

# COLORADO'S WATER PLAN

## EXECUTIVE SUMMARY

### **People love Colorado.**

Our iconic mountains, rivers, minerals, plains, communities, forests, snow, wildlife, and wilderness have drawn people by the millions to our centennial state. Our population has ballooned from 1 million in 1930 to over 5 million today, and could nearly double by 2050. Sustaining this growth requires water. While we grow at this pace, how do we preserve what we love about our state?

### **Colorado's Water Plan has answers.**

This plan is a roadmap that leads to a productive economy, vibrant and sustainable cities, productive agriculture, a strong environment, and a robust recreation industry. It sets forth the measurable objectives, goals, and actions by which Colorado will address its projected future water needs and measure its progress—all built on our shared values. Just as it was created, this plan will be implemented by working collaboratively with the basin roundtables, local governments, water providers, other stakeholders, and the general public. It includes a set of policies and actions that all Coloradans and their elected officials can support and help implement.

Meeting by the hundreds in small-town community centers and big-city water utilities, Coloradans have undertaken the largest civic engagement process in our state's history. We have faced our water challenges head-on and focused on solutions. Just as our forbearers created sound and functional water law and policy, we now take up the torch of innovation as a headwaters state ready to again lead the way on water.

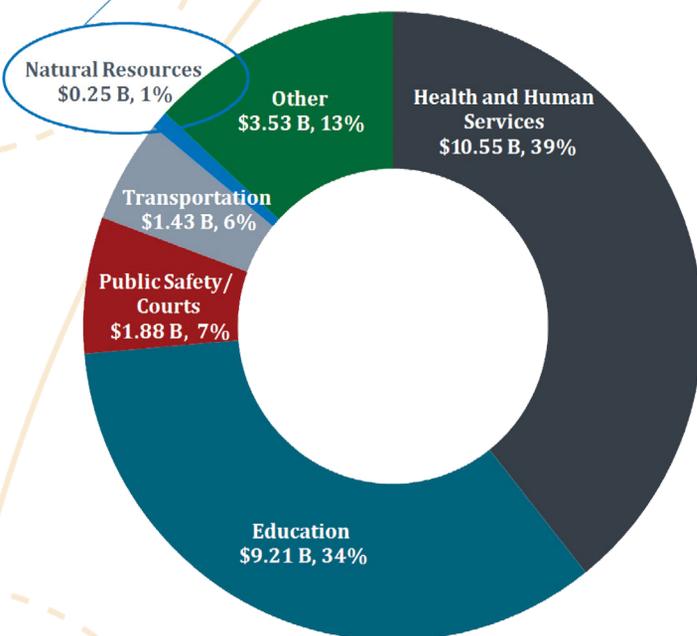
# Introduction: Collaborating on Colorado's Water Future

**N**ever before has Colorado experienced this type of momentum regarding water issues. We are galvanized by our challenges: drought, wildfire, flooding, climate change, and unprecedented growth. And we are energized by our capability: hundreds of meetings, thousands of participants, tens of thousands of comments, and the political will of our Governor and our General Assembly. If we are wise stewards of our water resources, Colorado has enough water to meet our state's future needs. The following are actions we can, and will, take immediately:

- ❖ The State will safeguard Colorado's water by proactively protecting our interstate water interests. We will also continue to apply and strengthen the doctrine of prior appropriation. This requires us to recognize that water rights are property rights whose owners are free to respond to the economics of the marketplace and to continue to work within our local control structure. Moreover, we strengthen the doctrine of prior appropriation when we evaluate and improve upon the water law and policy we have built on its foundation.
- ❖ The State will continue to stress that every water conversation begins with conservation and must include water storage. When we lower demand (conservation) and increase supply (storage), we close the supply-demand gap.
- ❖ The State will investigate options to raise additional revenue to support implementation of this plan. Only one-tenth of 1 percent of the state's budget goes toward natural resources, including loans for water projects. While we estimate \$20 billion in financial need in the areas of water supply, water infrastructure, recreation, and the environment over the next 30 years, water providers have plans in place to meet much of this need. Because our water is too important to fail, the State will continue to work with water users and stakeholders to ensure financing options are available for water projects.

**FIGURE ES-1** 2015 COLORADO STATE BUDGET

Water gets a portion of this; mostly in loans



- ❖ The State will examine and use its water-rights portfolio to ensure alignment with Colorado’s water values. State agencies will coordinate their uses of water to achieve multiple benefits, including environmental flows, irrigation important to wildlife habitat, and compact compliance. Like the Rio Grande Cooperative Project and the Animas-La Plata Project, the State will encourage projects that enhance the environment, provide recreation, increase supplies, and meet compact compliance. Like the Chatfield Reallocation Project, the State will continue to pursue and support projects that can creatively move water through various uses and through shared facilities.
- ❖ The State will increase efficiency and effectiveness in water project permitting while properly mitigating negative environmental impacts. It will achieve this by front-loading the State’s role in the permitting process and establishing a path to State support of water projects without being pre-decisional.
- ❖ The State will continue to strengthen water outreach, education, and public engagement to equip Coloradans with the necessary information to make informed water choices. Colorado’s Water Plan has generated momentum on Colorado water as a worthy statewide issue: Over 30,000 comments from across the state, and input from over 150 diverse entities, helped shape the plan. We will leverage this momentum to both educate a wider band of our population on water and tap Coloradans for good ideas and discussion.

This is the beginning of the next phase in Colorado water policy, where collaboration and innovation come together with hard work to meet and implement the objectives, goals, and actions set forth in Colorado’s Water Plan. The CWCB will continue the dialogue moving forward, and will strive for transparency along the way—this document lays the foundation for this discussion. The chapters of the plan consist of the following content:

**Chapter 1** provides background on how we got to where we are today and explains the need for Colorado’s Water Plan.

**Chapters 2 through 5** focus on the foundational elements that guide Colorado’s water management; our strategies and actions will build upon those elements going forward. Core elements include descriptions of Colorado’s legal structure and critical facts about supply and demand.

**Chapters 6 through 9** discuss the dynamic strategy we need to put into place to meet Colorado’s future water needs, including goals and actions. Chapters 6 through 8 focus on ways in which we can meet our water needs and prepare for an uncertain future.

**Chapter 9** addresses increased funding opportunities, more efficient and effective permitting, and enhanced education for citizens.

**Chapters 10 and 11** further detail strategies and recommendations for implementation as well as future updates to the plan.

Colorado’s Water Plan discusses values, objectives, goals, and actions throughout. These are defined as follows:

**TABLE ES-1** KEY TERMS AND DEFINITIONS

Terms	Definitions
<b>Value</b>	An overarching tenet that guides how Colorado’s Water Plan will work to shape Colorado’s water future.
<b>Measurable Objective</b>	A result or benchmark expected to be achieved from the implementation of Colorado’s Water Plan.
<b>Goal</b>	A purpose toward which Colorado’s Water Plan is directed.
<b>Action</b>	A necessary step to achieve the measurable objectives and goals, and ultimately to maintain Colorado’s water values.

# Colorado Water Law & Our Basins

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The legal and institutional system that governs the use and allocation of water in Colorado has three foundational elements: interstate compacts and equitable apportionment decrees, Colorado water law, and local control. Colorado's Water Plan is premised on these elements.

At the headwaters of the Continental Divide, all of Colorado's major rivers flow downstream to eighteen states and Mexico. As Colorado and its downstream neighbors developed over time, disputes arose among states over the allocation of interstate stream waters. Following early U.S. Supreme Court litigation, Colorado negotiated nine formal agreements with downstream states. These interstate water compacts are federal law, state law, and legally binding contracts among the signatory states.

Colorado water law, rooted in the doctrine of prior appropriation, commands widespread respect—not because of its longevity (older water law exists), or its rigidity (it has undergone significant change over the years), and certainly not due to its clarity. Our water law is respected because it works. First, it stipulates that water rights are property rights that can be bought and sold by willing parties and that can be transferred to new users. Second, it provides certainty among competing water uses by telling us which rights have priority. Third, it has accommodated Colorado values as they developed over time: when our mining and agricultural economies grew, when our municipalities on both sides of the Continental Divide grew, when we recognized the connection between groundwater and surface water, when we recognized the need for water for the environment, when we experienced energy booms and busts, and now, when growing demands for water threaten to eclipse diminishing supplies.

A network of water providers, public utilities, ditch and reservoir companies, individual water rights owners, and special districts deliver Colorado's water. Each river basin in Colorado faces unique challenges that demand custom solutions. So, who better than local water users and stakeholders to tackle these challenges? Municipal, county, and district officials make day-to-day decisions about topics ranging from water to emergency response. Colorado's Water Plan recognizes this structure as an asset—and local control allows us to effectively respond to our water challenges. Communities in each of eight basins developed regional plans, called Basin Implementation Plans, which now allow a comprehensive view of water statewide. But this approach also requires heightened collaboration among state and local entities on water issues. To this end, the CWCB has engaged the Colorado Municipal League, Colorado Counties, Inc., and the Special District Association of Colorado to embark on a new era of collaboration between state and local government on water and land use issues.





# Supply & Demand

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**S**eventy to 80 percent of Colorado's water falls west of the Continental Divide, while 80 to 90 percent of our population resides east of it. Twenty-four tunnels and ditches move an annual average of 500,000 acre-feet from the western slope to the eastern slope. Our average precipitation yields 14 million acre-feet of water annually in Colorado.

Over 5 million acre-feet of water is consumed annually through agriculture, municipal, industrial uses—though we've reduced our consumption in certain areas by 20 percent since the 2002 drought. States downstream of us are legally entitled to water as determined by our nine interstate compacts and two equitable apportionment decrees from the U.S. Supreme Court.

Since projections suggest wide variability in future precipitation,<sup>1</sup> Colorado faces the possibility of a significant water supply shortfall within the next few decades, even with aggressive conservation and new water projects.<sup>2</sup> Our legal and physical constraints open a gap between projected supply and demand in each basin. Colorado's Water Plan sets an objective to close this gap by 2030, while also addressing the effects of a changing climate on our water resources.

4+5



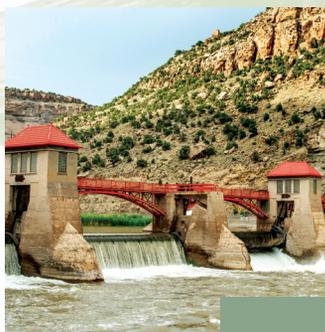


# Managing Our Water

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**C**hapters 6 and 7 establish action steps to help Colorado respond to its water challenges. These chapters delineate ways in which Colorado can advance conservation, reuse, alternative agricultural transfers, and multipurpose and collaborative projects while protecting the health of rivers, streams, and watersheds.

Chapter 6 opens with scenario planning, which provides the framework for how Colorado will address its water future, no matter what water supply and demand challenges we may face. Scenario planning also indicates what Colorado needs to first accomplish in the short term, and the rest of Chapter 6 explores specific approaches to meet our water needs. Chapter 7 examines factors beyond supply and demand—such as natural hazards, watershed health, and water quality—that affect water availability.





# The Colorado Way Forward

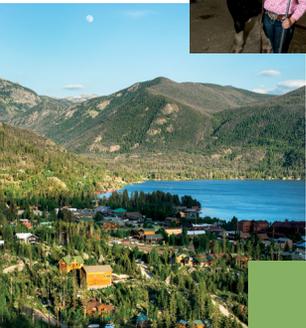
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**C**olorado's Water Plan focuses on collaboration. The basin roundtables not only provide grassroots insight into each river basin's challenges and solutions, but are a mechanism to resolve conflicts between basins. *Why does it matter if we get along?* Because our water challenges are great and demand our united focus. Because other governments watch Colorado's water positions closely. Because discordant infighting weakens Colorado's position in interstate and international arenas, invites unnecessary federal intervention in our water affairs, and dulls our responsiveness. It's undeniable: our water challenges necessitate that we pull together as one, innovate, and become more agile.

Fortunately, we are positioned to be better collaborators as a result of a recent paradigm shift in Colorado water. Indeed, this shift helped galvanize Colorado's Water Plan. Over the past decade, historically adversarial views have shifted toward: [1] the benefits of collaborating on win-win projects that benefit all parties; [2] putting money to work solving problems instead of escalating litigation; and [3] capitalizing on the regional connections that tie Colorado together economically and hydrologically—instead of ignoring those connections.

Colorado's Water Plan recognizes the historic nature of eastern slope-western slope relations. Never before has Colorado's footing been as firm on the issue of transmountain water as it is right now, as a result of this effort. Despite differences of opinion, the IBCC, basin roundtables, the CWCB directors, and numerous county commissioners reached consensus to support a conceptual framework, which sets out the fundamental principles the parties to a new transmountain diversion should expect to address. It presents seven principles to guide future negotiations between end users and basin-of-origin communities in the contemplation of any new transmountain diversion. The IBCC's diverse stakeholders thoroughly explored the difficult issues that would surround any new transmountain diversion. The CWCB will ensure that this conceptual framework is implemented by playing an active role in brokering agreements among parties on transmountain water. In this role, the State will promote eastern slope-western slope cooperation as well as consideration of interstate compacts in any transmountain diversion discussions.

This level of collaboration has already helped solve some of the most intractable issues in Colorado. Colorado's Water Plan aims to continue this practice to solve a growing funding need, a broken permitting system, and real risks in the Colorado River system. Education and outreach will be critical to ensuring that we understand the water challenges across Colorado, and that we are prepared to work together to find innovative solutions to address those challenges.





# Measurable Objectives, Actions, and Future Updates

**C**olorado's Water Plan is not the end of our story; rather, it marks the beginning of a new chapter in Colorado water. Implementing this plan, and meeting its goals and objectives, will require Colorado innovation and hard work. Rather than guess about the direction of our state's water policy, we now have measurable objectives to achieve, and we can monitor our progress on these objectives in real time.

Chapter 10, which summarizes the objectives, goals, and actions in Chapters 6 through 9, focuses on the actions that are most critical to implementing Colorado's Water Plan in the near term. Chapter 11 confirms that the plan is a living document that will require updates on an ongoing basis. Additionally, the CWCB will monitor our progress and report to the governor and the Colorado General Assembly annually. Together, these chapters will help ensure that Colorado is responsive in addressing its immediate water challenges and is prepared to adapt to changing conditions. The measurable objectives on which we will gauge our progress and success are outlined on the following pages.

The children of several of the authors of Colorado's Water Plan, standing together at Clear Creek in Golden. They represent the importance of planning for a sustainable water future: Gizachew Mitchell, Taye Mitchell holding Emma Bornstein, Saba Mitchell holding Wrenna McIntire, Forest Eklund, Aidan Reidy, Maeve Reidy, Sierra Mitchell holding Clay McIntire, and Rowan Eklund.





“Failure is not an option.”

—Gene Kranz, Apollo Mission Flight Director

## Supply-Demand Gap

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*Colorado's Water Plan sets a measurable objective of reducing the projected 2050 municipal and industrial gap from as much as 560,000 acre-feet to zero acre-feet by 2030.*

The success of Colorado's Water Plan will ultimately be measured by whether or not the municipal water supply-and-demand gap is closed, and the choices we make to close it. With increased efforts on conservation, storage, land use, alternative transfer methods, and reuse, Colorado can close its gap, balance its water values, and address the effects of climate change on water resources.

## Conservation

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*Colorado's Water Plan sets a measurable objective to achieve 400,000 acre-feet of municipal and industrial water conservation by 2050.*

Colorado must address projected gaps between future water needs and available water provisions from both the supply side and the demand side. Every acre-foot of conserved water used to meet new demands is an acre-foot of water that does not need to come from other existing uses.

## Land Use

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*Colorado's Water Plan sets a measurable objective that by 2025, 75 percent of Coloradans will live in communities that have incorporated water-saving actions into land-use planning.*

In order to reduce the amount of water needed for future generations of Coloradans and keep urban-adjacent agricultural lands in production, Colorado must support the growth of the next 5 million residents more strategically than the last 5 million. Colorado's Water Plan calls for a partnership among local water providers and Colorado's communities. This partnership aims to incorporate water-saving actions into local land-use planning. The CWCB will work with the Department of Local Affairs, local governments, water providers, Colorado Counties Inc., Colorado Municipal League, the Special District Association, councils of governments, and homebuilders (Colorado Association of Homebuilders) to examine and strengthen the tools they collectively possess to help Colorado reach this objective.

# Agriculture

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*Colorado's Water Plan sets an objective that agricultural economic productivity will keep pace with growing state, national, and global needs, even if some acres go out of production.*

To achieve this objective, the State will work closely with the agricultural community, in the same collaborative manner that has produced agricultural transfer pilot projects, to share at least 50,000 acre-feet of agricultural water using voluntary alternative transfer methods by 2030.

Without a water plan, Colorado could lose up to 700,000 more acres of irrigated agricultural lands—that equals 20 percent of irrigated agricultural lands statewide and nearly 35 percent in Colorado's most productive basin, the South Platte. While the right to buy or sell water rights must not be infringed upon, Colorado's Water Plan describes market-competitive options to typical "buy-and-dry" transactions. Such alternative transfer methods can keep agriculturally dependent communities whole and continue agricultural production in most years, and if such arrangements can be made more permanent in nature, they will provide certainty to both municipal water providers and agricultural producers. Options include lease-fallowing agreements, deficit irrigation, water banking, interruptible supply agreements, rotational fallowing, water conservation programs, and water cooperatives. The State will encourage innovation and creativity by agricultural producers and research institutions to maximize the productivity of every drop of water.

# Storage

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*Colorado's Water Plan sets a measurable objective of attaining 400,000 acre-feet of water storage in order to manage and share conserved water and the yield of IPPs by 2050. This objective equates to an 80 percent success rate for these planned projects.*

As the state conserves, Colorado must also develop additional storage to meet growing needs and face the changing climate. Tomorrow's storage projects will increase the capacity of existing reservoirs, address a diverse set of needs, and involve more partners. New storage projects will be increasingly innovative, and will rely on technologies such as aquifer storage and recharge. In addition, water managers will need to be more agile in responding to changing conditions, so that storage can be more rapidly added to Colorado's water portfolio while maintaining strong environmental health. To do this, we must address a broken permitting system that currently produces uncertainty and fosters mistrust among all stakeholders.

## Watershed Health, Environment, and Recreation

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*Colorado's Water Plan sets a measurable objective to cover 80 percent of the locally prioritized lists of rivers with stream management plans, and 80 percent of critical watersheds with watershed protection plans, all by 2030.*

The environment and recreation are too critical to Colorado's brand not to have robust objectives; a strong Colorado environment is critical to the economy and way of life. In addition, the WQCC identified a strategic water quality objective to have fully supported classified uses—which may include drinking water, agriculture, recreation, aquatic life, and wetlands—of all of Colorado's waters by 2050. These plans will address a variety of concerns, including pre- and post-fire mitigation, forest mortality, water quality impairments, potential impacts of legacy mines, flood mitigation and recovery, aquatic and riparian habitat enhancement, and land use change.

## Funding

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*Colorado's Water Plan sets an objective to sustainably fund its implementation. In order to support this objective, the State will investigate options to raise additional revenue in the amount of \$100 million annually (\$3 billion by 2050) starting in 2020.*

Such funds could establish a repayment guarantee fund and green bond program focused on funding environmental and recreational projects. In addition, such funds could further support conservation, agricultural viability, alternative transfer methods, education and outreach, and other plan implementation priorities.

Colorado faces challenging fiscal conditions, not only for water infrastructure, but most other parts of the State budget. In order to address the water infrastructure fiscal need, the CWCB will explore creation of a repayment guarantee fund and green bond program with an initial investment of \$50 million from the Severance Tax Perpetual Fund. A repayment guarantee fund could assist water providers in securing financing for regional multi-partner and multi-purpose projects by backing bonds so that all the partners can achieve financing. Issuance of green bonds could support large-scale environmental and recreational projects. These funds could be operated in a conjunctive manner. As water provider bonds were paid down, the guarantee fund could be reduced and could be used to pay green bonds. By doing so, an initial \$50 million investment could leverage half a billion dollars of regional projects. Under a well-planned, phased approach, an additional \$100 million per year might address all of the State-related funding needs described in Colorado's Water Plan, as further detailed in Section 9.2.

# Education, Outreach, and Innovation

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*Colorado's Water Plan sets a measurable objective to significantly improve the level of public awareness and engagement regarding water issues statewide by 2020, as determined by water awareness surveys. Colorado's Water Plan also sets a measurable objective to engage Coloradans statewide on at least five key water challenges (identified by CWCB) that should be addressed by 2030.*

Colorado's Water Plan will expand outreach and education efforts that engage the public to promote well-informed community discourse and decision making regarding balanced water solutions. This work will be collaborative and include state, local, and federal partners. As one component of this overall strategy, the CWCB will work with Colorado's innovation community, education and outreach experts, research institutions, and the Governor's Colorado Innovation Network (COIN) to address Colorado's water challenges with innovation and "outside-the-box" creativity.

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## COVER, OPENING PAGES AND EXECUTIVE SUMMARY - CAPTIONS AND CREDITS

### Front Cover

Young patron at the Routt County Fair in Hayden, M. Nager  
Riding the chairlift  
Aerial photo of Ridgway, K. Grambley  
Denver at night  
Red barn at the Sakata Farm in Brighton, M. Nager  
Uncompahgre River near Ouray  
Playing soccer on a grassy field  
Center pivot irrigation at Sakata Farm in Brighton, M. Nager  
Birds take flight over the Yampa River on the Daughenbaugh Ranch, M. Nager  
Wheat growing on the eastern plains  
Little girl playing in the sprinkler  
Rafting the Arkansas River near Buena Vista, M. Nager  
Vicki Phelps and students on the San Miguel River, M. Nager  
Cameo Call set of diversions, M. Nager

### Back Cover

Crystal Mill, abandoned, near Carbondale  
Sunset over Ridgway Reservoir  
Columbine, Colorado's state flower  
Ruddy duck (male) among water smartweed, near Walden, All Canada Photos / Alamy Stock Photo  
Water droplet on leaf  
Hayfield near Steamboat Springs, M. Nager  
Boy playing in fountain in Aspen, Visions of America, LLC / Alamy Stock Photo  
Woman flyfishing on the Arkansas River, H. Mark Weidman Photography / Alamy Stock Photo  
Cows grazing  
Mountain goat mother and kid atop Mount Evans with Rocky Mountains in background, Danita Delimont / Alamy Stock Photo  
River flowing

### Inside Back Cover

Works When I am 100 (Wrenna McIntire)  
Photo: J. Johnson

### Pages iv and v:

Aerial photo of Ridgway, K. Grambley

### Executive Summary (beginning on page xvi):

Snowy trees

### Chapter 2+3:

New dam built on Saint Vrain River near Longmont, CO after historic 2013 floods, M. Nager  
Kids playing soccer on a grassy field  
Crop rows, Sakata Family Farms, Brighton, M. Nager  
Durango-Silverton Narrow Gauge Railroad

### Chapter 4+5:

Denver Broncos helmet  
Dallas Divide, San Juan Mountain Range, near Ridgway

### Chapter 6+7:

Cameo Call set of diversions and Roller Dam, Colorado River, M. Nager  
Coors Field, Denver, G. Malowany  
Alberto Oscanoa of the Perilous Sheep Company, herds sheep in Routt National Forest, Colorado, M. Nager  
Working the ditches at one of Harold Griffith's irrigated corn fields in Fort Morgan, M. Nager

### Chapter 8+9:

Grand Lake, M. Nager  
4H competition at the Routt County Fair in Hayden, M. Nager  
Cows graze on Marsha Daughenbaugh's ranch near Steamboat Springs, M. Nager  
Vicki Phelps teaches students as part of a Telluride Institute Watershed Education Project collaborative program with the Telluride Academy, in the San Miguel River Basin, M. Nager

## REFERENCES

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- <sup>1</sup> Jeff Lukas, Joseph Barsugli, Nolan Doesken, Imtiaz Rangwala, and Klaus Wolter. "Executive Summary." In *Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation*. Second ed. (Boulder: University of Colorado, 2014), 3-4.
- <sup>2</sup> Colorado Water Conservation Board (CWCB). *Statewide Water Supply Initiative 2010* (Denver 2011), Section 5-28.