

TECHNICAL REPORT

A collaborative model for large-scale riparian restoration in the western United States

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In 2009, a group of practitioners took action to restore 175 miles of riparian habitat impaired by invasive plants along the Dolores River in southwestern Colorado and eastern Utah. Recognizing the magnitude of ecological, jurisdictional, and management challenges associated with this large-scale initiative, this group of managers built trust and relationships with key partners to foster collaboration across boundaries and cultivate consensus of a variety of perspectives and forms of knowledge. What emerged was a network of individuals, organizations, and agencies dedicated to restoring the Dolores River riparian corridor while sharing information and learning from one another. This public–private collaboration, called the Dolores River Restoration Partnership (DRRP), has been successful in creating a process by which financial, technical, and human resources are shared across boundaries to restore a riparian corridor. Specifically, the DRRP developed effective planning documents, a responsive governance structure, monitoring protocols, and a shared mindset for extracting lessons learned that have been instrumental in making progress toward its shared restoration goals and addressing a wide variety of restoration challenges. The tools developed by the partnership and lessons learned from their utility are outlined in this case study as a means to inform other collaborative restoration efforts.

Key words: collaboration, Dolores River, governance, learning, monitoring, partnership, planning, riparian restoration

Implications for Practice

- Planning documents with strong partner input and consensus, effective monitoring protocols, frameworks for extracting and building on lessons learned, and a responsive governance structure can be critical components for sustaining meaningful collaboration and coordinated restoration efforts.
- Finding ways for diverse stakeholders to communicate effectively and move forward together can be challenging; collaborative development of foundational planning resources can be helpful.
- Collective learning is important to collaboration success; providing a variety of opportunities for stakeholder sharing and discussion and having leaders capable of brokering and translating information across disciplines (Kallis et al. 2009) can be important.
- Partnerships inevitably undergo major transitions and eventual program termination; recognizing this during partnership development can facilitate later planning and implementation.

Introduction

Large-scale public–private collaborations are becoming increasingly common alternatives to site-based and highly centralized efforts for managing natural resources in the United States (Koontz & Johnson 2004; Heikkila & Gerlak 2005).

These collaborative approaches grew from the 1980s, an era characterized by intense polarization, expensive court cases, and sentiments that the bureaucratic, regulatory approaches toward natural resource problems were yielding lose–lose outcomes (Cronin & Ostergren 2007).

Collaborations have been credited with enhancing social capital, community understanding, and ecological conditions (Conley & Moote 2003). While there are many success stories (Cronin & Ostergren 2007), collaborations have also encountered problems. Mismatched scales between social institutions and ecological systems, difficulties of translating lofty visions into on-the-ground accomplishments (Wyborn 2011),

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and inadequate design of collaborative processes (Susskind et al. 2012) have seen well intentioned efforts fall short. Fortunately, collaborations have been studied extensively (Heikkila & Gerlak 2005), and important lessons are being disseminated and applied.

The following provides a case study of the Dolores River Restoration Partnership (DRRP), a public–private collaborative working to restore the riparian corridor of the Dolores River by managing the spread of non-native, invasive plants and increasing the diversity and abundance of native riparian plant communities. Specifically, this study presents key tools and processes implemented by the DRRP that were underscored during surveys of partners. Survey results were found to center on four key areas critical to partnership success: (1) effective planning, (2) responsive governance, (3) monitoring progress, and (4) collective learning. Implementing these four components has been critical to the partnership’s restoration achievements, which to date include enhancing resiliency and diversity on over 1,200 riparian acres of the Dolores River. This case study is intended to help professionals who are seeking to initiate or enhance existing collaborative restoration efforts by providing lessons learned that may be contextualized into a variety of partnership situations.

Methods

Location

The Dolores River flows northwest from the San Juan Mountains of Colorado across dozens of private landholdings, six counties, four of the U.S. Department of the Interior’s Bureau of Land Management (BLM) field offices, and two states before merging with the Colorado River near Moab, Utah. Many stretches of the Dolores River’s riparian corridor (from 37°34′27.66″N/108°34′36.65″W to 38°49′12.90″N/109°16′48.20″W) are infested with non-native invasive plants, particularly *Tamarix* spp. (tamarisk). Native to Eurasia and North Africa, tamarisk has come to dominate many arid and semi-arid rivers in the western United States, modifying wildlife habitat and changing fire frequency (DiTomaso 1998; Zavaleta 2000; Duncan et al. 2004). The Dolores River system is also impacted by elevated soil salinity levels, agricultural irrigation uses, and flows regulated by McPhee Dam (Holden & Stalnaker 1975; DeWine & Cooper 2007).

Development of the Partnership

In 2009, a group of stakeholders identified a shared problem: non-native, invasive plants such as tamarisk and *Acroptilon repens* (Russian knapweed) had degraded riparian habitat and forage, posed new risks associated with wildfire, and overtaken riverside campsites along 175 miles of the Dolores River below McPhee Dam (see Fig. 1). Given that these invasive plant species do not adhere to political boundaries and that stakeholders wanted to make a large-scale, meaningful impact, early discussions led to the realization that a partnership based on strong

working relationships and composed of federal agencies, private landowners, nonprofits, and others was warranted for an effective response.

Development of the Case Study

The information presented in this case study was developed through review of partnership meeting minutes and planning documents as well as semi-structured surveys conducted with a subset of DRRP partners able to participate in several conference calls organized in 2013. Surveys were conducted in person and by telephone by DRRP staff, and questions focused on determining challenges, successes, and lessons learned. Partners surveyed included 10 scientists and managers from government agencies, 7 planners, directors, and scientists from nonprofit organizations, 1 university scientist, 1 private landowner, and 1 program officer from a private foundation. A review of recent literature on collaborative natural resource management was also incorporated into this case study to contextualize the feedback received.

Results

Upfront and Transitional Planning

In 2009, representatives from two nonprofit organizations, The Nature Conservancy (TNC) and Tamarisk Coalition (TC), received a grant to work with private land owners and public agency managers on an invasive plant management and native plant restoration plan for the riparian corridor of the Dolores River. To address an early planning challenge of developing goals that resonated with a broad set of stakeholders, TNC and TC staff led a 2-year process for collaborative planning that included group site visits to the Dolores River, one-on-one discussions with partners, geospatial mapping of tamarisk infestations, facilitated problem-solving and decision-making sessions with the entire partnership, recruitment of new partners for feedback and shared ownership over planning documents, and ultimately the development of good working relationships and trust.

This planning effort produced the Dolores River Riparian Action Plan (DR-RAP), a stakeholder-designed, 36-page framework that includes a set of goals (ecological, economic, social, and management) and associated metrics, principles that guide partnership decision-making, project site-selection criteria, and site prioritization guidelines that have guided the partnership in restoration efforts to date (see Appendix S1, Supporting Information). Reported by surveyed partners to be “a living document,” DR-RAP has remained relevant over time and continues to be effective because it provides daily guidance for decision-making as well as a basin-wide vision and common language that keep restoration work moving in a consistent, coordinated direction. Numerous surveyed partners also characterized DR-RAP’s bridging of ecological goals for habitat enhancement with social goals for employing and training youth as pivotal toward engaging many partners and garnering a variety of funding sources.

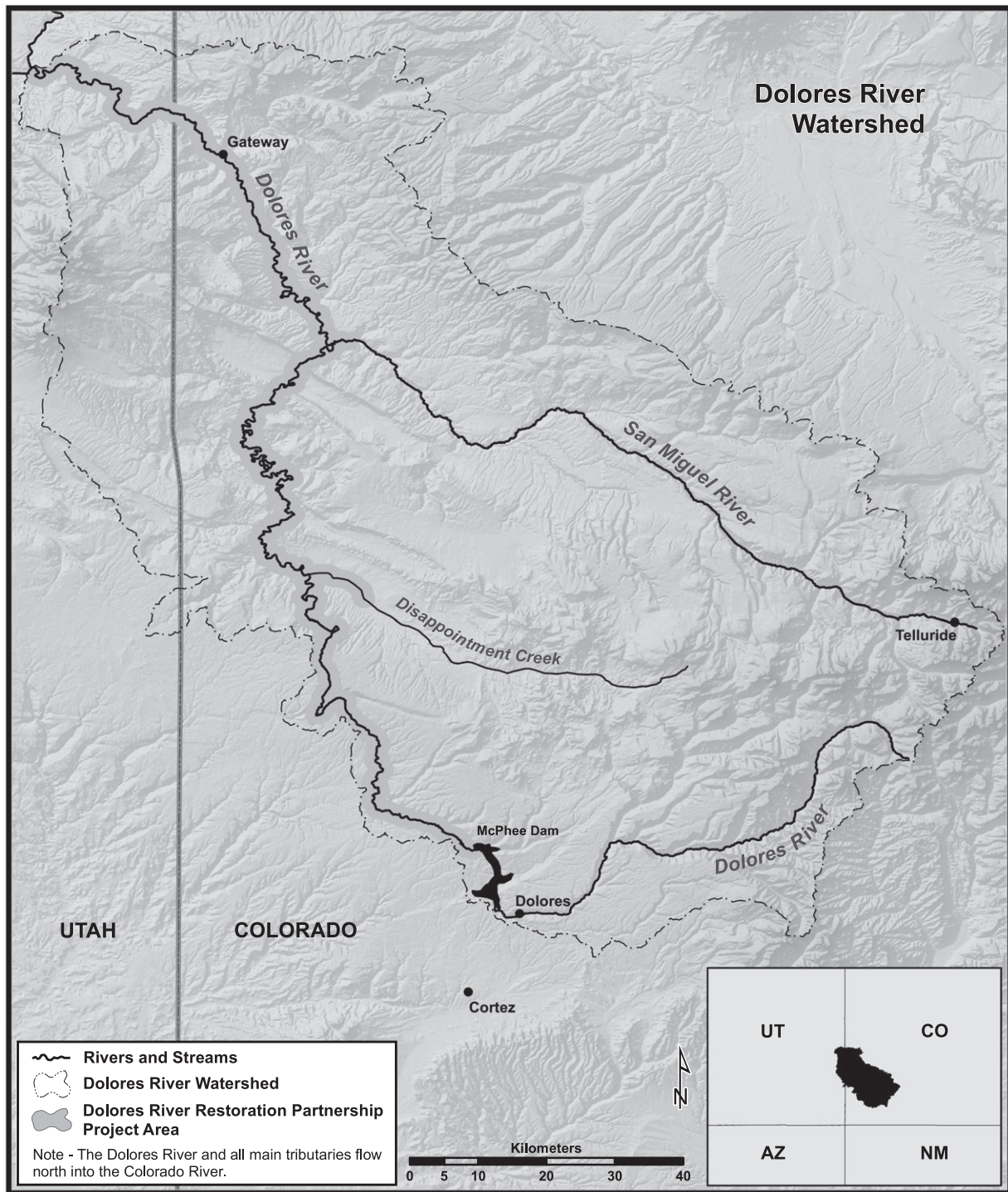


Figure 1. Map of the Dolores River watershed and project area.

Since developing DR-RAP, the DRRP has also taken steps to plan proactively for the long-term to ensure protection of the dollars, time, and energy invested in the Dolores River throughout the duration of the project. Determining the best manner in which to protect these investments proved challenging, but over a 2-year process, the DRRP completed a plan for transitioning

from high-intensity active restoration to low-intensity project monitoring and maintenance (M & M). The process for developing this new DRRP Transition Plan began in 2012 with revisiting and evaluating DR-RAP's goals, then focused on identifying what the transition should look like and determining funding, capacity, governance, and other needs to ensure a successful

transition. Surveys, in-person meetings, and one-on-one discussions were used to inform the development of the DRRP Transition Plan, a 15-page resource adopted in summer 2014 that outlines key partnership strategies for transitioning to M&M (see Appendix S2).

Partnership discussions concerning this transition have been largely positive and resulted in the development of new creative solutions for this shift in level of intensity of restoration work, such as the development of long-term funding strategies, a communications plan, streamlined governance, and multipurpose restoration teams that support the BLM and private landowners with M & M activities.

Responsive Governance Geared Toward Collective Action

The DRRP governance structure may be understood as an “interorganizational network” (Imperial & Koontz 2007) of individuals and organizations. In this arrangement, the network is a nonlegal entity that lacks regulatory power, so decisions are based on good working relationships, reputation, trust, reciprocity, and shared goals. The DRRP governance structure is composed of a Core Team and four supportive subcommittees, as developed through the DR-RAP planning process (see Table 1). The Core Team is composed of the chairs of each subcommittee, a facilitator, and a high-level representative from the BLM; subcommittees are composed of self-selected partners from communities near the Dolores River. The foundation for effective decision-making was established during the initial years of the partnership through collaborative planning, relationship-building, and joint orientation around problem-solving toward a shared vision and set of goals. DR-RAP, for instance, provides goals and objectives that all partners are committed to achieving, but also the flexibility to adapt and refine the means for doing so.

Surveyed partners stated that the DRRP governance structure has provided them with support and flexibility to respond to emerging needs and benefitted them through access to the skills, experiences, and resources of the partners with whom they work. This institutionalized value of flexibility to refine approaches and respond to emerging needs has been important for maintaining a balance between organizational process and on-the-ground accomplishments. Additionally, one surveyed practitioner reported that subcommittee involvement has allowed partners “to get deeply involved with their respective expertise ... without stepping on each other’s toes or discouraging initiative and creativity.”

According to numerous surveyed partners, the formalization of the DRRP through a Memorandum of Understanding (MOU) has also been of substantial importance (see Appendix S3). The MOU, initiated as a recommendation from the DR-RAP planning process, not only established the roles and responsibilities of 20 partners—ranging from county, state, and federal agencies to private foundations and nonprofit organizations—but also their commitment to implementing DR-RAP. Surveyed partners felt that the MOU has been critical for creating greater legitimacy for the partnership, guiding decision-making, bridging jurisdictional boundaries, and securing public and private

funds. As the DRRP begins to implement its Transition Plan for long-term M & M, one of the first steps for doing so will be to update and renew the current MOU, which expires in 2015.

Monitoring Progress Toward Goals

Monitoring is fundamentally important for understanding impacts, making course corrections (Shortell et al. 2002), and reducing uncertainty (Murray & Marmorek 2004). The DRRP uses monitoring to inform implementation efforts, track progress toward restoration goals, and answer site-specific restoration questions.

Initial monitoring efforts began in 2010 to track watershed-wide progress toward meeting DR-RAP’s ecological goals and to compare and identify the most effective restoration treatment methods across the watershed. Since then, monitoring and research efforts have expanded to address emerging partnership needs. Data collected for the partnership span multiple disciplines (e.g. botany, hydrology), methodologies (e.g. reading plots/transects and establishing photo points), analysis techniques (e.g. quantitative statistical analyses, photograph comparisons), and formats of distribution (e.g. scientific and annual reports).

The primary challenges faced by the partnership throughout the evolution of these monitoring efforts have centered on: translating the partnership’s evolving needs and questions into tangible monitoring protocols, accomplishing this on relatively tight time tables, and communicating these revisions effectively to monitoring contractors and personnel. Key lessons learned reported by partners include the importance of engaging an experienced applied scientist and an applied statistician early in the process, the importance of rigorous training for crews to ensure a quality work product, and learning to evaluate when university personnel versus nonacademic contractors might be most appropriate for a monitoring job.

Surveyed partners felt that the ability of the partnership to respond effectively to and work through these challenges has been largely a result of the development of DR-RAP to guide these activities, creation of a formal platform for discussing and processing these issues (Science and Monitoring Subcommittee), and a shared value in learning and improving.

Shared Mindset for Extracting and Implementing Lessons Learned

A number of scholars have attributed a partnership’s strength to its capacity to learn (Gerlak & Heikkila 2011). At its inception, the DRRP institutionalized the practice of building on lessons learned with a management goal in DR-RAP that emphasizes the importance of learning from experiences to improve efficiencies and outcomes. This learning typically occurs between an individual practitioner and a subcommittee (e.g. a land manager sharing with the Implementation Subcommittee a new planting method), or between subcommittees and the partnership (e.g. the Science and Monitoring Subcommittee sharing with the partnership at a biannual meeting results from a study that assessed soil and water conditions to inform planting of *Populus fremontii* [cottonwood] poles).

Table 1. A listing of DRRP subcommittees and their functions

<i>DRRP Subcommittees</i>	<i>Function</i>	<i>Composition</i>
Core Team	Composed of the four subcommittee chairs; facilitates biannual partnership meetings, coordinates across subcommittees, and helps mitigate decision-making challenges that subcommittees periodically encounter	Includes nonprofit organizations (Tamarisk Coalition, The Nature Conservancy, and Southwest Conservation Corps), one public agency (Bureau of Land Management), and one independent facilitator
Implementation	Collectively plans restoration work and shares lessons learned to improve restoration	Includes private landowners, public agencies (U.S. Fish and Wildlife Service Partners for Fish and Wildlife, U.S. Department of Energy, Bureau of Land Management, Natural Resources Conservation Service, Colorado Parks & Wildlife, Utah Division of Wildlife Resources, county programs), and nonprofit organizations (Southwest Conservation Corps, Western Colorado Conservation Corps, Canyon County Youth Corps, Tamarisk Coalition, The Nature Conservancy)
Science and Monitoring	Coordinates the collection, analyses, and dissemination of monitoring data to inform progress reporting and future restoration work	Includes managers from the Bureau of Land Management, the Natural Resources Conservation Service, and county weed departments, as well as scientists from The Nature Conservancy, Tamarisk Coalition, Rocky Mountain Bird Observatory, Denver University, and the University of Utah Rio Mesa Center
Outreach and Education	Coordinates volunteer projects and develops education materials	Includes nonprofit organizations (Dolores River Boating Advocates, Greater Dolores Action, Southwest Conservation Corps, Western Colorado Conservation Corps, Four Corners School of Outdoor Education, Tamarisk Coalition, and The Nature Conservancy) and one public agency (Bureau of Land Management)
Funding	Strategically pursues funding options to enhance and leverage resources	Includes nonprofit organizations (Tamarisk Coalition, The Nature Conservancy, Four Corners School of Outdoor Education, Western Colorado Conservation Corps) and one public agency (Bureau of Land Management)

The DRRP has extracted and implemented valuable lessons learned and translated them to a partnership-scale through several processes, including: the use of small-scale pilot-projects, hosting external restoration specialists for on-the-ground workshops, coordinating site visits to facilitate cross-boundary problem-solving, developing several on-the-ground monitoring protocols, having partnership coordinators that integrate various forms of knowledge, and staging biannual partnership meetings to disseminate information, facilitate active discussions on critical challenges, and celebrate partnership successes.

Discussion

A responsive governance structure, jointly developed planning resources, development of useful monitoring protocols, and commitment to implementing lessons learned have been vital for achieving large-scale, meaningful restoration success along the Dolores River. These considerations are not intended to provide a cookie-cutter recipe for collaboration (Conley & Moote 2003), but it is hoped by the authors that these shared experiences of the DRRP may inform and guide collaborative restoration efforts in other watersheds.

When well-planned, watershed governance can lead to innovation and many other desirable outcomes (Kallis et al. 2009). With a wide variety of public and private partners, the DRRP has spent considerable time planning in order to keep expectations and actions aligned. As one land manager noted during a survey, “Keeping products relevant to all of those in a partnership is important and is a moving target.” Having core documents such as DR-RAP that are collectively developed may provide other partnerships with a helpful frame of reference for navigating governance challenges.

When possible, it is critical that clear goals and reporting metrics are created at partnership initiation to ensure development of concise and efficient monitoring and reporting protocols, and that sufficient time is devoted to develop these thoughtfully. The DRRP necessarily developed several types of goals and metrics that are closely related and yet distinct. The challenges of developing, coordinating, and implementing methods for measuring and reporting success in these multiple ways for multiple entities at multiple scales have required significant time and energy.

Effective collaborative restoration should also include planning considerations for how to make transitions that are balanced, prompt, and ameliorative (Clark 2002). Several partners

believe that the development of the new DRRP Transition Plan for M & M may have benefitted from longer-term considerations during initial DR-RAP planning efforts in 2009. Clear expectations during partnership creation (e.g. who should perform this function, at what point in time, and under what set of conditions) may also have improved the timeliness and effectiveness of this important planning step for transition (Oppenheimer & Richie 2014). Practitioners should consider accompanying major transitions with evaluations to extract and share lessons learned that may inform and improve the effectiveness of collaborations in other watersheds (DeLeon 1983; Kleiman et al. 2000; Helling & Thomas 2001).

The fundamental take away of this case study is that commitment to evaluation, learning, and improvement at all stages of a partnership is essential to a partnership's effectiveness. Planning resources, governance structures, monitoring protocols, and a shared mindset for learning are but four opportunities through which to cultivate or sustain this collective commitment.

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Supporting Information

The following information may be found in the online version of this article:

- Appendix S1.** Dolores River Riparian Action Plan.
Appendix S2. DRRP Transition Plan.
Appendix S3. DRRP Memorandum of Understanding.

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