Wet Meadows and Riparian Restoration, Water Attenuation, and Climate Change Resiliency Project

Final Report

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Introduction

High Country Conservation Advocates (HCCA) is an environmental advocacy organization that collaborates with local stakeholders and policymakers, applies sound science, educates, and upholds the environmental laws affecting our community. Our mission is to protect the health and natural beauty of the land, rivers and wildlife in and around Gunnison County now and for future generations. Part of fulfilling this mission is to support and partner with local groups to implement compatible stewardship projects in our basin. Our work ensures these iconic public lands, waters, and wildlife will be healthy for generations to come.

The Gunnison Basin Wet Meadows Project is an ongoing effort with broad public support to rehabilitate and sustain resilient ecosystems. Project areas are better able to withstand drought and climate change by attenuating water across the landscape and by restoring historically wet areas to riparian sanctuaries.

In the Upper Gunnison Basin the semi-arid climate of the sagebrush ecosystem is interspersed with wet meadows and riparian areas providing critically important habitat and water. The project sites selected as wet meadows projects are in a sagebrush ecosystem with intermittent, ephemeral and perennial streambeds, meadows, swales (glacial tarns), and small islands of aspen and cottonwood trees within some stream channels. Plant composition along stream channels and in meadows includes sedges, willow, rabbitbrush and potentilla (cinquefoil). Stream channels, meadows, and many swales have eroded channels, headcuts, soil loss and drying out of soils causing grass, forb and riparian plant die-off. These areas have lowered water tables and encroaching upland plants, especially sagebrush.

These impacts were caused by historical uses including travel routes that affect hydrological flow, as well as livestock and big game trailing through these sensitive areas. This resulted in less productive plant growth and forage availability, and less water on the landscape. With the Zeedyk-style riparian and wet meadow restoration techniques, water availability and retention, grass, forb, and wetland species diversity and extent increases, causing the less productive sagebrush and other upland vegetation to die back.

HCCA's role in this endeavor had two distinctive and equally important responsibilities. First and foremost we needed to engage and mobilize a diverse volunteer stewardship team. We did this by forging relationships with local educational institutions, national restoration based non-profits, and our local community. The second role was that of management and coordination of resources, from rock delivered from local quarries, to direction of local specialists and contractors, to complete assessments, planning, and preparation of our volunteer stewardship events.

HCCA appreciates the support of the Colorado Water Conservation Board to fund our proposal in partnership with the Upper Gunnison River Water Conservation District (UGRWCD), the National Forest Foundation (NFF) and United States Forest Service (USFS), Bureau of Land Management (BLM), Colorado Parks and Wildlife (CPW), and Western Colorado University (WCU) to restore and protect sagebrush

ecosystems, streams and watershed health in the Upper Colorado River Basin. We are pleased to report on the successful 2020 - 2022 implementation seasons below.

Background

The Wet Meadows and riparian restoration, water attenuation, and climate change resiliency project came to fruition while discussing needs with our local land management agency personnel. Two distinct projects with similar benefits were identified with both using low-tech restoration based processes to affect positive change in the natural hydrology of wetland systems.

Our team selected 6 distinct sites across the Upper Gunnison Watershed for site specific restoration processes. While developing and implementing our planned restoration events we were able to engage 143 different volunteers for a total of 852 volunteer hours from 15 unique opportunities of community stewardship service.

Larger Wet Meadow Project Background

The Wet Meadow Restoration Resiliency Building Project (WMRRB) grew out of the Gunnison Climate Working Group (GCWG), a public-private partnership preparing for change in the Gunnison Basin. The WMRRB Project has been working since 2012 to enhance ecosystem resilience of riparian areas and wet meadows by restoring hydrologic and ecologic function to help the Gunnison sage-grouse and other wildlife species, as well as ranchers who depend on these habitats for their livelihoods, adapt to a changing climate.

Overall, the goal is to build ecological and social resilience in the Gunnison Basin through voluntary, collaborative conservation. The specific focus is on wet meadows and riparian areas, which occupy a small proportion of the sagebrush ecosystem yet provide critically important habitat for many species. These mesic areas, in an otherwise semi-arid climate, are vital to the life cycle of the federally threatened Gunnison sage-grouse by providing important brood-rearing habitat for grouse to raise their young chicks. These meadows also provide important food and cover for insects, pollinators, neo-tropical migratory birds, mule deer, elk, and forage for domestic livestock.

Wet meadows and riparian areas also serve as natural sponges to hold water in the soil, slowly releasing it after runoff events which ensures continued base flows and maintenance of water tables throughout the growing season. Holding water in these systems later into the summer season and during droughts benefits plants, wildlife, and ranchers. Many riparian areas and wet meadows in sagebrush ecosystems have been degraded by erosion and past land uses, resulting in incised gullies and lowered water tables. Intense episodic droughts, such as the ones in 2002 and 2018 have exacerbated these problems. As our global temperatures continue to rise, droughts and intense runoff events that increase erosion are likely to become more frequent. If these already uncommon habitats degrade further, the many plants and animals that depend on them, including the Gunnison sage-grouse (Jones, 2021), will suffer.

The specific CWCB project objectives were : 1) disperse flows more widely across floodplain surfaces to maximize infiltration and slow runoff during flood events; 2) stabilize eroded wet meadow soils to control head cutting and reduce gully expansion thereby retaining bank storage and extending base flows; 3) expand the size, extent and distribution of riparian/wetland sites; 4) slow sediment transport and aggrade unstable gullies; and 5) increase health, vigor, and density of riparian/wetland vegetation, such as native sedges, rushes, grasses, and forbs. Accomplishing these objectives improved watershed health and water quality, as well as habitat conditions. By enhancing the resilience of riparian and wet meadows habitats within the sagebrush ecosystems in the Gunnison Basin they will persist and thrive during drought periods. While these mesic habitats comprise a small percentage of the landscape, they are disproportionately important to big game, Gunnison sage-grouse, neo-tropical migratory birds, and amphibians.

Taylor Park Wetland Restoration Project Background

The Taylor Park Wetland Restoration Project is an ongoing collaborative effort with broad community support to restore stream, riparian, and wetland habitat in the headwaters of the Gunnison River, on the Grand Mesa, Uncompahgre, and Gunnison National Forest. Phase I of the project focused on Trail Creek. Project partners responsible for site assessment and designs include USFS hydrologists and EcoMetrics, a private contractor who specializes in beaver-based riparian monitoring, assessment, and restoration. A full Trail Creek report was created by EcoMetrics after 2021 implementation and is included in the final grant report.

Trail Creek is one of many streams in the headwaters of the Gunnison Basin that, prior to anthropogenic disturbance, was a broad valley-wide Stage-0 wetland complex, naturally maintained by beavers. The North American Beaver is an aquatic ecosystem engineer and keystone species that was once ubiquitous in the riverscapes of Taylor Park and other headwaters riverscapes. But after the near-extirpation of the species during the 19th century fur trade—and then following almost two centuries of subsequent riparian land use and suppression of beaver populations—most of the natural stream-wetland corridors in these areas have become incised, simplified, and dried up. While sporadic beaver colonies do occasionally reside along Trail Creek and other tributaries, approximately 90% have become degraded in their absence. Degradation of this sort is responsible for a severe loss of wetland, poor riverscape health, diminished watershed resilience, and a concomitant loss of the important habitat, hydrological benefits, and ecosystem services that these systems would normally provide when healthy.

The Trail Creek project is part of a greater vision to work with beavers to restore degraded stream/wetland riverscapes throughout Taylor Park and the greater Upper Gunnison Basin Headwaters. By restoring these natural ecosystems, we aim to improve watershed- and landscape-scale resilience to drought, flood, and wildfire in the face of climate change, development pressure, and increasing demands on natural resources in the basin. The Trail Creek project will serve as a demonstration of some of the strategies that can be employed to achieve this vision (EcoMetrics, 2021).

Methods

Wet Meadow Restoration Resiliency Building Project

In 2017, The Nature Conservancy (TNC) developed a landscape-scale model to help prioritize stream reaches for restoration. The model assessed restoration needs (how degraded the site is), the restoration potential (how much water is available) of the site, and the potential benefits to Gunnison sage-grouse. This model identified 32 HUC 12 watersheds, 541 stream reaches, encompassing 764 acres of degraded wet meadow on 271 stream miles in the Gunnison Basin.

Restoration techniques used in this project included grade control structures (one rock dams, log mats, sod plugs, BDAs, wicker weirs and low water crossings), flow dispersal structures (low water crossings, plug and ponds, BDAs and wicker weirs) and headcut control structures (Zuni bowls, rock rundowns, laybacks and log and fabric structures) following methods of Zeedyk and Clothier (2014) and Wheaton et al (2019). Most of the structures were made of rock and vegetation, but several other techniques were used depending on site conditions. Plug and ponds (or plug-and-spread), built with a bulldozer and excavator, were constructed to counteract the effects of channel incision, and restore hydrologic connectivity with adjacent wet meadows (Jones, 2021).

The Wet Meadows and Riparian Restoration, Water Attenuation, and Climate Change Resiliency Project was implemented in stages with some adaptive management to on the ground conditions as needed. The six tasks below span the project management cycle from site planning and material purchasing to implementation and monitoring. The methodology aligns with what is used by our partners in the larger Gunnison Basin Wet Meadows Project, headed by UGRWCD and which these projects are a part of, and the Taylor Park Wetland Restoration Project, which has been established since receiving this grant. Required permitting was completed in kind for each project location by our agency partners.

Task 1 - Localized site review & design

When this grant was submitted, we had general project locations in mind that we selected with the help of the USFS. To begin the projects in 2020 we worked with Matt Vasquez, Biologist for the Gunnison Ranger District, and local restoration specialist Paul Jones to identify sites that were appropriate for one-rock dams and could benefit from future plug-and-spreads in the coming years. Site review and design for the 2021 season was completed by Shawn Connor at Bio-Logic. Shawn is a landscape architect and restoration specialist and was instrumental in proper site selection, review, and design. Ashley Hom, Hydrologist for the Gunnison Ranger District, was the project lead for identifying and permitting the sites in Taylor Park including the Trail Creek project and the pilot Travel Management project that we outlined in our initial grant proposal. Ashley made the decisions regarding location parameters, implementation techniques, material staging site selection, and what equipment and materials were needed.

Task 2 - Rock purchase, delivery, and staging

HCCA worked with USFS and UGRWCD staff to contract and coordinate 51.22 tons of rock from local quarries for site delivery and completed invoicing and payment for materials. We ran into some difficulties with part of the delivery and staging as some of the sites, particularly in the Flat Top area, are

quite remote and less than ideal road conditions for heavy machinery to access. As such we had trouble identifying machine operators who were willing to complete this task. In the end, we were successfully able to stage the rock where needed before the volunteer events took place.

Most recently at Black Sage Pass we delivered 44 Tons of "Restoration Rock Mix" to the site in advance of this fall's planned community volunteer stewardship events.

Total rock purchased and delivered - 95.22 Tons.

Task 3 – Black Sage Pass re-evaluation - planning, design, and implementation

This task was initially budgeted for plug-and-spread implementation at the Flat Top site and was subsequently amended midway through the grant in order to adapt to challenges and conditions on the ground. We found difficulty in identifying a skilled contractor to complete this element of the project involving heavy equipment and knowledge and/or experience of creating plug-and-spread techniques in this landscape. Later the funds were reassigned to be used for a new site on BLM land called Black Sage Pass.

During the late spring/early summer field season of 2022, Shawn Conner with Biologic conducted Black Sage Pass earthwork planning and discussions with local restoration experts, Bill Zeedyk, and agency partners by going over the planned earthwork regarding plans, workflow, equipment and proper construction techniques.

Equipment problems caused a delay and weather set in and the project was not completed.
Shawn worked with agency partners to generate data and GIS shapefiles of what had been done in prior years as well as plan future design work.

In April, our team prepped maps and materials for an onsite USFS meeting that was later canceled due to snow bound site conditions. We were later able to get to the field with representatives from the USFS and UGRWCD in May, and we walked the Black Sage Pass earthwork treatments and discussed some possible actions moving forward.

During this site visit, we also walked through the hand-built rock treatments installed in 2018-2019.
It was rewarding to see how well they were working, and while most of it looked great, we noted that some needed maintenance and additional opportunities.

Most recently, in June, we were able to go back to Black Sage Pass, and formally monitor the rock structures. Shawn mapped the site by GPS and walked all of it again. He particularly mapped structures that required maintenance, some that could be expanded, and designed new structures. Afterward, Shawn generated the attached monitoring brief, mapped design for maintenance and new installation, and calculated material required.

Part of this task was to document work that could be accomplished at the planned September HCCA/WRV event as a continuation of our previous year's work outlined in this report as well as future HCCA events.

The power of having a legacy project, or one that volunteers return to and see the process of restoration happening, is not to be underestimated. These legacy projects have been an important part of community education and we have found that these opportunities are great for volunteer retention as they see the progress and changes at each subsequent visit.

Along with planning and design while reevaluating Black Sage Pass, a site-specific Wetland Delineation is being conducted in order to guide on-the-ground decision making. This part of the project is also being conducted by the experts at Bio-Logic with many of the overall project partners contributing financially to the overall cost of the project as it continues to be finalized over the coming months.

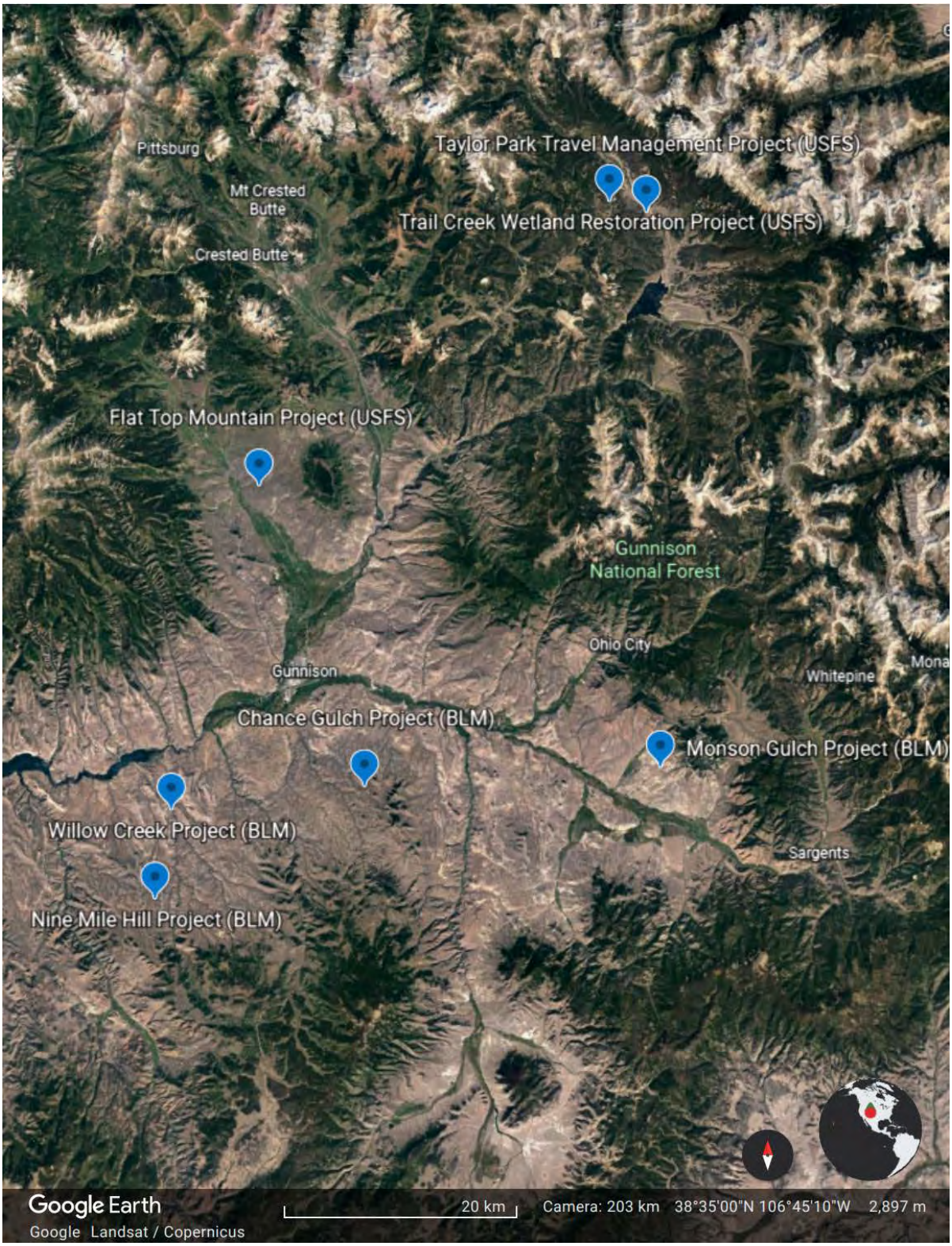
Task 4 – Volunteer coordination, training, and project construction

The heart of this overall project is volunteer participation. To coordinate volunteers, HCCA partnered with the USFS, CPW, UGRWCD, Wildland Restoration Volunteers (WRV), WCU, and the Gunnison County Sustainable Tourism and Outdoor Recreation (STOR) Corps. HCCA led the coordination and implementation of environmental restoration projects while providing opportunities for community members to get involved with stewarding our shared public lands. Before each volunteer project, HCCA and project partners provided volunteer education about objectives and structure design.

Our initial 2020 volunteer season had a more modest turnout than in 2021, with the arrival of COVID-19 affecting volunteer engagement. However, we were able to remedy this during 2021. During the 2020 season we hosted 41 individuals volunteering 345 hours of their time. These volunteers built 25 rock structures on Flat Top Mountain, preserving sensitive wet meadows habitat identified by our project partners. We also coordinated the construction of three plug-and-spread structures on Flat Top and Black Sage Pass, decommissioned eight miles of erosion-causing roads, restored 20 acres of wetland/riparian area, and restored .4 miles of streams.

During the 2021 season, we were able to increase the pace and scale of our projects. Building on the success and relationships established during the 2020 season, HCCA was able to attract 507 hours of volunteer time by 102 volunteers. These volunteers constructed 50 rock structures across project areas to preserve or restore sensitive wet meadow areas. Forty-five beaver mimicry structures were implemented to help attenuate water in the landscape and return complexity to poorly functioning riverscapes, allowing more vegetation to grow. Three hundred willows were planted by hand in riparian areas. Through these hands-on restoration efforts, ½ mile of river corridor was improved. Twenty worm fences were built totaling 542 linear feet, four fire pits were disassembled near streams, and 11 travel management signs installed to protect sensitive areas and improve communication. A total of 1,500 feet of impacted user-created road was closed and restored through revegetation. HCCA was able to provide lunches to every volunteer and developed relationships with local businesses to sponsor the work.

Restoration Project Area Map



<u>Ninemile Hill</u> (BLM)

Volunteers constructing a worm fence at Willow Creek (Ninemile Hill Project)

HCCA volunteers spent two days in this area partnering with the BLM to improve wildlife habitat (including for the Endangered Species Act-listed Gunnison sage-grouse) and protect sensitive areas. Volunteers constructed worm fences and strategically placed rock and woody debris to effectively treat head cuts forming in the meadows on site. Volunteers learned that head cuts are early erosion features that can develop into major gullies that result in water being drained from the landscape. Treating head cuts using local rock and woody debris proved to be an enjoyable task for volunteers who felt a sense of accomplishment with proper placement.

Volunteers learned about historic travel routes impacting wet meadows in the sagebrush-steppe landscape, which caused critical parts of the landscape to dry up through erosion and wet areas being drained. BLM staff on site explained the process of closing roads to protect water quality and wildlife habitat and how this is one of the best ways to protect sensitive areas. Constructing worm fences to properly discourage vehicle use in sensitive areas is another task that volunteers undertook. Safely stacking and drilling lodgepole pine logs required multiple hands to keep the fence steady and volunteers constantly switched positions of holding, drilling, and wrapping protective wire to the top level. The cadre of community volunteers came together and cheerfully completed the set objectives for the two workdays at Ninemile Hill.

Project implementation dates: 07/28/2021 & 07/31/2021
Accomplishments: 1 one-rock dam constructed, 8 worm fences (416 linear feet) constructed, 5 rock mulch structures constructed, 3 fire pits removed from riparian areas
Total Volunteers: 13
Total Volunteer Hours: 65

Taylor Park Travel Management (USFS)

Volunteers with a recently constructed worm fence in front of a ripped road

The Taylor Park Travel Management project focused on closing user-created routes that encroached on riparian areas and other sensitive lands. The goal of this project was to improve watershed health and support wildlife. Volunteers constructed fences and installed signs to improve communication on what routes are closed and what areas are open to dispersed camping. After routes were fenced, volunteers broke up compacted soil with hand tools and began the slow restoration process by reintroducing local vegetation and seeds.

Volunteers were led by USFS Hydrologist, Ashley Hom, who incorporated educational components to the travel management workdays. Ashley often asked volunteers what they would do as land managers when faced with complex environmental issues. These workdays in Taylor Park often occurred near the Taylor River and other creeks in Taylor Park where motorized recreation and dispersed camping cause

impacts within the riparian buffer zone. During these workdays, members of the public would often stop by and ask questions about the project, which provided a great way to share current issues regarding watershed health and actions to address them.

Ashley Merkel, USFS field tech, confirmed that 9.77 miles of road in total were ripped (in preparation for revegetation). HCCA and the USFS hired Stonefly Earthworks to complete the ripping and boulder placement necessary to implement the project. HCCA and USFS staff trained volunteers to build fences and install fence posts and signs to help prevent travel on recently reclaimed roads. In total, project volunteers built approximately 20 fences. HCCA volunteers spent two days implementing this portion of the restoration project. The STOR conservation corps also contributed an extra day of implementation work (additional volunteer time was needed for signage and fencing). Photos of the road ripping, fencing and signage are provided below..

Project implementation dates: 9/22/20, 9/29/20, 8/17/2021 & 8/31/2021
Accomplishments: 12 worm fences (126 linear feet) constructed, 9 travel management signs installed, 1,128 feet of road restored, 9.77 Miles of user created routes ripped,1 fire pit removed from riparian area
Total Volunteers: 9
Total Volunteer Hours: 48

Flat Top Mountain (USFS)

Volunteers working on a continuous section of one rock dams on Flat Top Mountain

HCCA partnered with WRV, BLM, USFS, CPW, and UGRWCD to restore riparian and wet meadow habitats in sagebrush shrublands, strengthening the resiliency of our local environment. Volunteers used innovative, yet simple, restoration methods, specifically small rock structures to raise the water table to support plants and insects needed by wildlife (including the Gunnison sage-grouse). Volunteers from HCCA joined WRV over the 2021 Labor Day weekend to learn or sharpen their skills in wet meadow restoration. The worksites on Flat Top Mountain offer an expansive view of the Gunnison Valley and city of Gunnison below. This project was one of the premier community-building stewardship events of the season.

Volunteers enjoyed sharing meals and coffee while stewarding their public lands. Each day began with a project overview, training exercises, and educational components. Once the crews were assembled and assigned project locations, the group problem solving and teamwork began. Crews of around five people would spend as much time needed on their rock structures, solicit feedback from project leaders, and then leapfrog other crews on their way to the next site, sharing stories and knowledge while passing by.

Project implementation dates: 8/29/20, 9/4/2021 & 9/5/2021
Accomplishments: 38 rock structures constructed
Total Volunteers: 20
Total Volunteer Hours: 130

Monson Gulch (BLM)

Riparian restoration volunteers at Monson Gulch

At Monson Gulch, volunteers spent time restoring wet meadow systems to protect biodiversity. The main focus of this site is to promote re-population of the Gunnison sage-grouse by implementing different rock and beaver mimicry structures so that hydrological function is restored. The Monson Gulch project was part of the three-day Labor Day weekend stewardship event with WRV. After two days at project sites in the sagebrush shrublands north of Gunnison, volunteers moved east to Monson Gulch.

The Monson Gulch site, tucked under Tomichi Dome, provided an opportunity for volunteers to get near (or in) some moving water while constructing hybrid wicker weir/beaver dam analog structures. These structures were made of local sagebrush, rocks, willows, and wooden stakes that were designed to slow water down and spread it out across the valley bottom. The crews split between two groups. Those who wanted to hone their rock-work skills opted to join the crews constructing rock structures. Those interested in weaving willow, tamping sod, and getting muddy chose to learn about implementing beaver mimicry structures. Regardless of which group volunteers chose to join, everyone gained more experience in reading the landscape and thinking like water.

Project implementation date: 09/06/2021
Accomplishments: 4 rock structures constructed, 5 wicker weirs constructed Total Volunteers: 8
Total Volunteer Hours: 52

Chance Gulch (BLM)

Volunteers constructing a one rock dam at Chance Gulch

Volunteers celebrated National Public Lands Day by implementing wet meadow restoration structures at Chance Gulch, near Gunnison. BLM hydrologist Andrew Breibart prepared and shared visual handouts that illustrated the goals of restoration work on Chance Gulch. Andrew spoke to the basin-wide wet

meadow restoration project at large and incorporated local mining history that occurred near Chance Gulch. Volunteers understood that participating in this stewardship event and implementing structures help to “wet the sponge” of mesic and wet meadows, allowing water to stay on the landscape longer in the season, supporting the health and resiliency of our local landscape and community. These hand-built structures also increase vegetation growth in the arid sagebrush steppe landscape, supporting the Gunnison sage-grouse and many other species. Many of the volunteers who participated live in Gunnison, but had never been to this area so close to town.

Project implementation date: 9/12/20 & 9/18/2021
Accomplishments: 1 rock baffle constructed, 1 hybrid sticks-and-stones structure constructed Total Volunteers: 7
Total Volunteer Hours: 35

Trail Creek in Taylor Park (USFS)

Volunteers constructing a BDA along Trail Creek

During September the first implementation of Low-tech Process Based Restoration (LTPBR) using Beaver Dam Analogs (BDAs), Post Assisted Log Structures (PALS), and other simple hand built structures on USFS land in Taylor Park took place on Trail Creek, a tributary of the Taylor River. A phenomenal 47 volunteers and partners including the STOR Committee, students and professors of WCU, USFS, BLM, and members of the Gunnison Valley Beaver Believers arrived with enthusiasm to help restore the degrading wetlands.

The excellent volunteer turnout allowed for the project to far exceed expectations, and many volunteers are interested in returning to lend a helping hand for Stage 2 implementation. Volunteers quickly took to the LTPBR techniques and felt a sense of ownership and pride in seeing the structures they built already increase pool depth and attenuate water in the landscape.

Volunteers were trained in how to contribute to implement LTPBR methods to strengthen the resiliency of riparian systems, improving watershed health. Mimicking beaver structures helps attenuate water in the landscape and return complexity to poor riverscapes, allowing more wetland vegetation to grow. In Phase 1 of the Trail Creek project, restoration practitioners, contractors, and volunteers worked together to build 32 BDAs, 12 sod speed bump structures, and 18 woody material structures. Volunteers also planted native willow harvested on-site along Trail Creek. This project was recently featured on the front page of one of our local newspapers, the Gunnison Country Times.

Project implementation dates: 9/9/2021, 9/15/2021, 9/17/2021
Accomplishments: Volunteers assisted in the construction of 45 beaver mimicry structures, 300 willow locally harvested and planted
Total Volunteers: 47
Total Volunteer Hours: 177

Task 5 – Monitoring
Monitoring of selected project sites is ongoing. Fortunately the areas of work are often near or adjacent to previous years' work. During implementation we are able to not only monitor the site, we are also utilizing the sites for tours showing volunteers and other partners the progress and how the habitat conditions improve from year to year. When bringing volunteers to the project area we often start with an education component that showcases the structures used along with how and why they positively affect the landscape. This process highlights erosion structures, revegetation efforts and earthen dams since they are often the techniques that volunteers will be utilizing.

Black Sage Pass Project Area - June 2022 Update: Hand built wet meadow restoration structures that were installed in 2018-19 were reviewed for effectiveness and structural integrity in May 2022. Nearly all the structures were functioning and remained effective. Some structures need maintenance, some are unbuilt, and new structures have been designed for future construction events. Significant additional opportunities remain at Black Sage Pass. New structures were designed and offer opportunities to finish restoring the project area. Generally, proposed structures are headcut control and grade control structures. A full site report was completed by Shawn Connor and included as part of this report.

Task 6 – Administration, contracting, permit compliance
All administration, contracting and permit compliance was coordinated in-house by HCCA and in conjunction with our local partners and stakeholders as needed. Throughout the project timeframe, HCCA has provided 233 hours of staff time in order to accomplish project implementation.

Results

2020 - 2021 Wet Meadow Report

During implementation, practitioners and volunteers used innovative yet simple restoration methods, e.g., rock structures, BDAs, and equipment-built plug-and-spreads to improve hydrologic and ecological function of wet meadows and riparian areas managed by the BLM, USFS, CPW, and private landowners. These treatments are designed to raise the water table, reduce erosion, reconnect the channel to the floodplain, and increase wetland plant cover. Field crews, including Western Colorado Conservation Corps, volunteers from WRV, HCCA, WCU, and contractors built a total of 291 structures, restoring 73 acres of wet meadow, and 315 acres of sagebrush habitats for sage-grouse along 5.9 stream miles at eleven priority sites in 2020 and 2021. See table 1 below for HCCA's contribution.

Vegetation monitoring shows that the project is improving hydrologic/ecological function of riparian areas and wet meadows. The management objective for the project is to increase the average cover of native sedges, rushes, willows, and forbs (obligate and facultative wetland species) in the restored portion of the treated properties by at least 20% within five years of treatment. To monitor that objective, the partners, led by the Colorado Natural Heritage Program, have established over 500 transects on treated and untreated (control) areas. Wetland species cover has increased by 153% in ephemeral (snow melt driven) systems, and by 49% in perennial (spring driven) systems, compared to a 1% reduction in untreated ephemeral systems and a 5% increase in untreated perennial systems (Jones, 2021).

2021 Trail Creek Report

In Phase 1 of the Trail Creek project, restoration practitioners, contractors, and volunteers worked together to build 32 BDAs, 12 sod speedbump structures, and 18 woody material structures (mostly PALS – post-assisted log structures). In addition to the structural treatments, volunteers harvested approximately 250 tall-stature willow stems from riparian areas on the Taylor River and planted them in the riparian area along Trail Creek.

This project aims to restore natural stream-wetland conditions to as much of the mainstem of Trail Creek as possible over multiple phases. This restoration approach can feasibly improve conditions over about 3.0 miles of riverscape corridor (about 127 acres). The amount of effort (density of treatments) needed varies. In phase 1, approximately 0.3-miles of the Middle segment was treated, starting where County Road 748 crosses and going downstream, to improve an estimated 10-12 acres of riverscape. Future phases will extend treatments up- and downstream with the aim of restoring the full 3.0 miles (127 acres) over time (EcoMetrics, 2021).

As of June 13, 2022 there is evidence of local beavers moving in and improving upon our hand-built restoration structures. Seen in the photo below, the historic lodge that has been reclaimed and fresh vegetation has been incorporated into a BDA.

Beavers reclaim historic lodge and improve BDA along Trail Creek

At the completion of this grant, HCCA engaged a total of 143 local volunteers. Volunteers included individuals from Gunnison and Crested Butte, students from WCU, and others who traveled from other parts of the state to participate in the low-tech restoration opportunities provided. The community education component of this project proved to be a pull factor for volunteers to participate and learn about public land-based climate change and drought resiliency projects. Faculty from WCU planned class field trips and assignments around our volunteer workdays.

Table 1: Major Volunteer Accomplishments

Year	Volunteers	Hours	Rock Structures	Beaver Mimicry Structures	Lunches Provided
2020	41	345	25	0	41
2021	102	507	50	45	102
Total	**143**	**852**	**75**	**45**	**143**

Conclusions and Discussion

All objectives were met. Funds were reallocated from task 3 for Black Sage Pass due to plug-and-spread setbacks from a shortage of heavy machinery availability, Gunnison sage-grouse closures, and snow cover during the final year of implementation. Project monitoring is ongoing and performed by our agency and contractor partners as well as the UGRWCD.

During the course of this grant cycle, HCCA has emerged as the premier organization for local environmental stewardship volunteer coordination. In 2021, HCCA developed a partnership with the Master in Environmental Management (MEM) program at WCU where each year a student serves in a fellowship position to assist the development and implementation of HCCA's Stewardship Program. MEM students have increased the capacity of the stewardship program so that HCCA can offer more effective climate resilience project implementation to the public land management agencies with a cadre of trained volunteers.

Future projects planned for the upcoming season include a continuation of the wet meadows restoration and increasing the impact of wetland restoration on Trail Creek in Taylor park focusing on beaver-based restoration. More recently, HCCA has been developing a relationship with the two local high schools in Gunnison County, Gunnison High School and Crested Butte Community School, to connect the next generation of community members to public lands in an experiential and educational way.

Building upon the success of this grant, projects planned for 2022 will feature HCCA volunteers returning to previous sites to continue restoring critical environments, strengthening Gunnison County's ecological and social resiliency.

Planned 2022 Wet Meadow Restoration Resiliency Building Projects

On September 2-5, HCCA will join WRV for a second year of joint wet meadow restoration at Miller Ranch State Wildlife Area (CPW) and Black Sage Pass (USFS). Volunteers will be led by agency staff and restoration practitioners.

To celebrate National Public Lands Day on September 24, HCCA will support the BLM along Upper Willow Creek (part of the Ninemile Hill project area) to treat headcuts with Zeedyk structures.

Planned 2022 Taylor Park Wetland Restoration Projects

This season we plan to double the impact made along Trail Creek in Phase I during 2021.
Over the course of four community volunteer workdays, the intended outcome of this project is to coordinate at least 90 volunteers to reconnect and restore 57 acres of riparian and wetland habitat along 1.35 miles of stream corridor and to increase water attenuation on the landscape. An anticipated 150 LTPBR structures are to be built with the assistance of volunteers. A total of at least 540 volunteer hours served Involvement of at least 90 volunteers, half being local students (includes students from WCU, Gunnison, and Crested Butte high schools).

Actual Expense Budget

	Task Description	Grant Funding Request	Cash Match	In-Kind Match	Total Match
1	Localized Site Review and Design	$5,000		$5,000	$5,000
2	Rock Purchase, Deliver, and Staging	$10,000		$10,000	$10,000
3	Black Sage Pass Re-evaluation	$15,000	$9,549	$5,451	$15,000
4	Volunteer coordination, training, and project construction	$14,000	$23,300	$37,500	$60,800
5	Monitoring	$0		$1,000	$1,000
6	Administration, contracting, permits	$5,000	$4,000	$10,485	$14,485
	Total	**$49,000**	**$36,849**	**$69,436**	**$106,285**

Appendix

Additional Photos

Volunteers with a one rock dam at Chance Gulch

Aerial view of Trail Creek the in the spring of 2022

Volunteers constructing a hybrid structure at Chance Gulch

Volunteers with a one rock dam on Flat Top Mountain

Riparian restoration volunteers at Monson Gulch

Volunteers gathering sod for a BDA along Trail Creek

Volunteer planting native willow along Trail Creek

Volunteers placing rocks for a one rock dam on Flat Top Mountain

HCCA and WRV volunteers at the beginning of a workday on Flat Top Mountain

Volunteers close, fence, and sign a decommissioned road in Taylor Park

Volunteers working to revegetate a decommissioned road in Taylor Park

Volunteers unloading worm fence poles at Ninemile Hill

Volunteers joining CPW and BLM to construct a worm fence at a decommissioned road at Ninemile Hill

Volunteers sort rocks to construct a one rock dam at Ninemile Hill

Volunteers construct a one rock dam at Chance Gulch

Volunteers completing a hybrid structure at Chance Gulch

Volunteers hauling and staging rock at Chance Gulch

Two recently constructed BDAs along Trail Creek

HCCA provided coffee for the Flat Top Mountain workdays

Volunteers constructing a wicker weir at Monson Gulch

Volunteers working on a series of one rock dams on Flat Top Mountain

References

BIO-Logic, Inc., 2022. USFS Black Sage Pass Project Area– Wanita Park, Gunnison Basin.

EcoMetrics, 2021. Trail Creek 2021: Partnering with beaver to restore stage-0 stream-wetland corridor.

Jones, P, 2021. Wet Meadow Restoration Resiliency Building Project Final Report 2020-2021.

Wheaton J.M., Bennett S.N., Bouwes, N., Maestas J.D. and Shahverdian S.M. (Editors). 2019. LowTech Process-Based Restoration of Riverscapes: Design Manual. Version 1.0. Utah State University Restoration Consortium. Logan, UT. Available at: http://lowtechpbr.restoration.usu.edu/manual

Zeedyk, B and Clothier, 2014. Let The Water Do The Work: Induced Meandering, an Evolving Method for Restoring Incised Channels, 2nd edition. Quivira Coalition.