

# Desert Rivers Collaborative

Implementation Plan 2015-2020

*Guidelines for Riparian Restoration along the Colorado and Gunnison  
Rivers in Mesa and Delta Counties*



Colorado River; Photo compliments of Grand Junction Visitor and Convention Bureau

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Implementation Plan 2015-2020

***June 1, 2015 (Version 1)***

## Desert Rivers Collaborative (DRC) Mission

The mission of the DRC is to protect, restore, and maintain native river corridor habitat in Mesa and Delta Counties through the development of community partnerships.

Prepared by Tamarisk Coalition



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## List of Acronyms

Acronym	Full Name
BLM	Bureau of Land Management
CCA	Colorado Canyons Association
CNHP	Colorado Natural Heritage Program
CPW	Colorado Parks and Wildlife
CFC	Colorado Riverfront Commission
CSU Extension	Colorado State University Extension
CWCB	Colorado Water Conservation Board
CWMA	Cooperative Weed Management Area
DRC	Desert Rivers Collaborative
DRRP	Dolores River Restoration Partnership
GVAS	Grand Valley Audubon Society
MLT	Mesa Land Trust
MCRW	Middle Colorado River Watershed
MCWC	Middle Colorado Watershed Council
NRCS	Natural Resources Conservation Service
NCRRP	Northwest Colorado Riparian Restoration Partnership
RRAFT	River Restoration Adventures for Tomorrow
SURP	Southeast Utah Riparian Partnership
TC	Tamarisk Coalition
UP	Uncompahgre Partnership
USACE	US Army Corps of Engineers
USBR	US Bureau of Reclamation
USFWS	US Fish & Wildlife Service
Water Center at CMU	Water Center at Colorado Mesa University
WCCC	Western Colorado Conservation Corps
WCLC	Western Colorado Landscape Collaborative
WCWHA	Western Colorado Wildlife Habitat Association
WRV	Wilderness Restoration Volunteers
WSCC	Western Slope Conservation Center

## Introduction

Riparian habitat along many western Colorado rivers, including the Colorado and Gunnison, has been degraded by several factors, among them colonization by invasive plant species, including tamarisk (*Tamarix* spp., also known as salt cedar), Russian olive (*Elaeagnus angustifolia*), Siberian elm (*Ulmus pumila*), and other herbaceous species. As these aggressive exotic plant species frequently displace native plant communities, riparian structure and functionality is often compromised in the advent of invasive species colonization, resulting in diminished fish and wildlife habitat, decreased water resources, increased wildfire hazards, and negatively impacted agricultural and recreational use.

The management of invasive riparian species has been a strong focus for many regional land managers and private landowners over the last several decades, with a number of tamarisk and Russian olive removal and revegetation projects completed along the Colorado and Gunnison Rivers and their tributaries.

While several of these undertakings were successful and met multiple resource objectives, other restoration projects lacked monitoring and follow-up maintenance and are now in need of re-sprout treatment of woody invasives, secondary herbaceous weed spraying, and/or follow up revegetation actions. Many local entities also realized that a more coordinated and well executed effort to conduct restoration in the Grand Valley would benefit everyone, and that developing a collaborative plan to guide this effort – a plan containing achievable, measureable goals and objectives - would be an important tool for coordinating these efforts and ensuring a more impactful restoration legacy at a landscape-scale.

As a result, the Desert Rivers Collaborative (DRC or “Collaborative”) was formed in 2012 to collectively address invasive species impacts affecting local riparian habitat along the Colorado and Gunnison Rivers and their major tributaries. Based in Grand Junction, Colorado, the DRC provides a platform for local entities to work together to conduct collaborative restoration efforts for the benefit of overall river health and improved local communities, through enhanced opportunities for recreation, education, and economic benefit.

Recently, DRC members determined an achievable set of ecological, social, economic, and management goals and developed the following plan to guide these efforts. While DRC partners acknowledged that myriad issues must be considered in developing a comprehensive riparian restoration plan, it was determined that the following plan would focus primarily on the coordinated treatment and subsequent revegetation of lands significantly impacted by invasive riparian plant species, while recognizing and building partnerships with outside groups working to address other key issues within the watershed (e.g. water quality and quantity, fish habitat improvement, etc.).



PHOTO: DAN LEITHAUSER

## Purpose of Plan

The purpose of the DRC Implementation Plan (Plan) is to:

- Compile information on:
  - Restoration work completed in the region to date, including complementary planning efforts
  - Partner organizations and regional initiatives operating within the area
- Develop a strategic approach for controlling invasive riparian plants that will enable stakeholders to prioritize, develop, and implement restoration actions
- Increase the level of collaboration and communication among stakeholders, thereby improving information transfer, adaptive management, and landscape-scale success
- Outline options for monitoring and maintenance of restored properties
- Articulate partnership challenges and potential resources to help address identified barriers

## Description of Focus Area

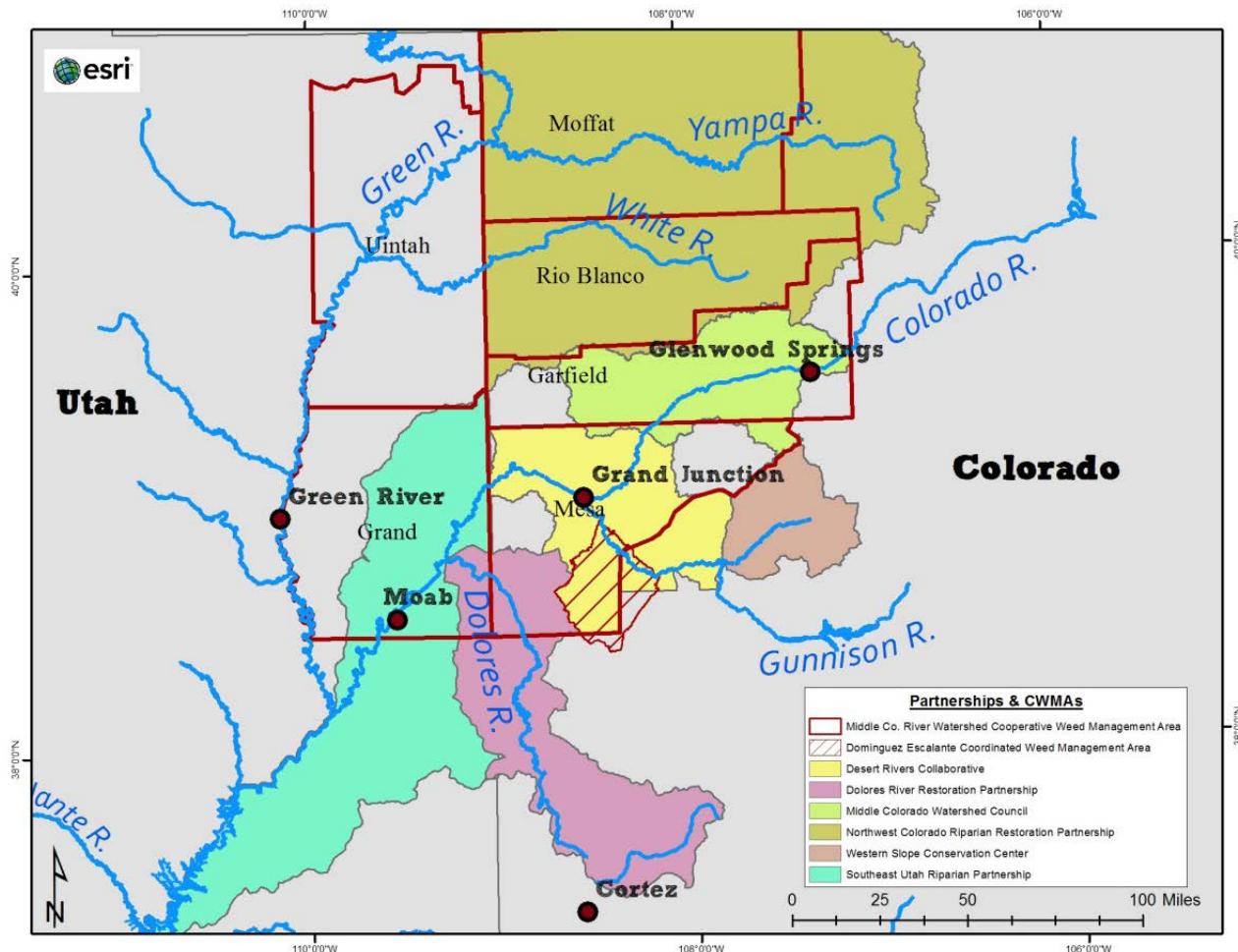
The DRC focus area includes the following two areas in Mesa and Delta counties: 1) the Colorado River (approx. 72 river miles) and its tributaries from the Mesa/Garfield County line to the Colorado/Utah border, and 2) the lower Gunnison River (approx. 49 river miles) and its tributaries from the City of Delta to its confluence with the Colorado River near downtown Grand Junction (Figure 1). This area is encompassed by the Colorado Headwaters Plateau watershed (HUC 14010005) and the Lower Gunnison watershed (HUC 1402005). 50% of the Colorado Headwaters Plateau watershed is located in Mesa County whereas approximately 75% of the lower Gunnison watershed is located in Delta and Mesa Counties. Physical characteristics of the project area are described in Appendix A.

FIGURE 1: DESERT RIVERS COLLABORATIVE FOCUS AREA MAP



The DRC borders other watershed partnership groups or organizations focused on riparian habitat improvement, including the Dolores River Restoration Partnership, Middle Colorado Watershed Council, Southeast Utah Riparian Partnership, Northwest Colorado Riparian Restoration Partnership, and Western Slope Conservation Center (Figure 2). The Middle Colorado River Watershed Cooperative Weed Management Area covers the Colorado and Gunnison rivers in Mesa County and the Dominguez-Escalante Coordinated Weed Management Plan encompasses the Gunnison River in both Mesa and Delta counties.

**FIGURE 2 – RELATIONSHIP OF DESERT RIVERS COLLABORATIVE TO OTHER PARTNERSHIP GROUPS**



## Project Area Landownership

Based on preliminary mapping and analysis, Table 1 details landownership by acreage along various stretches of the Colorado and Gunnison Rivers. Given the priorities of the partnership, a preliminary effort to prioritize desirable or appropriate restoration sites was conducted by determining sites within the partnership boundary with greater than 10% tamarisk cover. This information was then intersected with parcel data from Mesa County to create Table 1. This table will be refined with restoration targets as this plan is implemented and as landownership along the Gunnison River is better ascertained.

**TABLE 1 - PROJECT AREA LANDOWNERSHIP WITH TAMARISK COVER GREATER THAN 10%**

River	Section	Total Acres Tamarisk > 10%	Federal	State	Private	Other <sup>1</sup>	Unclassified <sup>2</sup>
Colorado	Mesa Co. line to Palisade*	1250	186	10	653	54	347
	Palisade to Loma **	1724	124	560	620	176	244
	Loma to Co/UT border*	884	607	3	252	0	22
Gunnison	CO confluence to Mesa Co. line*	618	325	0	248	44	1
	Mesa Co. line to City of Delta*	1075			Lacking Delta Co. parcel data		
<b>Total:</b>		<b>5551 Acres</b>					
*Data from the Colorado Headwaters Invasives Partnership Plan (2008 revision) were used to determine affected acreage. **Data from the Colorado River Section 206 Aquatic Ecosystem Restoration Mesa County, Colorado; Appendix B: Engineering Report (2012) were used to determine affected acreage. "Excluded" sites, which were areas that were taken out of consideration in the 206 Report, were not counted in this tally. Numbers may need to be adjusted upon mapping updates. <sup>1</sup> Other category includes properties owned by local government, irrigation companies, and school districts. <sup>2</sup> Unclassified lands refer to lands that do not have any official ownership based on Mesa County Assessor's records, according to parcel maps and surveys.							

## Related Planning & Mapping Documents

A number of documents were taken into consideration as the DRC delineated its focus areas, goals, and objectives. Several of these documents describe agency priority restoration areas and/or landscape-scale concerns. The **Project Prioritization Criteria and Decision Making** section (page 14) of the Plan details how specific projects or undertakings may fulfill multiple objectives, or address overlapping concerns, as defined by various organizations.

A number of recent mapping efforts have also greatly contributed to DRC's prioritization process. The document entitled Colorado River Section 206 Aquatic Ecosystem Restoration Mesa County, Colorado; Appendix B: Engineering Report (Tetra Tech & TC 2012) provides the most detailed known assessment of riparian habitat along the Colorado River from Palisade to Loma and, as such, was used as the basis for determining current conditions along this stretch of river. This document developed reconnaissance level plans for river segments based on vegetation field surveys completed in 2010.

For each segment the following data are provided:

- Segment information
- Land ownership information
- Estimated tamarisk and Russian olive canopy coverage
- Narrative description of the segment and recommendations
- Recreation features
- Photo numbers and photos
- Tables that summarize site restoration actions, including planting recommendations

This report, and corresponding maps and data, are available via the TC website at:

<http://tamariskcoalition.org/programs/planning-mapping>.

TC also commissioned a GIS prioritization process in 2013 to help determine areas of high restoration potential. This mapping exercise was complemented by another GIS project that was undertaken in 2014 to better catalog areas of tamarisk and Russian removal over the last two decades. The results of these mapping efforts are described in more detail in the **Project Prioritization Criteria & Decision Making** section of the Plan (page 14).

Areas where tamarisk and Russian olive have been removed and subsequent restoration work has been completed can also be viewed via an interactive map on the TC website at:

<http://tamariskcoalition.org/programs/projects-monitoring>.

Multiple appendices outline targeted weed species, restoration techniques, monitoring and maintenance guidelines and protocols, and approaches to address watershed challenges.



Although this Plan is focused on the control of invasive plant species, the stakeholders recognize that myriad other factors also threaten the sustainability of the Colorado and Gunnison River systems. This Plan is intended to support or augment other related efforts within the region, which are also listed below (Table 2). For full citations, see the **Sources Cited** section of the Plan (page 25).

PHOTO COMPLIMENTS OF GRAND JUNCTION VISITOR AND CONVENTION BUREAU

**TABLE 2 - RELATED PLANNING AND MAPPING DOCUMENTS**

	Plan or Document	Mapping Component	Lead Agency or Author/ Year*
Plans with Riparian or Wetland Habitat Focus	Colorado Basin Roundtable – Colorado Basin Implementation Plan (Draft)	Yes	SGM (2014)
	Colorado Headwaters Invasives Partnership	Yes	TC (2008 version)
	Colorado River Section 206 Aquatic Ecosystem Restoration Mesa County, Colorado (206 Report)	Yes	Tetra Tech & TC (2012)
	Colorado Wetlands Initiative Lower Colorado River Focus Area Strategic Plan	No	CPW (year unknown)
	Dominguez-Escalante Coordinated Weed Management Area Plan	Yes	UP
	Gunnison Basin Implementation Plan (Draft)	Yes	Gunnison Basin Roundtable (2014)
	Intermountain West Joint Venture Implementation Plan – Strengthening Science and Partnerships	Yes	Intermountain West Joint Venture (2013)
	James M. Robb Colorado River State Park – Weed Management Plan	Yes	CPW (2012)
	Mesa County Noxious Weed Management Plan	No	Mesa County (2013 version)
	Reconnaissance Inventory and Prioritization of Existing and Potential Bottomlands in the Upper Colorado River Basin 1993-1994.	Yes	US FWS (1995)
	Relationships Between Flow and Rare Fish Habitat in the '15-Mile Reach' of the Upper Colorado River	No	US FWS (1995)
	Riverbend Park Riparian Restoration Plan	No	Kinnaird et al (2014)
	Selenium Management Program - Program Formulation Document Gunnison River Basin, Colorado	No	Selenium Management Program Workgroup (2011)
	Statewide Strategies for Wetland and Riparian Conservation	No	Colorado State Parks & Colorado Division of Wildlife (2011)
	Statewide Water Supply Initiative	Yes	CWCB (2010)
	Survey of Critical Wetlands and Riparian Areas in Mesa County	Yes	CNHP (2003)

**TABLE 2 - RELATED PLANNING AND MAPPING DOCUMENTS CONTINUED**

	Plan or Document	Mapping Component	Lead Agency or Author/ Year*
	Upper Colorado River Endangered Fish Recovery Program – Recovery Implementation Program Recovery Action Plan (RIPRAP)	No	US FWS(2014 version)
	Upper Colorado River Subbasin Floodplain Management Plan	No	Richard A. Valdez and Patrick Nelson (2006)
	Colorado Riverfront Commission Strategic Plan	No	Colorado Riverfront Commission (2014)
	Mesa Countywide Land Use Plan	Yes	Mesa County (2000 version)
	Multi-disciplinary Approach to Waterfront Redevelopment and Design – A Case Study of the Colorado Riverfront, Grand Junction, CO	No	Multiple Authors (1988)
Additional Mapping or GIS Exercises	Assessment of Tamarisk and Russian olive Removal in the Grand Valley		Tamarisk Coalition (2014)
	Desert Rivers Collaborative GIS Analysis		David Barney, Mountain Cartography (2014)

\* See Acronym List

## Stakeholders

Participants in the Collaborative, as of January 2015, include the following organizations and individuals. Signatories to the DRC Memorandum of Understanding (MOU; Appendix B) are denoted by an asterisk.

Bureau of Land Management	Private Landowners
City of Fruita*	River Restoration Adventures for Tomorrow*
City of Grand Junction*	Southwest Chapter River Management Society*
Clifton Sanitation District*	Tamarisk Coalition*
Colorado Canyons Association*	Town of Palisade*
Colorado Parks and Wildlife*	US Bureau of Reclamation
Colorado Riverfront Commission*	US Fish & Wildlife Service*
Colorado State University Extension*	Water Center at Colorado Mesa University*
Delta County*	Western Colorado Conservation Corps*
Grand Valley Audubon Society	Western Colorado Landscape Collaborative*
Mesa County*	Western Colorado Wildlife Habitat Association*
Mesa Land Trust	Western Slope Conservation Center*
Natural Resources Conservation Service*	

## Mission

The mission of the DRC is to protect, restore, and maintain native river corridor habitat in Mesa and Delta Counties through the development of community partnerships.

## Vision

The vision of the DRC is dynamic, ecologically diverse, and resilient river systems, supported and enjoyed by western Colorado communities, residents, and visitors.

## Guiding Principles

In order to execute its mission, the Collaborative operates on the following principles, which are addressed and incorporated throughout the Plan. These principles are included in the DRC MOU (Appendix B).

- Collaborative is inclusive; participation is voluntary
- Landowner goals are respected and supported; expectations for landowners and land managers should be clearly outlined
- Information sharing and maximization of resources is of priority
- Outreach and community awareness should be fostered and promoted
- Projects should be implemented based on a prioritization scheme that promotes a high return on invested funds
- Projects that achieve multiple objectives, have the highest probability of restoration success , and have committed land managers dedicated to ongoing project maintenance should be prioritized over projects that fulfill fewer objectives, have multiple restoration challenges and/or lack committed land management. See Project Prioritization (page 14) for specific details.
- Prior to project implementation, a funding plan must be in place in ensure project completion, including monitoring and maintenance

## Five-Year Goals & Objectives (2015-2020)

Among western Colorado and eastern Utah river restoration collaborative efforts, the DRC is among one of the more urban-focused partnerships. While numerous state wildlife areas and state parks sections are scattered along the Colorado River within the DRC focus area, much of the area is characterized by residential, commercial, industrial, and municipal development. The area is also home to a variety of land managers and landowners, including private citizens, municipalities, state and federal agencies, and corporations.

As such, the partnership's goals and objectives, which were developed and agreed to by DRC participants during quarterly meetings, reflect a wide range of values, including ecological, social, economic, and management goals, all within the context of an improved riparian corridor. While many of these goals are complimentary, in some instances a particular goal may be the sole priority for a site, as supported by the **Site Criteria Characteristics** table (page 14) and **Decision Tree for Invasive Species Control** (page 15). Whereas improved riparian habitat is the primary goal for many partnerships, creation of more social and economic amenities such as more open space and park facilities - through the management of woody invasives, are also important to the DRC.

The Collaborative supports economic development activities that are sensitive to the preservation and/or integration of riparian habitat and river dynamics. Development activities that do not support habitat goals, development of community open spaces, or achieve other identified goals as a plan component will not be championed by the Collaborative. For example, funding to support clearing of woody invasives for the express purpose of new building construction would need to be found through other channels. That being said, the Collaborative does support projects that focus on the removal of seed sources that can impact success elsewhere in the watershed.

The four main goals, ecological, social, management, and economic, are described below, with specific objectives and actions to follow. A summary Goals & Objectives table (Table 3, page 10) is provided, as is a table that outlines Implementation Actions, Timelines and Partner Roles (Table 4, page 11).

### Goals & Objectives:

- **Ecological**
  - *Goal:* Restore and maintain native riparian habitat along the Colorado and Gunnison Rivers and their major tributaries
    - *Objective:* Increase prevalence of diverse, self-sustaining riparian plant communities while reducing dominance of invasive woody riparian species and associated secondary weed species
    - *Objective:* Improve wildlife habitat availability and utilization
  - *Goal:* Promote improvements in river function, flood control, and erosion mitigation
    - *Objective:* Restore natural riverine processes in areas where built environment will not be impacted
- **Social**
  - *Goal:* Foster community pride and livelihood through improvement of passive and active recreational experiences and opportunities for engagement along rivers and associated tributaries
    - *Objective:* Improve river access and opportunities for interaction with the natural environment for a variety of user groups
  - *Goal:* Provide education and outreach to the local community and public about riparian restoration

- *Objective:* Increase the number of outreach materials produced and events coordinated to improve community and public knowledge and engagement.
- **Economic**
  - *Goal:* Provide the local community economic incentives and employment opportunities for removing invasive plant species on their own property
    - *Objective:* Work with regional agencies and committees to advance sustainable development strategies, including utilization of existing grant opportunities
- **Management**
  - *Goal:* Employ adaptive management strategies that facilitate communication and coordination between land managers, landowners, and partners
    - *Objective:* Foster various opportunities for improved partner interaction, knowledge sharing and coordination on project planning and implementation

**TABLE 3 – FIVE-YEAR GOALS & OBJECTIVES SUMMARY**

Overall 5-Year Goals		Indicators	Causes or Sources of Impacts	Overall 5-Year Objectives
<b>Ecological</b>	Restore and maintain native riparian habitat along the Colorado and Gunnison Rivers and their major tributaries	Habitat connectivity, patch size, plant diversity and cover, animal diversity	Habitat loss due to invasive species, development, poor soils, loss of overbank flooding	Increase prevalence of diverse, self-sustaining native or desirable riparian plant communities while reducing dominance of invasive woody riparian species and associated secondary weed species
	Promote improvements in river function, flood control, and erosion mitigation	Bank stability, habitat complexity, peak flow velocity and discharge	Armoring of banks by invasives species, loss of overbank flooding, water diversions	Improve wildlife habitat availability and utilization
<b>Social</b>	Foster community pride and livelihood through improvement of passive and active recreational experiences and opportunities for engagement along rivers and associated tributaries	River usage by community, school groups, and other user groups, including passive and active recreationalists	Use currently impaired by invasive species, lack of access or infrastructure	Improve river access and opportunities for interaction with the natural environment for a variety of user groups
	Provide education and outreach to the local community and public about riparian restoration	Knowledge about restoration processes, number of articles written, people reached at events	Lack of exposure to restoration projects, unaware of organizations' work/mission	Increase the number of outreach materials produced and events coordinated to improve community and public knowledge and engagement
<b>Economic</b>	Provide the local community economic incentives and employment opportunities for removing invasive plant species on their own property	Employment opportunities for contractors and youth; visitor numbers, economic development metrics	Current lack of incentives, employment opportunities sporadic	Work with regional agencies and committees to advance sustainable development strategies, including utilization of existing grant opportunities
<b>Management</b>	Employ adaptive management strategies that facilitate communication and coordination between land managers, landowners, and partners	Joint grant applications, increased number of projects w/ multiple partners, written or oral presentation of "lessons learned"	Lack of interaction, stakeholders unaware of various funding/project opportunities	Foster various opportunities for improved partner interaction, knowledge sharing and coordination on project planning and implementation

TABLE 4 - IMPLEMENTATION ACTIONS, TIMELINES, & PARTNER ROLES

Goal	Overall 5-Year Objectives	Action	Timeline	Responsible Partners*
Ecological	Increase prevalence of diverse, self-sustaining riparian plant communities while reducing dominance of invasive woody riparian species and associated secondary weed species	Compile existing mapping data and landowner input on invasives species distribution and treatment history	July 2015	TC
		Utilizing available data, prioritize sites for restoration for the next 5 years	July 2015	All parties
		Develop 5-year funding plan to support work on prioritized sites	Aug 2015	All parties
		Develop private lands strategy	Aug 2015	TC, NRCS, CSU Extension
		On active removal sites reduce target woody invasive plant species to <10% total vegetation cover; increase native or desirable plant cover to ≥75% total cover, with total vegetation cover ≥30% (unless otherwise dictated by site constraints or plans)	Project specific	All parties
		Eliminate Class A species; treat other Class B species identified in Appendix C and/or other priority species identified by land manager	Project specific	All parties
		Over time, achieve 3 or more structural layers of vegetation with 2-3 age classes present on active restoration sites	Project specific	All parties
		On sites prioritized for passive restoration, ensure invasive plant species are reduced to <50% total vegetation cover; ensure native or desirable plant cover ≥50% total vegetation cover	Project specific	All parties
	Improve wildlife habitat availability and utilization	Develop monitoring and maintenance plan; detail capacity and funding needs to implement	Aug 2015; ongoing	All parties
		Ensure restoration meets wildlife habitat targets defined by biologists	Ongoing	All parties, CPW, BLM
		Determine if additional measures are needed to promote habitat usage (e.g. fencing/seasonal closures, etc.)	Aug 2015; ongoing	All parties, CPW, BLM
	Improve natural riverine processes in areas where built environment will not be impacted	Develop monitoring and maintenance plan; detail capacity and funding needs to implement	Aug 2015; ongoing	All parties, TC
		Determine potential impacts of woody invasives removal by comparing natural erosion sites to active removal sites as documented by reports	July 2015	CMU
		Work with appropriate stakeholders to determine suite of possible restoration actions that could have multiple benefits (e.g. improved fish habitat)	June 2015	All parties

TABLE 4 - IMPLEMENTATION ACTIONS, TIMELINES, & PARTNER ROLES CONTINUED

Goal	Overall 5-Year Objectives	Action	Timeline	Responsible Partners*
Social	Improve river access and opportunities for interaction with the natural environment for a variety of user groups	Ensure prioritized sites include public access and utilization areas	July 2015	Municipalities
		Coordinate with RFC and other similar organizations to align complementary goals and objectives	July 2015	All parties
		In coordination with municipalities, CPW, & BLM, develop or improve additional recreational or passive use sites where appropriate	July 2015	Municipalities, all parties
		Develop outreach plan for media engagement regarding DRC work, projects, etc.	Ongoing	All parties
		Develop interpretive signage along Riverfront Trail and other high visitation sites	Sept 2015	TC, CPW, RFC, all parties
		Educate trail hosts about riparian restoration activities	July 2015	TC, CPW, RFC, all parties
		Coordinate student projects with CMU or other institutions	Ongoing	All parties, CMU
		Host 1-2 volunteer events per year in coordination with organizations such as WRV or RRAFT	Ongoing	All parties, WRV, RRAFT, others
		Increase public safety from wildfires, improve highway safety, and increase scenic value by removing woody invasives in coordination with various partners	Ongoing;	CSFS, CSU Extension, all parties
	Increase number of outreach materials produced and events coordinated to improve community and public knowledge and engagement	Develop, in coordination with TC, specific outreach plan that details schedule of events, press opportunities, materials to be developed, including logo	July 2015	TC, all parties

**TABLE 4 - IMPLEMENTATION ACTIONS, TIMELINES, & PARTNER ROLES CONTINUED**

Goal	Overall 5-Year Objectives	Action	Timeline	Responsible Partners*
Economic	Work with regional agencies and committees to advance sustainable development strategies, including utilization of existing grant opportunities	Coordinate with RFC and other similar organizations to align complementary goals and objectives	July 2015	All parties
		Provide economic opportunities to private landowners through grants and technical resources to remove invasive species on their land	Ongoing	All parties
		Increase employment opportunities for local agencies, youth conservation corps, contractors, and businesses in the focus area	Ongoing	All parties
		Coordinate joint grant applications to fund project implementation and DRC coordination support	Ongoing	All parties
Management	Foster various opportunities for improved partner interaction, knowledge sharing and coordination on project planning and implementation	Hold 2-4 in-person DRC partnership meetings per year	Ongoing	TC
		Highlight DRC projects on TC website	Ongoing	TC
		Complete annual report detailing DRC activities	Annually, by March	TC
		Develop adaptive management feedback loop that incorporates monitoring information, “lessons-learned”, field trip findings, etc.	July 2015	TC, all parties

\* Denotation as responsible party does not preclude other DRC partners from participation; rather, this category is meant to provide guidance on how partners can work together to achieve stated objectives. Partner responsibilities may include: fundraising, project management, monitoring, and maintenance, among others. See list of stakeholders for list of partner abbreviations.

## Project Prioritization Criteria & Decision Making

The following **Site Criteria Characteristics** (Table 5) and **Decision Tree for Invasive Species Control** (Figure 3) are provided to help land managers ascertain where sites are most appropriate for restoration actions. Areas that meet a greater number of site criteria are typically considered more desirable for active removal and planting, whereas, passive restoration, with emphasis on the use of the tamarisk beetle (*Diorhabda carinulata*) for tamarisk control, may be more appropriate for sites that lack positive site attributes. The **Decision Tree for Invasive Species Control** denotes specific instances where passive restoration is a preferred action.

The following **Site Criteria Characteristics** were developed in coordination with a consultant who visually represented these characteristics in a GIS analysis commissioned by TC in 2014. The methods of the analysis and datasets are available upon request. This analysis can be updated as prioritization factors are changed (e.g. change in landownership, increase in acreage treated).

TABLE 5 - SITE CRITERIA CHARACTERISTICS

Criteria	Characteristics
Conservation Value	Woody invasive infestations adjacent to high priority resources*
	Small or moderate infestations of woody invasives that can controlled relatively easy*
	Connectivity to other restoration projects, riparian and other desirable land cover
	Prime soils, agriculture, and/or irrigated lands
	Hydrologic features – rivers, streams, lakes and wetlands
Land Status	Supporting partners
	Public lands, parks, recreation areas, and areas of scenic value
	Conservation easements having existing conservation plans
	Willing and able private landowners
Access (in order of decreasing priority)	Mechanized – heavy equipment
	Mechanized – medium to light equipment
	Non mechanized - foot access only
	Non mechanized - navigable waterway

\* Note, in GIS analysis, the characteristic utilized for mapping and prioritization purposes was “large areas of tamarisk and other invasive species”. For land manager assessment purposes, two new characteristic were created.

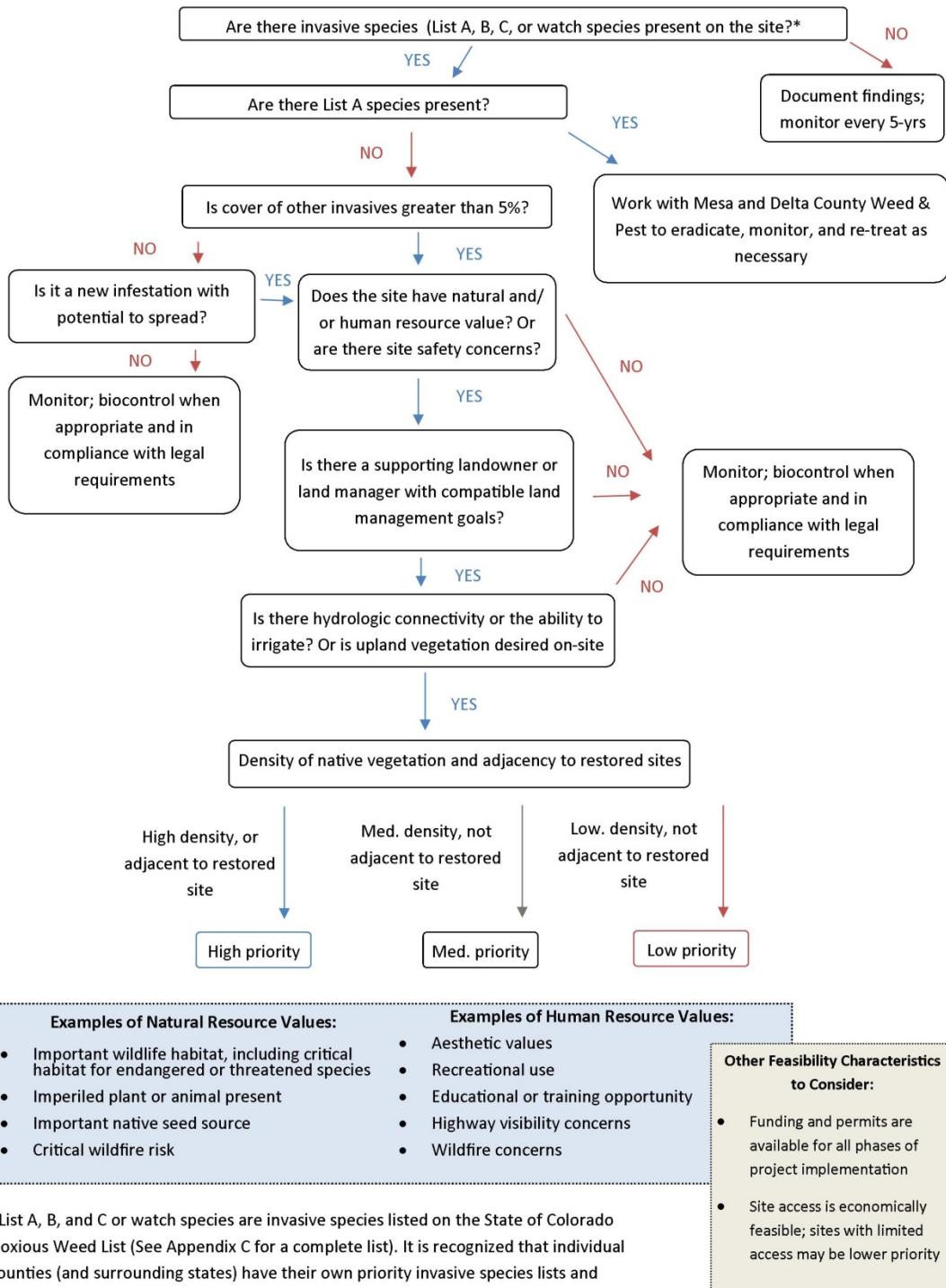
Site Criteria Characteristics should be used in conjunction with agency management plans, other overarching restoration plans, and available mapping efforts (see Table 2; page 6). Natural and human resource values, which are more subjective and difficult to map, should also be considered.

Furthermore, the following additional criteria must also be met at each site to assure restoration success:

- **Adequate funding** to complete the project, including monitoring and maintenance; preference is given to projects where partners can provide in-kind and/or cash match.
- **Permits are obtained**, where necessary, to comply with National Environmental Policy Act (NEPA), Section 404 of the Clean Water Act, Section 106 of the National Historic Preservation Act (NHPA), and Section 7 of the Endangered Species Act (ESA). Landowner access and maintenance agreements should also be obtained prior to project implementation.
- **Capacity is available** to conduct work. A trained work force and logistics plan is necessary to implement a successful project.

**FIGURE 3 – DECISION TREE FOR SITE SPECIFIC INVASIVE SPECIES CONTROL**

*ADAPTED FROM DOLORES RIVER RESTORATION ACTION PLAN (TAMARISK COALITION 2010)*



## Initial Site Prioritization for the Colorado River & Tributaries

According to initial estimates, approximately 800 acres of riparian habitat have been treated in the Grand Valley since the mid-1990s; however, many of these areas may require follow-up treatment or additional revegetation. The DRC will assess where additional treatment is needed for these areas. The groundwork for this assessment was laid when TC catalogued treatment areas (<http://tamariskcoalition.org/programs/projects-monitoring>) in 2014, though, ground-truthing will need to be completed in order to better ascertain additional maintenance and revegetation needs. The TC will work to coordinate this assessment in early 2015.

Based on an assessment of documents identified in Table 1 (page 4), input from land managers, and the site selection criteria identified above, the following sites were identified as high priority for riparian restoration on the Colorado River (Table 6; page 17). Some work has been completed on many of these sites; however additional work may be required. Sites are listed from east to west as denoted by river miles. River miles are relative to the confluence of the Colorado and Green Rivers (moving upstream). Landowner permission has not been acquired for many of these sites to date; a comprehensive outreach plan still needs to be developed before additional site-specific planning proceeds. Likewise, some of these sites encompass lands described as unclassified; in these instances, additional work will need to be done to determine landownership and/or land management status.



WOODY INVASIVE REMOVAL AT CONNECTED LAKES SECTION OF JAMES M. ROBB COLORADO RIVER STATE PARK

TABLE 6 - HIGH PRIORITY RESTORATION SITES FOR THE COLORADO RIVER

Site Name	River Mile	Agency Priority*	Landowners	Goals Met**
<b>Palisade Riverbend Park</b>	183-184	Town of Palisade	Town of Palisade	S, Ec, M
<b>Tillie Bishop SWA</b>	183 - 184	CNHP, CPW, USFWS	CPW, Private	E
<b>Orchard Mesa and Colorado River Wildlife Areas</b>	174 - 177	CNHP, USFWS	CPW, City of GJ, Mesa County, BOR, Private	E
<b>Indian Wash</b>	NA	City of GJ	City of GJ	E, S, Ec
<b>Watson Island &amp; Las Colonias</b>	171 - 172	City of GJ	City of GJ, Unclassified	E,S, Ec, M
Confluence Island/Jarvis	170 - 171	USFWS	City of GJ, Mesa County, BOR, Private, Unclassified	E
Broadway Bridge South Bank Island	169 - 170	USFWS	Private, Unclassified	E,S
<b>Connected Lakes Area</b>	167 - 170	CNHP, CPW	CPW, City of GJ, Mesa County, Audubon, BOR, Private	E, S, Ec, M
Bananas Island/Backwater	168 - 169	USFWS	City of Grand Junction, Mesa County, Private, Unclassified	E
<b>Walter Walker SWA</b>	164 - 166	CNHP, CPW, USFWS	CPW, Mesa County, Private	E
Island Complex near Rhone	159 - 163	CNHP	Private, Mesa County	E
Dupont Island Complex	161 - 162	USFWS R	Private, Mesa County, Unclassified	E
<b>OBY Property</b>	159 – 160	USFWS	CPW, BLM, Private, Unclassified	E
Old Fruita Bridge	158 – 159	USFWS	Private, Unclassified	E
<b>Big and Little Salt Wash</b>	NA		City of Fruita	S
Skippers Island Complex	154 - 156	USFWS	CPW, BLM, Private, Unclassified	E
Vulture Bottom	140 - 142	CNHP	BLM, Private	E
<b>Black Rocks</b>	137	CNHP	BLM	E
<b>Bolded site names indicate some work has been completed; additional work may be needed.</b>				
*See Table 1, **E= Ecological, S=Social, Ec = Economic, M = Management				

Additional prioritization will need to be completed in order to develop a more comprehensive implementation plan for the next five years, as indicated in the **Five Year Goals & Objectives** section (page 9). As part of this prioritization, areas selected for passive restoration with the tamarisk beetle will also be determined.

## Site Prioritization for the Gunnison River & Tributaries

Currently, the Bureau of Land Management (BLM) is working on completing its Resource Management Plan (RMP) and Environmental Impact Statement (EIS) for the Dominguez-Escalante National Conservation Area. The BLM expects to release the Proposed RMP and Final EIS for a 30 day protest period in the spring of 2015. The RMP will be finalized with the Approved RMP and Record of Decision expected in late 2015/early 2016. Once these documents are completed, the BLM should have better guidance on where to prioritize riparian restoration along their lands.

The Uncompahgre Partnership, a collaborative stakeholder group focused on improving ecosystem health, recently completed a Coordinated Weed Management Area Plan for the Dominguez-Escalante Canyons region to determine specific Gunnison River priorities. Tamarisk and Russian olive are listed as high priority weeds for this area, as are associated secondary weeds such as Russian knapweed (*Acroptilon repens*) and hoary cress (*Cardaria draba*). Currently the management plan for tamarisk is to eradicate all isolated infestations on the watersheds draining into the Gunnison River. Along the mainstem of the Gunnison River biocontrol is suggested as an interim management strategy, with a final plan to be developed once inventories and monitoring have been evaluated. A containment plan for Russian olive is being developed.

There are currently small restoration projects underway along the Gunnison River near the confluence with the Colorado River in Grand Junction and near the confluence with the Uncompahgre River near Delta.

## Private Lands

TC is working with the Natural Resources Conservation Service (NRCS), Colorado State University (CSU) Extension, and the Mesa Land Trust (MLT) to develop a private lands outreach campaign and funding strategy to work with willing landowners within the project area. Private landowners interested in conducting work on their land should contact the Collaborative or the Grand Junction NRCS office (970-243-5068 ext. 128). Focus is currently on the Colorado River; however, Gunnison River landowners are strongly encouraged to contact the DRC or the NRCS with project ideas.

A pilot project was completed in 2014 that involved numerous private landowners, the City of Grand Junction, Mesa County, NRCS, MLT, CSU Extension, and Redlands Water & Power. The Collaborative is continuing to look for other project areas that can address multiple resource concerns in a localized area. The pilot project will be used as a case study to help inform additional work on private lands in the region. To date, the importance of defining partner and landowner expectations has been made clear, as has the need to obtain appropriate access agreements. As in any project, the need for clear and open communication is paramount when working with multiple partners.

## Technical Resources for Removal & Revegetation

Specifics on how best to control tamarisk and Russian olive at a particular site are provided in Appendix D, whereas Appendix E covers secondary weed control. Best management practices for revegetation, including planting lists, are included in Appendix F.

## Monitoring & Maintenance

Monitoring is the observation of changes that are occurring or are expected to occur with, or without, remediation actions. The purpose of monitoring is to provide information to inform decisions to initiate, continue, modify, or terminate specific actions, restoration activities, or programs – better known as “adaptive management.”

Maintenance is the physical action to sustain restoration goals over time. These actions, carried out over years to decades, focus activities to sustain progress made during restoration activities. Monitoring provides information for making informed decisions to ensure “maintenance” will continue to remediate or improve the ecological processes of the watershed. Examples of maintenance actions are continued secondary weed control and supplemental establishment of native species if it is determined that initial restoration activities were not sufficient.

Short- and long-term monitoring and maintenance are critical to ensure that overall DRC project goals and objectives are being successfully met and sustained over time. Likewise, monitoring and maintenance assures success on the individual project level. Prior to project implementation, the Collaborative will work to obtain funding to support monitoring and maintenance for lands where projects are implemented, however, the Collaborative will be looking to land managers to provide staff and support necessary to implement monitoring and maintenance on their respective lands.



Through observation (*monitoring*), land managers can adjust restoration approaches to improve success (*adaptive management*), and sustain restoration goals (*maintenance*). However, these interacting activities are only effective if there is also effective communication between those who monitor, land managers, and maintenance staff. Thus, a system for communication and information storage is critical to ensure effective monitoring, adaptive management, and maintenance. Restoration activities will greatly benefit from an organized approach to such communications; the DRC can help to provide the framework to assimilate information.

## Suggested Approaches

To incorporate adaptive management principals, it is recommended that a process be established to collect, assess, and disseminate monitoring data for use on future projects.

Suggested methods to accomplish this task include:

- Establish and utilize uniform monitoring protocols;
- Create or utilize an existing website or geodatabase to upload DRC restoration project information using standardized forms and monitoring protocols;
- Identify an organization to take on archiving and distribution of restoration “lessons learned”; and/or
- Establish and maintain direct communications with adjoining watershed groups such as the Southeast Utah Riparian Partnership or the Dolores River Restoration Partnership

Suggested vegetation monitoring protocols are provided in Appendix G. Additional protocols may need to be developed in order to monitor success towards other defined goals, such as improved wildlife habitat or river function.

Colorado Mesa University (CMU) has been working with the DRC to develop geomorphic monitoring protocols based on field work conducted on the Colorado River in the Grand Valley.

## Costs

In order to plan a successful revegetation project, appropriate methods for woody invasives treatment, follow-up maintenance, revegetation, and monitoring must be chosen in considerations of both site specific ecological conditions and available funds. TC has developed a cost estimation tool that examines available technologies for each component of a riparian restoration project along with algorithms that estimate their costs that may be useful. These algorithms were created by TC using cost, efficacy, and appropriateness data collected from tamarisk control and restoration projects over several years. The cost calculator is available on the TC website at: <http://tamariskcoalition.org/resource-center/documents/riparian-restoration-cost-calculator>.

More information on the cost calculator and the information used to develop this tool are provided in Appendix H, Control, Biomass Reduction, Revegetation, and Monitoring & Maintenance Costs.

As additional project prioritization is completed for the DRC focus area, this plan will be updated to reflect overall estimated costs.

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