

Post-Field Trip Notes & Online Resources



Presenters

- Cheryl Cwelich, Upper Gunnison River Water Conservancy District (UGRWCD), and Nate Seward, Colorado Parks and Wildlife, [Wet Meadows and Riparian Restoration](#)
- Stacy Beagh, Strategic By Nature, and Chelsea Silva, River Network, *Colorado Stream Management Plan Peer Learning Network*
- Stacy McPhail, UGRWCD and Gunnison Ranchland Conservation Legacy, [Upper Gunnison Watershed and Water Management Plan Overview](#)
- Jesse Kruthaupt, Trout Unlimited, and Craig Ullman, Applegate Group, Inc. and UGRWCD, [Watershed System Optimization and Implementation Project](#)
- Bradley Boileau, River Watch, *Macroinvertebrates Sampling Demonstration*

Online Resources Mentioned During Field Trip

- Wet meadows & riparian habitat restoration + assessment
 - Wet meadows Gunnison site assessment questions ([Excel version](#) and [PDF version](#)).
 - [Re-greening a dryland watershed video](#) on U.S.G.S researcher Dr. Laura Norman's work that was released in 2022. Please note that the video describes only *one* study site and *one* set of results. If you go to her project website, you can select other "Science" projects managed under the [Aridland Water Harvesting Study | U.S. Geological Survey \(usgs.gov\)](#).

- Norman, L.M., R. Lal, E. Wohl, E. Fairfax, A.C. Gellis, and M.M. Pollock. (2022). [Natural infrastructure in dryland streams \(NIDS\) can establish regenerative wetland sinks that reverse desertification and strengthen climate resilience](#). *Science of The Total Environment*, 849, 157738. Using dozens of case studies, this paper documents the climate adaptation and mitigation services of rock structures, beaver dams and BDAs, including: (i) increasing water availability, (ii) reducing erosion and promoting soil formation and productivity, (iii) storing C and N in wetland-like sinks, (iv) controlling stormwater runoff and filtering water, (v) increasing vegetation viability, and (vi) decreasing temperatures and climate variability (see Table 2, Section 2) throughout the Western US.
- Natural Resources Conservation Service. (2018) [Hand-built structures for restoring degraded meadows in sagebrush rangelands: Examples and lessons learned from the Upper Gunnison River Basin, Colorado](#). Range Technical Note No. 40.
- Southwest Climate Change Initiative. (2011). [Gunnison Basing Climate Change Vulnerability Assessment](#). Prepared for the Gunnison Climate Working Group.
- UGRWCD. (2017). “Recipe” for quarry rock for Zeedyk structures.
- Sponholtz, C., and A.C. Anderson. (2010). [Erosion Control Field Guide](#). Dryland Solutions, Inc., and Quivira Coalition. More resources from Quivira Coalition at quiviracoalition.org/techguides/
- The Nature Conservancy. (2017). [Restoration/resilience building of riparian and wet meadow habitats: Upper Gunnison River Basin, Colorado](#). Final Report to the Terra Foundation.
- Gunnison Basin Wet Meadow & Riparian Restoration Collaborative (2022). [Iterative Vision, Goals & Objectives Statement](#).
- Wheaton, J.M., Bennett, S.N., Bouwes, N., Maestas, J.D. and Shahverdian, S.M. (Editors). 2019. [Low-Tech Process-Based Restoration of Riverscapes: Design Manual. Version 1.0](#). Utah State University Restoration Consortium. Logan, UT. 286 pp. DOI: 10.13140/RG.2.2.19590.63049/2.
- Zeedyk, B., and Clothier, V. (2014). [Let the Water Do the Work: Induced Meandering, an Evolving Method for Restoring Incised Channels](#). Chelsea Green Publishing.
- [Savory Institute](#): facilitates large-scale regeneration of the world’s grasslands and the livelihoods of their inhabitants, through holistic management (out of Boulder, CO).
- Watershed system optimization
 - Trout Unlimited. (2022). [Water Diversion Selection Tool](#). This tool is aimed at helping resource professionals identify a suite of site compatible diversion mechanisms and the ecological and logistical tradeoffs of each.
- Macroinvertebrate sampling and demonstration
 - River Watch training, October 18-21 at Camp Cedaredge, [reserve your spot at the training \(scroll down the page to training section\)](#).
 - Read about how to do macroinvertebrate sampling in [River Watch’s water quality sampling manual](#).
- Colorado SMP Peer Learning Network
 - Coloradosmp.org, an online Resource Library for stream management planning.
 - Next event: Environmental flows pre-pre-conference workshop at Sustaining Colorado Watersheds in Avon, CO. Monday, October 2, 2023, 1-5pm. Registration opens soon! Check back on the [Community & Learning page](#) in late August or early September 2023 for more information.

Notes from the Field Trip

Notes provided below are from the field trip and wet meadows tour in Gunnison. Notes are not comprehensive and should be understood as a snapshot of the field trip.

Group Agreements and Colorado SMP Peer Learning Network

- The Colorado Stream Management Plan Peer Learning Network (PLN) provides SMP leaders and coalitions around the state with a venue for information sharing, problem solving, and peer learning. All events hosted by the Peer Learning Network are posted to coloradosmp.org, an online Resource Library for stream management planning hosted by River Network and Colorado Water Conservation Board.
- Group agreements for the wet meadows tour and SMP/IWMP field trip:
 - Respect
 - Step up, step back
 - Listen to understand
 - Engage
 - Take care of your own needs
 - Have fun!

Wet Meadows and Riparian Restoration (Presentation and Tour)

with Cheryl Cwelich, Upper Gunnison River Water Conservancy District (UGRWCD), and Nate Seward, Colorado Parks and Wildlife, [Wet Meadows and Riparian Restoration](#)

In the early 1900s, potato farming was central to the Gunnison Valley. Back then, the climate was wetter and greener. Today, the area is drier which has led to massive gullies and erosion throughout the sagebrush landscapes. UGRWCD is working to “restore looking forward” using low tech, process-based design, including Zeedyk techniques. Bill Zeedyk modeled his techniques after ancient Puebloan structures that he had seen at Mesa Verde National Park. Zeedyk structures provide head cut control, grade control, and restore sheet flow.

UGRWCD’s focus on wet meadows restoration started with their 2009 Gunnison Climate Working Group. This group developed the Climate Change Vulnerability Assessment for the Gunnison Basin which identified the Gunnison sage-grouse as a species at risk to climate change. UGRWCD expects that the bird will eventually be put on the endangered species list due to climate change. With drier conditions, sagebrush and other vegetation in their native range does not grow high enough to protect the sage-grouse from the sun, and the food that the grouse rely on (forbs) do not grow as plentifully. In addition, grouse chicks are delicate and need cover so they can search for insects.

Wet meadows have degraded over time due to headcutting caused by ungulate trailing, trails, placer mining, and roads. The headcuts cause churning and scouring which leads to deeper cuts and gullies that migrate upstream. Wet meadows are important because they help keep water in higher elevation for longer. They act as a “great big apron” that captures and holds moisture, and they also provide carbon storage.

Gunnison has lost over 50% of its wetlands. UGRWCD is working to prevent future headcuts and restore the wet meadows with the goal of improving connectivity and creating a “wider sponge”. BLM has been the leader in applying for funds to restore the wet meadows. The secret to funding is that BLM and USFS can funnel money for this work through the district via the Wyden Amendment. Funding also comes from Great Outdoors Colorado (GOCO) and National Fish and Wildlife Foundation (NFWF). Colorado Parks and Wildlife has a wetland grant program, but UGRWCD has not used it much.

In the last 10 years, UGRWCD has installed 2,400 structures and restored 1,800 acres. Their management goal has been 20% increase in wetland plant species cover; they have seen anywhere between 20-240% increase in cover. Sagebrush will die back if starved of water for 48 hours (via watering). This happens naturally when rock and other structures are installed, keeping water on site for longer.

UGRWCD contracts with Western Colorado Conservation Corps to build rock and other structures. They also partner with Wildlands Restoration Volunteers, mostly baby boomers who come out in groups of 50-80 over a long weekend in September to install structures.

Restoration techniques include:

- Rock structures
 - One Rock Dam
 - Filter Dam
 - Lay Back
 - Low Water Crossing
 - Media Luna
 - Rock Rundown
 - Zuni Bowl
- Log Structures
 - Log and Fabric
- Drift Fences
- Plug and Spread

When working on or near private lands, UGRWCD suggests knowing your neighbors and inviting downstream water users into the conversation early on. This step creates transparency and allows UGRWCD to answer any questions or concerns about what the restoration work might mean in terms of changes in flow for downstream users. In addition, it is important to consider the timing of restoration.

Upper Gunnison Watershed and Water Management Plan Overview

with Stacy McPhail, UGRWCD and Gunnison Ranchland Conservation Legacy, [Upper Gunnison Watershed and Water Management Plan Overview](#)

UGRWCD used the Colorado Water Plan as a navigation tool for their Water Management Plan. They also referred to the Basin Implementation Plan for Gunnison.

Gunnison's economy has shifted over time. At first, the town relied on mining. Then, it shifted to ranching, then recreation, then fishing and camping, and now incorporates tourism as well.

Blue Mesa Reservoir, Colorado's largest body of water, is close, but it sits beneath the basin. This means that there is no water storage for Gunnison, so snowpack is important. Producers only do one cut per year and only irrigate for 10 weeks per year. Irrigation infrastructure is low tech and therefore improvements need to be low cost.

Gunnison Ranchland Conservation Legacy works to conserve land and water. To date, they have conserved 50% of agricultural land around Gunnison in perpetuity. They also use collaboration and outreach and education to help newcomers understand and appreciate the uniqueness of Gunnison.

UGRWCD has led the Water Management Plan as a neutral partner. To kickstart the process, they held a public meeting to help folks understand what a Water Management Plan is and is not. Stakeholder engagement has been crucial because they cannot pass or formalize a plan without stakeholder input. Identifying stakeholders and sitting down with them to understand their concerns has been key.

Phase I of the WMP was used for data gathering, stakeholder outreach, and demonstration projects. The district started by using models to gather information. They also conducted surveys with water users and recreation folks to help understand the data gaps, especially related to agricultural diversions. They cast a wide net on existing data and then developed assessments for three of the eight sub-basins. Demonstration projects rose up as important to helping folks see the district take action to improve resource and infrastructure issues.

Phase II was used for additional data mining and completion of the five remaining sub-basin assessments. Phase III comprised additional data collection and completion of sub-basin action plans.

The Gunnison WMP process is five years in the making. It has made the district more connected to the community and has been an important tool in helping the district defend their practices (a necessity because of the Colorado Water Compact).

Watershed System Optimization and Implementation Projects (Presentation and Tour)

with Jesse Kruthaupt, Trout Unlimited, and Craig Ullman, Applegate Group, Inc. and UGRWCD, [Watershed System Optimization and Implementation Project](#)

Jesse and Craig provided an overview presentation of the implementation projects that the group then went out to see in the afternoon. These projects are part of the district's interest in watershed system optimization. The goal of system optimization is to understand the system and look for areas that may need to be fixed. Agriculture is important to Gunnison and the district wants to protect senior water rights and help water users get their water efficiently.

Jesse approaches projects opportunistically. Once he gets one project going with a landowner, other landowners see it happening and want in. This often leads to better connectivity of irrigation for miles

and miles. They do not exactly use the projects list in the WMP to pick projects, but oftentimes the projects they take on are part of those lists anyway.

Craig is on retainer with the district to help landowners understand the costs of potential projects and support engineering design. His service is free of charge to landowners and this model helps the district to build and maintain strong relationships with landowners while simultaneously getting more projects completed on the ground.

Funding for implementation projects comes from Upper Gunnison River Water Conservancy District, Trout Unlimited, Colorado River District, Colorado Water Conservation Board, and Partners for Fish and Wildlife. Producers and ranchers usually provide in-kind match with labor.

Projects presenting during the PowerPoint presentation

Kenny Moore Reservoir

The users were interested in increasing storage. Gunnison Tomichi Valley Association has two parallel ditches. They tried using a check dam, but it caused a scour. Then, they tried cobble, but it blew out every year. The implementation project used a one wing dam and two headgates. The change provided benefits to fishermen and was safer for boaters. It also provided benefits to fish with the installation of a return gate.

Marshall No. 2

The water users used to push cobble up every year and then they put in a rock structure which eroded the bank and trees fell into the river. The implementation project moved the diversion upstream which allowed the water users to access water at lower flows.

Town Ditch

Town Ditch parallels Gunnison Tomichi Valley Ditch. The implementation project combined the two ditches. Combining the ditches would allow the water users to better balance flows. However, they decided not to combine them because they realized that they did not want to get too efficient because flows pulled off the Gunnison River provide supplemental flow to Lower Tomichi Creek.

McCanne 2

This ditch has major issues with another diversion at McDowell VT and Jesse and Craig suggested combining the ditches. Combining the ditched had the added benefit of helping decrease the temperatures in Lower Tomichi Creek.

Implementation project site visits

McCanne 3

The owner drove home this project. Working with the landowner, Trout Unlimited used a RESTORE Colorado grant to restore the bank and install low tech solution. The project was originally NRCS-designed but got put on the back burner because the owner did not like the design. Craig Ullman later helped with redesign and then they sent the design back up the chain at NRCS for approval with support from an NRCS Technical Service Provider. The project was \$42,000 for the headgate, concrete, construction, and other materials. NRCS only paid for the headgate structure, so they only inspected the concrete for the project rather than inspecting the full project.

(Additional sites were visited, but no notes were taken.)

Other notes:

- Most of the ditches Gunnison are independent, individually owned rather than part of an association.
- Craig and Jesse work regularly with the water commissioner, especially on combining ditches. But generally, the commissioner is not that involved. They will inform the commissioner if flow measurements are not accurate.
- Sometimes NRCS reaches out to get help with engineering – Trout Unlimited can provide help through hiring technical consultants, which they are able to do because TU has an RCPP alternative funding arrangement.
- If folks wanted to consider fish passage, Trout Unlimited has a diversion structure assessment and prioritization tool that tells you which diversion structure to use based on factors that you input into the tool.
- Piping is not very popular with water users because silt and debris could clog up the pipe.
- In terms of permitting, agriculture is exempt from Army Corps for *existing* structures.
- Closing thought: It is better to do an OK design then edit later then spend a ton of money trying to make the design perfect upfront because ultimately you will likely need to make modifications anyway.

Wet Meadows Assessment

Cheryl Cwelich and Max Sawyer, Upper Gunnison River Water Conservancy District, provided an in-the-field demonstration and description of how to conduct a wet meadows assessment using a tablet. Please refer to the [assessment questions](#) for more information.

Macroinvertebrate Demonstration

Bradley Boileau with River Watch provided background and a demonstration on macroinvertebrate sampling.

River Watch and macroinvertebrate background

River Watch has collected over 2,000 samples across the state with help from volunteers at over 115 groups. Historically, the program only focused on the chemical aspects of water, but now they are also focusing on the physical aspects. River Watch has funding from CWCB to do macroinvertebrate sampling with groups across the state.

The goal of their program is to support groups to collect baseline data. Most groups that work with River Watch stick with them. They work with high schools, Trout Unlimited, and many others. River Watch produces raw macroinvertebrate counts. This data can be entered into CDPHE's Ecological Data Application System (EDAS) to get a score for water quality.

“Macro” refers to being able to see with the naked eye. Macroinvertebrates are benthic – meaning that they live in the water as bottom dwelling creatures. They are excellent indicators of water quality. They survive about one year and are only in their adult stage for up to two weeks. Diversity of macroinvertebrates in a river is important – presence of different types of macroinvertebrates means that there is diversity of habitat. Macroinvertebrates are in groups based on their feeding methods.

Macroinvertebrate sampling

Read about how to do macroinvertebrate sampling in [River Watch's water quality sampling manual](#).

River Watch does a 3.5-day macroinvertebrate training every fall. Once groups go through these trainings, River Watch lends out over \$2,000 in equipment to the groups to use for sampling. Groups can use the sampling as match for grants. [Learn more about their trainings](#).