Klamath Falls MLRA Soil Survey Office

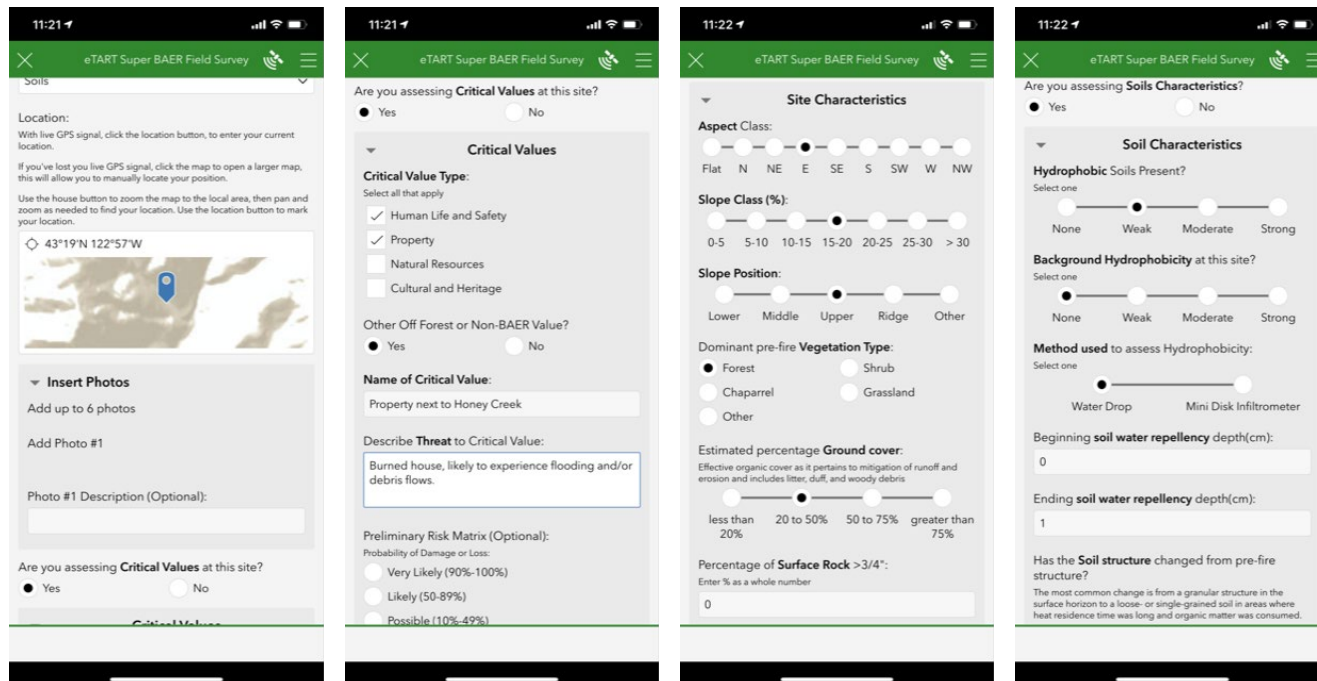## Assessing Erosion Risks in Post-Fire Areas in Oregon

Summary

Soil Survey staff have been assisting a number of agencies in response to the recent wildfires in Oregon. **Erosion Threat Assessment Reduction Teams (ETART)** are a FEMA-funded effort. Unlike Burned Area Emergency Response (BAER) teams that primarily examine Federal lands, ETART focuses on identifying risks to public health and safety, property, and infrastructure on state and private lands. ETART is a relatively new method for assessing erosion risks in burned areas, with the first team deployed in 2014. Due to the uniquely large, quick-spreading, and numerous fires in the western U.S. in 2020, specialists from various agencies were trained to quickly generate large-scale watershed assessments. In Oregon, the ETART effort is powered by a combination of agencies and departments: Oregon Department of Forestry, United States Forest Service, Natural Resources Conservation Service, United States Army Corps of Engineers, and individual county fire patrol associations, among others.

In addition to assessing erosion risks to public safety, property, and infrastructure, part of the ETART structure involves sub-teams dedicated to analyzing changes to various resources in post-fire environments. These resources include soils, geology, hydrology, botany, and fish and wildlife. The Soils Resource Team in Oregon is composed of the following individuals:

- Megan McGinnis, Bureau of Land Management — Oregon
- Mary Young, United States Forest Service — Wallowa-Whitman National Forest
- Anthony Collora, NRCS — Redmond
- Bruce Moffatt, NRCS — Eugene
- Tom Snyder, NRCS — Eugene
- Amy Kaiser, NRCS — Tangent
- Brooke Hogan, NRCS — Klamath Falls

The team conducted fieldwork October 27-30, using an ArcGIS mobile app called Survey123. The fieldwork focused on three tasks: validate the Burned Area Reflectance Classification (BARC) map, assess soil burn severity, and track areas with clear potential to produce threats to public safety, property, and infrastructure. Areas with such threat potentials are defined more specifically by identifying their "critical values" (see the following example screenshots).

Screenshots of the ETART field survey in Oregon from Survey123.

Rust-colored staining from a culvert on the Archie Creek Fire.

Clear bleaching of surface gravel where a log burned on the Archie Creek Fire.

On November 2, the team began modeling erosion in drainageways near areas that had been assigned "critical values" and in large drainageways surrounded by areas of high burn severity. The goal of the modeling was to predict post-fire changes in erosion in order to identify risks of debris flows, steam/culvert clogging, etc. The model, Watershed Erosion Prediction Project (Disturbed), is available online: https://wepp1.nkn.uidaho.edu/weppcloud/. Baseline erosion (pre-fire) near critical value areas and significant drainageways is determined by running the model without a burn severity map input. Then the model is run with the burn severity map input. Other model inputs include hillslope, land use, soils, and GRIDMET climate data with PRISM revision. One advantage of this climate model is that climate variations in the watershed across hillslope breaks can be predicted using elevation and aspect.

One of the challenges to completing this project has been staying safe and complying with COVID-19 safety guidelines. To overcome this challenge, the soil team conducted much of their communication remotely, using Microsoft Teams. When the work was more suited to in-person communication, such as modeling tasks, the group used large conference rooms to ensure social distancing. All staff wore masks when conducting fieldwork, and specialists used separate vehicles as much as possible.

Key Outcomes

The results of fieldwork and modeling were compiled into soil resource reports for each fire. In mid-November, virtual presentations for each fire took place. Each resource team presented the risks to human safety and property in their resource areas. The audience included representatives from the Oregon Department of Forestry, Oregon Department of Transportation, FEMA, and members of the public. The ETART assessments will be used to inform and support FEMA and other organizations in funding and organizing projects to mitigate erosion risks.

Exposed tree roots where topsoil burned and blew away on the Archie Creek Fire.
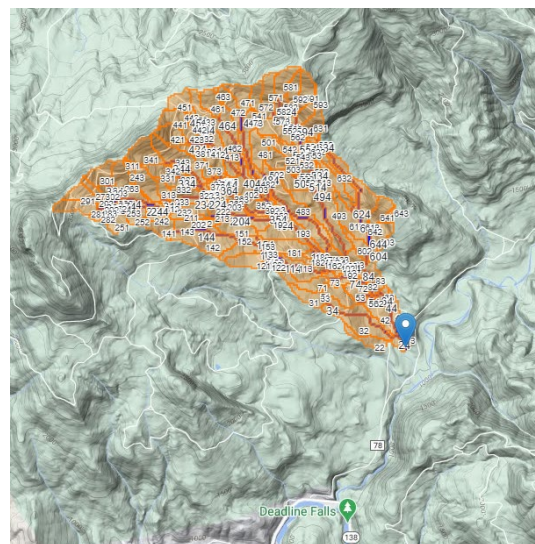
Delineation of subcatchments to Kelly Creek using the Watershed Erosion Prediction Project (WEPP) on the Archie Creek Fire.

Maintaining social distance while learning how to use WEPP.