

INTRODUCTION

Research question:

Do large wood (LW) jams cause a higher water content in underlying soil in comparison to soils not underneath jams?

LW benefits to the river network:

- Increases underlying soil nutrients LW in floodplains (Zalamea et al., 2007).
- Establishes sites of seedling establishment (Petit and Naiman, 2006).
- Provides modification to geomorphic processes (Collins et al., 2012).

An improved understanding of LW's role within the river network will lead to better management of river networks and the LW within this system.

STUDY AREA MAP

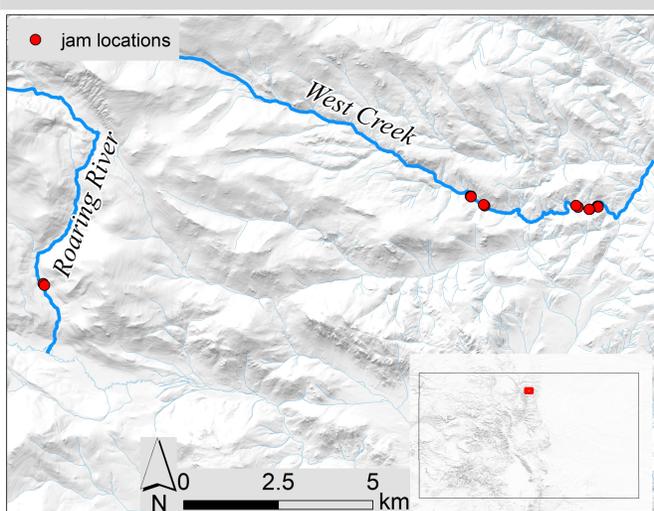


Figure 3. A study area map of our data collection sites on Roaring River, which experienced a flood in 1982, and West Creek which experienced a flood in 2013.



Figure 4. Two large wood jams found on West Creek in Colorado.

METHODS



Figure 1. (1A) Log jam 02 on reach 1 of Roaring River. (1B) The convex spatial densiometer used to record canopy coverage. (1C) The soil moisture probe used to collect soil moisture data.

Types of Data Collected:

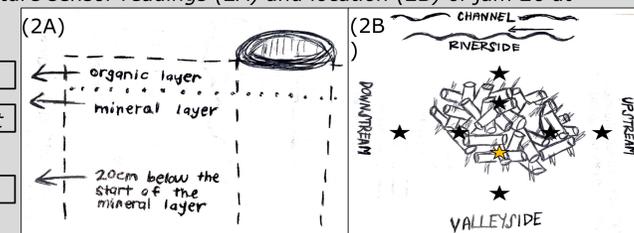
- Spatial reference
 - Global positioning system (GPS) for coordinates
- Percent canopy cover
 - Spatial densiometer
- Soil moisture sampling
 - Soil moisture probe



Sampling Techniques for Soil Moisture Sensor Data

Figure 2. Soil moisture sensor readings (2A) and location (2B) of jam 26 at reach 28

3.7% water content
10.9% water content
9.2% water content



Statistical analyses

- Non-parametric Kruskal-Wallis and Wilcoxon rank-sum pairwise comparisons to test differences among groups, using a Bonferroni correction for multiple comparison if needed, with significance level of $\alpha = 0.05$
- Spearman's correlation coefficient to determine correlation between soil moisture and canopy coverage

RESULTS

Soil moisture content by location

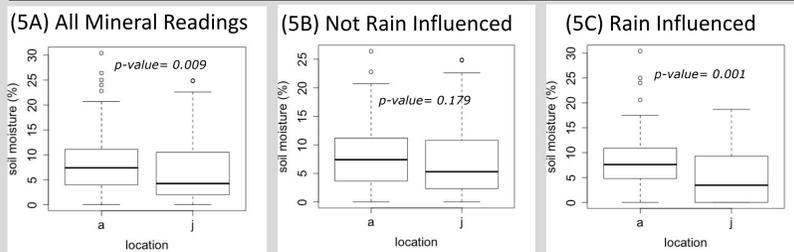


Figure 5. Boxplots of mineral layer soil moisture content by location: adjacent to jams (a) vs. underneath jams (j).

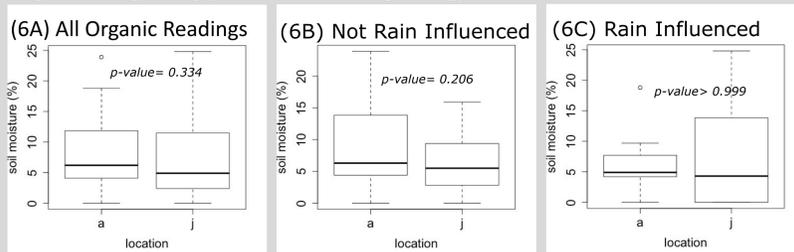


Figure 6. Boxplots of organic layer moisture content by location: adjacent to jams (a) vs. underneath jams (j).

Other variations in soil moisture

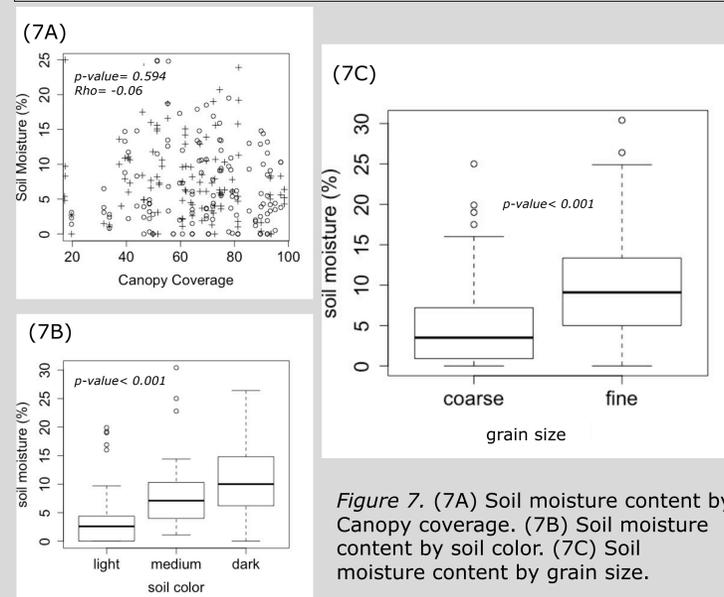


Figure 7. (7A) Soil moisture content by Canopy coverage. (7B) Soil moisture content by soil color. (7C) Soil moisture content by grain size.

Additional differences between underneath and adjacent jam measurements

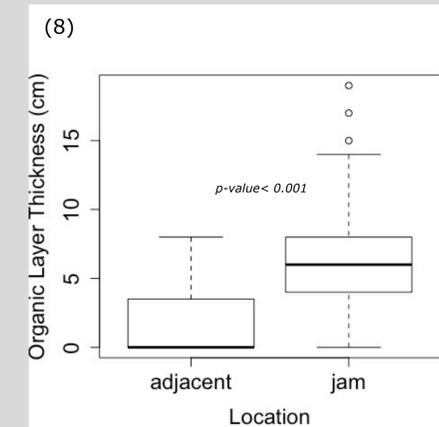


Figure 8. Organic layer thickness by location: adjacent and jam.

IMPLICATIONS

- No significant differences in soil moisture underneath jams compared to adjacent to jams in measurements taken without recent rainfall
- Soil moisture appears to be higher adjacent to jams after recent rainfall, likely due to jams protecting soil during rainstorms and impeding water infiltration
- Grain size and soil color (indicates organic matter content) strongly control soil moisture, with coarser and lighter soil containing lower soil moisture
- High variability in soil moisture due to rainfall events indicates the need to continuously monitor soil moisture to capture variability
- The organic layer is thicker underneath jams, indicating that over longer time scales (e.g., multiple decades), jams may have an influence on soil moisture as organic material decays and becomes incorporated into the subsurface

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