



Soil and Plant Science Division

Technical Soil Services

North Central Soil Survey Region



Forestland Soil Health Training

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

Purpose

On August 18–20, 2026, Duluth MLRA SSO staff assisted with the Forestland Soil Health training hosted by the NRCS Soil Health Division at the Cloquet Forestry Center in Cloquet, Minnesota. This training expands participants' knowledge of soil health practices and soil health management systems used in response to the exacerbating effects of drought, wildfire, and other factors on forestlands. It included presentations on soil health indicators, conservation solutions, and the use of the Forestland In-Field Soil Health Assessment (FIFSHA) worksheet to determine the severity and type of resource concerns. Participants included NRCS staff from several states along with partners from state agencies, the U.S. Forest Service, and conservation groups.

Background

Approximately 40 individuals participated in the training, allowing for a wide range of perspectives on soil health in forested ecosystems across the country. The classroom presentations and field-based components were led by the training cadre: Agriculture Conservation Experienced Services (ACES) Program Forester Tom Sauer (Iowa), ACES Forester Mike Oliver (Georgia), and NRCS Oregon Soil Scientist Steve Campbell. Duluth MLRA SSO Soil Survey Leader Mike Rokus, Soil Scientist Alena Wallin, Ecological Site Specialist Kade Anderson, and Soil Scientist Lindsey Weiss assisted by teaching participants about soils within the region, soil description techniques, and the FIFSHA worksheet.

On the first day, participants spent the morning in the classroom learning about local forestry practices, forest soils within the area, principles of forestland soil health, and an overview of the FIFSHA worksheet. Rokus presented on different forest soils of the region during the classroom component of the training. This prepared them for completing the assessments later that afternoon at the field sites that focused on



coarse-loamy glacial till soils derived from the Superior Lobe in northern Minnesota. The training cadre and Duluth MLRA SSO staff chose these sites due to the glacial till parent material. These sites did not have history of burning, and hardwood species were dominant.

For the field component, the training cadre divided participants into smaller groups before leaving for the day's field sites. A member of the training cadre and a Duluth MLRA SSO staff member walked each group through the FIFSHA worksheet. Duluth MLRA SSO staff members demonstrated digging a soil pit at different drainages at each site, and participants rotated through each landscape position to see a full catena. At each site, participants used the FIFSHA worksheet to identify the level of resource concern for soil health indicators at each site, such as soil cover, soil burn severity, and water-stable aggregates. Duluth MLRA SSO staff assisted by explaining the characteristics of the soil and how they related to completing the FIFSHA work sheet. They taught participants how to connect differences in parent material, landscape position, vegetation, and disturbance history to observed soil properties and soil health indicators. Explaining these connections helped participants more accurately interpret the FIFSHA results and demonstrated how soil survey data informs conservation planning and forest management decisions.

On the second day, participants spent the morning in the classroom learning about resource concerns, soil carbon sequestration, nutrient cycling, and forest ecosystem management. Participants learned how fire management affects soil and plant growth. It was important for participants to understand the area's fire history because it demonstrated that, in the absence of human intervention, the ecosystem is still recovering and adapting to its natural fire regime. This prepared them for completing the assessment later that day at the field sites that focused on red pine-dominated sandy outwash areas, where participants compared a prescribed burn site, an unburned site, and a logged site.

For the field component, Duluth MLRA SSO staff provided the same kind of assistance as the first day. They explained the characteristics of the soil, related them to completing the FIFSHA worksheet, and taught participants how to connect differences in parent material, landscape position, vegetation, and disturbance history to observed soil properties and soil health indicators (fig. 1). For example, the burned site differed from the others because of its fire management history, resulting in distinct soil properties for participants to observe while completing the FIFSHA worksheet. These soil properties included a charcoal layer near the surface so that participants could recognize the morphological evidence of past fire altering horizon boundaries (fig. 2).



Figure 1.—Duluth SSO Leader Mike Rokus preparing a glacial outwash backhoe pit for participants to observe. Since this backhoe pit had been exposed and altered from the elements during the summer, spraying water and cleaning the pit face allowed participants to view the soil in a field-moist condition.



Figure 2.—A soil profile in a lower backslope position with charcoal near the surface from a prescribed burn in the fall of 2025. The charcoal in the profile shows that the site was burned from past management. The site allowed participants to connect fire management practices with changes in soil properties and plant growth while completing the FIFSHA worksheet.



Duluth MLRA SSO staff discussed the differences between observations at these sites and observations from the previous day with participants to increase their understanding of the FIFSHA worksheet. Since participants went to different sites with varying species composition and management, they were able to compare differences in litter decomposition, organic matter, and other soil properties such as soil structure and root systems. Requiring participants to assess the hardwood-dominated sites and the pine-dominated outwash sites provided them with field experience of two different sites, and it allowed them to compare their assessment of each to see how differently sites can score on the FIFSHA worksheet.

On the final day, participants attended classroom presentations covering planned and unplanned fire effects on soil health and grazing impacts on forestland. Cloquet Forestry Center Research Coordinator and Forester Lane Johnson helped wrap up the training with a presentation on fire history in northeastern Minnesota. These presentations helped reinforce the field observations from earlier in the week. For example, learning more about soil health indicators, such as woody debris and soil cover, underscored their effect on the participants' overall scoring for resource concerns at each site. The presentations strengthened participants' understanding of how disturbance history, fire, and varying levels of harvest can result in different levels of soil resource concerns.

Key Outcomes

Overall, the Forestland Soil Health training provided an opportunity for NRCS staff and partners to improve their confidence using the FIFSHA worksheet, strengthen their understanding of forestland soil health principles, and share knowledge across states. In the field, Duluth MLRA SSO staff taught participants how to use the FIFSHA worksheet to compare different parent materials and soil types, soil burn severity, and forest management practices in diverse situations with varying resource concerns. For example, observations of inadequate soil cover, erosion, or compaction may help support consideration of practices that reduce disturbance, improve ground cover, manage woody residues, or address forest stand and habitat conditions. This hands-on approach strengthened participants' ability to evaluate forestland soil health indicators, identify potential limitations, and connect observed soil and site conditions to conservation solutions.