VOLUME 1 • JANUARY 2022

SOUTH PLATTE

Basin Implementation Plan

Basin Implementation Plan at a Glance

KEY ACHIEVEMENTS

Key projects and efforts demonstrate successes in meeting basin goals and water needs:

- Aquifer Storage and Recovery
- Charlie Meyers State Wildlife Area Habitat Enhancement Project
- Chatfield Reservoir Reallocation
- Direct Potable Reuse Demonstration
- Environmental Water Needs and Concerns
- Protecting the Future of Agriculture
- Greeley Municipal Water Conservation
- Protection and Enhancement of Forest and Watershed Health
- Resource Central – Conservation Made Easy
- South Platte Regional Opportunities Water Group Feasibility Study
- Southern Water Supply Pipeline II
- Stakeholder Understanding in Water Supply Planning

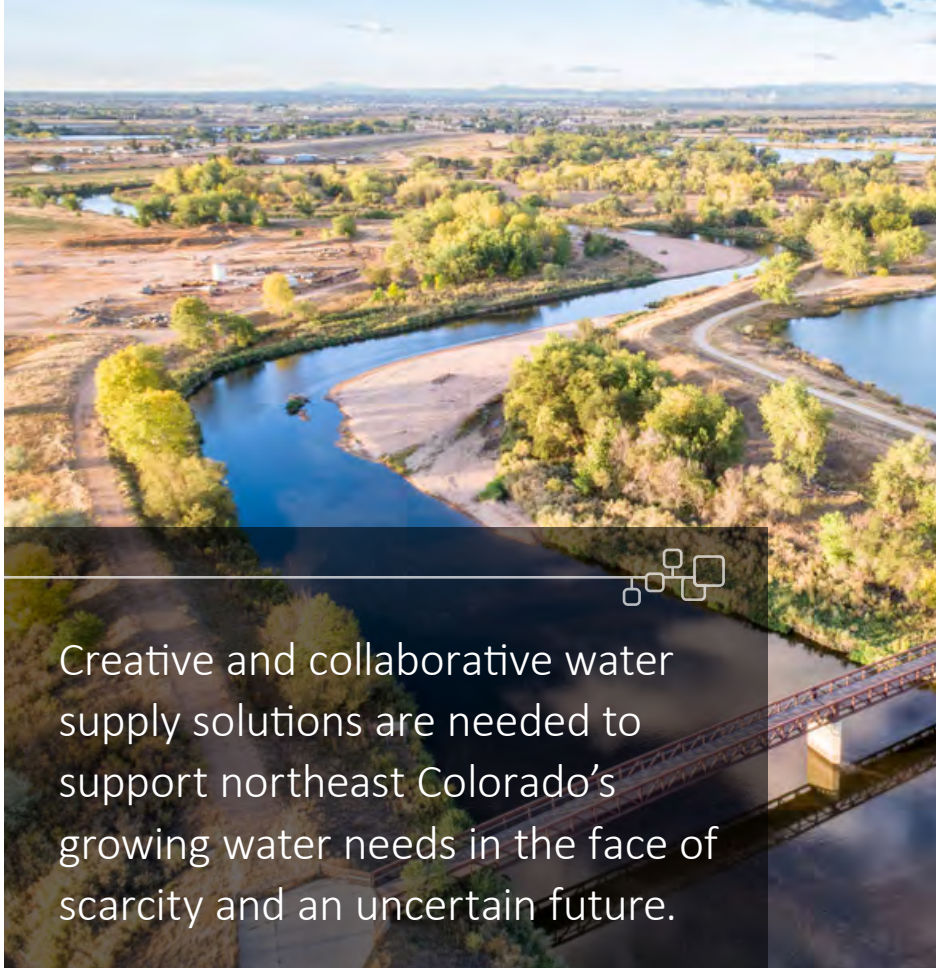
CHALLENGES

Primary challenges center around water scarcity due to growth, stressing already over-allocated water resources.

Water users and managers in the South Platte and Republican River Basins currently face many challenges meeting municipal, industrial and agricultural water needs while maintaining or enhancing environmental and recreational resources. These challenges can lead to conflicts that force water users to make difficult choices in meeting their existing and future needs.

OUTREACH STRATEGIES

The South Platte and Metro Roundtables carry out Public Education, Participation, and Outreach activities and a joint Education Action Plan that aligns with the 10 key outcomes in the Statewide Water Education Action Plan.



Creative and collaborative water supply solutions are needed to support northeast Colorado's growing water needs in the face of scarcity and an uncertain future.

GOALS + OBJECTIVES

The basin has 12 GOALS centered around:

- ✓ **Encouraging project implementation**
- ✓ **Maximizing development of native supplies while supporting cooperative outside supply options**
- ✓ **Maintaining and improving municipal and industrial conservation and efficiency**
- ✓ **Maintaining and promoting reuse**
- ✓ **Protecting irrigated agriculture**
- ✓ **Protecting and enhancing watershed function and environmental and recreational attributes**
- ✓ **Using scenario planning to manage uncertainty of future water needs**
- ✓ **Broadening communications, outreach, and education**
- ✓ **Improving efficiency and effectiveness of water project permitting**

DEMAND, SUPPLY, POTENTIAL WATER NEEDS

Municipal and Industrial:
Between 2015 and 2050, the South Platte Basin population is projected to grow 42 percent to 70 percent. The areas of the South Platte River Basin that are outside of the Metro Region are projected to grow at a faster pace in all scenarios. While per capita water use rates are projected to decrease, overall municipal and industrial water demand is projected to increase due to population growth.

Agriculture:
Due to urbanization, water transfers, and groundwater sustainability, the amount of irrigated land in the South Platte and Republican Basins is anticipated to decrease in the future. Climate change may increase on-farm shortages due to increased irrigation demand and lower irrigation water supply.

Environment and Recreation:
The Flow Tool, applied to eight Basin locations, suggests that climate change may reduce future stream flows and shift snowmelt runoff patterns to earlier in the year. Altered streamflow regimes will increase risk to a wide variety of environmental and recreational attributes.

Water Supply and Storage:
Water supplies in the South Platte Basin vary substantially based on location. Analysis of two important locations in the South Platte River Basin showed available supplies periodically during wet periods. Increasing demands could draw storage down to lower levels, leading water providers to develop additional supplies or boost reserves.

FUTURE PROJECTS

More than
$9.8 billion
total estimated costs for project implementation*

282 **Total Projects**

39 **Tier 1 Projects**

54 **Multi-purpose Projects**

185 **New projects added in 2020**

**Total cost based on projects that provided cost information. Future basin projects include both consumptive and nonconsumptive projects that span all sectors of water use in the basin and are at various levels of development from conceptual to implementing.*

STRATEGIC VISION

Basin goals, future projects, and desired water future for the Basin informed four primary strategies:

These strategies are:

- **Meet the municipal supply gap**
- **Protect irrigated agriculture**
- **Protect and enhance watersheds**
- **Implement projects**

List of Roundtable Members

This page recognizes the contributions of basin roundtable members.

Metro

- **David Allen –** *Broomfield City/ County Rep.*
- **Tom Arnold –** *At-large*
- **Darren Beck –** *Recreation Rep.*
- **Anne Beierle –** *Jefferson County Rep.*
- **Barbara Biggs –** *At-large Water Quality Rep./Chair*
- **Sarah Borgers –** *Jefferson County Muni Rep.*
- **Cortney Brand –** *El Paso County Rep.*
- **Jessica Brody –** *CWCB Board Member*
- **Devon Buckels –** *At-large*
- **Blair Corning –** *Industrial Rep.*
- **Loretta Daniel –** *Arapahoe County Rep.*
- **Lisa Darling –** *Douglas County Muni Rep.*
- **Casey Davenhill –** *At-large/PEPO*
- **Alexandra Davis –** *Arapahoe County Muni Rep.*
- **Chris Douglass –** *At-large*
- **Kim Gortz –** *El Paso County Muni Rep.*
- **Jim Hall –** *Nonvoting Out-of-Basin Rep.*
- **Eric Hecox –** *At-large Development Rep*
- **Emily Hunt –** *Adams County Muni Rep.*
- **Dawn Jewell –** *Arapahoe County Muni Rep. (alternate)*
- **David Kamin –** *At-large*
- **John Kaufman –** *Local Domestic Water Provider Rep. (alternate)*
- **Jim Lochhead –** *Legislative Appointment*
- **Ken Lykens –** *At-large Development Rep. (alternate)*
- **Morgan Lynch –** *At-large Stormwater & Drainage Rep.*
- **Rick Marsicek –** *Denver City & County Rep.*
- **Rick McLoud –** *Local Domestic Water Provider Rep.*
- **Shaden Musleh –** *At-large*
- **Susan Nedell –** *At-large Business Rep.*
- **Dave Nickum –** *Environmental Rep.*
- **Andy Nye –** *At-large*
- **Steve O'Dorisio –** *Adams County Rep.*
- **Bob Peters –** *Legislative Appointment (alternate)*
- **Lauren Pulver –** *Douglas County Rep.*
- **David Rausch –** *Adams County Rep. (alternate)*
- **Andrea Rogers –** *Forest Service (liaison)*
- **Rob Sakata –** *Agriculture Rep.*
- **Lesley Sebol –** *Colorado Geological Survey (liaison)*
- **Anita Seitz –** *At-large*
- **Sam Stein –** *CWCB Staff*
- **Dave Wissel –** *Upper South Platte Water Conservancy*
- **Scott Winter –** *El Paso County Muni Rep. (alternate)*
- **Jan Yeckes –** *Arapahoe County Rep. (alternate)*

South Platte

- **Lynn Baca –** *Adams County Rep.*
- **Rich Belt –** *At-large Industrial Rep.*
- **Dan Brown –** *At-large*
- **Audrey Butler –** *Boulder County Rep. (alternate)*
- **Sean Chambers –** *Weld County Municipal Rep.*
- **Sean Cronin –** *At-large, Non-Voting, IBCC Rep.*
- **Loretta Daniel –** *Arapahoe County Rep.*
- **Deb Daniel –** *Republican River Water Conservation District*
- **Casey Davenhill –** *Public Ed., Participation & Outreach Liaison*
- **Donnie Dustin –** *Larimer County Muni Rep.*
- **Frank Eckhardt –** *Central Colorado Water Cons. Dist.*
- **Dick Elsner –** *Park County Rep.*
- **Daylan Figgs –** *Larimer County Rep.*
- **James Ford –** *Gilpin County Muni Rep.*
- **Joe Frank –** *Lower South Platte Water Conservancy District*
- **Bruce Gerk –** *Sedgwick County Muni Rep.*
- **Scott Griebling –** *St. Vrain & Left Hand Water Cons. Dist.*
- **Jim Hall –** *Northern Colorado Water Cons. Dist., 2nd Vice Chair*
- **Kelsea Holloway –** *At-large Environmental Rep.*
- **Ken Huson –** *Boulder County Muni Rep.*
- **Lynda James –** *Upper S. Platte Water Cons. Dist., 1st Vice Chair*
- **Scott James –** *Weld County Rep. (alternate)*
- **Matt Jones –** *Boulder County Rep.*
- **John Kolanz –** *Legislative Appointment*
- **Stephen Larson –** *Broomfield Rep.*
- **Lisa Leben –** *Clear Creek County Rep.*
- **Kevin Lusk –** *El Paso County Rep.*
- **Gene Manuello –** *At-large Agricultural Rep.*
- **Shane Miller –** *Logan County Water Conservancy District*
- **Brent Nation –** *Morgan County Muni Rep.*
- **Randy Ray –** *At-large*
- **Larry Rogstad –** *At-large Recreational Rep.*
- **Lori Saine –** *Weld County Rep.*
- **Robert Sakata –** *CWCB Board Member*
- **Joel Schneekloth –** *Colorado St. Univ. Ext. Serv. (liaison)*
- **Sam Stein –** *CWCB Staff*
- **Kent Swedlund –** *Logan County Rep.*
- **Garrett Varra –** *At-large, Chair*
- **Kirk Vincent –** *At-large*
- **Robin Wiley –** *Yuma County Rep.*
- **Allyn Wind –** *Morgan County Rep.*
- **Christy Wiseman –** *Basin Roundtable Recorder*
- **Jim Yahn –** *At-large, IBCC Rep.*

Table of Contents

DISCLAIMER

The Analysis and Technical Update to the Colorado Water Plan and the Basin Implementation Plan (BIP) provide technical data and information regarding Colorado's and the basin's water resources. The technical data and information generated are intended to help inform decision making and planning regarding water resources at a statewide or basinwide planning level. The information made available is not intended to replace projections or analyses prepared by local entities for specific project or planning purposes.

The Colorado Water Conservation Board (CWCB) and basin roundtables intend for the Technical Update and the BIP to help promote and facilitate a better understanding of water supply and demand considerations; however, the datasets provided are from a snapshot in time and cannot reflect actual or exact conditions in any given basin or the State at any given time. While the Technical Update and BIP strive to reflect the CWCB's best estimates of future water supply and demands under various scenarios, the reliability of these estimates is affected by the availability and reliability of data and the current capabilities of data evaluation. Moreover, the Technical Update and BIP cannot incorporate the varied and complex legal and policy considerations that may be relevant and applicable to any particular basin or project; therefore, nothing in the Technical Update, BIP, the associated Flow Tool, or Costing Tool is intended for use in any administrative, judicial, or other proceeding to evince or otherwise reflect the State of Colorado's or the CWCB's legal interpretations of state or federal law.

Furthermore, nothing in the Technical Update, BIP, Flow Tool, Costing Tool, or any subsequent reports generated from these datasets is intended to, nor should be construed so as to interpret, diminish, or modify the rights, authorities, or obligations of the State of Colorado or the CWCB under state law, federal law, administrative rule, regulation, guideline, or other administrative provision.

What is the Basin Implementation Plan?

The Basin Implementation Plan (BIP), developed in a collaborative process by basin stakeholders, focuses on the current and future water needs in the South Platte and Republican River Basins, the vision for how individuals and organizations can meet future needs, and the goals and projects that provide a pathway to success. The initial South Platte BIP was completed in 2015, and this is the first update of that plan.

THE SOUTH PLATTE BASIN IMPLEMENTATION PLAN CONSISTS OF TWO VOLUMES:	
VOLUME 1:	A summary of the South Platte Basin's current and future water resources, focusing on goals, projects, and a strategic vision to meet future water needs.
VOLUME 2:	A more comprehensive description of South Platte Basin achievements, challenges, goals, and strategic vision for meeting future water needs as well as legacy and specific information on technical analyses, project data, and case studies. Note that Volume 2 is organized in a slightly different order than Volume 1.

THE SOUTH PLATTE BIP IS A JOINT EFFORT

The South Platte BIP was jointly developed by both the Metro Roundtable and the South Platte Basin Roundtable. It focuses on the water needs of northeast Colorado and encompasses both the South Platte River Basin and the Republican River Basin. The BIP discusses the basins individually and combined. The BIP uses the terms "South Platte River Basin" and "Republican River Basin" when discussing the individual basins. The BIP uses the term "South Platte Basin" when discussing the combined basin.

Section 1. Basin Overview

The South Platte River Basin is the most populous in the state. Approximately 70 percent of Colorado's population resides here, and its Front Range area is Colorado's economic engine. The basin also has the greatest concentration of irrigated agricultural lands in Colorado. Figure 1 provides an overview of the basin.

The topographic characteristics of the South Platte River Basin are diverse. The basin's waters originate in the mountain streams along the Continental Divide in the northern portion of the Front Range. The South Platte River emerges from the mountains southwest of Denver and moves north through the Denver metropolitan area where it is joined by numerous tributaries, such as Plum Creek, Bear Creek, Cherry Creek, Clear Creek, Coal Creek, Boulder Creek, St. Vrain Creek, Big Thompson River, and Cache La Poudre River. It then flows northeast across Colorado's High Plains. The western portion of the South Platte River Basin contains montane and subalpine areas that are mostly forested, in contrast to the High Plains of the eastern portion, which consists of mainly grassland and planted or cultivated land with highly urbanized areas. Approximately one-third of the South Platte River Basin land area is publicly owned, with the majority of these lands in the forested mountains. The South Platte River crosses the Colorado-Nebraska state line near Julesburg and merges with the North Platte River in southwestern Nebraska to form the Platte River.

The Republican River Basin in Colorado is located on the northeastern High Plains. Land uses are primarily agricultural. The headwaters of the North Fork and South Fork of the Republican River and the Arikaree River originate in the northeastern High Plains of Colorado near Wray, Cope, and Seibert, respectively. The Republican River is formed by the confluence of the North Fork of the Republican River and the Arikaree River just north of Haigler, Nebraska, with the South Fork of the Republican joining just southeast of Benkelman, Nebraska. Other major drainages within the Republican River Basin include Frenchman Creek, Beaver Creek, and Red Willow Creek.

The topographic characteristics of the Republican River Basin, which are similar to the High Plains region of the South Platte River Basin, consist mainly of grassland and planted or cultivated land. The Republican River Basin in Colorado is underlain by the High Plains or Ogallala aquifer, which is one of the largest aquifer systems in the U.S., extending from South Dakota to Texas.

Additional characteristics of the South Platte and Republican River Basins are summarized below.

AGRICULTURE

- The South Platte and Republican River Basins have 40 percent of Colorado's irrigated area.
- Agricultural sales in 2017 from counties in the South Platte and Republican River Basins at $5.6 billion made up 75 percent of the statewide total.
- Recent National Agricultural Statistics Service data from the U.S. Department of Agriculture indicate that the South Platte and Republican River Basins have in total nearly 14 million acres of land in farms (which includes both dryland and irrigated pastures and cropland). Nearly 90 percent of the land in farms is unirrigated, illustrating that dryland grazing and cropping are important aspects of agriculture in the basins.
- Of basin water diversions, 85 percent support agricultural purposes.
- Irrigated lands in the South Platte River Basin have been lost to both urbanization and permanent transfer of senior agricultural water rights to municipal use.
- Republican River Basin stakeholders have used federal assistance programs to retire irrigated acreage and improve irrigation efficiency to maintain compact compliance and sustain groundwater resources.
- Urban agriculture is an established and growing movement in the Denver Metro area that produces local food and other agricultural products, some of which occurs in historically underserved communities.

WATERSHED

- Across the basin, there is a wide range of ecological systems and important water-dependent recreational and ecological attributes. Coloradans and tourists regularly enjoy the recreational opportunities and environmental features of the basin, including Gold Medal fisheries, whitewater recreation, and popular state and national parks. A 2020 report by the Business for Water Stewardship estimated that water-related recreation in the South Platte Basin and Metro Region contributed a combined $8.9 billion to the state's economy.
- Water quality tends to diminish in lower parts of the South Platte River Basin as water is diverted and rediverted, and point and non-point sources discharge to the basin's waters. Salt content in surface water in the South Platte River increases as it flows from the foothills through the plains. Other water quality concerns include naturally occurring and anthropogenically introduced substances, including metals and nutrients. Water temperatures can also pose quality concerns.
- The headwaters of the major South Platte River tributaries as well as imported supplies from the Colorado River Basin provide the essential raw water supply for towns and cities from Fairplay in the south to Fort Collins in the north and extending eastward beyond Greeley. Recent major forest fires and resulting water quality issues have highlighted vulnerabilities to municipal and industrial (M&I) water service disruptions and the importance of forest health.

MUNICIPAL AND INDUSTRIAL

- Approximately 70 percent of Colorado's population resides in the South Platte River Basin. The basin has many of the most rapidly growing counties in the state and is projected to account for 70 percent of statewide population growth by 2050.
- South Platte River Basin M&I users are leading the state in water use efficiency. Water users in the Metro Roundtable area have the lowest systemwide per capita use in the state compared to other basins at 141 gallons per capita per day (averaged across the region's water utilities). Efficient use of the basin's resources through water reuse and conservation is a critical component of meeting future water needs.
- Competition for additional M&I water supplies is significant, and in some cases, multiple M&I suppliers have identified the same water sources as future supplies.

COMPACTS, ADMINISTRATION, AND REGULATORY

- The South Platte River Compact of 1923 (South Platte Compact) established a legal framework within which the water of the South Platte River is allocated to water users in both Colorado and Nebraska. Specifically, the South Platte Compact requires the Colorado State Engineer to curtail diversions east of the Washington County line that are junior to June 14, 1897, when flow in the river is less than 120 cubic feet per second (cfs) from April 1 through October 15.
- The Republican River Compact of 1942 (Republican River Compact) apportions the waters of the Republican River Basin among Colorado, Nebraska, and Kansas. The Republican River Compact quantified the average virgin water supply (defined as the water supply that is "undepleted by the activities of man") originating in the Republican River Basin upstream of the Nebraska-Kansas state line as 478,900 acre-feet per year (AFY). Colorado was allocated 54,100 acre-feet (AF), which was further allocated to specific tributary drainage basins.

The Platte River Recovery Implementation Program (PRRIP) and the Upper Colorado River Endangered Fish Recovery Program provide Endangered Species Act coverage for program participants. Participation in these programs protects existing uses and allows continued water development. In 2019, the PRRIP was extended by the U.S. Department of Interior, Colorado, Wyoming, and Nebraska to run through December 31, 2032.

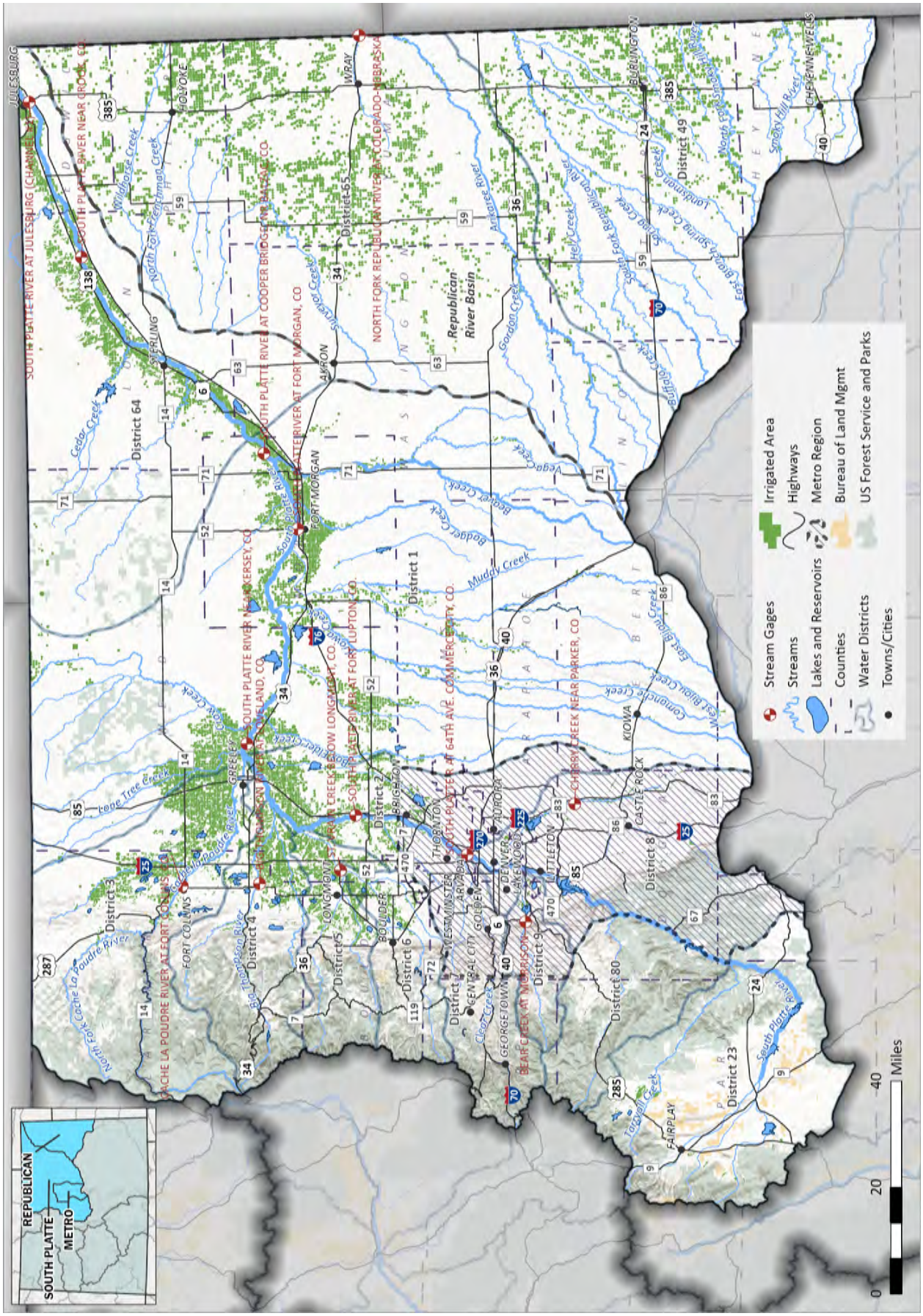


Figure 1. Map of the South Platte River, Metro, and Republican River Basins

Section 2. Basin Challenges

Water users and managers in the South Platte and Republican River Basins currently face many challenges meeting M&I and agricultural water needs while maintaining or enhancing environmental and recreational resources. These challenges can lead to conflicts that force water users to make difficult choices in meeting their existing and future needs.

This section describes the key challenges in the South Platte and Republican River Basins as identified by the South Platte and Metro Basin Roundtables (BRT). All these challenges are a direct or indirect result of water scarcity with respect to existing and future needs.

KEY CHALLENGE

Challenges in the South Platte and Republican River Basins are related to water scarcity. Growth, coupled with existing scarcity and future uncertainty, will stress already over-allocated water resources. On a positive note, scarcity has led to many creative water supply solutions and opportunities.

Table 1. Key Future Water Management Issues and Challenges

AGRICULTURE	WATERSHED	MUNICIPAL AND INDUSTRIAL	COMPACTS, ADMINISTRATION, AND REGULATORY
• Many groundwater irrigators rely on alluvial aquifer recharge for augmentation supply, but high groundwater tables have presented challenges in some areas. Also, recharge supplies sometimes go unused and could potentially be optimized. • Urbanization and permanent transfer of agricultural supplies for M&I use will decrease irrigated lands and impact the agricultural economy and open space. • Financial resources are needed to maintain or replace aging irrigation infrastructure. • The rapid increase in value of water rights makes it difficult to acquire additional irrigation supplies and increases "buy-and-dry" pressure.	• Protection of watersheds and the forests within them requires management of large areas of land that may be owned or managed by multiple entities and may be difficult to access. • While funding assistance programs exist, they do not fully meet the need for watershed and environmental and recreation project planning and implementation. • Climate change may degrade watershed health, increase the risk of wildfire, impair water quality, and increase risk to environmental and recreation attributes. • Additional data are needed to evaluate the health of streams and watersheds more completely and identify ways to improve conditions. • Identifying E&R flow needs is challenging because of technical issues and lack of data, and also due to overlapping and sometimes competing environmental and recreation needs.	• Reuse is an important source of supply, and strides are being made to overcome technical, regulatory, and public acceptance obstacles that currently hinder expanding water reuse. • Improving M&I water use efficiency will remain a key element of water resource management, but significant future gains will require continued, concerted efforts. • While the Denver Basin aquifer can be a viable water supply, it is challenged by uncertainty in statutory allocation of water and declining water levels that may limit its use to only drought resilience in some areas. • Financial and regulatory uncertainty are impacting the successful implementation of long-planned water projects, which may exacerbate future shortages in the basin.	• The Republican River Basin will continue to be challenged with Republican River Compact compliance and maintaining economic prosperity as basin groundwater continues to be mined. • Significant time and money is needed to comply with federal, state, and local permitting; prepare federal agency-led environmental impact statements; and finalize regulatory decisions and mitigation.

Table 1. Key Future Water Management Issues and Challenges (continued)




AGRICULTURE	WATERSHED	MUNICIPAL AND INDUSTRIAL	COMPACTS, ADMINISTRATION, AND REGULATORY
• An aging workforce and steep costs for entry into agriculture present challenges to industry sustainability. • Decreased water availability in the future due to declining aquifer levels in the Republican River Basin and designated basins, as well as diminished surface supplies from climate change, will impair farmers' ability to fully irrigate crops. • Urban agriculture faces several challenges (some of which are similar to rural agriculture), but the primary challenge is access to affordable land.	• Traditional metrics for monitoring stream health are outdated or difficult to monitor. • Increased water use in other sectors can reduce water available to E&R attributes and create additional risk. • Loss of irrigated land from urbanization and water transfers can have negative effects on migratory birds, wildlife movement corridors, wetland/riparian habitat, water quality, and floodplains, especially if revegetation is inadequate and local return flows are not maintained. • While environmental issues have been a focus in recent years, ignoring them can increase, for example, wildfire or water quality risks.	• Aquifer storage and recovery is a promising water storage strategy, but complications of water quality and available infrastructure and land need to be overcome. • Water quality will be a challenge as increased use of native South Platte surface water will lead to water treatment and brine disposal issues. • Water supplies will be needed to meet growing municipal and industrial demands that will occur beyond the current Technical Update planning horizon of 2050.	

CROSS-SECTOR CHALLENGES

- Competition for scarce water supplies is driving up water costs and posing challenges to meeting future M&I and agricultural water needs while protecting and enhancing the environmental and recreation opportunities. Climate change may exacerbate this challenge.
- Water supply solutions and strategies can have unintended consequences for other water users in the basin. For example, return flows, driven by the use and successive reuse of water, is a fundamental characteristic of supply in the South Platte River Basin. Efficiency improvements (whether municipal or agricultural), reuse, and watershed health projects involving recharge can reduce or change the timing of return flows that supply downstream water users of all sectors.
- Basin stakeholders will need to continue focusing on the requirements of the Platte River Recovery Implementation Program as additional native South Platte supplies are developed to meet current and future needs.
- Collaborative multipurpose regional projects, while attractive, can be challenging to implement due to limited or dispersed sources of supply; permitting, regulatory, and institutional issues; longer project development timeframes; and increased public involvement.
- Climate change creates substantial uncertainty and may increase water demands in all sectors, reduce overall supply, and create resiliency challenges that need to be considered in current planning.

Volume 2, Section 4 of the South Platte BIP includes more information on the challenges summarized in Table 1.

Section 3. Achievements

The South Platte and Metro Roundtables have been engaged in a wide variety of projects and activities since the South Platte BIP was issued in 2015. The ongoing and completed projects have achieved results that further roundtable goals and have provided benefits to agricultural, environmental, recreational, and municipal water users. Several of these achievements are summarized in this section (listed alphabetically).

Volume 2, Section 4 of the South Platte BIP includes more information on roundtable and basin stakeholder achievements since the 2015 South Platte BIP. The achievements describe examples of how the roundtables and stakeholders have sought to meet basin goals and water needs.

Aquifer Storage and Recovery

Centennial Water and Sanitation District has a conjunctive use water supply and storage system that maximizes the resiliency of renewable surface water supplies by integrating Denver Basin groundwater supplies for use during drought and other periods of decreased surface water availability. Centennial has a network of water supply wells that access non-tributary Denver Basin groundwater, some of which have been equipped for aquifer storage and recovery (ASR) injection of treated excess surface water supplies.

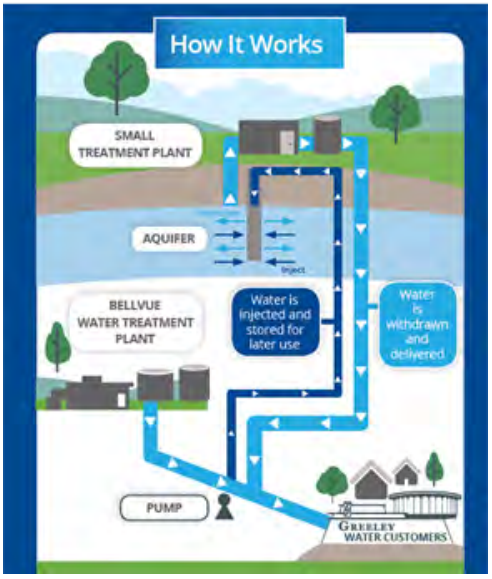
In 2020, Greeley performed a due diligence investigation of Terry Ranch, a bison ranch that covers approximately 13 square miles (8,410 acres) of rolling green hills near the Wyoming border. The study confirmed the feasibility of the Terry Ranch ASR project, and in 2021 Greeley finalized the purchase of the Terry Ranch groundwater rights, which will add 1.2 million AF of supply and storage to Greeley's surface water sources.

When compared to surface water storage, ASR has many advantages, including minimized land use, reduced evaporation, minimal environmental impacts, lower cost, and faster permitting. There are also a range of challenges associated with ASR development and use including regulatory uncertainty, careful water quality management to avoid treatment and distribution disruptions, and costly conveyance infrastructure to connect isolated ASR wells to demand centers. ASR is a particularly attractive opportunity when combined with other water supply and storage solutions. Relative to surface water storage, ASR is scalable and potentially offers early storage even during pilot system testing. Subsequent system expansion provides opportunities to optimize design and operation based on aquifer characterization.

The associated challenges are manageable, and ASR offers water providers the operational flexibility to optimize groundwater supplies for drought resiliency.

EXAMPLE PROJECT PROPONENTS:
Centennial Water and Sanitation District and City of Greeley

Centennial Water And Sanitation District and City of Greeley are two growing municipalities in the South Platte River Basin that have been exploring and implementing aquifer storage and recovery projects.



Greeley Water via Coyote Gulch

Charlie Meyers State Wildlife Area Habitat Enhancement Project

The Charlie Meyers State Wildlife Area (SWA) Habitat Enhancement Project is located in South Park in a 1.5-mile stretch of channel between Spinney Mountain Reservoir and Eleven Mile Canyon Reservoir. An initial habitat enhancement project occurred at the SWA over a 3-year period from 2013 to 2015. This was Phase V of a larger restoration project on the Dream Stream to improve fish and aquatic invertebrate habitats. In June of 2015 and again in July 2016, the Upper South Platte River watershed experienced record-breaking flood flows during runoff that moved through the project reach and damaged portions of the project that were intended to provide bank stabilization and toe protection for riparian plantings to establish. A subsequent maintenance project repaired the damages.

The overall habitat improvement project aims to restore natural river processes, provide bank stabilization and create "living streambanks" by planting treated bank locations with deep-rooted vegetation and willows. Some areas were fenced to prevent people from trampling small willow plantings. The treatments are intended to stabilize bank erosion caused from recent major floods and from years of erosion due to the position of the project reach downstream of the reservoir, which has drastically reduced the natural upstream sediment supply.

The large woody material used in stabilizing outside bends, adjacent to lateral scour pools, is expected to provide cover from predators and reduce stream temperature for the recreational trout populations already established within the project reach.

Monitoring creel populations and increased fish biomass are planned and monitoring water temperature reduction is being discussed. Similar monitoring has been conducted on nearby streams. Colorado Parks and Wildlife will also monitor treatment longevity and evaluate stability over time.

This project will help the Dream Stream section of the South Platte River remain a world-class Gold Medal fishery while addressing bank instability and erosional issues.

PROJECT PROPONENTS: Colorado Parks and Wildlife, Park County Land and Water Trust Fund Board, Aurora Water, Colorado Department of Corrections, United State Forest Service, Denver Water, Trout Unlimited, Boy Scouts

TIMELINE: Start 2013, Completion 2022

CONSTRUCTION COST: $560,000

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https://cpw.state.co.us/aboutus/Pages/News-Release-Details.aspx?NewsID=7944

Chatfield Reservoir Reallocation Project

Chatfield Reservoir was created in 1975 for flood control and water storage and draws more than 1.6 million visitors annually while providing water supply to Denver and the Front Range. **The Chatfield Reservoir Reallocation Project reallocated 20,600 AF of flood storage in the U.S. Army Corps of Engineers-managed dam and reservoir for multi-purpose water storage.**

The project provides environmental, municipal, agricultural, and outdoor recreational benefits with broad support from federal, state, and local organizations. The multi-purpose water storage project will provide water supplies for fast-growing Front Range communities, including Highlands Ranch, Castle Rock, and Castle Pines, without compromising Chatfield Reservoir's flood control function. Releases from storage will be used for agricultural purposes by Central Colorado Water Conservancy District, which supplies augmentation water to more than 1,000 irrigation wells over more than 360,000 acres of land in Adams, Morgan, and Weld Counties. The Chatfield Environmental Pool was created as part of the agreement between water providers and Colorado Parks and Wildlife to allow for strategic releases out of Chatfield Reservoir to enhance streamflows and water quality in the South Platte River below the reservoir.

PROJECT PROPONENTS: Colorado Parks and Wildlife, Central Colorado Water Conservancy District, and water providers.

TIMELINE: Start 2018, Completion 2020

CONSTRUCTION COST: $171 million

www.hdrinc.com/portfolio/chatfield-reservoir-reallocation

Direct Potable Reuse Demonstration Projects

The potential for future adoption of direct potable reuse (DPR) by major South Platte River Basin municipal water users could significantly change the water resources situation in the region. Front Range utilities, several of which are in the South Platte River Basin, are evaluating the potential incorporation of DPR into their future water supply portfolios. Two demonstration projects provide first-hand, tangible illustrations of the viability of DPR as a safe and sustainable water supply option. Both projects were supported by Colorado Water Conservation Board (CWCB) grants and are key steps toward meeting the water supply and reuse goals of Colorado's Water Plan and the South Platte BIP. The 2018 PureWater Colorado Demonstration Project and the new PureWater Colorado Mobile Demonstration facility support community engagement, regulatory development, operator training, and research and educational aspects of DPR implementation in Colorado. In fact, the PureWater Colorado Mobile Demonstration facility is a permanent state resource that water providers can use for education and outreach in their own communities.

In anticipation of DPR implementation in Colorado, the 2018 WateReuse Colorado DPR project developed a DPR regulatory framework for Colorado and a communications and outreach plan to support engagement with regulators, utility leaders, community leaders, and the public. In tandem with the 2018 WateReuse Colorado DPR project, the 2018 PureWater Colorado Demonstration Project was operated in spring 2018 as a regional initiative. Denver Water hosted the WateReuse Colorado demonstration at its recycling plant site. The demonstration produced water compliant with all drinking water standards and removed unregulated trace organics to concentrations below detection or orders of magnitude below health-based levels determined in national-level research. Dozens of groups toured the facility and sampled the purified water it produced. Beer and wine were also produced with the purified water.

Building on the success of the 2018 PureWater Colorado demonstration, Colorado Springs Utilities spearheaded an effort to design and construct a mobile demonstration capable of traveling across the state. After operating in Colorado Springs in 2021, the trailer will be housed at the Colorado School of Mines and can be used by other communities to advance DPR.

PROJECT PROPONENTS: Front Range utilities, several of which are in the South Platte River Basin

TIMELINE: Start 2018, Completion TBD

Kevin Mahan, Colorado Parks and Wildlife

Environmental Water Projects

Meeting environmental needs will involve overcoming challenges that include funding, local support, federal regulations, lack of baseline data, and climate change (which would likely negatively impact environmental attributes). Progress has been made through a variety of collaborative projects, programs, and legal changes, four of which are highlighted here.

The Watson Lake fish bypass fulfills one of the promises made by Northern Integrated Supply Project participants by reconnecting more than 2 miles of river habitat and providing upstream movement opportunities for fish around the existing Watson Lake diversion structure.

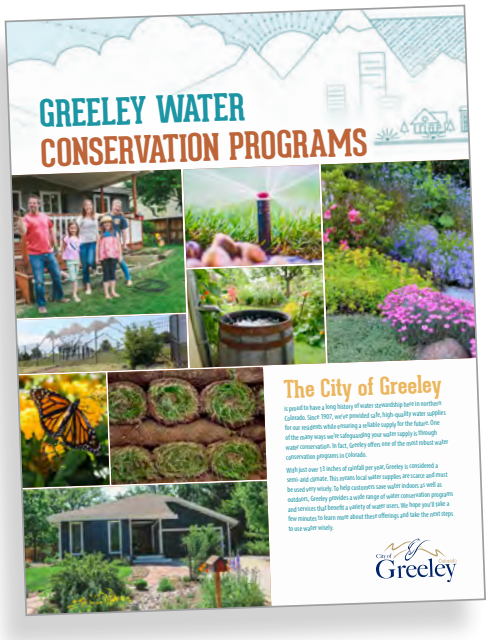
The NRCS provides technical and financial support to help landowners restore former wetlands, re-establish native wetland wildlife habitat, and retire marginal land from agricultural production on their property through the voluntary Wetlands Reserve Program.

In March of 2020, House Bill HB20-1037 was voted into law, authorizing CWCB to augment streamflows to preserve or improve the natural environment to a reasonable degree using an acquired water right that has been previously quantified and changed to include any augmentation use without a further change of the water right being required.

The CWCB developed a fluvial hazard zone program to identify and map hazards posed by natural stream processes, such as erosion and sediment deposition, and to develop tools to help communities and landowners better understand the hazards associated with flood events.

EXAMPLE PROJECT PROPONENTS:
Northern Colorado Water Conservancy District, Natural Resource Conservation Service (NRCS), CWCB

https://www.northernwater.org/NISP/environmental/watson-lake-fish-bypass



Greeley Municipal Water Conservation

The City of Greeley and its citizens demonstrate water innovation through several water conservation programs:

Water Budget Rate Structure: Rates for Greeley's homes are personalized by family size, landscape size, and current weather conditions to promote and reward water efficiency.

2021 Drought Emergency Plan: This Plan created tools to reduce water use and build water savings, build in equity, minimize financial impacts, and provide flexibility.

Water Audits: Free water audits help customers conserve water. Residential, commercial, industrial, and institutional water audits identify water waste and provide targeted recommendations for repairs and upgrades.

Rebates and Discounts: Greeley incentivizes customers to install water-saving devices like irrigation system parts, low-flow toilets, and commercial devices.

Life After Lawn: This "cash-for-grass" rebate incentivizes residents to remove turf for more xeriscape landscape, which beautifies Greeley and saves water at the same time.

Education and Outreach: Greeley's landscape lecture series, local teachers' trainings, and tours provide education on water conservation at every level for the community.

Online water efficiency tools: Customers can login to their Water Budget and WaterSmart portals to see and compare their water use over time.

Water and Land Use Planning: Water conservation standards are built into City code and criteria.

PROJECT PROPONENT:

City of Greeley
City of Greeley is a growing municipality in the South Platte River Basin that has implemented innovative programs for conserving water

https://greeleygov.com/docs/default-source/water/conservation/greeleywaterconservation_handoutfinal.pdf

Protection and Enhancement of Forest and Watershed Health

Colorado water supply agencies in the South Platte River Basin recognize a growing concern relative to increasing hydrologic variability, extreme weather events, periods of prolonged drought, and the hydrologic response of watersheds due to forest health issues. The potential for irrecoverable impairment to the South Platte River Basin's ecological health warrants a broader understanding of the critical function of forests and watersheds. Protection and enhancement of forest and watershed health are possible while meeting the increasing needs in the South Platte River Basin. Several examples are provided below.

Denver Water's Forest to Faucets partnership began in 2010 with the Rocky Mountain Region of the U.S. Forest Service to respond to the costly impacts of reactive forest management. Post-wildfire rainfall events brought sediment and debris deposits into Denver Water's collection system, which caused service disruptions following the 1996 Buffalo Creek and 2002 Hayman wildfires. Capitalizing on the mutual benefits to lead proactive forest management, enhance forest resilience to fire, restore burned forestland, and protect water supply collection systems, the Forest to Faucets partnership expanded in 2017 to include the Colorado State Forest Service and the NRCS. Collaboration among local, state, and federal agencies developed a methodology to analyze and rank wildlife hazards, flooding and debris risks, soil erodibility, and water use. This widely accepted methodology prioritizes "at-risk" watersheds for hazard reduction treatments and watershed protection measures.

Stream management plans (SMP) help Colorado communities assess river health and prioritize protecting and enhancing assets in their watersheds. Stream management plans adopted in the South Platte River Basin include St. Vrain and Left Hand Creek, Poudre Instream Flow Augmentation Plan, South Boulder Creek, Middle South Platte, Clear Creek, Upper South Platte Watershed Assessment, Lower South Platte, Upper Cache la Poudre River, Plum Creek, First Creek, and Second Creek.

The Poudre River Assessment represents an ecological evaluation of the Cache La Poudre designed to mitigate stream stress or enhance aquatic benefits, including consistent and clean water supplies, flood mitigation, fish and wildlife habitat, and diverse recreational opportunities.

Multiple companies and organizations support Riparian Reconnect, a restoration effort that aims to improve riverscape health and function by reconnecting incised streams with valley floor floodplains to restore riparian and wetland function using scientifically-based techniques.

PROJECT PROPONENTS: Denver Water, City of Fort Collins, Riparian Reconnect, and several other organizations

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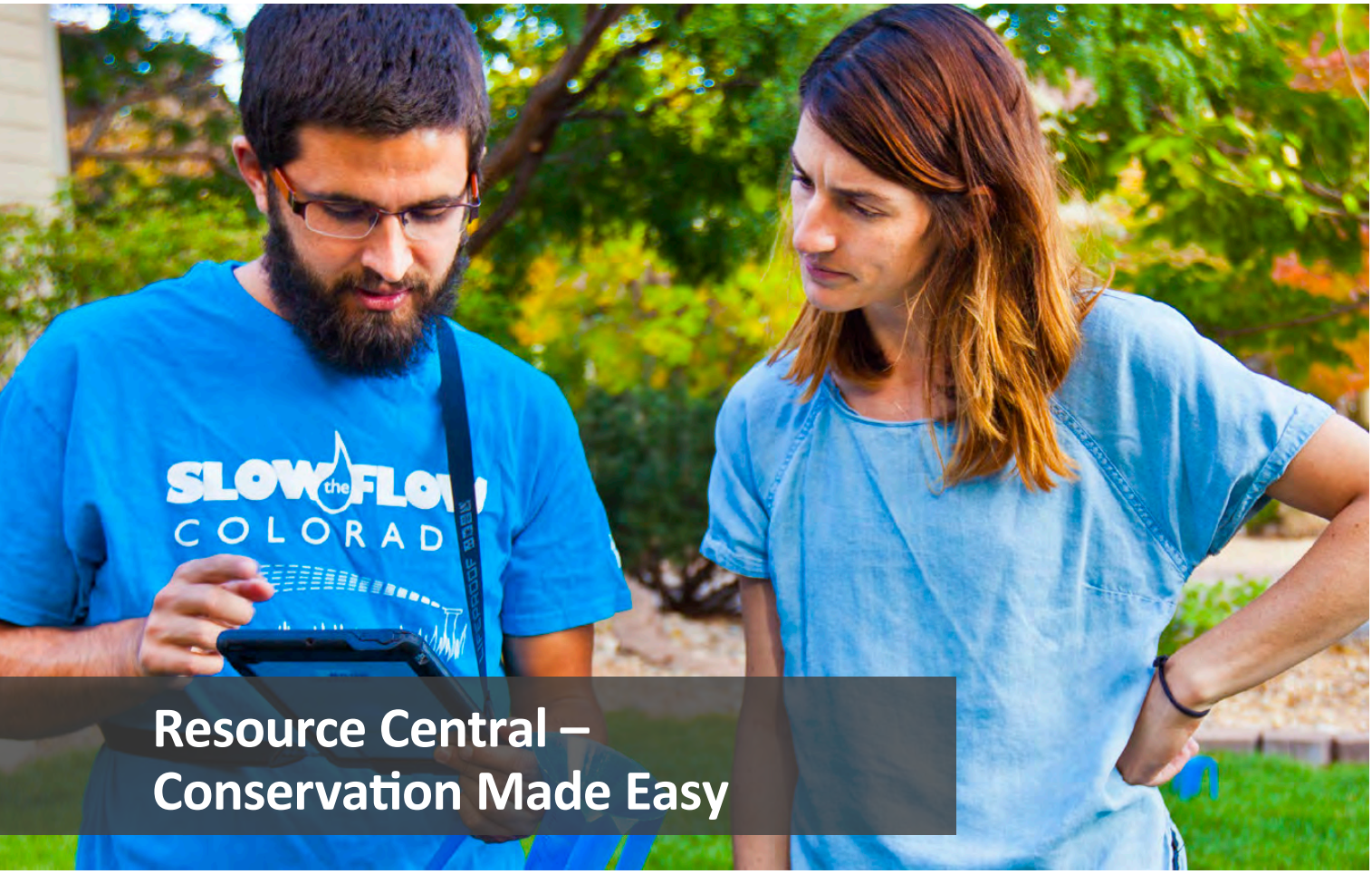
www.conservationfund.org/projects/south-boulder-creek



Resource Central – Conservation Made Easy

Resource Central's conservation programs have helped more than 600,000 people save water, conserve energy, and reduce waste since its founding in 1976. Since 2000, six water conservation programs supported by Resource Central have saved more than 1.5 billion gallons of water. In 2019 alone, Resource Central's conservation programs resulted in a water savings of more than 2.9 million gallons, which was a 15 percent increase from the prior year. And 2020 saw further reductions in water usage as the result of continued and increased program success. Resource Central offers a variety of water saving programs such as Garden in a Box (water efficient garden kits), Slow the Flow (sprinkler consultations), Start at the Tap (indoor audits), the Lawn Replacement Program, Grass-to-Garden, and WaterWise yard seminars. As a result of putting conservation into action across Colorado's Front Range, Resource Central is committed to shifting conservation from a hope to a habit.

PROJECT PROPONENTS:

Resource Central and 41 Front Range water providers

Resource Central is a nonprofit social enterprise based out of Boulder, Colorado. Founded in 1976, the organization partners with citizens and water providers to focus on hands-on programs to help people save water, conserve energy, and reduce waste. Of the 41 water providers that partnered with Resource Central in 2020 to support and implement programs, only three were located outside the South Platte River Basin.

www.resourcecentral.org

South Platte Regional Opportunities Water Group

The 2015 South Platte BIP included a discussion of opportunities to create a multipurpose, multiparticipant project in the lower South Platte River Basin (see Section 4.6.2 in the 2015 BIP). To advance this idea, a consortium of municipal and agricultural water users formed the ad-hoc South Platte Regional Opportunities Water Group (or SPROWG) to explore concepts for capturing, storing, and conveying junior water rights, reusable return flows, and water sharing agreements, known as alternative transfer methods (ATM), between the Front Range and the state line.

SPROWG used a Water Supply Reserve Fund (WSRF) grant to complete a feasibility study that refined project alternatives, produced enhanced modeling of options, refined alternative cost estimates, and outlined potential governance structures for owning and operating a multi-participant project.

Alternative concepts were developed to provide an average of 50,000 to 80,000 AFY of yield for municipal participants and 5,000 to 20,000 AFY of yield for agricultural participants. Alternatives included 215,000 to 409,000 AF of reservoir or managed groundwater storage in several locations. Life-cycle costs for the alternative concepts vary from $25,800 to $33,300 per AF for raw water and $44,100 to $58,300 per AF for treated water.

PROJECT PROPONENTS:
Several municipal and agricultural water users

TIMELINE: Start March 2019, Completion March 2020

COST: $350,000

Southern Water Supply Pipeline II

Photo Credit: Northern Water

With continued Front Range growth, Boulder, Left Hand Water District, Berthoud and Longs Peak Water District agreed to fund a second phase of the Southern Water Supply Project for secure, year-round water deliveries of their Colorado-Big Thompson and Windy Gap water. Northern Water constructed the first phase in the 1990s for Broomfield and other Front Range communities. Some of the second phase pipeline participant entities previously depended on seasonally operated open canals for water deliveries, which at times are subject to water quality concerns. In addition, the pipeline reduces losses in transporting water to the participating entities increasing the overall availability and reliability of supply in the basin.

The Southern Water Supply Pipeline II traverses from Carter Lake south to the Boulder Reservoir Water Treatment Plant, a total distance of over 20 miles and has a maximum flow rate of 50 cubic feet per second. The diameter of the steel pipeline is primarily 36-inches. The first 12 miles parallel the first Southern Water Supply Project pipeline (constructed in 1995) from Carter Lake to St. Vrain Road near Longmont's Vance Brand Municipal Airport. The pipeline's last 8 miles deliver water to Left Hand Water District and Boulder.

Northern Water's commitment to protecting sensitive species meant that scheduling had to be very nimble to deploy construction teams to ensure the protection of raptors and endangered species, while robust enough to get work completed on time. Through work with partner agencies in the corridor, Northern Water was able to accomplish the goal of completing the project promptly, on budget, while ensuring all environmental constraints were satisfied.

PROJECT PROPONENTS: Northern Water, Boulder, Left Hand Water District, Berthoud, and Longs Peak Water District

TIMELINE: Start 2018, Completion 2020

COST: $38 million for construction; $44 million in total including design, permitting, administration, management, and right-of-way.

Stakeholder Understanding in Water Supply Planning

The use of the South Platte Basin website to house a variety of tools, best practices, and lessons learned helps provide a platform for science-informed public policy. In 2020, www.southplattebasin.com was maintained and enhanced with a fresh, modern color palette. Large blocks of text were eliminated in favor of more photos and links. The main two audiences of the website were deemed to be roundtable members and engaged public citizens. Pages were reorganized for clarity and ease of use.

Along with the update, the Colorado Watershed Assembly coordinated with the Open Water Foundation to develop a site for the South Platte Data Platform. Three StoryMaps describing basin hydrology, water management entities, and future projects were developed and are available on the website.

The Education Committee of the roundtables expressed the importance of having technical documents available on www.southplattebasin.com. The website is flexible and can be used to advertise and administer Requests for Proposals for a variety of roundtable-related projects. Grant funds have been received to staff the maintenance and administration of the website and host a dedicated email address. Once a month, a snapshot of website analytics is taken to determine how many visits the website received, the duration of visits, and peak days of traffic.

www.southplattebasin.com

PROJECT PROPONENTS:
Colorado Watershed Assembly, Open Water Foundation

The Colorado Watershed Assembly provides information and guidance to local watershed organizations to help build constituency and collaboration. The Open Water Foundation is a nonprofit enterprise that provides open-source software to help organizations make better decisions about water.

TIMELINE: Start 2017, Completion 2018

COST: $50,000

Section 4. Updated Goals and Objectives

Each of the BRTs across Colorado developed goals and strategies or actions to achieve their goals during the development of their 2015 BIPs. The structure and naming convention of goals, objectives, strategies, and actions slightly vary across roundtables, but they all include a discrete set of high-level targets (described as goals and/or themes) with supporting objectives, actions, strategies, or processes that will help each BRT and their respective stakeholders achieve their basin targets.

The South Platte and Metro BRTs spent considerable effort reviewing the themes, goals, and measurable outcomes from their 2015 BIP; updating them to reflect current conditions; and creating better alignment between the goals and supporting strategies and measurable outcomes.

The themes, goals, strategies, and measurable outcomes developed by the South Platte and Metro BRTs fall into a hierarchy that is described on Figure 2. Four overarching themes were identified that capture the essence of what the goals seek to achieve. Twelve goals were identified that collectively support the themes. Each goal has a series of supporting strategies and measurable outcomes that describe how the goal will be achieved. The themes, goals, strategies, and measurable outcomes are described below.

Figure 2. Hierarchy of themes, goals, strategies, and measurable outcomes

Themes

1 A Good Colorado Plan Needs a Good South Platte Basin Plan

A South Platte Basin plan will need to be consistent with the values represented in the Colorado Water Plan. Comprehensive and reliable solutions to meeting the South Platte Basin's consumptive, environmental, and recreational water supply needs benefit all of Colorado. The continued and unmitigated loss of agricultural production through "buy-and-dry" is not in Colorado's overall interest.

2 South Platte Solutions Must be Pragmatic

An effective South Platte BIP must address the needs of a variety of water interests. Potential solutions must be pragmatic and embrace the realities of Colorado's prior appropriation doctrine, state and federal regulatory/ permitting nexus, increasing project costs, and environmental and socioeconomic impacts.

3 The South Platte Basin Will Continue its Leadership Role and Performance in Efficient Use and Management of Water

The state's future, and the future of each of its river basins, depends on efficient and sustainable use and management of all our available water supplies. The South Platte Basin will continue to lead the state of Colorado in maintaining, promoting, and implementing efficient use of water through M&I planning, conservation, and reuse, and in adopting innovative and efficient water use practices across all categories of water users.

4 The South Platte Basin Must Sustain its Economy, Culture, and Environment

Whether in an urban center, a rural agricultural community, or a mountain resort, Coloradans value our way of life, the financial engines that drive our communities, and our environment. The South Platte Basin will manage its water resources and develop projects to honor these unique values throughout our basin and the state.

Volume 2, Section 6 of the South Platte BIP describes themes, goals, strategies, and measurable outcomes in the context of basin challenges, opportunities for progress, and achievements

Goals

The BIP goals developed jointly by the South Platte and Metro BRTs are summarized below. Additional details on each individual goal, along with associated strategies and measurable outcomes, are provided after the summary. While the goals, strategies, and measurable outcomes collectively describe a vision for what the roundtables want to achieve, the organizations or parties responsible for carrying out the associated activities are not specifically identified due to uncertainties associated with specific abilities, authorities, and funding. Nevertheless, the goals, strategies, and measurable outcomes serve as guidance and a call to action for basin stakeholders and roundtable members to implement the activities described in the South Platte BIP as funding and capacity allow. To monitor implementation activities that are conducted by either the roundtable or stakeholders, a joint South Platte and Metro BIP Implementation Committee will be formed to track and support implementation of strategies and measurable outcomes within the authority of the roundtables (example committee support activities: funding projects consistent with measurable outcomes, identifying common objectives among stakeholders and fostering joint project efforts, encouraging stakeholders to pursue projects and strategies that are consistent with measurable outcomes, and educating stakeholders).

POINT OF VIEW FOR MEASURABLE OUTCOMES

The measurable outcomes for each goal and strategy are written as viewed from a future standpoint. In other words, the measurable outcomes describe what was achieved through the successful implementation of the strategy.

BASIN GOALS

- **Encourage implementation of projects**
- **Maximize development of native South Platte supplies**
- **Maintain and promote municipal and industrial conservation and efficiency**
- **Maintain and promote reuse**
- **Maintain and improve irrigated agriculture**
- **Protect and enhance watershed function**
- **Protect and enhance environmental attributes**
- **Protect and enhance recreational attributes**
- **Support collaborative development and management of supply options outside of the South Platte Basin**
- **Utilize scenario planning to better manage uncertainty of future water needs**
- **Broaden South Platte communications, outreach, and education programs**
- **Improve efficiency and effectiveness of water project permitting**

Encourage implementation of projects

The South Platte Basin will encourage the implementation of identified projects that meet existing and future M&I, agricultural, and environmental/recreational (E&R) water needs.

STRATEGIES	MEASURABLE OUTCOMES
1.A: Promote implementation of identified projects for all water user categories, with emphasis on Tier 1, Tier 2, and Tier 3 projects.	• Developed a system consistent with state guidance to check in with project proponents, track the status of identified projects, incorporate additional project data into the projects list, and communicate the status of project implementation back to the South Platte and Metro Roundtables. • Developed a system consistent with state guidance to add new projects to the projects list. • Tracked ongoing challenges related to project implementation. • Tracked advancement of projects across tiers (i.e., projects moving from Tier 3 to Tier 2 or Tier 2 to Tier 1).
1.B: Work with project proponents to identify project funding opportunities.	• Documented successful funding mechanisms applied to projects within the basin. • Documented successful collaborations and partnerships that resulted in project implementation.

Maximize development of native South Platte supplies

The South Platte Basin will collaboratively develop new projects to maximize the use and effectiveness of existing native surface and groundwater supplies.

STRATEGIES	MEASURABLE OUTCOMES
2.A: Collaboratively develop multi-purpose (e.g., municipal, industrial, agricultural, environmental, and recreational) projects. These projects may include storage, conveyance, and system interconnections that promote basinwide water use efficiency and enhance supply reliability while maintaining compliance with the prior appropriation doctrine.	• Documented multi-purpose projects on the projects list, specifically the resulting yield for different water uses and the project partners. • Supported funding requests to advance multi-purpose projects.
2.B: Develop methods and projects to more effectively use available groundwater supplies to supplement existing developed supplies and/or to provide additional yield and resilience using conjunctive surface/groundwater storage strategies (ASR and alluvial recharge).	• Documented projects on the projects list that use available groundwater supplies to supplement existing developed supplies and/or create additional resilience via conjunctive surface/groundwater storage strategies.

STRATEGIES	MEASURABLE OUTCOMES
2.C: Encourage sharing of data and information related to best practices, effective methods, and technological advancements that support the maximized use of existing native South Platte supplies.	• Asked WSRF grant recipients to describe best practices, effective methods, and/or technological advancements that supported the maximized use of existing native South Platte supplies in their deliverables. • Created a library of WSRF grants and other projects success stories, lessons learned, best practices, effective methods, and technological advancements and shared on the South Platte Basin website.

Maintain and promote municipal and industrial conservation and efficiency

Municipal and industrial water users in the Metro and South Platte Basins will maintain their leadership role in conservation in the state of Colorado, recognizing that limited water supplies and a robust population drive the application of conservation best practices within the basin and throughout the state. Future conservation and efficiency efforts can reduce adverse environmental and social impacts of new supply development, help mitigate the impacts of climate change, and also maintain or improve valuable environmental and social benefits of urban landscapes.

STRATEGIES	MEASURABLE OUTCOMES
3.A: Establish baselines against which future efficiency improvements can be assessed for effectiveness, recognizing the range of use characteristics across the basin, levels of efficiency improvements already achieved, and the challenges/tradeoffs of achieving additional efficiencies.	• Developed appropriate water efficiency baseline data and methods; data will be available for use in the next BIP update.
3.B: Support the development and distribution of educational materials to promote best management practices for municipal and industrial water providers	• Posted links to CWCB-supported municipal water efficiency guidance documents on the South Platte Basin website.
3.C: Encourage innovation and efficiency improvements.	• BRTs supported funding requests for innovative water efficiency studies and demonstration projects. • Performed analysis of efficiency goals (from both water-savings and economic standpoints) for different areas in the South Platte Basin using available data on existing use. • Developed specific efficiency recommendations in concert with water providers for different areas in the South Platte Basin using available data on existing use. • Supported funding requests for continuation and expansion of existing water efficiency programs, particularly in under-resourced communities. • Supported education related to on-site, non-potable supply alternatives, graywater use and rainwater capture. • Supported locally-driven funding requests for on-site water supply alternatives such as graywater and rainwater capture that are appropriate given the differing water portfolios and use constraints in basin communities.

STRATEGIES	MEASURABLE OUTCOMES
3.D: Identify and evaluate the range of benefits provided by urban landscapes and green spaces to make informed decisions on the most appropriate conservation and efficiency measures.	• Conducted study of the benefits of urban landscapes and green open spaces (e.g., parks, playgrounds, trails, urban agriculture, among others) in the South Platte Basin, which recognizes the importance of urban landscapes to communities (especially disadvantaged) without access to other opportunities for recreation and enjoyment of nature; study will be available for use in the next BIP update.
3.E: Promote and encourage implementation of wise land use planning strategies that provide a desirable quality of life while minimizing the demand for water for existing and new development.	• Provided links to CWCB guidance documents on integrating water resources and land use planning on the South Platte Basin website. • Tracked the increase in the number of municipal water providers that included land use strategies in water supply plans. • Tracked the increase in the number of municipal water providers or municipalities that incorporated water efficiency measures in land use planning. • Supported funding requests to further local integrated water and land use planning efforts (e.g., educational workshops, Comprehensive Plan updates, landscaping standards, etc.).
3.F: Support and promote water efficient landscaping.	• Supported funding requests for development, evaluation, or implementation of updated landscaping standards that promote water efficient landscaping and include elements such as limits on non-essential turf in new development, funding for local turf replacement programs, and targeted education and outreach on water efficient landscaping opportunities. • Supported funding of research on vegetation appropriate to potentially warmer and/or drier future conditions in urban/suburban landscapes and best-practices for landscape replacement and maintenance. • Supported feasibility study of state-funded program to provide matching funds for local turf replacement rebate programs. • Supported developing a catalog of resources on South Platte Basin website on water-efficient landscaping, including, for example, guidance on replacement of non-essential turf, water efficient landscaping standards, financing and funding opportunities to promote turf replacement, and economic data on water-efficient landscapes. • Tracked the increase in the number of municipalities that developed or implemented non-essential turf replacement incentive programs. • Supported funding requests for landscape and irrigation professional certification courses that include climate-specific best practices. • Tracked the increase in municipalities that supported and/or offered landscape and irrigation professional certification courses.

4 Maintain and promote reuse

Municipal and industrial water users in the South Platte Basin will explore opportunities to expand their existing reuse practices and programs. Limited native water supplies drive the need for a broad application of water reuse practices of reusable supplies within the South Platte Basin.

STRATEGIES	MEASURABLE OUTCOMES
4.A: Support and promote opportunities to increase current levels of M&I water reuse, including adoption of new DPR regulations, while considering other water users.	• Supported state-adopted new DPR regulations by 2023. • Advanced SPROWG and other regional water sharing/reuse projects and concepts. • New and updated integrated water resource plans and water efficiency plans were evaluated and integrated reuse where feasible, specifically with a focus on new reuse opportunities.
4.B: Support studies to help municipalities evaluate the trade-offs of new reuse projects, including the impacts of: • Additional municipal and industrial water conservation on water available for reuse. • Additional municipal and industrial water reuse in relation to water available for exchanges. • Additional reuse on agricultural, environmental, and recreational water uses within the South Platte Basin. • The sudden reduction or loss of access to first-use transbasin reusable water supplies (e.g., Colorado River Compact administration), to assess the level of risk from overreliance on reuse, and to explore acceptable levels of reuse in this context as well as ways that such risk may be managed and mitigated.	• BRTs supported funding requests that identify trade-offs of new reuse projects and consider ways to mitigate negative impacts.
4.C: Advocate for policy, funding, and regulations that promote safe and effective reuse throughout the South Platte Basin and Colorado. Consider supporting legislation that is supportive and helpful to advance reuse while preserving autonomy, flexibility, and options.	• BRTs supported funding requests for activities that assist in DPR rulemaking. • BRTs supported funding requests for activities that inform non-potable reuse risk analysis to ascertain regulatory requirements necessary for Regulation 84 to expand the use of reclaimed water and protect public health and the environment.
4.D: Support outreach efforts to improve policymaker and public understanding of water reclamation and reuse.	• Considered environmental and social justice issues in key reuse stakeholder processes, reuse projects, and regulations. • Achieved robust and diverse stakeholder participation in regulatory processes, new pilot projects, new research, and new use evaluations. • Applied previously created outreach and communications tools that help shape outreach efforts and gauge public acceptance of reuse.
4.E: Promote research and implementation of new innovations, technologies, processes, and collaborations that could be adopted by municipal and industrial water providers to increase reuse opportunities.	• BRTs supported funding requests for pilots that highlight proof of concept for new reclaimed water uses and technologies, with emphasis on those that will likely have the most meaningful impact.

STRATEGIES	MEASURABLE OUTCOMES
4.F: Support and promote efforts to secure additional and reliable funding of state, county, or municipal regulatory processes and ongoing administration that facilitate increasing reuse.	• State and local regulatory agencies were adequately funded to implement DPR regulations by 2024. • Local entities and reuse organizations continued to provide financial support to regulatory agencies for updates to regulations.

Maintain and improve irrigated agriculture

Due to the importance of agriculture to the future well-being of the South Platte River Basin, the Republican River Basin, and the state of Colorado, both basins support measures to maintain, and where legally, physically, and economically possible, improve and increase irrigated agriculture in the face of increasing M&I demand.

STRATEGIES	MEASURABLE OUTCOMES
5.A: Minimize traditional permanent buy-and-dry of irrigated acreage by implementing other strategies, including implementation of multi-purpose projects, maximizing use of native South Platte River Basin supplies, conservation, reuse, implementation of ATMs, and other innovative water-sharing measures.	• Supported development of a baseline of irrigated acres that have been dried up (possibly via a review of aerial imagery). • Supported review and documentation of the purchase of agricultural water rights and/or land to evaluate the status of buy-and-dry. • Supported review and documentation of agricultural land annexed by municipalities.
5.B: Develop multi-purpose projects to address agricultural water shortages.	• Tracked multi-purpose projects that address agricultural water shortages and documented the resulting yield.
5.C: Continue support of measures to maintain the economy and agricultural production of the Republican River Basin.	• In coordination with federal, state, and local entities, continued revitalization of Bonny Reservoir State Wildlife Area, which includes improvements to riparian and fish habitat, hydrology, recreation, hunting, and camping. • Expanded collaboration with other Ogallala Aquifer users and project sponsors. • Considered and documented other alternative existing and developing economic opportunities (e.g., wind turbines, ethanol production, alternative high-value crops).

5.D: Continue support of measures for long-term compliance with the Republican River Compact.	• Retired an additional 25,000 acres within the South Fork of the Republican River Basin after August 2016 by 2029.
	  • 10,000 acres by 2024
	  • Additional 15,000 acres by 2029
	• Quantified additional surface water right buyouts conducted pursuant to compact compliance efforts.
	• Initialized a water conservation program to reduce the amount of water consumed.
	• Maximized and tracked funding of federal conservation programs, including Conservation Reserve Enhancement Program and Environmental Quality Incentive Program (EQIP) with Republican River Water Conservation District (RRWCD) cost share.
	• Continued to evaluate the need for Compact Compliance Pipeline expansion of appropriation.

STRATEGIES	MEASURABLE OUTCOMES
5.E: Engage in and support development of ATMs in the South Platte Basin as a flexible and creative approach to avoid permanent dry-up where possible.	• Tracked ATM metrics on an annual basis (see Table 15 in Alternative Transfer Methods in Colorado, CWCB, for metrics). • Supported ATM proposals that leverage ATM funding mechanisms and advance South Platte Basin goals. Examples include Water Plan grants; WSRF; new state funding; U.S. Bureau of Reclamation WaterSMART Water Marketing Strategy grant program; environmental and conservation non-profit support; U.S. Department of Agriculture and NRCS programs, such as EQIP and RCPP; and pairing ATMs with agricultural conservation easements for tax benefits.
5.F: Promote policies by municipalities and land use authorities that reduce urbanization on actively irrigated acreage while respecting private property rights.	• Supported the identification of policies that have been implemented to preserve irrigated land and open space in areas that are pressured by urbanization. • Monitored land use codes and zoning regulations that foster urban agriculture.
5.G: Document and promote the associated environment and recreational benefits provided by irrigated agriculture.	• Supported implementation of "Next Steps" identified in the Special Study: Environmental and Recreational Benefits of Irrigated Agriculture in the Lower South Platte Basin.
5.H: Promote continued studies to characterize water quality (surface and groundwater) for irrigated agricultural use and identify practices that may improve water quality.	• Supported, tracked, leveraged the work of other organizations to document, and funded studies to characterize water quality (surface and groundwater) for irrigated agricultural use and identify practices that may improve water quality. Promoted studies on basin website.

6 Protect and enhance watershed function

Healthy watersheds support economies, environment, and quality of life by enhancing the ability of rivers and streams to provide clean drinking and irrigation water, productive fisheries, quality habitat, and outdoor recreation. Healthy watersheds also help mitigate the impacts of climate change by reducing wildfire risk. To benefit the ecological health of all the watersheds within the basin, as well as to meet water supply, economic, and water quality demands, the South Platte Basin will recognize the importance of and encourage strategies that enhance watershed functions and hydrologic processes.

STRATEGIES	MEASURABLE OUTCOMES
6.A: PROTECT AND IMPROVE WATER QUALITY THROUGHOUT THE WATERSHED	
6.A.1: Promote forest health through forest restoration and wildfire risk-reduction activities.	• Provided and supported outreach and education efforts to urban and rural communities about the connection between forest health, wildfire risk reduction, and sustainable drinking water supply. • Provided and supported outreach and education efforts to communities and water providers vulnerable to wildfire about federal, state, and local organizations and best practices that restore and maintain forest health and reduce wildfire risk. • Provided and supported outreach and education efforts to communities and water providers vulnerable to wildfire regarding potential funding opportunities for forest restoration. • Supported, tracked, and leveraged the applicable work of other organizations to document forest restoration and wildfire risk-reduction projects.
6.A.2: Control erosion and sedimentation.	• Compiled a library of best management practices, tools, and methodologies related to agriculture and wildfire mitigation and shared on the South Platte Basin website. • Provided and supported outreach and education efforts for agriculture and forestry practices that improve soil health using federal, state, and local organization knowledge and resources.
6.A.3: Consider holistic impacts to water quality and watershed health during project development and implementation.	• 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, and other means to minimize addition of pollutants to rivers and streams to the fullest extent possible. • Supported, tracked, and leveraged the applicable work of other organizations to document collaborative, integrated water resource management projects, including those that coordinate land use and water resource planning and management. • Supported, tracked, and leveraged the applicable work of other organizations to document agricultural projects that incorporate considerations for water quality and quantity. • Supported, tracked, and leveraged the applicable work of other organizations to document agricultural projects that directly support environmental attributes. • Supported, tracked, and leveraged the applicable work of other organizations to document environmental projects that directly support continued agriculture. Examples include augmentation ponds, ditch systems that provide water for environment and recreational benefits, and agricultural buffer zones between crop fields and waterbodies. • Supported, tracked, and leveraged the applicable work of other organizations to document the benefits or impacts of urban agricultural projects on water quality, watershed health, and stormwater management.

STRATEGIES	MEASURABLE OUTCOMES
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 streamflows, and filling or dredging.	• Compiled a library of actions, programs, and organizations that have resources (e.g., money, technical skill, institutional knowledge) to assist with minimizing negative effects on the identified waterbodies and shared on the South Platte Basin website. • Supported, tracked, and leveraged the applicable work of other organizations to document collaboration among land managers and recreational and related interest groups to develop strategies to divert recreationists from high-concern areas. • Supported the creation of a basinwide assessment to determine locations of headwater floodplain and wetland restoration projects. This study may be used to select locations for pilot projects that can be monitored for at least 5 years to determine ecological and hydrological benefits. • Supported WSRF grants for projects that minimize impacts of adverse effects on wetlands, lakes, streams/rivers, and associated ecosystems from water pollution, nutrient overload, reduced streamflows, and filling or dredging.
6.A.5: Apply adaptive management strategies for wildfire mitigation.	• Supported projects to identify ponds for firefighting in rural areas, and investigated strategies to bring those ponds into compliance, if necessary, with Colorado water law. • Supported, tracked, and leveraged the applicable work of other organizations to document forest and recreational management plans, especially those that focus on adaptive management. • Supported, tracked, and leveraged the applicable work of other organizations to document collaboration among land managers and recreational and related interest groups to develop strategies to divert recreationists from areas with high wildfire risk. • Tracked efficacy of fire-mitigation treatments.

A common working definition of restoration as promulgated by the Society for Ecological Restoration is "the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed".

—- International Principles and Standards for the Practice of Ecological Restoration, 2016

STRATEGIES	MEASURABLE OUTCOMES
6.A.6: Conduct restoration projects and promote innovative strategies to improve water quality in impaired areas and downstream impacts.	• In conjunction with the similar Measurable Outcome in Strategy 6.A.4, supported the creation of a basinwide assessment to determine locations of headwater floodplain and wetland restoration projects. This study may be used to select locations for pilot projects that can be monitored for at least 5 years to determine ecological and hydrological benefits. • 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. • 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. • Supported projects to improve water quality in impaired waters, with outcomes tracked through the biennial 303(d) and Monitoring and Evaluation lists to identify when waters are removed and/or added to the lists. • Supported a diversity of projects to evaluate threats to water temperature or assess impairment to waters due to increased water temperatures, and identified opportunities to address impairments. • Identified and documented projects that improve water quality in coordination with public agencies (conservation districts and the NRCS, among others). • Supported public education related to land stewardship and the responsible use of land and water. Examples are the Greenway Foundation, Colorado Trout Unlimited, and Leave No Trace. • Compiled a library of best management practices, tools, and methodologies related to watershed health metrics. Examples include U.S. Forest Service Watershed Condition Framework. Shared this library on the South Platte Basin website. • Compiled a library of best management practices, tools, and methodologies related to stream health assessments, stream restoration methods, and science-based solutions for wetlands and headwaters areas as well as other South Platte Basin aquatic ecosystems. Examples may include: Colorado Stream Health Assessment Framework, the Flow Tool, Colorado Riparian Association Stream Restoration Network, and Colorado Natural Heritage Program's Colorado Conservation Data Explorer (CODEX). Shared this library on the South Platte Basin website. • Documented and tracked the long-term trends of stream health and associated restoration methods (e.g., Colorado Stream Health Assessment Framework) for the South Platte Basin. • 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.	• Supported and conducted research and pilot projects investigating the effects of mitigation, forestry, and other treatments on burnt landscapes. • Compiled information on best management practices and lessons learned to scale up and implement actions that restore forest and hydrologic function to burnt areas.

STRATEGIES	MEASURABLE OUTCOMES
6.B: ASSESS, IDENTIFY, AND PRIORITIZE RELATIONSHIPS AND MULTILATERAL IMPACTS THAT AGRICULTURE AND FORESTRY HAVE ON THE WATERSHED	
6.B.1: Impacts on surface water and groundwater quality.	• Supported research investigating the effects of forestry treatments on hydrology. Specifically, more research is needed to discern how these effects differ among treatment types (e.g., forest restoration vs. fire-mitigation treatments).
6.B.2: Impact on streams, lakes, floodplains, riparian areas, wetlands, and wet meadows.	• Compiled a library of best management practices, tools, and methodologies related to agricultural practices that improve water quality. Examples include no-till, reduced pesticides, buffer strips, groundwater recharge, and wetland creation. Shared the library on the South Platte Basin website.
6.B.3: Impacts of water quality on irrigated agriculture infrastructure.	• Supported the identification of and listed the impacts salt, sediment, and increased chemicals may have on irrigated agricultural infrastructure.
6.C: THROUGH EDUCATION AND COMMUNITY COLLABORATION, IDENTIFY, PRIORITIZE, AND DEVELOP STREAM MANAGEMENT PLANS WITHIN THE SOUTH PLATTE BASIN	
6.C.1: Plans should address and be based around biological, hydrological, geomorphological, and other data to assess the flows, water quality parameters, recreational opportunities and other physical conditions that are needed to support collaboratively identified environmental and/or recreational values.	• Supported the development of 80% of the locally prioritized lists of rivers with stream management plans, and 80% of critical watersheds with watershed protection plans, all by 2030. • Identified locations where stream management plans are most needed using tools and studies such as focus area mapping and a basinwide assessment of the best opportunities for headwater floodplain and wetland restoration projects.
6.C.2: Encourage implementation of projects and programs identified within these stream management plans.	• Highlight completed stream management plans on the South Platte Basin website. • Supported implementation of projects identified in stream management plans through WSRF grants.

7 Protect and enhance environmental attributes

Throughout the South Platte Basin, the importance of ecological processes and environmental attributes will be fully recognized. The South Platte Basin will implement strategies that protect and enhance environmental attributes for ecologically, socially, and economically important habitats and focus areas.

STRATEGIES	MEASURABLE OUTCOMES
7.A: 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 South Platte Basin: • General river health • Aquatic, riparian, floodplain, wetland, and wet meadow habitats • Instream flows • Water quality and impacts associated with temperature and other pollutants • Riverine connectivity, including biological, hydrological, geomorphological processes, and stormwater impacts	• Supported, documented, and tracked (leveraging the work of others where applicable) continued monitoring of South Platte waterbody health. • Created or updated current mapping of connectivity between streams and identified physical and hydrologic barriers. • Compiled a library of best management practices, tools, and methodologies for outcomes listed above. Examples include Proper Functioning Condition, Colorado Stream Health Assessment Framework, and Stream Visual Assessment Protocol (SVAP). Shared on the South Platte Basin website. • 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 projects to better understand the ecological and hydrological results of restoration work.

7.B: Identify, assess, and implement actions, programs, and measures that aim to promote restoration, recovery, and sustained support of:
• Endangered species
• Threatened species
• State species of special concern
• Imperiled aquatic, riparian, terrestrial, and wetland-dependent species and plant communities
	• Supported the development of a database(s) to document current (baseline) conditions, and established metrics for measuring future changes, maintenance impacts, and decrease and/or increase of:
	  • Occupied habitat for federally and state-listed threatened and endangered species and plant communities.
	  • Habitat in the environmental and recreational focus areas that support or can support imperiled species and plant communities, and strive to secure the species in these reaches, if appropriate. Sources include Colorado Parks and Wildlife and Colorado Natural Heritage Program.
	  • Wetland, lake, or stream habitat used by migratory, wintering, and breeding birds and aquatic life.
	  • Wetland, lake, or stream habitat used by aquatic life.
	• Identified and documented programs and partners aimed at restoration, recovery, and sustained support (e.g., Colorado Parks and Wildlife, Wetlands for Wildlife, Corners for Conservation, Colorado Open Lands, and U.S. Fish and Wildlife Service's Partners for Fish and Wildlife).
	• Identified and documented on the South Platte Basin website threatened and endangered species, state-listed sensitive state species, and systems related to focus areas.

STRATEGIES	MEASURABLE OUTCOMES

7.C: 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.	• Supported the development of tools to document current (baseline) conditions, encouraged use of recently developed tools, and established metrics for measuring future changes, maintenance impacts, and decrease and/or increase of:
	  • The number of stream miles or surface area of streams, lakes, floodplains, riparian areas, wetlands, and wet meadows that are in proper functioning condition.
	  • Fish habitat by:
	  • Providing habitat enhancements and improvements to water quality and temperature
	  • Reducing non-natural dry-up points
	  • Promoting riverine connectivity
	  • Adopting collaborative programs to sustain and/or improve instream flow
	  • Increasing the ecological and hydrologic function of stream and wetland areas

7.D: When and where buy-and-dry projects occur, project proponents are encouraged to restore or manage the formerly irrigated land in a manner that promotes ecological health, function, and diversity.	• Supported, documented, and tracked (leveraging the work of others where applicable) the restoration of habitats before water is removed from the land.

Protect and enhance recreational attributes

Throughout the South Platte Basin, the importance of water recreational attributes and the associated economic and public health benefits to communities will be fully recognized. The South Platte Basin will implement strategies to protect and enhance recreational landscapes and sensitive habitats for future generations.

STRATEGIES	MEASURABLE OUTCOMES
8.A: Continue to develop, promote, and apply best management practices, tools, and methodologies to adequately assess what is needed to maintain or improve recreational opportunities derived from water-related ecosystems throughout the South Platte Basin.	• Compiled a library of best management practices, tools, and methodologies related to recreational opportunities derived from water-related ecosystems and shared on the South Platte Basin website. • Working with public, private, and governmental partners throughout the state (i.e., other BRTs), identified opportunities to take a statewide approach to protect and enhance recreational attributes. • Considered the variety of landscapes and recreational opportunities across the state, encouraging consistent statewide application of assessment tools. • Identified strategies for responsible stewardship of the landscapes that provide recreational opportunities and access to open space in every community. • Supported efforts to improve management to protect public lands for generations to come.

STRATEGIES	MEASURABLE OUTCOMES

8.B: Identify, assess, and implement actions, programs, and measures that aim to protect and strengthen local outdoor recreation economies derived from recreational water uses while protecting sensitive habitats.	• Supported the development of consistent and comprehensive metrics for measuring and reporting resource impacts.
	• Supported the development of a database(s) to document current (baseline) conditions, and established metrics to measure future changes, maintenance impacts, and decrease and/or increase of:
	  • Surface area, stream miles, and/or public access areas for sustainable recreational opportunities through cooperative efforts
	  • Sustainable recreational opportunities
	  • Miles of constructed and maintained trails and greenways to promote aesthetic values and quality of life
	  • Public access to recreational opportunities in lakes and streams/rivers, including fishing and boating
	  • Successful collaboration and relationships with landowners, nonprofits, for profit, and public entities to ensure projects are funded and completed
	  • Total area of wetlands, lakes, streams/rivers, and associated ecosystems for birding, waterfowl hunting, and wildlife viewing
	  • River miles or flatwater surface acres available to river and flatwater boaters
	  • Location of where and extent to which recreational pursuits conflict with sensitive habitats.

9 Support collaborative development and management of supply options outside of the South Platte Basin

The South Platte Basin will work collaboratively with the state of Colorado and entities in other basins, including the Colorado Basin, to develop and manage all water supplies for the benefit of the entire state.

STRATEGIES	MEASURABLE OUTCOMES
9.A: Collaboratively support ongoing state of Colorado, Department of Natural Resources, and Interbasin Compact Committee leadership in managing the state's supplies within other basins, including the Colorado and Arkansas Basins.	South Platte Basin's critical water needs considered by State agencies when making decisions regarding water management in the Colorado and Arkansas Basins

10 Utilize scenario planning to better manage uncertainty of future water needs

The South Platte Basin will incorporate the five planning scenarios from the Technical Update to better manage uncertainty of future water needs. Scenario planning allows for evaluating inherent uncertainties in future climate conditions, social conditions (such as values and economics), and supply-demand conditions (e.g., energy, agricultural, and municipal needs).

STRATEGIES	MEASURABLE OUTCOMES
10.A: Promote use of scenario-based planning and the scenarios from the Technical Update in local water supply planning.	• Developed and maintained a database that summarizes the scenario planning approaches taken by water providers.

11 Broaden South Platte communications, outreach, and education programs

The South Platte Basin will expand on existing communications and outreach programs to improve knowledge and understanding of water challenges and needs for all citizens of the South Platte Basin, and on how these needs are being addressed through the South Platte BIP.

STRATEGIES	MEASURABLE OUTCOMES
11.A: Support and expand communication and outreach activities of the Public Education, Participation, and Outreach (PEPO) Workgroup of the Interbasin Compact Committee and the Metro/South Platte BRT education liaisons.	• Attended and participated with the PEPO Workgroup of the Interbasin Compact Committee. • Developed and posted meeting schedules of the joint Metro/South Platte PEPO Committee. • Increased attendance and participation on the joint Metro/South Platte PEPO Committee.
11.B: Support the South Platte Basin's participation with the Colorado Statewide Water Education Action Planning (SWEAP) process to engage South Platte Basin residents in better understanding the South Platte BIP and in encouraging an active role in their communities to promote informed decisions about critical water issues.	• Attended and participated in the SWEAP process meetings. • Provided written updates on the SWEAP process to the Metro and South Platte Roundtables. • Made written updates available on the South Platte Basin website.
11.C: Support implementation of tools developed by the SWEAP process.	• Outcomes will be measured as consistent with actions outlined in the SWEAP for Colorado 2020-2025.
11.D: Provide annual updates to the South Platte Education Action Plan consistent with goals and strategies of the BIP.	• Provided annual updates to the South Platte Basin Education Action Plan. • Successfully implemented tasks identified in the South Platte Basin Education Action Plan.
11.E: Continue to develop the network of existing community organizations to increase local awareness of the goals and priorities of the South Platte BIP	• Provided speakers and other communications relating to the South Platte BIP and other helpful facts.
11.F: Expand communication of the goals, strategies, and measurable outcomes of the South Platte BIP.	• Developed and implemented a marketing plan to support BIP implementation.

12 Improve efficiency and effectiveness of water project permitting

The South Platte Basin will support the State of Colorado's efforts to improve efficiency and effectiveness in water project permitting by local, state, and federal agencies while properly mitigating negative environmental impacts.

STRATEGIES	MEASURABLE OUTCOMES
12.A: Proactively engage in and support discussions and actions to improve efficiency and effectiveness of water project permitting.	• Reduction in average time and cost for water projects to be permitted. • Improved alignment between local, state, and federal permitting processes. • Increased resources to conduct permitting activities.
12.B: Encourage the sharing of best practices and lessons learned from water project permitting with other water users in the basin and throughout the state.	• Compiled and shared on the South Platte Basin website water project permitting best practices and lessons learned by CWCB.

Section 5. Demand, Supply, and Potential Water Needs

Water in the Basin

The South Platte Basin's varied topography has a strong influence on its hydrology. Mountainous areas receive more precipitation than the plains. Mountain precipitation occurs mainly as snowfall and can exceed 300 inches annually (equivalent to around 30 inches of water). The plains, located in the rain shadow of the Front Range, may only receive between 7 and 15 inches of precipitation annually, depending on location. Annual precipitation amounts can vary substantially.

The water supply of the South Platte River Basin is highly variable, with an approximate average annual native flow volume of 1.4 million AF. About 400,000 AF of transmountain water is imported from the Colorado Basin and approximately 100,000 AF from the Arkansas, North Platte, and Laramie Basins. Approximately 30,000 AF from non-tributary groundwater aquifers supplement the water supply in the South Platte River Basin. Surface water diversions average about 4 million AF annually, which is much more than native supplies combined with imports from other basins. In addition, annual groundwater withdrawals total 500,000 AF on average. The amount of diversion in excess of native flow highlights the return-flow-dependent nature of the basin's hydrology, and the basinwide efficient use and reuse of water supplies.

The Technical Update to the Colorado Water Plan generally quantified demands, supplies, and potential water needs at the basin scale; however, the hydrology of the South Platte and Republican River Basins are distinct and, as such, so are the analysis methodologies used to evaluate demands, supplies, and future water needs. Results of these analyses for the South Platte and Republican River Basins are presented both separately and in aggregate. Also, where possible, Metro Basin results are differentiated from the rest of the South Platte.

Agricultural irrigation is the predominant use of water in the Republican River Basin. Surface water supplies are scarce in this basin, and irrigators rely on pumping supplies from the High Plains Aquifer (also known as the Ogallala Aquifer). Nearly all of the irrigated fields are served by sprinklers, which makes efficient use of the pumped supplies. Municipal water use associated with numerous small and rural towns accounts for less than 1 percent of the total water demand.

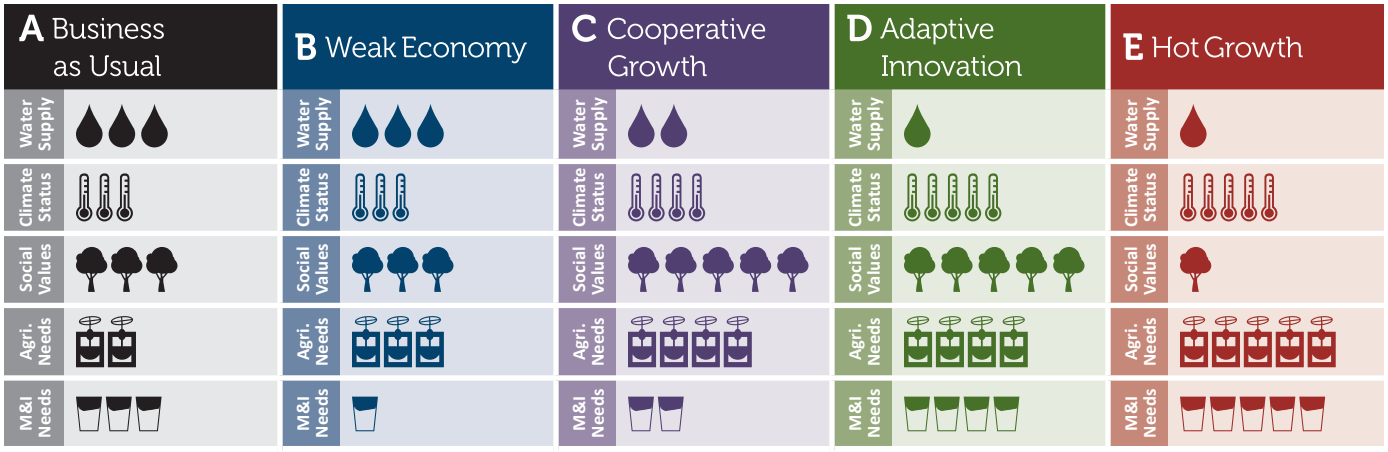
Planning Scenarios

The Analysis and Technical Update to the Colorado Water Plan (Technical Update) published in 2019 quantified the current and potential future water demands, supplies, and additional water needs under five alternative future scenarios. A key enhancement to Colorado's water planning processes has been the incorporation of scenario planning. The Colorado Water Plan identified five different but plausible future conditions for the year 2050. The scenarios each consider several water resources drivers and how the drivers may change. The drivers included population, urban land use, climate change, industrial water needs, agricultural conditions, and adoption of municipal and agricultural water conservation measures.

Water demands, supplies, and potential future water needs were quantified for the South Platte and Republican River Basins in the Technical Update (Section 4.8). This section summarizes demands, supplies, and potential water needs presented in the Technical Update.

Potential future water needs, aka gaps, were estimated for each planning scenario. Gaps are a characterization of the potential risk that water supplies will not be adequate to meet future demand.

The graphic below provides a brief overview of the drivers and the scenarios. Refer to the Technical Update, Sections 2.1.3 and 2.1.4, for more details on the scenarios and drivers (**https://cwcb.colorado.gov/colorado-water-plan/technical-update-to-the-plan**).



A Business as Usual

- Population growth increases at trends predicted by the State Demography Office (SDO).
- Future hydrology, per capita water demands, and adoption of conservation measures are similar to what has recently occurred.

B Weak Economy

- The world's economy slows, and the state's population growth is less than predicted.
- Hydrology is similar to recent patterns.
- This scenario puts the least amount of stress on future water supplies and is a bookend for scenarios.

C Cooperative Growth

- Statewide population is similar to SDO predictions but is distributed differently across the state.
- Climate is moderately warmer, and irrigation demands increase.
- People seek to mitigate increased demands by more aggressively adopting water conservation.

D Adaptive Innovation / **E Hot Growth**

- Both scenarios assume that population growth is higher than projected, and both assume a much warmer and drier future climate.
- The scenarios' primary differences revolve around conservation. In the Adaptive Innovation scenario, the state aggressively adopts conservation measures in both municipal and agricultural sectors. In the Hot Growth scenario, conservation is not a focus.

THE FUTURE WATER CONDITIONS DESCRIBED FOR THE SOUTH PLATTE BASIN WILL BE IN THE CONTEXT OF THE FIVE PLANNING SCENARIOS.

Refinements to Technical Update Modeling

No updates to the Technical Update modeling or analyses in the South Platte or Republican Basins were made for the purposes of updating the South Platte BIP. During the BIP update process, some basins identified enhancements to the Technical Update data, modeling, and analyses. Enhancements included incorporating better municipal water use data, updating operating protocols for basin storage facilities, and revising potential future industrial water demands. While the South Platte and Metro BRTs did not recommend enhancements at this time to the Technical Update modeling and analyses, they did express a desire to improve the resolution and accuracy of the modeling in the future.

Modeling refinements in other basins, however, did affect the assessment of how imports of supplies from existing transmountain diversion (TMD) projects may be affected in the various planning scenarios. The effects of these modeling refinements are described in Volume 2, Appendix A.

Representation of Existing Transmountain Diversions in the Technical Update

Transmountain diversions, particularly from the West Slope to East Slope, are a critical component of the water supply necessary to meet Colorado's municipal and agricultural water demand now and into the future. Many factors influence the amount and timing of TMDs, including water availability and storage in both the source and destination basins, demands, availability of other water supplies owned by water providers, and operational considerations. All of these factors may change in the future, particularly under climate-impacted conditions.

The Technical Update analyzes Colorado's current and potential future water supplies and demands in the context of five future planning scenarios that were described in the Colorado Water Plan. The planning scenarios do not specifically describe how TMDs may change in the future, though they do describe changes to drivers that impact water availability for TMDs. For example, the planning scenarios that incorporate climate change project a general decrease in streamflow, which could result in a reduction in water available to TMDs. Additionally, the planning scenarios predict an increase in demands, which could result in an increase in TMDs, up to their physical and legal diversion limits, to meet the growing demand. Large storage facilities on both sides of the Continental Divide further complicate how TMDs may operate in the future.

Understanding how these changing factors may impact the future amount and timing of TMDs is complicated from both technical and legal perspectives. The Technical Update, therefore, assumes that historical levels of TMDs and current operations will continue into the future. Previous planning efforts, including the 2010 Statewide Water Supply Initiative (the precursor to the Technical Update) and the 2015 Basin Implementation Plans, also incorporated this assumption. In future Technical Updates, water providers with major transmountain diversions should be consulted to understand how their operations could change on both the West and East Slopes under the conditions assumed in the planning scenarios.

The Technical Update provides a summary of the potential decrease in future TMD amounts but it does not apply the decrease in TMDs to projected future gaps. In climate-impacted scenarios, decreases in TMDs could lead to increases in agricultural and M&I gaps in basins that receive these supplies. Projected gaps could further increase because return flows from transmountain supplies can often be reused by the water provider or other downstream users. However, transmountain diverters may adjust their operations and diversions in response to future changes in water availability or increases in demand, and therefore the degree to which gaps may change is unknown.

TMDs are a critical component of Colorado's water resources. Future Technical Updates will seek to better understand potential future operations of existing TMDs and the effects on Colorado's water supply and gap estimates where it is reasonable and legally permissible.

Municipal and Industrial Demands

POPULATION PROJECTIONS

Approximately 3.8 million people reside in the South Platte Basin, which designates it as the most populous with about 70 percent of the statewide population. The Metro Region holds the majority of the population at 51 percent of the statewide total. The remaining portion of the South Platte River Basin has 19 percent of the statewide population, and the Republican River Basin has less than 1 percent.

Between the years 2015 and 2050, the South Platte Basin is projected to grow from approximately 3.8 million people to between 5.4 million and 6.5 million people depending on the scenario, which represents an increase in population of 42 percent to 70 percent (see Table 2). Under all scenarios, the areas of the South Platte River Basin that are outside of the Metro Region are projected to grow at a faster pace than the Metro Region, with overall growth between 54 percent and 123 percent, depending on the scenario.

DEMANDS

The Metro Region baseline water demands were largely based on data reported by water providers (per the requirements of House Bill 1051) and had the highest representation of water-provider-reported data for any basin or region in the state. The remaining South Platte River Basin baseline demands were also largely based on water-provider-reported data. The Republican River Basin baseline water demands were mostly estimated.

Per capita demands have decreased over time and have offset potential increases in demand driven by population growth in many communities. In the future, it is anticipated that conservation will continue to partially mitigate potential increases in demand from a growing population. In each basin, systemwide per capita demands are projected to decrease relative to the baseline in each future scenario except Hot Growth (see Table 2). Additionally, the assumption of a hot and dry climate in Hot Growth is projected to cause a significant increase in outdoor demands.

Current and future diversion demands for municipal water users are driven by population and water usage rates. Population estimates were based on State Demography Office projections, with upward or downward adjustments based on the scenario description.

Overall annual volumetric municipal baseline and projected demands, which combine the effect of population growth and per capita use rates, are projected to grow from approximately 654,000 AFY in 2015 to between 899,000 AFY and 1,187,000 AFY in 2050, depending on the scenario (see Figure 3 and Table 2).

The South Platte River Basin includes about 40 percent of the statewide self-supplied industrial demand. Approximately 67 percent of the baseline industrial demands are in the Metro Region and 33 percent are in the remaining South Platte River Basin. There are no industrial demands in the Republican River Basin. Industrial demands in the South Platte River Basin are associated with large industry, snowmaking, and thermoelectric. Each of the future planning scenarios assumed a small increase in industrial demand will occur, though the increase varies by scenario. For example, Hot Growth industrial demand is highest because the scenario assumes maximum development of resources.

GAPS

Water supply gap estimates for M&I uses under the five planning scenarios were calculated differently for the South Platte and Republican River Basins and are presented separately in Table 2.[1] In addition, while the models used for the gap analysis in the South Platte River Basin generated a rich set of demand, supply, and gap data, it is difficult to parse results according to the boundaries of the Metro Region and remaining South Platte River Basin. As a result, water supply gaps are described for the South Platte River Basin as a whole.

[1] See Section 2, Volume 1 of the Technical Update to the Colorado Water Plan for more detail

Below are observations on M&I gap calculation results:

- Gaps under Hot Growth are projected to be significantly higher than in other scenarios (see Figure 4).
- Adaptive Innovation includes similar assumptions to Hot Growth in terms of future climate conditions and population projections; however, annual and maximum gaps are projected to be much less, which demonstrates the value of conservation. In addition, the gaps for Business as Usual and Adaptive Innovation are projected to be very similar even though Adaptive Innovation incorporates high population growth and a hot and dry future climate condition. The similarity in gaps suggests that additional conservation on a basinwide scale will help offset additional demands from population growth and climate change. Nonetheless, gaps in Adaptive Innovation are projected to be significant and point to the need for developing additional water supplies.
- The persistent nature of the timeseries of gaps on Figure 5 points to the need for projects that will provide firm yield.
- Figure 5 shows that gaps can increase significantly during dry periods, especially in Adaptive Management and Hot Growth (the scenarios most severely impacted by future climate assumptions). Projects and water management strategies will be needed to meet periodic maximum M&I gaps.

Table 2. Summary of Baseline and Projected Municipal and Industrial Water Demands and Gaps

	Baseline[1]	Business as Usual	Weak Economy	Cooperative Growth	Adaptive Innovation	Hot Growth
Population						
Metro Region	2,768,100	4,061,900	3,817,100	3,922,000	4,161,600	4,317,700
Remaining South Platte River Basin	1,030,100	1,856,900	1,585,800	1,928,800	2,292,400	2,148,900
South Platte River Basin Subtotal	3,798,200	5,918,800	5,402,900	5,850,800	6,454,000	6,466,600
Republican River Basin	31,600	35,500	30,300	33,600	38,400	41,100
Total South Platte Basin	**3,829,900**	**5,954,300**	**5,433,200**	**5,884,400**	**6,492,400**	**6,507,700**
Systemwide Per Capita Demands (gallons per capita per day)						
Metro Region	141	138	135	130	126	148
Remaining South Platte River Basin	181	176	174	164	158	190
Republican River Basin	245	236	236	221	214	251
Overall South Platte Basin	**152**	**150**	**147**	**142**	**137**	**163**
Municipal Diversion Demand (AFY)						
Metro and Remaining South Platte River Basin	645,800	994,100	890,700	926,400	992,500	1,175,500
Republican River Basin	8,400	9,200	7,900	8,100	8,900	11,200
Total South Platte Basin	**654,200**	**1,003,300**	**898,600**	**934,500**	**1,001,400**	**1,186,700**

Table 2. Summary of Baseline and Projected Municipal and Industrial Water Demands and Gaps (continued)

	Baseline[1]	Business as Usual	Weak Economy	Cooperative Growth	Adaptive Innovation	Hot Growth
Industrial Diversion Demand (AFY)						
Metro and Remaining South Platte River Basin	72,900	78,900	78,200	76,400	77,700	82,200
Republican River Basin	0	0	0	0	0	0
Total South Platte Basin	**72,900**	**78,900**	**78,200**	**76,400**	**77,700**	**82,200**
Total Municipal and Industrial Diversion Demand (AFY)[2]						
Metro and Remaining South Platte River Basin	718,700	1,073,000	968,900	1,002,800	1,070,200	1,257,700
Republican River Basin	8,400	9,200	7,900	8,100	8,900	11,200
Total South Platte Basin	**727,100**	**1,082,200**	**976,800**	**1,010,900**	**1,079,100**	**1,268,900**
Average Annual Gap (AFY)						
Metro and Remaining South Platte River Basin	0[3]	192,800	136,600	159,800	221,400	390,600
Republican River Basin	0	700	0	0	500	2,800
Total South Platte Basin	**0[3]**	**193,500**	**136,600**	**159,800**	**221,900**	**393,400**
Maximum Annual Gap (AF)						
Metro and Remaining South Platte River Basin	0[3]	256,300	184,500	213,300	333,200	540,700
Republican River Basin	0	700	0	0	500	2,800
Total South Platte Basin	**0[3]**	**257,000**	**184,500**	**213,300**	**333,700**	**543,500**

[1]*Baseline year is 2015.*

[2]*M&I demands may vary slightly from the M&I Demand section of the Technical Update (Section 4.8.5) due to differences in geographic distribution of demand for counties that lie in multiple basins.*

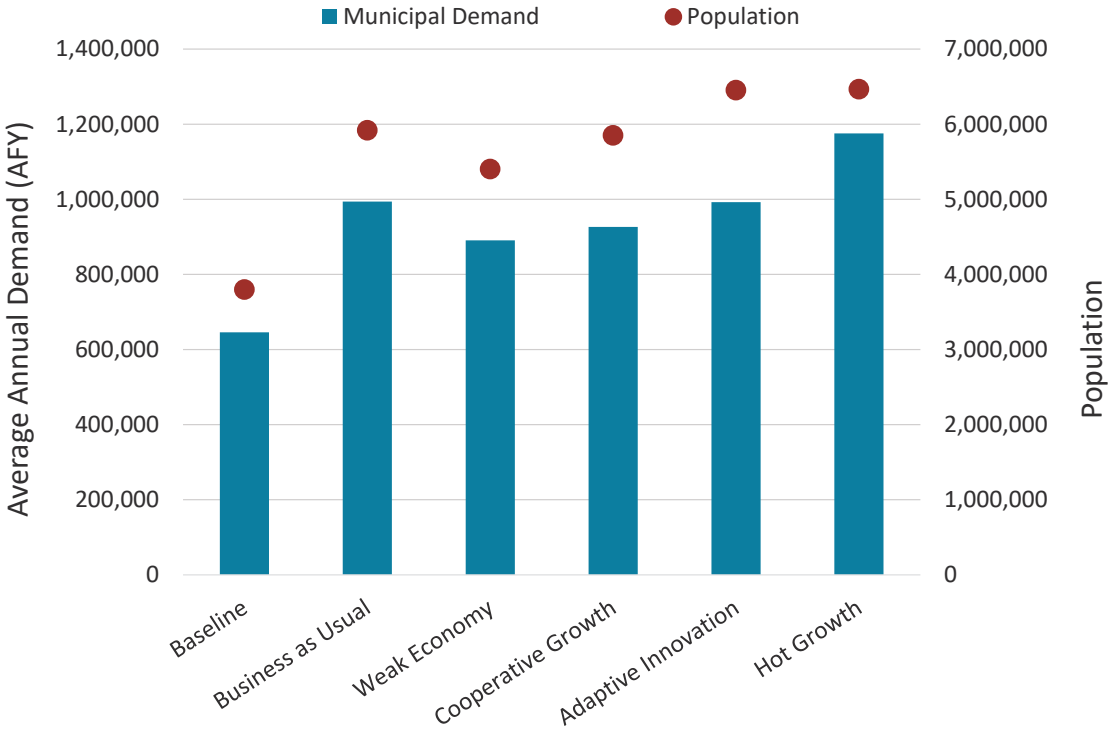
[3]*Colorado Decision Support System water allocation model in this basin calculates small baseline M&I gaps, but they are either due to calibration issues or they are reflective of infrequent, dry-year shortages that are typically managed with temporary demand reductions, such as watering restrictions.*

Calculation methodologies and assumptions for M&I water demands are available in the Technical Update documentation.

https://cwcb.colorado.gov/colorado-water-plan/technical-update-to-the-plan

Figure 3. Baseline and 2050 Projected Population and Municipal Demands

SOUTH PLATTE



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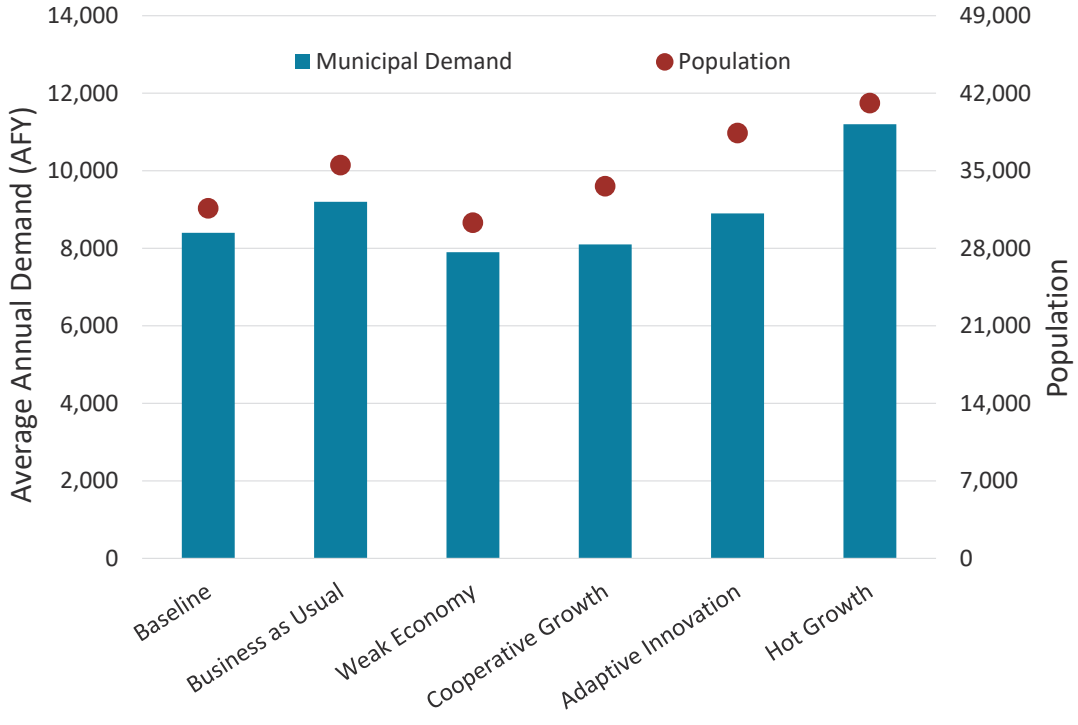

Figure 4. Baseline and 2050 Projected Maximum Annual M&I Demand Met and Gaps

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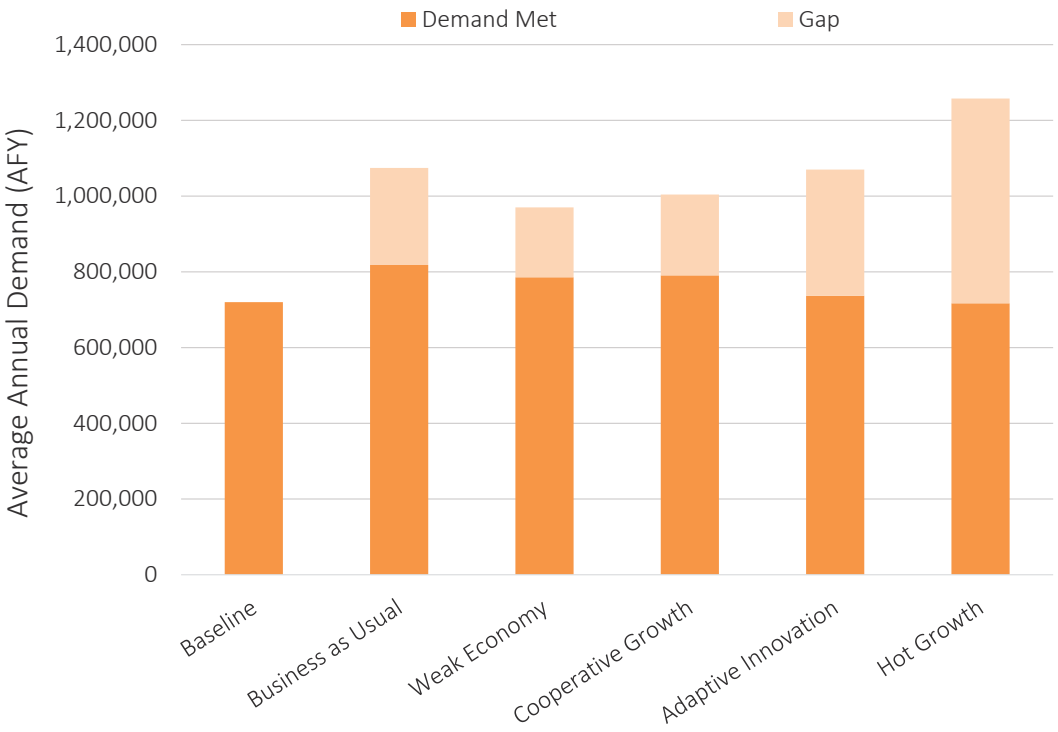

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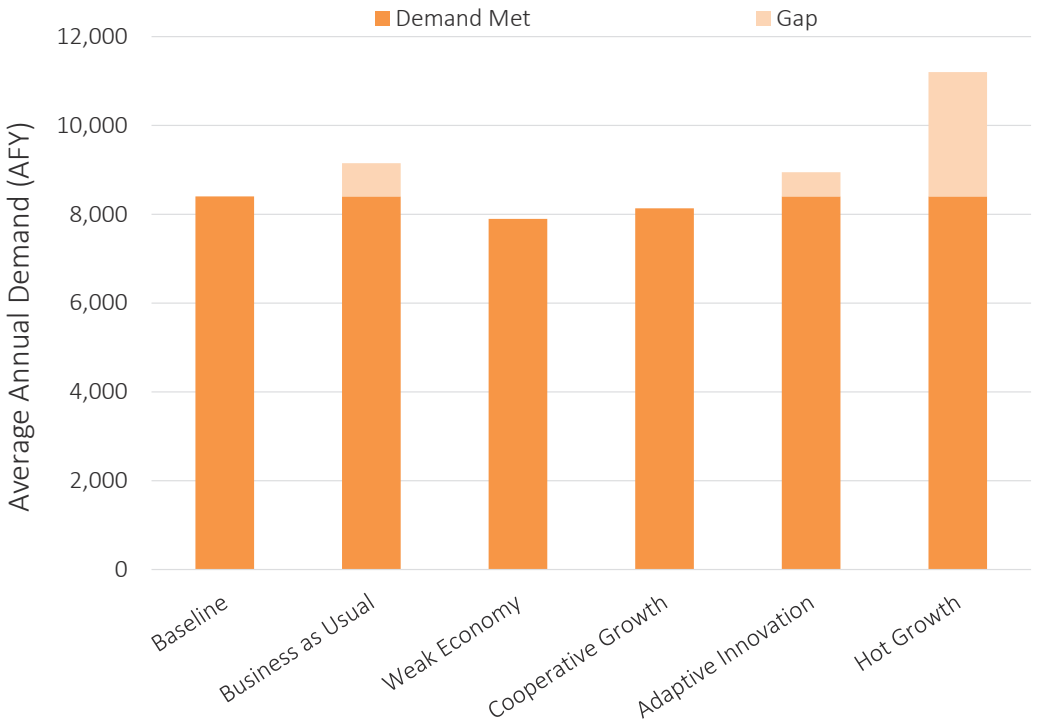
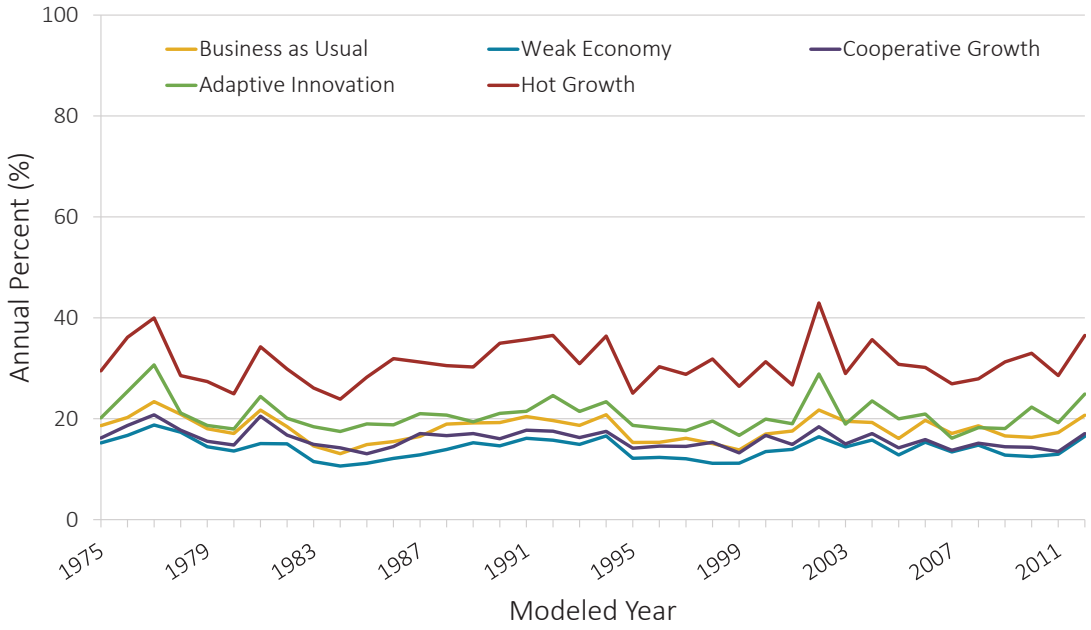


Figure 5. Modeled Annual M&I Gaps in the South Platte River Basin (expressed as a percent of demand unmet) for Planning Scenarios



Agricultural Demands

DEMAND

South Platte River Basin

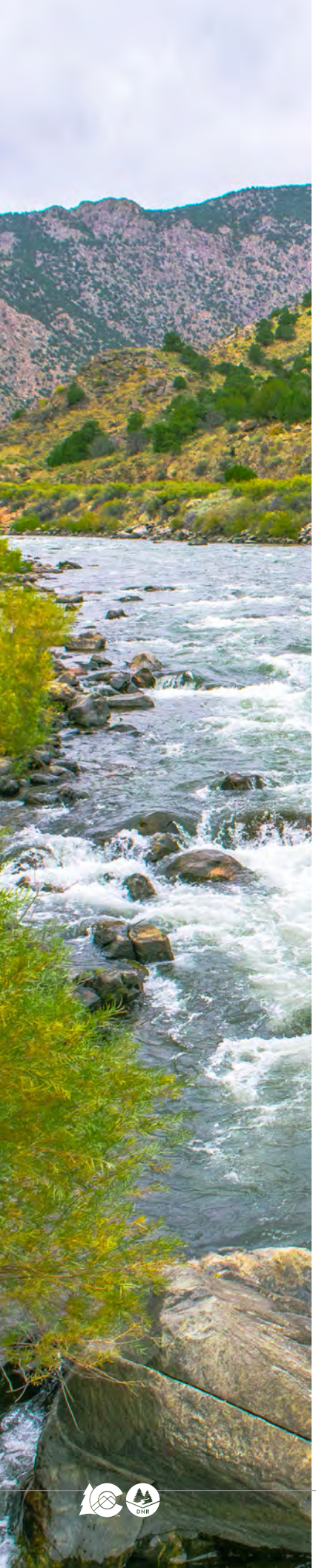
The South Platte River Basin is the highest-producing basin in the state in terms of the value of agricultural products sold. Approximately 854,000 acres of irrigated lands are located along and adjacent to the South Platte River and its tributaries and stretch to the state line.

Farmers divert surface water and pump groundwater to support production. In many cases, both sources of supply are available to irrigate South Platte River Basin farms. Much of the surface water supply in the basin is generated via return flows, as an upstream irrigators' inefficiencies become the water supply for downstream irrigators.

The amount of irrigated land in the basin is anticipated to decrease in the future. Urbanization will impact irrigated lands in and around the basin's municipalities by 2050. The majority of urbanization of irrigated land (60 percent) is projected to occur in the St. Vrain, Big Thompson, and Cache La Poudre Basins. These basins have some of the highest concentrations of irrigated land adjacent to municipalities that are projected to increase in population. Although large population increases are also anticipated in and around the Denver Metro area, the concentration of irrigated land that could be urbanized is less. Acquisition of senior water rights by buy-and-dry methods is also expected to reduce the amount of irrigated land.

"Modeled Years" are not a reference to historical conditions. Models used to simulate the planning scenarios consider 1975 to recent-year water supplies (in some scenarios, adjusted for climate change impacts), current administrative practices and infrastructure, and projected 2050 demands.

Agriculture diversion demand represents the amount of water that would need to be diverted or pumped to meet the full crop irrigation water requirement. The diversion demand does not reflect historically applied irrigation amounts because irrigators often operate under water-short conditions and do not have enough supply to fully irrigate their crops.



Republican River Basin

The Republican River Basin has nearly 580,000 irrigated acres, making it one of the highest-producing basins of irrigated crops in the state. The basin has very limited surface water supplies. As a result, irrigators rely on groundwater supplies from the High Plains Aquifer (also known as the Ogallala Aquifer). While all of the pumping in the basin is subject to the Republican River Compact, the Compact accounting recognizes that most of that pumping comes from storage in the High Plains Aquifer and not the stream system. Groundwater pumping is managed by several groundwater management districts in the basin.

The current amount of irrigated land is expected to decline in the future, and irrigated lands will need to be retired to maintain compliance with the Republican River Compact. In addition, declining saturated thickness in the High Plains Aquifer will also lead to the retirement of lands irrigated with groundwater.

GAPS

Water supply gap estimates for agricultural uses under the five planning scenarios were calculated differently for the South Platte and Republican Basins and are presented separately in Figure 6 and Table 3. In addition, while the models used for the water supply gap analysis in the South Platte River Basin generated a rich set of demand, supply, and gap data, it is difficult to parse results according to the boundaries of the Metro Region and remaining South Platte River Basin. As a result, water supply gaps are described for the South Platte River Basin as a whole and the Republican River Basin.

The agricultural diversion demands were compared against available water supply modeled for current conditions and the five planning scenarios. Gaps were calculated when water supply was insufficient to meet demands. Observations on agricultural gaps for the South Platte and Republican Basins include:

South Platte River Basin

- The current agricultural gap is significant but is not projected to increase greatly in the future as a percentage of demand.
- On a volumetric basis, gaps are projected to decrease as agricultural diversion demands decrease, primarily from urbanization and potential conversion of agricultural water rights to municipal use.
- As shown on Figure 7, current and future agricultural gap simulation results hovered at around 15 percent of total demand in normal to wetter periods but increased during dry periods.

Republican River Basin

- Both diversion demands and gaps will likely decrease in the future due to reduction of irrigated lands in order to comply with the Republican River Compact and also as a result of declining water levels in the High Plains Aquifer.
- Even with reduced demand, reduced supplies will result in a fairly consistent gap in the future of approximately 25 percent of demand.

Table 3. Summary of Baseline and Projected Agricultural Diversion Demands and Gaps

	Baseline[1]	Business as Usual	Weak Economy	Cooperative Growth	Adaptive Innovation	Hot Growth
Irrigated Acreage (acres)						
Metro and Remaining S Platte Riv Basin	854,300	701,100	701,100	722,400	722,400	679,900
Republican River Basin	578,800	442,000	443,400	442,000	442,000	442,000
Total South Platte Basin	**1,433,100**	**1,143,100**	**1,144,500**	**1,164,400**	**1,164,400**	**1,121,900**
Average Irrigation Water Requirement (AFY)						
Metro and Remaining S Platte Riv Basin	1,516,000	1,239,000	1,239,000	1,353,000	1,277,000	1,336,000
Republican River Basin	846,000	639,000	641,000	663,000	646,000	718,000
Total South Platte Basin	**2,362,000**	**1,878,000**	**1,880,000**	**2,016,000**	**1,923,000**	**2,054,000**
Average Annual Demand (AFY)						
Metro and Remaining S Platte Riv Basin	2,465,800	1,988,700	1,988,700	2,157,400	1,696,500	2,063,100
Republican River Basin	1,067,200	805,500	807,500	835,300	797,200	885,800
Total South Platte Basin	**3,533,000**	**2,794,200**	**2,796,200**	**2,992,700**	**2,493,700**	**2,948,900**
Average Annual Gap (AFY)						
Metro and Remaining S Platte Riv Basin	506,700	404,900	402,100	402,100	378,300	444,000
Republican River Basin	266,800	201,400	201,900	208,800	199,300	221,400
Total South Platte Basin	**773,500**	**606,300**	**604,000**	**610,900**	**577,600**	**665,400**
Incremental Avg. Ann. Gap (AFY)						
Metro and Remaining S Platte Riv Basin	-	-	-	-	-	-
Republican River Basin	-	-	-	-	-	-
Total South Platte Basin	**-**	**-**	**-**	**-**	**-**	**-**
Maximum Annual Gap (AFY)						
Metro and Remaining S Platte Riv Basin	1,206,100	978,400	960,700	901,900	824,800	1,064,000
Republican River Basin	361,300	278,300	278,700	278,300	253,600	281,800
Total South Platte Basin	**1,567,400**	**1,256,700**	**1,239,400**	**1,180,200**	**1,078,400**	**1,345,800**

[1] *Baseline agricultural demands were estimated River using a model that used "current" irrigated acreage and cropping patterns and incorporated historical weather patterns.*

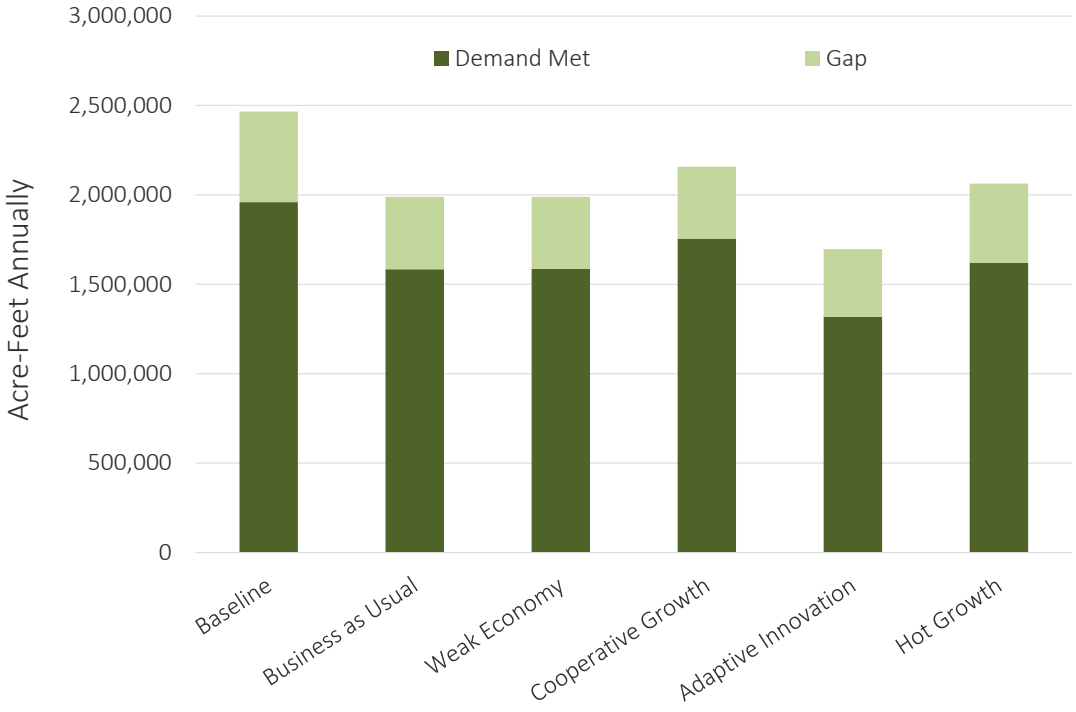
Calculation methodologies and assumptions for agricultural water demands are available in the Technical Update documentation

https://cwcb.colorado.gov/colorado-water-plan/technical-update-to-the-plan

The Incremental Average Annual Gap quantifies the degree to which the basinwide gap could increase beyond what agriculture has historically experienced under water-short conditions. Gaps in the South Platte and Republican River Basins will exist in the future but are not projected to increase on a basinwide scale because overall demands will decrease due to loss of irrigated land. On-farm shortages will likely increase in some future scenarios because of diminished supply and warmer conditions.

Figure 6. Baseline and 2050 Projected Average Annual Agricultural Diversion Demand, Demand Met, and Gaps

SOUTH PLATTE



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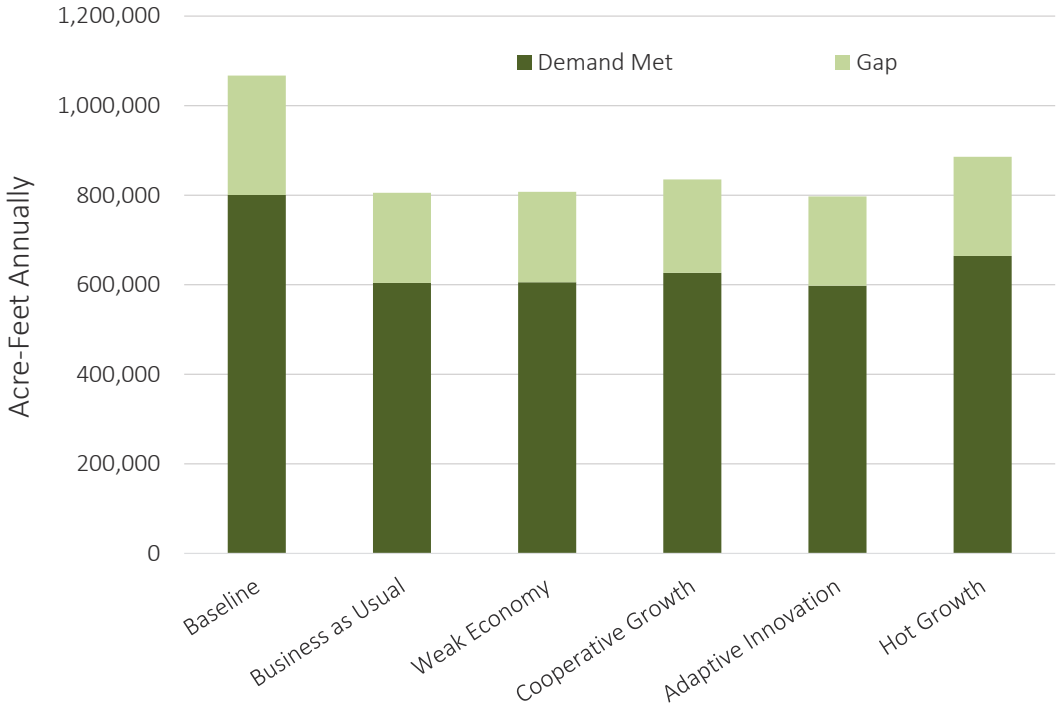
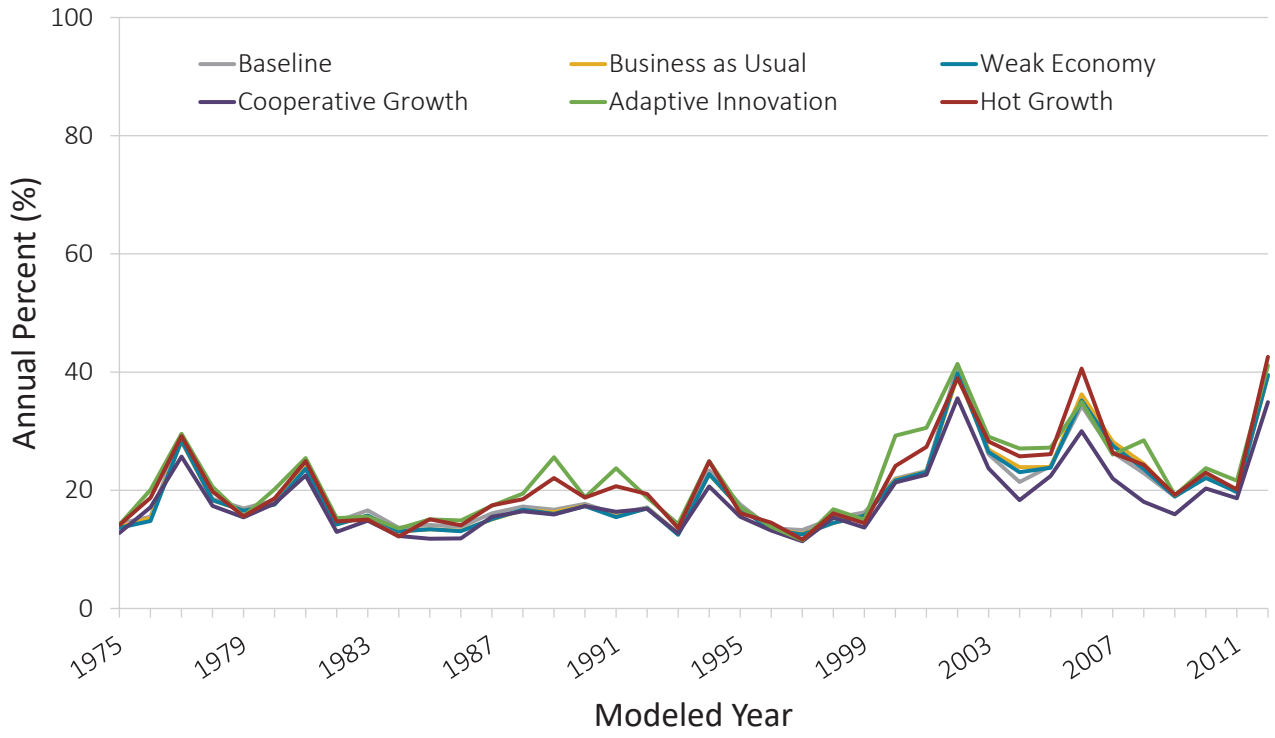


Figure 7. Modeled Annual Agricultural Gaps in the South Platte River Basin (expressed as a percentage of demand unmet) by Planning Scenario



While warmer and drier conditions in some planning scenarios may drive on-farm irrigation demand higher, overall agricultural diversion demand in the South Platte Basin as a whole is expected to decrease in the future due primarily to the loss of irrigated land. It is likely that shortages on remaining irrigated land may increase in some future scenarios due to lower water supplies and warmer conditions.

Environment and Recreation

During the Technical Update, current and potential future risks to E&R attributes in the basin were evaluated using the Colorado Environment and Recreation Flow Tool (Flow Tool). The Flow Tool was developed to help BRTs evaluate their portfolios of E&R projects by fostering an improved understanding of potential streamflow-related risks (both existing and projected) to E&R attributes throughout their basins.

The Flow Tool uses streamflow data from the Colorado Decision Support System (CDSS), modeled streamflow data for various planning scenarios, and established flow-ecology relationships to assess risks to flows and E&R attribute categories at preselected gages across the state. The Flow Tool is a high-level tool that is intended to provide guidance during stream management plan and BIP development.

A total of eight water allocation model nodes were selected for the Flow Tool within the South Platte River Basin. Figure 8 shows subwatersheds (at the HUC 12 level) and the relative number of E&R attributes located in each watershed. Table 4 summarizes Flow Tool results in the basin.

- South Platte River at South Platte (06707500)
- South Platte River at Denver (06714000)
- St Vrain Creek at Lyons, Colorado (06724000)
- Middle Boulder Creek at Nederland, Colorado (06725500)
- Big Thompson River at Estes Park, Colorado (06733000)
- Big Thompson River at Mouth, near La Salle, Colorado (06744000)
- South Platte River near Kersey, Colorado (06754000)
- South Platte River at Julesburg, Colorado (06764000)

The identification of future risks to E&R attributes helps facilitate discussions about projects or strategies that can be implemented to reduce the risks. This type of discussion is similar to and integrates with roundtable strategies that focus on reducing the risk of municipal or agricultural supply gaps.

Colorado Parks and Wildlife

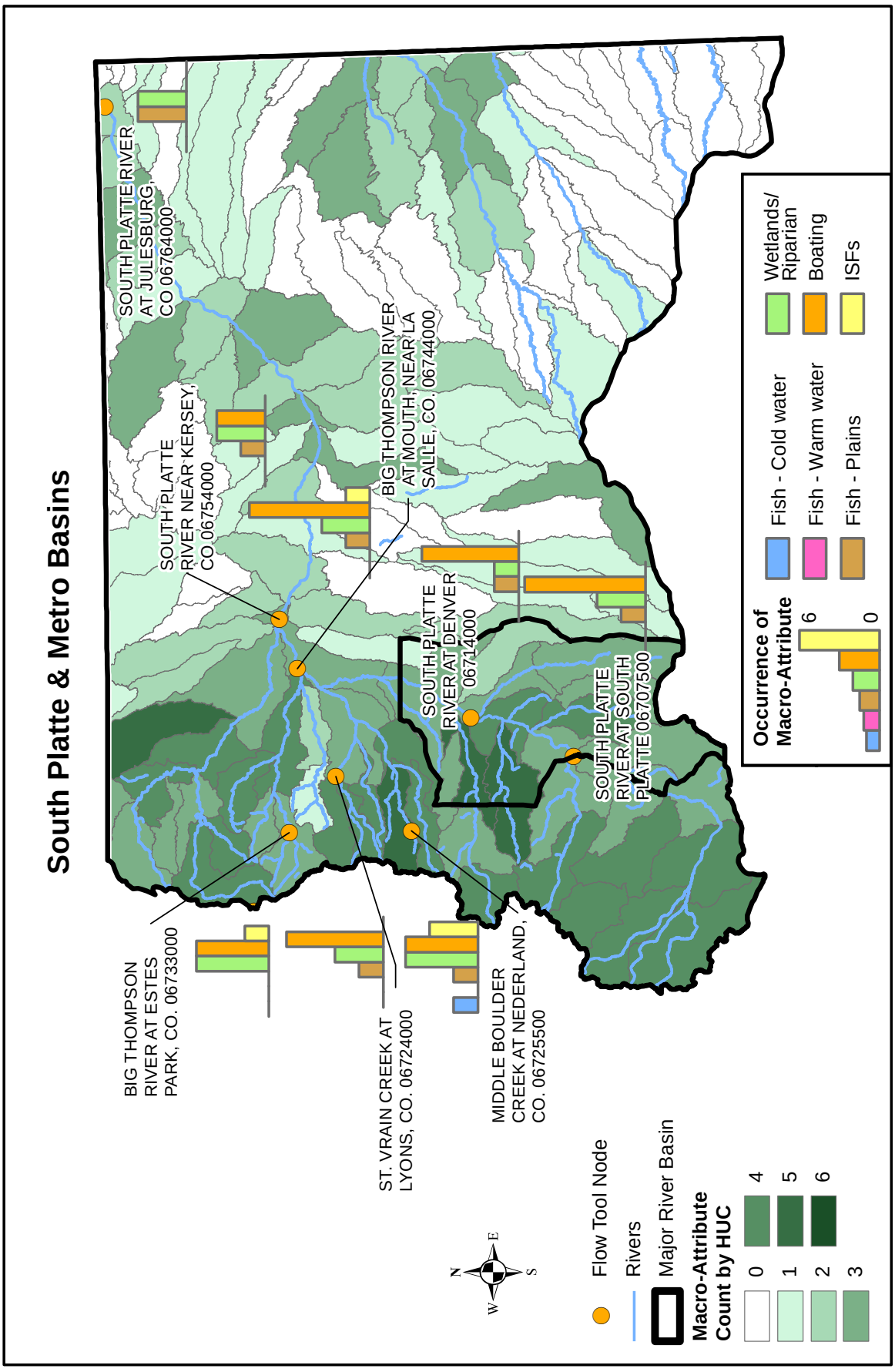


Figure 8. Flow Tool Nodes Selected

Table 4. Summary of Flow Tool Results

Category	Observation
Projected Flows	• Patterns of monthly mean peak flows are projected to be highly variable across the basin. The projections below are divided by the mountain portion of the watershed, Front Range headwaters of the South Platte, and the lower portion of the South Platte watershed. • In the mountains portion of the watershed (e.g., Big Thompson at Estes Park, St. Vrain at Lyons, and Middle Boulder at Nederland), total annual flows are projected to be less for the climate-impacted scenarios (Cooperative Growth, Adaptive Innovation, and Hot Growth) compared to Baseline, Business as Usual, and Weak Economy. During wet years, the difference is the greatest compared to the drier years. Monthly mean peak flows are projected to occur earlier in April and May for climate-impacted scenarios compared to Baseline, Business as Usual, and Weak Economy. Summer monthly mean flows are projected to be lower as well for the climate-impacted scenarios. • Along the South Platte River Basin closer to Denver, total annual flows are projected to be variable for climate-impacted scenarios compared to Baseline, Business as Usual, and Weak Economy but are generally projected to be less, especially during the wetter years. Monthly mean peak flows are projected to be overall much less for climate-impacted scenarios and peak earlier in April and May compared to Baseline, Business as Usual, and Weak Economy. Baseflows during summer and winter months are projected to be greater for Business as Usual, Weak Economy, and Cooperative Growth compared to Baseline and slightly less for Adaptive Innovation and Hot Growth. The differences flatten out farther downstream in the watershed. • Lower in the South Platte watershed, Cooperative Growth has the greatest projected annual total flow compared to all other scenarios. Adaptive Innovation and Hot Growth are projected to have the lowest annual total flows, especially in the wetter years.
Ecological Risk	• Farther upstream in the watershed, in the mountains/foothills and Front Range near Denver, due to the shift in mean monthly peak flows for the climate-impacted scenarios to an earlier spring peak runoff and lower mid- to late-summer flows, both spawning windows for various species and summer low-flow conditions could adversely affect fish species. Lower flow conditions combined with warmer air temperatures due to climate change could result in warmer water temperatures that would negatively affect cold-water fish species. • In the mountains, peak flow and low flows generally create low to moderate risk for riparian plants and fish, although these risks may increase under climate-impacted scenarios.
ISFs and RICDs	• There are numerous instream flow (ISF) reaches in the mountains and foothills and several recreational in-channel diversions (RICD) in the South Platte River Basin. The location of modeled flow points does not allow specific insight into what future scenarios imply for these locations, but the general pattern of diminished flows, especially diminished flows under climate change scenarios, suggests that the flow targets for ISFs and RICDs may be met less often.
E&R Attributes	• Increasing risk to E&R attributes arise from several sources. Changes in flow timing through water management (e.g., storage of peak flows) could reduce ecosystem functions that are dependent on high flows (e.g., sediment transport) and could reduce boating opportunities. Changes in timing under climate-impacted scenarios (early peak flow) could also increase risk for ecosystems and species. • Under all scenarios in most locations, E&R risk may be increased by depletions from increasing human water consumption and decreasing supply under a changing climate. Water management (e.g., reservoir releases) has the potential to mitigate negative impacts.

Focus Area Mapping

Since the 2005 passage of the Colorado Water for the 21st Century Act, the nine BRTs and the CWCB have worked to characterize Colorado's E&R water needs. The effort has included extensive inventory, analysis, and synthesized mapping of each basin's E&R attributes. Through this process, each basin created Focus Area maps that identify streams or watersheds where environmental and recreational attributes are located and/or where these attributes may be at risk. The Focus Area maps were included in the 2010 version of the Statewide Water Supply Initiative and were updated by some basins during the development of the 2015 BIPs.

During the 2015 BIP effort, the South Platte and Metro BRTs reviewed and updated their Focus Area maps to incorporate additional focus areas, including:

- Several areas near canyon mouths of various Front Range tributaries to the South Platte River
- Reaches in Park County with significant riparian plant communities as well as recreational attributes not previously mapped

During the current BIP update effort, the E&R subcommittee of the roundtables determined that new focus areas should be added that reflect recreational reservoirs (e.g., Cherry Creek, Spinney, Jackson); wetland habitats and warm water sloughs along the Lower South Platte; and the Poudre headwaters (recovery area for threatened Greenback cutthroat trout). The subcommittee is compiling updated attribute mapping, and the resulting focus areas will be added in the future. Figure 9 shows the current Focus Area map for the South Platte and Metro BRTs. The E&R subcommittee also expressed a need to consider additional spatial data (e.g. burn scar mapping and areas vulnerable to future fires) during future updates to the Focus Area maps or during the development of analysis tools that could provide supplemental information useful for prioritizing SMPs and other proactive watershed health enhancement activities.

The South Platte and Metro BRTs see the Focus Area map as a tool for communicating where the roundtables would like to prioritize projects, helping to align goals and funding for projects, and collaborating with water project proponents on ways to create multi-benefit projects.

The Focus Area maps were created to:

1. **Help guide water supply planning**
2. **Help identify where projects could reduce risks to E&R attributes**
3. **Identify potential collaborative projects**

More information on the Focus Area map and details on specific focus area reaches are included in Appendix B of the 2015 South Platte BIP.

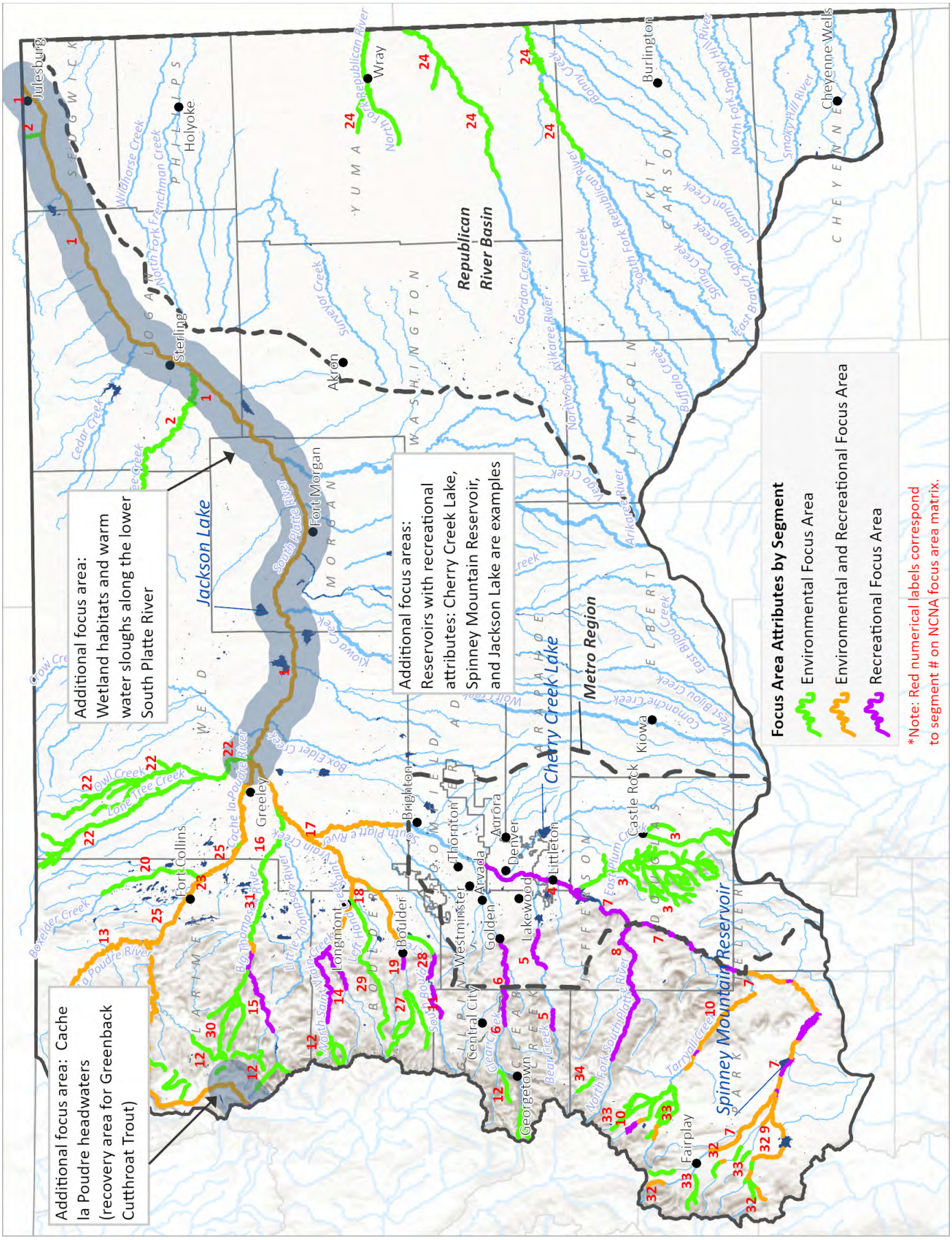


Figure 9. Focus Area Map

Water Supplies

Water supplies in the South Platte River Basin vary substantially based on location within the basin. The availability of surface water supplies depends on both the size of the upstream contributing drainage area and the nature of senior water rights. Groundwater supplies are dependent on the characteristics of local aquifers. In addition, several water providers in the South Platte River Basin rely on TMD projects. Return flows generated from the use of water are a significant source of supply for downstream water users. Given the complexities and variability of water supplies in the basin, it is difficult to characterize available supplies on a basinwide scale. As a result, simulated available water supplies at two significant locations in the South Platte River Basin are summarized below.

Figures 10 and 11 show simulated available flows at two locations on the South Platte River: the South Platte River at Denver and South Platte River at Kersey. The Denver location, upstream of the Burlington Ditch, is the primary calling right on the mainstem of the Upper South Platte River. The Kersey gage reflects the impact to available flow downstream of the confluence with the Cache La Poudre and the Lower South Platte Rivers calling rights for storage and irrigation. Available flow at both locations is generally only available during high flow years and for relatively short periods of time. In scenarios with impacts of climate change, available flows are projected to diminish, and peak flows are projected to occur earlier in the runoff season. Figure 11 focuses on available flow (which is impacted by water rights considerations) but it also includes a depiction of baseline physical flow for comparison purposes.

Figure 10. Simulated Hydrographs of Available Flow

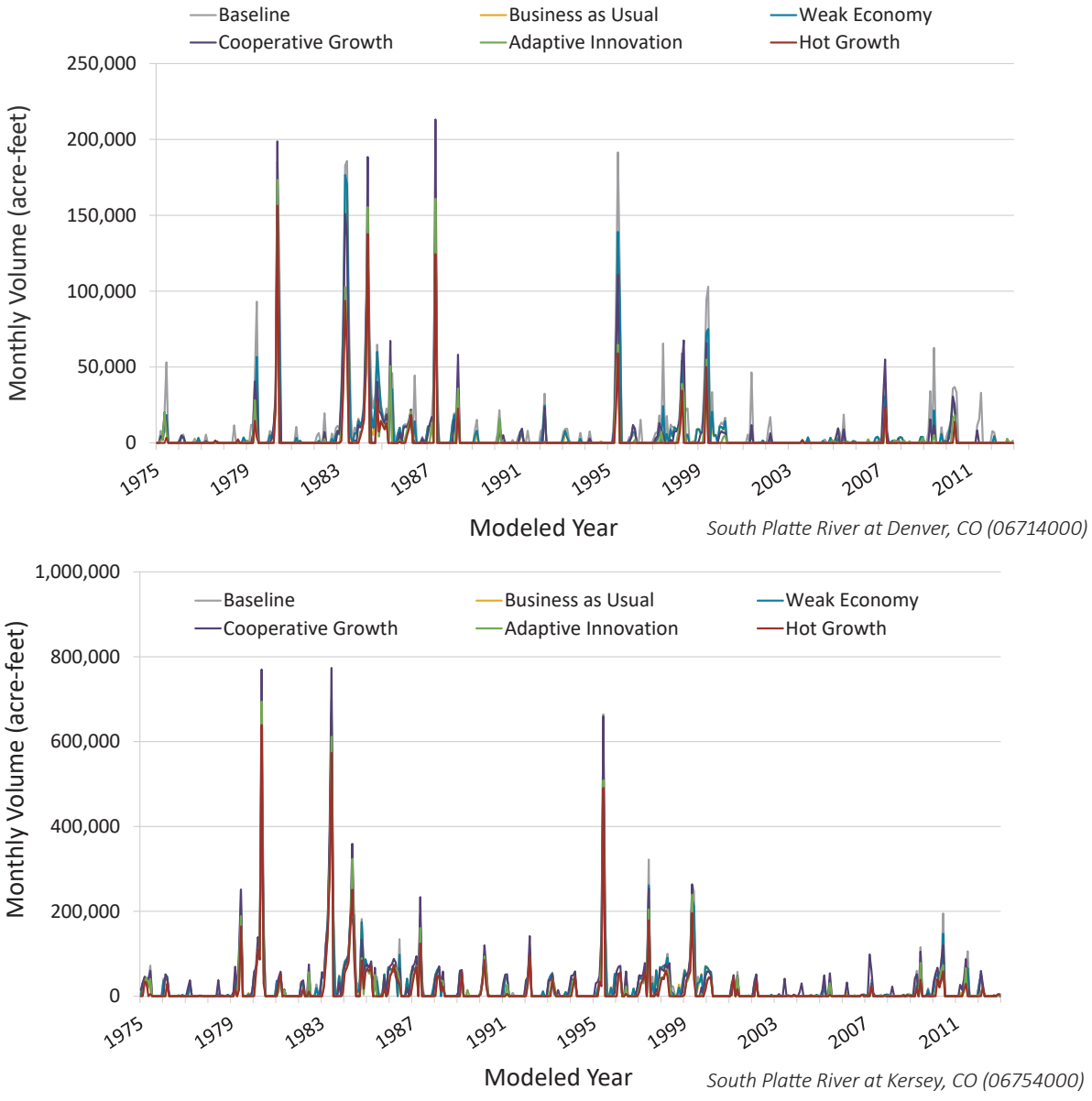
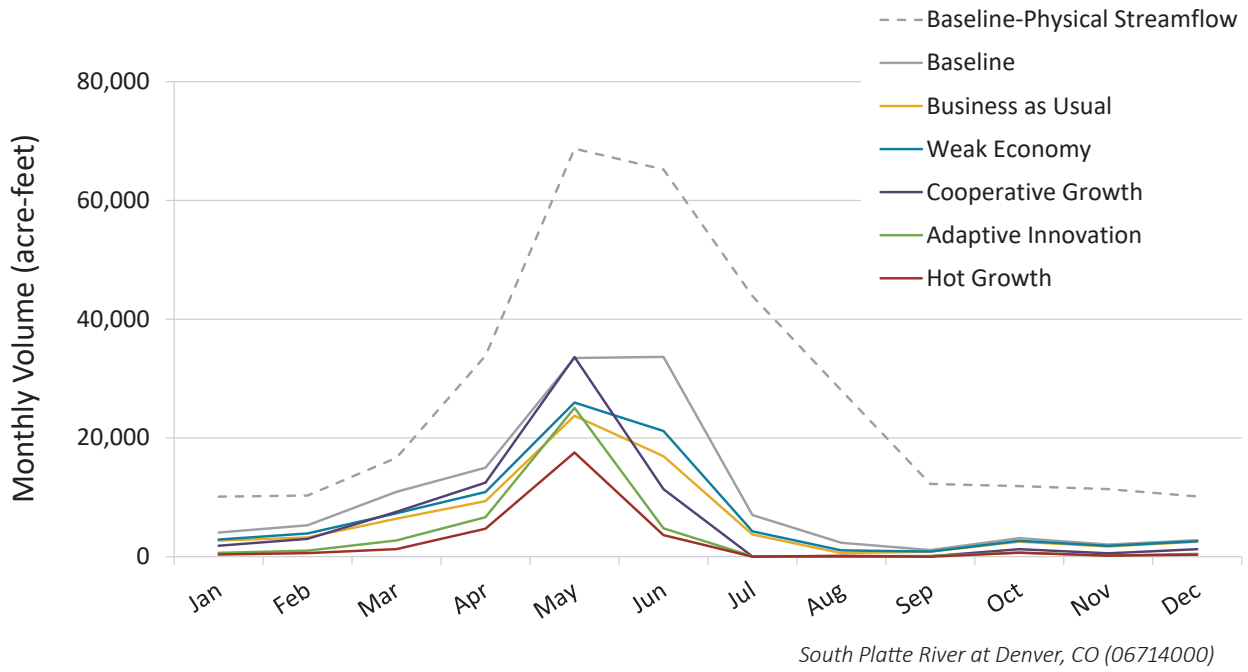
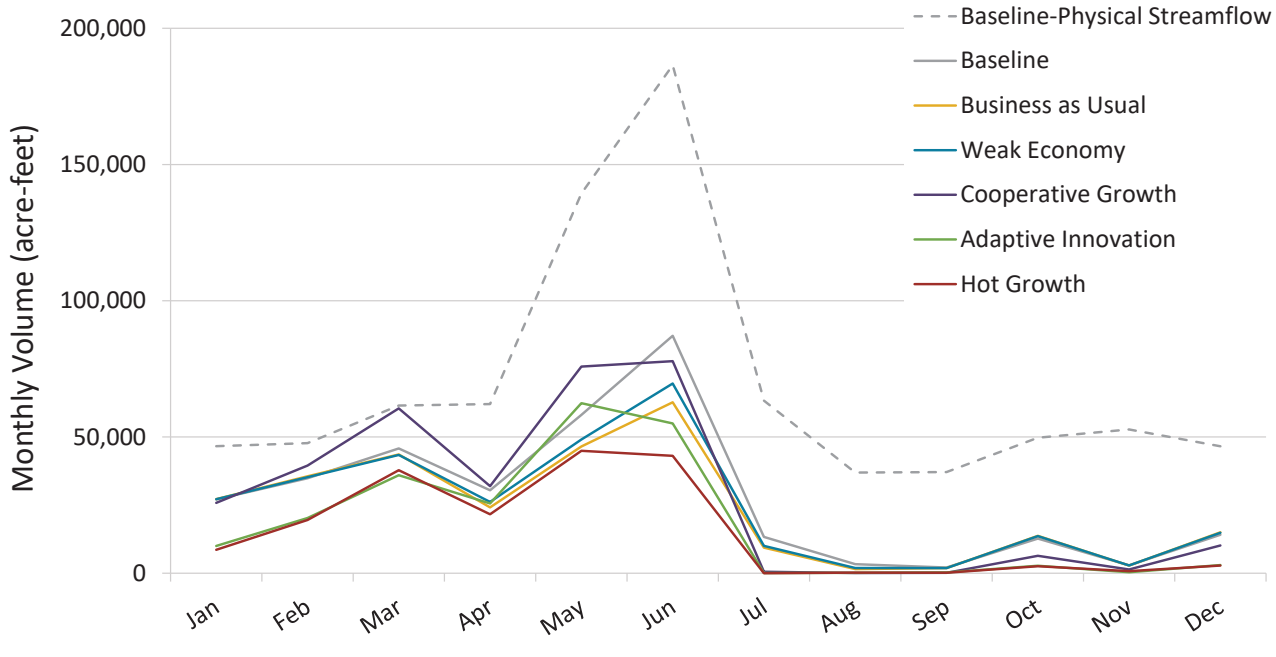


Figure 11. Average Monthly Simulated Hydrographs of Available Flow



South Platte River at Denver, CO (06714000)



South Platte River at Kersey, CO (06754000)

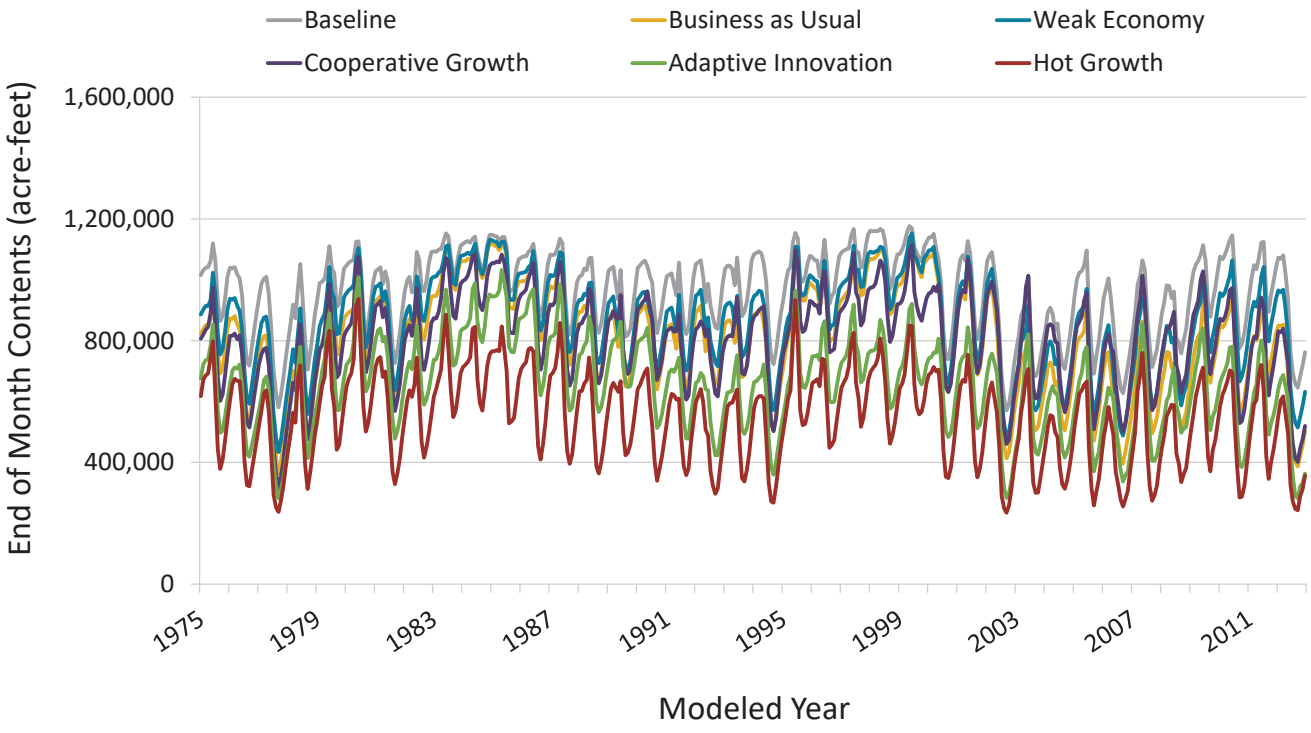
Storage

Total reservoir storage output from the South Platte water allocation model is shown on Figure 12. Baseline conditions show the highest levels of water in storage (in general); the lowest is in Hot Growth. Cooperative Growth, Adaptive Innovation, and Hot Growth show lower amounts of water in storage than the two scenarios that do not include the impacts of a drier climate.

The results indicate that, without new projects, higher demands will draw storage down to lower levels. Concurrent drier conditions will impede full recovery of reservoirs. Lower demands in Adaptive Innovation help reservoir levels stay somewhat higher than in Hot Growth. It should be noted that the water allocation model allows reservoirs to be drawn down to the full extent water rights and storage amounts allow. Water providers would likely not be comfortable operating with chronically lower amounts of water in storage and would seek to acquire additional supplies or build new projects to boost reserves.

Results suggest increasing demands could draw storage down to lower levels, leading water providers to acquire additional supplies, build new storage projects or boost storage reserves.

Figure 12. Basin Total Simulated Storage



Section 6. Strategic Vision for the Future

The strategic vision for the future in the South Platte Basin is described in this section. The strategic vision is the amalgamation of the goals, future projects, and desired water future for the basin. The strategic vision for the South Platte and Metro roundtables focuses on four elements:

1. MEET THE MUNICIPAL SUPPLY GAP
2. PROTECT IRRIGATED AGRICULTURE
3. PROTECT AND ENHANCE WATERSHEDS
4. IMPLEMENT PROJECTS

See Volume 2, Section 9 of the South Platte BIP for more detail on the shortage analysis.

Summary of Strategies

1 MEET THE MUNICIPAL SUPPLY GAP

The South Platte Basin is currently home to 70 percent of the state's population, and the cities along the Front Range in the basin are projected to experience significant population increases by 2050. Municipal water providers have been working diligently to develop needed water supply projects and strategies to meet future demands. The South Platte and Metro BRTs included a vision for meeting future municipal needs in the 2015 South Platte BIP, and they renewed the vision in light of the planning scenarios that were analyzed in the Technical Update. The South Platte and Metro BRTs also emphasized that, while the Technical Update's planning horizon was the year 2050, **water will be needed beyond 2050 as population continues to grow**.

The 2015 BIP estimated M&I water demands in the South Platte Basin in 2050 and assumed those demands would be met with a combination of existing supplies and new projects (referred to at the time as "IPPs"). A supply gap was forecast in 2050 based on a shortage of projects to meet the full 2050 demand. Projects included planned water supply projects, estimates of yield from agricultural transfers, and growth into existing supplies.

The future yield from projects was adjusted using a "success rate" to account for the uncertainty of the specific projects being fully implemented and delivering the planned yield by 2050. In the base portfolio, a success rate of 88 percent was used for Metro projects; a success rate of 66 percent was used for projects in the rest of the South Platte Basin.

Shortage analysis for the updated South Platte BIP

The municipal water supply shortage analysis was updated based on the results of the Technical Update, the updated list of future water supply projects and strategies, and input from the BRTs. The updated analysis was conducted using the following general steps:

- **Estimate future additional water demands:** Additional future water demands were estimated based on the projected future increase in 2050 M&I demand beyond current levels (as of 2015).
  - Assumed current M&I demands will be met into the future using existing supplies.
  - Assumed that current storage reserves or contingency supplies need to be maintained into the future (i.e., existing supplies will not be used to meet the estimated increase in future demand).
- **Estimate yield from future water supply projects:** Potential yields were estimated from completed, planned, and conceptual projects and other future supplies, such as agricultural transfers and water efficiency practices.
  - Assumed the potential yield of projects may not be fully realized by 2050 and included "realization of yield" factors to adjust estimated yield across the planning scenarios.
- **Perform a shortage analysis:** The estimated yield of projects was compared to the additional 2050 M&I demand in each planning scenario. Shortages were estimated, and strategies for meeting shortages were proposed.

The shortage analysis was conducted using a methodology that parallels the 2015 South Platte BIP. The shortages differ from the M&I gaps presented in Section 5 in that the gaps do not account for yield from potential future projects, assumptions regarding reserves and contingency supplies are not included in the gap calculations, and water savings from conservation are integrated into the gap calculation and are not specifically identified as they are in the shortage analysis.

Future Additional Water Demands:

The Technical Update estimated municipal water demands in 2050 based on the future conditions described in the planning scenarios, which included demand reductions from implementing indoor and outdoor conservation. The reduction in demand from conservation varies among the five planning scenarios.

The planning scenarios assume that municipal water providers and users will pursue conservation strategies that fit the conditions described in each scenario. For the shortage analysis, the amount of water saved through the pursuit of conservation measures in each scenario was estimated and was considered to be a supply strategy to meet future demand. The reduction in demand from conservation in each scenario was calculated as the difference between the 2050 demand assuming current per capita water use along with future climate and population, and the 2050 demand assuming adjusted per capita water use to account for the conservation strategies projected in each planning scenario.

Yield From Future Water Supply Projects and Strategies:

Several water supply strategies were considered for meeting the South Platte Basin's 2050 projected increase in M&I demand. Estimated yields for water supply projects were derived from the updated projects list. The Technical Update results were used to estimate future yield from agricultural water transfers resulting from urbanization of irrigated lands and the purchase of senior water rights used for irrigation.

Yields from each group of strategies were adjusted downward because not all projects will be operating at their full capacity by 2050, they may not be implemented as currently contemplated, and they may not produce the anticipated yield. To account for these considerations, an adjustment factor, or "Realization of Yield," was applied to each category of future project and each planning scenario (see Table 5).

Future water supply strategies:

- **Reductions in future demand from conservation**
- **Completed/Planned projects**
- **Conceptual projects**
- **Agricultural transfers**

Table 5. Summary of Realization of Yield Factors

	REALIZATION OF YIELD LEVEL AND DESCRIPTION				
Type of Project	**Business as Usual**	**Weak Economy**	**Coop. Growth**	**Adaptive Innovation**	**Hot Growth**
Completed: Projects completed since 2015	**50%** of yield has already been realized, but the other **50%** of yield will be available to meet future demands				
Planned: M&I water supply and reuse projects likely to be implemented by 2050	**90%**; projects will almost be fully utilized by 2050.	**80%**; projects are slowed by weak economy and lower demands	**90%**; projects will almost be fully utilized by 2050.	**100%**; projects urgently needed because of high demand for water	**100%**; projects urgently needed because of high demand for water
Conceptual: M&I water supply and reuse projects that might be implemented by 2050	**75%**; projects may evolve and not be fully implemented by 2050	**25%**; projects slowed down due to less funding and demand	**75%**; a portion of project yield could benefit other uses	**75%**; a portion of project yield could benefit other uses	**80%**; projects urgently needed because of high demand for water
Ag Transfers: Urbanization of irrigated lands	**30%**; not all ag water is transferable	**30%**; not all ag water is transferable	**30%**; not all ag water is transferable	**50%**; water providers push to use ag water	**50%**; water providers push to use ag water
Ag Transfers: Senior water right purchases	**50%**; not all ag water purchased by M&I providers used by 2050; ATMs are implemented	**30%**; not all ag water purchased by M&I providers used by 2050 due to low demand and funding	**50%**; not all ag water purchased by M&I providers used by 2050; ATMs are implemented	**50%**; not all ag water purchased by M&I providers used by 2050; ATMs are implemented	**50%**; not all ag water purchased by M&I providers used by 2050; ATMs are implemented

Shortage Analysis:

The South Platte Basin will address the increase in M&I water demand in 2050 through a combination of the completed, planned, conceptual, and agricultural transfer projects described previously and the additional conservation embedded within the Technical Update scenario descriptions. Figure 13 and Table 6 compare the combined yield from all identified projects with the estimated increase in M&I demand in 2050. In this figure, completed/partially utilized and planned projects are combined, and agricultural water sources (urbanization and municipal transfers) are combined. The conservation strategies in each scenario that will reduce future demands is shown as a source of supply because M&I water providers will need to invest resources in current and future water conservation programs to achieve these water savings. In this respect, those programs are similar to proposed infrastructure projects in the other strategy categories.

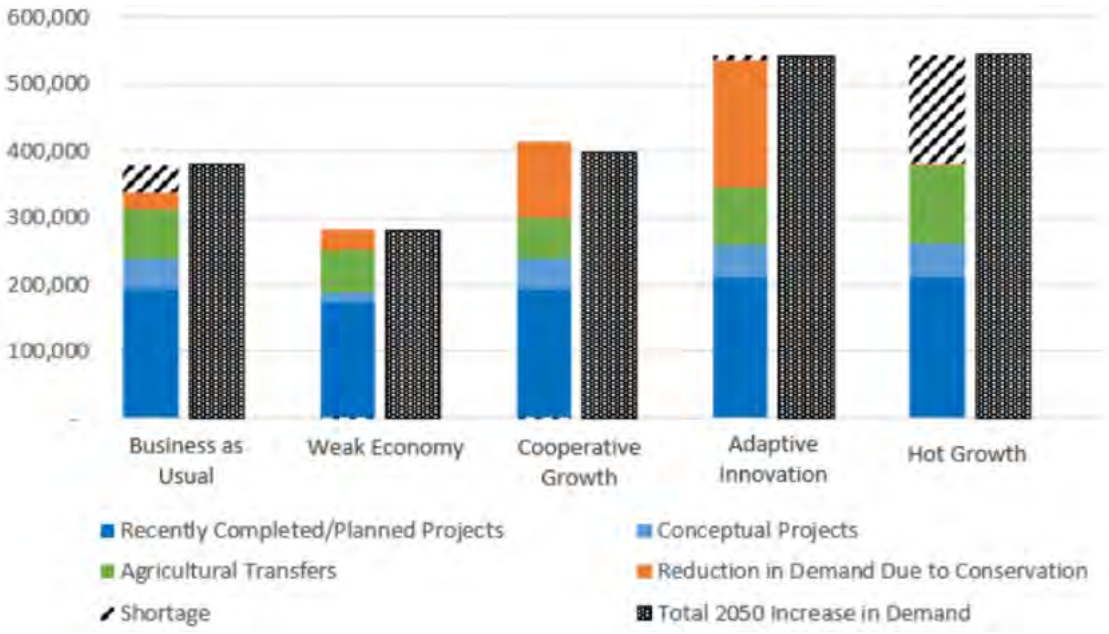


Figure 13. Comparison of Additional 2050 M&I Demands with Yield of Water Supply Strategies

Table 6. Results of Shortage Analysis

		Business as Usual	Weak Economy	Coop. Growth	Adaptive Innovation	Hot Growth
Total 2050 Increase in Demand		380,000	280,000	399,000	542,000	543,000
SUPPLIES	Recently Completed/ Planned Projects	192,000	173,000	192,000	212,000	212,000
	Conceptual Projects	47,000	16,000	47,000	47,000	50,000
	Agricultural Transfers	75,000	63,000	60,000	86,000	117,000
	Reduction in Demand Due to Conservation	25,000	30,000	115,000	191,000	3,000
Shortage		**41,000**	**-**	**-**	**6,000**	**161,000**

While the basinwide shortage analysis suggests that, in some scenarios, water providers have identified water supply strategies that will meet their collective 2050 needs, individual water providers could struggle to find adequate water supplies and may need to rely on strategies like additional agricultural water transfers or more aggressive water conservation to meet their needs.

Several observations can be made regarding the South Platte BRT's vision for meeting future water needs.

- The largest category of future water supply is from projects that are planned and projects that are completed but not fully utilized. Municipal entities have invested considerable resources in identifying and advancing the projects needed to meet a substantial portion of their anticipated water needs in 2050 and beyond. **The South Platte BIP's goal to encourage the implementation of projects underscores the importance of this strategy for meeting future demands.**
- Water conservation practices are projected to be an important strategy for meeting future demands in scenarios that incorporate high levels of conservation (i.e., Cooperative Growth and Adaptive Innovation). One of the more promising strategies for fostering water conservation and managing demand is integrating land use planning with water conservation and efficiency. Communities throughout the West have found that by pursuing aggressive conservation programs like increasing development density, installing climate-appropriate landscapes, and promoting technological advancements, they can continue to grow while reducing and delaying the need for acquiring new supplies.
- While the South Platte BIP has a goal to protect irrigated agriculture, a significant component of future M&I supply is projected to come from agricultural-to-municipal water transfers via various mechanisms, including acquisitions, leases, ATMs, and urban growth over irrigated lands. The specific agricultural supply yield shown in the future underrepresents the full amount of water that will be transferred from agriculture to municipal use because many of the planned and conceptual projects rely on agricultural supply for their yield. In addition, M&I water providers are expected to continue to look to agriculture as a source of supplemental water to improve system resiliency and redundancy beyond the amounts needed to meet their basic demands. ATMs may be a useful way for M&I water providers to access supplemental supplies while preserving some level of irrigated agricultural production.
- Water reuse is an important part of the basin's water supply strategy. Reuse projects are not explicitly highlighted but make up some of the completed/partially utilized, planned, and conceptual projects shown on Figure 13. In the Denver Metro and North Front Range areas, both direct and indirect reuse is being pursued by many water providers that own reusable supplies. Reusable water can be recovered after first use using a variety of mechanisms, including river exchanges, engineered conveyance systems, recycled water plants, and onsite grey water and black water systems. On a basinwide scale, reuse generally does not increase the total supply available in the basin, because additional reuse can in many, but not all cases, reduce supply to downstream water users that have historically diverted the unused, reusable supply. However, on a local level, reuse can increase supply for the water user reusing its return flows. Despite some limitations and challenges, there are many encouraging opportunities to expand water reuse in the basin.

Integrating land and water resource planning fosters conservation

Many communities are turning to demand side management—an approach that seeks to reduce the demand for water. A promising strategy for this is integrating land use planning with water conservation and efficiency.

Several resources are available to promote and guide the integration of water and land use planning. Volume 2, Section 6 of the South Platte BIP provides additional detail.

Reuse will be an important tool

Many municipal and industrial users in the South Platte Basin are using or are pursuing practicable additional use of consumable, reusable return flows. While reuse has limitations, it offers many encouraging opportunities to meet the M&I supply gap.

Volume 2, Section 6 of the South Platte BIP provides additional detail.

In most of the cases, there is a remaining unmet demand for each of the scenarios after the yield from currently identified projects and planned conservation is considered. Current supply strategies are projected to meet 2050 water demands in Weak Economy and Cooperative Growth, but additional supply sources of varying magnitudes are needed to meet 2050 demands in the other scenarios, ranging from 6,000 AFY in Adaptive Innovation to more than 160,000 AFY in Hot Growth. Business as Usual projects that more than 40,000 AFY of additional water supply will be needed by 2050 beyond what has currently been identified.

M&I water providers could engage in a variety of strategies to address the unmet demand. Some of these strategies include:

- Implementing more aggressive conservation measures above and beyond those already included in the planning scenario descriptions, including increasingly aggressive watering restrictions during droughts and more limiting landscape ordinances.
- Developing additional storage opportunities (such as new storage, expanding or reallocating storage in existing reservoirs, restoring existing storage via sediment removal, and protecting storage through multipurpose floodplain and stream channel restoration that reduce sediment loads and enhance habitat), conjunctive use projects, and other strategies to capture excess supplies in wet years and making them available during drought years.
- Pursuing additional agricultural water transfers either through ATMs or acquisitions.
- Implementing additional water reclamation for indirect or direct potable reuse projects that further maximize the benefits of reusable return flows for the M&I sector.
- Working collaboratively with the state of Colorado and entities in other basins to develop water supplies outside of the South Platte Basin for the benefit of the entire state.

The particular mix of these and other strategies to address the unmet demand will vary by water provider and may change over time in response to new technical innovations, regulatory changes, or other factors, such as the technical and social viability of direct potable reuse.

Supplemental water supply strategies could have adverse consequences to the agricultural community, environmental resources, or customer lifestyles and would involve difficult choices to be made by the municipal water providers and basin stakeholders. The South Platte BIP's goals and strategies help navigate these difficult choices and collectively provide a vision for a balanced approach to meeting future water demands. The goals encourage implementing projects, maximizing use of native supplies, and promoting conservation and reuse while protecting the environment and agriculture. The South Platte and Metro BRTs will use their goals as guideposts to encourage balanced and collaborative solutions to meeting future M&I demands.

A balanced approach is needed

Meeting future M&I water demands while minimizing adverse impacts will require a balanced approach. The South Platte BIP's goals provide guideposts for achieving this balance.

Water is needed beyond 2050

While the shortage analysis focused on the year 2050, water demands will continue to grow in the future and additional water supply strategies and projects will be needed. Storage, conservation, and reuse will be important components.

The future is uncertain

The shortage analysis had widely ranging results driven by uncertainty related to demand drivers like population growth and climate change, and also the realization of yield from water supply strategies. Basin stakeholders will need to be adaptive and collaborative to meet the challenges of an uncertain future.

Storage is critical

New storage, whether above or below ground, will be critical for meeting the future water needs of the South Platte Basin.

2 PROTECT IRRIGATED AGRICULTURE

Agriculture in the South Platte and Republican River Basins is an important economic driver in the northeast region of Colorado and for the state as a whole. Total agricultural sales in the South Platte and Republican River Basins totaled more than $5.6 billion in 2017 and represented 75 percent of total agricultural sales in the entire state. Table 7 shows the 2017 market value of agricultural products for counties in the South Platte and Republican River Basins reported in the U.S. Department of Agriculture's Census of Agriculture.

Table 7. Market Value of Agricultural Products Sold in 2017 by County in the South Platte and Republican River Basins

County	Sales	County	Sales
Weld	$2,047,177,000	Lincoln	$67,900,000
Yuma	$918,716,000	Boulder	$43,898,000
Logan	$617,928,000	Elbert	$35,373,000
Morgan	$559,535,000	Arapahoe	$26,695,000
Kit Carson	$474,278,000	Douglas	$18,867,000
Washington	$184,558,000	Jefferson	$9,041,000
Phillips	$174,241,000	Park	$5,107,000
Larimer	$150,717,000	Teller	$1,242,000
Adams	$126,500,000	Broomfield	$613,000
Sedgwick	$93,851,000	Gilpin	$216,000
Cheyenne	$89,226,000	Clear Creek	$174,000

Denver County withheld from reported statistics

Despite agriculture's economic and cultural importance to the South Platte and Republican River Basins, the industry will face future pressures related to urbanization, groundwater sustainability, and "buy-and-dry" transfers of water supplies to municipal use in addition to typical challenges like market volatility, water shortages, pests, and extreme weather.

Future losses of irrigated lands are anticipated. The Technical Update projected between 130,000 and 180,000 acres of irrigated land could be lost in the South Platte River Basin from a combination of urbanization and "buy-and-dry" transfers that are currently being initiated or contemplated. More than 400,000 acres of irrigated land could be lost in the Republican River Basin due to groundwater sustainability issues and compact compliance.

While the Metro and South Platte BRTs acknowledge that a certain amount of agricultural dry-up will be implemented to meet future water demands in the South Platte River Basin and comply with the Republican River Compact, the vision of the roundtables is to protect irrigated agriculture and sustain or enhance the socioeconomic wellbeing of agricultural communities to the maximum extent possible. Goal 5 of the South Platte BIP, "Maintain and Improve Irrigated Agriculture," supports this vision, as do other goals that focus on project implementation, maximizing the use of native supplies, and education.

Protection of Agriculture in the South Platte River Basin

Several strategies can be pursued to protect agriculture in the South Platte River Basin. Many of these were described in the 2015 South Platte BIP and are further described in Volume 2 of the updated South Platte BIP.

It will be critical to protect the South Platte and Republican River Basins' remaining agricultural assets because they will be pressured by loss of irrigated land and water scarcity.

Support Alternative Transfer Methods

Since the early 2000s, the state of Colorado has focused on ATMs as a strategy that provides water for municipal, industrial, and environmental purposes by temporarily using agricultural supplies and compensating irrigators for the use of their water. Dry-year leasing has been the primary means of implementing ATMs, but they could potentially be implemented by rotational fallowing, deficit irrigation, or switching to less consumptive crops (though some of these strategies may be more complicated to legally implement). In addition, conservation easements have recently been implemented to preserve agricultural uses of water but also allow periodic leasing or other water sharing agreements to help meet water supply gaps. The South Platte and Metro BRTs support the implementation of ATMs and efforts by the State to promote and provide financial support through the ATM grant program.

Support Multipurpose Infrastructure Projects that Use Native Supplies and Foster ATMs

Agriculture in the South Platte can also be protected by maximizing the use of native, unappropriated supplies as an alternative to the purchase of senior water rights. Infrastructure such as storage and conveyance facilities are needed to divert and manage native supplies to create firm and reliable yield.

Another strategy for protecting irrigated agriculture is the development of new infrastructure and water supplies for augmenting out-of-priority depletions from irrigation wells. Recharge facilities are increasingly being used in the South Platte River Basin to recharge the underlying alluvial aquifer with augmentation replacement supplies. Typically recharge diversions remove water from the stream system during times when flows are high. In many cases, the aquifer recharge enhances flows in the river at times when flows are low and provides streamflow benefits to environmental and recreational attributes. In addition, recharge facilities can be designed to enhance water fowl habitat, thus providing multiple benefits.

Infrastructure is also needed to implement ATMs on a large scale. If a significant volume of supply were to be generated from ATMs, it would likely come from numerous farms spread over a wide geographic area. Storage and transmission infrastructure are needed to collect and aggregate the ATM supply to facilitate its exchange or conveyance to locations where the supply can be used by municipal water providers.

Multi-purpose infrastructure projects involving municipal, agricultural and environmental water users and stakeholders can help municipalities meet their water needs while helping to protect or enhance agriculture and environmental attributes. The SPROWG concept is a good example of how this could be accomplished. The SPROWG concept seeks to develop storage in three locations along the South Platte River between Denver and the Colorado-Nebraska state line. The concept would primarily use native unappropriated supplies to provide more than 50,000 AFY on average for the Denver Metro area and growing communities along the Front Range in Northern Colorado. In addition to native supplies, the concept could also facilitate the implementation of ATMs on a large scale and provide facilities to better utilize unused but reusable return flows. Some of the supply is contemplated to be used by agriculture, and E&R enhancements have been explored. The South Platte and Metro BRTs supported the investigation of the SPROWG concept, and they support the development and implementation of multi-purpose projects in general.

Use Water More Efficiently in All Sectors

The efficient use of water can help agriculture stretch available supplies and can help delay or prevent the need for cities to purchase senior agricultural water rights. Irrigation efficiency improvements that reduce the nonbeneficial consumption of water can help increase the irrigation supply provided to crops. On the municipal side, increased reuse and conservation as well as a focus on water-wise land use planning can provide a degree of protection to irrigated agriculture, though it can also impact available supplies. If cities along the Front Range conserve and reuse more water and reduce water demands for non-essential turf irrigation, they can prevent or at least delay the need to purchase and transfer senior agricultural water rights; however, increased conservation and reuse can also reduce a portion of return flows that supply downstream irrigators. In other words, increased efficiency in all water use sectors is beneficial, but trade-offs should be recognized and, if possible, mitigated.

The South Platte and Metro Roundtables encourage and promote efficient water use in all sectors as a critical strategy for meeting future water needs.

Protection of Agriculture in the Republican River Basin

The South Platte and Metro BRTs will continue to support the Republican River Basin's compliance program and its largely agricultural economy, which is undergoing dramatic changes in water management as it complies with the requirements of the interstate water compact. Stakeholders in the basin have made great efforts to protect irrigated agriculture:

- The RRWCD was created by the Colorado Legislature in 2004 to foster local involvement in Colorado's efforts to comply with the requirements of the Republican River Compact. The RRWCD has been active in using federal and local funding to provide assistance for retiring irrigated acres as a tool for compact compliance. In addition, the RRWCD constructed the Compact Compliance Pipeline, which conveys water from groundwater wells north of Laird, Colorado, to the North Fork of the Republican River just upstream of the Colorado-Nebraska state line. The water delivered by the pipeline offsets groundwater consumed by irrigation wells and allows continued pumping while maintaining compliance with the compact.
- The Colorado Master Irrigator program is another strategy Republican River Basin irrigators are using to protect agriculture in the basin. The program, which is supported by CWCB funding, is an educational course that equips irrigators with training and tools for increasing water conservation and irrigation efficiency. The course is designed to be collaborative and useful in establishing connections that are long term and beneficial for participants. The objective of the program is to help irrigators find ways to apply less irrigation water while maintaining a profitable farming operation and prolonging the life of the aquifer.

The basin will continue to be challenged with maintaining compact compliance and economic prosperity as the primary natural resource continues to be mined; however, the recent approval of an agreement with Kansas and Nebraska, along with adoption of compact compliance rules, will ensure long-term agricultural viability. The collective efforts of all stakeholders in the basin are needed to meet these challenges to ensure a prolonged agricultural economy.

Secondary Benefits of Irrigation

Irrigation is not only important for agriculture and the rural communities it supports. The network of irrigation infrastructure, crop production, and return flow regime also support E&R attributes in the South Platte River Basin. Protecting irrigated agriculture also helps to maintain the secondary benefits of irrigation to E&R attributes. The South Platte and Metro BRTs conducted a special study during the BIP update to explore the relationship between irrigated agriculture and E&R attributes in the basin. The study is summarized on the following page. Volume 2 of the South Platte BIP includes the full study report.

Environmental and Recreational Benefits of Irrigated Agriculture in the Lower South Platte River Basin

As part of the South Platte BIP update, the South Platte and Metro BRTs funded a special study that focused on the E&R benefits of irrigated agriculture in the Lower South Platte River Basin (study area). The purpose of this study was to research and document potential beneficial interactions among agricultural, environmental, and recreational water uses within the study area with a spatial data analysis and case study review. The study area was defined as the portion of the basin associated with the mainstem of the South Platte River from downstream of Denver to the Nebraska state line.

SPATIAL DATA REVIEW

The purpose of the spatial data review was to collect, review, and document publicly available spatial data related to agricultural, environmental, and recreational water use attributes. Using these data, spatial analyses were completed using ArcGIS to identify locations where datasets of interest overlapped or intersected. The areas of data overlap were potential locations of beneficial interactions among agricultural, environmental, and recreational water uses. Field verification or a direct study is needed to confirm if locations represent beneficial interactions and the extent to which these intersections support one another.

The spatial data review suggested there are substantial locations of beneficial interaction between agricultural and environmental water uses. From these results, it can be assumed that irrigated agricultural lands are an important source of water that supports E&R resources in the Lower South Platte River Basin. It also demonstrates that agricultural lands and environmental resources should be managed collaboratively. Key results from the spatial data review are highlighted below.

Agriculture and E&R beneficial interactions:

- Wetlands supported by irrigated agricultural lands
- Wildlife habitat along irrigation canals, ditches, and ponds
- Bird habitats
- Recreational opportunities like flatwater boating and fishing

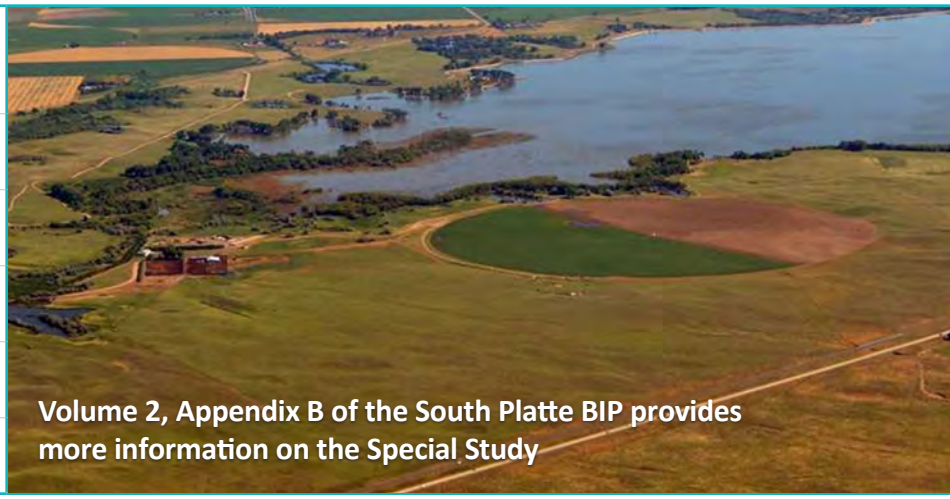
CASE STUDIES

Case studies were collected from the Bird Conservancy of the Rockies, Platte River Recovery Implementation Program, and Ducks Unlimited to further document beneficial interactions among agricultural, environmental, and recreational water uses in the study area. The case studies provide examples of beneficial interactions as well as the mechanisms in which agricultural, environmental, and recreational water uses interact with each other, such as recharge and retiming of South Platte River flows, leasing water, allocating portions of water rights, and conservation easements.

NEXT STEPS

Several additional steps for the analysis were proposed that included field investigations to verify beneficial interactions, evaluate impacts of potential reductions in irrigated lands on interactions, identify locations at risk of losing water, investigate other recreational uses of land in the study area, identify cultural impacts of water uses in the study area, and provide a resource to help inform future projects in the Lower South Platte River Basin.

34%	Basin wetlands (primarily freshwater emergent) potentially supported by the ***irrigated agricultural lands***
26%	Basin wetlands (primarily riverine) potentially supported by ***irrigation canals***
21%	Irrigated agricultural lands that potentially support ***fish habitat***
72%	Basin-irrigated agricultural lands that potentially support ***bird habitat***
64%	Basin-irrigated agricultural lands that potentially support ***reptile habitat***
100%	Basin-irrigated agricultural lands that potentially support ***mammal habitat***



Volume 2, Appendix B of the South Platte BIP provides more information on the Special Study

3 PROTECT AND ENHANCE WATERSHEDS

The South Platte Basin will need to protect and enhance its watersheds and associated E&R attributes while meeting its future M&I water needs and preserving agriculture. Doing so will require collaboration, strategic planning, and successful implementation of projects.

The updated goals, strategies, and measurable outcomes collectively embody the South Platte and Metro BRTs' vision with respect to protecting and enhancing watersheds. The goals reflect a spirit of collaboration, planning, and action (see Goals 6, 7, and 8).

Information on collaborative watershed groups is available via that Colorado Watershed Assembly website (www.coloradowater.org) and the Atlas of Collaborative Conservation in Colorado

- **Collaboration:** The goals point to collaboration by encouraging the holistic consideration of impacts to water quality and watershed health during water project development and implementation. Documentation and information sharing is encouraged regarding successful approaches on tools and strategies, such as on water quality best management practices, stream restoration methods, and stream health assessment methodologies. Collaboration is critical to identifying the best ways to incorporate environmental and/or recreational enhancements to water projects that can enhance the overall health of South Platte Basin watersheds.
- **Strategic Planning:** Successful planning requires a solid understanding of existing conditions and challenges. The goals identify data needs that are foundational to understanding the health of streams and watersheds. With an understanding of existing conditions, planning can be better informed and the results of projects or strategy implementation can be assessed. In addition, the goals support the development of SMPs. These plans are geographically focused, collaborative plans that assess the health of streams and identify strategies and projects that will improve stream health.
- **Action:** The measurable outcomes associated with the South Platte and Metro BRTs' goals identify a wide variety of actions that are supportive of their goals. The South Platte and Metro BRTs also identified numerous watershed-focused projects in their Project Database (see Section 7 for a summary of the database). The vision of the South Platte and Metro BRTs is to encourage and support the implementation of watershed, environmental, and recreational projects through funding assistance, fostering collaboration, and encouraging multipurpose projects.

The South Platte and Metro BRTs identified several high-level opportunities associated with their goals that will help protect and enhance basin watersheds. Opportunities that can help advance their goals and the strategic vision for the South Platte Basin are summarized in Table 8. More detail on these opportunities is provided in Volume 2, Section 6 of the South Platte BIP.

Table 8. Opportunities to Protect and Enhance Watersheds

WATERSHED FUNCTION

FOREST MANAGEMENT: Forest ecosystems provide habitat, recreational opportunities, and water supplies for municipal and agricultural water users. Colorado and the South Platte River Basin have recently experienced significant disturbance of forest ecosystems due to wildfire. Build-up of fuels, insect and disease activity, and dry conditions have driven wildfire risks to forests. Basin stakeholders have initiated wildfire recovery efforts to restore habitat and protect water quality. In addition, stakeholders are conducting proactive forest management studies and activities that reduce wildfire risk and protect watersheds and water supplies on both sides of the Continental Divide.

WATER QUALITY: Clean water is critical to all sectors of water use. Basin stakeholders have pursued innovative watershed health-related projects that provide both water quality and flood control benefits, and they have also conducted numerous regional studies of water quality and management. Water quality is also tied closely to forest health and can be severely impacted in the wake of forest disturbances like wildfires. Many basin stakeholders are proactively integrating water quality considerations into studies and projects.

PROCESS- AND FORM-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 restoration projects benefit streams and protect clean water supplies for municipalities and agriculture. 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, then a form-based restoration approach can be utilized to restore as much of the river's former footprint and functions as possible.

ENVIRONMENT

WATER RIGHTS: ISF water rights and natural lake level water rights[2] can only be held by the CWCB and provide a right for a specific amount of flow within a specified reach or a specified lake level to assist in protecting the environment. The presence of an ISF right in a reach does not guarantee streamflows, however, and does not necessarily translate into adequate protection in the reach.

CHANNEL RESTORATION: Channel restoration projects can benefit both in-stream aquatic habitat and species as well as riparian species and vegetation. Channel restoration projects can also help improve water quality.

STEWARDSHIP PROJECTS: Stewardship projects involving federal/state agencies, landowners, and/or non-governmental entities can establish protections that include areas near stream riparian areas and protect stream attributes for multiple uses.

SPECIES REINTRODUCTION: Native and other beneficial species reintroduction projects allow for species to be reintroduced to habitat areas where their numbers may have declined.

RECREATIONAL

CHANNEL RESTORATION: Channel restoration can benefit recreational uses such as fishing, flatwater boating, rafting, and kayaking.

RECHARGE BASINS: Creation of alluvial recharge basins for agricultural augmentation plans can also provide waterfowl habitat and hunting opportunities.

[2] In 1973, the General Assembly authorized the CWCB to appropriate water rights for instream flows and natural lake levels to preserve the natural environment to a reasonable degree. Since 1973, CWCB has appropriated instream flow water rights on nearly 1,700 stream segments covering more than 9,700 miles of stream, and natural lake level water rights on 480 natural lakes.

4 IMPLEMENT PROJECTS

Implementation of water development and management projects is the primary means by which municipal water providers, E&R advocates, agricultural water users, and industry will meet their future water needs. Implementation of projects ties to and will advance nearly all of the goals and strategies identified in the South Platte BIP. Amplifying the importance of projects, the South Platte and Metro BRTs have identified numerous and varied projects to meet future water needs at a total future cost of nearly $10 billion (an estimate that does not include all identified projects). See Section 7 for a summary of future projects, and Volume 2, Section 7 for additional detail on future projects.

The roundtables have long recognized the importance of supporting and implementing projects. In fact, the 2015 South Platte BIP recognized that implementing planned projects is critical to meeting the future water needs of the basin as well as the state of Colorado. While the 2015 BIP included a focus on implementing M&I projects, it also promoted the implementation of agricultural and E&R projects and encouraged collaborative multi-purpose projects. The same sentiment was expressed during the BIP update process, and a focus on project implementation is embedded in the goals, strategies, and measurable outcomes.

The degree to which projects are successfully implemented relates directly to the risks associated with meeting future M&I, agricultural, and E&R needs. Successful completion of water supply projects is critical to meeting future M&I demands, as demonstrated earlier in this section. Even if all of the identified projects are mostly implemented by 2050, South Platte and Metro water providers will still need to identify additional strategies to meet all of the projected demand. If water supply projects are not successfully implemented, water providers will be further challenged to find other alternatives to meet demands. Agricultural water users and E&R stakeholders are also seeking successful project implementation to help meet their current and future water needs. Without successful implementation of agricultural and E&R projects, risks to food supplies, rural economies, ecosystem health, and recreation will mount.

The 2015 South Platte BIP identified 10 primary challenges to successfully implement solutions to water supply shortages in the basin. These challenges, summarized below, are still important to consider:

Future M&I needs are significant, and meeting them can affect other water use sectors as water is reallocated to meet M&I needs.	Political and social support will be critical to the success of planned supply projects.
Costs for developing additional M&I and agricultural water supplies is continually increasing due to dwindling local supplies and the need for larger, more complex projects.	Temperature increases and changes in precipitation from climate change could significantly increase demand.
Agriculture in the South Platte and Republican River Basins is critical to Colorado's economy and culture, and loss of agricultural water supplies can be detrimental.	Front Range job growth benefits Colorado as a whole, and business and political leaders need to recognize that benefit with respect to buy-in on water supply projects.
Permitting for new water supply projects can be very lengthy and expensive.	Achieving extremely high levels of conservation and reuse requires societal buy-in and policy support beyond the purview of water providers.
E&R attributes should be proactively considered, but a lack of useful environmental data create difficulties in assessing E&R needs or project benefits.	The Interbasin Compact Committee must support implementation of water supply solutions.

Collaboration and communication among diverse stakeholders will help overcome these challenges and implement projects successfully. The South Platte BIP's overarching themes and goals support collaborative approaches, and many basin water users are pursuing innovative projects that will rely on and benefit from collaboration. Examples of projects and water supply strategies that benefit from collaboration include:

The implementation of collaborative, balanced water supply solutions in the South Platte Basin will ultimately benefit all Coloradans.

- Water use efficiency improvements and water-sharing strategies involving conservation, reuse, ATMs and system integration.
- New storage and conveyance systems that are developed and shared among multiple water providers and leverage synergies in their systems and supply water for multiple purposes (M&I, agriculture, environmental and/or recreational).
- Additional focus on opportunities to conjunctively use surface and groundwater supplies to extend use of both the Denver Basin Aquifer system and the foothills/ mountain crystalline rock aquifers, as well as make better use of the South Platte River alluvial system from Denver to the Nebraska state line.
- Early consideration of watershed health and water quality during water supply project development instead of the more traditional approach of defining mitigation strategies after consumptive water supply options are defined.

The South Platte and Metro BRTs support these types of collaborative approaches to identifying balanced solutions to current and future water supply challenges.

Section 7. Future Basin Projects

The BRTs, along with other stakeholders, identified projects that will further progress toward achieving basin goals and meeting future water needs. The list of projects is managed in a database that was initially developed prior to the 2015 BIP and was updated in 2020 during the BIP update. The purpose of the Project Database is to keep a record of the projects considered by the roundtables through the BIP process, both in the past and into the future. Table 9 provides a snapshot summary of the Project Database at the conclusion of the current BIP update process.

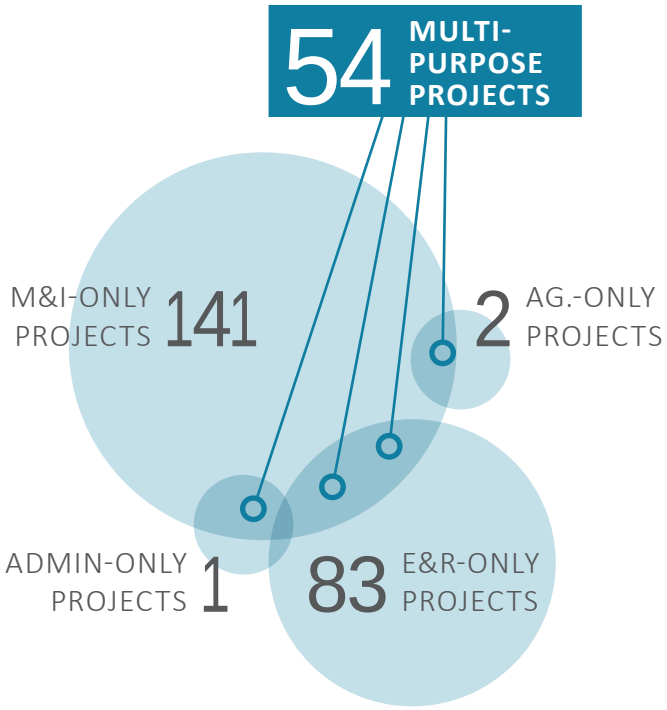
Total estimated costs for project implementation are more than $9.8 Billion

(for projects that have identified a project cost)

Table 9. Snapshot Summary of Basin Projects

Total Projects	282
New projects added in 2020	185
Projects completed	17
Projects being implemented	81
Projects identified as meeting M&I needs	178
Projects identified as meeting Ag needs	44
Projects identified as meeting E&R needs	132
Projects identified as meeting Administrative needs	15
Tier 1 projects	39
Tier 2 projects	53
Tier 3 projects	135
Tier 4 projects	55
TOTAL COST OF ALL PROJECTS	**$9,870,000,000**
PERCENTAGE OF PROJECTS WITH AN ESTIMATED COST	**56%**

Projects that are concepts, planned, or are being implemented were the basis for the above data summary (with the exception of data specifically describing projects completed or being implemented)



Project Tiering and Level of Readiness

A new feature of the Project Database for the BIP update is the assignment of "tiers" to projects (see description of tiers in the graphic). The project tiering exercise is a tool roundtables can use to do a preliminary characterization of their projects and associated project readiness. It facilitates a "first-pass" process and helps standardize data-gathering to allow for project updates and movement through the tiers as they advance toward funding. Project tiering was initially developed as a tool for basin-level WSRF grant approval discussions, where the data fields describing alignment with BIPs, local planning, and criticality are likely to be considered. Note that some of these categories are subjective and were considered differently across basins. Tiering has no bearing on whether a project can be funded. Project proponents can apply for CWCB funding whether or not their project is in the database, and inclusion of a project in the database does not guarantee funding. For the CWCB in the long term, it will be useful for identifying immediate and long-term project costs and associated funding needs. Data fields describing level of readiness, alignment with the Colorado Water Plan, and the amount of available project data will also be considered.

TIER 1	**Supported and Ready** *Ready to launch and has full data set*
TIER 2	**Supported and Pursued** *Almost ready to move forward and has a significant amount of data*
TIER 3	**Supported and Developing** *Project is developing but still needs to be fleshed out*
TIER 4	**Considering** *Project not yet moving forward but should be kept on the list*

Additional information on the Project Database and its content are provided in Volume 2, Section 7 of the South Platte BIP, as well as a description of the tiering process conducted by the South Platte and Metro BRTs.

Section 8. Education and Outreach

The South Platte and Metro Basin Roundtables combine their efforts to carry out Public Education, Participation, and Outreach (PEPO) activities in accordance with a joint Education Action Plan (EAP). The South Platte Basin EAP is updated annually by the PEPO Liaison and approved by the PEPO Committee. The PEPO Liaison has the duty to educate the roundtable and assist the flow of information among the roundtable, the Interbasin Compact Committee (IBCC) and the CWCB. Additionally, the PEPO Liaison coordinates with the basin roundtables to develop potential communications strategies, plans, and programs that support basin outreach and education.

Identifying a clear message is critical to successful implementation of the Education Action Plan

The roundtables provide guidelines for stakeholder engagement. Through the collaborative efforts of roundtable members, a strategy has been developed that reflects a shared vision for the South Platte Basin. Support for identified solutions among all stakeholders will increase if those stakeholders believe they have been engaged in a collaborative process. Broad awareness of the South Platte BIP and the statewide roundtable process will help create a successful and unified plan.

Meetings held over the last several years have led to agreement on a clear message, which focuses on four key elements of the South Platte BIP that support meeting current and future water supply needs in the South Platte Basin:

1. A high success rate of currently planned projects.
2. The ongoing leadership and advancement of conservation and reuse to efficiently use current and future water supplies.
3. The development of ATMs as an alternative to the permanent purchase and dry-up of irrigated agriculture.
4. Collaborative work with the state of Colorado and entities in other basins, including the Colorado and Arkansas Basins, to develop and manage all water supplies for the benefit of the entire state.

The South Platte Basin website houses a variety of tools, best practices, and lessons learned to provide necessary information to foster knowledgeable and productive civic engagement. Programs are being created to promote those four key elements and will be monitored to assess their progress. Key metrics to monitor success will include attendance and participation at events, meetings, and field trips. In addition, website and social media analytics will be enhanced to determine the volume, duration, and areas of interest of visitors to **www.southplattebasin.com**.

The communications strategy identified four categories of stakeholders as potential audiences:

- **Academic**: post-secondary educators and students
- **Agriculture**: trade organizations, conservancy districts, conservation districts, Colorado Foundation for Agriculture, Colorado Ag Water Alliance, and Future Farmers of America
- **Environment and Recreation**: County recreation and open space districts, Ducks Unlimited, Elk Foundation, Trout Unlimited, Pheasants Forever, Poudre Learning Center, and more
- **Roundtables**: members, web presence, CWCB and PEPO Liaison

The Metro and South Platte Basins are home to Northern Water Conservancy District, Denver Water, Aurora Water, and other large water suppliers who have their own outreach efforts that leverage the South Platte BIP and Colorado Water Plan messages.

In the future, the **Metro and South Platte Roundtables will expand on existing communications and outreach programs to improve knowledge and understanding of water challenges and needs for all citizens of the South Platte Basin and how these needs are being addressed by the South Platte BIP.**

The following outreach strategies will be applied:

1. The basin will support and expand communication and outreach activities of the PEPO Workgroup of the Interbasin Compact Committee and the Metro/South Platte Roundtable Education Liaisons.
2. The basin will support participation with the Colorado Statewide Water Education Action Planning process to engage South Platte Basin residents to better understand the South Platte BIP and to take an active role in their communities to make informed decisions about critical water issues.
3. The basin will support implementation of tools developed by Water Education Colorado in their Statewide Water Education Action Planning process, and provide annual updates to the South Platte Education Action Plan consistent with goals and strategies of the BIP.
4. Finally, the basin will continue to develop the network of existing community organizations to increase local awareness of the goals and priorities of the South Platte BIP.

The basin's website provides useful information such as education resources, stories about the basin's water, project reports, and guiding documents.

Visit the site at:

southplattebasin.com

The South Platte and Metro Roundtables seek to educate all citizens of the South Platte River and Republican River Basins (including those historically underrepresented) and foster inclusive participation in roundtable activities and funding opportunities. The roundtables will align with recommendations for equity and inclusion that are developed in the Colorado Water Plan.