

Human–Wildlife Interactions 11(3):302–310, Winter 2017

Case Study

Utah's Watershed Restoration Initiative: restoring watersheds at a landscape scale

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Abstract: The Utah Watershed Restoration Initiative (WRI) is a partnership-based program, administered by the Utah Department of Natural Resources, which seeks to improve the functional capacity of high-priority watersheds throughout the state. Since its inception in 2006, the WRI partnership has completed nearly 1,500 projects to restore and rehabilitate >526,091 ha in Utah watersheds. The WRI program is unique to the west, in that it transcends jurisdictional boundaries and local, state, and federal management authority to focus finite resources on completing high-priority conservation projects. We surveyed selected WRI participants in 2015 to determine what factors they believed most contributed to the overall success of the program. Survey respondents attributed the success of the WRI program to: 1) engaged leadership at multiple levels, 2) a bottom-up hierarchy, 3) a history of collaboration, 4) practice partnerships, 5) a science-based approach, 6) operating at a meaningful spatial scale, 7) being solution minded, not problem focused, and 8) unselfish sharing of resources. In this paper, we discuss these success factors and provide recommendations to those desiring to implement voluntary incentive-based landscape conservation strategies.

Key words: *Centrocercus urophasianus*, collaboration, greater sage-grouse, landscape restoration, partnership, rangeland restoration, species conservation, Utah, watershed restoration

IN THE EARLY PART of this century, western rangelands were facing serious threats (Havstad et al. 2009). In some areas, the dominant sagebrush (*Artemisia* spp.) vegetation was dying over large areas. Severe drought was common, and an explosion in Army cutworm (*Euxoa auxiliaris*) population was denuding sagebrush at an unprecedented scale (Utah Division of Wildlife Resources [UDWR] 2002). Pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) was encroaching into and eliminating the sagebrush canopy and understory over large areas of western rangelands (Miller et al. 2005). Long-term Utah range trend data were also showing a rapid spread of cheatgrass (*Bromus tectorum*) in the understory of many of the state's sagebrush stands threatening conversion of these areas to cheatgrass monocultures following fire or the death of the sagebrush (Banner et al. 2009).

Concern about declines of the greater sage-

grouse (*Centrocercus urophasianus*; sage-grouse) prompted several environmental organizations to petition the U.S. Fish and Wildlife Service (USFWS) to provide the species protection under the Endangered Species Act (ESA; USFWS 2010). In 2015, the USFWS determined that the species did not warrant ESA protection because rangewide efforts had largely mitigated the conservation threats (USFWS 2015). These state-initiated efforts demonstrated to the USFWS that conservation certainty could be achieved using a voluntary incentive-based collaboration strategy.

Arguably, among the best examples of this approach is the Utah Watershed Restoration Initiative (WRI). The basic tenet of WRI was to not just protect these sagebrush communities from fire and disease, but to think big and restore the health (resistance and resilience) of watersheds over large landscapes to benefit



Figure 1. The landscape vegetation classification for Utah encompasses 17 Bailey Ecoregions (Ramsey and West 1983).

wildlife habitat, water quality and quantity, livestock forage, and reduce the risk of catastrophic fires. The work would benefit all rangeland users and be marketable to an increasingly urban audience (Utah Partners for

Conservation and Development [UPCD] 2008). The WRI is a partnership-based program, sponsored by the UPCD and developed to improve the functional capacity of high priority watersheds throughout the state of Utah. The

UPCD is a unique partnership of Utah natural resource oriented agencies and organizations at the federal, state, and local level committed to providing solutions to land use challenges (UPCD 2008). Now completing its twelfth year of projects in Utah, the stated purpose of WRI is to restore and improve watershed health in priority areas across the state. The WRI focuses on 3 ecosystem values: 1) watershed health, 2) water quality and yield, and 3) opportunities for sustainable uses of natural resources (Watershed Restoration Initiative 2017).

This conservation effort seeks to enhance and protect Utah's present and future quality of life by improving water quality and yield, reducing catastrophic wildfires, restoring the structure and function of watersheds following wildfire, and increasing habitat for wildlife populations and forage for sustainable agriculture. Since 2006, partners have completed nearly 1,500 projects managing >500,000 ha. In 2015, >122 agencies, organizations, and individuals contributed to WRI projects by providing funding or in-kind assistance.

Because there are few other watershed restoration initiatives of this magnitude operating in the West, we were frequently asked what our keys to success are. To answer this question, we surveyed program participants in 2015 to determine what factors they believe most contributed to the overall success of the program.

Study area

Utah consists of 219,887 km² and is located within the Dry Domain of Bailey Ecoregions (Ramsey and West 1983). The major ecoregions include alpine, subalpine, intermountain semi-desert, and desert (Figure 1). Most WRI projects have been completed in the intermountain semi-desert lowlands. These lowland areas receive ≤30 cm of precipitation annually (Banner et al. 2009).

The lowland areas are largely classified in northern Utah as sagebrush-steppe and in central and southern Utah as primarily sagebrush semi-desert (Ramsey and West 1983, Banner et al. 2009). Both are shrub-dominated sagebrush systems differentiated by an increased herbaceous component in higher latitude sagebrush-steppe systems compared with lower-latitude sagebrush semi-desert. Generally,

big sagebrush (*A. tridentata*) varieties dominate most landscapes within occupied habitats with Wyoming (*A. t. wyomingensis*), basin (*A. t. tridentata*), and mountain (*A. t. vaseyana*) big sagebrush at lower, mid, and high elevations, respectively (Banner et al. 2009, Dahlgren et al. 2016). Although statewide landownership in Utah is predominantly federal, private lands in the state provide approximately 50% of the current habitat for sage-grouse populations (Beck et al. 2003, Dahlgren et al. 2016).

Pinyon-juniper woodlands are also an important vegetation type in the intermountain semi-desert ecoregion. However, there is strong evidence that these woodlands have been expanding into the sagebrush landscape. The infilling affects soil and plant community structure, water and nutrient cycles, forage production, wildlife habitat, and fire cycles (Tausch 1999). Concomitantly, WRI has also focused on managing pinyon-juniper encroachment.

Methods

In 2015, Utah was invited by the host state of Nevada to present during the plenary session on the Watershed Restoration Initiative at the Western Association of Fish and Wildlife Agencies (WAFWA) annual conference in Reno, Nevada. The purpose of the presentation was to share program insights with other WAFWA members that could help them launch similar programs in their states. A key question we were asked to address was why this program has been so successful in Utah.

In the winter and spring of 2015, we surveyed long-term Utah WRI participants to learn more about why they are involved in the program. The study followed the key informant design (Dillman 2000). Key informants were defined as natural resource professionals who were currently participating in the WRI or had participated in its formation and early years. We asked participants why they invested their time in WRI rather than focus just on their own programs. Specifically, we also asked them to identify what factors they believed led to the success of WRI in terms of matching dollars contributed by partners (greater than a 4:1 ratio), number of partners participation in projects per year (>30) and hectares treated per year (>40,500), the original objectives of the initiative.

The WRI program has a strong communication network through its regional teams. So, we also asked the current 5 regional team chairs to query their members by email about why they participate in WRI, a single open-ended question, and to respond directly to the WRI program director. Because we wanted to share more about participant insights at the WAFWA conference than overall program operation, we did not use a structured survey but instead focused on identifying unique ideas shared by participants. We also solicited input from former leaders in the WRI program. Insights provided by key leaders and informants can provide important information regarding overall program effectiveness (Dillman et al. 2014).

Results

Over 30 individuals shared their reasons for participating in WRI. Respondents included employees of federal land management agencies, state agencies, county government representatives, and staff within non-governmental organizations (NGOs). From their responses, we grouped similar responses and identified the unique reasons that are shared in this paper. We did not attempt any statistical or detailed analysis of respondent demographics. We wanted to identify unique insights, even if shared by only an individual WRI participant. Because of the open-ended survey, we received diverse responses. We consolidated the responses into 8 major categories for interpretation and reporting.

Leadership at multiple levels

As WRI was being developed, we had the benefit of leadership emerging at multiple levels. The natural resource agencies at the federal, state, university, and local level already had an affiliation through the UPCD. The UPCD had existed since the 1960s under a variety of names and varying membership (UPCD 2008). The Director's Council of this organization met sporadically to exchange information except when faced with a need to address a major threat or challenge.

When the threat to rangelands in Utah occurred, the UPCD Council had strong leadership including Mike Styler, executive director for the Utah Department of Natural

Resources (UDNR); Kevin Conway, director of UDWR; Leonard Blackham, commissioner of the Utah Department of Agriculture and Food; Silvia Gillam, state conservationist for the Natural Resources Conservation Service; and Sally Wisely, state director for the Bureau of Land Management (BLM). This group provided the initial support, funding, and staff to develop the WRI. The UPCD Director's Council has continued to provide support for the initiative for the 11 years since its launch. Two key staff were committed by their agencies to work with the UPCD Director's Council to develop the program. Most of the approaches and practices in WRI were developed and implemented by Rory Reynolds from UDNR and A. J. Martinez from the BLM, including initiating and nurturing the regional teams. The individuals filling these roles have changed over time along with 2 others in the UDWR. However, all have remained committed to managing and growing WRI.

Bottom-up hierarchy

Most of the work of the WRI happens at the local level through regional teams. Regional teams were developed based on the UDWR administrative boundaries (Figure 2). The UDWR committed staff to provide support and assistance with the development of projects and functioning of the teams. Restoration biologists were hired in each region by UDWR to support the program and manage projects across ownership boundaries. Regional teams elect their own officers, prepare their own charters, identify their focus areas, schedule their meetings and review, score and rank projects. Ranking guidance and criteria for projects and general oversight comes from the state-level positions and the UPCD Director's Council. Additional focus at the state level was and still is principally centered on seeking additional funding sources, looking for efficiencies in project implementation, maintaining a database and business system, and providing anything else that regional teams need to be successful.

History on our side

Most of the factors that made WRI successful can be seen in any state with leadership and commitment, but the fact that agencies in Utah, including the UDWR, have a long history of

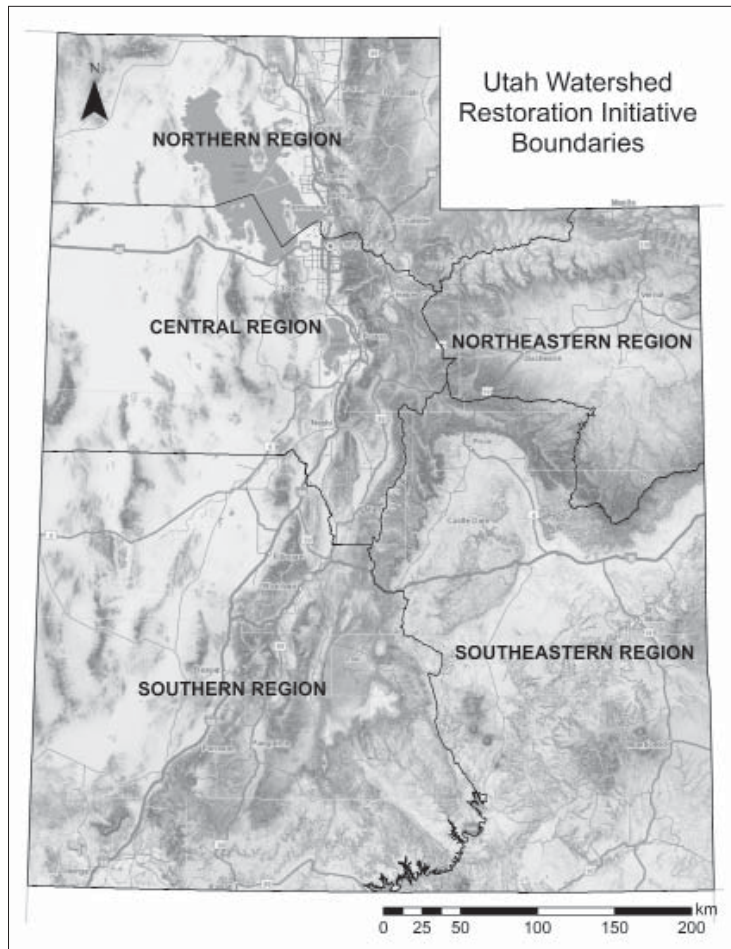


Figure 2. Utah Watershed Restoration Initiative (WRI) boundaries, Utah Department of Natural Resources, 2017).

involvement in habitat work gave WRI a jump start. The UDWR Great Basin Research Center in Ephraim, Utah provides the infrastructure to support WRI, including the ability to purchase, store, and custom mix seed as well as development, maintenance, and delivery of crucial habitat restoration equipment. Since the 1940s, a primary effort of the personnel has been to improve regionally adapted plant material for use in restoration projects (UDWR 2002). The agencies involved, including UDWR, BLM, and the U.S. Forest Service have 60 years of habitat management and restoration experience and a long history of cooperating in range trend monitoring and treatment projects (UDWR 2015).

In the 1990s, the Utah legislature implemented a fee on each hunting and fishing license, called the Habitat Authorization, that provided dedicated funding (about \$2 million per year at that time, now over \$2.3 million) to conduct

habitat improvement projects throughout the state (UDWR 2011). The Habitat Authorization provided the funding for a dedicated position to coordinate habitat projects in the state. This position has evolved to be the habitat conservation coordinator in the UDWR, a key position for administering the WRI. One of the early staff in this position, John Fairchild, promoted the initial construction and then 2 expansions of a new seed warehouse that has become a cornerstone of WRI, providing an opportunity to purchase, store, and provide seed in large quantities at discounted prices to WRI partners. Due to the early emphasis placed on habitat by the UDWR, a cadre of employees throughout the agency was ready to take on the bigger challenge of landscape-scale restoration.

Practice partnership

The WRI program emphasized practicing partnership at every level. It is easy to participate; there is no secret handshake involved. Credit is shared, and “we” is the most common pronoun used when

describing a project. Anyone who participates in designing, managing, or funding a project gets credit for their contribution. All steps in the process of proposing a project are open to everyone to review and monitor. Open communication is encouraged in several ways. The project ranking criteria award extra points for adding partners and working across ownership boundaries (Table 1).

The online business system includes a communication system that allows anyone registered and logged into the site to provide comments on projects and keeps a record of both the comments and responses (WRI 2017). Projects lose points if comments are not responded to by the project proponent, thus encouraging a civil back-and-forth exchange of ideas. Meetings and field trips are held by regional teams to review focus areas and projects, sharing both successes and failures. The strengths that each partner brings to the

Table 1. Criteria used by regional team to rank project for Watershed Restoration Initiative (WRI) funding (WRI 2017).

| Category | Ranking criteria | Score value |
|---|------------------------------------|-------------|
| WRI core values | Water quality and yield | 10 |
| | Wildlife and biological diversity | 30 |
| | Opportunities for sustainable use | 10 |
| Ecological considerations | Threats and risks | 10 |
| | Catastrophic fire threat reduction | 10 |
| | Future management | 15 |
| | Conservation focus area | 20 |
| Administrative/Partnership considerations | Partner inclusion | 15 |
| | Project monitoring | 15 |
| | Relation to management plans | 10 |
| | Communication | 5 |
| Total points | | 150 |

initiative are identified, and an emphasis is placed on sharing that with others. For instance, the state contracting process is much easier and more efficient to use than federal processes, so many projects carried out by a federal agency use the state contracting process (e.g., contracting for cultural clearance and mechanical treatments). In the case of projects by our federal partners, the contribution of funds from state and private partners allows their projects to be more competitive for funding at the regional level than going it alone.

The WRI is a partnership, not a dictatorship. Partners are not obligated to bring projects through WRI. If it makes more sense to go it alone or through another mechanism, go ahead. Finally, we report accomplishments regularly through a variety of mechanisms, always giving credit to our partners.

Science approach

Since the beginning, WRI has been committed to using the best science available while implementing the monitoring of projects and using the results to drive adaptive management of future projects. Every 2 years, a statewide workshop is held to bring in researchers and experts in treatment techniques (e.g., chemical herbicide use in cheatgrass areas, conifer treatment methods) to share their work and interact with the WRI partners. Regional teams also hold smaller sessions annually. Field tours of

projects in every stage are held by each regional team to look at treatment results and solicit input for similar projects in the future, including seed mixtures. The project proposal review process provides opportunities for colleagues to make suggestions to project managers to improve the project. Monitoring is an important part of each project, and monitoring results are made available to researchers to analyze and publish results. Recent research published by Frey et al. (2013), Sandford et al. (2015), Cook et al. (2017), and Sandford et al. (2017) have reported positive responses of sage-grouse to WRI conifer removal projects.

Operate at a scale that matters

Since the start of WRI, projects have grown in size and are often planned in multiple phases to treat at a landscape scale. Regional teams establish focus areas so that multiple agencies can work in the same watershed rather than randomly treating areas across the landscape. Big projects have become the norm, and there is a regional team that uses the motto “go big or go home” when looking at projects. Larger projects often provide an economy of scale that allows overhead to be spread over more hectares, reducing the per-hectare cost. The cost to stage large machines with operators for a 121-ha project is the same as a 1,214-ha project. Contractors bid lower per hectare for larger projects, allowing more hectares to be

completed for the same money.

Treating watersheds at a scale that matters requires large planning efforts including National Environmental Policy Act compliance and archeological clearances before a project is executed. Programmatic Environmental Assessments and Environmental Impact Statements make this work even more efficient. It requires partners to develop projects that cross ownership boundaries, and even with the savings from economy of scale and using efficiencies within agencies, success requires big funding. Each year, the WRI partners have been successful in pooling funding to conduct large projects.

In FY2015, nearly 32,375 ha were treated in Utah with partners contributing \$14.6 million plus an additional \$1.9 million of in-kind services toward the projects. These treatments do not include fire rehabilitation, which is also often completed through WRI.

Solution-minded, not problem-focused

One philosophy that has guided WRI from the beginning is that we identify problems and bottlenecks that reduce our efficiency and effectiveness, then we focus on finding and implementing solutions. Over-analyzing problems can lead to stagnation; we often refer to this as the “paralysis of analysis.” Developing solutions and quickly implementing the best keeps the process moving. This applies to funding as well. We try to be agile in moving funding to other waiting projects if a project needs to be delayed.

Partnership, not a charity

Finally, WRI is a partnership, not a charity. This means that there is not an expectation for any partner to participate in WRI if they are not receiving a net gain in reaching their objectives. Partners should receive more than they invest in the initiative. Many partnerships are organized to give benefits to some by the sacrifices of others (Williams and Ellefson 1996). That is okay for charitable purposes, but WRI wants all partners to gain in a substantial, measurable way. Gains from a single project may include better water quality for the first partner, more forage for livestock for the second, increased wildlife populations for a third, and reduced wildfire suppression costs for a fourth. A good landscape scale watershed project should

provide all of these and more (Williams and Ellefson 1996).

Discussion and conclusions

Some people wonder whether a program devoted to restoring healthy watersheds is appropriate for a state wildlife agency. To build a large partnership investing in and promoting an initiative, unifying ideas are essential to engage all partners. Partners need to be able to find their priorities under the umbrella of the initiative. With WRI, although wildlife habitat may not be a leg in the program’s 3-legged management stool, restoring and maintaining healthy watershed encompasses restoring fish and wildlife habitat. A major focus of WRI is addressing the encroachment of conifers into sagebrush habitat in Utah. Research in Utah and other states in the West has shown that conifer encroachment into sage-grouse habitat leads to avoidance of the habitat, lek abandonment, and subsequent population declines (Cook et al. 2017).

The encroachment of juniper and pinyon pine woodlands into sagebrush ecosystems has been identified as a major sage-grouse conservation threat in Utah (State of Utah 2013). Radio-marked sage-grouse were monitored from 2012 to 2015 in the Box Elder Sage-grouse Management Area in Utah in areas where mechanical conifer removal projects were conducted (Cook et al. 2017, Sanford et al. 2017). The authors demonstrated that sage-grouse select for nest and brooding sites closer to conifer removal areas and that the probability of individual nest and brood success declined as sage-grouse females selected sites farther from conifer removal areas (Sanford et al. 2017).

From an ecosystem perspective, WRI talks about improving the health of watersheds and reducing the risk of catastrophic wildfire by removing conifers in sagebrush systems, but for a wildlife agency, it also means reducing a threat to sage-grouse populations and improving sage-grouse habitat and populations. Initially, WRI was established with output-based objectives to evaluate its success, including matching dollars provided by partners, number of partners contributing to projects, and area treated. As the program has matured, objectives have been established that are more outcome-based, such as area

of sage-grouse habitat created or restored to prevent the listing of sage-grouse under the ESA (USFWS 2015).

Management implications

At the end of the day, it's all about maintaining relationships—range professionals working with the support of their respective state or federal agencies and producers, understanding that rangeland ecosystems are dynamic and that the “keep doing the same thing” alternative places a variety of rangeland values at risk. The challenge facing WRI and other range restoration initiatives is to maintain support from a general public that is less aware of the dynamics playing out on western rangelands and the need to intervene with proven restoration techniques to maintain the ecosystem values targeted by WRI: watershed health, water quality and yield, and opportunities for sustainable uses of natural resources.

Acknowledgments

We want to thank R. Reynolds and J. Fairchild from the UDWR for reviewing an early draft of this manuscript. We want to thank the survey participants who shared their views on and experience with the initiative. Finally, we thank the UPCD Director's Council for their support of WRI and >120 individuals, agencies, and organizations who are partners in our landscape-scale approach to watershed restoration in Utah. The manuscript was greatly improved with comments provided by N. Frey, HWI associate editor, and 2 anonymous reviewers.

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