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

Redmond Soil Survey Office Assists Oregon NRCS Snow Survey with SNOTEL Soil Climate Installations

Figure 1.—(Left to right); Meghan Ciupak and Wes Engel (snow survey hydrologists), Jim David (Ochoco National Forest soil scientist), and Alex Gajdosik (Redmond MLRA soil scientist), at the Ochoco Meadows SNOTEL.

Purpose

The current soil monitoring network across Oregon is inadequate and lacks finer spatial resolution for soils data, critical for drought forecasting and monitoring, in addition to modeling evaporative demand, streamflow, and surface runoff. The Oregon Snow Survey is establishing the Oregon Soil Monitoring Initiative (OSMI) with the objective ofimproving the spatial resolution of soils data by utilizing existing SNOTEL and SNOLITE stations as sites for soils monitoring. OSMI will be spearheaded by the Natural Resources Conservation Service (NRCS) Oregon Snow Survey. Partnerships will be critical for maintaining and building constructive relationships across the state, providing soil scientists who will be critical in expanding the soils monitoring network, and providing technical input from experts in related fields. Potential partners would include Oregon Water Resources Department, United States Forest Service, National Park Service, Bureau of Land Management, Oregon State University, National Weather Service, United States Drought Monitor, Northwest Climate Hub, National Integrated Drought Information Service, NRCS, and others.

Background

Figure 2.—Soil profile similar to the Corngreen proposed series. Ashy over clayey, glassy over smectitic, frigid Aquic Vitrixerands.

The initial step toward this goal is to create a consortium involving public land management, resource management, and scientific groups that could aid in expanding the network in a way that is most impactful and efficient. The second step is to choose and prioritize sites to install soil sensors and replace existing, non-functional sensors throughout the 3-year period. The last step is to install soil sensors at these sites so that data can be collected and used by our program and other interested parties.

The next goal of this initiative, after the 3-year period (and in some cases concurrently), would be to expand above-ground monitoring. Each site with soil sensors will have sensors for net radiation and relative humidity installed to provide a more robust dataset that is impactful for not only soils monitoring but also snowpack monitoring and streamflow forecasting.

This network expansion will take place simultaneously with sensor upgrades for air temperature and other ongoing upgrades and maintenance at SNOTEL and SNOLITE sites. The expectation of this expansion is that soils sensor installations will take place outside of the regular field schedule, so normal maintenance is largely undisrupted.

Key Outcomes

On October 24th and 25th, staff from the Redmond MLRA SSO, Ochoco National Forest, and Oregon NRCS Snow Survey visited the Derr. SNOTEL and Ochoco Meadows SNOTEL in the Ochoco National Forest. The installation included excavation of a soil pit within 80 feet of the telemetry shack, full pedon description, full pedon sampling for characterization at KSSL, and the installation of Stevens HydraProbe sensors. Sensors at all SNOTEL locations are installed at standard depths of 2, 4, 8, 20, and 40 inches. The Stevens HydraProbe records dielectric permittivity, volumetric soil moisture, electrical conductivity, and temperature. Data is uploaded hourly to the SNOTEL Network.

Soil described at the Derr. SNOTEL was similar to the Norlo series: an ashy over loamy, glassy over isotic, frigid Aquic Vitrixerands. Soil described at the Ochoco Meadows SNOTEL was similar to the proposed Corngreen series: sshy over clayey, glassy over smectitic, frigid Aquic Vitrixerands. Note that after installation of the sensors, it typically takes a year or more for soil to settle at the pit and around the sensors for consistent data.

Figure 3.—Sensors being installed at the Derr. SNOTEL Site.