Appendices: Accessing Colorado Water Plan Grants for Riverscape Restoration
Version 1.0

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Appendices - Overview

These Appendices supplement the *Accessing Colorado Water Plan Grants for Riverscape Restoration* memo. The Appendices catalogue CWP excerpts that intersect with the four riverscape restoration focus areas. The resources in these Appendices are designed to aid grant writers in identifying and citing specific CWP sections or excerpts that align with their proposal's scope and objectives.

Appendix A – State Context & Challenges: *excerpts from CWP sections on State Context & Water Challenges, organized by restoration focus area. This appendix can be used to identify CWP excerpts on statewide water challenges that reference riverscape restoration, or that could demonstrate the need for riverscape restoration projects.*

Appendix B – Basin Summaries: *excerpts from the CWP summaries of each basin's implementation plan (BIP), organized by restoration area, Basin Implementation Plan (BIP), and BIP subsections. This appendix can be used to identify issues specific to each basin that could be addressed through riverscape restoration,*

Appendix C – Tools: *excerpts from the CWP chapter 5 section on 'Tools for Implementation', organized by restoration focus area and by each 'tool' described in the CWP. This appendix identifies the tools from the CWP that are most relevant to riverscape restoration, and excerpts related to each tool that could help justify the need for riverscape restoration projects.*

Appendix D – Partner Actions: *each partner action that addresses the four restoration focus areas, with explanatory excerpts, organized by partner action category (described in the CWP), restoration focus area, and by CWP action area. The excerpts in this appendix explain each partner action and its relevant to riverscape restoration.*

Appendix E – Riverscape Restoration in BIPs: *this appendix copies basin goals from each BIP that address riverscape restoration. This appendix can be used to identify all goals from each basin's BIP that are related to stream restoration. This is the only appendix that is based on BIPs, and not the CWP.*

APPENDIX A – State Context, Challenges & Vision

Excerpts from CWP chapters 3 (State Context), 4 (Basin Context) and 6 (Vision & Actions for Addressing Colorado's Risks) on state context and water challenges that address the four riverscape restoration focus areas. Some excerpts identify issues that can be addressed through riverscape restoration and/or nature-based solutions.

Focus Area	CWP Excerpts
Stream & Watershed Restoration **and** **Nature-based Solutions**	"River flows, floodplain connectivity, aquatic and riparian habitat, ecosystem function, forest condition, water quality, bank stability, stream access, water temperature, and habitat connectivity are all critical factors to consider when determining environmental and river-based recreational needs." CWP.48 "Currently, approximately 30 percent of Colorado's streams and lakes do not meet applicable water quality standards for one or more classified uses (agriculture, water supply, recreation, or aquatic life).2 Waters that do not attain water quality standards (also called impaired waters) affect our ability to use water for domestic water supply, agriculture, aquatic life, and recreation." CWP p.149 "Rather than implementing a patchwork of watershed health projects, our efforts must increasingly seek to create more opportunities for larger, landscape scale watershed restoration projects and multi-benefit projects that meet the needs of many water users as well as the environment." CWP p. 204
Climate, Wildfire, Drought Resilience	"In addition to impacting water supply, hydrologic drought can lead to the loss of wildlife habitat and impact aquatic species." CWP .38 "Drought resilience means building strategies that reduce the impacts of drought shocks and ongoing climate stresses on communities, economies, and ecosystems, and allow them to rebound more quickly when drought occurs." CWP p.38 "Impacts to ecology that push ecosystems toward lasting change from which recovery is difficult is known as "ecological drought." CWP p.38 "Drought Impacts: Municipal water shortages; Warmer water temperatures, affecting aquatic life; Agricultural surface water shortages resulting in reduced irrigation supplies; Storage depletions; Increased draw on groundwater aquifers; Reduced recreation opportunities; Increased wildfire risk, decreased forest health, and increased algal blooms; Degradation of water quality through reduced stream flows" CWP p. 38 "Impacts to agriculture, such as poor soil moisture and reduced water supplies from surface and groundwater sources lead to "agricultural drought." Plant stress and low crop yields can result from agricultural drought." CWP p.38 [strategies] "Strategic Funding – targeted investments that build drought resilience in…. watersheds (forest treatments, stream improvements)." CWP .39

	"Technical Update: Projected future streamflow in most locations across the state show potentially drier conditions in the late summer months under scenarios with climate change, and peak runoff may shift as much as one month earlier, potentially impacting water right yields" CWP p.50
Collaboration, Engagement & Planning	Environmental Flow Tool: "The Environmental Flow Tool was developed during the Technical Update to help assess current and future flow conditions and associated risks to ecological health at selected nodes in each basin." https://dnrftp.state.co.us/#/CWCB/Technical%20Update%20to%20Water%20Plan/2.%20Tools/EnvRec_Flow_Tool/ CWP p.48 "Impacts to our economy that are driven by other types of droughts can result in shortages of goods such as fruits, vegetables, grains, and meats, or services such as rafting" CWP p.38 "Colorado's $19 billion in outdoor recreation comes from fly fishing, rafting, paddle boarding, waterfowl hunting, wildlife watching, camping, and other activities on or near rivers, lakes, and streams" CWP p.48 Colorado Water Plan Environment and Focus Areas Map: "CWCB developed a web-based interactive map that included a statewide compilation of nodes from the Flow Tool, Focus Area maps, geographic information on stream management plans (SMP) and integrated water management plans (IWMP), and environmental and recreational attributes." https://cwcb.maps.arcgis.com/apps/MapSeries/index.html?appid=880753ceb13d43e3bc89e2259247aafa. CWP p. 49

APPENDIX B – Basin Summaries

Excerpts from CWP chapter 4 on Basin Context that address the riverscape restoration focus areas. Excerpts include those that specifically address the focus area, as well as excerpts identify issues that can be addressed by riverscape restoration or nature-based solutions. Excerpts are organized by **Basin(rows)** and by **focus area (columns**). Excerpts are tagged as: **basin goal; basin challenge; demand, supply, potential water need; or strategic visions for the future,** based on the context in which they were presented in the CWP.

	Stream & Watershed Restoration, and Nature-based Solutions	**Climate, Drought & Wildfire Resilience**	**Collaboration, Engagement & Planning**
Arkansas	**Basin Goals – Watershed Health:** "Maintain, improve, or restore critical water supply watersheds that could affect Arkansas Basin water uses and environmental and recreational values. Improve water quality as it relates to the environment and/or recreation" CWP p.81 **Basin Goals – Environment & Recreation:** "Maintain or improve aquatic, riparian, and avian habitat (including wetlands) that would support environmental features and recreational opportunities" CWP p.81	**Basin Challenges – Watershed:** "Managing impacts of fires and floods on an increasing frequency and spatial scale." CWP p.80	**Basin Goals – Municipal and Industrial -** "Develop collaborative solutions among municipal, agricultural, and environmental and recreational users of water, particularly in drought conditions." CWP .81
Colorado River	**Basin Challenges – Cross Sector:** "Sustaining riparian health are also challenges." CWP p. 88	**Basin Challenges – Cross Sector:** "Forest and watershed health is a basin wide challenge, especially given the impacts of recent wildfire activity." CWP p.88 **Demand, Supply, Potential Water Needs – Environment and Recreation:** "Flows are projected to be variable depending on impacts of climate change. Decreased peak flows across the basin create risks for riparian/wetland plants and fish habitat" CWP p.91	

Gunnison		**Basin Challenges – Watershed:** "There is a need for better watershed health management tools to mitigate wildfire risk and sedimentation in streams" CWP p.96 **Basin Challenges – Watershed:** "Environmental and recreational flows may be met less often in climate-impacted scenarios, especially in reaches with increased consumptive needs." CWP p.96 **Demand, Supply, and Potential Water Needs:** "Future environmental and recreational risks include riparian/wetland plants and fish habitat ecological impacts due to climate change. Identifying these risks helps facilitate discussions about projects or strategies that can be implemented to reduce the risks." CWP p.99 **Strategic Visions for the Future: "**protect environmental and recreational values; prepare for climate change" CWP p. 98	**Basin Challenges – Municipal and Industrial:** "Population growth in the headwater regions will require additional water management strategies." CWP p.96 **Basin Challenges – Compacts, Administration, and Regulatory:** "Meeting environmental needs in a manner that does not adversely impact existing uses remains a challenge." CWP p.96 **Basin Goals:** "Describe and encourage relationships among agricultural and environmental recreational water uses" CWP p. 97
North Platte	**Basin Goals:** "Maintaining healthy rivers through the strategic implementation of projects that meet prioritized environmental and recreational needs" CWP p.105		
Rio Grande	**Basin Overview:** "Recreational opportunities abound, due in part to abundant wildlife supported by extensive wetlands and riparian areas." CWP p.110 **Basin Challenges: Watershed -** "Changing conditions of the watershed, including stream and wetland degradation, affect water supply, with direct impacts to environmental, recreational, and agricultural attributes." CWP p.112	**Demand, Supply, and Potential Water Needs – Environment and Recreation:** "Climate change and altered hydrology are expected to impact environmental and recreational attributes. Spring runoff peak flows are expected to occur earlier in the future along with potential lower flows in the later summer… these changes in hydrologic conditions will decrease water availability for a variety of wetland and riparian habitats." CWP p.115	

	Basin Goals: "Healthy watersheds that provide critical ecosystem services, are resilient to disturbances, and benefit from ongoing efforts to protect water sources, improve water quality, maintain connected ecosystems, and enhance aquatic, riparian, wetland, and upland habitat." CWP p.113		
South Platte	**Basin Goals:** "Protect and enhance watershed function & environmental attributes" CWP p.122	**Basin Challenges - Watershed:** "Climate change may degrade watershed health, increase the risk of wildfire, impair water quality, and increase risk to environmental and recreation attributes." CWP p.120	**Basin Challenges – Watershed**: "Additional data are needed to evaluate the health of streams and watersheds more completely and identify ways to improve conditions." CWP p.120 **Basin Challenges – Watershed:** "While funding assistance programs exist, they do not fully meet the need for watershed and environmental and recreation project planning and implementation" - CWP p.120 **Basin Challenges – Watershed:** "Traditional metrics for monitoring stream health are outdated or difficult to monitor." CWP p.121
Yampa – White - Green	**Basin Challenges – Watershed:** "Stream temperatures and increasing nutrient loads are emerging water quality concerns." CWP p. 136 **Basin Goals:** "Maintain and consider the existing natural range of water quality that	**Basin Challenges – Cross Sector: "**Wildfire frequency and severity is increasing in the western United States. Because wildfires have the potential to impact a watershed's water quality and quantity, water managers are joining efforts to improve forest health and create more wildfire-resistant landscapes." CWP p.136	

	is necessary for current and anticipated water uses" CWP p. 137	**Basin Challenges – Cross Sector:** "Drought impacts and their effects, potentially exacerbated by climate change, have continued to grow … this will be a major focus of basin water planning." CWP p. 136	
Southwest		**Basin Challenges – Watershed:** "Drought and large, uncontrolled forest fires have had a devastating effect in many areas of the Southwest Basin. Forest health initiatives are needed for community wildfire protection, increased watershed resiliency, water quality protection, and source water protection planning, and to mitigate negative impacts from past forest management practices." CWP p.128 **Demand/Supply Needs – Environment and Recreation:** "The risk to peak-flow-related riparian/wetland plants and fish habitat is currently high and may increase under climate-impacted scenarios" CWP p.131	

APPENDIX C - Tools

CWP excepts related to the eight tools that intersect with the riverscape restoration focus areas. Excerpts are organized by **tool (rows**) and by the four riverscape restoration **focus areas (columns**). For rows that encompass multiple tools, the tool is bolded above relevant excerpts.

	Nature Based Solutions	**Stream & Watershed Restoration**	**Climate, Drought, & Wildfire Resilience**	**Collaboration, Engagement, & Planning**
Stream Watershed Restoration and Enhancement **&** **Climate Adaptation and Innovation**	**Stream Watershed Restoration and Enhancement:** "Nature Based Solution Example: protecting and supporting existing beaver populations and their habitat where appropriate is a desirable management tool in many forested areas to protect flow regimes, balance healthy patterns of sediment erosion and deposition, and improve aquatic habitat." -p.170 "Examples of nature-based solutions include… restoration of wetlands or other habitats" -p.170	**Stream Watershed Restoration & Enhancement** "Resilient River systems require seasonal flow fluctuations and provide complex and connected aquatic and riparian habitats needed to sustain stable, diverse, abundant, and reproducing populations of aquatic and riparian species. To promote resiliency, stream restoration projects should consider the effects of drought, climate change, and aridification, which include decreased supply, changes in water temperature, and changes in runoff magnitude, duration, frequency, rate of change, and timing." -p.170 "Process-based Restoration: Process based restoration aims to restore dynamic watershed and stream characteristics that reflect those in minimally impacted systems. This type of restoration project can improve water quality, habitat, and steam resilience. Process-based	**Stream Watershed Restoration & Enhancement** "… benefits of stream restoration include drought and flood resilience, increased forage for wildlife, balanced patterns of erosion and deposition, wildlife resilience, floodplain connectivity, and improved water quality and habitat" -p.170 **Climate Adaptation & Innovation:** "Colorado will need to focus on practical drought solutions, wildfire mitigation, flood preparedness, and water supply and demand strategies that are adaptable to changing hydrology." -p. 159	**Climate Adaptation & Innovation:** "Creative, collaborative, and innovative solutions will be needed to lower our future water supply risks as our population grows and the climate warms… Challenges to fostering innovation can include the inability to create open dialogues with the business community, legal or regulatory barriers to innovation, or lack of support for research and development" -p. 159

		restoration projects benefit streams and protect clean water supplies for municipalities and agriculture" -p.170 "Form-based Restoration: When there is not room to restore the footprint that a river could occupy or influence in a wide variety of flow conditions due to development and infrastructure, a form-based restoration approach can be used to restore as much of the river's former footprint and functions as possible. Form-based restoration projects seek to restore or enhance water quality and fish habitat and abundance, and they also increase the stability of banks and stream channel beds." -p.170		
Natural Hazard Planning **&** **Data Collection and Sharing**			**Natural Hazard Planning:** "Wildfire Ready Watersheds – This CWCB program aims to provide a mitigation framework for communities to assess the susceptibility of their water resources and critical infrastructure to post-wildfire impacts." -p.162 p. 162 – "Pre-hazard mitigation and planning are opportunities to reduce risk and lower costs associated with natural hazards."	**Natural Hazard Planning:** "Colorado Fluvial Hazard Zone Mapping Program – The CWCB developed a technical protocol to help communities identify, map, and plan for natural hazards associated with erosion, sediment deposition, and other dynamic river processes" – p.162 **Data Collection & Sharing:** "A wide variety of entities statewide collect and make data available online through

				mapping tools that provide easy access to, and understanding of, data." -p. 164
Collaboration Groups **&** **Public Education and Outreach** **&** **Endangered and Threatened Species Recovery Programs**		**Endangered and Threatened Species Recovery Programs** "Colorado participates in three recovery programs designed to protect and recover stream-dependent endangered and threatened species in various river basins while providing regulatory certainty and ESA compliance for water users. As a result, these programs encourage cooperative water management and habitat restoration." -p. 161 "Platte River Recovery Implementation Program. The PRRIP, established in 2007, was formed to support the recovery of four target species by enhancing, restoring, and protecting habitat in the Platte River in Nebraska while providing ESA compliance for water projects in Colorado, Nebraska, and Wyoming. The target species are the piping plover, least tern, whooping crane, and pallid sturgeon." -p. 161		**Collaboration Groups** "The Water Plan identifies the need to address risks to water supply and watershed health with coordinated planning across boundaries. Regional and local, place-based collaborative groups are a vital component to successfully approaching these multi-scale efforts… Collaboration often means partners pool their resources and create shared goals, processes, and structures to support their new, joint work. Collaborative groups explore, prioritize, deliberate on, and implement the solutions they have developed together" -p. 157 "Collaboration can be particularly useful for addressing problems that: Have too high of a cost for one entity to carry alone; Cross ownership or management boundaries; Have high levels of uncertainty, missing information, or are viewed differently by participating stakeholders; Involve tradeoffs and balancing the needs of different water users" -p. 157 **Public Outreach and Education** "In the future, CWCB will continue to aid in research, coordinate efforts, and provide funding and guidance for water

				education, outreach, and participation in projects statewide." -p.154
Watershed Planning	"Nature-based solutions can be considered in many of the tools suggested in the Water Plan including watershed management, natural hazard planning, and stream/ watershed restoration" - p. 170	"Coordinated efforts that leverage funds to enhance river corridors for recreation can help creatively support both watershed health and recreation." -p.158	"Watersheds provide vital ecosystem services, such as habitat, carbon sequestration, and water supply filtration. Healthy watersheds with healthy riverscape structure and function are resilient, and resilient ecosystems are able to absorb repeated disturbances (e.g., fires, floods, droughts) and adapt to change without fundamentally changing the services (e.g., flow regime) on which society and the environment depend. The health of forests, streams, and the larger watershed ecosystem is critical to its ability to absorb shocks and stresses." -p. 158	"Stream Management Plans & Integrated Water Management Plans**:** SMPs are data-driven assessments of river health that help communities prioritize how to protect or enhance environmental and recreational assets in their watershed. Similar to SMPs, the IWMP framework focuses on water management practices, streamflow, and resulting effects to ecosystems and water uses. IWMPs are more broad than SMPs and consider a wider array of needs and larger groups of stakeholders, including water rights owners and riparian landowners." -p.158 "Effective watershed management planning considers a range of perspectives from diverse voices" -p. 158

APPENDIX D – Partner Actions

CWP explanatory excerpts for each party action that addressed the four riverscape restoration focus areas. Excerpts are organized by **partner action category (rows)** and by riverscape restoration **focus area (columns)**. Each excerpt is tagged with its correlating **partner action (bolded, above)** and with the **CWP action area (bolded, below)** that partner action is listed under.

	Nature Based Solutions	**Stream & Watershed Restoration**	**Climate, Drought & Wildfire Resilience**	**Collaboration, Engagement, & Planning**
Healthy Lands	"**Forest health improvements**: Efforts to improve or maintain healthy forests can create watersheds that are resilient to natural disasters, provide high-quality water supplies, and can help stabilize forest carbon." CWP p. 206 **THRIVING WATERSHEDS** "**Reducing Erosion and Improving Water Quality:** Management practices such as... buffer strips can reduce on-farm erosion and improve water quality." CWP p. 195 **ROBUST AGRICULTURE** "**Reconnecting Floodplains & Nature Based Solutions"** Beaver reintroduction and construction of beaver mimicry structures are examples that support these strategies. These kinds of projects improve the natural environment, but they also help provide clean water supplies for both municipalities and	"**Improving Riparian & Aquatic Habitat:** Resilient river systems require seasonal flow fluctuations and provide complex and connected aquatic and riparian habitats… Efforts to improve riparian and aquatic habitat are important to the recovery of native and imperiled species." CWP p. 206 **THRIVING WATERSHEDS** "**Reconnecting Floodplains & Nature Based Solutions:** Projects that reconnect floodplains to waterways and restore wetlands and riparian habitat along headwater streams can increase drought, fire, and flood resilience and provide environmental benefits." CWP p.206 **THRIVING WATERSHEDS**	"**Forest health improvement:** Identifying and implementing projects in fire-prone forests to protect critical water supply infrastructure from sedimentation and debris flow will be important for building resilience." CWP p.206 **THRIVING WATERSHEDS** "**Pre-and post-hazard planning for critical infrastructure:** Planning and implementing projects that protect critical water supply infrastructure from sedimentation and debris flow in the aftermath of wildfire is important for creating resilience in water supplies. Pre-hazard planning and implementation can help prevent impacts from wildfire, and post-hazard planning can help minimize the negative impacts from wildfire after it has occurred." CWP p.218 **RESILIENT PLANNING**	"**Holistic Planning for Urban Landscapes that Improve Quality of Life:** Thoughtful planning can help connect people to nature through shared greenspaces with climate-appropriate vegetation, flood-tolerant green infrastructure, and access to waterways" CWP p. 180 **VIBRANT COMMUNITIES** "**Coordinating on forest health and understanding forest hydrology:** As Colorado looks to the future, additional research is needed to project how runoff quantity and quality from our forested watersheds may change in response to future disturbances and/ or restoration" CWP p.218 **RESILIENT PLANNING**

	agriculture." CWP p. 206 **THRIVING WATERSHEDS** "**Support for natural and working lands:** Natural climate solutions can be supported and leveraged through a variety of State programs." CWP p.218 **RESILIENT PLANNING**			
Engaged Partners				**Effective Engagement and Education:** "Critical partners in watershed planning like NGOs can often help with efforts such as data collection, project implementation, analysis, and education. They can often form strong, trust-based relationships with communities." CWP p. 207 **THRIVING WATERSHEDS** "Agencies and stakeholders need to plan together, prioritize together, and act together" CWP p. 177 **THRIVING WATERSHEDS** **Effective Engagement and Education:** "While NGOs and government groups can often support innovation, creative opportunities to innovate and engage new partners is needed. Often, NGOs or nonprofits can help support expanding connections" CWP p.219 **RESILIENT PLANNING**
Integration with Other Sectors	"**Robust Agriculture** Shared efforts to improve water quality	"Efforts to improve stream health or function often benefit other water sectors." CWP p. 177	"**Resilient Planning:** Efforts made to improve watershed and forest health will increase the ecosystem's	"**Vibrant Communities:** The development of multi-benefit projects that enhance environmental and

	can benefit multiple sectors" CWP p.207 **THRIVING WATERSHEDS**	**THRIVING WATERSHEDS** "**Thriving Watersheds**: Preserving, enhancing, and restoring streams in urban corridors and protecting their flows can provide environmental and recreational benefits as well as provide attractive landscapes, shade, and water quality benefits for urban residents" CWP p.181 **VIBRANT COMMUNITIES** **"Thriving Watersheds:** Agricultural best management practices can benefit farms while improving water quality" CWP p.195 **ROBUST AGRICULTURE**	ability to effectively respond to environmental changes and natural disasters and enhance water security and quality for downstream communities." CWP p.207 **THRIVING WATERSHEDS**	recreational uses can often enhance municipal supply or improve the quality of life in urban areas" CWP p. 207 **THRIVING WATERSHEDS**
Meeting Future Water Needs		"Efforts to improve stream health and infrastructure efficiency benefit all water use sectors while enhancing the environment and recreation opportunities" CWP p. 177 **THRIVING WATERSHEDS** "**Rehabilitate streams to improve habitat, reduce erosion, and meet needs:** Projects that reconnect streams with their floodplains can improve stream and riparian habitat as well as water quality for the benefit of all water sectors." CWP p.205 **THRIVING WATERSHEDS**	"**Geen Infrastructure:** Repairing and protecting functioning ecosystems can mitigate risk from natural hazards." CWP p.217 **RESILIENT PLANNING**	"**Multi-purpose projects for building resiliency:** Multi-purpose projects better address water supply challenges across municipal, agricultural, environmental, and recreation sectors as they occur." CWP p.217 **RESILIENT PLANNING** "**Rehabilitate streams to improve habitat, reduce erosion, and meet needs:** Stream management plans and integrated water management plans are collaborative efforts that can identify projects and needed flows for stream rehabilitation that consider all of the benefits that a stream provides to local users." CWP p.205 **THRIVING WATERSHEDS**

				"**Increase access to recreational opportunities:** Thoughtful planning should balance increased [recreational] access opportunities with watershed/habitat protection." CWP p.206 **THRIVING WATERSHEDS**
Thoughtful Storage	"**Nature-based solutions:** Established best practices for nature-based solutions that support healthy forests, watersheds, and their natural water infrastructure such as floodplains and wetlands can attenuate flood flows, boost late-season low flows, and improve ecosystem health and water quality." CWP p. 205 **THRIVING WATERSHEDS**	"**Streamflow enhancement (retiming and releases):** Releases from water storage can enhance streams during critical low-flow periods for aquatic life, can help address water temperature issues during low-flow periods, and can help bolster critical high-flow periods to maintain stream habitat or riparian corridors." CWP p.205 **THRIVING WATERSHEDS** "**Protecting Storage From Effects of Wildfire Debris Flows:** Projects that enhance connections between headwater streams and floodplains can improve stream and watershed health and reduce risks from wildfire, flooding, and drought." CWP p. 217 **RESILIENT PLANNING**		
Wise Water Use		"**Invasive phreatophyte and species removal:** Local removal efforts can complement stream or riparian improvements but large-scale efforts to remove these species requires effective management across jurisdictions." CWP p.206 **THRIVING WATERSHEDS**	"**Create greater drought, fire, and flood resilience:** Stream and watershed restoration efforts should strive to incorporate multiple opportunities, benefits, and funding sources where possible. Specific ecosystems such as headwaters, floodplains, and wetlands can be evaluated and	"**Streamflow and Lake Protections For Environmental Needs -** [CWCB instream flow appropriations are] an important tool for preserving and enhancing streams and ecosystem health. Voluntary water acquisitions can also be used to improve stream flows to benefit streams and habitat." CWP p. 206 **THRIVING WATERSHEDS**

			prioritized using watershed-specific metrics.” CWP p. 206 **THRIVING WATERSHEDS**	

Appendix E – Stream Restoration in Basin Implementation Plans

This appendix identifies the goals, strategies and objectives from each BIP that are most relevant to stream restoration project proponents. This appendix is designed to support grant writers in identifying alignment between projects and the BIP for the basin that project is occurring in. This resource should be used to identify the most aligned goals from relevant BIPs. However, it is strongly encouraged for any project proponent to read further about each goal in the BIP to understand the full context of these excerpts.

Arkansas Basin

The Arkansas BIP identifies goals in five different categories: storage (S), municipal & industrial (M), agricultural (A), environmental & recreation (E&R), and watershed health (W). The following goals address riverscape restoration, relevant bullets from the BIP are included underneath each goal. Excerpts that are the most relevant to riverscape restoration projects are **bolded.**

Goal M4: Develop collaborative solutions among municipal, agricultural, and E&R users of water, particularly in drought conditions

Goal A5: Sustain recreational and environmental activities that depend on habitat and open space associated with farm and ranch land

- Looking at current multi-purpose projects and identifying successful strategies that support both agriculture and E&R values

Goal ER1: Support projects and programs within and outside the Arkansas Basin that protect E&R water supply needs, and collaborate with municipal and ag users to enhance E&R values

Goal ER4: Maintain or improve aquatic, riparian, and avian habitat (including wetlands) that would support environmental features and recreational opportunities

- Supporting the maintenance, improvement, and/or **restoration of these habitats**
- Supporting the maintenance, improvement, and/or **restoration of wetlands throughout the Arkansas Basin**

Goal W1: Maintain, improve, or **restore critical water supply watersheds** that could affect Arkansas Basin water uses and E&R values

- Promoting watershed health and water quality as shared values to all Arkansas Basin water users.
- Collaborating with ARWC to **define strategies and projects to protect watersheds.**

Goal W2: Improve water quality as it relates to the environment and/or recreation

Rio Grande Basin

The Rio Grande BIP has five goals. The three goals listed here identify strategies or outcomes (listed in the bullets) directly related to stream restoration. Excerpts that are the most relevant to riverscape restoration projects in the basin are **bolded.**

Goal: Healthy watersheds that provide critical ecosystem services, are resilient to disturbances, and benefit from ongoing efforts to protect water sources, improve water quality, enhance aquatic, riparian, wetland, and upland habitat, and maintain connected ecosystems.

- **Outcome -** The extent and **function of streams, wetlands, riparian areas,** and associated ecosystems that contribute to watershed resiliency **are protected, restored, conserved, and maintained.**
    - **Strategy - Implement a wide variety of river and riparian restoration projects, including both low-tech and hi-tech solutions that improve habitat quality and resiliency.**
    - **Strategy - Implement floodplain reconnection projects that improve the connectivity and sustainability across floodplain habitats.**
    - **Strategy - Implement wetland and wet meadow restoration projects** that provide habitat, filter pollutants, and restore and maintain surface and groundwater tables.
- **Outcome -** Water management strategies include water quality benefits
    - Strategy - Explore **natural water storage and pollution mitigation techniques.**
- **Outcome - Habitats that support healthy terrestrial and aquatic wildlife populations are maintained, enhanced, and restored.**
    - **Strategy - Implement riparian and aquatic habitat enhancement projects that restore and conserve riparian vegetation,** multi-aged cottonwood galleries, and aquatic habitat.
    - **Strategy - Implement restoration and enhancement projects that maintain wetland habitats.**

Goal: Aquifers w/sustainable supplies of groundwater for farmers and ranchers, towns, and wildlife habitat

- **Outcome –** Land and water management projects and initiatives are developed and implemented that support healthy ecosystems and contribute to sustainable aquifer levels
    - **Strategy - Implement wetland and wet meadow restoration projects** that provide habitat, filter pollutants, and restore and maintain surface and groundwater tables.
    - **Strategy - Implement floodplain reconnection projects**, where appropriate, that improve connectivity and sustainability across floodplain habitats
    - **Strategy - Implement a wide variety of river and riparian restoration projects, including both low-tech and hi-tech solutions,** that improve habitat quality and resiliency.

Goal: Vibrant and resilient agriculture, recreation, municipal, and industrial economies that support thriving communities

- **Outcome –** Quality, sustainability, and safety of water-based recreational opportunities are improved. Fish hatcheries have sustainable, secure, and adequate physical and legal water supplies
    - **Strategy - Conserve and restore wetland and other wildlife habitat**

South Platte Basin

The South Platte BIP identifies 12 goals. For each goal, specific strategies and measurable outcomes are identified. Each goal is divided into strategies or sub-goals; i.e. **goal 6: protect and enhance watershed function** has 3 sub goals – 6a, 6b, and 6c. Each sub goal also has specific strategies identified, i.e. 6.A.1, 6.A.2, etc... The goals and strategies that address riverscape restoration are included here. Each strategy also lists desired outcomes, outcomes relevant to stream restoration are included as bullets under each strategy. Excerpts that are the most relevant to riverscape restoration projects in the basin are **bolded.**

Goal 6 – Protect and enhance watershed function

- **Goal 6.A Protect and improve water quality throughout the watershed**
    - 6.A.1: Promote forest health through forest restoration and **wildfire risk-reduction activities**
    - 6.A.2: **Control erosion and sedimentation**
    - 6.A.3: Consider holistic impacts to water quality and watershed health during project development and implementation
        - Outcome - Supported, tracked, and leveraged the applicable work of other organizations to document projects that include management of stormwater through **natural-based solutions** for urban, rural, and **headwaters areas.**..
    - 6.A.4: Identify, assess, and implement actions, programs, and measures that aim to minimize the adverse effects on wetlands, lakes, streams/rivers, and associated ecosystems from water pollution, nutrient overload, reduced stream flows, and filling or dredging
        - Outcome -Supported the creation of basin wide assessment to **determine the locations of headwater floodplain and wetland restoration projects**
    - **6.A.6: Conduct restoration projects and promote innovative strategies to improve water quality in impaired areas and downstream impacts**
        - **Outcome - Supported the use of process-based restoration which seeks to restore the natural hydrologic, biologic, and geomorphic processes that contribute to a stream's ecological dynamics. One strategy of process-based restoration is reconnecting incised streams with their floodplains to restore functions such as sediment filtration, floodwater attenuation, and habitat. When there is not room to restore the footprint that a river could occupy or influence in a wide variety of flow conditions due to development and infrastructure, supported the use of form-based restoration which promotes modification of stream channels to improve in-channel habitat conditions and bank stability**

        - Outcome - Supported the documentation of best management practices and challenges of planning and implementing science-based headwaters restoration work. This might include lack of equitable fund distribution and/or lack of awareness around benefits to water supply, recreation, and quality.
        - **Outcome - Supported policy and regulatory changes that will help to scale up headwater stream and wetland restoration throughout Colorado as an important tool for water management, E&R, and increasing resiliency to floods and drought.**
    - 6.A.7: Identify, assess, and implement actions, programs, and measures that **address post-fire impacts**
- **6.B - Assess, Identify, and Prioritize Relationships and Multi-Lateral Impacts that Agriculture and Forestry have on the watershed**
    - 6.B.2: Impacts on streams, lakes, floodplains, riparian areas, wetlands, and we meadows.

Goal 7: Protect and enhance environmental attributes

- 7A: Continue to develop, promote, and apply best management practices, tools, and methodologies to adequately assess what is needed to maintain, increase, or enhance the following throughout the SP basin: ... **aquatic , riparian, floodplain, wetland, and wet meadow habitats.... riverine connectivity,** including biological, hydrological, geomorphological processes.
    - Outcome - Based upon the assessment and/or existing knowledge of where **the best opportunities for headwater floodplain and wetland restoration are located, identified and monitored** (**for at least 5 years) a few restoration pilot project**s **to better understand the ecological and hydrological results of restoration work.**
- 7B: Identify, assess, and implement actions, programs, and measures that aim to **promote restoration, recovery, and sustained support of: ... imperiled aquatic, riparian, terrestrial, and wetland dependent species and plant communities.**
- 7C: Identify, assess, and implement actions, programs, and measures that aim to protect, maintain, and **improve conditions and long-term sustainability of streams, lakes, floodplains, riparian areas, wetlands, and wet meadows for self-sustaining fisheries and functional waterfowl, beaver, and other aquatic habitats.**

Gunnison Basin

The Gunnison BIP identifies nine goals. Three goals are relevant to riverscape restoration work, the most relevant key components of these goals are listed as bullets. Excerpts that are the most relevant to riverscape restoration projects in the basin are **bolded.**

Goal 5: Quantify and protect environmental and recreational uses.

- Continue to meet identified environmental and recreational needs basin wide by developing 10 projects from the list of projects in the Gunnison BIP by the year 2030.
- **Improve the current baseline of native trout and endangered fish populations in the Gunnison Basin through the year 2050.**
- Continue to identify and quantify environmental/recreational needs throughout the Gunnison Basin.

Goal 6: Maintain or, where necessary, improve water quality throughout the Gunnison Basin.

- As determined by ongoing water quality data collection, maintain outstanding water quality in headwaters streams and improve site-specific water quality related to mining, hydraulic fracturing, selenium, and salinity.

Goal 7: Describe and encourage relationships among agricultural and environmental recreational water uses.

- Complete **multi-purpose water projects where possible, including two storage projects and two watershed restoration projects**, in the Gunnison Basin by 2030 that demonstrate the beneficial relationship among agricultural, environmental, and recreational uses.
- **Explore where watershed restoration techniques, such as wet meadow and flood plain restoration, can be used to address water quality and quantity issues that support both agriculture and environmental and recreational uses.**

Yampa – White – Green Basin

The Yampa-White Green BIP identifies eight goals. For each goal, the BIP lists specific objectives and a near-term focus. Three goals are most relevant to riverscape restoration. Excerpts that are the most relevant to riverscape restoration projects in the basin are **bolded.**

Goal 6: Quantify and protect environmental and recreational water uses

- Objective 3. Perform analyses to maximize the effectiveness of recommended solutions for meeting multiple objectives (i.e., consumptive and nonconsumptive). Examples of projects include the appropriation of new instream flow water rights; water rights and storage leasing; diversion, headgates, structures, and river improvement to allow irrigation efficiencies; and **riparian restoration and habitat improvement to improve specific and general watershed health for consumptive and nonconsumptive uses alike.**
- Objective 4. **Recognize that floodplains, riparian areas, and wetlands are natural storage reservoirs, and implement restoration projects to maintain and improve these storage reservoirs. Rehabilitation of degraded riparian areas and reconnection of floodplains in degraded stream systems allows spring floods to recharge groundwater tables for slow release to the stream system later in the summer, which supports low flows and helps maintain nonconsumptive benefits.**
    - **Near-term focus:** Reconnect streams with floodplains. Maintain and restore wetland and riparian habitats.
- Objective 8. Research and design **multi-purpose projects to improve riparian or aquatic ecology and bank stability without changing the existing flow regime** while voluntarily modernizing irrigation diversion systems and reducing bedload deposits.
- Objective 14. Invest in education and outreach efforts that inform a broader audience (both in-basin and statewide) about E&R water needs and how they can be met in the basin, and provide a forum for a two-way exchange of ideas to enhance participation.

Goal 7: Maintain and consider the existing natural range of water quality that is necessary for current and anticipated uses."

- Objective 2. Evaluate solutions to address how stream temperature problems might be alleviated in the face of a warming climate"
- Objective 3. Address sediment transport on lower White River".
- Objective 6. Support non-point-source water quality efforts (i.e. riparian and flow restoration and land use practices)...
- Objective 7. Engage in collaborative efforts to address wildfire-watershed risks.

Goal 8: Develop an integrated system of water use, storage, administration, and delivery to reduce water shortages and meet environmental and recreational needs.

- Objective 7. Implement the stakeholder engagement, diversion structure improvements, and riparian and flow restoration opportunities to be outlined in the Yampa IWMP.
- Objective 8. Implement the stakeholder engagement, diversion structure improvement, and riparian and flow restoration opportunities to be outlined in the White River IWMP.

Southwest

The Southwest Basin identifies seven goals. Two of these goals are tangential to stream restoration aims: “meet environmental water needs” and “promote healthy watersheds”. Restoration fits into four of the strategies for these two goals.

Goal E: Meet Environmental Water Needs

- Strategy E1: Encourage and support restoration, recovery, and sustainability of endangered, threatened, and imperiled aquatic and riparian-dependent species and plant communities
- Strategy E2: Support efforts to protect, maintain, monitor, and improve the condition and natural function of streams, lakes, wetlands, and riparian areas to promote self-sustaining fisheries, support native species and functional habitat (aquatic and terrestrial ecosystems) in the long term, and adapt to changing conditions

Goal F: Promote Healthy Watersheds

The BIP states “The BRT recognizes that forest health and watershed health are interconnected. Healthy forests moderate snowpack melt and runoff, enhance soil moisture storage and groundwater recharge, reduce the likelihood of flooding, prevent soil erosion, and filter contaminants. Wildfires in the region threaten critical water resource infrastructure, increase flooding, and sedimentation in streams.”.

- Strategy F2: Support efforts to enhance and maintain watershed health by protecting and/or restoring watersheds to ensure sustainable water supply, water quality, critical infrastructure, and/or environmental and recreational areas
- Strategy F3: Encourage and support projects that build resilient watersheds and healthy forests impacted by drought, fire, and climate change.

Colorado Basin

The Colorado BIP identifies 6 themes, each with underlying goals. One of the six themes is directly related to restoration; however, the BIP lacks specific guidance citing restoration objectives. Two of the goals for this theme are most relevant to riverscape restoration project proponents.

Theme 1: Protect and restore healthy streams, rivers, lakes and riparian areas.

- Goal: Protect and maintain healthy and self-sustaining aquatic and riparian ecosystems and rehabilitate damaged ecosystems.
- Goal: Protect and maintain healthy forests, mitigate wildfire impacts, and rehabilitate damaged forests.

North Platte Basin

The North Platte Basin identifies eight goals. **Goal #4 is "maintain healthy rivers and wetlands through the strategic implementation of projects that meet prioritized environmental and recreational needs"**. The processes identified do not reference restoration work.