



Soil and Plant Science Division

Technical Soil Services

Northwest Soil Survey Region



Oregon Snow Telemetry (SNOTEL) Sites Get Upgraded With Newly Added Soil Moisture and Temperature Sensors

Salem, Oregon, Major Land Resource Area (MLRA) Soil Survey Office (SSO)

Purpose

Since 2023, Soil and Plant Division staff have provided Oregon NRCS Snow Survey program staff with technical assistance and full characterization soil sampling at sites. As part of an ongoing effort to modernize and enhance the SNOTEL network, NRCS Oregon is upgrading SNOTEL sites with new instrumentation as part of a statewide effort to strengthen climate-resilient monitoring infrastructure. During June and July 2026, staff from the Salem MLRA SSO supported NRCS Oregon Snow Survey and National Water and Climate Center (NWCC) staff with the installation of new soil moisture and temperature sensors at the Mud Ridge and Mt. Hood Test Site SNOTEL locations. These upgrades will improve the accuracy and reliability of the measurement of soil volumetric water volume content, thereby strengthening seasonal water supply forecasting, drought monitoring efforts, and assessments of agricultural conditions.

Background

NRCS staff installed soil moisture and temperature sensors at depths of 5, 10, 20, 51, and 102 centimeters (2, 4, 8, 20, and 40 inches) (fig. 1). As part of the installation effort, staff completed full soil characterization sampling to ensure that key soil physical properties, such as bulk density and texture, can be accurately related to the volumetric water content values generated by the sensors (fig. 2). At each site, they excavated two soil pits: one larger pit for describing and sampling the soil profile and a smaller pit dedicated to probe placement. They cut alcoves into the pit face so probes could be seated against undisturbed soil. After installation, staff replaced soil horizons in their original order to maintain natural structure and reduce the likelihood of probe movement as the pit settles.



Figure 1.—Small pit used for the placement of soil moisture and temperature probes.



Figure 2.—In the foreground, Soil Scientist David Rand (Salem MLRA SSO) collecting soil bulk samples in the pit. In the background, Hydrologist Cedric Pimont (Oregon Snow Survey) and Lead Electronics Technician Alex Rebentisch (NWCC) connecting soil moisture probes to the data collector inside the SNOTEL equipment shed.



Oregon Snow Survey and NWCC staff completed the wiring and tested the probes prior to the installation. Oregon Snow Survey staff also completed regular annual site maintenance. Maintenance items included ensuring the site was free of debris and overhanging limbs, checking weather sensors, and refilling the snow pillow sensor with fresh antifreeze fluid.

Key Outcomes

Since 2023, NRCS Oregon Soil Survey, NWCC, and SPSP staff have upgraded 30 of Oregon's 82 SNOTEL sites with soil moisture and temperature sensor capability, further strengthening the state's monitoring network. The work at the Mud Ridge and Mt. Hood Test Site locations directly supports NRCS' priorities by strengthening climate-resilient monitoring infrastructure, improving data quality for water resource forecasting, and enhancing the agency's ability to deliver actionable, science-based information to partners and producers.