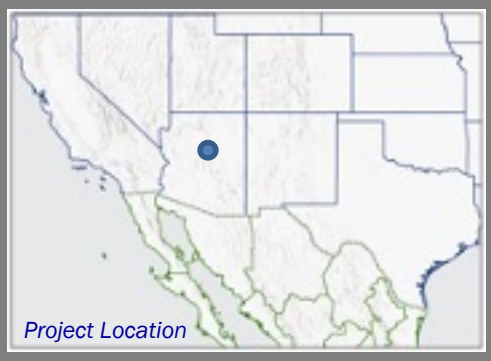
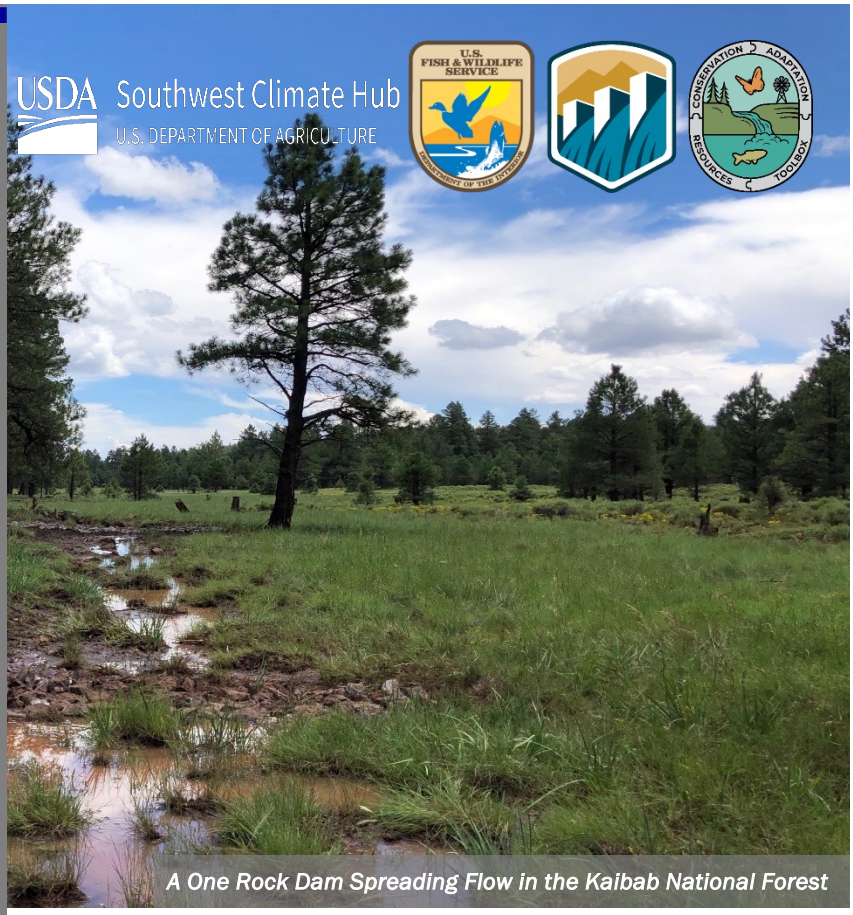
RESTORATION

Riparian Restoration Supports Healthy Forests in Northern Arizona

Climate change is compounding the effects of historical fire exclusion and unsustainable land use across Southwestern ponderosa pine forests. The Four Forest Restoration Initiative (4FRI) is a collaboration between the U.S. Forest Service (USFS) and stakeholders to reduce catastrophic wildfire risk and improve landscape health across four national forests in Arizona. Stakeholders include state and federal agencies, universities, non-governmental organizations, and forest industries. The Stakeholder Group has helped inform the USFS planning process for 4FRI and collaborates on restoration implementation and monitoring. One key focus of 4FRI is protecting and restoring riparian areas - including springs, wet meadows, and streams - which supports biodiversity, water resources, overall forest health, and climate resilience.





A One Rock Dam Spreading Flow in the Kaibab National Forest

KEY ISSUES ADDRESSED

After Euro-American settlement in the Southwestern US and displacement of Native peoples, introduced practices such as excluding beneficial fire transformed the landscape. Many waters were constrained and overused, reducing riparian habitat. Riparian habitat has been further impacted by overpopulated livestock and elk which can overgraze and trample on native flora. Protection and restoration of springs, steams, and wet meadows should be scaled up because healthy riparian areas are biodiversity hotspots, provide drinking water to downstream communities, and act as fuel breaks during wildfires and “refuge” habitat amidst advancing climate change. Protecting and restoring riparian areas is a key component of whole forest health.

PROJECT GOALS

- Protect and restore springs, wet meadows, and streams using the best-available science
- Evaluate restoration approaches through monitoring and scale-up restoration work across 4FRI
- Increase public awareness of riparian areas in national forests as important habitats and water resources

RAISING RIPARIAN AWARENESS

The public can support riparian restoration by learning about threats to waters and wetlands, volunteering for restoration projects, and advocating for water and wetland protection through national forest public comment opportunities.

An Eroded Stream Channel Disconnected From its Wet Meadow

PROJECT HIGHLIGHTS

Diverse Approaches to Riparian Restoration: 4FRI implements a range of riparian restoration techniques, all of which contribute to overall landscape health. Elk and livestock exclosures are fences that surround riparian areas to minimize grazing and keep vehicles out, allowing native plants to recover. Well-placed rock structures reduce stream channelization and help reconnect water flow with the broader floodplain. Reintroducing native willow trees stabilizes soils and provides shade.

Evaluating Restoration Success: 4FRI uses a range of techniques to evaluate their restoration sites. These include taking before and after photos, characterizing soil wetness, and documenting plant species which require riparian conditions.

Drone Imagery Suggests Success: 4FRI worked with U.S. Geological Survey who flew a drone over a spring restoration site. Thermal and high-resolution imagery initially showed greener vegetation where exclosures protected native plants from overgrazing, demonstrating the potential of drone-based monitoring.

Volunteer-Powered Restoration: Volunteers who donate time and expertise are critical to installing and maintaining many restoration tools. 4FRI's riparian restoration work is supported by many local organizations, including the Arizona Elk Society and the Grand Canyon Trust.

Collaborators

- Four Forest Restoration Initiative (4FRI)

LESSONS LEARNED

Riparian restoration approaches that center natural water flows are some of the most successful within 4FRI. One rock dams and rock-lined bowls help slow and spread water across a floodplain. This promotes wet meadow habitats and reduces channelization, allowing flows to reconnect and wetland plants to regrow. These can be built by hand using local materials. When coupled with protective exclosure fences which mitigate grazing and trampling from introduced livestock and elk, these approaches are especially effective at healing impacted areas.

This restoration can be an iterative process: restoring a wetland may require multiple visits and approaches. 4FRI appreciates the uniqueness of every riparian system and acknowledges that not every restoration tool will be feasible at every location. Increasing the pace and scale of riparian restoration work to engages a range of resources, teams, and knowledge sets, from planning to implementation to monitoring. Waters and wetlands are invaluable in our arid Southwestern national forests, and advancing this work represents a true collaborative effort.

NEXT STEPS

- Expand the use of drones to characterize restoration needs and evaluate restoration success in partnership with the U.S. Geological Survey
- Scale-up riparian restoration work across 4FRI by building out capacity and resources for planning and implementation
- Continue to plan and implement priority riparian restoration projects across 4FRI

For more information on this project, contact Cerissa Hoglander: choglander@grandcanyontrust.org

An Elk and Livestock Exclosure at a Spring Fed Wet Meadow

CART Author: Erin Connolly, Drought Learning Network (DLN), May 2024.
Photos courtesy of Grand Canyon Trust
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