



RIO GRANDE BASIN IMPLEMENTATION PLAN

EXECUTIVE SUMMARY

APRIL 2015

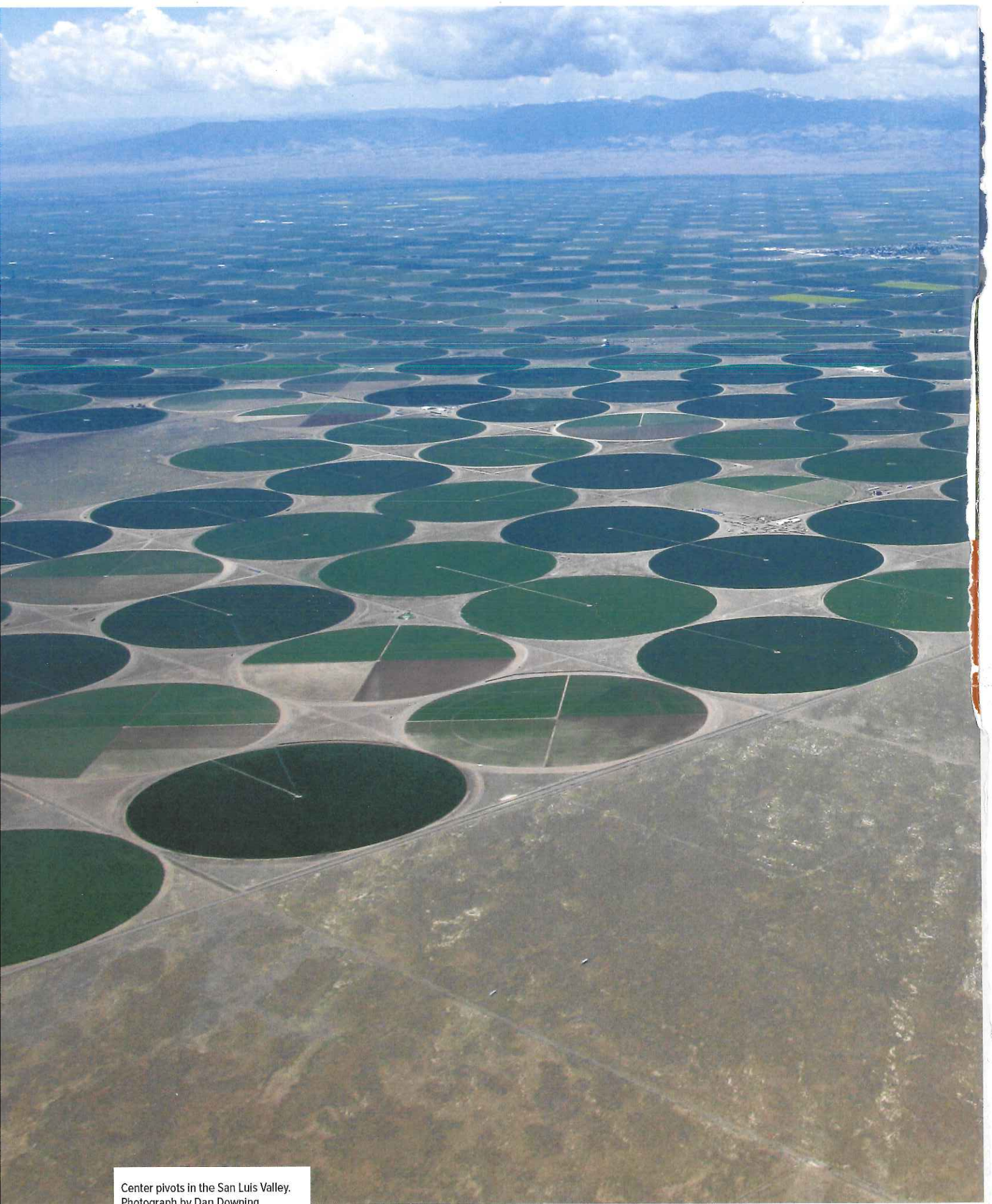


**Rio Grande
Basin Roundtable**



**DiNatale
WATER CONSULTANTS**





Center pivots in the San Luis Valley.
Photograph by Dan Downing

INTRODUCTION

The Rio Grande Basin Implementation Plan (the Plan) was developed in response to Governor John Hickenlooper’s 2013 Executive Order, which launched a Colorado-wide initiative to develop strategies to address the State’s growing water demands. The Rio Grande Basin Roundtable (BRT) is one of nine basin roundtables established by the “Colorado Water for the 21st Century Act.”

The Colorado Water Conservation Board provided guidance to basin roundtables, stating that “the purpose of the Basin Implementation Plans is for each basin roundtable to identify projects and methods to meet basin-specific municipal, industrial, agricultural, environmental, and recreational needs. The Basin Implementation Plans will inform and help drive Colorado’s Water Plan.”

The Plan identifies the critical water issues facing all who live, work, and recreate in the Rio Grande Basin (the Basin) and proposes ways in which those issues can be addressed, thereby advancing the statewide mission to ensure:

- ⦿ A productive economy that supports vibrant and sustainable cities, viable and productive agriculture, and a robust and diverse recreation and tourism industry
- ⦿ Efficient and effective water infrastructure promoting smart land use
- ⦿ A strong environment that includes healthy watersheds, rivers and streams, and wildlife



Fishing on the Rio Grande.
Photo: Rio de la Vista

Working within the Rio Grande Basin's water-related challenges will require cooperation of the entire community.

The Rio Grande Basin has a diverse culture and rich history, which has been shaped by its water resources and shortages. As the community faces complex challenges and an increasingly scarce water supply, managing the use of this essential resource will be key to the future. The Basin's water-related challenges are formidable, including:

- ⊙ Sustained and systemic drought
- ⊙ Significant decline of the groundwater aquifers that sustain agriculture, towns, and critical ecosystems
- ⊙ Landscape-scale wildfires
- ⊙ Forest succession due to diseases and insect outbreaks
- ⊙ Climate change
- ⊙ Dust on snow
- ⊙ Lack of a diverse economy
- ⊙ Degraded and at-risk wildlife habitats
- ⊙ Aquatic-dependent wildlife being considered for or listed as a threatened or endangered species under the Endangered Species Act (ESA)
- ⊙ Rio Grande Compact obligations to downstream states
- ⊙ Costly and time-consuming permitting of water projects
- ⊙ Aging irrigation and municipal water infrastructure

Working within these challenges will require cooperation of the entire community. As part of the Plan development process, the BRT appointed a Steering Committee and five subcommittees — Agricultural, Environmental and Recreational, Municipal and Industrial, Water Administration, and Public Outreach — to reach out and give a voice to the various interests in the Basin, and to carefully weigh all perspectives as the Plan was developed. Through an extensive education and outreach campaign, the BRT engaged the entire community to promote understanding of and receive feedback on the Plan's objectives.

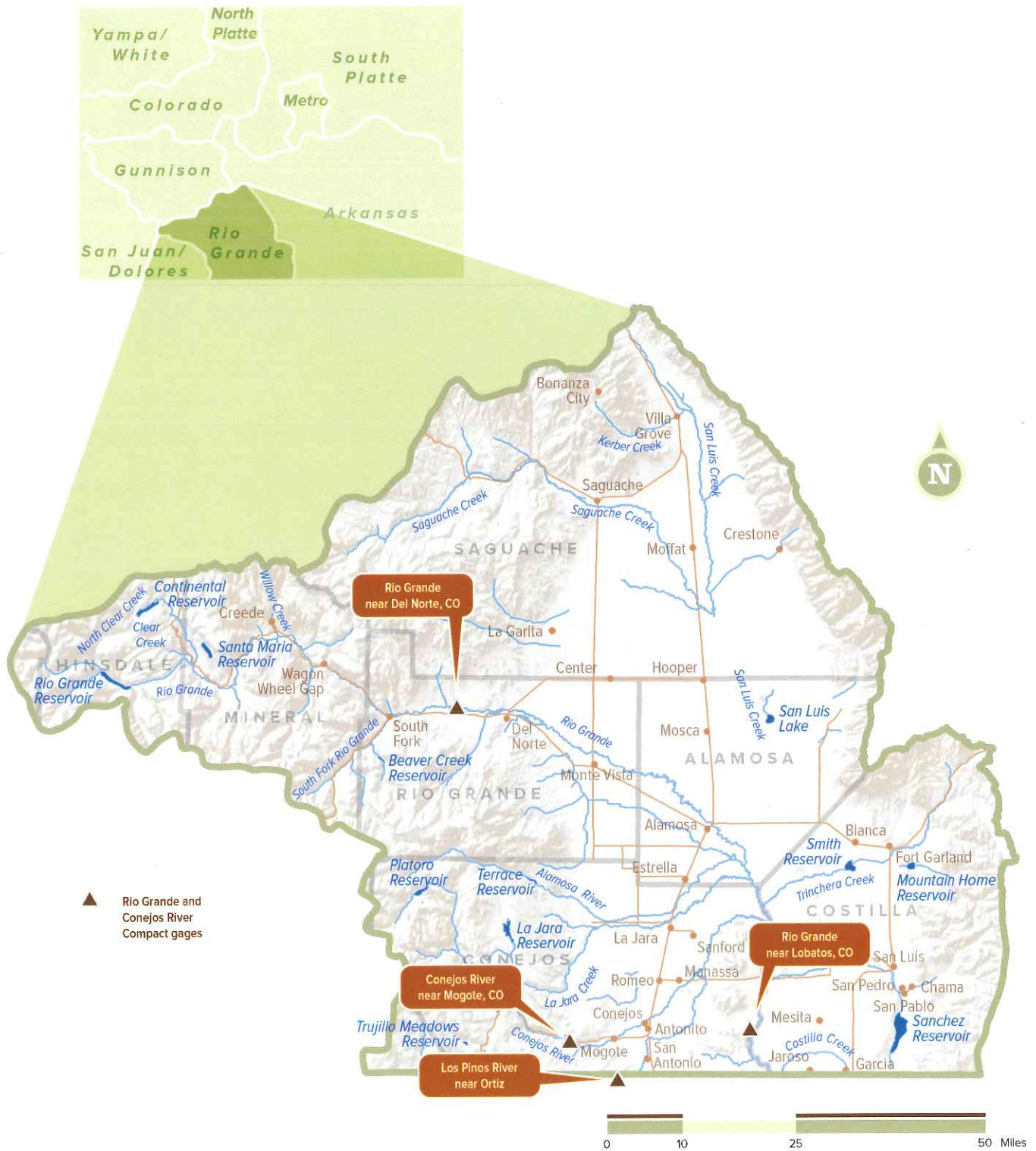
This Executive Summary provides an overview of the major components of the Plan, including Basin water needs, opportunities, and projects and methods that the BRT will support and implement to meet the water resources challenges ahead. The Plan itself provides a discussion of these components and is supported by technical appendices that provide in-depth detail on all aspects of the Plan.



Potato harvest in the San Luis Valley. Photo: Julie Messick

FIGURE 1.

Map of Rio Grande Basin geography.



BASIN OVERVIEW

The upper Rio Grande drainage in south central Colorado encompasses roughly 7.5% of the State's land (approximately 8,000 square miles). Its borders are defined by the Colorado–New Mexico state line on the south, the La Garita range on the north, the San Juan Mountains and Continental Divide on the west, and the Sangre de Cristo and the Culebra mountains on the east.

Snowmelt runoff and, to a lesser extent, summer storms are the main contributors of water supply to the headwaters rivers and streams that flow from the mountains to the broad San Luis Valley (the Valley). With an average elevation of 7,500 feet, the floor of this high mountain valley receives an average of less than eight inches of precipitation per year.

The Rio Grande Compact (the Compact), signed in 1938, requires that a portion of the annual flow in the Rio Grande and Conejos River be delivered to the downstream states of New Mexico and Texas. The amount of water that legally must be conveyed annually is determined using a sliding scale, with increasing delivery requirements as the total flow increases. The Compact impacts Colorado's water users by reducing the water available for consumptive use in the Basin.

In addition to diversions from rivers and streams, water users draw upon two stacked aquifers, known as the “confined” and “unconfined” aquifers. The uppermost aquifer, the unconfined, ranges in thickness from 30 to 100 feet and is recharged by precipitation, streams, canal leakage, and return flows from irrigation. The larger, deeper confined aquifer is separated from the upper aquifer by a series of blue clay and basalt layers, and extends in some locations several thousand feet below the surface.



Artesian well on Dutton Ranch, near Alamosa. Source: Allen Davey



BASIN WATER NEEDS

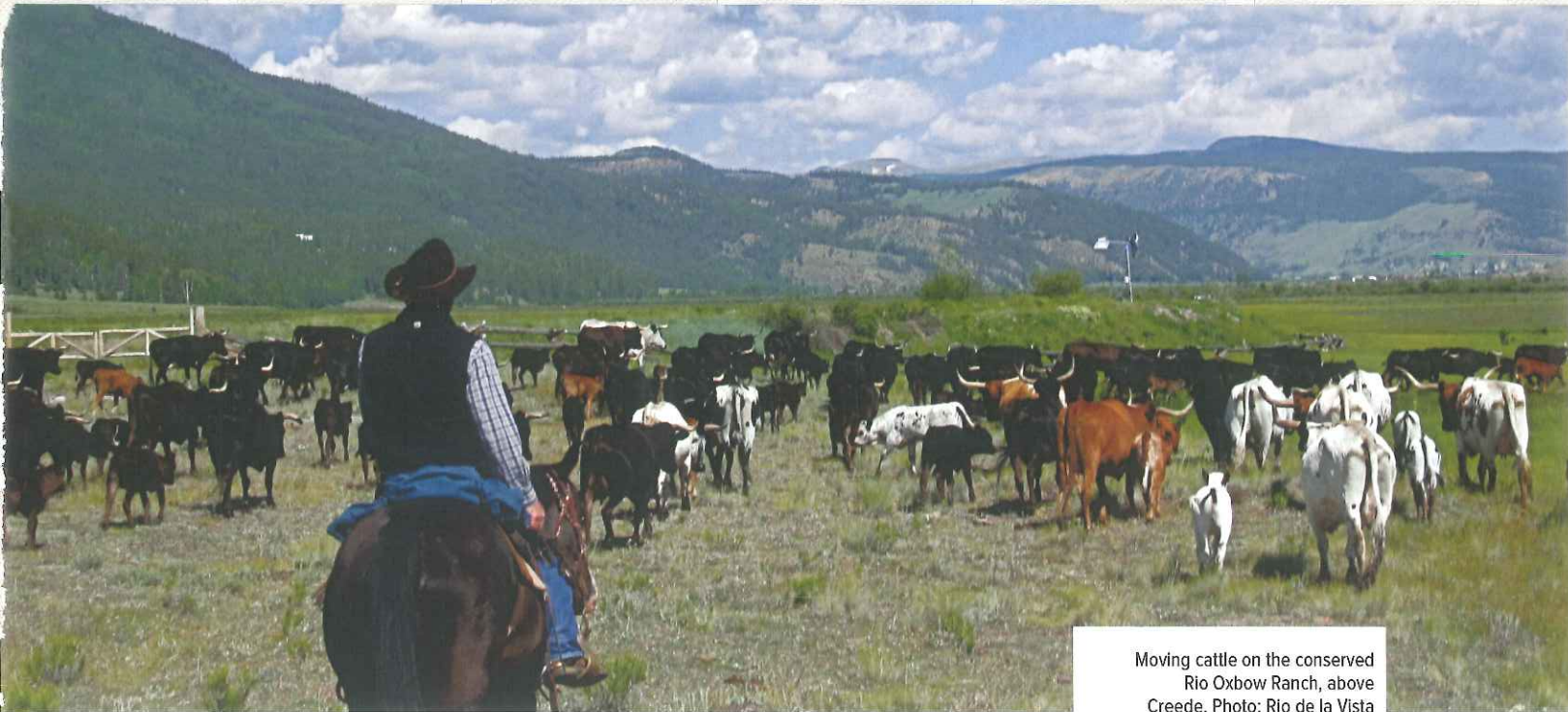
Basin water needs can be categorized into four major sectors: Agricultural, Municipal and Industrial, Environmental and Recreational, and Water Administration.

AGRICULTURAL NEEDS

Basin-wide, there is twice as much public land as there is private land, with most of the streams' headwaters in the Rio Grande National Forest (RGNF). The majority of the land on the Valley floor is privately owned. Development of farmland began in the 1850s, when early Hispanic settlers first began using water for irrigation through acequia systems, such as the San Luis People's Ditch. As the region's population grew due to land development and large-scale irrigation projects, reservoirs and, later, wells were used to supplement the water supply.

Canals, ditches, reservoirs, and wells continue to irrigate farms and ranches. They help to support agriculture, the primary economic driver of the region, with approximately \$325 million of agricultural products sold each year. Crops account for approximately \$285 million of that amount — including alfalfa and grass hay, barley, potatoes, and spring wheat — and livestock contributes another \$40 million. Agriculture is the largest employer, accounting for 18% of all local employment. While nearly 80% of all water is used for agriculture statewide, that percentage is even larger in the Basin, at approximately 99%. A significant portion of the irrigation demand is met through pumping from the aquifers.

During the recent drought years, it has been widely recognized that the current level of agricultural well pumping is unsustainable. Water users in the Valley will be required by law to bring the aquifers to sustainable levels and to comply with the Colorado Division of Water Resources' (DWR) Well Rules and Regulations (the Well Rules and Regulations) for replacement of well pumping depletions. Because of the overall shortfall in water resources for irrigation, it is anticipated that up to 60,000 acres will be taken out of agricultural production in an effort to bring the water used into a sustainable balance with the water supplies.



Moving cattle on the conserved Rio Oxbow Ranch, above Creede. Photo: Rio de la Vista

The Basin's reservoirs are critical to providing water supply for irrigation use and meeting replacement of well pumping depletions in time, place, and amount. Many are in poor condition. Rehabilitation of dams, spillways, and outlet works is necessary to provide water storage capacity as well as to ensure public safety.

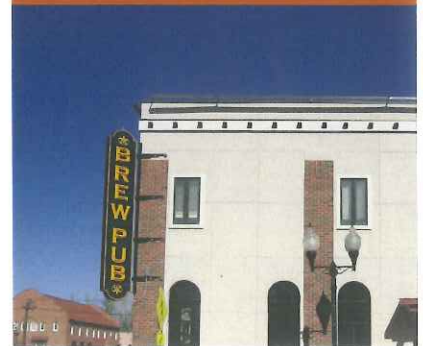
MUNICIPAL AND INDUSTRIAL NEEDS

In the Basin, combined municipal, rural residential, industrial, and commercial water needs are small in proportion to agricultural use. The population, currently estimated at 46,400, is projected to increase to approximately 79,600 by 2050. The water demand associated with this increase in population is not significant compared to the Basin's overall demands.

However, many communities in the Basin have antiquated water treatment and distribution systems. Upgrading and adapting these water systems is essential to ensure safe drinking water supplies and meet the growing municipal and industrial water needs. In addition, implementation of the Well Rules and Regulations will require augmentation of groundwater pumping for all towns in the Basin.

Existing industrial and commercial water demand, primarily from solar photovoltaic facilities and agricultural warehouses, is also relatively small. Future increases in industrial water demand are not considered to be significant.

The population, currently estimated at 46,400, is projected to increase to approximately 79,600 by 2050.



San Luis Valley Brewery in the City of Alamosa. Photo: Emma Regier

ENVIRONMENTAL AND RECREATIONAL NEEDS

The Basin's rivers and streams provide the backbone for the communities, economies, and ecosystems of the Valley. Many of the farms and ranches situated along riparian corridors and ditches rely on surface irrigation and often provide seasonal wildlife habitat by flooding meadows and hay fields. Groundwater irrigators rely on the waterways to provide recharge to the aquifers through streamflows and diversions into recharge zones.

The Basin's thriving tourism industry, much of which is water-dependent, accounts for 11% of employment in the area. The Basin is largely ringed by the Rio Grande National Forest, and large areas of Bureau of Land Management (BLM) lands. In addition, it is home to the Great Sand Dunes National Park and Preserve, the Alamosa, Monte Vista, and Baca national wildlife refuges, and many State Wildlife Areas and other State lands. The Basin's two million acres of public land and associated wilderness areas, wildlife areas and refuges, and Wolf Creek ski area annually attract hundreds of thousands of visitors to the region. Popular recreational activities include angling, hunting, wildlife and bird watching, winter sports, camping, rafting, paddling, and boating activities. All depend on adequate and healthy water resources.

In addition to providing valuable recreation opportunities, the wetland and riparian habitats in the Basin support over 75% of the area's wildlife, including 13 State and federal threatened species, endangered species, and species of special concern, as well as over 160 species of birds. The continued protection and revitalization of riparian areas and wetlands helps to sustain and improve water quality, critical fish and wildlife habitats, groundwater recharge, and floodplain function. These actions ensure the future of threatened or endangered species, such as the Southwestern Willow Flycatcher and the boreal toad, and will help to keep other species, such as the Rio Grande cutthroat trout, Rio Grande sucker, and Rio Grande chub, from becoming listed under the ESA. Prime wildlife habitat that exists on private working agriculture lands can be protected and restored through further implementation of incentive-based programs with willing landowners. The BRT has a long track record of supporting both voluntary conservation easements on working lands through the Rio Grande Headwaters Land Trust's Rio Grande Initiative and river restoration projects through the Rio Grande Headwaters Restoration Project. Historic mining impacts are being addressed with the support of the BRT on the Alamosa River, Willow Creek, and Kerber Creek.

The Basin's rivers and streams provide the backbone for the communities, economies, and ecosystems of the Valley.



Mule deer in the Alamosa Valley.
Photo: Juanjo Sergura

WATER ADMINISTRATION NEEDS

The future water management and administration of both surface and groundwater resources is critical to the long-term viability of the Basin's water resources. Accurate streamflow forecasts are needed for administration of the Compact to minimize over- and under-deliveries to downstream states, predict Compact curtailments, and minimize stream dry ups. Flexible administration and operation of reservoirs that allows for cooperative agreements to be implemented is needed to enhance the ability to store water for Compact, agricultural, municipal and industrial, and environmental and recreational needs, and to provide for retimed releases to meet multiple purposes while protecting downstream water rights. The Rio Grande Cooperative Project, a partnership between the San Luis Valley Irrigation District, Colorado Parks and Wildlife and the Colorado Water Conservation Board is an example of a project that meets these multiple needs.



Winter snowpack on Montezuma Peak in the San Juans.
Photo: Heather Dutton



San Luis People's Ditch, the oldest water right in Colorado.
Photo: Rio de la Vista

BASIN GOALS AND MEASURABLE OUTCOMES

The Basin Plan's Steering Committee and subcommittees identified 14 goals for the Plan. These goals focus on the most important issues confronting the Basin and strive to achieve long-term sustainability in water supplies and uses.

Most of the goals address all four of the need categories identified in the Plan: Agriculture (Ag), Municipal and Industrial (M&I), Environmental and Recreational (Env&Rec), and Water Administration (WAdm).

The goals and associated needs are shown on the next two pages. These goals will be used by the BRT to develop projects and evaluate proposals brought forward for funding.



Steering Committee meeting to go over the Rio Grande Basin Plan. Photo: Heather Dutton

RIO GRANDE

1. Protect, preserve, and/or restore the sustainability of the Rio Grande Basin watersheds by focusing on watershed health and ecosystem function.

Ag M&I Env&Rec WAdm

2. Protect and preserve the doctrine of prior appropriation and vested water rights, and fully utilize Colorado's compact entitlements as specified under the Rio Grande and Costilla Creek compacts.

Ag M&I Env&Rec WAdm

3. Sustain the confined and unconfined aquifers in accordance with Senate Bill 04-222 and operate within the State Engineer's new Rules and Regulations for the San Luis Valley.

Ag M&I Env&Rec WAdm

4. Operate, maintain, rehabilitate, and create necessary infrastructure to meet the Basin's long-term water needs, including storage.

Ag M&I Env&Rec WAdm

5. Manage water use to sustain optimal agricultural economy throughout the Basin's communities.

Ag M&I Env&Rec WAdm

6. Support the development of projects and methods that have multiple benefits for agricultural, municipal and industrial, and environmental and recreational water needs.

Ag M&I Env&Rec WAdm

Heart Lake.
Photo: Heather Dutton

BASIN GOALS

7. Meet new demands for water, to the extent practicable, without impacting existing water rights and compact obligations.

Ag

M&I

Env&Rec

WAdm

8. Establish a long-term education and outreach effort for water use and needs in the San Luis Valley/Rio Grande Basin.

Ag

M&I

Env&Rec

WAdm

9. Make progress toward meeting applicable water quality standards throughout the Basin.

Ag

M&I

Env&Rec

10. Promote water management and administrative practices that are adaptive, flexible, and responsive to optimize multiple benefits.

Ag

M&I

Env&Rec

WAdm

11. Protect, preserve, and enhance terrestrial and aquatic wildlife habitats throughout the Basin.

Env&Rec

12. Conserve, restore, and maintain wetlands and riparian areas for the benefit of a healthy watershed.

Ag

M&I

Env&Rec

13. Work to sustain active river flows throughout the year in cooperation with water users and administrators to restore and sustain ecological function of the rivers and floodplain habitats within the context of existing water rights and compact obligations.

Ag

M&I

Env&Rec

WAdm

14. Maintain and enhance water-dependent recreational activities.

M&I

Env&Rec

WAdm

Southwestern willow flycatcher at McIntire-Simpson BLM property. Photo: BLM



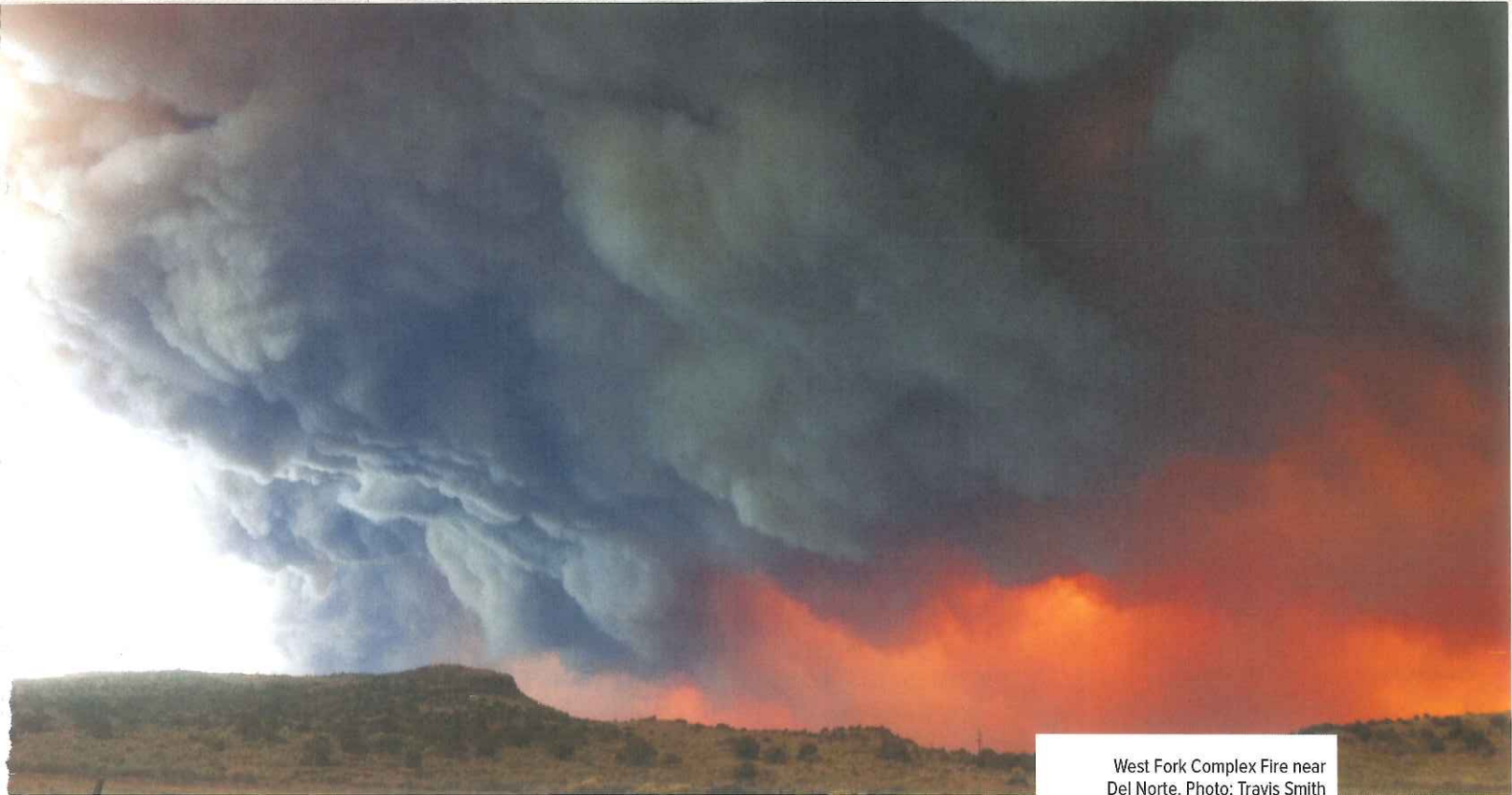
CONSTRAINTS AND CHALLENGES

The Basin will face major challenges with respect to future water management. These are summarized below.

THE RIO GRANDE COMPACT

The State of Colorado, through the Colorado Division of Water Resources (DWR), is charged with administering the mandatory obligations of the Rio Grande Compact. This duty essentially makes Compact flows the number 1 priority water right that is to be satisfied before all other water rights are met. The Division Engineer uses the annual flow forecasts to determine the flow obligation. Overestimation or underestimation of annual streamflow can result in impacts to water rights users and under- or over-delivery of Compact obligations. To meet the Compact obligations, holders of more junior water rights often have to forgo taking their water or are curtailed, reducing their ability to maximize crop production. An irrigation season, usually April 1 to November 1, has been established, and all flows outside of the irrigation season are delivered to the Colorado–New Mexico state line. During the irrigation season, the Division Engineer determines daily curtailment to irrigators in order to meet the remaining Compact obligation. In recent years, the factors affecting hydrology have made flow forecasting exceedingly difficult, resulting in high curtailment of both junior and senior water rights holders during the irrigation season. The consequence of this is the reduction of river flows available for consumption in the Basin, which further increases the demand on groundwater to offset shortages. This has led to depletion of the aquifers and the need to rebalance the water uses to achieve a sustainable water supply.

In recent years, flow forecasting has been exceedingly difficult. This results in less river flows available for consumption in the Basin, and increases the demand on groundwater.



West Fork Complex Fire near Del Norte. Photo: Travis Smith

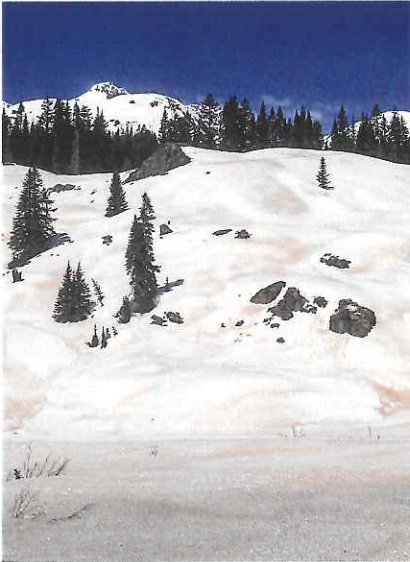
FACTORS AFFECTING HYDROLOGY

Environmental conditions, which impact streamflows, habitat, and the condition of the watershed, are an important component in water management and its implementation in the Basin. These environmental challenges include:

- **Prolonged and Lingering Drought**
An extended drought that began in 2002 and continues into 2015 has resulted in significant reduction in snowpack accumulation and runoff in the Basin and beyond. Manifesting in reduced stream and river flows, this has broad implications for surface water management and use. This trend has also served as a catalyst for erratic wildfire behavior, beetle outbreaks, and dust on snow events.
- **Forest Fires**
Increased intensity and size of wildfires is caused in part by drought conditions and beetle-killed forests.
- **Beetle Kill**
The Colorado-wide epidemic of beetle-killed forests, which has been extensive in the Basin, creates complex factors that affect surface water and groundwater hydrology by altering snow accumulation and infiltration, changing the timing of snow melt, accelerating forest succession, and increasing wildfire intensity.



Beetle kill in the Rio Grande National Forest. Photo: US Forest Service



Dust on snow at the top of Red Mountain Pass. Photo: Steve Vandiver

- **Dust on Snow**
Driven by high winds that transport and deposit dust onto the winter snowpack, the phenomenon known as dust on snow has a measurable effect on the rate at which snow melts. It may cause the peak runoff to occur as much as three weeks earlier than historically has occurred and may decrease annual runoff by as much as 5%.
- **Climate Change**
Climate change studies predict that the southwestern United States, including the Rio Grande headwaters, will experience higher temperatures and reduced precipitation compared to historic levels. This will result in earlier runoff as well as reduced streamflow and water supplies, by an estimated 30% over the next 50–100 years, in the entire Rio Grande Basin. While the implications of climate change are not fully known or understood, the community will continue to monitor this issue and the BRT is seeking ways to prepare for and enhance the Basin’s resiliency in the face of these changes.

AQUIFER SUSTAINABILITY

A severe drought and warmer temperatures have led to declining river flows and earlier snowmelt, causing peak flows to occur much before the greatest need for irrigation. From 2000 to 2014 the flows in the Rio Grande have totaled 1.8 million AF less than the total would have been if the Basin received long-term average flows during the same time period. Reduced surface water supply has meant less available water for surface irrigation and aquifer recharge. The subsequent increase in reliance on groundwater to meet growing season needs has led to depletion of streamflows and significant



Confined well discharge to ditch. Photo: Kelly DiNatale

declines in the unconfined aquifer, which has fallen by as much as 1 million AF since 2002.

Although irrigators pump the greatest percentage of groundwater for agriculture, pumping for municipal, recreation, and environmental uses is important to the Basin. All of the towns in the Basin rely on wells for their municipal supply. Additionally, many State Wildlife Areas and USFWS and BLM Wildlife Refuges utilize wells to create habitat and grow food for local and migrating wildlife. Finally, aquifer levels are important to many surface and subsurface hydrologic features of the Basin, such as the hydrology of the Great Sand Dunes National Park and Preserve, the health of countless wetland complexes, and the ability of producers to harvest hay and graze livestock in historically sub-irrigated pastures.

Basin groundwater users recognized that the “race to the bottom” of the aquifers would result in a tragedy of the commons where all uses would be eliminated if everyone did not work to bring pumping to sustainable levels. From this realization came the idea of self-governance through Groundwater Management Subdistricts, enabled by SB-222, to be formed under the Rio Grande Water Conservation District (RGWCD). Subdistricts are discussed in the methods section.

The Colorado Division of Water Resources identified the need to promulgate Well Rules and Regulations for existing uses of groundwater in the Basin. The rules will meet the requirements of SB-222, including the prevention of injury, providing for sustainable groundwater supplies, and preventing interference with meeting Colorado’s obligation under the Rio Grande Compact. Well rules will require groundwater users to shut off wells, obtain an augmentation plan, or join a Groundwater Management Subdistrict.

The Colorado Division of Water Resources Well Rules and Regulations are intended to prevent injury, provide for sustainable groundwater supplies, and prevent interference with meeting Colorado’s obligation under the Rio Grande Compact.

FUNDING

It is recognized that funding of water projects, both in the Basin and statewide, will continue to be a significant challenge. Regardless, implementation of the projects identified in the Plan is critical. The Basin has a history of positive cooperation in protecting water resources and implementing water-related projects. Multi-purpose projects and public/private partnerships that provide multiple benefits have a strong track record of success and broad-based support for securing funds and achieving implementation. Many Basin entities have succeeded in obtaining such funding as State and federal grants, loans, donations, and in-kind contributions and will continue to seek diverse support for needed projects. The BRT will continue to encourage cooperative projects and diversified funding.

OPPORTUNITIES AND PROJECTS AND METHODS

There are a number of identified water management projects that meet a broad array of existing and future water demands. Most of these efforts build upon cooperative efforts between a variety of stakeholders and interests. Projects identified in the Plan provide an overview of current strategies and how they address needs and the associated challenges. In addition, there are no limits to other potential efforts that may be identified and can address future opportunities.

Rio Grande near Rio Grande Canal headgate. Photo: Arista Hickman



GROUNDWATER MANAGEMENT SUBDISTRICTS

The Well Rules and Regulations will require basin groundwater users to achieve sustainable aquifer levels through three methods: shutting off wells, obtaining augmentation plans, or joining Groundwater Management Subdistricts. Subdistricts sponsored by the RGWCD are a proactive opportunity for groundwater users to work together to reduce groundwater withdrawals, thus avoiding a complete shutdown of wells, which has occurred in other Colorado Basins. Until snowpack and streamflows increase, reductions in pumping will be the primary method of recovering aquifer levels.

Subdistrict No. 1 is currently the only established Subdistrict. It encompasses much of the irrigated acreage in the Closed Basin to the north of the Rio Grande, except for lands along Saguache and San Luis Creeks. The RGWCD estimates that as many as 40,000 acres may need to be removed from irrigated agriculture in Subdistrict 1 alone. Additional acres are anticipated to be removed from irrigation as other areas in the Basin are



Rio Grande Reservoir with
100 years celebration sign.
Photo: Rio de la Vista

required to meet aquifer sustainability requirements through additional groundwater management Subdistricts, which are actively being formed across the Valley. These Subdistricts will continue to be integrated with groundwater administration and provide a key method for addressing aquifer sustainability.

COOPERATIVE PROJECTS WITH BASIN RESERVOIRS

Coordinated operation of reservoirs in the Basin will improve the management of surface water resources. The continued cooperation of reservoir owners to optimize storage and release opportunities will help meet agricultural demands, enhance river flows to meet environmental needs, increase recreational opportunities, provide a reliable supply of augmentation water for agricultural, domestic, and M&I users, and assist in Rio Grande Compact compliance. The coordinated rehabilitation of existing reservoirs is necessary to maintain the safety and long-term viability of these facilities. The Rio Grande Cooperative Project is a breakthrough partnership between

the San Luis Valley Irrigation District, Colorado Parks and Wildlife, and the Colorado Water Conservation Board. It provides for the rehabilitation of Rio Grande and Beaver Creek reservoirs to protect public safety, and new operating strategies in the future to meet multiple needs including agricultural, municipal and industrial, environmental and recreational, and water administration.

IMPROVING STREAMFLOW FORECASTING

Accurate measurement and prediction of streamflow are critically important to Basin water users, particularly for annual Rio Grande Compact administration and daily determination of curtailment on diversions for the Rio Grande and Conejos River. Several projects have been identified for future consideration and implementation that utilize new technology and forecasting science to improve streamflow forecasting. Examples include using mobile or permanent radar to fill in gaps in precipitation measurement and using modeling to determine how forest succession has impacted snow accumulation and streamflows.



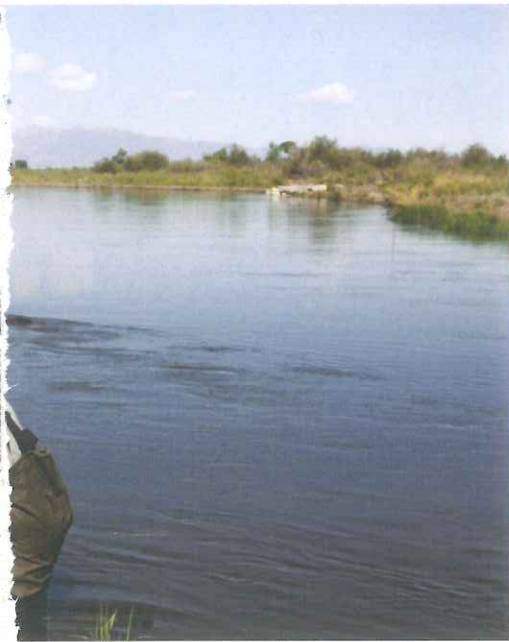
Southwest Conservation Corp members planting willows. Photo: Heather Dutton

WATERSHED HEALTH

The Basin's watershed encompasses forests, rangelands, grasslands, floodplains, wetlands, riparian areas, and farmlands. Currently, these ecotypes are threatened by water scarcity, erosion, insect outbreaks, wildfire and ensuing floods, decreased biodiversity, and drought. The Plan provides strategies to restore and sustain the environmental health of the watershed. Projects target improving forest resiliency, safeguarding water supplies,



Platoro Reservoir in the Conejos Basin. Photo: Richard Stenzel



and protecting public safety by altering stand structure to include multi-aged trees and building fuel breaks to reduce fire risk, taking into account important community values. The Plan also highlights the importance of enhancing soil health throughout the Basin by improving grazing management on rangelands and building organic matter on farms, in order to increase the water holding capacity and resiliency across the entire Basin.

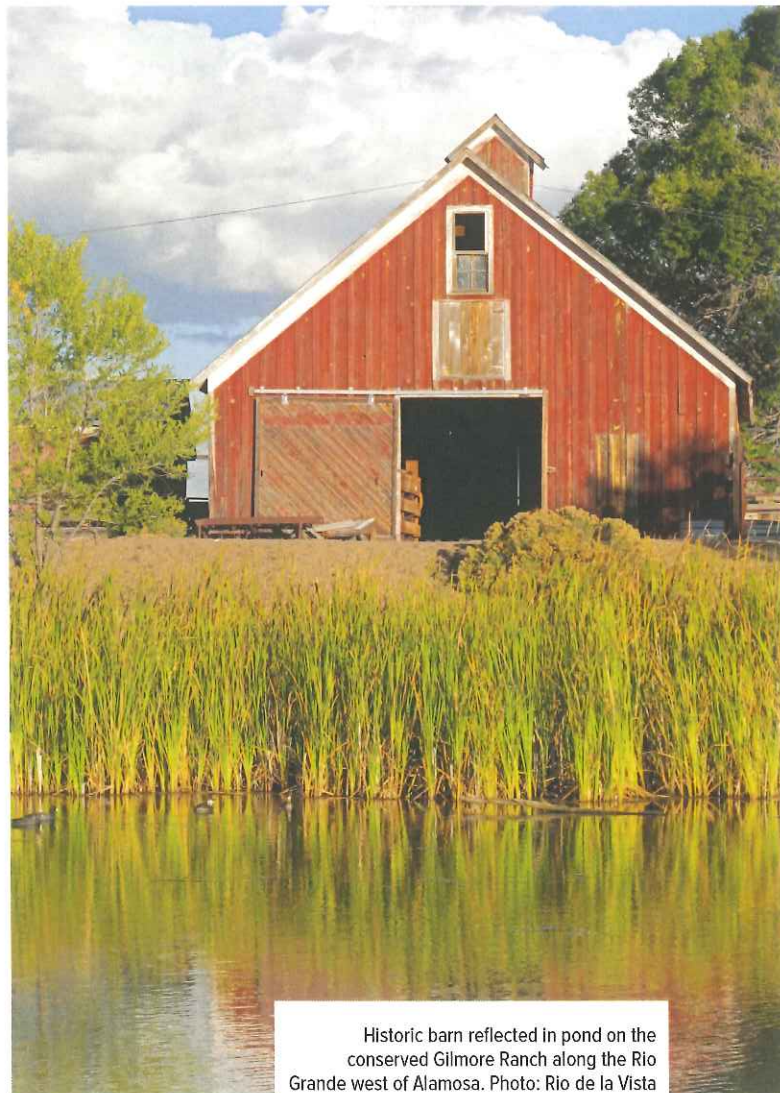
IMPROVING WETLANDS AND RIPARIAN AREAS

The Plan identifies the need for continued protection and rehabilitation of wetlands and riparian areas through stream bank stabilization, vegetation cover and species composition, wetland habitat management, floodplain connectivity, aquatic and riparian habitat, and irrigation infrastructure improvement projects. These types of projects

reduce erosion, improve water quality, enhance fish and wildlife habitat, and restore ecosystem functions, while maintaining and improving agricultural operations. These projects meet multiple objectives with benefits to wildlife, agricultural producers, and recreational users that rely on these systems.

CONSERVATION EASEMENTS

Many landowners across the Valley have voluntarily conserved their private lands through permanent conservation easements, which keep land and water intact on working farms and ranches, and protect critical wildlife habitat. Hundreds of thousands of private land acres have been protected to date and many more valuable projects have been identified for future implementation. These projects are voluntary, incentive-based, and provide multiple benefits including helping to secure water supplies for agriculture, protect wetlands and wildlife habitat, and, in many locations, assist with water administration by keeping water rights and historical water use patterns intact.



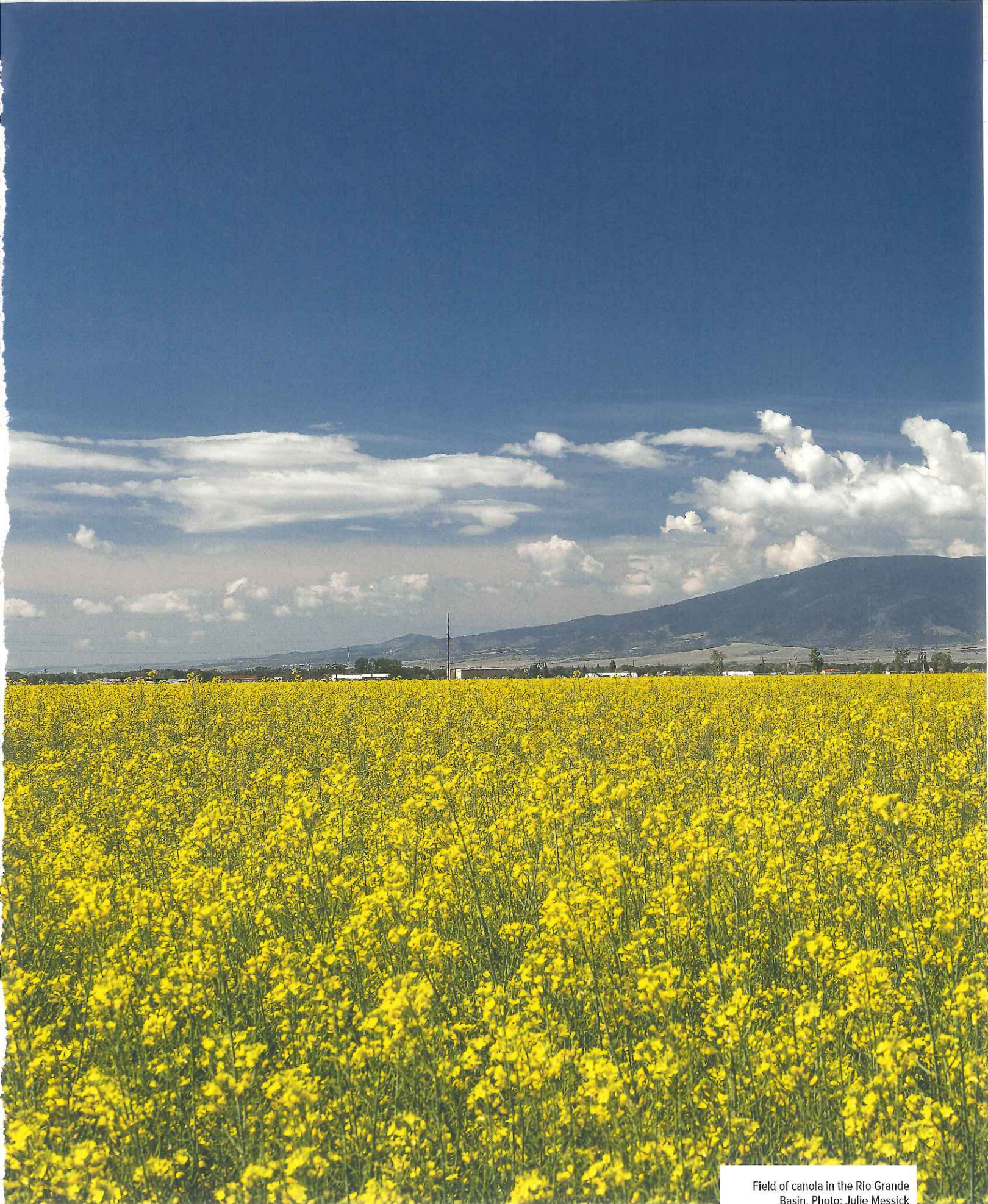
Historic barn reflected in pond on the conserved Gilmore Ranch along the Rio Grande west of Alamosa. Photo: Rio de la Vista

STRATEGIC CROP DEVELOPMENT AND IRRIGATION IMPROVEMENTS

In order to maintain profitable farm operations, some agricultural producers in the Basin have changed the types of crops they grow in response to market conditions. For example, the cultivation of alfalfa and grass hay, which have commanded higher prices during the recent drought, but consume roughly double the amount of water that is required to grow potatoes and barley, has increased over the last 10 years. As the ability to cost effectively pump groundwater decreases in response to sustainability requirements, agricultural producers may consider alternative crops that require less water, rather than drying up significant acres of productive agricultural land. Likewise, farming practices that increase soil health can help reduce water demands in the long term. Other practices that may be considered in the future, such as irrigation scheduling and deficit irrigation — giving crops just enough water to produce a minimal profit — are possible alternative techniques for agricultural producers faced with reduced water supplies. The Plan identifies and supports implementation of these strategies to continue agricultural production with reduced supplies. Failure to do so will result in a greater reduction in irrigated acres and associated agricultural production.

SOIL HEALTH

The potential for enhancing soil health in the Basin is a vital component of improved water management and has a proven track record of providing increased agricultural production, reducing the use of chemicals and irrigation, and increasing the water-holding capacity, organic matter, and beneficial microbes in soils. Likewise, improved grazing management on rangelands can build soil health, thereby enhancing water-holding capacity, stream and aquifer recharge, forage productivity for both livestock and wildlife, and diverse species composition. The Plan encourages public land managers, farmers, and ranchers to implement these practices to sustain the basis of the natural systems they rely upon to maintain their livelihoods and quality of life.



Field of canola in the Rio Grande Basin. Photo: Julie Messick

CONCLUSION: THE WAY FORWARD

Identifying critical challenges and developing clear solutions for managing water resources is a vital step in the Basin's path forward. The ongoing economic prosperity of this unique region, the health of its environment and wildlife habitat, and the development of recreational opportunities for the community all depend upon implementation of the Plan's recommended strategies to protect and optimize the use of the Basin's water.

Benefits from successful implementation of this Plan also extend beyond the Basin. Agriculture in the Basin produces the highest per acre revenue of any basin in the State, while the environmental and recreational attributes are of local, national, and international importance. Financial support from the State of Colorado, federal agencies, and private and public sources will be necessary to implement the action items outlined in the Plan.

As the San Luis Valley communities address the obstacles to protecting and enhancing the Basin's water values, new challenges will arise. For this reason, the Plan is dynamic and will adapt as future opportunities and constraints present themselves. The Plan will be updated periodically as additional information is collected, new focus areas are identified and new issues emerge. The primary goal of the BRT and the Plan is to create a sustainable water future. The actions identified in this Plan for responsible stewardship of the Basin's water resources will help achieve that future and aim to preserve a balance of water uses and needs that will benefit generations to come.

Sandhill cranes flying over the San Luis Valley. Photo: Julie Messick





Barley field at sunset.
Photo: Julie Messick

ACKNOWLEDGMENTS

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The Rio Grande Basin Water Plan was prepared by DiNatale Water Consultants with significant input and assistance from the Rio Grande Basin Roundtable (Mike Gibson, chairperson) and the Basin Plan Steering Committee and Basin Plan subcommittees. The Steering Committee members, who also served on Subcommittees and many who were active participants in drafting and editing this Water Plan, are: Mike Gibson, Rick Basagoitia, Ron Brink, Nathan Coombs, Rio de la Vista, Heather Dutton, Eugene Jacquez, Nicole Langley, Judy Lopez, Cindy Medina, Emma Regier, Travis Smith, Charlie Spielman, Kevin Terry and Steve Vandiver.

Graphic Design: Jeremy Carlson

Front Cover Photos, from top:

Top: Confluence of the Rio Grande and Conejos River on the Cross Arrow Ranch. Photo: John Fielder

Rio Grande Cutthroat Trout.
Illustration © JR Tomelleri

Farmer irrigating via acequia system.
Photo: The Acequia Institute

Back Cover Photo:

Confluence of the Conejos River (right) with the Rio Grande (left) east of La Jara, Colorado, looking south.
Photo © Adriel Heisey
www.adrielheisey.com

Map of the Rio Grande Basin wrapping front and back: Jeremy Carlson



Rio Grande Basin Roundtable



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