



Soil and Plant Science Division

Technical Soil Services

North Central Soil Survey Region

Field Study of Soils Course

Duluth, MN, Major Land Resource Area (MLRA) Soil Survey Office (SSO)

Purpose

In May, the Duluth MLRA SSO, along with the U.S. Forest Service (USFS) and Minnesota Department of Natural Resources (DNR), assisted 30 local undergraduate students in a backhoe pit description event organized by the University of Minnesota (UMN), Fond du Lac Tribal and Community College, and Leech Lake Tribal College. The backhoe pit description event was part of UMN Pedology Professor Nic Jelinski's Field Study of Soils course, which provides students with the opportunity to tour Minnesota to learn about regional glacial geology, landforms, soil formation, and parent materials. Students attending UMN completed Nic Jelinski's Field Study of Soils course over a few weeks while students attending Fond du Lac and Leech Lake Tribal Colleges attended the week-long backhoe description event that Duluth MLRA SSO, USFS, and Minnesota DNR hosted from May 19 to May 22. Fond du Lac and Leech Lake Tribal Colleges have not previously held soil description events like this, so it was rewarding to provide them with the opportunity.

Background

On May 1, 2025, the Duluth MLRA SSO with USFS Soil Scientist Dave Morley held an introduction to soil description day at Fond du Lac Community College for students new to soils. This event allowed students to familiarize themselves with the description process prior to the backhoe description event held for the Field Study of Soils course that took place from May 20 to 23. Duluth MLRA SSO staff and USFS staff walked students through hand-dug pits, teaching them about the properties soil scientists typically describe.

On May 19, a lecture and lab were held by Duluth MLRA SSO Leader Mike Rokus and Morley at Fond du Lac Tribal and Community College to get students acquainted with course materials and to review basic soils information. During the lecture, the students learned how the soils were transported to their current location (glacial geology) and the

development of the soil since the parent material was deposited. Later, they moved to the laboratory and spent time learning soil texturing techniques using known samples provided by the University of Minnesota.

From May 19 to May 22, students met Duluth MLRA SSO staff in the field to begin backhoe pit descriptions. Duluth MLRA SSO staff used a backhoe to excavate soil pits along catenas to give students the opportunity to describe soil profiles in different drainages and parent materials (figs. 1 and 2). Minnesota DNR Plant Ecologist and Botanist Jeff Lee reviewed the Minnesota Native Plant Community names and codes with the group and explained soil-plant dynamics, drainage, and site productivity at each location.



Figure 1.—UMN Professor Nic Jelinski explaining soils information to students.



Figure 2.—College students examining excavated soil profile.



Cloquet Forestry Center was extremely helpful and allowed Duluth MLRA SSO staff to dig backhoe pits on the property and to use its facilities. On May 20, students described soil pits dug in outwash parent material and organic material. On May 21, students looked at both Rainy and Superior lobe coarse-loamy till parent material in Independence, MN, near the Cloquet River. On May 22, Duluth MLRA SSO staff ended their portion of the course with hand-dug pit descriptions in fine-loamy St. Louis sublobe of the Des Moines lobe till off Shipley Road, near Independence, MN. Following hand-dug pit descriptions, students visited a burn site of the Munger Shaw Fire, which started on May 12, 2025, and was 95 percent contained by May 19. USFS Soil Scientists Jeff Kroll and Dave Morley joined students and educators to discuss Burned Area Emergency Response used to determine severity and impacts of a burn on soil and water resources.

Key Outcomes

As a result of participating in the Field Study of Soils course, students developed skills in describing soil horizonation, texture, color, and structure, as well as knowledge about soil morphology and glacial geology. This hands-on experience provided a steppingstone to a future career in research, consulting, and conservation. The UMN students continued with their Field Study of Soils course at a different location the following week, and Fond du Lac Tribal and Community College and Leech Lake Tribal College students received certificates of completion for participating in the backhoe soil description event.

The Field Study of Soils course is and will continue to be an important outreach and educational opportunity for local college students interested in soil science and natural resources management. Duluth MLRA SSO staff hope to continue collaborating on this course with Nic Jelinski, Environmental Institute STEM Coordinator Steve Gebhard, and Leech Lake Tribal College Natural Science Instructor Muhammad Hasnain to further the soils education of students in the future.