



**INDEPENDENCE**  
INSTITUTE.ORG



# WHERE LIFE IS WRITTEN IN WATER

Why Water Issues Unite, Divide,  
and Matter So Much in Colorado

---

by Greg Walcher  
Natural Resources Group  
Grand Junction — Washington, DC

IP-1-2021 • March 2021



# EXECUTIVE SUMMARY

---

There is a simple reason why water is so contentious in Colorado: there isn't enough. There never has been, and never will be, enough water to supply nearly six million residents, much less 90 million people in 16 other states who depend at least partly on Colorado water.

Colorado averages about 16.5 inches of precipitation a year, but much of it evaporates before ever reaching the streams. It comes mostly in the form of snow, mostly within a four-month period, then it melts and runs rapidly out of the state. Put simply, life in the Centennial State depends on the ability to store water during the wet periods, for use during the dry periods.

Water must be stored in Colorado, or lost to downstream uses. Thus, the primary issue will never be about the amount of snowfall, which officials cannot control, but about storage, diversion, and use, which they can.

- Ten states and Mexico have legal claims that require Colorado to deliver portions of its water downstream.
- Colorado loses much of its own water every year because of the inability to capture and use it—even during severe droughts when water may be rationed. That's because the State does not have enough storage capacity, in all its combined reservoirs, to store all the water to which it is entitled.
- Roughly eighty percent of the state's water falls on the Western side of the Continental Divide, while eighty percent of its people live on the Eastern side. That creates a built-in tension between the Front Range and Western Slope that is a constant of water debates.

Coloradans should resist efforts to change their unique system of water law. That system, developed in Colorado, forms the basis of all western water law, and reopening long-settled issues could subject Colorado's future to decisions in more populous and powerful states.

The amount of water stored, for use in Colorado, can be significantly increased:

- By enlarging already existing reservoirs, either slightly raising the dam height, or dredging silt to increase the depth,
- And by adding additional reservoirs in carefully selected areas, especially small sites off the main streams, where dams have a much smaller environmental impact.

Finally, water supplies and water quality can both be improved, even without new storage, by:

- Better management of national forests, whose overgrown and unhealthy condition blocks thousands of acre feet of water from ever reaching the streams,
- Removing tamarisk, Russian olive, and other non-native invasive species that clog waterways and consume millions of gallons of water,
- Upgrading irrigation and other delivery systems to reduce evaporative losses, reduce salinity and other mineral pollutants, and apply water most efficiently,
- Constructed wetlands, which treat wastewater naturally while significantly improving water quality, especially in cities.

Such actions would dramatically increase the amount of clean water flowing in Colorado's rivers.

# INTRODUCTION

---

Colorado water issues are legendary for their divisiveness, giving rise to a gigantic statewide industry of government planners, water districts, associations, irrigation companies, engineers, contractors, and lawyers. Water always seems to be near the top of legislative agendas, at the federal, state, and local levels. Hundreds of reporters specialize in water, closely following dozens of conferences, committees, boards, roundtables, and public meetings. The discussions at water meetings are often more contentious than almost any other issue facing the State.

In the 1970s writer Marc Reisner went to Colorado to interview water leaders and write a piece called “Water Wars in Colorado” (a commonly used phrase). He wrote that:

“There was obviously a lot of fighting going on in Colorado, and most of it seemed to be over water. As the days went on, I interviewed upstream farmers who cursed downstream farmers, ditch irrigators who cursed pump irrigators, East Slope Coloradoans who cursed West Slope Coloradoans, West Slopers who cursed East Slopers, boosters of industry who cursed boosters of agriculture and visa versa, water lawyers who spun conspiracies before my eyes, and environmentalists who, railing against nearly everyone, were in turn railed against by nearly everyone else. Even in my home state of California, where battles over water have been going on almost from the day the first white settlers arrived... I have rarely seen such intensity of

feeling or levels of exasperation as I saw in Colorado.”<sup>1</sup>

It has always been that way in Colorado, and still is. The reason Colorado leaders are so passionate about water is simple: there isn’t enough of it. Unlike every other state, Colorado is prevented from using most of its own water by a series of interstate compacts, agreements, and treaties. It is required to deliver water to every neighboring state except Oklahoma, and to others as far away as California. Thus, the primary issue will never be about the amount of snowfall, which public officials cannot control, but about storage, diversion, and use, which they can.

Colorado has pioneered numerous conservation practices and does more than many other states to use its water wisely. State law prohibits waste, speculation, and downstream marketing, while allowing exchange agreements, conservation easements, and other tools promoting efficiency. Its original system of “prior appropriation” (copied by most other western states) has made the growth of cities and industries possible. Without it, there simply could not be over five million people in Colorado.

The future of the State’s prosperity, however, is continuously threatened by attempts to change its complex but vital water system—especially efforts to allow interstate marketing, to renegotiate one or more of the interstate compacts, or to repeal the water rights system in favor of some sort of public trust doctrine. All attempts to develop further uses of Colorado water inevitably face opposition, especially from California and other states that benefit from Colorado’s failure to use all its entitled water, and increasingly, from many of its own citizens.

Water planning is a never-ending process, because water shortages are a constant. The current Colorado Water Plan, adopted in 2015, forms the basis for much of the official government policy and funding activity, though it is by definition a “living” document. Most of the focus of water districts is on conservation practices, and more efficient operation of existing storage and delivery systems, but that will never be the end game. It can never completely supply the needs of our growing population.

Colorado has a dire need for more water storage, in nearly every part of the state, in order to hold its entitled share of water during wet periods, for use in dry periods. Additional storage is a crucial part of the official water plan, but there is little discussion about it. There are a small number of new storage systems now envisioned, but many people now view water projects as either a waste of public funds, or harmful to the environment, or both. That is an unfortunate and unnecessary view.

In fact, there are many ways to store additional water in Colorado, beyond the traditional system of dams and reservoirs. Many existing facilities can be enlarged, and in many places water can be stored underground, with almost no environmental impact in either case. The shortage of water is, in reality, more a problem of political will than engineering know-how. The ability to design and build modern systems to deliver clean water, without harming either the environment or other users, is the exciting challenge for a new generation of leaders.

The alternative is to oppose every project, stop every proposal, and do nothing. That is not only feasible; it is easy. Perhaps by design, the American political system makes it far easier to slow down or block a bad plan than to adopt a good one.

Unfortunately, that system also makes it easy to stop any and every project, good or bad. That is where Colorado finds itself today with respect to water issues. The future is uncertain because of public opinion divisiveness, legislative deadlock, east-west brinkmanship, rural-urban distrust, and municipal-agricultural competition.

All of those divisions can be solved. Doing so requires a shift in the public thought process. The continual focus on water shortages must shift to a greater discussion of ways to get more water into the system. Obviously, political leaders cannot make it snow more, but the problem is more than just the amount—it is the timing. When the state gets almost all its water during four months of the year, capturing it for later use is of far greater importance than the amount.

Fifty years ago, congressional committees proposed augmenting the flow of the Colorado River through a grandiose scheme to pipe water from the Columbia River in Oregon. Today, it is clear that there are much better ways to augment the available water supplies—by being smarter about how we use the water Colorado already has.

Water has already been the subject of almost innumerable articles, essays, studies, reports, analyses, debates, arguments, lawsuits, agreements, and compacts. The legal aspects of Colorado water, based on a complex system of laws, compacts, and treaties, is an entire field of academic study. Hundreds of people over the past 150 years have made a prosperous living understanding, litigating, and teaching water law.

Students of Colorado River history and politics will find indispensable the 2005 paper, *“History of Colorado River Law,*

*Development and Use: A Primer and Look Forward*” by Justice Greg Hobbs. Those interested in more historical detail can also consult the brilliant paper written by the late Upper Colorado River Commissioner Ival Goslin, called “Colorado River Storage Project Act of 1956, and Colorado River Basin Project Act of 1968—What Do They Mean for Colorado?” More general summaries of key Colorado water issues are published by Water Education Colorado, formerly the Colorado Foundation for Water Education; especially useful is a series of ten “Citizens Guides” to Colorado water law, water quality, conservation, groundwater, interstate compacts, and similar topics.

This Issue Paper provides a new analysis of current water issues confronting policy makers in Colorado, including a historical perspective on why ancient water debates remain so important today. It is written from the perspective of founding principles, free-markets, private enterprise, and state and local control. The Issue Paper is not, as water issues themselves should not be, partisan or parochial. Historically, Colorado leaders on both sides of the political aisle have battled it out among themselves, then put on a united front to the rest of the country. That should still be the standard.

## SECTION 1—BACKGROUND

### *The Principal Political Issue of the West*

*“Our State has been blessed with extraordinarily talented people, matchless climate and scenery, mineral wealth and other resources. But our way of life and economic vitality depend on water, and it is scarce. Really scarce.”*

*- Senator Bill Armstrong*



*Spring snowmelt in Colorado. Photo: Denver Water*

### **Why water matters**

Water politics in the great American Southwest often seem mysterious to people in the rest of the country. Chicago gets almost 36 inches of precipitation a year, Portland 43, New York over 45, Houston 50, and Miami nearly 62. Washington, D.C., where federal water policy is made and enforced, receives an average of 40 inches per year.<sup>2</sup>

By contrast, America’s second largest city, Los Angeles, sees less than 15 inches a year, Phoenix only 9, and Albuquerque barely 11. On average the Southwest gets less than a third as much rain as the rest of the country, and has but one major river, the Colorado.

The State of Colorado averages about 16.5 inches of precipitation a year, which would be about 15 million acre feet in a reservoir. Yet much of that water

evaporates before it even reaches the streams, and almost all of it comes in the form of snow, which melts and runs rapidly out of the state in eight major river basins: the Colorado, North Platte, South Platte, Rio Grande, Arkansas, Republican, San Juan, and Yampa/White.

Water will always be the source of dispute in the West, for one simple reason: there isn't enough. In Colorado, the ability to capture, move, and use some of that water, while it is available, is the basis of all life, including wildlife, human life, communities, jobs, economic growth, politics, controversy, and rancor. It directly and indirectly affects all other issues. As Colorado's legendary Congressman Wayne Aspinall, long-time Chairman of the House Committee on Interior and Insular Affairs, famously said, "In the West, when you touch water you touch everything."

## Why the West is different

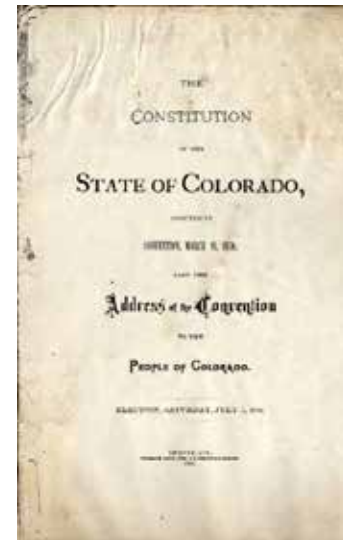
The arid states of the American West developed, over the course of a century, a complex and distinctive system of laws to make scarce water available to human inhabitants. Today, Westerners often find themselves defending that water system, which seems peculiar to people in the green parts of the country. To people surrounded by rivers and oceans, it seems strange that a person would actually need to "own" water, that people would fight so vociferously over such "property," or that the land itself may be worthless without "water rights."

Yet in the constitutions of nearly all the western states, a simple provision is found: if a person diverts water from a natural stream and puts it to beneficial use, he has acquired a property right, and may not be stopped. In the Colorado Constitution, the specific wording is, "The right to divert the unappropriated waters of any natural stream to beneficial uses

shall never be denied."<sup>3</sup> Because Colorado streams do not contain enough water for every need imaginable in the future, water courts confirm the water rights of specific users, based on the "priority" of who first appropriates the water to beneficial use. As the Colorado Constitution puts it, "Priority of appropriation shall give the better right as between those using the water for the same purpose."<sup>4</sup> This "doctrine of prior appropriation" (first in time, first in right) is unique to the arid West, which simply would not have become home to millions of Americans without it.

That is different than the basic premise underlying water law in the eastern U.S., which is based on the riparian doctrine—essentially, that water rights generally go to whoever owns the land along the streams. In Colorado, the fact that a person owns land, even under the stream and on both sides, does not mean he has the right to use its water. The waters belong to the people of the state, and the right to use them belongs to those who divert it, put it to specified beneficial uses, and in the priority order in which they did so.<sup>5</sup>

The differences between East and West may be exaggerated on some issues, but with respect to water, the U.S. is almost like two separate countries, one brown and one green. In the East and South, water is regulated on a completely different set of principles than in the arid West. Many national leaders simply do not understand, and consequently do not support, the need—the absolute necessity—for water rights to be viewed as property that is owned by individuals or businesses, under guidelines and regulations at the state level.



To most people, the movement of water seems fairly simple. It falls from the clouds onto the land, flows to the sea, is evaporated into the clouds and falls again, creating an endless cycle that every elementary school student learns. In current politics, the relationship of mankind to the water is mostly about water quality: water must be used in ways that do not diminish its value to others, and in ways that do not endanger public health.

Maintaining the purity of water supplies and eliminating pollution is important everywhere. But in much of the American West, issues of water *quality* are far less daunting than the nearly-insurmountable challenges of water *quantity*. An adequate and affordable water *supply* means the difference between life and death in the western half of the country, and owning older and more senior water rights

literally conveys the power to control—even to wipe out—agriculture, businesses, industries, and even entire communities.

## The truth—Colorado has almost no water

Leaders who seek to understand and succeed in the politics of the West must understand the politics—and

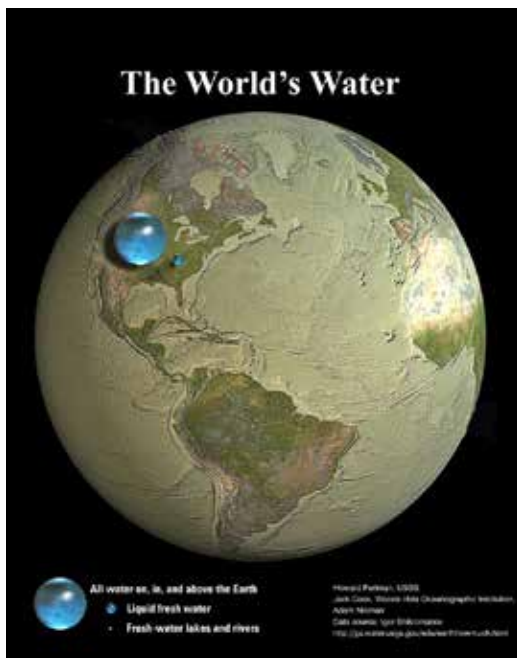
importance—of water. A few harsh facts help explain why water is so dearly held and so controversial in the West.

- 96.5 percent of the water on Earth is too salty to be available for human use.<sup>6</sup>

- Of all the Earth's fresh water, 69 percent is locked in polar ice and glaciers, and another 30 percent is buried underground, much of the groundwater too deep to access.<sup>7</sup>
- About 0.04 percent is in the form of clouds at any given time.<sup>8</sup>
- That leaves less than one percent of the Earth's fresh water available for use by all the plants, animals and humans in the world.
- Of that amount, more than eighty percent is found in the world's major river systems: the Nile, Amazon, Ganges, Yangtze, Mississippi, Orinoco, Congo, Ob, Yenisei, Mekong, St. Lawrence, Volga, Zambezi, Danube, and a handful of others.
- Thus, the percentage of the Earth's usable water found in all the arid states west of the Mississippi is scarcely measurable. The Southwest's only major river, the Colorado, is not even among the world's top 200.

For Colorado, the situation is even more complex:

- Eighty percent of the State of Colorado's tiny annual water supply comes in the form of snow, mostly within a four-month period. Colorado is sometimes called the "rooftop state" because all of its water flows out of the state in eight small rivers—virtually none flows in from other states.<sup>9</sup>
- Although there are 5.8 million people in the State, there are over 90 million people in 16 other states that are at least partly dependent on water that originates in Colorado.
- Ten states and Mexico have legal claims that require Colorado to deliver portions of its water downstream. There are nine interstate compacts, two Supreme Court equitable apportionment decrees, two memoranda of



understandings/agreements and two international treaties, all of which govern how much water Colorado is entitled to use, further limiting its own ability to grow.<sup>10</sup>

- Colorado does not have enough storage capacity, in all its combined reservoirs in its eight river basins, to store all the water to which it is entitled under these interstate agreements, so every year the state loses some of its own water because of the inability to capture and use it—even during severe droughts when water may be rationed.
- Finally, 80% of the state's water falls on the Western side of the Continental Divide, while 80% of the people live on the Eastern side.<sup>11</sup>

For the people in the arid Western states, there will never be an end to the political battles over a much-too-small water supply. And those battles will never really be about the amount of snowfall, which political leaders cannot control, but about storage and diversion, which they can.

Western states, especially Colorado because of its headwaters location, must capture and store their limited water supply during the few months when the snow is melting and running toward the oceans, or there simply won't be any during most of the year. Put simply, westerners must store water during wet periods to live during dry periods. Arid regions cannot sustain life—much less prosperous businesses and fast-growing metropolitan cities—without water storage. This is, understandably, a difficult concept to national leaders who are not from the West. The Potomac River, in the 106 miles between Washington, D.C. and the Chesapeake Bay, contains more water than the entire 7-state, thousand-mile length of the Colorado River and all its combined tributaries. But it should not be a difficult concept to State leaders in the West.

## No Stopping Population Growth in the Southwest

Since the beginning of the Jimmy Carter Administration and his infamous “hit

list” of western water projects, many people have viewed such projects as pure political pork, the bargaining chips of politicians in an obsolete era. Dams and reservoirs are often considered taxpayer-funded boondoggles

that cost a fortune to build and cause significant damage to the environment. The latter is a debatable point, but it is beyond dispute that the West could not be inhabited as it is today without the reservoirs, tunnels and pipelines that bring water to its cities. Without water projects there could not be 5.8 million people in Colorado or 7.3 million in Arizona. There most certainly would not be over 39 million people in California without the Colorado River Aqueduct and a dozen other major water supply projects.

To be sure, many Coloradans do not think the State has been improved by the mass migration of several million people, who escaped the cities only to create a frustrating rat race in the mountains. If

it were possible to go back in time and refight the political battles of the early 20th century, even Front Range residents might oppose the trans-mountain water diversions that allowed the extreme growth between Ft. Collins and Pueblo.



*Continental Divide, Grand County. Note most snow is on the West Slope, Lake Granby side. NASA, 2008*



*Colorado at night. Photo: NASA*

But the people are there now, and they are not leaving—more are coming.

The reality is that the arid Southwest is the fastest growing part of the United States—a huge region dependent upon



*Early irrigation structure in Routt County*

the already-overused Colorado River. Four of the ten fastest growing states in the nation in 2019 are in the Colorado River Basin (Nevada, Arizona, Utah, and Colorado). Americans continue to

migrate from the large cities of the Northeast and Midwest toward the South and West. Of the 20 largest cities in 1950, all but four have actually lost population, some of them dramatically. Detroit, Buffalo, St. Louis, Cleveland and Pittsburg all lost more than half their former populations,<sup>12</sup> while America's fastest growing cities are places like Phoenix, Dallas, Las Vegas, Denver, San Antonio,<sup>13</sup> and St. George, Utah (one of America's fastest growing small towns).<sup>14</sup>



Put simply, Americans have developed a love affair with the Southwest, and in a free and mobile society, little can be done to stop them from moving there. That enduring truth is the reason water has always been, and will always be, the principal natural resources issue of the West.

In a free and mobile society, people move to places they consider desirable to live, and then they require water. Someone, somewhere,

somehow, is going to provide it. The challenge for leaders is not how to stop it—that is not possible and attempts to do the impossible often result in bad decisions. Rather, the challenge for real leaders is how to supply the water needed for prosperous communities in a manner that is sustainable and environmentally responsible. The challenge is not new, but the magnitude of it is truly without precedent.

## **An issue older than Colorado**

When westerners try to explain the region's water system to others, it is easy enough to clarify the simple impossibility of living in the arid West without the ability to take water out of the river and put it to use. That is true nearly everywhere, so it's the easy part of the dialogue. The disconnect occurs when describing the concept of "prior appropriation."

The legal details are simple enough. If a person diverts water from a natural stream and puts it to beneficial use, he acquires a property right—a right that is senior to those who might come later, and junior to those who were there before. Because no western stream contains enough water for every future need, special water courts decree the water rights of specific users, based on the "priority" of who first appropriated a quantity of water to beneficial use. This "doctrine of prior appropriation" is unique to the arid West, but it is not nearly as new as some might think. In fact, it was an important part of the culture of the West long before the arrival of American settlers in the mid-19th century.

Many textbooks attribute the prior appropriation system adopted by those early pioneers to Mexican laws that existed before these territories became part of the U.S. In fact, the concepts are

even older than that. Few Coloradans realize it today, but water was just as vital to the Native American tribes, long before Colorado became a Territory in 1861.

The famous 1868 book, *Life Among the Apaches*,<sup>15</sup> has long been noted among historians because its author, Major John Cremony, had such a unique opportunity to get to know the Apache tribes and leaders, first as interpreter to the U.S. Boundary Commission in the 1840s, then as a cavalry officer in Arizona, New Mexico, and Texas during the Civil War. He was the first white man to become fluent in the Apache language, and published the first written compilation of it.<sup>16</sup> He met the Apaches first as an enemy, but became their advocate as he grew to understand why these tribes viewed white settlers with such alarm. As he explained, it was more about their water than anything else.

“The Apaches entertain the greatest possible dread of our discoveries of mineral wealth in their country,” Cremony wrote. But not because they attached any particular significance to the value of mineral ore—they found the Americans’ obsession with gold and silver comical. Rather, it was about the water.

“The occupation of mines involves the possession of water facilities... To occupy a water privilege in Arizona and New Mexico is tantamount to driving the Indians from their most cherished possessions, and infuriates them to the utmost extent. If one deprives them of their ill-gained plunder he is regarded as an outrageous robber; but should he seize upon one of their few water springs, he is rated a common and dangerous enemy, whose destruction is the duty of all the tribe.”<sup>17</sup>

Mark Twain never actually said that “whiskey is for drinking; water is for fighting.” But the saying is accurate, and the West’s white settlers did not invent it. The native people were every bit as dependent on, and therefore attached to, water rights as the new settlers. Attachment to water—in almost the same direct legal sense in which we think of it today—was notable throughout the West, including among the Ute tribes that originally occupied much of Colorado.



*Remains of an ancient Anasazi reservoir in Mesa Verde National Park*

One band of Northern Utes called themselves Pahvant, which meant “living near the water,” a description not only of their geographical location near the Wasatch mountains, but their way of life, connected to the water economically, historically, and culturally.



*Orchards and vineyards in Palisade, Colorado, once a barren desert but now a lush green valley, entirely because of irrigation, made possible by the State’s system of water rights*

The same was true of the Weminuche Utes who inhabited the Dolores and San Juan watersheds, and the Tabeguache Utes who occupied the Uncompahgre and Gunnison all the way to Grand Junction. Other Ute bands were located in, and named for, the valleys of the Grand,

White, and Yampa Rivers. Their lives and livelihoods were inextricably linked to those river systems, and any incursions that threatened their water threatened their survival. They suddenly had to contend with outsiders who not only wanted to live on the land, but to do so, needed to establish a legal system of ownership over that same water.

Centuries earlier, original inhabitants of the Mesa Verde region (c. 600–1300 a.d.), survived the dry climate by building water projects, some of them fairly elaborate.<sup>18</sup> There are at least twenty prehistoric water basins, with capacities up to 25,000 gallons, in the region.<sup>19</sup> They are thought to have stored mostly domestic water,<sup>20</sup> though the Anasazi also built significant dams, ditches, and irrigation systems, making them the West's first water conservationists.<sup>21</sup> Like

their modern counterparts, those ancient Pueblo villagers had to be able to survive droughts, so their ability to cooperatively maintain—and defend—their water systems was essential to their survival.<sup>22</sup>

That was just as true for more modern arrivals, such as the Hispanic settlers who dug what is now called the People's Ditch in the San Luis Valley. It is thought to be the oldest irrigation system still in use in Colorado. The ditch was probably there some years earlier, but the water rights were eventually allocated under Colorado's new legal system after statehood in 1876. The ditch was given the priority adjudication date of 1852, making it the earliest recognized water right in Colorado.<sup>23</sup>

## SECTION 2—NO PLACE LIKE COLORADO

---

### *Why Water Issues Are Different Here*

*"Here is a land where life is written in water"*

- Thomas Hornsby Ferril

The Colorado pioneer farmer was symbolized by the character of Hans "Potato" Brumbaugh in James Michener's novel "Centennial." The Volga-German immigrant came to Colorado in 1859 to prospect, but instead found his gold through irrigation—turning marginal land along the South Platte into rich cropland—and made a fortune in potatoes and sugar beets. He "harnessed the river and nourished the land," and demonstrated that "it was the farmer, bringing unlikely acreages into cultivation by shrewd devices, who would account for the wealth of the future state."<sup>24</sup>

The development of agriculture, mining, cities, and towns in Colorado was enabled by the science and technique of water diversion. It also required hard work, pitched battles, controversy, lawsuits, organization of taxing districts, ballot measures, political campaigns, hundreds of millions of dollars, and generations of effort.

State Capitol buildings throughout America are built around lofty rotundas decorated with lofty works of art. Many feature statues and busts of early state leaders. Others display historical artifacts or allegorical paintings of Freedom, Liberty, Democracy and Justice. But in the rotunda of the Colorado State Capitol, early leaders were so acutely aware of the importance of the water on which all else depends, that its walls were decorated with murals and poetry about water.



*Men shall behold the Water in the Sky and count the Seasons by the living Grasses.*



*Then Shall the River-namers track the Sunset. Singing the long song to the Shining Mountains.*



*Here shall the melting Snows renew the Oxen here Firewood is and here shall men build Cities.*



*Water shall sluice the Gold yellow as leaves that fall from Silver Trees on silent Hills.*



*And Men shall fashion Glaciers into Greenness and harvest April rivers in the Autumn.*



*Deep in the Earth where roots of Willows drank shall Aqueducts be laid to nourish Cities.*



*Water the lightning gave shall give back lightning and Men shall store the lightning for their use.*



*Beyond the Sundown is tomorrow's Wisdom Today is going to be long long ago.*

The scenes feature Art Deco/WPA-style murals painted by Allen True, illustrating a poem by Thomas Hornsby Ferril.<sup>25</sup> It begins, “Here is a land where life is written in water,” and concludes by referring to the storage and transportation of water as “tomorrow’s wisdom.” The sentiment continues in a series of eight murals that describe the importance of capturing and storing water for the beneficial uses of agriculture, cities, mining, and electric power.

People throughout history have viewed dams, reservoirs, ditches, hydroelectric generators, aqueducts, canals and pipes as essential for supplying water to people, *and for improving the environment*. The great water works of the Roman Empire were counted among the man-made wonders of the world for centuries, the envy of a millennium.<sup>26</sup>

## Making the deserts bloom—the purpose of water projects

Early leaders of the American conservation movement were deeply religious and came to view their



*President Taft dedicating the Gunnison Tunnel, Montrose, September 23, 1909*

environmental work as a religious undertaking. They took to heart Old Testament predictions about the promise of the second coming, which included—in addition to sight for the blind and hearing for the deaf—improvements in the natural environment of a people scratching out an existence in a wasteland: “...and the desert shall rejoice, and blossom as the rose... for in the wilderness shall waters break out, and streams in the desert. And the glowing sand shall become a pool, and the thirsty ground springs of water.” (*Isaiah 35:1–7*)

Early conservationists believed it was their obligation to make uninhabitable places livable. They believed, as John F. Kennedy articulated in his inaugural address, “that here on Earth, God’s work must truly be our own.” They developed confidence in the American ability to build water projects on a scale massive enough to change the entire Great Plains, once called the “Great American Desert,” into the “breadbasket of the world,” and to alter the livable environment of the entire American Southwest. “Make the deserts bloom” became a sort-of national calling for conservationists, so that moving water from great distances to bring agriculture and civilization to arid lands was more than just one item on the agenda—it became synonymous with conservation.

Conservation leaders throughout Colorado’s history pursued water projects as a means for irrigating otherwise dry regions, supplying domestic water to growing towns and cities, restoring degraded environments, preventing floods, and improving public health. For several generations of conservation pioneers, advances in agriculture went hand in hand with access to clean and plentiful water. In a literal sense, they were not wrong—these great projects did tame the floods, irrigate the dry valleys, and allow the growth of cities.<sup>1</sup>

That is why President Theodore Roosevelt’s great conservation agenda included creation, in 1902, of the Bureau of Reclamation, to build water projects and “make the deserts bloom.” It is why President Taft made the train trip from Washington, D.C., to Montrose in 1909 personally to dedicate the Gunnison Tunnel and bring irrigation—and prosperity—to the Uncompahgre Valley.

For the same reason, President John F. Kennedy traveled to Pueblo in 1962 to celebrate the Frying Pan-Arkansas

project, which provided water to cities and farm throughout the lower Arkansas Valley. These projects made growth and prosperity possible for numerous Colorado communities. Herbert Hoover, serving as Secretary of Commerce, came to Grand Junction in the process of negotiating the Colorado River Interstate Compact, a deal that makes the Colorado River the lifeblood of 40 million people in seven states.

Water leaders in every part of Colorado struggled for years to create the giant water systems that make today's cities possible. History has already forgotten most of their names, but shouldn't: Benjamin Eaton, Robert Cameron, Edward Taylor, Wayne Aspinall, Ival Goslin, Charles Hansen, Alva Adams, Frank Delaney, Delph Carpenter, Glenn Saunders, Felix Sparks, Michael Hinderlider, Tommy Thomson, W. D. Farr, Fred Kroeger, Sam Maynes, William Miller, John Fetcher, Chips Barry, and many others.<sup>27</sup>

## The new normal—why Colorado stopped building water projects

Sadly, today's water leaders spend far more time defending their existing facilities than thinking of visionary ways to store more water in environmentally responsible ways. Reservoirs and water storage have been so vilified by the environmental lobby that they are not generally considered an option in addressing future water needs. In fact, in the 1990s when Bruce Babbitt said he wanted to be "the first Secretary of the Interior in history to tear down a really large dam,"<sup>28</sup> he was criticized by very few western leaders. On the contrary, he helped further popularize the perception of dams as ecological criminals. Over the past 20 years, more than 850 dams have been removed from American rivers and streams.<sup>29</sup>

Babbitt helped create today's conventional wisdom that human use of water is bad for the environment.

Consider that this 2011 television ad was an effective draw for tourism in "Pure Michigan": "Water. We take our showers with it; we make our coffee with it. But we rarely tap its true potential and just let it be itself, flowing freely into clean lakes, clear streams, and along more freshwater coastline than any other state....."<sup>30</sup> Note the clear message that taking showers and making coffee is bad environmental policy.

Today, even across the arid western states there are no more than a handful of new storage reservoirs even planned. New reservoirs have become so unpopular that they are rarely proposed and when they are, the public instinctively reacts suspiciously. In the West, water projects are, more often than not, viewed as a threat to the existing order. A ballot proposal in 2003 to create a simple financial mechanism for funding new water projects (then known as Referendum A) became so thoroughly unpopular in Colorado that it was defeated on the ballot in every single county,<sup>31</sup> and became a campaign issue against candidates in three consecutive election cycles. The measure did not authorize a single water project—it was merely a funding mechanism. Still, a century of history



*President Kennedy dedicating the Frying Pan-Arkansas Project, Pueblo, August 17, 1962.*



*Mary's Lake power plant, an 8,100 KW generator, Colorado-Big Thompson project*

gave people in Colorado good reason to suspect the worst—that it might

While serving on the Colorado Water Conservation Board in 2003, I went to a classroom of advanced 6th-grade students studying science, because they were completing a unit on water. We had an excellent conversation about the natural processes of water, and about the shortage of water during the drought years Colorado was experiencing at the time. There was much concern about water rationing, and the students were working on various plans to reduce water usage in their own homes. The students could describe in impressive detail the process of evaporation, and the cycle of water that rains, flows, evaporates, then rains and flows again. They had toured a wetland and understood fairly well the importance of water quality, and the various threats to it. Yet shockingly, when I quizzed them a bit about the infrastructure of water in their city, all they really knew was that it comes out of the faucet. When I asked them how it got into the faucet, I got blank stares. One sharp student mentioned the pipes buried under the streets that bring water into homes, but when asked how the water got from the river into the pipes, the “disconnect” was palpable. Not one single student had any idea that the water was available to their homes specifically because of dams, reservoirs, and diversions. They had been studying water issues for more than a month, but no one had even mentioned the existence of such water projects, nor the vital relationship between humans and water, nor given them any concept of where their own water comes from.

eventually be used to build trans-mountain diversions to “steal” water from one basin and move it to another. That feeling was exacerbated because the measure created the funding mechanism before the specific projects were identified.<sup>32</sup> So the proposal went down in flames at the ballot box and the result was, at least for another generation, no new water storage at all.

Similarly, in the race for alternative energy, hydro-electric power is rarely mentioned. Flowing water is more readily renewable than any other energy source, and in Colorado alone produces 1.5 million megawatt hours of electricity a year.<sup>33</sup> Like the sun and wind, gravity is free, but water continues to flow even when the wind doesn’t blow and the sun doesn’t shine. Nor is hydro-electric energy off the table because dams inevitably destroy fish migration routes. In fact, modern technology can solve the problem of fish passage around dams, as has been demonstrated at hundreds of dams across the country.<sup>34</sup> It is simply because most Coloradans no longer view dams, reservoirs, tunnels, aqueducts and pipelines as necessary—much less as part of the future solution to growth problems. This is, above all, an education problem.

## **If you don’t build it, they won’t come—or so Colorado leaders once thought**

Since the early 1970’s many environmental leaders have labored under the delusion of a simple fallacy. Namely, that if we refuse to provide the infrastructure needed for growing populations, we can stop the growth. In a free and mobile society, though, the strategy has never worked, and it never will. Americans do not have—and do not want—any legal authority to tell people they are not allowed to move to desirable places, like Colorado. Like it or not—and many of us don’t—they move anyway, and then they require services like transportation, communications, and water.

To be clear, the arrogance of some people can be frustrating—including people who build their home in the middle of the wilderness, then expect paved roads that are plowed in the winter, redundant fiber optic cable loops, police and fire protection, electric, water and sewer services. In such circumstances, taxpayers may emphatically say no. But to ignore the growth of major metropolitan cities like those on Colorado’s Front Range and pretend it will go away is futile.

In 1975, Colorado Governor Richard Lamm was so concerned about projected growth south of Denver that he led a campaign against building the city’s proposed \$75 million southwest beltway (I-470). His Administration took the segment out of the Interstate highway system<sup>35</sup> and held a press conference to “drive a silver spike” through the project, saying it would foster urban sprawl. Of course, in the end, the sprawl occurred anyway, so a generation later the highway was completed at a cost of \$270 million.<sup>36</sup> The E-470 tollway was added a few years later. Today the last segment of a complete beltway is still not built, and may never be, to the frustration of

commuters frozen in gridlock. Lamm wanted the money spent instead on mass transit, and far more has now been spent on the light rail system. But today many people even oppose that—people who continue to believe if you don't built it the people won't come. Anti-growth activists all over America today can be counted on to oppose any public works project on the same theory, despite clear examples that lack of infrastructure does not keep people from moving where they choose.

The reality is the same with water as with highways, power lines, or any other infrastructure. Delaying construction of the Central Arizona Project, for more than 20 years after Congress authorized it, did nothing to keep Phoenix from doubling in population during that period.<sup>37 38</sup>

Nor did the EPA's 1989 veto of the proposed "Two Forks Dam" keep another 1.5 million people from moving to Denver since then.<sup>39</sup> In fact, the entire "hit list" of

water projects killed during the Carter Administration did not cause even a downward blip in the relentless migration of Americans to the South and West. Does that mean all these water projects were well-designed, responsible, and visionary efforts that should have been built? Certainly not. Many Coloradans still think Two Forks was ill-advised, for example.

What it does mean is that any discussion of water issues must at least begin with the underlying premise that water must be provided where people live. Failing to provide the necessary infrastructure does not stop or control growth; it merely prolongs the inevitable, making solutions more difficult and more expensive. The great challenge for today's leaders is not stopping all projects, which is easy, but finding the right balance, which is hard.

## SECTION 2—WHICH BRINGS US TO...

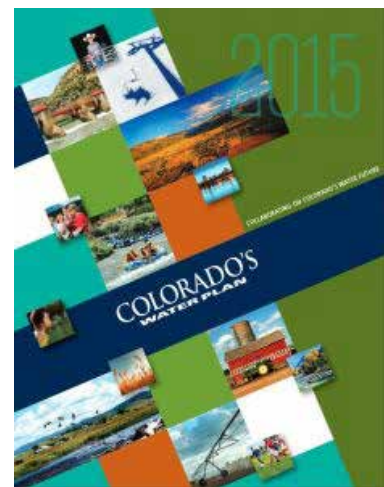
### *Colorado Water Issues of the 21st Century*

*The shadows sway and seem to say  
Tonight we pray for water, cool water  
And way up there, He'll hear our prayer  
And show us where there's water—cool,  
clear water  
- Sons of the Pioneers, 1934*

### **Colorado's water plan**

As the *Book of Ecclesiastes* observed more than 200 years B.C., "there is nothing new under the sun."<sup>40</sup> The writer was not referring to Colorado's continual water planning, but he could not have described it better.

In November of 2015, then-Governor Hickenlooper announced what he called Colorado's "first-ever" comprehensive water plan. It was the final product of a decade of meetings, committees, and proposals.<sup>41</sup> As finally adopted by the Colorado Water Conservation Board (CWCB), the 500-page plan calls for \$20 billion worth of conservation measures, though no specific strategy for funding it. That particular statewide planning process started at the CWCB in 2013. It followed on the heels of the 2004 Statewide Water Supply Initiative of the Owens



Administration,<sup>42</sup> which included the Basin Roundtables envisioned by Natural Resources Department Director Russell George. So the 2015 plan was part of a process that had been underway for several decades. The result of basin round-table meetings throughout the State, much of the new water plan was praiseworthy, and remains the foundation for water planning in Colorado.

It calls for a statewide conservation goal of 400,000 acre-feet of water by 2050, an ambitious but reasonable goal. It also mentions a projected shortfall in municipal and industrial water supply of 560,000 acre-feet by 2050, and proposes to reduce that shortfall to zero by 2030. The math was always a bit unclear, but whether Coloradans conserve 400,000 or 560,000 acre feet, it would be a good thing. Importantly, the plan also calls for construction of 400,000 acre-feet of additional water storage—also without specifying locations or projects.<sup>43</sup>

Colorado is still growing, and its need for water will continue to grow. Colorado is entitled under interstate agreements to substantially more water than it uses, so it is irresponsible not to store the water available during wet periods, for use during dry periods. However, that does not necessarily always mean storage through additional new dams and reservoirs. The CWCB began about

20 years ago advocating creative new ways to store water, both by expanding existing reservoirs, and by using underground storage in closed aquifers. Both techniques have

been used successfully elsewhere, and both are now part of Colorado's official state plan.



## Conservation alone is not enough

The Plan explicitly acknowledges the vital importance of water storage:

“Colorado’s water infrastructure, including water storage, is critical to the ability to maintain stable water supplies; water storage infrastructure allows Colorado to use its legal entitlements before water flows out of the state. In addition, water storage infrastructure is essential in assisting with flood control; supporting all types of use—including agricultural, environmental, municipal, and industrial—in periods of drought; complying with interstate compacts; and augmenting stream systems to allow water use by water users that would otherwise not have a right to divert under the prior appropriation system. Most storage projects, however, were developed in the middle of the last century, and the construction of both new infrastructure and storage has remained relatively static over the last 30 years.”<sup>44</sup>

Despite the attempted balance between storage and conservation, though, many leaders remain skeptical of the official State water plan, partly because it also mentions the prospect of new trans-mountain diversions—which are as controversial as ever. Half of the Colorado River is already diverted to the Front Range, between 450,000 and 600,000 acres feet a year. There are, as the plan points out, plenty of ways for the Front Range to conserve water, and to store more of its own supply (as Two Forks would have done). In fact, as Denver Water CEO Jim Lochhead points out, metro area residents have already reduced water consumption

by more than 20 percent in the last 15 years, despite a 15 percent increase in population.<sup>45</sup> Lochhead was quoted saying, “We can go a lot lower without sacrificing quality of life.”<sup>46</sup> He is right.

Coloradans have been down this road many times before, and the same giant unresolved issue is always present—funding. Much of the anticipated \$20 billion cost of these water measures would be borne by utilities and their customers (who have not yet been asked if they want higher water bills), but the State also needs another \$100 million a year for its share.<sup>47</sup> The CWCB report accompanying the plan suggested new federal funding (unlikely from today’s Congress), tax increases (perhaps a statewide mill levy, higher severance taxes, or a sales tax increase)—or a new bond program. Only the latter approach would really be new, although the 2003 experience with Referendum A makes clear what a can of worms that can be.

Still, the existence of a statewide water plan, which resulted from such a long-term collaborative effort by so many, provides at least the hope that Coloradans might eventually emerge from those years of distrust, and work together on long-term solutions. That should involve both conservation and creative new storage in every river basin of the State, instead of diverting water between them—which is the source of so much of the distrust. It should also involve public-private partnerships, bonding, and other new funding sources. That might actually be “something new under the sun.”

Since the plan was adopted in 2015, the annual summer conferences of the Colorado Water Congress have featured lengthy discussions and various updates. There has been virtually nothing new about the source of the proposed \$20 billion for conservation measures, nor

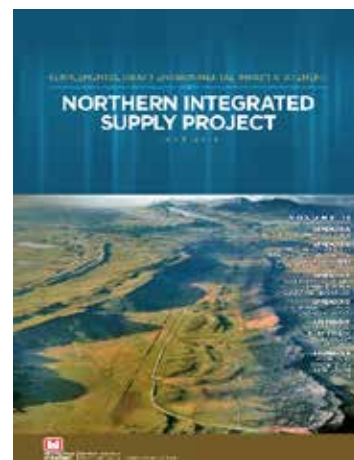
very many more specifics about the statewide conservation goal of 400,000 acre feet by 2050. There is additional conversation and planning of several proposals for new water storage, which has been desperately needed for a long time.

Naysayers continue to insist there is no way to finance \$20 billion for new water measures. But consider that Denver’s transportation master plan calls for \$133 billion by 2035; water issues are every bit as serious as transportation. The problem with water is political will, not money. Most water districts today are afraid even to propose new projects, because of the predictable environmental opposition. Colorado’s last major reservoir project (Reuter Hess) took almost 30 years.<sup>48</sup> Few leaders want to dedicate the rest of their working lives to such a project.

## A few notable projects

A notable exception is the White River Storage Project proposed by the Rio Blanco Water Conservancy District, which urgently needs to replace Kenney Reservoir, where silt has reduced the storage capacity from 13,800 acre feet to about 8,000, and taken away half the surface acreage.<sup>49</sup> The district can solve the water supply problem with its proposed Wolf Creek reservoir, and also generate huge economic value in an area that can no longer rely on coal mining or oil. The project could also improve the environment, supply water for endangered fish, and build a whole new future in the Rangely area.<sup>50</sup>

Another notable active plan to increase storage is the Northern Integrated Water Supply Plan, which would add two new reservoirs and



pumping plants, pipelines, exchanges with two existing irrigation companies, and a new diversion of the Poudre River—the combination of which would supply 15 Northern Front Range entities with 40,000 acre-feet of new water supplies. Importantly, the project would store excess water that otherwise leaves Colorado during wet years. Since 2009, more than 3 million acre-feet of water, beyond legal requirements, have left Colorado downstream to Nebraska—while the Front Range thirsts for more water.<sup>51</sup> The area simply cannot use all it might be entitled to use, because of the shortage of storage capacity. Meanwhile, the project was subject to a federal Environmental Impact Statement that took more than 15 years.

Another important example is Denver Water's proposed enlargement of Gross Reservoir. Part of the value of the ill-fated 1980s "Two Forks" proposal was its ability to store water on the South Platte River itself, as opposed to additional major diversions from the Western Slope. Gross Reservoir, located in Boulder County, now holds about 41,000 acre-feet of water, and the expansion would triple that capacity by raising the existing dam another 131 feet, at a cost of about \$464 million. The project is slated to be complete by 2025, assuming the resolution of lawsuits and federal permits—a big assumption.<sup>52</sup>

In part, the Gross Reservoir project signals a new approach that resulted from the Colorado River Cooperative Agreement, signed in 2012 by Denver Water and 17 Western Slope entities, including Grand, Summit, and Eagle Counties and the Colorado River Water Conservation District. The main purpose was to allow Denver to develop additional water supplies while also protecting watersheds in the Colorado River Basin. That included the plan to expand Gross Reservoir, one of the

primary storage basins for water diverted from the Colorado River headwaters through the Moffat Tunnel.

Both the Northern Integrated Water Supply Project and the Gross Reservoir expansion are tied up in the seemingly interminable lawsuits, though, which have become a standard part of the process—and one of the most significant threats to the future of Colorado water.<sup>53</sup>

## Colorado River Cooperative Agreement

The signing of the Colorado River Cooperative Agreement represented a significant new relationship between east and west, in the way water issues would be addressed, at least for the next few years. After five years of negotiations, Western Slope leaders agreed not to oppose Denver Water's plan to enlarge Gross Reservoir, and Denver Water agreed to provide water for flows that support ski areas and other recreation on the Western Slope, as well as flows for habitat improvement in Grand County, significant payments to Summit and Grand Counties, and an agreement to continue to supply water to the Shoshone Generating Station (the old hydroelectric plant in Glenwood Canyon), whether the plant is operating or not.<sup>54</sup>

Shoshone is a long-standing and crucial issue to Western Colorado, because the plant's water right is senior to all the transmountain diversions, but is owned by Minneapolis-based Excel Energy, not by any Western Slope entity. The "Shoshone call," needed to keep the 15-megawatt plant running during low-flows, guarantees a water supply and river flows from Summit and Grand Counties to California, while limiting diversions for Northern Colorado, Pueblo, Colorado Springs, Aurora, and potentially Denver.<sup>55</sup> Thus, many West Slope and downstream

entities have grown reliant on Excel's use of that power plant to ensure water in the Colorado River.<sup>56</sup> The plant is also unusual in that it depends on river flow, rather than captive water in a reservoir, so its operation is central to many water debates throughout the West. There are frequent attempts to convince Excel to sell the plant, or to decommission it, either of which would have a dramatic impact on water supplies. That is unlikely, because of its unusual reliability, and because it generates over \$4 million in revenue to Excel annually, at almost no cost because it has been paid for since its construction in 1909. Thus, while Denver did not have the ability to deny the Shoshone water right, it gained some ability to relax the quantity during dry years. But the pledge to supply Shoshone water, whether or not the plant was operating, was intended to avoid the need for the "Shoshone call," and was significant to the Western Slope.<sup>57</sup>

Significantly, the agreement also requires increased the amount of conservation and reuse required for Denver Water's customers. And in perhaps the greatest departure from a century of legal wrangling and power plays, Denver Water agreed that any new water project it proposed in the Colorado River Basin would be developed only in cooperation with the Western Slope entities affected by the development.<sup>58</sup>

At the signing ceremony in 2012, Governor Hickenlooper said, "I'm not sure the fighting's ever going to completely stop, but it is nice to see that it is at least moving into rubber bullets and bean bag shot guns."<sup>59</sup> Indeed, Denver's agreement not to pursue new projects except by working with the Western Slope was not unique, but making the commitment in advance of any specific proposal represented a new era of comity. The signatories included the counties

mentioned above, and also the cities/towns of Glenwood Springs, Rifle, Fraser, Granby, Breckenridge, Dillon, Frisco, Silverthorne. They also included the most important water districts in the Colorado River Basin, including not only those in the headwaters counties, but also all the major districts in the Grand Valley.<sup>60</sup> Ironically, while all those signatories agreed not to oppose Denver's storage of its Blue River and Gross Reservoir Expansion Project water on the Front Range, they could not speak for everyone else. Predictably, the Gross Reservoir project was opposed in court by Boulder County and at least one environmental organization, so Denver Water may or may not see the hoped-for fast-track benefit of that part of the agreement.<sup>61</sup>

Such cooperation, though, is what the State Water Plan was supposed to be about. It remains to be seen whether the idea will gather momentum, or join other strategic plans that sit on shelves gathering dust.

## Basin-of-origin protection

In a larger sense, the Colorado River Cooperative Agreement is a component of the century-old dispute over "basin of origin" protection—a factor in virtually every trans-mountain diversion project debate in state history. For example, part of the agreement made by the Northern Colorado Water Conservancy District, to gain approval for the Windy Gap project, was construction of Wolford Mountain Reservoir to provide

When Durango attorney Gerry McDaniel and I walked into the Colorado Water Congress in 1991, we felt like strangers entering a saloon in old western movies—the piano player stops while the entire room stares. I was president of Club 20 and McDaniel chaired its Water Committee. Several Western Slope legislators were already there: Reps. Scott McInnis, Danny Williams, and Tim Foster, along with Senators Dave Wattenberg and Tillie Bishop.

Legendary Denver Water Board lobbyist Sarah Duncan (coincidentally a former Durango resident and friend of Club 20) approached us with her usual wry smile and said, "I suppose you're all here to talk about basin-of-origin—again." She already knew well that Club 20 was pushing legislation to codify a permanent requirement for future water projects.

The never-resolved "basin-of-origin" issue has been a top Western Slope priority for decades. Legislators from that region had sponsored "basin-of-origin" bills many times. For eight years, the effort had been led by successive House Majority Leaders, Scott McInnis and Tim Foster. Despite their seniority, effectiveness, and popularity in the House, they were continually outvoted on this issue by Front Range majorities, as were several of their successors. The Club 20 group met the same fate that day, trying in vain to convince the Colorado Water Congress to endorse the bill.

“compensatory storage” for Western Slope use (to “compensate” for the loss of water diverted across the Continental Divide).<sup>62</sup> Similarly, part of the agreement enabling the Frying Pan-Arkansas project was the construction of Reudi Reservoir, for the same “compensatory” purpose.<sup>63</sup>

Such “deals” are not technically required under Colorado law, however, nor is such compensation necessarily required for all such diversions. It should be.

The idea of “basin-of-origin” protection was well understood by the 1930s, when the first major transmountain diversion



*Blue River water is diverted from Dillon Reservoir, into the Roberts Tunnel, under the Continental Divide, into the South Platte*

came with federal construction of the Colorado Big Thompson Project. It included ten reservoirs, 18 dams, six power plants, and a Continental Divide tunnel. But it also included “compensatory storage” for the West Slope, Green Mountain Reservoir.<sup>64</sup> The concept is simple—water should not be diverted out of its natural river basin, across the Continental Divide to the Front Range, without some protection for those living in the river basin from which the water is taken. The most common form of protection is “compensatory storage,” as in the case of Reudi, Green Mountain, and Wolford Mountain. That is the only way Western Slope leaders can realistically retain the ability to develop water in the future.

Colorado water law has always allowed water conservancy districts to divert water out of the Colorado River Basin—but only if the diversion will “not impair or increase the cost of present or future water supplies for the exporting basin.”<sup>65</sup> However, the no-impairment rule only applies to diversions from the Colorado

River Basin to conservancy districts; the no-impairment rule does *not* apply to Colorado River Basin diversions to cities.<sup>66</sup> And most trans-mountain diversions were built by cities: Denver, Aurora, Colorado Springs, and Pueblo. The proposed “Basin-of-origin” legislation would have applied that same compensation requirement to any future project, whether proposed by a water district, a city, or anyone else. Without such protection for the basin-of-origin, the Western Slope has never supported trans-mountain diversions, and presumably never will.

The legislative saga continued for years. A particularly notable effort in 2001–02 was led by Rep. Matt Smith, whose bill would have made future diversions contingent on compensation acceptable to local leaders in the basin-of-origin, essentially giving veto power to the Western Slope; Arizona has a similar limit on transbasin diversions.<sup>67</sup> In 2003 Rep. John Salazar carried a similar bill, followed by Rep. Josh Penry the next session, and several others since then. None of them succeeded.

The debate has quieted somewhat, partly because the Colorado River Cooperative Agreement addressed the issue—at least with respect to the Colorado River—and partly because of a compromise in the 2015 Colorado Water Plan. It included the principle that “future Western Slope needs should be accommodated as part of a new trans-mountain diversion project.” That could mean either compensatory storage or money, but either way “a new trans-mountain diversion would move forward only as a package that also accommodates both the eastern and western slopes.”<sup>68</sup> That is conciliatory language that calms the debate, and was crafted from years of round-table meetings, but it lacks the force of law. Thus, future Governors and Legislatures will continue to face the issue. Nor is the 2015 Agreement universally

accepted. The 2018 Legislative Policy Agenda for the City of Loveland, for instance, still wants it both ways, insisting that “Any transfer of native flows from Northern Colorado to other basins must compensate the native basin.” Yet with respect to the West Slope, it takes the defiant position that “Any basin of origin bill must not unduly inhibit Loveland’s ability to acquire... water rights and change the use of any such rights for inclusion in Loveland’s water supply system.”<sup>69</sup>

That is why Club 20, the Colorado Basin Roundtable (in its 2016 report), and many other Western Slope leaders, still insist “that any project which includes trans-basin diversion must include basin-of-origin protection and/or mitigation” acceptable to the local governments.<sup>70</sup>

Following defeat of the 2002 bill, Rep. Matt Smith warned that without such protection, there would never be another trans-mountain diversion in Colorado. He was obviously right—there hasn’t been, and almost certainly will not be.

Perhaps ironically, while the legislature has neglected to place compensation requirements in statute, advocates for basin-of-origin protection may have won the cultural and political battle anyway, as collaboration has become the only tenable position for statewide candidates of both parties. In 1998, candidate Bill Owens famously told an audience in Gunnison that “the era of trans-mountain diversions, without the approval of both sides of the mountain, is over.”<sup>71</sup> Following that precedent, candidate Jared Polis told the Colorado Water Congress in 2018, “As a matter of principle, I will oppose transmountain diversions that are not developed through the collaborative principles that the inter-basin compact committees have agreed on.” He “would oppose any transmountain diversions that

have not been agreed upon by respective areas.”<sup>72</sup>

## Saving agriculture

During the same years the legislature debated basin-of-origin legislation, there was controversy over growing cities, especially Aurora, purchasing agricultural water rights in the lower Arkansas basin, then transferring them to Aurora (South Platte Basin). In 2003 the legislature required compensation of the lost tax revenues for 30 years whenever an agricultural water right is transferred out of one county for use in another.<sup>73</sup> The theory behind the 30-year limit was that by that time a county would be able to diversify its economy to be less dependent upon agriculture—which no doubt seems short-sighted to Arkansas Valley counties now, two-thirds of that time having expired already.

One of Colorado’s most tragic examples is Crowley County, which once had 50,000 acres of irrigated farmland, but today fewer than 5,000. The other 90 percent of that once fertile cropland is now dry, the water rights having been sold in the 1970s and 80s, mostly to Pueblo, Pueblo West, Colorado Springs, and Aurora. The Arkansas Basin Roundtable spent considerable time discussing how to restore water to Crowley County, and made several recommendations, including county purchases of water rights to refill Lakes Meredith and Henry, though with neither specific funding sources nor ideas on why the cities would want to sell the water back.<sup>74</sup> The incentives faced by many farm families are difficult to overcome.



*Former Governor Bill Owens*

Thousands of rural families have children who see a different future than farming, so many parents have no one to carry on the business. That is mainly why the average age of farm owners has been rising for decades, and it now nearly 60.<sup>75</sup> It is the primary reason Colorado has 600,000 fewer acres of farmland than it had 20 years ago.<sup>76</sup> Thus, while many people lament the loss of agriculture when farmland is dried up by thirsty cities, it is difficult to blame people for selling their most valuable asset—their water—when they have no other good choices for carrying on.

## **Conserved water—why the incentives are all wrong**

Colorado leaders have struggled for years to find ways to change the incentives. One idea a few years ago was to fix a quirk in Colorado water law related to “saved water” (also called “salvaged water”). The problem is based on a premise as old as statehood, that owners must use their water as wisely as possible. The public can never be expected to pay for additional projects so water can be wasted. The incentives in Colorado water laws always had that intent, but not always that result.

During the 2001-2004 drought, the law was clear, that no one ever has the right to “waste” any water. That means when filing for water rights, the amount of the right is determined by how much can be put to beneficial use for the specified purpose, and not one drop more. So if a farmer’s water right provides enough water to irrigate 100 acres, that amount is determined at the time of the decree. But if a farmer saves water by installing drip water systems, he is deemed to have been “wasting” any water that is saved. In other words, he has absolutely no incentive to upgrade water systems, because if he does he would lose some of his existing water right.

Especially in a drought cycle, western water rights have huge economic value, so if farmers can save water by upgrading their systems, others (especially growing cities) will happily pay for the cost of the upgrades—and purchase the saved water, sometimes at a very high price. But in the early stages of the drought when some farmers and cities tried it, water courts began to rule that farmers could not sell such “saved water,” because they never legally owned it—they were “wasting” it, which no one has a right to do. The difficult political question remains: how can anyone expect farmers to be more diligent and conserve more water at their own expense, especially if they can actually lose the right either to use or sell the saved water? Why would they do that? How should the legislature eliminate that disincentive and allow saved water to be sold, without upending the still vitally important prohibition against wasting water?<sup>77</sup>

This is a common problem in the West, and in some states an imperfect solution was found. The legislatures in several states (California, Montana, Washington, and Oregon) adopted provisions that allowed “saved water” to be sold, without it being considered “wasted”—if it could be shown that the previous irrigation practices were the common and accepted practices for that region.<sup>78</sup> As a result, tens of thousands of farms across the West have been able to modernize their water systems and free up vast amounts of water for growing cities, rather than the worse alternative of cities simply buying out the farms and eliminating agriculture. Colorado has not taken that step, however, so the problem remains a significant obstacle to agricultural water conservation.<sup>79</sup>

This is not merely a philosophical exercise. More than 90% of all water in the arid West is used in agriculture,

so even a little agricultural savings can provide a great deal of water for cities. Farmers have several incentives for water conservation, including in some cases federal funds. Salinity program funds can help finance on-farm improvements in the Colorado Basin, for example, and the U.S. Department of Agriculture can provide economic assistance, through the Regional Conservation Partnership Program (RCPP), the Environmental Quality Incentive Program (EQIP), and others. There are also programs offering incentives at the state level, at CWCB, at CSU cooperative extension, and others.<sup>80</sup> But in each case, the money might help finance the costs of concrete ditches, gated pipe, sprinkler systems, drip systems, and other such improvements—but they offer a fraction of what the “saved water” is actually worth, were it sellable on the open market. Until Colorado addresses this issue, massive volumes of water will continue to be used irrigating farms, which might otherwise be available for other demands.

## Conservation easements—a powerful tool, but still unused

One fascinating tool Colorado developed in 2003 is the use of conservation easements on water rights. Conservation easements are now in common use nationwide as a means to preserve land against future development. Landowners sell their “development rights” to a third party (a non-profit land trust or a government agency) and their deed is then restricted against the ability to subdivide, build houses, or otherwise change the essential character of farms, ranches and natural areas. For the public, the advantage is in preservation of open space everyone values. For the landowner, this tool offers the ability to infuse the operation with the one thing it needs most—cash—without having to sell out to developers. Over a million acres on 4,000

properties in Colorado are now preserved as open space in this manner.<sup>81</sup>

There is no good reason the same tool cannot be used to preserve water rights on farms and ranches.

In parts of Colorado, water rights are worth at least as much as land, and in many cases much more. It is hard to second-guess the wisdom of a farmer who sells his water rights to a thirsty and growing city for more money than he could ever hope to earn farming. As mentioned earlier, it is a particularly difficult choice for farmers whose children have careers in the cities and no desire to take over the family farm. Yet in spite of the desperate need for water in many western cities, most residents think drying up farmland to gain the water is a long-term mistake. So, the Department of Natural Resources began asking, if society wants the farmers to hold out and refuse to sell their water rights to the cities, why shouldn't it pay them for that decision, just as they are often paid not to sell the land itself. Especially where the water is worth even more than the land, doing so would help the farmers stay in business better than anything else. In the case of land, a farmer can either sell a conservation easement for cash, or for tax credits, and because so many farms do not have tax liability problem, Colorado was the first state to allow such tax credits to be sold for cash.<sup>82</sup>

All the same advantages should apply to water, if Coloradans really want to preserve agriculture and open space in the arid West—and keep farm families solvent. Thus, the Colorado legislature



*Dozens of historic Palisade orchards are preserved by conservation easements.*

agreed in 2003 to explicitly authorize the use of conservation easements to save agricultural water rights, though seventeen years later land trusts (who buy most of the conservation easements on land in Colorado) still view the idea as experimental—and none have yet tried it as a means of saving farms and ranches. It is an idea whose time is surely coming, however, and should be considered wherever growing cities threaten to dry up agriculture.

There are other examples around the country where incentives can and should be changed to make sure the law is aligned with public goals for the 21st Century. Water conservation is essential to the future, and efforts to facilitate system upgrades and efficiency should be encouraged. Old laws that discourage efficiency ought to be updated.

Water conservation ought to be the beginning of all water supply discussions in the West, but it can never be the end. Growing metropolitan areas need more water than can be supplied merely through conservation. It remains as crucial as ever to store water during the wet years for use in dry years, and in most of the West, the current storage capacity is still considerably less than it could be. In Colorado, Western Slope residents may always feel threatened by any discussion of new water storage projects, because they know the population and the money are mostly centered across the mountains on the Front Range. But in fact, the Front Range also has the capacity to store much more of its own water and use and reuse that water much more productively. Colorado has made several great strides in doing so.

There is nevertheless a need for more water storage in every single river basin in the West, including all eight of the major basins in Colorado. And here is the blunt

truth about east-west politics inside a state like Colorado: as long as the Front Range remains short of water, Western Slope water will always be “on the table.” The only long-term answer is to provide the population base with the water it needs, and that can be done without “taking it away” from anyone.

## Why not let the market decide?

A Denver newspaper in 2016 highlighted the apparently-shocking new discovery by some investors that in Colorado, “water is the new gold.” As the article explained, water rights may be as valuable to modern developers and town builders as the mother lode was during the gold rush that settled Colorado.<sup>83</sup>

The story involved the sale of an old family farm in northern Colorado, expected to fetch millions at auction because it included not only 400 acres of land, but also 276 shares of Colorado-Big Thompson water. In fact, the land’s top appraised value was said to be about \$6.2 million, but the water was worth at least \$6.9 million, and possible much more.<sup>84</sup>

The story is not uncommon. Such value places much Colorado farmland out of reach for farmers. With Colorado’s population expected to double in the next three decades, that water is simply too valuable to be used on farms. Instead, the land was bought by a developer, probably for later sale to one of the cities. That’s why the auctioneer for this farm sale was quoted saying, “Water is the new gold.”

This is not, however, a phenomenon limited to intra-state sales and transfers within Colorado. Water marketing is a global trend, leading both *Fortune* and *MarketWatch* to consider water the “gold of the 21st Century.”<sup>85</sup>

*The Atlantic* featured a lengthy article

in 2016 about wealthy New York hedge fund managers seeking to undo a century of western water law and solve drought problems by creating water markets.<sup>86</sup> Their idea was to allow water to be bought and sold like any other commodity. That would have the effect, long-term, of moving most of the West's water from farming—by far the largest use of water—to municipal uses. That could solve the problem of major cities with too little water for their ever-increasing populations. It would also provide a way out for farmers and ranchers who have long struggled against low crop prices, the exodus of their kids, and an aging population. They would have the money for a decent retirement if they could just sell their water for the millions it is often worth, so their argument went.

That prompted many westerners to wonder—why not let the market decide where water is most needed?

In a limited way, some have already done that, especially in Eastern Colorado (and in Southern California). That has completely dried up several formerly thriving farming communities, a new series of ghost towns being slowly created. But there are limits to how far that can go under existing laws, and there are good reasons for those limits.

The short version is: If Colorado water can be bought and sold on the open market, there will soon be no water, at least in rural Colorado. It will all belong to rich investors and be used exclusively in Los Angeles, San Diego, Las Vegas, Phoenix, and perhaps Denver. Western Slope cities like Montrose, Gunnison, Craig, Cortez, and even Grand Junction, could never compete with those multi-billion dollar economies. Nor could farming communities like Rocky Ford, Burlington, Sterling, or La Junta. Could even Denver compete with Los Angeles?

## Water is different than other commodities

The great irony is that westerners, possibly more than people in any other region, are culturally accustomed to defending free markets and private enterprise. That includes a vitally important role for governments in protecting the private enterprise system—sometimes against hedge fund speculators. That's because water is not like other commodities. It doesn't belong to individuals or companies or farms; it belongs to the people of the State. Water rights owners don't own water; they own the right to use it. That is a property right and it can be bought and sold, but only in ways consistent with applicable laws.

First, water rights cannot generally be sold across State lines, because that would effectively transfer a State's share of the River, which is carefully allocated under the Interstate Compacts. Second, water speculation is illegal in Colorado; that is what keeps people from buying and owning water they do not really intend to use. Water is too precious in the West to be denied to people who need it by people who don't. Finally, water rights granted for one purpose cannot simply be sold for another purpose in another location without going back to water court again. That is the central principle that allows the courts to make sure one person's water deal doesn't harm another. Those protections are more than just symbolic—without them, there would be no water available in rural areas where cash is scarce.

Many observers say the slow but steady transfer of agricultural water rights, and the resulting death of agriculture, is inevitable. It is true that many farms can operate more efficiently and with less water than they have historically, and conservation is always a good thing.

It is also true that much of the world's population now eats better quality food, grown by fewer farmers using fewer acres than ever before. That is at least partly because of the elaborate water system that turned the Colorado River Basin into a giant seven-state plumbing system which, in addition to delivering water to almost 40 million Americans, also produces a quarter of the nation's crops, including a substantial portion of the fruits and vegetables Americans eat. As of 2017, Colorado itself had about 2.6 million acres of irrigated farmland.<sup>87</sup> But the Colorado River Basin, including water exported from it into eastern Colorado, and especially into southern California, irrigates 5.7 million acres in four states and Mexico.<sup>88</sup>

People can decide for themselves whether they think drying up agriculture in the West is a good idea, but it is hard to deny that would be the result of free and open water marketing. If Wall Street billionaires can offer farmers and ranchers millions for their water rights—money they could never hope to earn otherwise—one could hardly blame them for selling. And if those investors get fabulously wealthy by reselling that water to cities and developers for a healthy profit, one could hardly blame them for seizing such a golden opportunity.

There is nothing to stop such an outcome—except Colorado's old, complex, and cumbersome system of water laws. It is easy for Coloradans to forget how closely tied their lives are to that very delicate system, especially if they never learned it. The system seems anachronistic to Wall Street. But the history, culture, economy, and way of life—the very survival—of western communities depends on that system. It is worth learning, teaching, and defending.

## Why water history matters, and why it is dangerous to ignore

*Roots* author Alex Haley wrote, "In all of us there is a hunger, marrow deep, to know our heritage—to know who we are and where we came from."<sup>89</sup> Family stories and childhood memories are more than just a desire to know about the past. They teach us what we know and make us who we are.

That is as true for a community as it is for individuals. Individuals inherit not just hair color, but also values, understanding of right and wrong, sense of humor, work ethic, religion, ideas of duty and fairness, and much more. Just so, communities inherit values and character from earlier generations. This is why learning history, and passing it along, is so vital.

Colorado was settled by tough pioneers who scratched out a living in some very inhospitable places, where most rivers run only seasonally. The communities they founded are possible only because they built systems to store and move water. Modern residents of modern cities with modern technology often forget what it took—still takes—to live in such arid climes. They take for granted the delivery of water to their homes, and food to their stores, and don't take time to teach the children how that happens. No wonder so many people now view old western water laws as "outdated."

Attendees at almost any water meeting anywhere in the West will hear that view expressed by some. They frequently hear speakers proposing a new free-market system, where water rights could be bought and sold by anyone, for any purpose, so the market would determine the highest and best use of water. Occasionally, Coloradans must remind themselves of stark realities. The Colorado, South Platte, North Platte,

Arkansas, Rio Grande, Republican, White, Yampa, and San Juan Rivers all have one thing in common. There is not enough water. If water is for sale to the highest bidder, there won't be any for most of Colorado. The communities between Denver and Los Angeles survive only through careful enforcement of the prior appropriation system. It is folly to expect a thirsty Los Angeles to care enough about Vail, for example, that it would decline to buy available water.

Consider the plight of St. George, Utah, continually scrambling to develop new housing because as one of the nation's fastest growing small towns, it adds 30 percent to the population every decade.<sup>90</sup> But new developments require new water, and every water project proposed faces intense opposition from California and Nevada. They both need the water, and defending St. George is not their job. Whose job is it?

A decade ago, when forced to stop using more than its share of the Colorado River (see Section 4), California didn't bat an eye at drying up farms to supply the growing cities. Smaller communities can never compete with big city money, so they must jealously guard the water system that enables their survival.

That jealousy is part of the character of Colorado. It is part of the State's collective "family history," and must be passed along unhindered to future generations.

## Not for sale—at any price

From a marketing perspective, what exactly is the value of water? In economic theory, it is simply how much someone will pay—willing seller, willing buyer. More than any other factor, that determines the price of almost all goods and services. But there may be some things whose value cannot be determined that way, or at least shouldn't be.

The first example, in the West, is water. Local communities, of course, do put a price on water, based on how many gallons individual households use each month.

But on a statewide basis, and especially between states, water is not bought and sold in an open market—and Colorado can never allow it to be. The careful allocation between states is based on delicate agreements that have survived for decades, making prosperity possible in Colorado.

Compare three major water providers who rely on water from the Colorado River Basin. The City of Grand Junction's Utilities Department spends about \$15 million a year and delivers water to 25,000 people.<sup>91</sup> The Denver Water Department has an annual budget just over \$500 million, and serves 1.5 million customers.<sup>92</sup> The Metropolitan Water District of Southern California has an annual budget close to \$2 billion and serves 19 million people.<sup>93</sup>

All three regions face periodic water shortages, and all are constantly looking for better ways to deliver more water to thirsty and growing populations. So are Phoenix, Las Vegas, and dozens of others in seven states. There is no limit to the amount of money available to buy water, were it simply for sale on the open market.

In fact, the entire State of Colorado has an annual Gross Domestic Product (GDP) of less than \$400 billion, the 16th largest state (economically) in the country. California, on the other hand, with an



*Pagosa Springs, Early 1890s. Photo: Colorado Historical Society*

annual GDP of \$3.2 trillion, is the fifth largest economy in the world—compared to other countries, not states.<sup>94</sup> How much would Colorado's share of the Colorado River be worth, if it were for sale?

This is not just idle speculation. There have been numerous proposals over the years for various forms of "water marketing." One plan in the early 1990s would have built a giant reservoir on Roan Creek to store water for sale to California. A few investors would have become fabulously wealthy, but at the expense of any further use of Colorado River water in Colorado's future.

Marc Reisner wrote that "in the West, it is said, water flows uphill toward money."<sup>95</sup> Obviously human engineering makes it possible to deliver water outside its natural basin. That does not make it a good idea.

Some investors claim free markets solve water shortages, but they merely transfer the shortage to the area with the least money. The most current example is in Australia, where a decade-old water marketing system has led to a national scandal (referred to by the media as "Watergate"). That's because big money from elsewhere has completely dried up



the Barwon-Darling River Basin, with disastrous consequences for fish, wildlife, agriculture, and communities.<sup>96</sup> There has been large-scale

corruption and market manipulation. Australia thought a cap-and-trade system for water might create incentives for

efficiency, but speculators seek profit, not efficiency. Today, just four individual users control 75% of the water in that basin. Nationwide, 14% of Australia's water licenses are now owned by investors, including a Cayman Islands group paying record prices, not by actual water users.<sup>97</sup>

Ironically, California, Nevada and Arizona have been considering a water-trading plan based on that Australian system. Perhaps there are better models to study, but marketing interstate water is likely to produce similar results, should it ever be allowed.

Coloradans should take stock of the reality that if water is for sale to the highest bidder, so is the State's future. In the case of Crowley County mentioned earlier, Darla Wyeno, the town clerk, was among those who sold her water rights. The money helped put their son through college, yet she still laments the fate of their farm, saying, "When we sold our water, we sold our future."<sup>98</sup>

Colorado ought to make clear that its water is not for sale—at any price.

## SECTION 4—JUST BECAUSE WE’RE PARANOID

---

### *Major Threats to Colorado’s Water*

*Water, water, everywhere,  
And all the boards did shrink;  
Water, water, everywhere,  
Nor any drop to drink.  
- Samuel Taylor Coleridge*

In recent years, news reports are filled with detailed analyses of the primary threats to the Colorado River Basin, the great American Southwest, the Great Plains, and the quality of life itself in the West. The threats focus almost entirely on two primary issues: *population growth*, and *climate change*. Spoiler alert: most writers are opposed to both, and no writer has any meaningful solution to either.

There have always been activists who think the world is overpopulated, and many westerners think that particular region is overpopulated. Whether one agrees or not, though, water policy cannot alter it.

Climate change attracts the most attention. What people could do, according to countless writers, is stop using so much water, because climate change is depleting the water supply, and destroying agriculture,<sup>99</sup> to the point that human behavior (i.e. farming and ranching) is destroying the region’s environment. Yet there is no good alternative to the human desire to live, eat, drink, breathe, and travel in the Southwest.

Population and climate are both legitimate issues for debate, but they are decidedly NOT the most important threats to Colorado water. Colorado’s future prosperity depends on the ability to develop and use its water, and there are two existential threats to that

ability: federal control, and downstream (especially California) opposition.

In both cases, Colorado faces the ominous prospect of not being in control of its own destiny. Water decisions affecting this State’s future ought to be made by the people of this State. They are far outnumbered when dealing with either California or Washington, D.C., so their unity is essential.

### **Weaning California**

No water issue in the past generation has been more difficult—or more important—than the effort to wean California from its over-use of the Colorado River. The agreement to do so was a saga involving dozens of water leaders from all seven states and the federal Interior Department, debated for well over a decade, which resulted in the most significant water conservation milestone since the original Interstate Compact.

A brief background helps explain the difficult situation Colorado faced. Within a few years of the settlement of the West in the mid-19th Century, it became obvious that the Colorado River and its tributaries could not support unlimited growth in all seven states that depended upon it. It took until 1922 for those states to reach an agreement—the first interstate water compact in America—on how to divide the waters “fairly.” The river was split into two halves, Upper Basin and Lower Basin, each entitled to half the annual flow of water.<sup>100</sup> A later agreement (1948) divided the Upper Basin waters, half to Colorado and the other half to Utah, New Mexico and Wyoming.<sup>101</sup> The Lower Basin States of Arizona, Nevada and California divided the water mostly according to population, meaning California got the lion’s share, a

much smaller portion went to Arizona, and almost none to Nevada (there were relatively few people in Nevada in 1922).<sup>102</sup> But a complex part of the Lower Basin agreement that would come back to haunt everyone 80 years later, was the definition of California's entitled share. It included a specifically defined amount of water each year (4.4 million acre feet or MAF), PLUS any unused portion of Arizona and Nevada shares, PLUS any surplus water in the system during wet years.

"Surplus water" had never really been officially defined, but it did not matter for many decades because there was always extra water from the Arizona and Nevada



*The Colorado River Aqueduct delivers a billion gallons a day, through 2 reservoirs, 5 pumping stations, 63 miles of canals, 92 miles of tunnels, 55 miles of concrete pipes, and 28 miles of pressurized siphons.*

allotments. So, California continued to grow unchecked, becoming dependent not only on its entitled share of the River, but another 25 percent—over 800,000 acre feet each year.<sup>103</sup> But by the 1990's, when the Central Arizona Project completed the huge aqueduct to Phoenix, Arizona finally grew into its entire allotted share of the river. At

the same time, the growth of Las Vegas had resulted in Nevada using its entire share, and it was in dire need of more water itself; Las Vegas had about 2,000 people in 1922, but over 2 million today. Neither state had any unused portion anymore. However, Colorado had never grown into its own entitled share and used about a million acre feet less than its entitlement. That meant California was using Colorado water (Lower Basin using Upper Basin water), a complete violation of the Interstate Compact—unless there

was surplus water in the system because of exceptionally wet years.

As a result, every proposal to use additional water in Colorado became a threat to existing uses in California, and for the first time in history, California needed a clear definition of the term "surplus." That was a legal hook the Upper Basin states had never had before, so they insisted on a water conservation plan to limit California's use of the river to its entitled 4.4 MAF share. But after so many years of already existing uses, California could not reduce its use of the River without enormous expense and difficulty. So as a means of accomplishing the task, the Upper Basin states agreed to "interim surplus criteria," literally to declare artificial "surpluses" while California ratcheted down its use of water, as long as certain measurable milestones were reached during the ten-year phase-in period. It was at times difficult, funny, sad, painful, nasty, statesmanlike, optimistic, pessimistic, futile, promising, and rewarding—and in the end it worked.

It would be difficult to overstate the difficulty of that effort for California water leaders. When the process began, southern California agriculture was almost entirely based on open-furrow irrigation, often in 120-degree desert summers. Almost the entire Imperial Valley had to be retro-fitted with gated pipe, concrete ditches, drip watering systems, and other expensive conservation measures. Even more difficult, they had to impose on a 100-year old system a legal means to quantify water rights. This problem was especially difficult for Upper Basin residents to understand, because in most of the West a water right can only be decreed after it is explicitly shown how much water will be needed, for what exact purpose, in what exact location, and for exactly what duration. But several of the largest

and oldest water rights in the California system belonged to large irrigation districts (not individual farmers), whose water rights decreed “such water as they in their judgment may require.” That gave such districts little legal incentive to conserve or use water wisely.

Forcing a quantification requirement on century-old systems was an enormous burden, requiring foresight, leadership, and sometimes brutal political battles. Several times, California officials asked the other states for more time, but the others held firm, with rock-solid support from Interior Department officials in both the Clinton and Bush Administrations. The final adoption in 2003 of the California 4.4 plan, officially the “California Colorado River Water Use Plan,” and the “Quantification Settlement Agreement,” was hailed as one of the great accomplishments in water conservation history.<sup>104</sup>

For many years, some leaders were resigned to thinking that once California was accustomed to all that water, it would be impossible for Colorado ever to get it back. But the final agreement proved once and for all that the Interstate Compact was enforceable. The U.S. Supreme Court rulings against Colorado in a string of *Kansas v. Colorado* cases also made clear the high court’s willingness to enforce interstate compacts, even at the expense of taking water from long-term users.

As the Colorado River District’s external affairs manager Chris Treese put it, “Colorado can celebrate the fact that our negotiators were so far-sighted in 1922 as to write the compact... Our water entitlement is reserved for us to develop when we want to, if we want to. We don’t have to rush to development because someone else is.”

The issue is not settled permanently, however. California’s largest water users continue to litigate the quantification agreement, even in the summer of 2020.

A three-judge appellate court panel in San Diego heard a dispute between the Imperial Irrigation District (IID) and one of its large farm owners.<sup>105</sup> He had sued to overturn an

apportionment plan within the district that would limit his use of irrigation water. Surprisingly, he and other growers are still arguing that farmers have a right to however much water they “reasonably need,” based on past use (meaning use prior to adoption of the 2003 California Quantification Settlement Agreement). The case is of tremendous interest to Colorado and the other states, because IID is by far the largest Colorado River water rights holder in California—it has the right to 3.1 MAF, which is nearly two-thirds of California’s entire share of the Colorado—and because farmers use 97 percent of IID’s water.<sup>106</sup>

## Are California water battles any of Colorado’s business?

The IID case is only one of several internal California water issues that could significantly impact Colorado. Another is the effort to address long-term water shortages for farms in the San Joaquin Valley, while the giant cities continue to grow, and while trying to leave as much water in the rivers as possible for the endangered “Delta smelt.” As in Southern California, the north and central regions also have very limited water, so how they



*Open furrow irrigation in the Imperial Valley*

divvy it up literally determines which areas grow and prosper and which areas do not.

This case is connected to the long-term multi-state struggle involving the Colorado River. That settlement was so expensive and painful within California, that it also focused increased attention on northern California. That's because while much of the Los Angeles water supply comes from the Colorado River, the rest

comes mostly from the "State Water Project."



That system of reservoirs, aqueducts, and pumping stations extends over two-thirds the length of California, supplying water to 27 million people, including the Bay Area, the San Joaquin Valley, the

Central Coast and Southern California, including L.A. and San Diego. It also irrigates 750,000 acres of farmland in the San Joaquin Valley,<sup>107</sup> which is the crux of the problem. More water for the cities means less water for irrigation—and more water for endangered fish means less water for either.

The primary issue is the management of reservoirs and diversions from the Sacramento-San Joaquin Delta. It is complicated by the fact that the State runs its own elaborate system, essentially parallel to the federal government's "Central Valley Project," owned and operated by the Interior Department.<sup>108</sup> The former supplies massive amounts of water to the big thirsty cities, and the latter to most of the agriculture in the Central Valley—which produces more than half the fruits and vegetables grown in the United States.<sup>109</sup> Both projects take water from the Sacramento-San Joaquin Delta, so the state and federal governments negotiated a Coordinated

Operation Agreement in the 1980s, defining how the two water projects meet water needs, while complying with environmental laws, and with court rulings about the Delta smelt. That agreement called for periodic reviews, which began in 2016.

It is difficult to balance those limited supplies among agriculture that supports the entire nation, some of the country's largest and most important cities, and vital habitat for wildlife. Yet it remains largely an internal problem for California, and a complex negotiation between that State and the federal government. Except for one detail that has Colorado water leaders on edge.

During his last weeks in office in 2018, California Governor Jerry Brown negotiated a final deal that seemed likely to get all the competing interests on the same page, and incoming Governor Gavin Newsom endorsed it. It requires an Act of Congress, because of it needs hundreds of millions of federal dollars for new water storage, desalination, and water recycling programs.<sup>110</sup> That might seem unlikely, except the sponsors include almost the entire state congressional delegation, which includes both the Speaker of the House and Minority Leader.<sup>111</sup> In the fine print of the deal, though, the Metropolitan Water District of Southern California, the most powerful water entity in the West, quietly gave the federal government a significant share of its own water, during extremely dry years.<sup>112</sup> That matters to Colorado because if Los Angeles ever finds itself short of water because of that little detail, it has but one other place to turn—the Colorado River.

Environmental groups have already gone off-script, demanding more water for fish, and Governor Newsom now waffles, so final implementation is uncertain. But if future water shortages cause L.A. to

demand more water from the Colorado River, it would reopen the most difficult and delicate compromise in a century. In other words, California's internal water battle is none of Colorado's business—until it is.

## The 2019 Drought Contingency Plan

In a larger sense, everything involving the Colorado River is Colorado's business. Its leaders were at the forefront of negotiations that led to 2019's adoption of new "Drought Contingency Plan" (DCP) for the Colorado River.<sup>113</sup> It took several years of meetings between the seven states, various federal agencies, utilities, and numerous environmental organizations. Yet they have dramatically different views of the deal they supposedly crafted together.

Congress passed legislation ratifying the DCP agreement and President Trump signed it.<sup>114</sup> All of the states, including Colorado, felt good about the settlement, which protects their water entitlements while preserving important flows. Yet different people can look at the same facts and reach entirely different conclusions.

The largest water user on the River, California's Imperial Irrigation District (IID), filed suit to stop implementation the same day the President signed it into law, claiming it might further shrink the Salton Sea—which has very little to do with the agreement.<sup>115</sup> In fact, the Salton Sea's very existence is the result of a disastrous canal failure in 1905, which inundated a town, a railroad, and much of an Indian reservation. "Saving" that man-made catastrophe from drying up is not the problem of Upper Basin states like Colorado. More to the point, it is not really what IID is upset about—the IID has been fighting for decades to preserve an old system that allowed its wasteful use of the Colorado River. For the new

drought plan, the Metropolitan Water District of Southern California even offered to cover IID's contributions, so that California could agree to the deal. No matter, IID sued anyway, which surely demonstrates an agenda that is not really related to the purposes of the DCP.

At the same time, the Sierra Club, "Save the Colorado," and other environmental groups also opposed the deal.<sup>116</sup> They argued that the "hydrology has changed," so that the DCP should have triggered an entire new environmental impact statement—to replace one done just over a decade ago. Most environmental groups, though, supported the deal.<sup>117</sup>



The DCP is an agreement of states, consistent with the original Interstate Compact that regulates which states get how much water. It can be modified by mutual agreement, with congressional consent, as has been done here. The states have agreed to keep enough water in Lake Powell and Lake Mead to keep those vital reservoirs from "crashing" as water levels shrink precipitously during sustained droughts—without reducing their entitled shares of the river.

Some government scientists raised concerns about the importance of increased river flows to mosquitoes, caddisflies, and midges—and thus to fish. The main issue is whether Lake Powell and Lake Mead will continue serving their purpose of storing water, to supply the allocations among states consistently. Today's lower reservoir levels are partly due to drought, but also

due to the government releasing water for fish, rather than storing it for people. The Drought Contingency Plan is an important step in preserving the balance between environmental and human concerns.

## Colorado has the most to lose

The balance between the interests of Colorado and the downstream states is even more delicate and more difficult. Colorado frequently faces an ominous issue involving all the Lower Basin states, namely, their periodic attempts to renegotiate the Interstate Compact itself. Several states have always thought the 1922 agreement unfair, especially Nevada and Arizona, both of whom receive significantly less water than California,

based on their relative populations at the time. None of the other states, however, have as much to lose as Colorado, should the agreement ever be re-negotiated, because only Colorado has a significant unused allocation.

Historically, when any political official has spoken openly about reopening the discussion, Colorado

leaders have reacted swiftly, decisively, and with a united front, to put an end to such talk. Candidates have generally recognized the delicate nature of the issue throughout the West, with one notable exception. During the 2008 presidential campaign, Senator John McCain, the Republican nominee, made a campaign appearance in Pueblo, Colorado. He was asked about western water issues—as national candidates invariably are when visiting the Centennial State—and his answer baffled the crowd. He was from

Arizona, and knew distribution of the Colorado River was a sore subject for his own constituents, so he relied on a line he had often used on the campaign trail back home. He said it was past time the outdated and unfair old Colorado River Compact should be renegotiated.<sup>118</sup>

McCain had no idea what a hornet's nest he had stepped into in Pueblo, but several people immediately told him. National party leaders quickly explained to him that you can never say that in Colorado, and that Colorado leaders would never stand for renegotiation. Indeed, then-Senator Ken Salazar said it would only happen “over my dead body,” and Republican Senate candidate Bob Schaffer agreed, using the phrase “over my cold, dead political carcass.” McCain's campaign issued a correction, assuring Colorado voters that he would protect their water against thirsty downstream cities.<sup>119</sup>

In truth, the Interstate Compact does create an ongoing problem for Colorado, specifically because its allocations are based on a higher volume of water than is usually there, as discussed earlier. Whether that is due to the overgrowth of forests and invasive species, or climate change, or any other cause, it remains a serious issue. The specifics of the Compact and related agreements illustrate why.

The Colorado River's water is divided between Upper and Lower Basins, half the water allocated to each. The allocations are based on an annual flow of about 16.5 million acre-feet (MAF), approximately the 100-year historical average.<sup>120</sup> The Lower Basin states of California, Nevada, and Arizona were allocated 7.5 MAF of water, as were the Upper Basin states of Colorado, Wyoming, Utah, and New Mexico (the remaining 1.5 MAF goes to Mexico under a 1944 treaty).<sup>121</sup> California convinced Congress to distribute the



Lower Basin's half by population: 4.4 MAF for California, 2.8 MAF for Arizona, and 0.3 MAF for Nevada. The Upper Basin states agreed on distribution of their half in 1948, allocating percentages of the annual flow, not fixed amounts. Colorado got 51.75 percent (of the Upper Basin half), Utah 23%, Wyoming 14%, and New Mexico 11.25%.<sup>122</sup>

Today, some hydrologists say the actual flow of the River is not 16 MAF, but perhaps 13 over the past 20 years.<sup>123</sup> Debate rages about how that affects administration of the river, how to operate the main reservoirs (Meade and Powell), and how to deal with a "call," or demand, from the Lower Basin during drought years.<sup>124</sup> Every time the issue is raised, leaders in the other states—and sometimes federal officials—assume Coloradans will just have to "conserve" (*i.e.* use less). More to the point, many leaders oppose new water storage projects, because they say there just isn't any more water to develop—entitlement or not.<sup>125</sup>

Yet through all of these debates, rarely has any water leader seriously suggested equally adjusting all the allocations, based on the lower quantity of water. Under current law, the Lower Basin is entitled to its 7.5 MAF, in times of surplus or drought. California gets its 4.4 MAF, whether or not there is enough water for the other states. So, if there is not enough water for the entire Lower Basin allocation, Colorado loses. Glenn Saunders, who practiced water law for 60 years in Colorado, once argued that the Compact could be rewritten without much difficulty, and without a protracted political battle, IF the percentages stayed the same, with every state's entitlement adjusted to reflect the actual flow.<sup>126</sup> That would make the Lower Basin share 6.5 MAF, not 7.5, and California would get 3.8, not 4.4.

It is highly unlikely that the other states would ever agree to such a solution, but it is the ethical "high ground" position for Colorado leaders. Colorado can readily acknowledge the Compact's supposedly inherent flaw (over-estimation of the flow), while still insisting on the essential fairness of the allocations. Saunders was right in suggesting that should be the official policy of Colorado, and the entire Upper Basin.

## **Federal water rights—the most serious threat of all**

While the most obvious threat to Colorado water is the slow steady transfer to California and other downstream states, the most insidious and perhaps dangerous threat is the ever-expanding definition of federal "reserved water rights." It is a potential threat to water in both rural and urban areas, similarly onerous for both farms and growing cities.

The evolution of this issue is a good example of how initially well-meaning environmental protections became twisted to suit the agenda of a national lobby—one that was not primarily motivated by concern about Colorado's economic future. When the public lands were first "reserved" by Congress to remain in public ownership forever, the intent was clear. These lands were to be preserved for the use and enjoyment of future generations and managed in a way that allowed fair access to the resources for the current generation. The National Forest system, for instance, was created in 1897 "to improve and protect the forests" for two specific purposes: "to secure favorable conditions of water flows, and to furnish a continuous supply of timber."

It was well understood that if greedy people denuded the forests, they would kill the ability to produce wood for future

generations, *and* they would degrade the quality of water flowing from those forests. So the federal officials were to manage the public lands to guarantee the availability of wood and water.

Early leaders in the West built reservoirs to store the spring runoff in the high country. Many reservoirs, ditches, pipelines, millraces, and other water supply systems were built on federal



land—with the explicit authorization of Congress. Congress did so for two important reasons, as valid today as ever. First, at higher elevations closer to the original snowmelt, the quality of water is

higher, and the cost of water treatment is lower. The further downstream water flows, the more minerals and pollutants it picks up, increasing treatment costs. Second, at high elevations considerably less water is lost to evaporation because it is colder. Thus, capturing and storing water is best accomplished high in the mountains, and in Colorado that generally means on federal property.

The issue of federal water rights dates from that homestead era, when public lands were available to be privatized, and Congress authorized construction of roads, water systems and other infrastructure needed for settlement in the new territories. After the turn of the 20th century, Congress began to “reserve” certain public lands—removing them from availability for homesteading, and classifying them as national forests, parks, and wildlife refuges. The change led to a showdown between existing uses of water and the federal government’s need to maintain those public lands.

Even today, landowners, municipalities and water districts across the West often find themselves at odds with federal land managers. The managers are intent on regulating water for the benefit of the land, not the people—as if the two are mutually exclusive.

Though water is owned by the states, and water rights are regulated under state law, the U.S. Supreme Court had to weigh in as early as 1908, in the famous *Winters v. U.S.* case.<sup>127</sup> The court ruled that when the U.S. sets aside an Indian reservation, it is implied that the government had also reserved enough water to fulfill the purposes of the reservation; the water right has the same priority date as the reservation’s establishment.<sup>128</sup> In 1963 the court also confirmed the existence of “reserved water rights,” not just on Indian reservations, but all public lands that were explicitly “reserved,” meaning national forests and parks.

On the other hand, the court began to recognize government’s over-reach when agencies insisted on more water than was necessary “to satisfy the primary purposes” of the law creating the national forest or park. The government lost a series of such cases, starting with *U.S. v. New Mexico* in 1978. The case held that the existence and quantity of federal reserved water rights depends upon the reservation’s authorizing legislation, and the specific purpose for which a particular park or forest was established.<sup>129</sup> Reserved water rights could be claimed by a national forest “only where necessary to preserve the timber in the forest or to secure favorable water flows for private and public uses under state law...” but not “for aesthetic, recreational, wildlife preservation,” or other purposes.<sup>130</sup>

In Colorado, several cases further clarified that reserved rights precedent. In an early 1980s Denver water case, courts affirmed the existence of federal reserved

water rights, but those rights are junior to any rights that existed at the time of the reservation.<sup>131</sup> A similar case awarded reserved water rights to Rocky Mountain National Park, consistent with the purposes for which the park was created. But the courts denied U.S. Forest Service (USFS) claims for more general instream flow rights, and a claim for recreational flows in Dinosaur National Monument; because both uses were unrelated to the purposes for which those parks and forests were established.<sup>132</sup> In the 1990s the federal government claimed an instream flow right for “channel maintenance” in the South Platte River. The courts denied the claim, mainly on the grounds that the USFS did not need “channel maintenance” rights, because it already had other land use authority to regulate “and limit” third-party diversions in the national forests.<sup>133</sup> The authority has been oft-used by federal managers.

## Black Canyon of the Gunnison

The built-in conflict between federal, state, and private water rights reached the boiling point over the National Park Service’s claim for water rights in the Black Canyon of the Gunnison River. The Gunnison River, like most in the West, has more users than water, so the seniority of water rights is enormously important to irrigation districts, ranches, cities and towns along the river and its tributaries. In addition, the largest reservoir in Colorado sits above the Black Canyon. Blue Mesa Reservoir, together with the Crystal and Morrow Point dams that form the “Aspinall Unit,” is a critical component in a very complex system for regulating the flow of water throughout the seven-state Colorado river system, supplying downstream irrigators and cities, storing several years’ supply of water, and making it available year-round.<sup>134</sup> Thousands of people depend on that water for numerous purposes, including

recreation and power generation. Fishing and boating on Blue Mesa Reservoir, and rafting through the canyons below it, are big business in that region.

The Black Canyon was made a national monument in 1933. Thirty-eight years later the government clarified its intent that the monument should also include water rights, a flow sufficient to keep the canyon beautiful, and available for fishing and rafting.<sup>135</sup> However, despite the development in the 1960s of the reservoir system just above the canyon, the rapid growth

of communities that use water from the same river, and a huge push by the state government in the 1980s to protect such “instream flow” rights, the federal government never bothered to quantify its water rights for the Black



*“Chasm View,” Black Canyon of the Gunnison, NPS*

Canyon. Remember, under the laws of most western states, water rights cannot be decreed until the amount, duration, and location are determined. Yet decades after creation of the park, that is what the federal government proposed to do—retroactively.

The struggle began with a 1978 case, in which a court said the Park Service had a reserved water right there, and ordered the agency to quantify and file for that right. Two days before the end of the Clinton Administration in 2001, the government finally did so, insisting that the rights would have an original 1933 priority date. That was an immediate threat, of course, to every water rights

owner whose rights were decreed later; there are hundreds of them, including virtually all the farms and ranches above Gunnison.<sup>136</sup> The Colorado Water Conservation Board (CWCB), which has jurisdiction over “instream flow” water rights, had already decided that at least a reasonable argument could be made on the federal government’s side of the priority question, so instead of fighting over the date, the agency focused instead on how much water federal officials wanted. The Park Service’s answer, in the January 18, 2001 filing, was astonishing.

The agency proposed, in essence, to own the maximum possible historic flow during the wettest years on record—not just during the spring runoff season but year-round. That would mean completely changing the multi-state management agreement that runs Blue Mesa Reservoir, to the detriment of vital electric power generation, as well as downstream cities and towns. It would mean drying up numerous farms and ranches upstream in the Gunnison Valley, flooding a portion of the town of Delta, including part of U.S. 50 and a vital railroad. Perhaps worst of all—since the government claimed the plan was for the benefit of the environment—experts at the Colorado Division of Wildlife said that extreme amount of water would destroy a world-famous gold-medal fishery in the Gunnison Gorge, just below the Black Canyon. In all, over 380 water users across the West had interests threatened by the federal plan, filing more objections than in any case in the history of western water law.<sup>137</sup>

Stories like this are actually common in the West, where federal assertions of water rights seem to trump all previous local interests, on the theory that federal interests take priority over state and local interests. In the Black Canyon of the Gunnison case, there are good and bad endings to the story. First, Colorado

used the case to pioneer an important precedent, showing how federal water interests can be protected under state law.<sup>138</sup> There is really no need for a divisive state-federal battle *if the environmental protection agenda is genuine*. Colorado law explicitly allows water rights to be held for “instream flow” purposes, to maintain and improve the environment “to a reasonable degree” (meaning, trying to protect other interests, too). Under this important law, only the State can own such rights because the State can also protect other existing interests in a dispassionate way. So CWCB used that law, filed a claim for instream flow rights in the Black Canyon on behalf of the State, in quantities that would reasonably protect the flows in the canyon, including large historic springtime flows, without causing the major damage the original federal plan would have caused. The agreement was a historic compromise, cosigned by Interior Secretary Gale Norton, Colorado Attorney General Ken Salazar, and Natural Resources Department Director Greg Walcher.<sup>139</sup>

The deal was a happy ending to a decade-long battle, viewed by many as a way forward on similar struggles in other states. Several Western states asked for copies of the agreements, and there was talk of a similar approach in at least a dozen other major cases. Everybody won, and everybody was happy—almost. The only people involved who were not happy with the result were a few national environmental organizations, whose agenda was to stop many existing uses of water. Some would have been happy to see farms and ranches dry up, and downstream cities and towns curtailing their growth. They clearly did not care about the impacts of flooding the town of Delta.

As soon as the wave of good publicity from the historic deal had blown over,

these groups filed the inevitable lawsuit against the federal government for “abdicating its responsibility” to take the most water it could get, and for allowing the use of state law to protect federal interests. They said using state law to protect federal interests was illegal.<sup>140</sup>

A Denver district court judge agreed with the environmental groups and ruled against the historic settlement. That sent the parties back to the negotiating table, resulting in a final settlement 5 years later, with the reserved flows somewhat reduced, but no longer relying on State law to preserve the instream flow.<sup>141</sup> The agreement that had been touted as a potential solution to hundreds of contentious cases throughout the West was soon forgotten. The long-term implications for future federal reserved rights cases is uncertain, at best.

## Forty years of wilderness water debates

Federal agencies have now asserted federal water rights on nearly every national forest, national park, and wildlife refuge in the West, along with numerous BLM parcels. Environmental groups continually file lawsuits on the issue, and agencies use designations such as “Wild and Scenic Rivers,” “Natural Areas,” “National Conservation Areas” and others to stop new uses of water, other than instream flows and recreational rights. In Congress, a great deal of environmental protection work—especially wilderness legislation—has ground to a halt for 25 years because of the debate about how to handle the water rights. Advocates for more wilderness, and those seeking to “release” wilderness study areas both find their efforts frustrated by the lack of consensus on the primary issue in the West. The top-down command approach generally taken by federal agencies, and the us-against-them approach of land and water owners, mostly results in stalemate.

Earlier this year, for example, the House passed a wilderness bill that Rep. Diana DeGette has repeatedly introduced for over 20 years.<sup>142</sup> It would designate as wilderness some 660,000 acres in 36 areas in Colorado, as well as 478,500 acres in California and 131,900 acres in Washington (none of which are in DeGette’s Denver district). Similarly, the House passed a wilderness bill last fall sponsored by Rep. Joe Neguse, designating about 400,000 acres, mainly on the Western Slope.<sup>143</sup> In both cases, and several others, the bills have virtually no chance in the Senate, and the primary objection is their silence on federal control of water.<sup>144</sup> That controversy has been at the heart of Colorado wilderness discussions for 40 years.

The last major wilderness bills for Colorado were negotiated by Senators Bill Armstrong and Gary Hart in 1980, and Senators Tim Wirth, Ben Campbell, and Hank Brown in 1993.<sup>145</sup> They passed because they explicitly protected existing water rights, as well as preserving Colorado’s right to develop its entitled waters in the future. In the 1993 bill, when water had become the primary stumbling block, Congress explicitly disclaimed either an express or implied reserved water right, precluding any future assertion of a wilderness reserve water right in Colorado.<sup>146</sup>

Congress has been all over the map on the same wilderness-water issue in other states. In the 1980s wilderness bills were passed for both Utah and Wyoming, both of which clarified the need for federal water rights to be adjudicated in state courts, and junior to existing water rights. The Wyoming bill also prevented any federal assertion that would stop a planned water project. However, a 1987 New Mexico wilderness bill (El Malpais) and the 1994 California Desert Protection Act, both expressly reserved sufficient

water to carry out the purposes of the wilderness areas. In a 1990 Arizona BLM wilderness bill, Congress went even further, reserving water “sufficient to fulfill the purposes of the legislation,” and directing the Interior Department to file claims to quantify the rights and take steps necessary to enforce them.<sup>147</sup>

Why the differences in the way Congress has approached these issues in Colorado, as compared to other western states? In a nutshell, because water issues are more controversial, more difficult, and more important in Colorado than in any other state.

It might seem obvious that preserving public land requires protecting the associated water, too, but that is not where the discussion ends. That would provide easy agreements in most cases, but that is not what the argument is really about. It is, put simply, about the use of water issues to impede *already-existing* businesses, cities and towns, farm and ranches, and the ability for such human uses to grow in the future.

## The government never gives up

Despite all the court cases “clarifying” what rights the USFS has and does not have, the agency has continually sought to tie up existing uses of water, with an agenda to leave it in the streams, for environmental values, and coincidentally, for California. In 2015, the agency was forced to withdraw from a decade-long attempt to require ski resorts to transfer their water rights to the federal government.<sup>148</sup> The USFS announced the major policy shift on December 30, perhaps hoping that few would notice.<sup>149</sup>

All the major Rocky Mountain ski resorts (122 of them, with over 25 million skier visits annually) are on national forests—not because the ski industry prefers

federal land, but because the federal government owns all the big mountains.<sup>150</sup> Twenty-two ski resorts in Colorado own 112 separate water rights.<sup>151</sup> Those include Aspen, Snowmass, Loveland, Vail, Beaver Creek, Keystone, Breckenridge, Copper Mountain, Crested Butte, Steamboat, Purgatory, Telluride, and Winter Park (and most of the smaller ones, too). The federal government owns the land, but it does not own the snow, the streams, and the water, which belong to the people of the State. That has been a sticking point for years with the USFS for years, which wants to own and control all the water that crosses national forests. Almost no western landowners own or control all the water that crosses their land, but federal officials think the government should own all the water that crosses its land.

Federal courts dealt the agency a major blow in the ski area case in 2012. The court sided with the ski industry and said such a requirement would be a taking of private property without compensation, as forbidden by the 5th Amendment. So in 2014 the agency floated a proposal for a lesser requirement: ski areas would have to prove there is enough water to operate into the future, as a condition of their permit.

It is somewhat daunting to be asked to prove how much water might be available in the future to meet an arbitrary “sustainability” standard, but at least it stopped short of an actual federal taking of the water right. So that is what the USFS finally decided it must accept, but only because it was clear they could not win the legal case. For the time being, that ended the ski area threat, with the government officially albeit grudgingly acknowledging that water rights, even on national forests, are a matter of State law. Still, it seems unlikely that the USFS will permanently give up on something it has wanted for 30 years, just because it lost one court case.

Federal control over the ski areas' water could only serve one purpose, namely, to curtail its use by the ski areas. That would put federal land managers, not ski resort experts, in the position of deciding how and when snowmaking is needed, and other questions that could literally make or break some of the most important businesses in Colorado.

## The Colorado Ditch Bill—one attempt to block federal control

If further evidence of this long-term federal agenda is required, one need only look at the saga of the “Ditch Bill” that began in the 1970s and lasted nearly 40 years. It evolved from a series of disputes in which the USFS attempted to require permits for the owners of existing reservoirs and ditches on federal land to maintain or repair those water systems. In many cases, the government even tried to extort from the owners a portion of their private water rights in exchange for the permits. Owners argued that the reservoirs and ditches had been there for decades—many of them predate the existence of the national forests—and people have a right to maintain their property.

And they were outraged by the agency's attempt to take part of their private property, a clever ploy the USFS called “bypass flows”: the water owners would be required to let part of their water “bypass” the ditch and remain behind in the stream—in exchange for a permit to maintain or repair a dam, headgate, weir, or ditch. In other words, the federal agency in effect was saying, “we'll allow you to repair and maintain your private property—if you give us part of it.”

These were not cases where the government owned any water rights; the federal government only owns the land across which the ditches or pipes

are located. The water rights, and the structures, are private property. Since these water systems are vital to the survival of farms and ranches, and will not work unless regularly cleaned and maintained, and because the USFS remained intransigent on the issue, Congress finally stepped in.

The direction from Congress was clear—the USFS was to acknowledge existing ditches by issuing permanent easements, allowing maintenance and access as needed for operation; the agency was given 10 years to work through the process once and for all. Specifically, the “Ditch Bill,” carried by the late U.S. Rep. Mike Strang (R-Carbondale) and passed in 1986, required the government to issue permanent easements for water conveyance systems that existed before 1976. The owner had to request the easement by 1996, and had to have a valid water right under state law.

The Ditch Bill was intended to provide for continued agricultural irrigation notwithstanding other land management decisions, even wilderness designations.<sup>152</sup> To address the wilderness issue, the bill stated that maintenance on ditches that cross wilderness areas must be done “consistent with” *both* wilderness management *and* maintenance of the private easement. The intent was ranchers and forest managers should use common sense, and if possible try to maintain ditches without building roads or using motorized vehicles. The environmental lobby opposed that language, saying access for dam repairs would be a “disaster” in wilderness areas. Ironically, under the Wilderness Act, areas should never be designated wilderness in the first place if they contain dams, reservoirs, ditches, or other structures built by people.<sup>153</sup> After all the debate, though, Congress determined that the farmers were right, and provided clear direction.

Ranchers hailed the bill's passage as a victory for private property rights. By the 1996 deadline, the USFS received 2,500 requests for the easements, but a decade later had "processed" and issued only 600 of them. In 2004, under increased pressure from Congress, the agency finally got around to issuing direction to its local managers on how to deal with the matter, though they slow-walked the process; a decade later only about 60% of the easements for which applications had been received had been completed. Some of those were finally issued by 2013, and some were never issued.<sup>154</sup>

The paralysis of federal land management agencies is not necessarily their choice. It is better understood as a creation of the Congress. Congress alone can be blamed for creating the contradictory laws about who is in charge of water. As shown earlier, Congress has often made clear that water management is a function of state, not federal law. Yet it has also created federal reserved water rights, sometimes without a requirement that they be filed under state law, and in other instances Congress has plainly disclaimed the existence of such federal water rights.

Throughout the homestead period, Congress passed a series of laws granting easements across federal lands for roads, rails, and water systems. When those laws were repealed by the Federal Land Policy Management Act of 1976 (FLPMA),<sup>155</sup> Congress explicitly recognized the continued validity of all easements already granted under previous laws. Yet over the years since, it has also complicated that simple "grandfather" clause by acknowledging and tolerating bureaucratic delays, competing claims, and legal action.

Congress has passed some wilderness bills that included federal reserved water rights, but others specifically disclaiming

such federal rights. It has taken action to release some claims, but held fast to others.

In the Colorado Ditch Bill, Congress instructed the USFS to grant ditch easements, and gave it a deadline. But Congress did not act when the deadline passed without the required USFS action. One reason for the delay was pressure from individual Members of Congress who did not support the easements.

Congressional reaction to the mishmash of conflicting laws is all over the map, too. Angry hearings have been held—on both sides of these issues—with senators alternately berating federal managers for asserting federal control over water, and for not doing so. Congressional schizophrenia on the matter has added to the resentment and economic disruption across the West. A clearer understanding is badly needed. More than once, legislation has been introduced that would declare all water in the United States to be federal property. That has not yet seen the light of day in any hearing room, but perhaps the outcome will eventually be the same, with Congress and federal agencies steadily chipping away at interstate agreements, state water laws, and private water rights.

Such federal control, and attempts at further federal control, remains the single greatest threat to Colorado's water future.

## **NWOTUS—the law means exactly what it says, but EPA ignores it**

Perhaps the most onerous recent threat to private water rights in the West is the continuing litigation about "WOTUS." Within two months of his inauguration, President Trump ordered the Environmental Protection Agency (EPA) and Army Corps of Engineers (USACE) to withdraw their controversial

“Waters of the United States” (WOTUS) regulation, and the agencies did so.<sup>156</sup> That had the effect of temporarily reverting to the previous uncertainty, with constant disputes about which waters fall under the agencies’ federal permitting jurisdiction.

In 2015, the Obama Administration tried to resolve that long-standing controversy, in essence by asserting absolute federal jurisdiction over nearly all water everywhere.<sup>157</sup> Nothing in the Clean Water Act gives either agency such overwhelming power, yet the administration nevertheless used its new “interpretation” of WOTUS to establish absolute control.

The EPA and USACE said the new rule gave them “broader authority over the nation’s waterways.” But it wasn’t just the nation’s waterways—it was virtually all water. EPA said it would prevent the wanton destruction of wetlands by developers and farmers. They claimed Americans had already drained half of the 220 million acres of wetlands that once existed, mostly to increase farmland.

In other words, all those levees and dikes that permit agriculture throughout much of the Mississippi and Missouri basins (i.e. the Great Plains) were a mistake. Never mind that most of the draining was done by the U.S. government, or that the region is now the breadbasket of the world. EPA sought to restrict, regulate, or even stop such activity, by asserting its authority over every stock watering pond, ditch, puddle, and parking lot drain in the U.S. That was a vast expansion, considering the Clean Water Act specifically applies to America’s “navigable waters.”

More than half the states sued, and the 6th Circuit Court of Appeals enjoined implementation in 26 states, ruling that the new interpretation exceeded EPA’s

and USACE’s statutory authority. Colorado was one of those states, so the injunction blocked the Obama Rule’s implementation in Colorado. However, several other states litigated in support of the Obama Rule, and a different federal court disagreed with the 6th Circuit, reinstating the 2015 rule in those states. The result was a rule blocked in 26 states, but implemented in 24 others. That inconsistency and confusion made WOTUS a significant campaign issue in 2016, with Trump publicly promising to repeal the new rule if elected.

The legal confusion stemmed from the 2006 Supreme Court case *Rapanos v. U.S.* about the Clean Water Act. Five Justices ruled against the EPA criminal prosecution of the defendant, but they were split as to the rationale. Four Justices joined in a plurality opinion; Justice Anthony Kennedy agreed with the plurality’s result, but wrote a separate opinion. According to Justice Kennedy’s opinion, which most lower courts treated as the controlling opinion, the EPA could claim authority wherever there was a “significant nexus” between navigable waterways and smaller bodies of water.<sup>158</sup> But in 2015, the Obama EPA ignored the word “significant” and essentially claimed all water is eventually tributary to some river. The Trump executive order said EPA should rely instead on the dissenting opinion of Justice Antonin Scalia, who argued that the law specifically applies only to “navigable waters.”<sup>159</sup> Critics hooted at that interpretation, but in fact that is what the law says.

The original Clean Water Act of 1972, from which the EPA and USACE are granted authority, contained the phrase “waters of the United States” in eleven places. All eleven use the phrase “navigable waters of the United States.”<sup>160</sup> There is also a definitions section in the law, in which “navigable waters” is defined

as “waters of the United States,” meaning the terms are synonymous. In other words, there are no “waters of the United States” that are not navigable. Not in the plain language of the Clean Water Act.

That landmark anti-pollution law has been amended numerous times since 1972, including major additions in 1977 and 1987.<sup>161</sup> Still, in every line where the phrase “waters of the United States” appears, it is either preceded by the word “navigable” or refers clearly to inter-coastal waterways, and to pollution from boats, ships, and oil rigs.<sup>162</sup> Congress has never changed the plain language giving the executive branch the authority to require permits *only* for “navigable waters of the United States.” The accurate acronym is “NWOTUS,” not “WOTUS.”

## Why it was written that way

The issue is not as complicated as many people assume. When Congress adopted the Clean Water Act, it sought to end pollution of the nation’s waterways.<sup>163</sup> It was a long-overdue response to wanton disregard that caused rivers to catch fire, poison drinking supplies, and kill fish and wildlife habitat. The new anti-pollution agency (EPA) was tasked with setting acceptable standards and establishing regulation that would end pollution of the “navigable waters of the United States.”<sup>164</sup> Because Congress didn’t presume to control all water in the country (most of which was and is regulated by states), the Clean Water Act was written to apply only to “navigable waterways” that served “interstate commerce”—clearly within Congress’s constitutional powers. The Clean Water Act asserted no federal authority over smaller bodies of non-navigable state waters.

Major rivers and lakes across America have made amazing comebacks since 1972, with fish and wildlife populations

thriving again. Poisoned and flaming rivers are now consigned to the history books, thankfully. That doesn’t mean there are no more water quality issues. Conservation requires constant vigilance. But it is the nature of all government bodies to grow in scope, to constantly become larger, more powerful, and better funded each year. EPA and USACE are no exceptions.

Thus, there has been a continuous effort to expand the meaning of “navigable waterways” and “interstate commerce,” past the point of common sense. For years, EPA and USACE have called almost all flowing water “navigable,” including ditches and streams nowhere near large enough to float a boat, much less one involved in interstate commerce. The 2015 WOTUS rule bluntly declared virtually all water to fit that definition, if it is tributary or connected in any way to water that obviously qualifies. The problem with that is, virtually all water eventually makes its way into streams, lakes, rivers, and ultimately the ocean. That certainly does not mean that all water is navigable, commerce-supporting, or was ever intended to be regulated by the EPA.

In 2016, candidates openly talked about EPA’s regulatory over-reach, and the issue rang true for millions of voters. As a candidate, Donald Trump promised to address the matter early in his Administration.<sup>165</sup> It may be one reason he did so well in rural counties across the West.<sup>166</sup>

The federal government has a legitimate role, as Trump’s 2017 Executive Order acknowledged, to “ensure that the Nation’s navigable waters are kept free from pollution, while at the same time promoting economic growth, minimizing regulatory uncertainty, and showing due regard for the roles played by Congress

and the states under the Constitution.”<sup>167</sup> But that obligation does not extend to asserting federal control over virtually all water, and nothing in the law gives either the EPA or USACE such authority. Such over-reach was not only ill-advised and impossible to enforce, it was also a significant threat to the future growth and prosperity of western states like Colorado.

## **Will Colorado surrender—after winning the battle?**

In a move that should seem shocking to Colorado leaders who have generally viewed water issues as non-partisan (because of the need to maintain a united front against all threats), newly-elected Attorney General Phil Weiser, shortly after taking office, withdrew Colorado from the litigation, and expressed support for the Obama-era rule.<sup>168</sup> In May he went beyond that, and filed suit against the EPA’s newly rewritten “Navigable Waters Protection Rule.”<sup>169 170</sup>

Understandably, several national environmental groups are opposed to the Trump version of the rule and want to return to the 2015 power grab. But for the State of Colorado officially to endorse that view, and to spend public funds doing so, is to upend 144 years of Colorado water law, and more than a century of the leadership of both parties defending Colorado water rights against federal control. Since 1952, the federal government has waived its sovereign immunity in deference to state water laws.<sup>171</sup> Through all the cases cited earlier, and through the political battles since 1952, the “McCarran Amendment” has made clear that water belongs to the states. A Colorado Attorney General attempting to erode that deference invites federal mischief that could seriously endanger future growth and prosperity for his own State. The federal government sought control over virtually any activity

that touches nearly any body of water, on public or private land. The West won that battle, at least temporarily, unless its own leaders decide to surrender. It is not clear whether the Biden Administration will seek to reverse the Trump WOTUS rule, but if it does, the West should be prepared to fight the battle again, not surrender. It is a battle the State can win, as already proven, and Colorado’s economic future could be at stake.<sup>172</sup>

## **The legislature pushes back against federal control**

Attorney General Weiser’s action flies in the face of legislation signed in 2016 by Governor Hickenlooper. That bill was a reaction to the ill-fated Forest Service attempt to confiscate ski areas’ water rights. This time Colorado pushed back.

It isn’t often that legislation on complex water issues passes both houses of the Colorado legislature unanimously. The “Colorado Water Rights Protection Act,” with unanimous bipartisan support, set a very important precedent in modern water law.

The measure re-asserts the constitutional principle that waters of Colorado belong to the people of Colorado, are adjudicated by State water courts, appropriated under State law, and administered by the State engineer.<sup>173</sup> That was not new, but it had been many years since the Legislature has said, in essence, we still have no intention of changing our system just because the federal government now wants more power over water.



That restatement of principles reminds federal agency landlords that they, too, serve the public and are expected to operate under the law. Moreover, it signals the State Attorney General, and State agencies, that they are not only authorized, but encouraged, to take legal action when Colorado water rights are threatened by federal overreach.

The bill was “watered down” (hence the unanimous support) to the disappointment of some advocates, especially in acknowledging existing federal water rights. But when the USFS tried to extort actual ownership of the ski areas’ water rights, as a condition of allowing them to continue operating on the national forests, it was too much for both parties. The Governor and Legislature officially said they would tolerate no more of that.<sup>174</sup>

The Colorado Water Rights Protection Act makes clear at least the State’s official policy, that if any federal agency wants to own water rights in Colorado, it must apply and go through the same water court process as anyone else. The federal government must get in line and comply

the bill requires that office to refuse enforcement of improper federal water claims. Thus, federal agencies like USFS can no longer rely on the State to help subjugate its own citizens. Perhaps more to the point, such federal overreach in the future might find serious obstacles—not just political opposition from ditch companies and water districts, but legal opposition from the State itself—at least if the Colorado Attorney General is willing defend Colorado rights. It is vital that Coloradans stick together to defend their water system against all threats, including federal control. As this law makes clear, that is State policy.<sup>175</sup>



*Gov. John Hickenlooper signs Colorado Water Rights Protection Act, 4/21/2016, with Sens. Kerry Donovan & Jerry Sonnenberg, Reps. Diane Mitsch Bush, Jon Becker & Speaker K.C. Becker*

with the priority system that applies to all water users. Some observers say the law has no teeth. After all, if federal agencies didn’t care what Colorado wanted in 2015, why would they care now? But in fact there are some teeth in the law, symbolism aside.

Since the actual administration of water systems and enforcement of water court decrees is done by the State Engineer,

## SECTION 5—WHAT’S NEXT?

### *A Few Suggestions*

*I told my troubles to the river  
She shared them with the seas  
She returned them to me doubled  
The river holds no offer of peace  
- Tom McRae*

### Conservation

Because there is not enough storage in any of the state’s main river basins, Colorado water issues can never end with conservation alone—but the discussion must always begin there. Conservation is the essential foundation of all water law. Intelligent leadership on the issue presupposes that Coloradans use whatever water they have in the most efficient and responsible manner possible. Public funds should never be spent on water projects that are not needed. Nor should water ever be diverted from its natural stream in order for wasteful people to squander the precious resource. That principle seems obvious but water conservation is subjective, elusive, and impossible to define.

Earlier in this century, several western states endured the worst drought in 800 years.<sup>176</sup> Several major cities, including Denver and Cheyenne, implemented water rationing for a time, and the eastern plains saw wind and sand reminiscent of the 1930’s dust bowl. The flow of the Colorado River was only about a third of its long-term natural flow, less than half of its flow during the 1930s. Worse, the drought of 2001-2004 resulted in all-time low water levels in many of the major reservoirs used to store water for such dry periods. Many of those reservoirs are still not filled to capacity again. Similar droughts were experienced in 2013, when Denver again implemented water restrictions.<sup>177</sup> It is a recurring problem in the arid West.

As Ben Franklin wrote in the 1746 edition of *Poor Richard’s Almanack*, “When the well’s dry, we know the worth of water.” Faced with a complete shut-off of the water to whole communities, and especially to hundreds of miles and thousands of acres of farms and ranches, water officials in those years turned every stone and examined every means for saving limited water supplies.

In Colorado, several new principles were established that will benefit future generations.

For example, one quirk in western water law that irks many homeowners is the prohibition against capturing and using rain water that falls on their roofs, because another water user downstream may own water rights that are senior to an upstream user who might otherwise save rainwater. Every individual homeowner could capture precipitation in that manner, but very few of them actually own water rights. So if an entire city of people did that, they could effectively “steal” a substantial amount of water owned by downstream farmers or cities. During the drought in 2003, though, several of the cities in the Denver area found they could capture wastewater for use and reuse, without harming downstream farmers by releasing other water the cities owned in upstream reservoirs, and letting it pass downstream to the farms. Such water “exchanges” allowed huge amounts of water to be conserved without the need for protracted legal procedures to buy, sell,



or trade water rights. Today, such water exchanges are commonly used all over the West as a more efficient means for moving water from one place to another without harming anyone.

To many people the idea of water conservation means low-flow toilets and shower heads, watering lawns less often, or even xeriscape landscaping. Such measures are second nature to many conservation minded Coloradans. That has not always been the case, and



*Recharging aquifers is a fast-growing strategy. Photo: Superstition Mountains Recharge Project in Arizona - CAP*

retrofitting entire cities with such modern technology is expensive and disruptive. It took Denver 20 years to accomplish it, and many cities are still

in the process. Despite the difficulty and expense of such measures, they are a mere “drop in the bucket” in terms of saving water. Conservation on a larger scale—way beyond shower heads—is needed in much of the arid West.

Part of that solution, as covered earlier, should include strong incentives for agricultural users to conserve water, such as fixing the “saved water rights” issue, and allowing marketable easements that could finance system upgrades and efficiencies.

## **A bigger cistern—storage remains the critical element**

In Colorado, partly because of advances in technology, there are actually numerous ways to increase and improve the water supply. More water storage is badly needed, but that does not necessarily

always mean more new dams and reservoirs. There are several other approaches to new storage.

## **Underground storage**

In California, several of the largest new reservoirs funded by a \$2.5 billion water bond, approved by voters in 2014, are actually not stored behind any dam on any stream, but underground.<sup>178</sup> There are many underground rock formations that create “bowls” where water can be stored—places where an underlying rock layer is impermeable but topped by a layer of porous rock like sandstone, where water can be pumped underground and will stay in place until needed. That requires a bowl-shaped formation with no cracks, so water will not flow anywhere, and there are many such places all over the country. Today’s leaders should be investigating those locations, using resources like the U.S. Geological Survey and its state counterparts to map not just the surface of our lands (most of which has been done), but its underlying structure (much of which has not).

Consider the economics, by comparison with dams and reservoirs. In the California example, the Contra Costa Water District plans to raise the height of the existing Los Vaqueros Dam by 55 feet, which would expand the reservoir’s capacity by an additional 115,000 acre-feet, at a cost of \$980 million.<sup>179</sup> A second project in Santa Clara County would construct a new dam and reservoir at Pacheco Pass, with a capacity of 140,000 acre-feet, at an estimated cost of \$969 million.<sup>180</sup>

By contrast, funding was also approved for four underground storage projects totaling \$649. Just one of those projects, the Willow Springs groundwater bank (50 miles north of Los Angeles) could add 500,000 acre-feet of new storage, and the cost is only \$95 million.

Aquifers are often located closer to the communities they would serve, sometimes directly under the city, which greatly reduces pumping and piping costs, and they can be recharged easier than reservoirs can be filled.<sup>181</sup> The greatest advantage for the arid West is avoiding evaporation. Consider that Lake Powell is estimated to lose over 380,000 acre feet to evaporation annually (more than Nevada's entire share of the river), and Lake Mead almost twice that much.<sup>182</sup> Groundwater aquifers have no evaporation at all. There are also manmade underground holes, especially abandoned mines, that can be used for water storage and several states have successfully done that. Colorado has 23,000 abandoned mines,<sup>183</sup> though there is no comprehensive study of which sites might work for water storage. Water stored underground does not require dams, does not interrupt stream flow or fish habitat, and is not lost to evaporation, so the State should seriously consider funding such an analysis, perhaps by the Colorado Geological Survey, or a private geology contractor.

Coloradans are rightfully skeptical after the 2015 EPA blunder that released millions of gallons of toxic orange sludge from the Gold King Mine above Silverton. The waters turned orange for 100 miles, in Cement Creek, then the Animas River, the San Juan River, and ultimately Lake Powell.<sup>184</sup> Colorado and New Mexico had to declare states of emergency. At least four counties banned swimming, fishing, or floating on the rivers. The Navajo Reservation had to stop water usage. Farmers had to close irrigation headgates, and ranchers could not water livestock. It was a disaster for rafting companies (big business in Southwest Colorado) and others. The subsequent EPA cover-up, congressional investigations, mass media coverage, and government delays in providing information or cleanup funding,

left many Coloradans very suspicious of any activity at old abandoned mines.<sup>185</sup>

But the water in Gold King Mine was not purposely stored there for future use; clearly that would not have been a useable site. It built up over time because of a poorly designed drain plug installed years earlier.<sup>186</sup> All mines are different and there are many locations where such risks are not present. In many such mines, water storage is not only feasible, but potentially extensive and cost-effective.

## Enlarging existing facilities

There are also thousands of existing reservoirs that could store more water than they do, including nearly every single one in the arid west. In many cases reservoirs no longer hold their original capacity because they fill with silt over time, as did the Kenney Reservoir. In other cases their water level must be lowered or restricted because the dam is in need of repair. In Colorado, 168 dams are restricted from their full capacity because of dam safety issues. The South Platte Basin alone has 63 restricted dams, resulting in the loss of 25,000 acre-feet of storage capacity.<sup>187</sup>

Nationally, more than 15,000 dams are classified as "high hazard potential, and the Association of State Dam Safety Officials estimates that it would cost \$65 billion to rehabilitate them.<sup>188</sup> However, considering the additional water storage that is possible without the need for new reservoirs, repairing existing dams may be considerably cheaper than building new ones. And in the case of existing dams, the political fights have already been waged and settled, so repairing and rebuilding is much easier than starting over in a different place.

Existing reservoirs can not only be filled to capacity, but in many cases can be

enlarged considerably cheaper than the cost of new construction, as with Denver's proposed Gross Reservoir enlargement. The possibility of a statewide program of enlargement should not be underestimated—Colorado is home to 1,963 dams. Approximately 113 of them are federally owned, and 1,288 are private (mostly agricultural). But 72 dams are owned by the State of Colorado, 397 by local governments, and 93 by public utilities.<sup>189</sup>

The Gross Reservoir project involves adding height to the dam, and there are many dams where that is feasible. In

many other cases, the structure can be enlarged by dredging the bottom deeper. In thousands of existing reservoirs, merely removing silt that has been deposited since the original

dam construction can return a far greater storage capacity than what is left today. That is as true with giant reservoirs like Lake Powell as with small ones like Kenney Reservoir. In some instances, even the original floor of the reservoir can be deepened significantly, depending upon the geology. Leaders should also be studying these options, to ensure that Colorado is using all the storage capacity it has already paid for, conserving water to the maximum extent possible without new construction.

## Hydropower as renewable energy

Colorado has about 60 hydroelectric power systems that are capable of producing 1,160 megawatts of power.<sup>190</sup>

A fourth of that capacity is at the three dams that comprise the Aspinall Unit on the Gunnison River. But there are dozens of smaller facilities, and many more places where they could be added, taking advantage of already existing dams.

The federal government has added hydropower generation to existing dams several times in recent years, including at Ridgway Dam on the Uncompahgre River and the South Canal project near Montrose.<sup>191</sup> Both are roughly 8 megawatt facilities, enough to add considerable capacity to the grid in that area (power for 5,000 homes). In a State that has publicly committed to 100 percent renewable energy in the next few years, hydropower ought to be closely examined. Installation can be expensive, but systems last considerably longer than solar panels or wind turbines, and their annual maintenance cost is lower.<sup>192</sup>

The Colorado congressional delegation has worked to reduce some of the barriers to new hydropower construction, especially the daunting federal permitting process. Then-Rep. Cory Gardner and Rep. Diana DeGette cosponsored the Hydropower Regulatory Efficiency Act, which exempted small hydropower projects from Federal Energy Regulatory Commission permitting requirements.<sup>193</sup> Also, Rep. Scott Tipton carried a bill to authorize hydropower installation at Bureau of Reclamation facilities.<sup>194</sup> Both bills became law, paving the way for additional hydropower installations in Colorado.

In 2011 and 2012, the Bureau of Reclamation identified 37 existing dams and 28 canals in Colorado where new hydropower facilities could be installed, estimating that 342,000 megawatt hours of electricity could be generated each year by doing so.<sup>195</sup> With similar potential at hundreds of sites owned by the State,



*Tri-County Water Conservancy District's 8MW hydropower plant at Ridgway Dam*

local governments, and utilities, it seems clear that hydropower has the potential to contribute significantly to Colorado's green goal.

## Environmental restoration—the largest water project of all

There are other tools available to increase the supply of water in Colorado's rivers and lakes. At the top of the list throughout the West is dealing with an invasive, non-native plant species variously known as tamarisk, tamarix or salt cedar. The plants were imported into the West by well-meaning settlers who liked the attractive color of their wispy spring blooms, and their rapid growth that helps inhibit erosion. No one anticipated how effectively they would spread across virtually every river system in half the United States, nor was there any understanding of how much water they would consume. These trees grow more like dense shrubs, more than 20 feet tall, and form a dense thicket that chokes out virtually all other plant life (they also poison the ground with salt that kills other plants). Tamarisk spreads both by roots and by seeds, which are borne on both wind and water. It sheds so many leaves and needles that it increases the frequency and intensity of wildfires that kill other plants, while tamarisk growth is actually stimulated by fire. Property owners today have learned that when a tamarisk tree is cut, it must also be sprayed with deadly herbicide within a few minutes, because it can seal the wound almost immediately to protect its roots, which will quickly sprout again. Thus, it has become one of the most difficult of all non-native species to control, and is Colorado's most insidious and least known water problem.

Tamarisk has tap roots that extend down as much as 100 feet. They can lower water tables and dry up entire springs, wetlands

and riparian areas. And while tamarisk consumes about the same amount of water *per tree* as the native cottonwoods and willows it has replaced, it grows in far greater density, often in stands of over 3,000 trees per acre. Tamarisk covers nearly 2 million acres of American river and stream banks.<sup>196</sup>

Simple math shows that if tamarisk could be eradicated from American rivers, the result would be among the largest water projects ever built. Consider the raw numbers. If there are 3,000 tamarisk trees per acre, covering almost 2 million acres of river banks, that is 6 billion tamarisk trees. If they consume 32 gallons of water per day each, as is now estimated,<sup>197</sup> that is 192 billion gallons of water every day. If replaced by the native cottonwood and willow vegetation (which consume a similar amount of water per tree, but occupy only a quarter as much land, and with considerably lower density), roughly 75 percent of that water would remain in the rivers—roughly 144 billion gallons *per day*. That is almost five times as much water as the entire United States uses domestically each day (88 gallons per person)<sup>198</sup>—clearly enough to supply the needs of thirsty cities *and* the environment. More to the point, it would put over 400,000 acre-feet of water back into the river system.

Legislation passed in 2003 and 2006 gave over \$50 million federal dollars to research universities, and non-profit “demonstration projects.” The tamarisk still thrives, despite all the studies.



*Tamarisk along the Colorado River west of Grand Junction.*

The Tamarisk Coalition, now known as RiversEdge West, based in Grand Junction, has raised national awareness of the magnitude of the problem, made great progress in organizing eradication efforts, added to the scientific understanding of the species, and is woefully underfunded. Raising less than \$4 million a year, it can restore less than 2,000 acres a year.

## Evapotranspiration and the mismanagement of public lands

Plants that grow along streams and rivers and soak up water are called “phreatophytes.” Tamarisk and willows are examples of such plants, but they are not the only plants that keep large amounts of water from our rivers and lakes. In fact, culprits far larger than those are the overgrown forests that clog watersheds throughout the Rocky Mountain region.<sup>199</sup> So when water leaders find themselves discussing the peculiar question of how much water is supposed to be in the rivers, they should consider the role of forests.

The compacts that regulate Colorado’s rivers were negotiated at a specific moment in time, and allocated the water based on the best available information about how much was normally available, and where it was most needed. The latter half of that equation has changed dramatically as population growth has occurred in unexpected places like Las Vegas. The amount of water native to the rivers should not have changed much over time. Yet it has.

Today many of the nation’s rivers, including the Colorado, have considerably less water than was there when the compacts were negotiated. Modern-day water leaders often assert that their predecessors were simply wrong about the amount of water available, or that a series of wet years in the early 1900’s

skewed their figures. It is a convenient argument for opposing new water projects; one can simply claim there is no more available water. It is convenient, but it is wrong. Leaders who negotiated the interstate water agreements (mostly between 1920 and 1950) had decades of river measurements on which to base their assumptions, not just a few unreliable years. Several gaging stations date from 1906.<sup>200</sup> The Colorado River and its tributaries, for example, had been measured regularly for more than 40 years when the first compact was negotiated, and some of the best engineers in the country worked on it. They were not mistaken about the average amount of water in the system. There simply isn’t as much water there today, and there may be several reasons for that. The primary reason is trees.

Normally, water moves from the land to the atmosphere in two ways. The most commonly understood is evaporation. The second occurs when water moves upward through plants, from roots to leaves or needles, then as they dry that water moves into the atmosphere, replaced by more from the roots—that process is called transpiration. But there is also a third process, recognized by scientists but largely unknown to political leaders until recent years. Snow falling on the leaves and branches of trees can simply evaporate directly into vapor without ever reaching the ground. In this process, trees interrupt the normal flow of water from clouds to streams, rivers, oceans, and back to clouds. That interruption is called “evapotranspiration,” and it has reached crisis levels in the mountain west, where overgrown forests are preventing vast quantities of water from ever reaching the rivers. To be clear, evapotranspiration is a natural process. But what is not natural is the amount of trees in the national forests, which are often choked with 300–900 trees per acre, when there should

naturally be 30–50—as well as dense brush and other “understory” vegetation. As a result, the *rate* of evapotranspiration is much greater than it should be.<sup>201</sup>

It is impossible to overstate the importance of evapotranspiration to western water issues, especially considering the importance of every acre foot of water. All of the Colorado River Lower Basin states use their full entitlements every year, but under the agreements, Colorado is still entitled to develop and use about 1 million acre feet more than it does now.<sup>202</sup> That much additional water is simply not there, so any attempt in Colorado to develop that extra water (and thus take it out of the river) is a serious potential threat to the other states, especially in the Lower Basin. Being at the top of the river, Colorado could simply divert and use that water—it has a legal right to do so—but at a time when river flows are diminishing, that would necessarily take water from existing users in other states downstream. That is, unless there really were an extra million acre feet of unused water in the system. Thus it is vital to find out why that water is missing, and if possible, to get it back.

Some activists are quick to claim the water is reduced because of global warming. However, there is a problem with the theory. Current measurements do show that the river flows are diminished compared to a century ago. But studies of the amount of precipitation do not show such drastic reductions in snowfall over that same time. In fact, of the state’s five largest and most famous snowstorms, one was in 1913 and one in 1946. The other three were in the modern era (1982, 1997, and 2003).<sup>203</sup> In a year like 2003, then, one might expect an immediately noticeable increase in the spring runoff, accompanied by the rapid rise in reservoir water levels, and possibly

even a public celebration that the drought was over and the rivers were back. That did not happen.

Similarly, 2008 was said at the time to be the wettest year in more than three decades in Colorado, yet runoff levels and reservoir levels did not see a corresponding rise that year. In short, the snow is still falling, but the water is disappearing in alarming quantities before it ever gets to the ground, because evapotranspiration is at an all-time unnatural high. And the amount of water that can be lost in this manner is astonishing. The Bureau of Reclamation estimates that the Lower Basin loses almost 4 million acre feet per year to evapotranspiration, which is nearly as much as California’s entire allotment. In the Lower Basin there is significant evapotranspiration from farm crops, whereas in the Upper Basin forests cover more ground than farms.

As many water leaders as there are in the Upper Basin, you would think there would be numerous detailed studies of exactly how much water is lost to this phenomenon in this region, and how that number may have changed over the years as the forests became more and more overgrown. On the contrary, there is almost no such analysis available. Most recent studies have skewed the definition between “transpiration” and “evapotranspiration,” publishing statistics about losses from “agricultural evapotranspiration.” That suggests blaming farms and ranches for at least part of the water loss, while ignoring



the management of national forests—even though the government itself readily admits the overgrowth and its effect on water.<sup>204</sup> There are also several climate change studies pointing out that significantly higher temperatures would increase evapotranspiration. That seems logical enough, but the dearth of information on the phenomenon that is already occurring is troubling. State water leaders should actively seek such information from federal land managers, and from the state Division of Forestry.

The federal agency responsible for keeping track of water in these rivers is the Bureau of Reclamation, which has all but completely removed this discussion from its studies. The Bureau does publish reports on “consumptive uses and losses” of water in the Upper Basin. The charts track (loosely) the evaporation from reservoirs in the Upper Basin, said to be between 183,000 and 469,000 acre feet per year during the past few years, but there is no analysis of losses to evapotranspiration. There are several good studies available about the effect of forest thinning on water flows, such as those done in the Frazier Experimental Forest some years ago. But it has become almost off-limits to discuss the role of national forest management in reducing the flow of the Colorado River system, which is missing a million acre feet per year.

The idea of holding the Forest Service responsible for adequate water flow is not radical or new. It is the heart of the agency’s original mission. As mentioned earlier, the “Organic Act of 1897,” which created the national forest system, made clear the Forest Service’s dual mission: *“for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States.”*<sup>205</sup> Leaders 100 years ago

understood clearly that management of forests was directly connected to the amount and quality of water flows, and it was the first priority—supplying timber was the second.

The lack of management of the national forests has contributed to a significant reduction in the availability of water in the arid West. So, as leaders discuss ways to use water more efficiently, they should understand that water conservation begins long before water reaches the faucet. It begins with responsible land management.

## **The threat to water quality, as well as quantity**

Land management has a direct effect not only on water supply, but also on water quality. The massive mudslide that followed the Buffalo Creek fire and filled Strontia Springs Reservoir with mud in 1996 cost Denver Water over \$30 million and took a decade to repair. The 2002 Hayman Fire threatened Cheesman Reservoir, posing an even greater danger to Denver water supplies.<sup>206</sup> For 20 years many experts have warned of the possibility of a catastrophic fire destroying the State’s most vital watershed—the headwaters of the Colorado River. The River originates at Grand Lake, on the west side of Rocky Mountain National Park; a series of reservoirs store the most pristine water during spring runoff, for use on both sides of the Continental Divide and by all the downstream states. Those reservoirs are surrounded by mountains on every side, almost completely covered by dead trees waiting for the lightning strike that would set off an unprecedented conflagration. The danger was systematically ignored.

At a congressional hearing in 2009, experts from the USFS and concerned water district officials testified that in

Grand County 90 percent of all trees above 5 inches in diameter were dead. They told Congress that if a wildfire should break out in these dead forests (considered probable by nearly every witness), it would likely be followed by massive erosion during the next rainstorm or the next spring runoff. And that, they testified, could create a water quality disaster like nothing the West has seen.<sup>207</sup>

Dead forests have surrounded virtually every important water supply facility in that headwaters region: Grand Lake, Lake Granby, Windy Gap, Willow Creek, and Shadow Mountain Reservoirs. Witnesses at the 2009 hearing warned that if a catastrophic fire and subsequent erosion were to fill these lakes with mud, it would be virtually impossible to supply the water required from Denver to Fort Collins, to administer the Interstate Compact with the downstream states, or to supply irrigation water upon which much of the West's agriculture depends. These dire warnings have been sounded by water leaders throughout the West, and Congress has stubbornly ignored them. Now, Members of Congress cannot point fingers elsewhere and indignantly demand to know why they were not briefed. They were warned for years, and in 2020 the catastrophic fire finally happened.

All previous Colorado fire records were shattered in the summer and fall of 2020. The Pine Gulch Fire destroyed 140,000 acres from the Bookcliffs to Roan Creek.<sup>208</sup> The Cameron Peak Fire burned 209,000 acres in three wilderness areas and Rocky Mountain National Park, from the Mummy Range down the headwaters of the Cache La Poudre River.<sup>209</sup> Within weeks, another fire destroyed much of the center of the National Park, over 194,000 acres. It began on East Troublsome Creek near the Rabbit Ears Range, burned across Pony Park, through Grand Lake, across Trail Ridge Road, through the

Kawuneeche Valley, the Porphyry Peaks, Big Meadows, over the Continental Divide, and down the Big Thompson River all the way to Estes Park. Colorado's most iconic National Park will never be the same. And water supplies for 30 million people in seven states are now at risk. The mudslides, erosion, and sedimentation are almost certain to follow before long, and the damage at Strontia Springs in 1996 was nothing compared to the threat now posed by Grand Lake and Lake Granby.<sup>210</sup>

Nor is the problem unique to that watershed. At a similar hearing in 2013, Summit County Commissioner Dan Gibbs testified about dead and dying forests in his county, and urged Congress to provide more funding for restoration. "Over the past 10 years, we've seen a transformation of our forest in this county and others around the state," he said. "In Summit County alone, 146,000 acres of trees are dead—nearly half of all our pine trees."<sup>211</sup> That forest surrounds Dillon Reservoir, Denver's largest water supply. Will the warning be heeded?



*Grand Lake, headwaters of the Colorado River, surrounded by dead trees in Rocky Mountain National Park – a water quality disaster waiting to happen*

## Cumulative impacts of water diversions

In the view of many policy makers, water quality is all about pollution. But as recent events are teaching us, traditional pollution—factories dumping waste into the river—is only one way water quality is degraded. That kind of pollution is much easier to regulate, even to stop. Thirty-seven years after the Clean Water Act became law, there are very few examples of the kind of blatant water pollution

that caused the Cuyahoga River to catch fire in 1969.<sup>212</sup> Toxic sludge cannot simply be dumped into rivers anymore, and America's waterways are much cleaner as a result. Technology has also improved the ability to test water for less visible pollution. After the CWA was passed in 1972 the EPA began measuring chemicals and elements like lead and mercury in the water supply. Initially able to measure "Parts per thousand," the agency could later monitor "parts per million" and



*Salinity is a serious problem as irrigation is applied to farms in the arid West. Photo: USDA*

today's scientists can detect some pollutants in "parts per trillion." It is possible to measure to such a minute degree that cleaning the water beyond that level is impossible. The cleaning of America's rivers is one of the great environmental

successes in world history, and Americans should be proud of it, not looking for more reasons to regulate.

Today's challenges are increasingly complicated, as scientists learn more about the elements that can diminish water quality, and as the definition of "pollution" and its sources continually expands. In dealing with degraded water quality, if the source of pollution can be traced to a single location, regulators can stop it ("point source" pollution). But often, pollution occurs throughout a river system and the exact source cannot be pinned down ("non-point source" pollution). That is more difficult to regulate, since there is no single guilty party.

Water quality is often impaired by the presence of natural substances if they are in higher concentrations than normal. For

example, salt in its various forms (salinity, selenium and others) is dissolved into the water by agricultural irrigation in many parts of the West, including Western Colorado. The salt is a natural component of the dirt, and very small amounts are in most rivers. When the water is filtered through the soil on farms, then drained back into a river, the amount of salt in the river increases. Even though salt is a natural substance, too much can kill fish and vegetation. Yet no specific farmer can be blamed for something that happens over a massive region of the country. Putting an end to farming is obviously no solution. Instead, the government has partnered with private landowners in spending billions to upgrade farms and ranches with more water-saving irrigation systems (gated pipe, concrete ditches, and drip water systems). These techniques have reduced salinity pollution in the West's waters, but not eliminated it.

Another phenomenon is even more difficult for today's conservation leaders: the cumulative effect of diversions over a long period of time. This is among the most difficult of all water quality issues, because there is no one entity responsible for it, nor any one place where it can be stopped. In most Western states the water laws do not even acknowledge the existence of the problem. Water is cleanest at the highest altitude. As it flows downstream, it picks up more and more dirt, sand, minerals, chemicals, and other pollutants. Thus, water diversions upstream invariably take cleaner water out of the stream, leaving dirtier water downstream. If you take out the cleaner water, you are left with the dirtier water.

The oversight in historic water laws is that where water rights are property rights, no user is allowed to degrade the quality of water *so much that it is not useable* by downstream owners. No user may degrade water to the extent that it

prevents someone else from using their water. But that is a very high standard, virtually impossible to prove. Almost all uses degrade water, *but not that much*. If one user hundreds of miles upstream takes a very small amount of water out of the stream, it is difficult to show that the water far downstream is degraded *to the point of uselessness*. However, when hundreds of upstream water users divert the cleanest water for more than a century, it clearly has a significant impact on the quality of water downstream.

In the case of the main stream of the Colorado River, fully half of Colorado's share of the water (usually from 450,000-600,000 acre-feet per year) is diverted across the Continental Divide to the Front Range cities—half of all the high-altitude cleanest water in the system.<sup>213</sup> Virtually all of those diversions are at the highest altitude possible, near the Continental Divide. Water left in the river for all downstream users—including millions of people in Western Colorado, Utah, Arizona, New Mexico, Nevada and California—is of lower quality than it would otherwise be. That makes water treatment more expensive for western cities, degrades fisheries for a thousand miles, and affects irrigated agriculture in six states. But what can regulators do about it? No specific water diversion can be blamed, and clearly Colorado is not prepared to shut down the water systems upon which a majority of Coloradans have depended for generations. Still, for the legal system to pretend these systems have no effect on downstream water quality is unrealistic and outdated.

A handful of states have just begun to understand the cumulative impact on water quality of numerous upstream water projects, and a few have tried to adjust the laws. In Colorado, for example, water allocations based on the prior appropriation system do not generally

consider cumulative impacts of such diversions on water *quality*—as long as water *quantity* is protected, and as long as the proposed project does not harm water quality *so severely that another user cannot use his water*. For at least 20 years, this has been a serious political issue, especially in considering controversies such as Aurora buying agricultural water rights in the lower Arkansas River Valley, drying up farms to supply the growing city.

Aside from the long-term implications for agriculture, the less obvious problem is that the new diversions to the city were far upstream from the agricultural rights being purchased. As a result, water quality is degraded for those farmers and communities that choose not to sell their water rights. The General Assembly has long debated ways to consider the cumulative impact of all the existing diversions on water quality before issuing more decrees for more upstream diversion rights. The consideration of such cumulative impacts cannot supersede the prior appropriation system established by Article XVI of the Colorado Constitution, so despite several legislative attempts over the past 25 years, the issue remains largely unresolved.

## What can Colorado do?

In recent years, both federal and state governments (including Colorado) continue to focus more on “non-point source” pollution. One reason is that point source pollution is now very well controlled. Non-point sources are much more difficult to regulate effectively, but not impossible. Efforts should focus on three areas:

1. Stop pollutants from entering the system, to the extent possible,
2. Add as much clear water to the

- system as possible,
3. Use new methods to treat and clean the water at every opportunity.

First, we cannot stop all minerals and chemicals from entering the water supply; some occur naturally, and others result from activity vital to our survival, such as agriculture. But to the extent possible, we should continually upgrade irrigation systems, modernize industrial facilities, improve domestic water treatment plants, and find other ways to prevent degradation of water quality. These processes will never be perfect, but the

effort must continue.

Second, any cleaner and purer water that can be added to river systems helps. And as shown, the conventional wisdom that Colorado cannot change the amount of water in its rivers is

plainly untrue. Efforts to properly manage public lands, programs to eradicate non-native species like tamarisk, and the addition of more water storage can dramatically increase the amount of clean water flowing in the rivers. Those activities ought to be top priority for water leaders.

Third, there are a number of ways to improve water treatment, including a closer examination (and duplication) of nature's own processes. Many states, cities, and companies have constructed wetlands to mimic nature's cleansing processes, often with great success. Frequently, this approach turns out to be less expensive and more effective than traditional water treatment plants.



*Sediment fences are a common way to keep pollutants from entering the system, especially at construction sites. NOAA*

Colorado has used it instead of punitive fines against polluters, as in the case of the Coors spill in Clear Creek in 2001.<sup>214</sup> In lieu of punitive measures, the company financed and constructed a wetlands treatment facility that became a great success, treating effluent from the plant itself, and from the City of Golden, while also providing educational experiences for visiting students and classes.<sup>215</sup> Wetlands are the most nearly perfect water filter ever discovered, and Colorado ought to make much greater use of nature's technology to further enhance the quality of its waters.

## Produced water, from oil and gas drilling

Finally, Colorado might also be in a unique position to enhance its short water supplies through the use of "produced water" from energy production. Such a program has the potential to turn an otherwise difficult problem into a significant asset.

Companies drilling for oil and gas usually encounter water, too. In order to recover the oil and gas, that water must also be pumped to the surface, and then either transported for disposal somewhere else, or left in shallow pools to evaporate. That is referred to as "produced water" and it has always been a nuisance for oil and gas companies.

Common sense might suggest that it would be better to put that water to beneficial use, either onsite, or at nearby farms, or even by draining it into nearby streams. At least it could be used by someone. The trouble is, any of those "solutions" run afoul of other water laws. Specifically, some groundwater eventually flows into surface streams, so it likely belongs to another water rights owner downstream. On the other hand, if that particular groundwater is not

“tributary” to any other water right, then it is essentially “new” water. In that case, the federal Clean Water Act prohibits discharging it into the “waters of the United States” without a permit from the EPA.<sup>216</sup>

No wonder produced water has been considered a nuisance, with no good options either for using it, or disposing of it. Producers felt “damned if they do, and damned if they don’t.” For many years, they had little choice but to put produced water into surface ponds and allow it to evaporate, or to pump it back into the ground, either way at great expense with no return on the investment.<sup>217</sup> That is wasteful anywhere, but especially in a state so desperate for more water.

In Colorado, the State Engineer has carefully classified all groundwater as either tributary or non-tributary. If the water is clean and non-tributary, as is common, that opens various possibilities for use of this “new” water. One helpful aspect of the EPA regulation is that produced water is not considered a pollutant if it is used onsite by the oil and gas operators, or if it is re-injected into the ground at the same location. The latter, however, normally requires a water well permit from the State, further complicating any potential uses of produced water.

The permit problem applies not just to oil and gas drilling, but also to coal bed methane production. That also produces water, and in 2009 a case called *Vance v. Wolfe* reached the state Supreme Court. The Court confirmed the requirement, ruling that “dewatering” a coal bed to produce methane gas was, in fact, a beneficial use of groundwater under Colorado law.<sup>218</sup> That meant coal bed methane producers needed a water well permit and an augmentation plan, in order to protect other vested water rights.

However, that also opened the door to a new discussion about the potential value of produced water, because it “legalized” putting that water to “beneficial” use.<sup>219</sup>

Because such water is so valuable, Colorado has addressed it more directly than many other states. In 2016, the Colorado General Assembly finally changed the law, authorizing energy operators to use non-tributary produced water—without a water well permit—for specific drilling operations, including fracking, well maintenance, dust control, and pumping operations.<sup>220</sup>

That does not mean all the issues related to produced water have been solved—far from it. The Ground Water Protection Council (GWPC), which represents state oil and gas regulators and environmental protection agencies, has issued a report raising caution about the need for water treatment, and warning that states should understand all the potential dangers of reusing produced water before allowing it.<sup>221</sup> Predictably, the group also sees a need for additional regulation—by its members, of course.

The GWPC is right that produced water often contains compounds like radionuclides that could impact wildlife and other aspects of ecosystems. Apparently an accumulation of strontium in the shells of freshwater mussels in Pennsylvania was traced to the discharge of produced water from oil and gas operations.<sup>222</sup> The report also suggests that radium levels are higher at discharge points in Wyoming, so clearly there is a need to understand the various potential impacts.

If technical issues can be overcome, there is tremendous potential for additional water in Colorado from produced water. Understandably, many environmental groups are opposed to relaxing federal

or state rules, partly because they are concerned about water quality impacts, but mostly because they oppose oil and gas drilling, so they resist any positive outcome.<sup>223</sup> That is a legitimate debate about which reasonable people may disagree, but in the context of water supply, it is an issue worth examining much more closely.

## Our legacy—will future generations honor ours?

Like other contentious environmental issues, clean water presents stark choices for today's leaders. They can take the punitive route and use the power of government to stop everything they think is harmful. There is certainly a place for government in protecting the environment, and citizens should not let down their guard on the impressive improvements already achieved.

People clearly have the ability to leave Colorado's water cleaner and healthier than ever, and can do so in all the ways discussed. With the right policies, today's leaders also have the ability not only to preserve, but to improve the environment and the standard of living by ensuring greater supplies of water. They should do that, too.



*"The only limit to Colorado's future is the availability of water." - Governor John Love*

Communities cannot thrive and prosper without enough water to supply the growing needs of a growing population and a growing economy. Adding more water storage need not be a threat to the environment, but

is actually one of the ways people can improve their surroundings, add more habitat for more species, enhance the

land's productivity, and make Colorado an even better place to live, work and raise families.

The stigma attached to water projects is outdated, especially as new and creative ways to store water are found: underground, off-stream, in existing reservoirs, and occasionally in new ones built to modern standards. Some activists may continue to demonize virtually any use of water for any purpose other than watching it flow to the ocean. But leadership requires doing things right, not stopping everything. Inaction will leave future generations with no good choices.

Doing nothing is a poor option. The future will bring significant droughts again; those cycles are a part of nature. If nothing is done to improve water supplies, then future generations would be right to blame today's leaders for a lack of foresight. Infrastructure will cost more in the future than it does today. Leaders ought to muster the political will to protect the environment, and to provide for the needs of their descendants. True conservation leaders must begin to talk about water projects again, unapologetically promoting conservation, storage, and utilization as a positive way to provide for inevitable growth, and especially as a way to improve the environment.

Otherwise, future Coloradans will remain short of precious water, catastrophic wildfires will continue, watersheds will fill with silt and debris, and nothing will have been done to mitigate the disasters that will result. Today's leaders have the chance to leave behind a much more honorable legacy.

INDEPENDENCE INSTITUTE is a non-profit, non-partisan Colorado think tank. It is governed by a statewide board of trustees and holds a 501(c)(3) tax exemption from the IRS. Its public policy research focuses on economic growth, education reform, local government effectiveness, and constitutional rights.

JON CALDARA is President of the Independence Institute.

DAVID KOPEL is Research Director of the Independence Institute.

ADDITIONAL RESOURCES on this subject can be found at: <https://i2i.org>.

NOTHING WRITTEN here is to be construed as necessarily representing the views of the Independence Institute or as an attempt to influence any election or legislative action.

PERMISSION TO REPRINT this paper in whole or in part is hereby granted provided full credit is given to the Independence Institute.

---

## ENDNOTES

- <sup>1</sup> Reisner, Marc, *Water Wars in Colorado*, Analysis of the Federal Government's Water Resources Policies, Alicia Patterson Foundation, 1979.
- <sup>2</sup> Osborn, Liz, *United States' Rainiest Cities, Weather and Science Facts*, *CurrentResults.com*, 2020.
- <sup>3</sup> Colo. Const. Art. XVI, § 6.
- <sup>4</sup> *Ibid.*
- <sup>5</sup> Colorado Foundation for Water Education. *Citizens Guide to Colorado Water Law*, 2004, p. 5.
- <sup>6</sup> [How Much Water is There on Earth?](#) U.S. Geological Survey.
- <sup>7</sup> *Ibid.*
- <sup>8</sup> *Ibid.*
- <sup>9</sup> The Little Snake River rises in Routt National Forest, but meanders across the Wyoming border eight times before its confluence with the Yampa in Moffat County. [Little Snake River](#), *Wikipedia*.
- <sup>10</sup> Colorado Division of Water Resources, [Interstate Compacts; Water Education Colorado](#), [Citizen's Guide to Colorado's Interstate Compacts](#).
- <sup>11</sup> Grace, Stephen, [Water in Colorado](#), Colorado Encyclopedia.
- <sup>12</sup> Sauter, Michael B., *These 5 Cities Have Lost Half or More of Their Populations Since 1950*. *USA Today*, 6/11/2019.
- <sup>13</sup> Richardson, Brenda, *Census Reveals the Fastest Growing Cities in the U.S.*, *Forbes*, 5/28/2019.
- <sup>14</sup> Associated Press, via KNAU Radio, [Census Bureau: St. George, Utah 5th Fastest Growing Metro Area in U.S.](#), 3/29/1990.
- <sup>15</sup> Cremony, John C. *Life Among the Apaches*. San Francisco: A Roman & Co., 1868.
- <sup>16</sup> [John C. Cremony](#), *Wikipedia*.
- <sup>17</sup> Cremony, *Life*, *op. cit.*
- <sup>18</sup> Mays, Larry W., [Ancient Water Technologies in North America](#).
- <sup>19</sup> Wilhusen, Richard H., Melissa J. Churchill, & James M. Potter, *Prehistoric Reservoirs and Water Basins in the Mesa Verde Region*, *American Antiquity* 62(4): 664-81.
- <sup>20</sup> *Ibid.*
- <sup>21</sup> Rohn, A. H., *Prehistoric Soil and Water Conservation on Chapin Mesa, Southwestern Colorado*. *American Antiquity* 28:441-455 (1963).
- <sup>22</sup> *Ibid.*
- <sup>23</sup> Colorado Water Center., [People's Ditch in the San Luis Valley](#), Colorado State University/Colorado Water Knowledge.
- <sup>24</sup> Michener, James A., *Centennial*, N.Y.: Random House, 1974, p. 591.
- <sup>25</sup> Kopel, Jerry, [How Tom Ferril poetry came to the statehouse rotunda](#), Colo. Statesman, 10/22/1999.
- <sup>26</sup> Gargarin, M. & E. Fantham (editors), *The Oxford Encyclopedia of Ancient Greece and Rome* vol. 1, Oxford University Press 2010. pp. 144-145.
- <sup>27</sup> Taylor and Aspinall were long-serving West Slope Congressmen. Governor Eaton pioneered South Platte irrigation. Cameron founded Ft. Collins and helped bring water to Colorado Springs. Goslin was Director of the Upper Colo. River Commission. Adams served as Senator and Governor. Carpenter negotiated the Colorado River Interstate Compact. Delaney founded the Colorado River District and pioneered compensatory storage (storing water in the basin of origin to "compensate" for water lost to diversion). Saunders and Maynes were legendary water lawyers. Sparks was long-time director of CWCB. Hinderlinder was State Engineer for 30 years. Miller and Barry were Denver Water leaders. The others were vital regional water leaders: Thompson in Southeast Colorado, Hansen and Farr in the Northeast, Fetcher in the Yampa Valley, and Kroeger in Durango.
- <sup>28</sup> Associated Press, *Babbitt: I Only Meant to Remove Elwha, Glines Dams*. *Lewiston Tribune*, 11/3/1994; *Babbitt, Bruce. Cities in the Wilderness*. Washington: Island Press, 2005, p. 137; *Berlau, John. Eco-Freaks*. Nashville: Nelson Current, 2006, p. 192.
- <sup>29</sup> Kessler, Rebecca. *Mimicking Nature, New Designs Ease Fish Passage Around Dams*, *Yale Environment* 360, Yale School of Forestry & Environmental Studies, 5/6/2014.

- <sup>30</sup> O’Gieblyn, Meghan, *Interior States: Essays*, N.Y.: Anchor Books, 2018, p. 171.
- <sup>31</sup> Stebbins, Jan, *Search for Water Continues*. *Summit Daily News*, 11/7/2020.
- <sup>32</sup> Udall, Rep. Mark, testimony, *Colorado: Options to Increase Water Supply and Improve Efficiencies*. U.S. Congress, House Resources Committee, Subcommittee on Water and Power Resources, 12/12/2003.
- <sup>33</sup> Sullivan, Sharon, *Hydropower in Colorado*. *Water Education Colorado*, 10/1/2013.
- <sup>34</sup> NOAA Fisheries, [Successful Fish Passage Efforts Across the Nation](#), 4/16/2018.
- <sup>35</sup> [Interstate 470 Colorado](#), Interstate Guide.com.
- <sup>36</sup> Carey, Susan, *C-470’s Long and Winding History*, *Denver Business Journal*, 8/9/1998.
- <sup>37</sup> [Background and History](#), Central Arizona Project (2020).
- <sup>38</sup> [Phoenix Metro Area Population 1950-2020](#), Macrotrends (2020).
- <sup>39</sup> [Denver Metro Area Population 1950-2020](#), Macrotrends (2020).
- <sup>40</sup> Eccles, 1:9.
- <sup>41</sup> Goodland, Marianne, *Water Legacy: Hickenlooper’s Tenure*, *The Gazette*, 6/21/2018.
- <sup>42</sup> *Ibid.*
- <sup>43</sup> Colorado Water Conservation Board, [Analysis and Technical Update to the Colorado Water Plan](#), 9/23/2019.
- <sup>44</sup> Colorado Water Conservation Board, *Colorado Water Plan, Chapter 4: Water Supply*, 2015.
- <sup>45</sup> Thompson, Amy, *The Plan to Strengthen Denver’s Water Supply*, 5280, 8/11/2016.
- <sup>46</sup> Yachnin, Jennifer, *Ambitious Colo. Plan Focuses on Conservation, Costs Billions*, *E&E News*, 11/20/2015.
- <sup>47</sup> Colorado Water Plan, *op. cit.*
- <sup>48</sup> Reuter Hess Reservoir, [History](#) (2020).
- <sup>49</sup> Rio Blanco Water Conservation District, [Taylor Draw Dam and Reservoir](#) (2020).
- <sup>50</sup> Rio Blanco Water Conservation District, [White River Storage Project](#) (2020).
- <sup>51</sup> Northern Colorado Water Conservancy District. [Overview](#), Northern Integrated Supply Project (2020).
- <sup>52</sup> Thompson, Amy, *op. cit.*; Martin, Jeff, *Lessons Learned from Two Forks Applied to Expansion of Gross Reservoir*, Colorado Realtor, 7/19/2020.
- <sup>53</sup> Marmaduke, Jacy, *Huge Poudre River water project back in the spotlight*, *The Coloradoan*, 6/24/2018; Brennan, Charlie, *Denver Water appeals judge’s finding*, *Denver Post*, 2/9/2020.
- <sup>54</sup> Denver Water, Summit County & Grand County, [Colorado River District. Colorado River Cooperative Agreement](#).
- <sup>55</sup> Benson, Emily, *The tiny power plant that shapes the Colorado River—merely by existing*, *High Country News*, 1/2/2018.
- <sup>56</sup> Best, Alan, *Shoshone ‘call’ runs upstream valleys*, *Vail Daily*, 7/17/2002.
- <sup>57</sup> *Shoshone call agreement may benefit West Slope*, *Granby Ski-Hi News*, 4/13/2013.
- <sup>58</sup> *Ibid.*
- <sup>59</sup> Hickenlooper, John, [Colorado River Cooperative Agreement](#), Press Conference, 5/29/2012.
- <sup>60</sup> Colorado River Cooperative Agreement, *op. cit.*
- <sup>61</sup> Brennan, Charlie, *op. cit.*
- <sup>62</sup> England, Dan, [The Evolving Process of Permitting](#), *Water Education Colorado*, 7/16/2019.
- <sup>63</sup> Roaring Fork Conservancy, [Frying Pan Valley and Ruedi Reservoir](#), Ruedi Water and Power Authority brochure, 2020.
- <sup>64</sup> [Green Mountain Reservoir](#), Wikipedia.
- <sup>65</sup> Committee on Western Water Management, *Water Transfers in the West*, Washington, D.C.: National Academy Press, 1992, p. 78.
- <sup>66</sup> Getches, David H., *Interbasin Water Transfers in the Western United States*, in *Water Conservation, Reuse, and Recycling*. Washington, D.C.: National Academies Press, 2005, pp. 241-42.
- <sup>67</sup> *Ibid.*, p. 240.
- <sup>68</sup> Colorado River Cooperative Agreement, *op. cit.*
- <sup>69</sup> City of Loveland, [Executive Summary, Legislative Policy Agenda](#), 2018.
- <sup>70</sup> Club 20, [New Water Projects](#) resolution, adopted 1998, 2006, 2012.
- <sup>71</sup> Lens, Jim, *Referendum A Makes Sense for Us All*, *Denver Business Journal*, 9/21/2003.
- <sup>72</sup> Gardner-Smith, Brent, *For Colorado Candidates, New Water Storage a Key Political Identifier*, *News Deeply*, 9/12/2018.
- <sup>73</sup> Colorado Foundation for Water Education, *op. cit.* p.20.
- <sup>74</sup> Goodland, Marianne, *Buying and Drying: Water Lessons from Crowley County*, Colo. Independent, 7/9/2015.
- <sup>75</sup> Abbott, Chuck, *On Average, U.S. Farmers are Aging*, *FERN Ag Insider*, 4/11/2019.
- <sup>76</sup> *The Future of Irrigated Agriculture in Colorado: Great potential, great vulnerability*, *The Fencepost*, 9/29/2017.
- <sup>77</sup> Nichols, Peter D., Megan K. Murphy & Douglas S. Kenney, *Water and Growth in Colorado: A Review of Legal and Policy Issues*, *Natural Resources Law Center, University of Colorado School of Law*, 2001.
- <sup>78</sup> Woodard, Cassidy, *A Look at Laws Authorizing Uses of Conserved and Saved Water in California, Montana, Oregon, and Washington*, *Colorado State University*, Apr. 2016.
- <sup>79</sup> Colorado Water Education Foundation, *Citizens Guide to Water Law*, 2d ed., 2016, p. 24.
- <sup>80</sup> *Ibid.* p.30.
- <sup>81</sup> [What is a Conservation Easement?](#) Great Outdoors Colorado (blog), 1/17/2017.
- <sup>82</sup> Income Tax Credits, [Conservation Easement](#), Wikipedia.
- <sup>83</sup> Worthington, Danika, *Farm near Mead hits auction block, but it’s the water everyone has their eyes on*, *Denver Post*, 7/17/2016.
- <sup>84</sup> *Ibid.*
- <sup>85</sup> Farrell, Paul B., *Water is the new gold, a big commodity bet*, *Market Watch* 7/24/2012.
- <sup>86</sup> Lustgarden, Arbrahm, *A Free-Market Plan to Save the American West From Drought*, *The Atlantic*, Mar. 2016.
- <sup>87</sup> *The Future of Irrigated Agriculture in Colorado*, *op. cit.*
- <sup>88</sup> Cohen, Michael et.al., *Water to Supply the Land: Irrigated Agriculture in the Colorado River Basin*, *Pacific Institute*, 2013, p. v.
- <sup>89</sup> Haley, Alex, *Roots: The Sage of an American Family*, N.Y.: Doubleday, 1976.
- <sup>90</sup> Associated Press, [Census Bureau: St. George, Utah 5th Fastest Growing Metro Area In U.S.](#), 3/27/10.
- <sup>91</sup> City of Grand Junction, [2021 Line Item Budget by Department](#), 12/2/20.

- <sup>92</sup> Denver Water, [2020 Amended Budget](#), pp.5, 54 (Accessed 7/7/2020).
- <sup>93</sup> Metropolitan Water District of Southern California, Realizing the Benefits of Sound Investments: Biennial Budget, Fiscal Years 2018/19 and 2019/20 (2019), p. 29; [Metropolitan Water District of Southern California](#), Wikipedia.
- <sup>94</sup> [Comparison between U.S. states and sovereign states by GDP](#), Wikipedia.
- <sup>95</sup> Reisner, Marc, *Cadillac Desert: The American West and Its Disappearing Water*, N.Y.: Viking, 1986.
- <sup>96</sup> Lewis, David & John Langford, *Why Has the Darling Dried Up? Inside Story*, 5/8/2019.
- <sup>97</sup> Triskele, *Watergate: An ecosystem cultivated for sharks won't support goldfish*, Michael West Media, 5/9/2019.
- <sup>98</sup> Goodland, *op. cit.*
- <sup>99</sup> Thiel, Aaron, *Climate Change Impacts on Agriculture in the Colorado River Basin*, University of Wisconsin Milwaukee, School of Freshwater Sciences, Center for Water Policy (undated).
- <sup>100</sup> [Colorado River Compact](#), 11/24/1922.
- <sup>101</sup> [Upper Colorado River Basin Compact](#), 1948.
- <sup>102</sup> Boulder Canyon Project Act, Pub. L. No. 642, 43 U.S.C. 617 (1928).
- <sup>103</sup> [Colorado River Water Use 4.4 Plan](#), Water Education Foundation.
- <sup>104</sup> *Quantification Settlement Agreement and Related Agreements and Documents, to Which Southern California Agencies are Signatories*, Imperial Irrigation District, Metropolitan Water District of Southern California, Coachella Valley Water District, 10/10/2003; Water Education Foundation, *op. cit.*
- <sup>105</sup> *Michael Abatti, et al. v. Imperial Irrigation District*, California Court of Appeal, Fourth Appellate District Division One, (Super. Ct. No. ECU07980) 7/16/2020.
- <sup>106</sup> Roth, Sammy, *A Long-Simmering Water Battle Comes To A Boil In Southern California*, L.A. Times, 6/18/2020.
- <sup>107</sup> [State Water Project](#), California Department of Water Resources (2020).
- <sup>108</sup> Hanak, Ellen, Jay Lund et.al., *Managing California's Water: From Conflict to Reconciliation*, Public Policy Institute of California, 2011, pp. 19-55.
- <sup>109</sup> *California's Central Valley: Producing America's Fruits and Vegetables*, House Committee on Natural Resources, 2/5/2014.
- <sup>110</sup> Cadei, Emily & Dale Kasler, *Huge Delta water deal backed by Dianne Feinstein, Jerry Brown, Kevin McCarthy*, Fresno Bee, 11/30/2018.
- <sup>111</sup> *Ibid.*
- <sup>112</sup> Kasler, Dale & Ryan Sabalow, *Newsom Inherits A 'Whole Bunch Of Headaches' Despite Last-Minute Water Deals By Brown*, Sacramento Bee, 1/9/2019.
- <sup>113</sup> [Colorado River Basin Drought Contingency Plans](#), U.S. Bureau of Reclamation (2019).
- <sup>114</sup> *Trump Signs Colorado River Drought Contingency Plan*, Arizona Public Media, 4/16/2019.
- <sup>115</sup> Ritter, Kayla, *California Water District Sues to Stop Colorado Drought Plan*, HotSpots H2O, 4/22/2019.
- <sup>116</sup> James, Ian, *Here's What the Colorado River Deal Will Do*, AZ Central, 3/27/2019.
- <sup>117</sup> Nyczepir, Dave, *Congress Could Move Quickly on Drought Contingency Plan for Colorado River*, RouteFifty.com, 3/28/2019.
- <sup>118</sup> Romm, Joseph, *McCain suggests renegotiating Colorado River compact to benefit Ariz., Nev., and Calif.*, Grist, 8/19/2008.
- <sup>119</sup> Associated Press, *McCain now says Western water pact should stand*, Vail Daily, 8/20/2008.
- <sup>120</sup> U.S. Bureau of Reclamation, *Colorado River Basin Water Supply and Demand Study, Executive Summary*, Dec. 2012, p. 3.
- <sup>121</sup> Colorado River Compact, *op. cit.*
- <sup>122</sup> Upper Colorado River Basin Compact, *op. cit.*
- <sup>123</sup> Kukn, Eric, *Hydrology, Science and Policy: Future Scenarios for the Colorado River*, 23rd Annual Water Law Conference, San Diego, CA February 24-25, 2005, p. 16.
- <sup>124</sup> Finley, Bruce, *West wrestles with Colorado River 'grand bargain' as changing climate depletes water governed by 1922 compact*, Denver Post, 8/25/19.
- <sup>125</sup> Kuhn, *op. cit.*
- <sup>126</sup> Saunders, Glenn, *Reflections on Sixty Years of Water Law Practice*, Natural Res. Law Center, Univ. of Colo. School of Law, 1989, pp. 49-50.
- <sup>127</sup> *Winters v. United States*, 207 U.S. 564 (1908).
- <sup>128</sup> U.S. Dept. of Justice, [Federal Reserved Water Rights and State Law Claims](#).
- <sup>129</sup> *Ibid.*
- <sup>130</sup> *United States v. New Mexico*, 438 U.S. 696 (1978).
- <sup>131</sup> *United States v. Denver*, 656 P.2d 1 (Colo. 1982).
- <sup>132</sup> *Ibid.*
- <sup>133</sup> Gordon, Nancy, *Summary of Technical Testimony in the Colorado Water Division 1 Trial*, U.S. Forest Service General Technical Report RM-GTR-270, Sept. 1995, p. 2.
- <sup>134</sup> Redmond, Zachary, *Wayne Aspinall Unit, Colorado River Storage Project*, U.S. Bureau of Reclamation History Project, 2000.
- <sup>135</sup> Walston, Roderick E., *The Reserved Rights Doctrine: Case Study Involving Black Canyon of the Gunnison National Park*, *Journal of Contemporary Water Research & Education*, Issue 133, 5/2006, pp. 31-33.
- <sup>136</sup> Shea, James, *Black Canyon Water Case Largest In State's History*, Montrose Press, 7/15/2006.
- <sup>137</sup> Jaffe, Mark, *Black Canyon Awash in Water Rights Victory*, *Denver Post*, 5/14/09; Benson, Reed D., *A Bright Idea from the Black Canyon: Federal Judicial Review of Reserved Water Right Settlements*, 13 *University of Denver Water Law Review* 229, 2009..
- <sup>138</sup> Walston, Roderick E. *op. cit.*
- <sup>139</sup> Joint DOI/DNR Press Release, [Historic Settlement Agreement Reached On Black Canyon Of The Gunnison Water Rights](#), 3/31/2003.
- <sup>140</sup> Shea, James, *op. cit.*
- <sup>141</sup> Walston, Roderick, *op. cit.*
- <sup>142</sup> Blevins, Jason, *U.S. House Approves Largest Colorado Wilderness Bill In 40 Years*, Colorado Sun, 2/14/2020.
- <sup>143</sup> Paul, Jesse, *The CORE Act Has Passed The U.S. House*, Colorado Sun, 1/31/2019.
- <sup>144</sup> *Ibid.*
- <sup>145</sup> *Special Use Provisions in Wilderness Legislation*, Natural Resources Law Center, University of Colorado School of Law, 2004.
- <sup>146</sup> *Ibid.* p. 2-3.
- <sup>147</sup> *Ibid.*

- <sup>148</sup> Blevins, Jason, *Ski Industry Sues The Forest Service Over Water Rights*, Denver Post, 1/10/2012; Ski Area Water Clause, 80 Fed. Reg. 81508–81527 (12/20/2015).
- <sup>149</sup> Blevins, Jason, *Forest Service Buries Plan on Transfer of Ski Area Water Rights*, Denver Post, 12/30/2015.
- <sup>150</sup> Peters, Greg, *The Future Of Ski Resorts On Public Lands, Your National Forests*, Winter/Spring, 2014.
- <sup>151</sup> Ski Area Water Clause, *op. cit.*
- <sup>152</sup> Browning, Michael F., *The Ditch Bill Deadline Approaches*” *Colorado Lawyer*, Vol. 24, No. 7, July 1995, p. 1569.
- <sup>153</sup> Wilderness Act of 1964, Pub. L. 88-577, 16 U.S.C. §§ 1131-1136 (1964).
- <sup>154</sup> Colorado Ditch Bill, Pub. L. 99-545, 100 Stat. 3047, 1986; Evaluating Applications and Issuing Easements for Certain Water Development Facilities on National Forest System Lands That Qualify Under the Act of October 27, 1986, 69 Fed. Reg. 39404, pp. 39404-39405; [Colorado Ditch Bill Act](#), U.S. Forest Service.
- <sup>155</sup> Federal Land Policy and Management Act. Pub. L. 94-579, 43 U.S.C. Chapter 35.
- <sup>156</sup> USACE and EPA. *Intention To Review and Rescind or Revise the Clean Water Rule*, 82 Fed. Reg. 12532, 3/6/2017.
- <sup>157</sup> Clean Water Rule: Definition of ‘Waters of the United States, 80 Fed. Reg. 37053, 6/6/2015.
- <sup>158</sup> *Rapanos v. United States*, 547 US 715 (2006).
- <sup>159</sup> Exec. Order No. 13778, 82 Fed. Reg. 12497 (Mar. 3, 2017).
- <sup>160</sup> Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500, 86 Stat. 816: Sec. 311(a)(11), Sec. 311(b)(1), Sec. 311(b)(2)(A), Sec. 311 (b)(3), Sec. 311 (c)(1), Sec. 311 (e), Sec. 311 (m) (A), Sec. 311 (p)(1), Sec. 311 (p)(6), Sec. 312 (h)(4), Sec. 312 (l) (1).
- <sup>161</sup> Copeland, Claudia, *Clean Water Act: A Summary of the Law*, Congressional Research Service, 10/18/2016.
- <sup>162</sup> 33 U.S.C. § 1251.
- <sup>163</sup> EPA. [History of the Clean Water Act](#).
- <sup>164</sup> Federal Water Pollution Control Act Amendments of 1972, Sec. 311, *op. cit.*
- <sup>165</sup> Stecker, Tiffany, *WOTUS ‘Ultimately Doomed.’ What Happens Next?* E&E News, 11/16/2016.
- <sup>166</sup> Jordan, Mary & Kevin Sullivan, *‘Smothered’ and ‘Shoved Aside’ In Rural America*, Washington Post, 12/29/2017.
- <sup>167</sup> Exec. Order No. 13778, *op. cit.*
- <sup>168</sup> Smith, Jerd, [Colorado executes about-face on Clean Water Act, but not everyone agrees](#), Water Education Colorado, 4/24/2019.
- <sup>169</sup> *Weiser says State of Colorado will take legal action to protect the state’s waters from weaker federal protections*, Colorado Attorney General’s office, 4/21/2020.
- <sup>170</sup> *State files lawsuit defending Colorado streams and wetlands from flawed federal rule*, Colorado Attorney General’s office, 4/22/2020.
- <sup>171</sup> 43 U.S. Code § 666: Suits for adjudication of water rights. See also U.S. Dept., of Justice, [The McCarran Amendment](#).
- <sup>172</sup> Hannah Northey, *Biden Would Face Slog to ditch Trump’s WOTUS*, E&E News, 8/20/2020.
- <sup>173</sup> [Gov. Hickenlooper Signs Colorado Water Rights Protection Act](#), Eagle River Water and Sanitation District, 4/27/2016.
- <sup>174</sup> *Ibid.*
- <sup>175</sup> [Colo. Rev. Stat. § 37-92-310 \(2016\)](#).
- <sup>176</sup> Oregon State University, *Chronic 2000-2004 drought, worst in 800 years, may be the ‘new normal’: study*, Phys.org 7/29/2012.
- <sup>177</sup> *Denver Water approves mandatory watering restrictions because of drought*, Denver Post, 3/27/2013.
- <sup>178</sup> Rogers, Paul, *California Oks \$2.5 Billion To Build New Dams, Water Storage Projects*, Santa Cruz Sentinel, 9/11/2018.
- <sup>179</sup> *bid.*
- <sup>180</sup> *Ibid.*
- <sup>181</sup> Leslie, Jacques, *The Best Place For California’s Water Is Underground*, LA. Times, 7/5/2018.
- <sup>182</sup> Associated Press, *Researchers Study Reservoir Evaporation For Better Budgeting of Colorado River Water*, CPR News, 4/7/2019.
- <sup>183</sup> [Abandoned Mine Lands](#), Colorado Geological Survey (2020).
- <sup>184</sup> [2015 Gold King Mine waste water spill](#), Wikipedia (2020).
- <sup>185</sup> Gordon, Rob, *Exposing the EPA’s Gold King Mine Cover-Up*, Daily Signal, 6/14/2017; *Debunking the EPA’s Fake Accounts of the Gold King Mine Disaster*, The Daily Signal, 6/26/2017.
- <sup>186</sup> Gold King Mine Release: Inspector General Response to Congressional Requests. EPA, Inspector General, Report 17-P-0250, 6/12/2017.
- <sup>187</sup> *Report to the Colorado Legislature: HB12-1278 Study of the South Platte River Alluvial Aquifer*, Colorado Water Institute, Colorado State University, 12/31/2013, Appendix VIII.
- <sup>188</sup> Silva, Raul et.al., *The Cost of Rehabilitating Our Nation’s Dams: A Methodology, Estimate & Proposed Funding Mechanisms*, Lexington, Ky.: Association of State Dam Safety Officials, 2017.
- <sup>189</sup> American Society of Civil Engineers. *2020 Report Card for Colorado’s Infrastructure*, Colorado Section ASCE, 2020, p. 27.
- <sup>190</sup> Sullivan, Sharon. *Hydropower in Colorado*, Water Education Colorado, 1/1/2013.
- <sup>191</sup> *Ibid.*
- <sup>192</sup> *Ibid.*
- <sup>193</sup> Hydropower Regulatory Efficiency Act of 2013, H.R.267, 113<sup>th</sup> Congress (2013).
- <sup>194</sup> Bureau of Reclamation Small Conduit Hydropower Development and Rural Jobs Act, H.R.678 ,113<sup>th</sup> Congress (2013).
- <sup>195</sup> Sullivan, Sharon, *op. cit.*
- <sup>196</sup> Nissen, Scott, Anna Sher & Andrew Norton (eds.) *Tamarisk: Best Management Practices in Colorado Watersheds*, Colorado State University, 2009.
- <sup>197</sup> Song, Lisa, *A Water Hog Redeemed*, High Country News, 5/4/2010.
- <sup>198</sup> [Water Sense: Statistics and Facts](#), EPA (2020).
- <sup>199</sup> National Science Foundation, *Billions of gallons of water saved by thinning forests*, Press Release 18-029, 4/23/2018.
- <sup>200</sup> Lee, Taesam & Jose D. Salas, [Record Extension of Monthly Flows for the Colorado River System](#), U.S. Bureau of Reclamation, 12/2006.
- <sup>201</sup> National Science Foundation, *op. cit.*
- <sup>202</sup> Upper Colorado River Basin Compact, *op. cit.*
- <sup>203</sup> Dermody, K.C., *The 5 Most Epic Snow Storms in Colorado’s History*, Out There Colorado, 1/5/2018.
- <sup>204</sup> National Science Foundation, *op. cit.*
- <sup>205</sup> 16 U.S. Code ch. 2: National Forests. U.S. Forest Service, Organic Administration Act of 1897 (emphasis added).

- <sup>206</sup> Joint Oversight Hearing, *Mountain Pine Beetle: Strategies for Protecting The West*. Subcommittee on Water and Power, Subcommittee on National Parks, Forests and Public Lands, House Committee on Natural Resources, 6/16/2009.
- <sup>207</sup> *Ibid.* Wilkinson testimony.
- <sup>208</sup> [Pine Gulch Fire Information](#), Incident Information System.
- <sup>209</sup> [Cameron Peak Fire Information](#), Incident Information System.
- <sup>210</sup> [East Troublesome Fire Information](#), Incident Information System.
- <sup>211</sup> Laughlin, Breeana, *County Commissioner Rallies Congress For Forest Assistance*, Summit Daily, 5/5/2013.
- <sup>212</sup> Adler, Jonathan. *The fable of the burning river, 45 years later*, Washington Post, 6/22/2014.
- <sup>213</sup> Roesmann, Peter, Colorado River District, *Transmountain Diversions Create Political Divide In State*, Glenwood Post Independent, 10/19/2003.
- <sup>214</sup> *Coors Settles With Colorado Authorities After Beer Spill*, Water World, 12/27/2001.
- <sup>215</sup> *Colorado and Coors Build Test Wetland for Wastewater Treatment*, Greenbiz, 9/9/2003.
- <sup>216</sup> EPA [NPDES Permit Basics](#); 48 Fed. Reg. 14153, 4/1/1983, as amended at 49 Fed. Reg. 38048, 9/26/1984; 50 Fed. Reg. 4514, 1/31/1985; 50 Fed. Reg. 6941, 2/19/1985; 65 Fed. Reg. 30908, 5/15/2000.
- <sup>217</sup> EPA, [Study of Oil and Gas Extraction Wastewater Management Under the Clean Water Act](#), EPA-821-R19-001, May 2019, pp. 2, 7, 21.
- <sup>218</sup> *Vance v. Wolfe*, 205 P.3d 1165, 1173 (Colo. 2009).
- <sup>219</sup> Kelley, Dalton, [The Other Black Gold](#), University of Denver Water Law Review, Sturm College of Law, 3/23/2017.
- <sup>220</sup> Colo. Rev. Stat. § 37-90-137.
- <sup>221</sup> *States Seek Data to Enhance Produced Water Reuse As EPA Eyes New Rules*, Inside EPA, 7/12/2019.
- <sup>222</sup> *Ibid.*
- <sup>223</sup> *Ibid.*



**INDEPENDENCE**  
INSTITUTE.ORG

---

727 East 16th Avenue | Denver, Colorado 80203 | 303.279.6536

---

**INDEPENDENCEINSTITUTE.ORG**