

Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Soil Moisture Monitoring

Discipline: Natural

Type of Project: Technical Assistance/Research

Funding Agency: Bureau of Land Management

Other Partners/Cooperators: University of Montana

Student Participation:

Effective Dates: 9/14/2016 - 9/13/2021

Funding Amount: \$149,959

Investigators and Agency Representative:

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Project Abstract: Objective(s): The project objectives are aligned with Goal I (Data Collection and Integration) & Goal 3 (Drought Planning and Capacity Building) detailed in the Federal Action Plan of the National Drought Resiliency Partnership (20 16). The recipient shall install Decagon Devices monitoring stations that transmit and store the data, perform Qa/Qc, transform the raw data into useful statistical measures, and host the information on a website with public access to the near real-time data. The MCO will organize/manage the data according to MCO standards and combine it with other datasets across Montana in a user-friendly interface that simplifies data access and viewing and minimizes the need for post processing by the end user. Specifically, the objectives are as follows:

1) Provide data needed to optimize land management decisions and adaptively respond to rapidly changing conditions associated with climate change and drought. Adding soil moisture sensors to areas that currently lack representation in the existing monitoring network will improve the ability of nearby land managers' to align permitted activities that are directly and/or indirectly impacted by soil moisture (i.e. vegetation treatments, livestock grazing, mine reclamation, etc.) with existing resource conditions. This will improve adaptive management efforts designed to ensure sustained yield of the resources, which is expected to be increasingly complicated by climate change and the associated feedbacks linked to the natural environment.

2) Integrate the point-scale measurements with spatially continuous datasets derive from remote sensing or other empirical relationships to improve the accuracy and availability of existing and/or new datasets that require soil moisture as an input. The point estimates of soil moisture have high accuracy, precision, and temporal resolution and can be combined with coarser, but spatially continuous datasets to locally calibrate them, as well as determine the uncertainty in the estimates. Combining in situ measurements and remotely sensed estimates of soil moisture, or soil moisture related metrics, will improve the accuracy and availability of data, especially in areas with high heterogeneity or in remote locations that may lack monitoring stations.

3) Coordinate with state and federal partners across Montana to create a single database with standardized data collection, Qa/Qc, and data management. Standardizing the collection and management of soil moisture data, as well as collocating it with data collected by other partners, will improve the accuracy and spatial representation of the dataset. This will increase the utility of the data to end users, as it will be more easily accessible, analyzed, and integrated with external projects and research.

Keywords: Soil moisture, monitoring, drought planning, land management, BLM, University of Montana