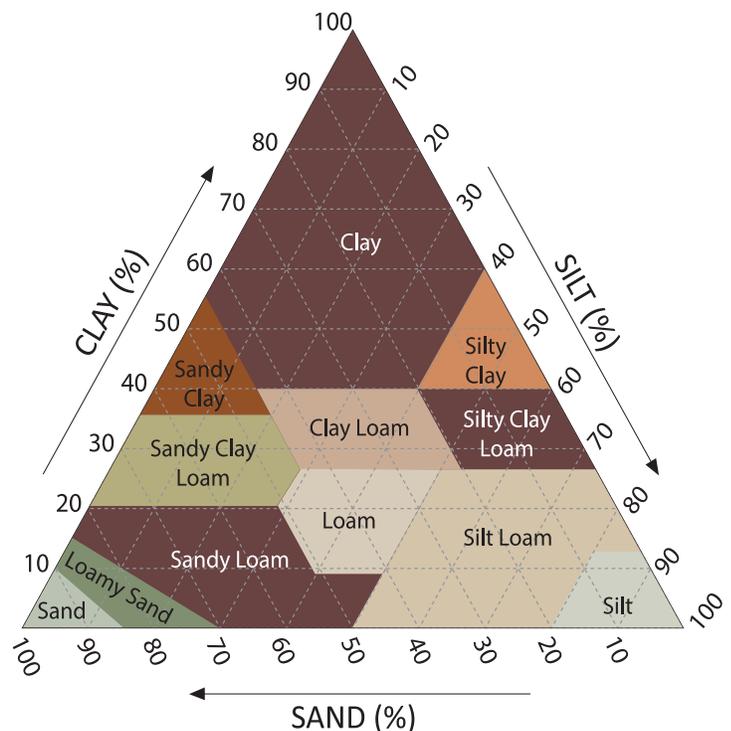
Learn more about the United Nation’s Sustainable Development Goals (SDGs) and explore resources for educators from UNESCO: <https://en.unesco.org/themes/education/sdgs/material>

MATERIALS

- ◆ Web Soil Survey map handouts
- ◆ highlighter



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Credit: USDA, Davis and Bennett, 1927. Adapted by SSSA.

PROCEDURE

1. You will be examining soil texture maps near three areas: 1) Charleston, SC, which is located on the coast near the Atlantic Ocean; 2) Baton Rouge, LA, which is at the southern end of the Mississippi River; and 3) Chattanooga, TN, which is located near the Tennessee River. Think about and discuss each area. What geologic features may be nearby? How might the different settings impact soil texture?
2. Examine all three soils maps and make notes of any differences and/or similarities you see across the different areas.
3. Answer the following questions for each location as you examine a soil texture map near Charleston, SC; Baton Rouge, LA; and Chattanooga, TN.
 - a. What surface textures seem to be the most prevalent on the map?
 - b. Do you notice any patterns on the map? If so, describe them and consider why the patterns might have formed as they did.
 - c. Identify if there are any water features on the map. If so, highlight these areas.
 - d. If there is a water feature present, what types of soil textures are present near it/them? Why might this be so?
 - e. The map legend displays only the types of surface textures that are present on the map. Compare the map legend with the surface texture triangle. What surface texture(s) are absent? Why might these types not be present?
4. Now that you have looked at the individual maps in more detail, look again at all three maps in comparison to each other.
 - a. What new similarities do you notice?
 - b. What types of soil textures are common to all three areas? Why might this be?
 - c. What questions do you have about soil texture after making comparisons between the three locations?

SYNTHESIS

Consider why certain soil textures are present in each area. What geologic processes may be impacting the soil textures that are present? Why do you think soil texture would be influenced by geologic processes at all? Write up a paragraph sharing your thoughts.

EXTENSION

Learn about the soil textures in your community by examining a local soil map. What surface textures are most prevalent in your area? Do you notice any patterns? How does your local soil compare to the three maps you examined earlier? What geologic features are present in your community which might influence the soil texture? Write a paragraph to share your observations and comparisons.

USING WEB SOIL SURVEY TO CREATE A LOCAL SOIL MAP AND ANALYZE SURFACE TEXTURE

1. Visit <https://websoilsurvey.nrcs.usda.gov/app/> and get acquainted with the site.
2. Select the green button that says "START WSS."
3. Select an Area of Interest (AOI):
 - a. Under the brown Quick Navigation tab, select Address.
 - b. Type in a specific address, or just a city and/or state for an area where you'd like to learn more about the soil. Hit "Enter" or select the "View" button.
 - c. Use the magnifying glasses   to zoom in or out. If you'd like to zoom in, select the + magnifying glass, then click on the map. Similarly, select the – magnifying glass and click on the map to zoom out.
 - d. Use the hand button  to move the map around until your desired AOI is centered.
 - e. Select an AOI in a rectangular shape using the square AOI button  or select an AOI in any polygon using the polygon AOI button . Once an AOI button is selected, select your area on the map. The application has a limit of 100,000 acres. If you exceed that size, an error box will pop up and ask that you make your AOI smaller.
4. Display the soil texture map of your selected area:
 - a. Click the "Soil Data Explorer" tab.
 - b. Click the "Soil Properties and Qualities" tab.
 - c. Expand the "Soil Physical Properties" section by clicking on it.
 - d. Click on "Surface Texture."
 - e. If you would like to read a description of surface texture, select "View Description."
 - f. To view the map, select "View Rating." The map will load on the screen.
5. Select the "Printable Version" in the top right of the app to see the selected map including the legend. Optionally, add a title to the map. Click "view."
6. A PDF will load which has the map on the first page and map legend on the second page. The specifics of the surface texture and descriptions will follow.

Buttons: USDA NRCS Web Soil Survey

U.S. Department of Agriculture's Natural Resources Conservation Service (USDA NRCS) • www.soils.usda.gov

The USDA NRCS delivers science-based soil information to help farmers, ranchers, foresters, and other land managers effectively manage, conserve, and appraise their most valuable investment — the soil.

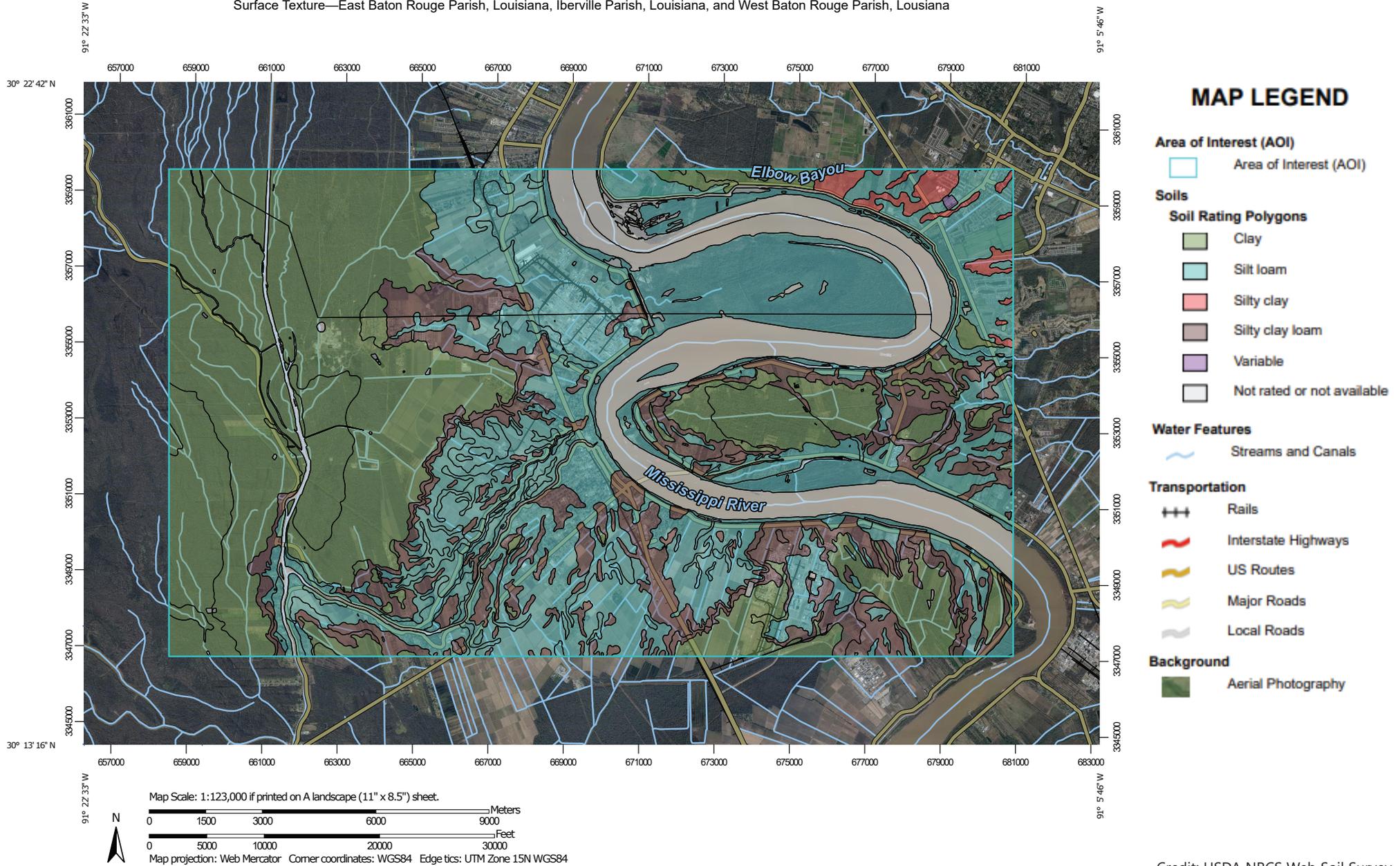
Surface Texture—Charleston County Area, South Carolina



Credit: USDA NRCS Web Soil Survey

Surface Texture—Baton Rouge, Louisiana

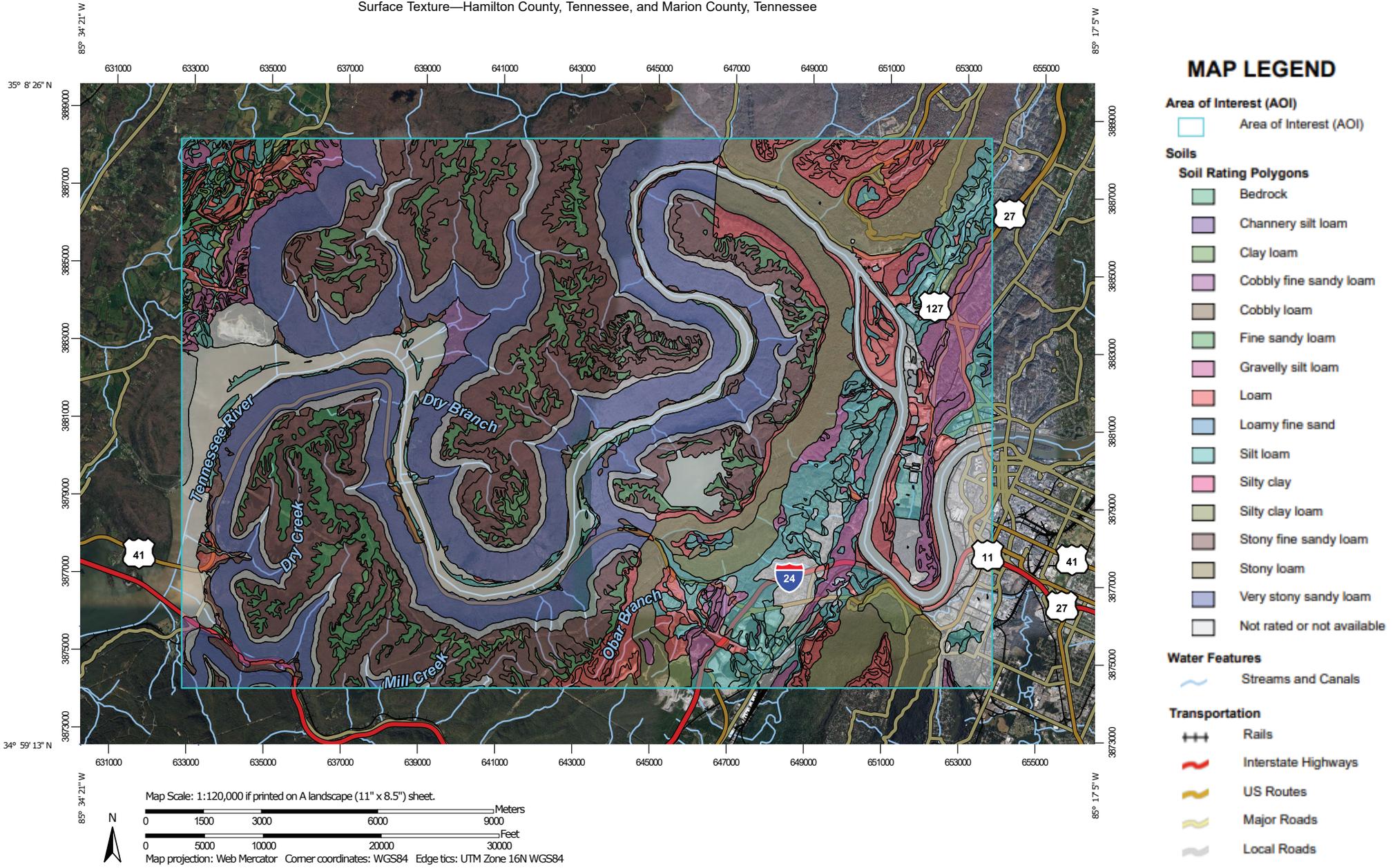
Surface Texture—East Baton Rouge Parish, Louisiana, Iberville Parish, Louisiana, and West Baton Rouge Parish, Louisiana



Credit: USDA NRCS Web Soil Survey

Surface Texture—Chattanooga, TN

Surface Texture—Hamilton County, Tennessee, and Marion County, Tennessee



MAP LEGEND

- Area of Interest (AOI)**
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- Soils**
 - Soil Rating Polygons**
 - Bedrock
 - Chantery silt loam
 - Clay loam
 - Cobbly fine sandy loam
 - Cobbly loam
 - Fine sandy loam
 - Gravelly silt loam
 - Loam
 - Loamy fine sand
 - Silt loam
 - Silty clay
 - Silty clay loam
 - Stony fine sandy loam
 - Stony loam
 - Very stony sandy loam
 - Not rated or not available
- Water Features**
 - Streams and Canals
- Transportation**
 - Rails
 - Interstate Highways
 - US Routes
 - Major Roads
 - Local Roads
- Background**
 - Aerial Photography