Wet Meadow Resilience Building in the Gunnison Basin, Colorado: An Analysis of Soil Moisture

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Why restore wet meadow ecosystems?

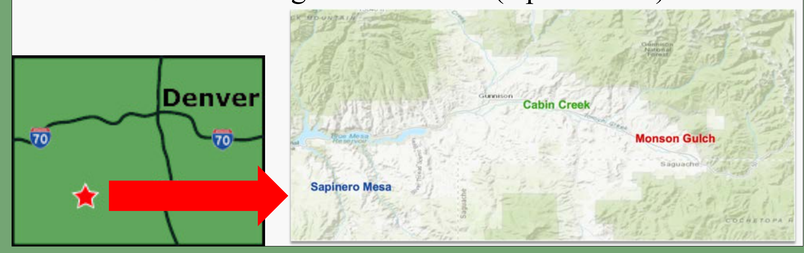
Wet meadows are shallow basins, with shallow water tables and poorly drained soils. These ecosystems retain water in the soil for much of the growing season and during periods of drought. Westward expansion degraded these habitats through the ditching of water for agricultural use, roads being built through wet meadows, and other activities. This led to erosion, head-cuts, and drier soils in these areas. Wet meadows are resilient ecosystems and provide many resources such as nutrient filtering, sequestration of carbon, habitat and forage for many wildlife species including the federally threatened Gunnison sage-grouse (*Centrocercus minimus*). In the Gunnison Basin wet meadows are scattered amongst a sea of sagebrush. This project specifically investigates:

1) Does soil moisture increase at shallow and deep depths in restored wet meadows compared to non-restored and sagebrush areas?

2) Do restored wet meadows retain higher soil moisture values throughout the day and across seasons compared to non-restored and sage brush areas?

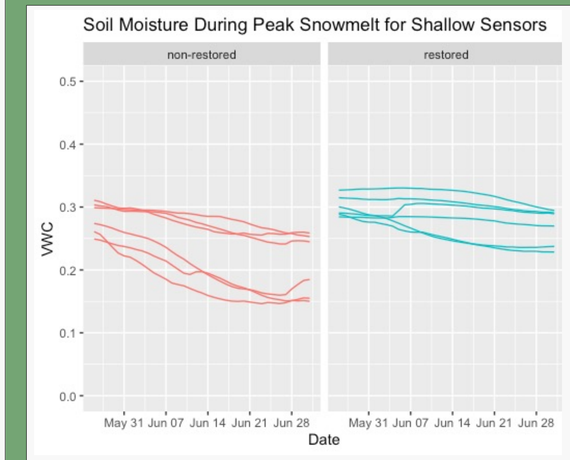
What did we measure?

We measured the volumetric water content (VWC) in the soil among restored, non-restored, and sagebrush transects at three watersheds in the Gunnison Basin. The data presented in this poster is from restored and non-restored transects at Monson Gulch during the snow melt (April – June).



Monson Gulch	Sapinero Mesa	Cabin Creek
3 restored	3 restored	3 restored
3 non-restored	3 non-restored	3 non-restored
3 sagebrush	3 sagebrush	3 sagebrush

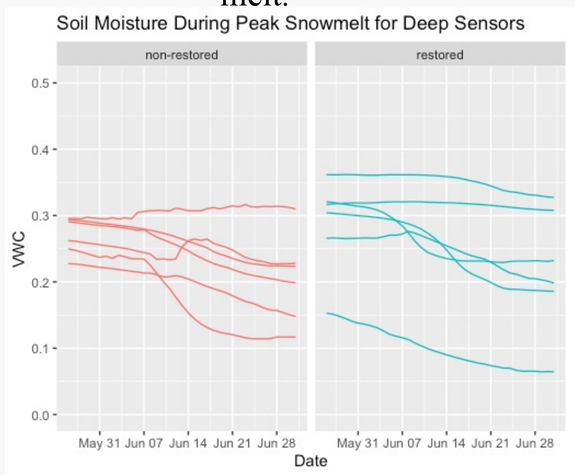
We placed our soil moisture transects two meters downstream from vegetation transects . Sensors are placed at a shallow (15 cm), representing VWC in the root zone, and deep (46 cm) depth to represent the possibility of recharging ground water..



What did we find?

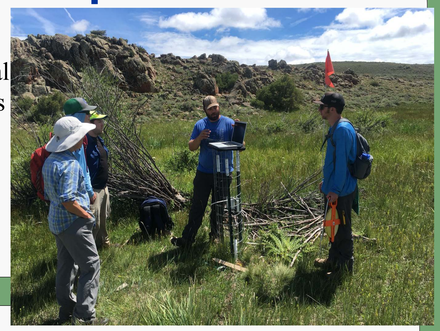
Using a generalized additive mixed model, we compared the impacts of restoration for both depths on the volumetric water content in the soil during peak snow melt.

The VWC in restored transects, for both depths, is 0.0671 cm^3/cm^3 greater than in non-restored transects (t-value 2.597).



What are the implications?

The information gathered in the project can help better inform managers if the natural hydrology of the ecosystem is being restored, through sheet flow, maintaining a shallow water table, and water availability for wetland plant species.



What next?

I plan to analyze data collected at all three transect types and the other two sites. In addition, looking at the changes in soil moisture across the entire growing season may lead to more understanding of restoration work. Lastly, there should be more data collection and data analyzing throughout years. These relationships can then be used to make management decisions in other wet meadow restoration projects without the cost of monitoring equipment.

Funding Sources

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