



2024 Project Progress Report:

Exploring How Spring Grazing of Meadows Effects Soil Carbon and Vegetation Productivity

By Eric Winford

PRELIMINARY RESULTS for 2024:

TITLE: Exploring How Spring Grazing of Meadows Effects Soil Carbon and Vegetation Productivity

PERSONNEL: Winford, Eric (PI, UI-FRFS); Lynch, Laurel (CO-PI, UI-SWS); Johnson, Tracey (CO-PI, UI-FWS); Roby, Phaedra (Student Tech, BSU); Capps, Makay (Student Tech, CSI); Noah Jackson (Student Tech, UI-ENVS)

BACKGROUND: Recent discussions with stakeholder groups, including the RRCR Advisory Board and the Rangeland Center Partner Advisory Council, have indicated interest in understanding the ecologic and economic benefits of spring grazing meadows and if there are drawbacks or conditions during which spring grazing would have negative outcomes. Some grazing literature suggests that spring grazing of meadows may increase soil compaction, damage emerging herbaceous plants, remove willow shoots necessary for willow expansion, and/or damage streambanks; while other research suggests that spring grazing can increase the productivity of herbaceous plants by stimulating additional stem and leaf growth (Swanson et al., 2015; Wyman et al., 2006). Our project will evaluate several indicators to understand both the benefits and potential drawbacks of spring grazing to provide answers to these stakeholder questions. The results of this project will be provided to land managers and livestock producers through outreach events at RRCR as well as peer-reviewed articles and manager-focused fact sheets. While our project is small in scope and of short duration, we believe it will provide critical baseline data that can be used to apply for additional funds to expand the study to include additional sites and sustain data collection over multiple years.

HYPOTHESIS or OBJECTIVES: This project will evaluate whether early season grazing of meadows, as compared to a control of no grazing, leads to differences in plant cover and productivity, willow height and volume, and soil health and soil carbon stocks. Our objective is to establish baselines for these indicators at three paired grazed and ungrazed meadows (n=6) at the RRCR in Blaine County, ID. The meadows will be randomized and assigned to one of two grazing schedules for the duration of the project: either early-season high intensity or no grazing.

After accounting for initial site-level differences, we hypothesize that at the end of the growing season (1) vegetation productivity and cover will be similar in control and spring-grazed plots, (2) willow height and volume following spring grazing will be similar in control and spring-grazed plots, and (3) soil carbon stocks will be similar in control and spring-grazed plots.

PROCEDURES: In spring 2024, we hired Capps and Roby as student techs to help us out with the field work. After paying close attention to the precipitation and temperature, we initiated data collection on May 3rd at the first meadow (Upper Betts, see Figure 1). We installed 8 points in each of the two plots (grazed or ungrazed) and collected vegetation cover and height data at each point using 4 quadrats. Across both plots we also collected soil carbon samples, bulk density samples, and measured water infiltration. We collected aerial imagery with drone flights using a DJI Phantom 4 Pro with 20MP camera immediately following data collection, with ground-control targets (GCPs) placed at each of the sample points (see Figure 2). Approximately 100 heifers spent 7 days on the grazed site. Working in conjunction with the ranch and livestock managers, the project team decided to aim for a moderate level of utilization. A cool, dry spring in 2024 resulted in less forage production than anticipated, and the team worried that higher levels of utilization might harm plant productivity.

On May 10th, we sampled the second meadow, (Eagle) using the same process as at the first meadow. Cows immediately moved from the first meadow to the second, and we re-sampled the first meadow. On May 17th we sampled the third meadow (Middle Diversion), and once cows were moved into the third meadow, re-sampled the second. After seven days, cows were moved from the third meadow, and we re-sampled on June 6th.

We had planned a final sample of all the meadows in September. The Glendale Fire on September 2nd burned the third meadow, but we were able to do a final sample of the other two meadows on September 5th and 6th.

ACCOMPLISHMENTS or RESULTS: Data from the project is currently being processed and analyzed. All soil samples were delivered to Moscow in October and are currently being prepared for analysis; percent moisture and pH have been determined, and subsamples are being prepared for soil carbon and nutrient analyses (these efforts involve training an undergraduate research assistant, Noah Jackson). Soil bulk density measurements are being made in Boise. All drone imagery is being analyzed in Boise. Preliminary results are expected later in 2024.

PUBLICATIONS or OUTPUTS: This work was highlighted by the UI Communications Team: [Researchers Study Early Grazing](#)

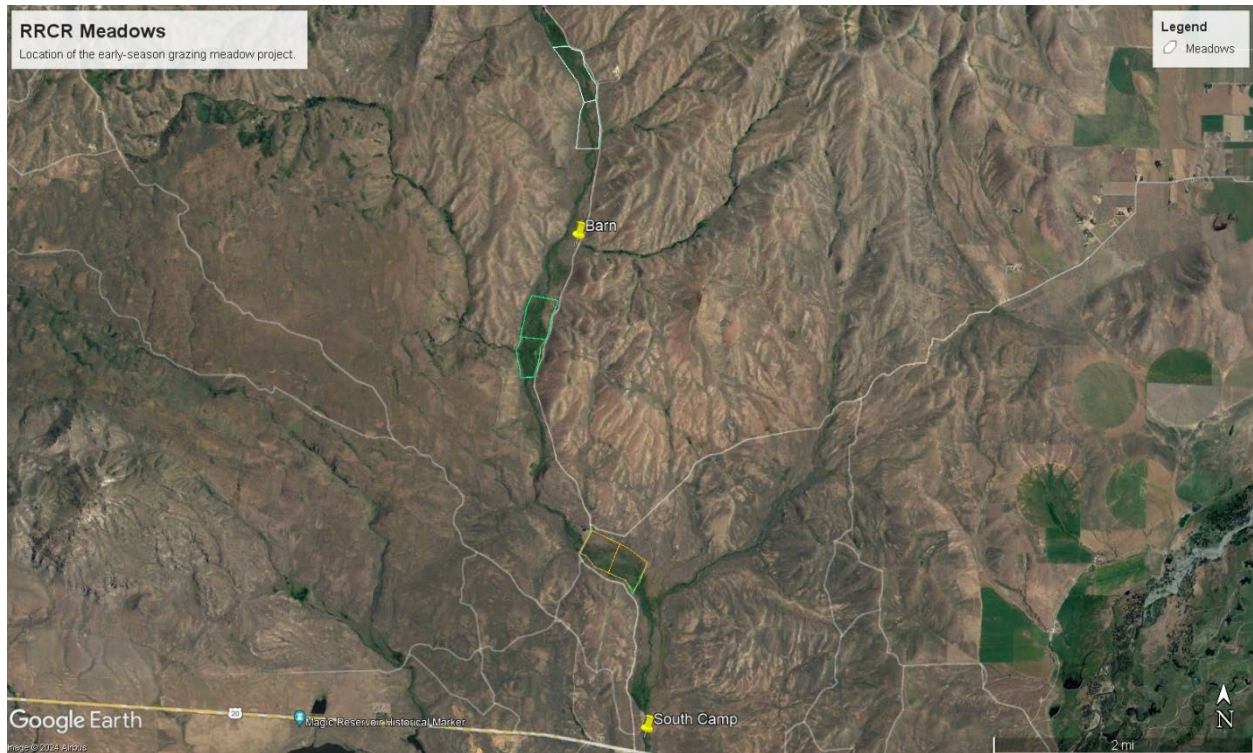


Figure 1 - Early season grazing meadows. The meadow to the south is Betts, the middle meadow is Upper Eagle, and the meadow to the north is Middle Diversion.

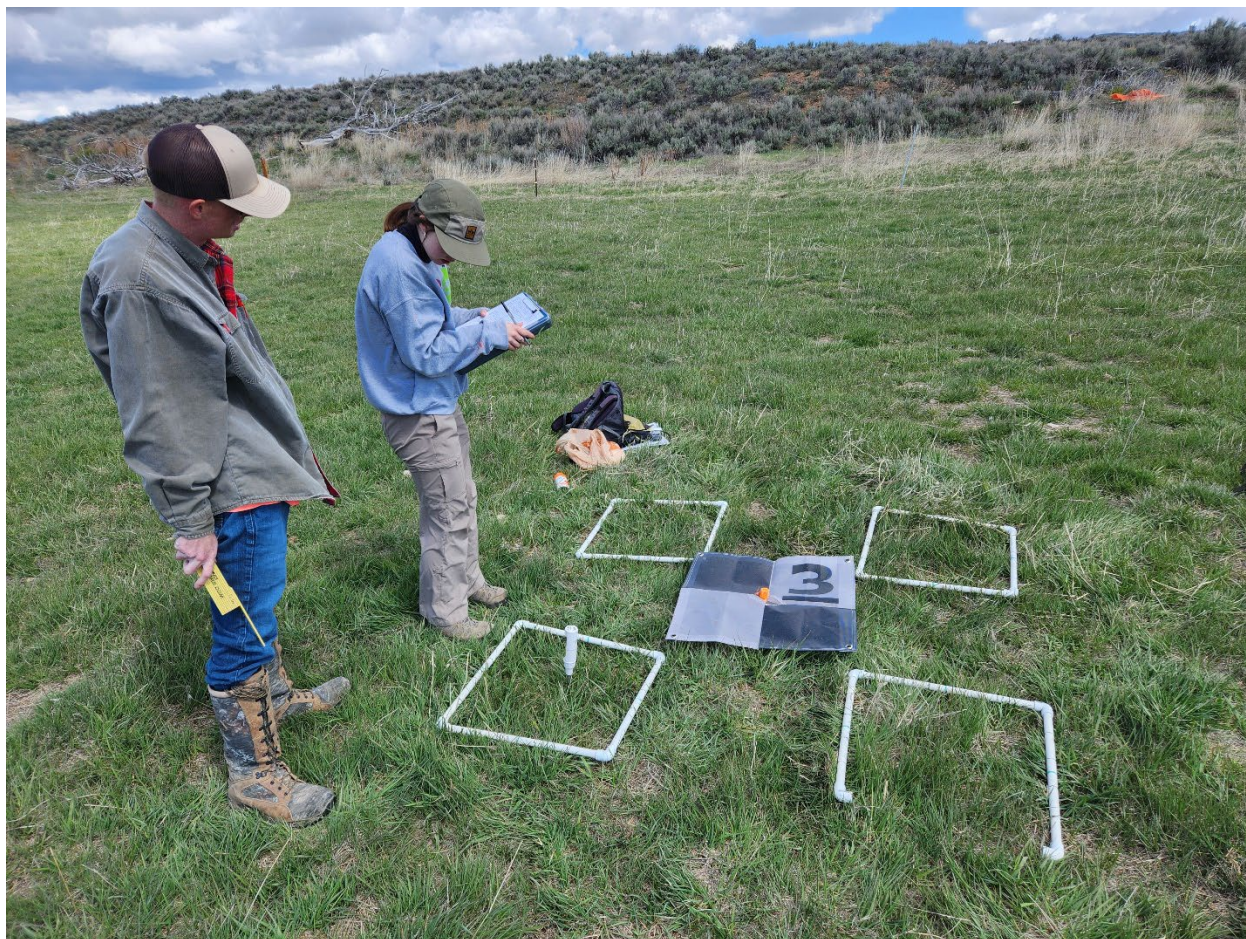


Figure 2 - Student technicians recording plant cover, height, and soil moisture at one of the monitoring locations.