

Science to Solutions

Low-Tech Riparian and Meadow Restoration Keeps Rangelands Greener Longer



In Brief:

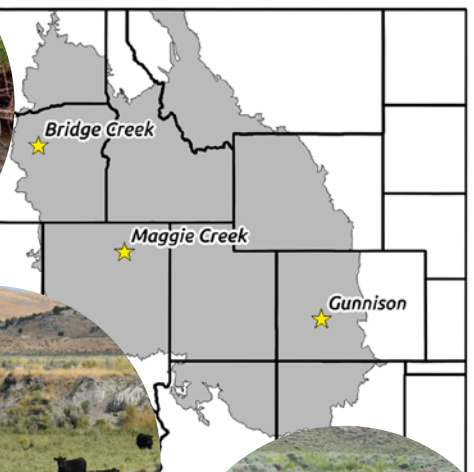
- Traditional approaches to riparian and wet meadow restoration are often intensive and expensive, limiting the extent to which they can be applied.
- Practitioners are increasingly turning to cost-effective, low-tech restoration options that restore soil moisture and improve vegetation, which can be more easily implemented at large scales.
- New research shows low-tech restoration methods effectively **increased vegetation productivity by 25%** and **kept plants greener longer** during the year.
- Restoration efforts also showed reduced sensitivity to precipitation over time, resulting in **greater resiliency** against the impacts of drought and climate variability.

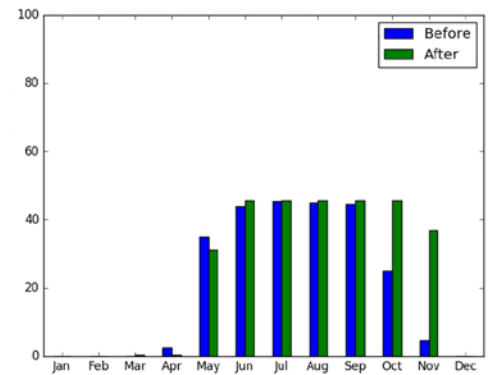
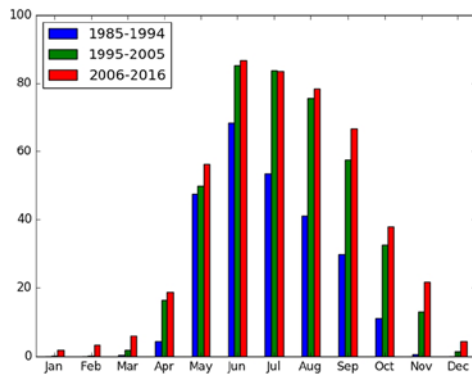
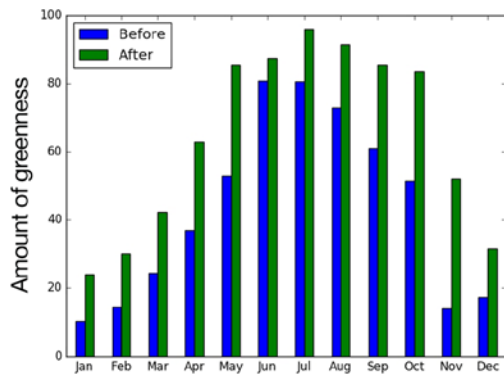
On semiarid rangelands in the western U.S., water is life. Wet habitats—like riparian areas, streams, and meadows—comprise less than 2% of the landscape but are vitally important for wildlife and livestock. Unfortunately, nearly half of these scarce resources are considered degraded. Traditional approaches to restoring riparian areas and wet meadows are often intensive and expensive, limiting the extent to which they can be applied.

Increasingly, practitioners are using more cost-effective, low-tech restoration methods—like simple hand-built structures made of wood, mud, and rocks—that can be more readily applied to match the scope of degradation. These techniques are designed to kickstart natural recovery processes with the least amount of money, which allows landowners and managers to treat areas on a larger scale.

Goals of low-tech wet habitat restoration include enhancing floodplain connectivity, boosting soil moisture retention, and raising water tables, which produces more ‘green groceries’ that feed wildlife and livestock in the late summer and early fall.

New research shows that these low-tech restoration techniques are indeed making riparian and meadow areas more productive, and helping them stay greener longer. A **study** sponsored by the NRCS-led Sage Grouse Initiative and the Bureau of Land Management evaluates the outcomes of three different low-tech wet habitat restoration projects around the American West.





Low-tech restoration methods increased vegetation productivity by up to 25% and kept plants greener longer during the year. Plus, Maggie Creek revealed added benefits of restoration with time: plant productivity was less sensitive to precipitation as the restoration effort matured, generating greater resiliency against the impacts of drought and climate variability. This study shows how low-tech restoration techniques implemented at appropriate scales are generating outcomes that are measurable from space.

Methodology

Using freely available satellite imagery, the study quantified productivity using the Normalized Difference Vegetation Index (NDVI) at sites where various low-tech restoration methods were applied:

1. Beaver Dam Analogs (Bridge Creek, Oregon) – Simple hand-crafted structures made of wood, mud, and cobble were built to mimic natural dams and encourage beaver recovery in a perennial stream (evaluated 10 years post-restoration). These dams slow streamflow and reconnect floodplains, creating more wet habitat and green vegetation.

2. Time-Controlled Grazing Management (Maggie Creek, Nevada) – Changes in the livestock grazing season of use and watering points were implemented to promote riparian vegetation recovery along a perennial stream (evaluated 25 years post-restoration). Adjusting grazing locations and the timing of grazing helps streamside vegetation recover.

3. Zeedyk Structures (Gunnison River Basin, Colorado) Hand-built rock and wood structures were installed to improve hydrologic function of wet meadows and intermittent streams (evaluated 5 years post-restoration). These structures slow down flowing water to spread it across the landscape in order to reduce erosion and increase wetland vegetation.

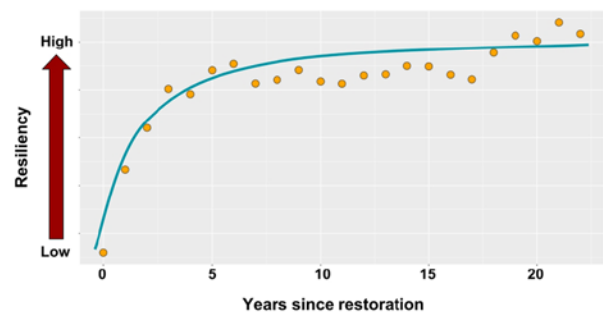
Source

Silverman, Nicholas L. et al. 2018. **Low-tech riparian and wet meadow restoration increases vegetation productivity and resilience across semiarid rangelands.** Restoration Ecology.

“Low-tech stream restoration helps put money in the piggy-bank when it’s wet, so that wildlife, ranchers, and the ecosystem as a whole can draw upon the stored soil water during dry times.”

~Nick Silverman, study’s lead researcher, University of Montana

Building Resiliency Over Time



Science In Action

Through the Sage Grouse Initiative, the NRCS and partners provide **technical and financial assistance** for strategic practices that help landowners scale-up conservation of the West’s precious water resources.

- Download resources from USDA-NRCS: [Mesic Area Conservation For Sage Grouse](#).
- Use [SGI Interactive Web App](#) “Mesic Resources” mapping tool to help target wet habitat restoration and protection

The **Sage Grouse Initiative** is part of **Working Lands for Wildlife**, led by USDA’s Natural Resources Conservation Service, which is a partnership-based, science-driven effort to proactively conserve America’s working agricultural lands and wildlife.