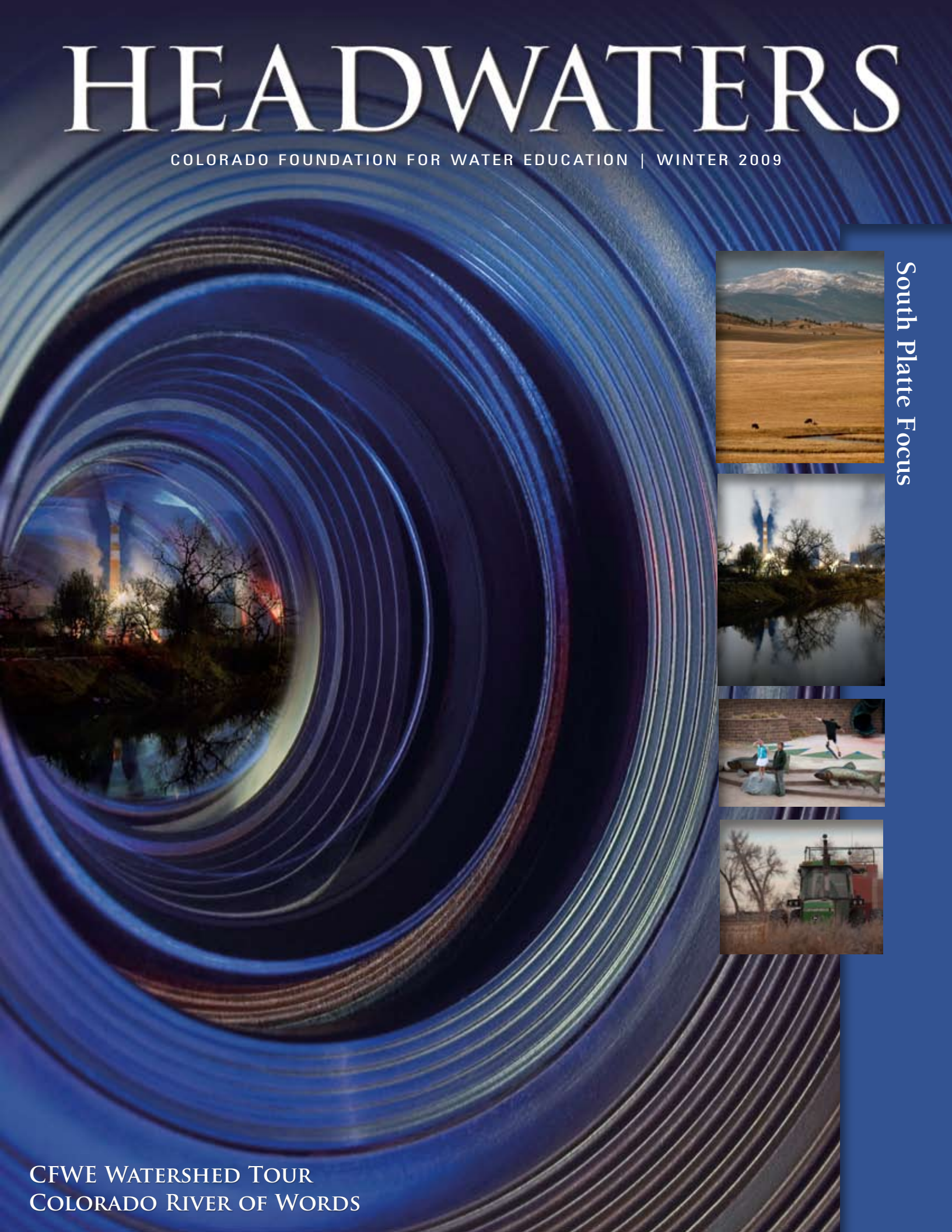
HEADWATERS

COLORADO FOUNDATION FOR WATER EDUCATION | WINTER 2009



South Platte Focus

CFWE Watershed Tour
Colorado River of Words

Currents

Filing and paperwork often seems to be a large part of my job, but it is not without the occasional surprise. About six months ago, I was compiling proof of the Foundation's nonprofit status for a grant application. In reviewing the documents, I realized that the organization's fifth birthday had slipped by unnoticed during the transition of the previous year. Reflecting on the missed milestone, I thought of the countless people and the years of effort it took to turn the idea of the Colorado Foundation for Water Education into a reality.

We all now benefit from the hard work of those before us, which resulted in a secure organization with a clear track record of producing high-quality educational experiences and products. But as is my nature, I could not help but think of those paths that we did not go down. What programs could we have launched? With which audiences have we yet to connect? Thankfully, I have the opportunity to lead the CFWE staff and Board of Trustees through these questions over the next few months as we undertake an update of our strategic plan.

" I would like to thank all of our sponsors, members and donors for a successful 2008. The important work we accomplish would be impossible without you."

Past Foundation leaders, such as Karla Brown and Diane Hoppe, succeeded in meeting and exceeding most of the goals from the 2003 strategic plan. The current CFWE Board and staff are excited to set new goals and priorities that will guide us for the next few years. An update on this process will be available in the Spring 2009 edition of Headwaters.

During the strategic plan update, one of the big questions we will ask ourselves is, "What are the needs of our members and stakeholders, and how can we better meet them?" Luckily, a statewide assessment of water education in Colorado led by the Colorado Water Conservation Board and finalized in June 2008 made some of these needs clear.

The Foundation intends to pursue a number of the task force's recommendations. One of these is to provide a better hub for water education providers across the state. It seems rarely a week goes by without a passionate individual or group asking for our input or involvement in a new water education program. We try our best to support their efforts and point them towards others doing similar work, but I am still amazed at the number of proposals and ideas I hear of second- or thirdhand. Water education is truly thriving in Colorado!

In late 2009, the Foundation will unveil a new Web site. Its design will help connect water education providers and users across the state. It will also serve as an information hub for the latest news, reports and happenings in the water profession. My hope is that it will become a resource for the water-interested community to learn and support each other.

And speaking of support, I would like to thank all of our sponsors, members and donors for a successful 2008. The important work we accomplish would be impossible without you. As I look forward to 2009, I know we have a six-year history of support in the form of time and financial assistance from you that will keep the Foundation strong.

Best wishes to all for a peaceful and happy 2009.

Nicole Seltzer

Nicole Seltzer
Executive Director

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Mission Statement

The mission of the Colorado Foundation for Water Education is to promote better understanding of water resources through education and information. The Foundation does not take an advocacy position on any water issue.

Colorado Foundation *for* Water Education

On the Cover:
The cover—with photos of a Rocky Mountain backdrop, twilight, recreation and agriculture—illustrates a cross section of life along the South Platte River. Photos by Kevin Moloney, Michael Lewis and iStockphoto.com.

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Headwaters is a magazine designed to provide Colorado citizens with balanced and accurate information on a variety of subjects related to water resources. Copyright 2009 by the Colorado Foundation for Water Education. ISSN: 1546-0584 Edited by Lori Ozzello. Design by Emmett Jordan.

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CFWE HIGHLIGHTS

2008 SOUTH PLATTE TOUR

By David Harper
Photographs by Brian Gadbery

Northern Water's Eric Wilkinson talks with tour participants during their final stop. Wilkinson represents the South Platte River on the Interbasin Compact Committee.

Participants explore Northern's model of the Colorado-Big Thompson Project. The water feature demonstrates the project's journey from water from diversions on the Colorado River, across the Continental Divide to cities, towns and farms on the eastern plains.

The Colorado Foundation for Water Education conducted its annual river basin tour, two days focused on the South Platte Basin. Eighty-four attendees from diverse backgrounds, many of whom have a stake in the river's future, visited different places along the river, listened to the speakers and formed their own opinions about the myriad water administration issues of the basin.

The tour began at the Metro Wastewater Reclamation District's Robert W. Hite Treatment Facility. Metro officials Barbara Biggs and Steve Frank discussed the wastewater reclamation process and incumbent challenges of servicing 1.6 million people from 45 water and sanitation districts.

Tour participants learned about several issues of importance to the basin. From regulatory issues such as calls on the river, to large projects like the Arkansas Valley Super Ditch and the Tamarack project, the tour served as an introduction into the inner workings of the South Platte.

Much of the focus of the June tour was on adapting to changing water use patterns. In an area such as the South Platte, urbanization and population growth have caused a shift from agricultural to municipal use. This requires water administrators to rise to the challenges and study the best options available for dealing with the anticipated continuation of this trend.

Joe Frank, general manager of the Lower South Platte Water Conservancy District sees greater statewide and nationwide cooperation as one of the keys to protecting water rights. Providing people from across the state a ground-level view of the South Platte is a means of facilitating this cooperation.

"The tour highlighted several different operations and areas of the South Platte and gave people a good overall understanding of what happens on a day to day basis in the basin,"said Frank.

The analysis of the impacts of shifting water resources from agricultural to municipal purposes extended beyond water administration. Larry Rogstadt of the Colorado Division of Wildlife spoke to urbanization's impact on wildlife, and Jerry Kenny of the Headwaters Corporation talked about the Platte River Recovery Implementation Plan. According to Kenny, the program is designed to "resolve escalating conflicts between water use and endangered species protection" within the basin. The program focuses on beleaguered species such as the pallid sturgeon and the whooping crane, but is also concerned with reducing the likelihood that other Platte species become endangered.

Tour participants also got to see the importance of the South Platte to energy generation with a trip to the Pawnee Power plant outside of Brush. Operated by Xcel Energy, the coal-fired plant can generate 500 megawatts, but is dependent on South Platte water rights and an on-site reservoir.

The tour concluded at Northern Colorado Water Conservancy District's headquarters in Berthoud. There, regional planning and large scale projects that will shape the future of the basin were discussed by a panel of experts moderated by Reagan Waskom, a CFWE board member and the Colorado Water Institute's director.

Tour participants emerged with a clearer picture of the South Platte Basin. Given the diversity of tour presenters and participants—state legislators, farmers, lawyers, and water administrators, among others—the tour provided key decision makers with a greater and more nuanced understanding of the basin. ❑

JOIN US FOR THE JUNE 2009 TOUR

Please plan to join the Foundation for our 2009 Tour of the Rio Grande Basin. Staff is creating a 2.5 day educational adventure that will focus on the challenges and successes of water management and use in the San Luis Valley. Look for details on our Web site in February 2009.

At the home of the Poudre Learning Center, the historic Hazelton School in west Greeley, the group toured the amphitheater, xeriscape and outdoor learning facilities. The once-doomed school was rebuilt with donations from Greeley's four Rotary chapters and the community. It offers interdisciplinary learning for K-12 students in the surrounding school districts.

Watermarks

Even though the South Platte led fortune seekers, trappers and later colonists into Colorado, the river has long battled an image problem.

Scrawny. Meager. Shallow. Spiritless. Dull. Flat.

Stephen Long insulted it. Crossing the river near Julesburg, Mark Twain opined, "It's such a small thing. If it were my river I wouldn't leave it out at night. Why some dog would come along and lap it all up!"

Imagine the river as a public figure whose image handlers must overhaul, so to speak. They'd tout the river's leanness, its conservative principles. Mr. (or Ms.) Platte is a steady, get-things-done character, they'd say. He/she is the heartbeat of agriculture and the champion of the economy, a verifiable agent of change who wrote the state's history. The dowdy appearance? That's just one more indication that the Platte pays more attention to its job than its looks.

OK, so the South Platte isn't the most inspiring river, but it is hardworking and it's grown up with northern Colorado. The river supplies our largest cities and highest producing ag counties. To make it happen, trans-mountain diversions provide flows that almost equal the amount of water that leaves the state.

As a drylander who grew up loving the prairie, a river like the South Platte makes an enormous difference, no matter how many names anyone famous—dead or alive—calls it. The river is a geographical blessing, a fellow drylander explained. It means settlement and prosperity, he wrote, while a few miles north or south the grasslands remain marginal.

Throughout the process of publishing the South Platte River *Headwaters,* one idea kept popping up: The more a person reads, researches and listens, the more obvious it is that Headwaters writers could easily have crafted a complete issue of the magazine on each topic.

Allen Best, an experienced environmental writer, traveled from Golden east to the plains to profile the South Platte and one of its tributaries, Clear Creek. The two have interlocking, but vastly different histories. From mining along the creek to farming along the river, the basin is rich in anecdotes.

Eryn Gable explains the basin roundtables, a relatively new concept aimed at getting people within basins to sit down and talk. The meetings put people with a range of interests in a room together to sketch out solutions. Farmer and roundtable chair Bill Jerke said a few years ago he never would have dreamed he'd sit down with some of the other representatives, let alone form working relationships.

Agriculturists and economists look at the future of farming and ranching in Colorado. They're changing, along with the river and the state.

Jayla Poppleton spoke with the metro roundtable's members. The Denver area, because of its population and in some cases separate concerns, has a roundtable of its own. Once thought to have a limitless deep groundwater supply, Douglas county water providers now are on the hunt for renewable water supplies and more diverse water portfolios.

Josh Zaffos, a Fort Collins-based writer, talked to water conservation officers. Until 2002, drought was a sort of nebulous possibility and water conservation officers were a little like algebra: No one was sure when you'd actually use it, but you had to have it anyway. Now, conservation is front and center.

Finally, we have the 2008 River of Words. The young poets capture the river's symphony, reminding us that it is more than what we divide, use and reuse.

Wrote Sarah Hamilton, a Denver 8th grader:

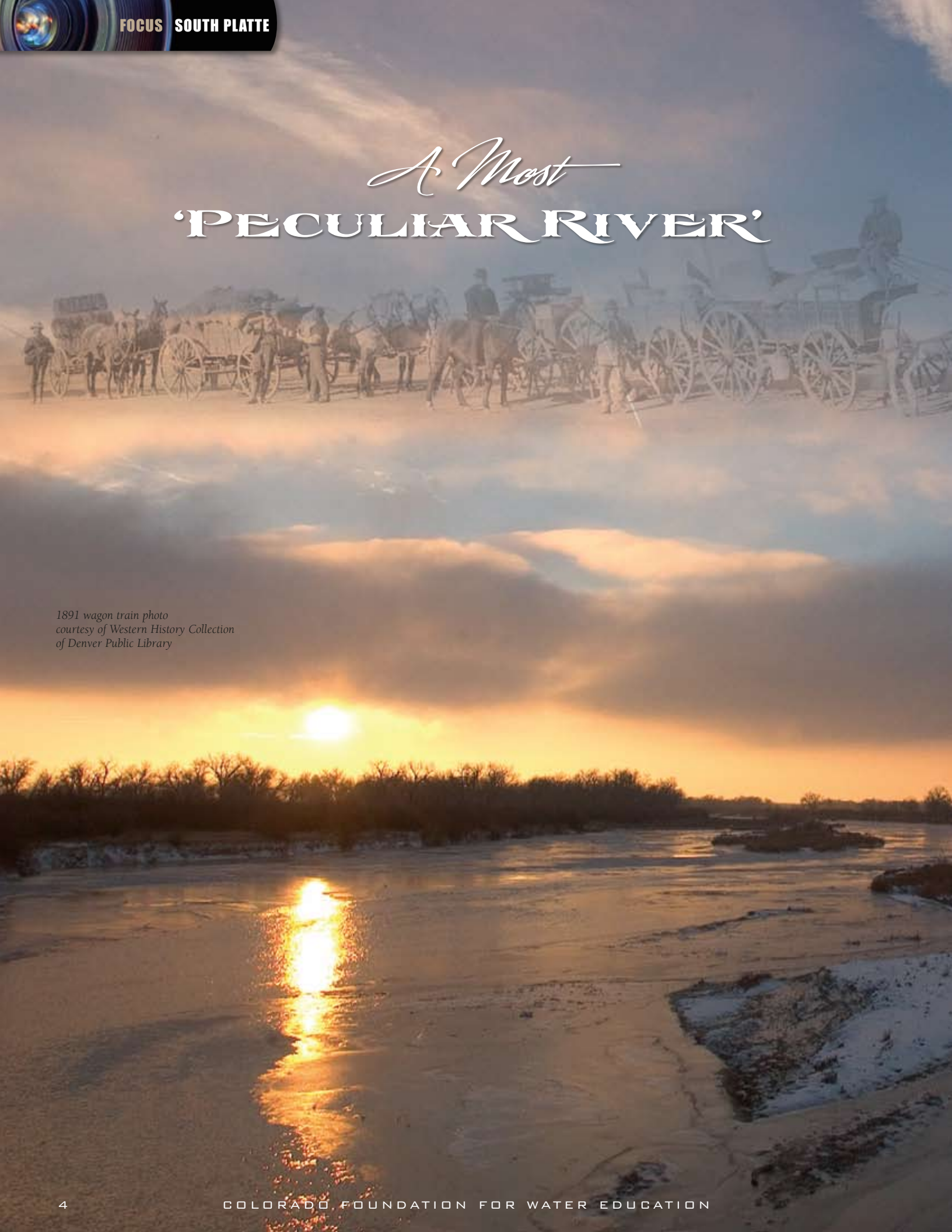
… for the river is a thread
binding together the unknown
cross-stitching the squares of farmland,
weaving veins into leaves…

That's the South Platte.

Lori Ozzello

Lori Ozzello
Editor

A Most 'Peculiar River'



1891 wagon train photo courtesy of Western History Collection of Denver Public Library

by Allen Best
Photographs by Kevin Moloney

Westward travelers of the 19th century invariably found the South Platte River perplexing. Samuel Mallory, on seeing the river for the first time, dubbed it the most "peculiar river I ever saw. It is about a mile wide and runs with a rapid current, yet I can wade across it at any place, and I have never seen a place yet where it is four feet deep."

Ice forms on Clear Creek, near the headwaters at Loveland Pass.

Loveland Basin ski area produces snow from Clear Creek flows.

Mallory, a former mayor of Danbury, Conn., made the observation on June 10, 1860, while on the way to the Colorado gold fields. The route along the river that spring was busy. The night before, said Mallory, a train of 27 mammoth wagons passed his party, probably near present-day Brush and Fort Morgan. Mallory and companions could already see snow-covered peaks.

Even then, the distant mountains were being remade. The Clear Creek Valley was the epicenter. Major discoveries of placer gold in 1859 confirmed the vast riches of gold near today's Idaho Springs and Central City. Quickly the landscape and its waterways were rearranged. Individual gold pans were abandoned in favor of lengthy wooden boxes into which teams of men—for this was a young man's game—shoveled dirt and gravel, all this then rinsed by streams of water to remove the lighter materials. Gravity flows were harnessed to create jets of water that blasted whole hillsides. It wasn't pretty, but that wasn't the point.

These two stretches of water, Clear Creek and the lower South Platte River, are studies in contrasts, both in their native states and in their evolving uses since 1860. Much shorter, Clear Creek is less than 60 miles from its headwaters along the flanks of the Continental Divide to its confluence with the South Platte. The creek's snow-melted waters tumble 8,000 feet and through volumes of Colorado history.

The history is evident even today: upended creeks strait-jacketed to make room for narrow-gauge trains and now broad roadways. Ochre mine dumps, looking like alpine anthills, dot the hillsides. Where Clear Creek issues onto the plains at Golden is the Coors Brewery, "brewed with pure Rocky Mountain spring water" since 1873. Downstream farther yet, beyond residential neighborhoods, abandoned gravel pits, and industrial fabricators, are still a few fields, remnant truck farms in the hamlet of Welby, near the mouth of the creek, northeast of downtown Denver.

To this trio of uses—industrial, residential and agriculture—in recent years has been added a fourth: recreation. The centerpiece for this transformation is downtown Golden where the creek and its riparian banks had long been treated like a back alley.

Now gussied up with parks, walkways and benches, the creek is an amenity, a means to a different sort of beneficial use. By reconfiguring boulders, watercourse designers diverted the creek to achieve the maximum merriment of kayakers. At the core is a new kind of water right—which Golden obtained—dedicated to recreational flows. A novel concept, it was confirmed only in 2003, when a split Colorado Supreme Court allowed a lower court decision to stand. By that time the state legislature had adopted a recreational in-channel diversion statute.

The lower South Platte River since 1860 has a simpler, neater storyline. Almost exclusively, irrigators developed the lower river—from the confluence with the Poudre River, east of Greeley—during a spurt of ditch and reservoir building from about 1880 to 1910. Afterward came wells, their use proliferating with the spread of cheap electricity. Industrialization is more sparse than along Clear Creek, and even then almost exclusively complementary to farms: a string of sugar beet factories built early in the 20th century—only one, at Fort Morgan, still operates—and since the late 1960s, meatpacking plants, a cheese factory and, at Sterling, an ethanol plant.

Mark Twain crossed this river near Julesberg in 1861, and he was unimpressed. "The Platte was 'up,' they said—which made me wish I could see it when it was down, if it could look any sicker and sorrier," he later wrote in "Roughing It." If not for the "sentinel rank of scattering trees standing on either bank," the river might be lost altogether, he wrote.

In other places along the lower river, trees were even more rare. "About noon we passed a cluster of 11 trees on the opposite side of the river—a wel-

The historic Argo Mine and Mill in Idaho Springs long drained heavy metal-tainted water into Clear Creek. Now a water treatment plant cleans pollutants from the drainage.

U.S. 6 follows Clear Creek in Clear Creek Canyon between Idaho Springs and Golden.

come sight, these lonely cottonwoods!" remarked E.H.N. Patterson in 1859 while journeying between Brush and Sterling. Wood was scarce. Travelers often burned dried bison dung for campfires.

Today, the grove of trees—in places a quarter mile wide—runs continuously along the South Platte, from Denver to Nebraska. Some argue that in the past saplings were trampled by the giant bison herds, but also by Native Americans who, enjoying the mobility of horses, were fast depleting their resources.

Year-round water flows are also sometimes cited as cause of these enlarged forests. Compact negotiator Delph Carpenter in the 1920s insisted that the aboriginal Platte bustled with high water in spring and then dried up from July through September from Fort Morgan to North Platte, Neb. That's possible, although Carpenter's archived notes suggest a less ironclad wet-and-dry assessment. His many correspondents could recall individual years, but not a blanket assessment. C.C. Hawley of Fort Collins, for example, testified to digging holes in the riverbed to get drinking water during the years 1863 and 1864.

Still, the evidence is clear that what Carpenter described as the "disappearing river" has now become a "growing river." Part of the reason is the introduction of non-native water—more than 400,000 acre feet annually from the Western Slope, most from the Colorado River. According to Colorado Water Conservation Board figures, the Colorado-Big Thompson Project contributes an average 218,000 acre feet diverted annually, followed by 54,000 from Roberts Tunnel, and 52,000 from Denver's Moffat Tunnel collection system. Other contributors are the Grand River Ditch, 18,000; Laramie-Poudre Tunnel, 18,000; Aurora Homestake, 12,000; Michigan Ditch, 3,300; Wilson Supply Ditch, 1,500; Vidler Tunnel, 740; Straight Creek Tunnel, 460; Berthoud Pass Ditch, 350; Boreas Pass Ditch, 115; and Eureka Ditch, 42.

The return flows from irrigation may be even more significant in making the lower South Platte a steadier river. This return via mostly underground routes sometimes takes days, even years. The South Platte, wrote the late J.M. Dille in "Irrigation in Morgan County," is probably the "outstanding example in the West of 'return flow' development."

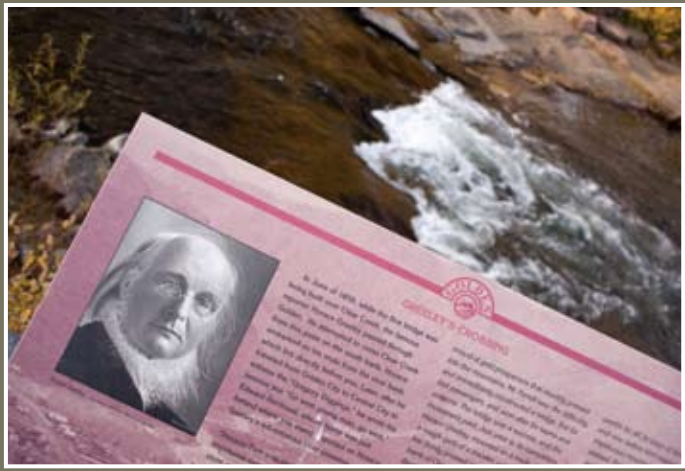
Early efforts at ditch building were usually small. A notable exception was at Sterling, where a canal appropriation from 1873 irrigated 16,000 acres. Arrival of the railroads—the Union Pacific in 1881 and the Chicago, Burlington and Quincy in 1882—spurred the larger developments. With a wider market for their crops, Morgan County farmers built four of the six largest ditch systems in the 1880s.

Abner Baker was integral to these ditches. Born and reared in the Midwest, he fought in the Civil War, then became a salesman and a photographer. In 1870, although he knew nothing of irrigation, he decided to seek his fortune at Horace Greeley's new Union Colony. Journeying south from Cheyenne, he confided to his diary his first impression of the landscape. "There is nothing in the dry, sterile-looking plains to awaken enthusiasm in anyone," he wrote.

In time, Baker saw the prairie differently. At Union Colony, he learned quickly the mechanics of surveying and scraping out irrigation ditches. A decade later, he was ready to go out on his own. With the aid of three brothers in the 1880s, he helped create four major ditch systems from Wiggins to Brush, promoted creation of Fort Morgan and helped establish Morgan County. He died at age 54, his full ambitions still unrealized, but he had created the foundation for what local boosters called one of the nation's most bounteous agricultural precincts. The "cheerless" and "monotonous" plains so often lamented by travelers were changing rapidly.

Corn and alfalfa, both vital as feed for cattle and other livestock, was the new irrigation economy's primary product. Sugar beets soon became another source of cash. The last major piece of the supply puzzle was the 1906 decision to construct Empire Reservoir. With an extended Bijou Ditch, an addi-

Diversion headgates tap water from Clear Creek at Golden, Colo. Though agriculture is only a memory in the area, irrigation infrastructure still crosses the suburban landscape.



Signage marks a spot where journalist Horace Greeley, the namesake of Colorado's city, once crossed Clear Creek in Golden and was washed off his mule by the current.

tional 40,000 acres around Fort Morgan was irrigated.

"Verily, eerily the boom is on, and Fort Morgan is now going forward by leaps and bounds," gushed the Fort Morgan Times. Empire's storage with two other reservoirs, Riverside and Jackson, created a capacity of more than 130,000 acre feet. Most ditches are operated in tandem with reservoirs. There are six major ditches in the Fort Morgan-Brush area.

Farther downstream, three reservoirs—Prewitt, North Sterling and Julesburg—serve lands in Logan and Sedgwick counties. The trio began to fill in the early 1900s. Joe Frank, general manager of the Lower South Plate Water Conservancy District, said the population of Logan County more than doubled in the decade after the reservoirs were completed. Along with ditches, the reservoirs helped establish an irrigated corridor reaching east to the Colorado-Nebraska line.

Jim Yahn, secretary-manager of the North Sterling Irrigation District, said the lower South Platte now has water during times of the year it wouldn't naturally, the result of return flows from Denver and other points upstream. This sequence of water flowing from one city downstream to farms and other cities or towns also means generally the farther the river goes, the later the water was appropriated.

"At Julesburg, having an 1890's water right is still a good right, whereas in Denver if you have that right, it's not worth nearly as much," he said, referring to Colorado's first in time, first in right doctrine. "The return flows are what made that happen. What created the return flows were the ditch companies."

Wells are the final element in lower South Platte irrigation. First used broadly in the 1930s, their use spread again—mostly to provide water to finish crops—in response to a mid-1950s drought. From the start, some thought the water produced by wells came from the same source as the river itself. For decades, supporting evidence accumulated, showing a farmer could, by drawing well water, reduce the flows available to other and usually senior downstream water right owners.

In the 1969 the state legislature acted to protect the rights of senior appropriators. Not until the drought of 2002, as crops withered for lack of water, did the other shoe drop.

In the Empire Lodge case of 2001, the Colorado Supreme Court ruled the State Engineer did not have the authority to approve temporary substitute water supply plans for augmentation. Augmentation plans replace water to the aquifer or the river as necessary to protect senior water rights from injury, when a junior well or surface diversion intercepts water that those senior rights would otherwise receive. During the 2002 drought, ditch companies and cities complained that wells were pumping illegally. They took the matter to court and won.

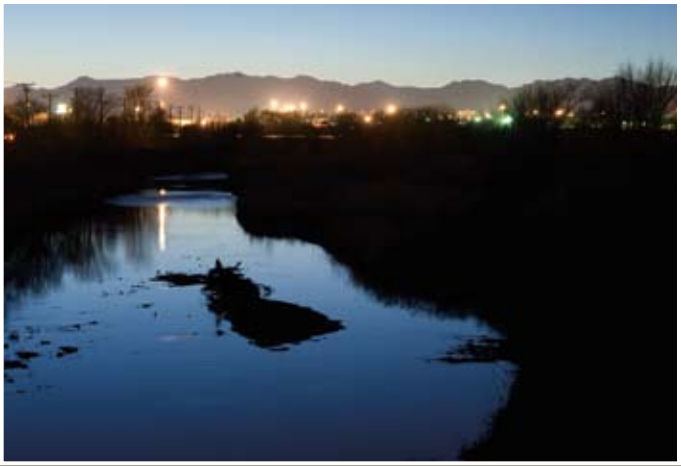
Then early in 2003, a new state law required well owners to file a permanent augmentation plan in water court. Several owners could not find enough water to make up for what they pumped, or depleted, and were either substantially curtailed or forced to stop pumping. The result: Growers dried up large tracts of land.

In recent years, water providers along the urbanized Fort Range corridor between Parker and Greeley purchased water rights from lower South Platte irrigators to meet downstream obligations while retaining water from upstream sources. Shares in Weldon Valley Ditch Co., Morgan County's oldest with a priority date from 1881, escalated in value by 600 percent between 1998 and 2008, reports secretary Eric Christensen. "And that interest isn't coming from agriculture," he said.

The story of Clear Creek from its mining days forward is more tangled, and always shadowed by environmental degradation.

"Gravel, sand, boulders, rocks—not one stone left upon another; not one where Nature put it," observed James Meline in 1866 after traveling from Golden to Black Hawk. Mining quickly moved underground, following lodes to the source of gold and, in later years, silver and molybdenum. This, in turn, necessitated stamp mills to reduce ores and, with the aid of cyanide, arsenic and mercury, extract the gold and silver. By 1860, more than 150 mills already exist-

Rail lines shadow Clear Creek as it crosses an urban industrial landscape east of Golden.



Clear Creek flows into the South Platte at Welby, an industrial suburb northeast of Denver,.

ed in the Clear Creek Valley, polluting the creeks without restraint. These tainted waters were also muddied, as whole hillsides of trees were rapidly felled to gain wood for mine props, corduroyed roads, charcoal and, of course, heating.

From downstream came complaints. In 1880, the Golden Weekly Globe reported that quality of town water was "seriously objectionable." A tincture of iron was so strong, added the newspaper, to make the water useless for washing. Farmers were also dissatisfied. One irrigator claimed his 10 acres were so severely defiled that not even weeds would grow.

In 1882, irrigators traveled to Central City to negotiate changes. They got little sympathy and fewer concessions. One operator said his 25 mills expended only two ounces of potassium cyanide every 24 hours. His livestock, he said, drank the mill water without injury. Gregory M. Silkensen, in a history of the Farmers' High Line Canal and Reservoir Co., said irrigators were unwilling to directly challenge miners, who then stood at the head of Colorado's economy. A 1930s lawsuit yielded a Colorado Supreme Court decision that pollution was not a right—even if remediation made mining uneconomical. Even then, a court victory was one thing, and enforcement quite another—a task state government had not then assumed.

Changes came after World War II. Cleanup of the mines upstream began, and the creek—devoid of fish since 1859—was stocked, and the river's purpose changed. As in the lower South Platte, a major use had been irrigation, with the first ditch incised in 1859. Soon after, several major canals emanated from the Golden area, fanning onto adjoining highlands, allowing productive cultivation of crops, orchards and vegetable farms. As in the lower South Platte, reservoirs are crucial to the ditches from Clear Creek. Largest of the reservoirs is Standley Lake, located in Westminster, near 88th and Kipling. From here, water is distributed to Denver's northern suburbs and even to ever-more-scarce farms west of Brighton. Administration is by the Farmers Reservoir and Irrigation Co.

Instructive in this process is Arvada. Founded in 1870, the town at the end of World War II had a population of 1,500 people, mostly clustered near 57th and Wadsworth. Its population now exceeds 100,000, with 20 percent of its water coming from Clear Creek. Even today, some sidewalks are lined by ditches used for lawn irrigation, a remnant of the 19th century infrastructure. Clear Creek currently provides drinking water for up to 350,000 people in the northern metropolitan area.

Pollution cleanup continued. In 1983 the U.S. Environmental Protection Agency established a Superfund study area. At issue were the 1,300 mostly abandoned small mines. Of special consideration was Idaho Spring's Argo Mine and Mill, from which a 4.16-mile tunnel continued to produce 700 pounds of pollutants daily. A treatment plant now eliminates that pollution. The Clear Creek Watershed Foundation was formed in 1991 to further advance the effort.

But the work is not done. John Woodling, a former state fisheries biologist now with Trout Unlimited, said roads, particularly Interstate 70, along with phosphorous and nitrogen-rich water released from seven sewage treatment plants in the upper basin, continue to degrade Clear Creek. What he finds amazing, he said, is that the river has actually prospered—a few years ago a 21-inch brown trout was snagged in Clear Creek Canyon.

At Golden, the revitalized Clear Creek is more than nice. It's also a story of money. This, said water attorney Glenn Porzak, who represented the city in arguing for recreational flows, was always part of the calculus. "Before, there was a high vacancy rate in the downtown area, and once they cleaned up that corridor, it completely switched things around."

From Golden, bicycle and pedestrian paths extend 20 miles along Clear Creek, downstream to its confluence with the South Platte. In places, with narrowed vision, the settings can be bucolic, even pastoral. Shift your gaze 5 degrees, though, and electrical transmission lines, warehouses and highway pillars come into sight. For much of its course, Clear Creek remains part of metropolitan Denver's back alley. ❑

Basin Overview

The South Platte Basin (including the Republican River Basin) covers approximately 27,660 square miles in northeast Colorado. The largest cities in the basin are Denver (population 560,882), Aurora (population 287,216), and Lakewood (population 144,150). The topographic characteristics of the South Platte Basin are diverse. Elevations in the basin range from more than 14,000 feet at the headwaters near the Continental Divide to 3,400 feet at the Colorado/ Nebraska state line. The headwaters of the South Platte River originate at an elevation of about 11,500 feet. The South Platte River emerges from the mountains southwest of Denver, flows through the metropolitan area, and then enters the High Plains.

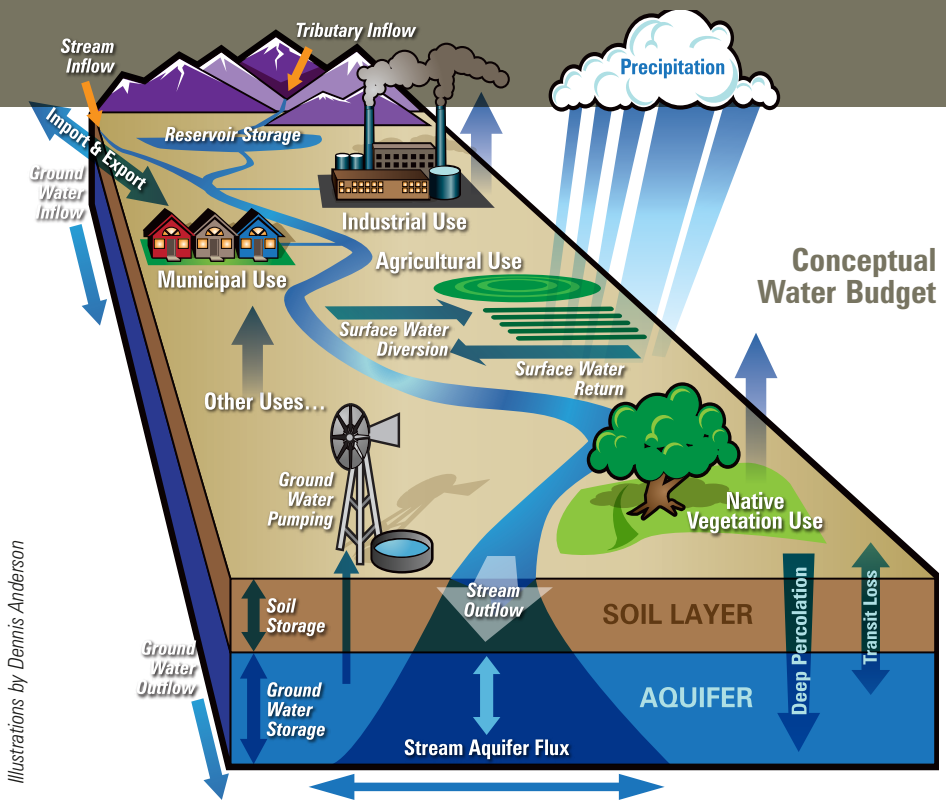
Approximately one-third of the basin's land area is publicly owned. Western portions of the basin and its montane and subalpine areas are primarily forested, while the High Plains region is mainly grassland and planted/cultivated land. This includes the Pawnee Natural Grassland. *(CWCB SWSI Fact Sheet, 2006)*

River Compacts

Colorado River Compact of 1922
Rio Grande, Colorado and Tijuana Treaty of 1944 (United States and Mexico)
Upper Colorado River Basin Compact of 1948
South Platte River Compact of 1923
Republican River Compact of 1942

Conservancy Districts

Central Colorado
Lower South Platte
Logan County
Northern Colorado
St. Vrain and Lefthand
Badger and Beaver
Upper South Platte
Sedgwick-Sand Draws
Center of Colorado



Illustrations by Dennis Anderson

Water managers consider a long list of variables—return flows, imported water, stormwater, groundwater, precipitation, evapotranspiration, soil conditions, transit losses and seepage, among other things.

Intream Flow Rights

In 1973, the Colorado General Assembly formally recognized instream flows for environmental protection as a beneficial use under state water law. For the first time, the state provided a mechanism for appropriating water in a stream and not just when it was diverted. Today, more than 1,350 instream flow rights help protect some 8,000 miles of Colorado rivers and streams. Stream reaches in the South Platte are listed above.

River	Upper Terminus	Lower Terminus	Range of Flow Rights (cfs)
Big Thompson River	Confluence with Dry Gulch	Dille Tunnel Diversion	15 - 50
Boulder Creek	Confluence of North and Middle Boulder Creeks	75th Street Bridge	0.45 - 15
Cache la Poudre River	Confluence with La Poudre Pass Creek	Wild & Scenic terminus	16 - 55
Clear Creek	Headwaters	Confluence with South Clear Creek	10

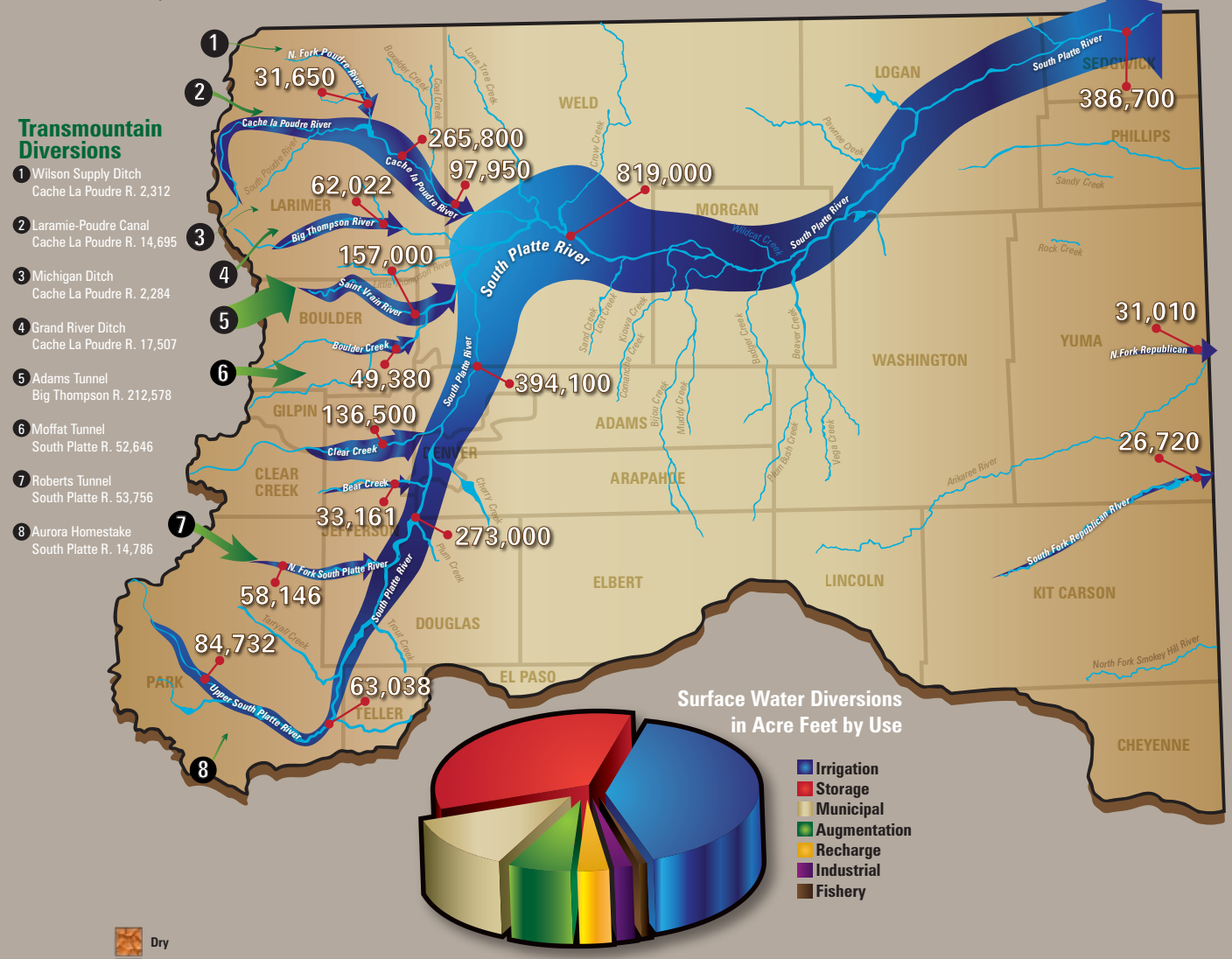
Major Storage Projects

Horsetooth Reservoir	152,000	Aurora Reservoir	32,400
Carter Lake	112,200	Barr Lake	32,100
Eleven Mile Canyon Reservoir	97,800	Milton Reservoir	29,732
Cheesman Reservoir	79,064	Prewitt Reservoir	28,840
North Sterling	74,590	Julesburg Reservoir	28,178
Riverside Reservoir	63,302	Chatfield Reservoir	26,600
Spinney Mountain Reservoir	53,873	Antero Reservoir	25,618
Standley Lake	43,344	Marston Reservoir	19,795
Gross Reservoir	41,811	Horse Creek Reservoir	18,747
Empire Reservoir	37,710	Button Rock Reservoir	16,080
Jackson Reservoir	35,415	Cherry Creek Reservoir	13,226

The South Platte Basin

South Platte Average Annual Stream Flows *(acre feet)*

The State Engineer's Office so-called snake diagram illustrates historic streamflows, measured by stationary gauges. Notice that the numbers from tributary inflows don't add up to the amount in the South Platte River when it crosses into Nebraska. The reasons: consumptive use, ditch diversions and reservoir releases. The term consumptive use refers to water that has evaporated, transpired, been consumed by people or livestock or been absorbed into crops and products. Historic average flows obtained from USGS Water-Data Report CO-07 and the Office of the State Engineer of Colorado.



Source: Colorado Water Conservation Board

The South Platte River pictured east of Kersey.
Photo by Emmett Jordan

Roundtables: A Silver Lining for Water Users

By Eryn Gable

Colorado's unprecedented growth and the increased emphasis on multiple uses of water have complicated decision making while creating an opportunity for collaborative solutions.

One outgrowth is the creation of nine groups—or Basin Roundtables—for each of the state's river basins plus the Denver metro area. The roundtables came out of the Statewide Water Supply Initiative and legislation passed in 2006. The Interbasin Compact Committee, made up of representatives from each basin, is meant to provide a statewide perspective; negotiate interbasin agreements; and address issues between roundtables.

The monthly meetings bring together a broad range of stakeholders to talk about competing water issues and give local residents greater input in water decisions. The South Platte Basin Roundtable, with 51 voting members, meets the second Tuesday of each month in Longmont. Metro, with 27, meets the second Wednesday. Metro members represent 29 cities and towns.

"It is a mechanism that creates a dialogue among water users that otherwise might not be there," said Mike Shimmin, one of the South Platte roundtable's Interbasin Compact Committee representatives.

Jim Yahn, the vice-chairman of the South Platte roundtable, said the meetings enabled him to talk with people he never would have before, including city water providers, recreation representatives and environmentalists.

"I've just had the opportunity to really understand what other people think about water and also had the opportunity to let people know my opinion on water—how we use it and why we use it the way we do," he said.

At both the Metro and South Platte roundtables, the issue of water usage and how to find more water is high on everyone's minds.

"There's not a lot of native water to be developed in the South Platte, especially further upstream," said Joe Frank, manager of the Lower South Platte Water Conservancy District and a member of the South Platte roundtable.

"If we don't produce more water and we continue to grow the way we're growing, the

"If we don't produce more water and we continue to grow the way we're growing, the inevitable fact is there will be dry up of irrigated agriculture."

—Joe Frank, Lower South Platte Conservancy District

inevitable fact is there will be dry up of irrigated agriculture," he added.

While water users obviously want to avoid a dryup, the dialogue allowed even former foes to gain a greater appreciation of each other's struggles. A member of the Metro roundtable, Robert Sakata farms 2,700 acres along the South Platte River. He noted that being on the roundtable has opened his eyes to the challenges cities are facing to meet their water demands. Sakata noted the cities have already made great strides as far as conservation, giving them less of a buffer during dry years.

"We shouldn't dry up farms to take water to move it to the cities, but in reality, there [aren't] a lot of other choices," Sakata said.

Although there is interest in preventing a dry up to preserve Colorado's agricultural economies, there are limits to what can be done to protect these interests. After all, making it harder for farmers to sell their water would infringe on their private property rights.

That's one reason for the popularity of the idea of leasing water rights, which would allow farms to continue operating and hopefully prevent some of the devastating economic impacts that have resulted from agricultural buyouts in the past. But leasing water rights from agriculture may not make sense from an economic point of view because of the high cost of the infrastructure required to bring that water to the cities.

Chips Barry of Denver Water said one way to allow cities to get more for their money is simply to add more capacity to planned projects. For example, additional capacity could be added to Aurora's $754 million Prairie Waters project, a 34-mile pipeline to transport water from the South Platte River near Brighton to the city.

And while federal regulations such as the Endangered Species Act and the National Environmental Policy Act make siting, permitting and constructing new water storage projects challenging, Barry, who sits on the Metro roundtable, said more storage is critical. "I think you'll see additional storage projects, not on the direct flow of water from the South Platte River, but you will see additional storage," he said.

Frank Eckhardt, a board member of the Central Colorado Water Conservancy District who farms 3,000 acres south of La Salle, said storage is going to be critical to meeting the cities' water needs, but there are also ways to stretch the water that's available. For example, he

Background

In 2005 the Colorado General Assembly passed HB 05-1177, the Colorado Water for the 21st Century Act. This act set up the Interbasin Compact Committee and nine Basin Roundtables, and created a new collaborative process for addressing Colorado's water needs. The Interbasin Compact Process is intended to use information created through the Department of Natural Resource's Statewide Water Supply Initiative process to foster dialogue and lead to a more secure water supply future for Colorado. The Roundtables are funded by severance tax monies.

Getting Involved

The easiest way to get involved with the roundtables is to attend monthly meetings. There are also opportunities to become involved in the roundtables' subcommittees, even if you are not a member of the roundtables. The subcommittees are always looking for people with expertise in the issues they are addressing. Information about the roundtables can be found at http://ibcc.state.co.us.

South Platte Basin Population and Water Demand Projections

Subbasin Designation	2000 Population	2000 Gross Demand (Af)	2030 Population	2030 Gross Demand (Af)	Conservation Savings	Increase In Gross Demand (Af)	Planned Projects	Identified Gross Demand Shortfall (Af)
Denver Metro	1,432,700	366,000	2,157,200	513,400	26,800	120,600	108,100	12,500
South Metro	685,800	152,900	1,146,400	256,900	15,400	88,600	38300	50,300
Upper Mountain	39,200	9800	125,300	29,400	1,700	17,900	16,500	1,400
High Plains	24,900	9,800	28,800	11,200	700	700	800	—
Northern	747,200	212,400	1,364,600	400,000	22,600	165,000	146,500	18,500
Lower Platte	55,800	21,500	89,300	39,900	1,500	16,900	8,900	8,000
Total	**2,985,600**	**772,400**	**4,911,600**	**1,250,800**	**68,700**	**409,700**	**319,100**	**90,600**

Nearly two-thirds of the increase in the state gross municipal and industrial (M&I) demand by 2030—or approximately 409,700 acre ft.—will be in the South Platte Basin. M&I is defined as all of the water use of a typical municipal system, including residential, commercial, industrial, irrigation and firefighting. Large industrial water users that have their own water supplies or lease raw water from others are described as self-supplied industrial (SSI) water users. M&I and SSI water demand forecasts for the South Platte Basin are shown in the table above.

CWCB, Statewide Water Supply Initiative (2004)

Jim Yahn, the secretary-manager of the North Sterling Irrigation District, pictured near North Sterling Reservoir.

If we can't have some kind of additional water from the Western Slope, really the only place that the cities' thirst can be satisfied is through agricultural water.
—Jim Yahn
Vice-Chairman, South Platte Roundtable

said thinning out the trees along the South Platte could recover an additional 159,000 acre feet of water per year.

"I think the river needs to be cleaned up and thinned out a little bit," said Eckhardt, who sits on the South Platte roundtable.

He noted that farmers in the South Platte basin already made changes because of the supply crunch, planting fewer crops that are water intensive, like wheat and barley, and idling sections—or in some cases, all—of their cropland. "I think the farmers in the South Platte use less water irrigating than any place in the state per acre. They're that efficient," he said.

Another solution Sakata sees is more transfers of water between basins, but he said the organization of the roundtables has made cooperation between basins difficult. "In a sense, it's almost built walls between the basins instead of built bridges," he said.

Nevertheless, the roundtables have made an effort to bring people from different basins together to talk about the issues they face. For example, the South Platte roundtable met with members of the Yampa, White and Green basin roundtable last year to discuss a transbasin water project to benefit both basins. Similarly, a joint meeting of roundtables from the Arkansas, South Platte and Metro basins last year examined common water issues.

"It's causing regions around the state to come together in ways that they wouldn't have done before," Shimmin said.

Yahn emphasized that getting water from other basins is critical to preventing the dryup of agricultural lands in the South Platte Basin. "If we can't have some kind of additional water from the Western Slope, really the only place that the cities' thirst can be satisfied is through agricultural water," he said.

Gene Manuello, a South Platte roundtable member who grows corn and hay and raises cattle northeast of Sterling, noted that such transmountain diversions do not tend to be popular on the Western Slope. "The Eastern Slope thinks that's the answer, but the Western Slope doesn't think there's any water there to transfer. It's a pretty touchy subject," he said.

One key to finding that answer will be a

study by the Colorado Water Conservation Board on the amount of unappropriated water left in the Colorado River.

Clearly, there are no easy solutions to the South Platte's water crisis. Many people—farmers and residents alike—don't want more agricultural land dried up. The cities want secure water supplies for their booming populations, and environmentalists and recreationists want to keep more water in the rivers for wildlife and recreation.

David Nickum, executive director of Colorado Trout Unlimited and a member of the Metro roundtable, said the South Platte Protection Plan, a collaborative effort to protect more than 70 miles of the river, will be key to ensuring the well being of fish and wildlife as cities' thirst increases. "It will be a challenge, but this plan sets the stage for the health of the river to be maintained while delivering the water that will ultimately be needed by the metro area," he said.

Nickum also noted that environmentalists are concerned about water quality in the South Platte, especially as debris and sediment from the 2002 Hayman Fire continue to fill reservoirs, reducing capacity and damaging fish habitat. "That watershed has a lot of healing yet to do and dealing with the water quality impacts will be a major challenge."

Eric Wilkinson, general manager of the Northern Colorado Water Conservancy District, said the South Platte roundtable is doing the best it can to tackle these difficult issues. "I think within the resources it has available, it has been pretty active in the issues it's trying to address," said Wilkinson, who serves as the other Interbasin Compact Committee representative on the South Platte roundtable. "It recognizes the threat…posed by significant agricultural dryup is a real tough challenge."

While the South Platte and Metro roundtables have not been able to resolve anything yet, they have put lots of ideas on the table, including increased storage, controlling invasive species and leasing agricultural water.

"We'll just keep banging away and hope we come up with some answers," Manuello said. ❑

Roundtable Projects

Senate Bill 06-179 created the Water Supply Reserve Account. This grant program was authorized for a five year period (2006-2011) and makes available $42million from severance tax monies for water studies and projects in each of the basins. Grant funds are awarded and administered by the CWCB only after receiving approval by a basin roundtable. Among the ones selected:

Chatfield Reservoir Reallocation Program: A 20,600 acre foot portion of Chatfield Reservoir's storage space currently reserved for flood control could be used for municipal and agricultural water supply under this project. The Army Corps of Engineers is conducting a study of the impacts of storing additional water in the reservoir. It is slated for completion later this year. The South Platte and Metro roundtables have approved $130,000 for this environmental impact statement and feasibility report. If the Corps decides the project is feasible, a group of 15 water suppliers would divide the new storage space.

South Platte River Recreation and Habitat Feasibility Study: The Metro roundtable approved $150,000 for a study conducted by the Greenway Foundation to identify recreation and habitat improvements to increase riparian vegetation and the abundance of aquatic life.

Ovid Reservoir Comprehensive Feasibility Study: The Ovid Reservoir project has a conditional storage right originally proposed by Groundwater Appropriators of the South Platte. The intent was to construct an off-channel reservoir near the state line that could store 5,700 acre feet of water to be used to augment well depletions and prevent a compact call. The South Platte roundtable provided $176,000 for a study examining the feasibility of constructing and operating this reservoir.

Lower South Platte Wetland Initiative: This project from Ducks Unlimited aims to develop several wetland recharge projects along the lower South Platte River in Morgan, Logan and Sedgwick counties. The South Platte roundtable requested $278,476 for the first phase of this initiative.

Lower South Platte Water Protection and Restoration: This project, sponsored by Ducks Unlimited, seeks to restore wetlands via conservation easements and recharge projects in Sedgwick and Morgan counties. The South Platte roundtable provided $825,552 for this project.

Halligan-Seaman Water Management Project: The South Platte roundtable provided $101,740 for a study examining the expansion of storage at two existing reservoirs on the North Fork of the Poudre to provide additional water for population growth and some agricultural production. The project would develop about 35,000 acre feet of water annually.

Conservation Conversation

Changes in Attitude

By Joshua Zaffos

When Kevin Reidy began his job at Aurora Water in July 2002, his hiring doubled the agency's water conservation staff. The two-person department was in charge of a "pretty typical" city conservation program, Reidy said, based around watering restrictions and a water-wasting ordinance. "But to be honest, they were not being enforced," he added.

The summer of 2002 brought severe drought to most of Colorado. Many utilities already recognized the state's scarce water resources, but the low snowpack, high temperatures and dry conditions in the first years of the 21st century overwhelmed some providers.

Denver Water's storage was more than half empty after summer 2003, said Melissa Elliott, the utility's water conservation manager. The intensity of the drought brought a realization that a new level of conservation and efficiency measures was necessary for the near and not-so-near future.

"I think the drought was a big wakeup call," added Ruth Quade, the Greeley water conservation coordinator.

The alarm rang especially loud in the South Platte Basin, where roughly 3 million people live; that's about 70 percent of the state's total population. Providers had to stretch dwindling supplies, and they recognized the challenge of preparing for projected growth. According to the Statewide Water Supply Initiative, or SWSI, a report completed by the Colorado Water Conservation Board in 2004, communities of the South Platte will add another 1.9 million people, or a 65 percent increase, by 2030.

"It got us thinking we need to include drought response and conservation in our long-term planning," Elliott said.

Reaching Out

Today, Aurora Water spends $1.6 million a year on conservation programs and Reidy is among 10 full-time employees in the department. The organization was already stepping up its efforts when dry times hit, but Reidy referred to the "drought momentum" that led Aurora and its citizens to take existing measures more seriously and to institute new incentives and restrictions to meet present and future water needs. "We were able to really capitalize and to allow that to slingshot us forward," Reidy said.

Measures have included higher water rates and a more rigid block-rate structure, where higher rates are assessed once users exceed set thresholds. Aurora Water also instituted drought-time penalties for excessive use. In 2009 and 2010, the agency will increase rates again, mostly to help finance its Prairie Waters Project, which will expand Aurora's water supply 20 percent through a major water pipeline and purification facility.

Aurora Water increased its distribution of rebates for efficient toilets, washing machines and other appliances. Through six years, Reidy said the utility has awarded rebates for almost 6,400 toilets and nearly 5,900 high-efficiency washers, and saved approximately 475 acre feet of water. An acre foot, on average along the Front Range, can meet the needs of two to three urban families. The savings, then, could translate to a supply for as many as 1,425 homes.

Along the Front Range, Denver Water has also led the way in implementing water conservation. The agency, which serves 1.2 million users, pioneered the practice of xeriscaping two decades ago. Its conservation staff has grown to 40 people and Denver water continues to seek ways to stretch water supplies, using tiered water rates, restrictions and rebates. Originally, Denver Water planned to reduce consumption by 22 percent by 2056. After the drought, Elliott said the

Kevin Moloney

utility ramped up. Including any new growth, the utility plans to reach the goal by 2016, slashing 40 years from its original plan.

One initiative has meant reaching out to low-income homes, installing more efficient toilets and washers, which not only saves water but also lowers bills. The service is provided free from Denver Water and the Mile High Youth Corps through the Low Income Energy Assistance Program. About 2,000 homes qualified for efficiency upgrades in 2008.

Denver Water also targeted irrigators—such as schools, city parks and homeowner associations—to replace turf or switch to high-efficiency sprinklers. The program saves an acre foot of water for about $4,500, compared to new storage projects, which cost roughly $10,000 per acre foot.

Tracy Bouvette, of the Great Western Institute, a water-conservation education and policy group, said Denver Water and Aurora Water are "kicking butt" with their measures and approaches, which trickles down to other communities. Denver Water's Elliott said her organization serves as an incubator for demonstration programs that smaller providers might eventually consider.

'A double-edged sword'

The larger providers' progress underscores a gap in action taken by many smaller ones. Through all of Colorado, communities spend $11 million on water conservation efforts, according to the Colorado Water Conservation Board. Denver Water accounts for $8 million, or roughly 70 percent of the total, and Aurora Water spends $1.5 million, or 15 percent. Greeley Water budgets $500,000 per year for water conservation, or slightly more than 6 percent. The median conservation program budget, reported the CWCB, is $25,000.

Size matters, said utility managers: Small communities have small budgets and small staffs. Managers sometimes claim conservation means less revenue and, potentially, less available water during drought.

"It's kind of a double-edged sword. The more we save because of our debt load, the lower the revenues" said Gary Dreessen, the director of wet utilities in Fort Morgan. "When the public used less water, we had less money and we had to raise the rates."

After switching its supply from wells to Colorado-Big Thompson Project water, Fort Morgan took on a debt that it has to repay with revenue. The city dedicates $9,000 a year to conservation programs, mostly for education, leak surveys and repairs, and efficiency kits for toilets and showerheads. The city did set up more stringent rules during the drought, but today it does not use a block-rate structure. Dreessen said tiered rates don't do much for Fort Morgan, because it lacks storage to save conserved water.

Conservation educators say reluctance by some providers can be a combination of fiscal pragmatism and foot dragging.

For instance, demand hardening—the theory that long-term conservation strategies such as more efficient irrigation or restricted residential use, means communities are already taking significant conservation action and have fewer steps to implement during dry times—is frequently cited as a reason to defer tighter measures.

"There's a lot of mythology surrounding demand hardening," said Paul Lander, executive director of the Colorado WaterWise Council. "Demand hardening is part of reliability planning, but it should be the beginning of the conversation, not the end."

With demand hardening, residents may increase efficiency by xeriscaping or installing low-flow household fixtures and appliances. But, the changes make conservation more difficult during a drought or shortage.

Smaller communities do have a legitimate point: Rebate programs and restriction ordinances are "easy, technically," Lander said, "but very few of these things can get done without [financial] resources."

Just as Denver Water and others have served as trailblazers in practice, the state put up money to encourage smaller providers. The Water Conservation Act of 2004 set new guidelines for water-conservation plans, which providers must develop to qualify for grants. Bouvette said the law, which also expanded the state's drought-mitigation planning, created some minor but critical requirements for conservation plans. Providers must show they are tracking water use and savings, and outlining actions for future conservation.

Utilities can apply for the grants through the Colorado Water Conservation Board to implement programs. Ben Wade, the program assistant for the board's Water Conservation and Drought Planning Section, said more than a dozen

Brian Gadbery

Xeriscape projects in the South Platte basin:

Aurora	Greeley	Parker
Boulder	Fort Collins	Thornton
Broomfield	NCWCD	
Denver	Loveland	

Source: Colorado WaterWise Council

communities have filed plans with the state. Fort Morgan is among them. The money has paid for irrigation audits, educational workshops and how-to-xeriscape DVDs for homeowners.

The new rules support the second phase of SWSI, specifically goals to boost water efficiency and conservation and allow communities to meet the projected demands of 2030. The state estimates a 20 percent gap in available water. Conservation, along with new development and storage, will be a key component in meeting the needs.

A technical roundtable outlined measures and implementation strategies, and various financial, legal and institutional roadblocks for providers to consider. Under development by the Colorado WaterWise Council are best management practices, which the organization hopes to complete by 2010. The intent is to further guide communities through steps toward greater conservation.

Lander believes community leadership is essential to prepare for more customers and more dry times, but along with other conservation managers and educators, he said that providers can't be the only ones responsible for the changes.

"We want people to go from being water customers to being water stewards," said Aurora's Reidy.

Lasting changes

A February 2008 study, based on Aurora's conservation practices since 2000, shows watering restrictions influence customer use, especially when combined with pricing measures, like tiered rates. In both cases, the measures affect water users where they feel it most—their wallets—and can trigger lasting changes.

Higher utility bills are a quick way to get customers' attention and change behavior, said Greeley's Quade, but other measures can support that mission and also ease the financial burden from rate hikes.

Greeley has had water restrictions on the books since 1907, said Quade. In addition to tightening those controls during the drought, Greeley issued rebates for toilets and washing machines, which became a permanent program. The city also hired two full-time auditors who work with commercial water users and irrigators to conduct efficiency surveys.

More recently, Greeley began exploring customized household water budgets. Through a pilot project launched in 2001, the city is studying water use and efficiency targets set for individual residences based on lot sizes, precipitation and other factors. Boulder and a few other communities use similar systems that tailor water rates to customers.

Under Greeley's draft conservation plan, written in compliance with the state's guidelines, the program could be fully implemented in the future. "It will be relatively costly," Quade admitted, because it requires a whole new administrative system for billing, appeals and customer service. The pilot project will help determine if the progressive measure is worth the cost in the long run, and whether water budgeting is one way to empower customers to be water stewards.

Lander points out that few families are aware of how much water they use, which means they probably have a diminished sense of how to increase household water efficiency through separate acts. He likens water conservation to saving gas: People keep their tanks full by not driving, keeping their tires inflated and using other small measures that ultimately lead to big savings.

Automated meter reading, another innovation which Aurora Water has used since the mid 1990s, allows a utility to use electronic readers to get an accurate assessment of water use. Again, the program required a substantial investment, but it allows households to be aware of real-time water consumption.

"On the residential side, we're trying to make it so water waste is totally unacceptable," said Denver's Elliott. That's meant education and marketing on top of incentives, regulations, rebates and innovations. There are plenty more avenues to explore, Elliott said, mentioning that in Melbourne, Australia, wasteful neighborhoods get listed and ostracized in local newspapers as a means of discouragement.

Citizens in the South Platte Basin, in addition to their water providers, seem to be getting it. Just as people have generally limited their drive time as gas prices rose and dropped, customers who altered water consumption during drought maintained prudent use; for Denver Water, that amounted to a 20 percent reduction that held through somewhat wetter years.

Said Great Western's Bouvette: "Water conservation is as much a behavioral change as it is an engineering, nuts-and-bolts change." ❑

Water Conservation and Efficiency: SWSI Phase 2

Brian Gadbery

CFWE South Platte Basin tour participants visit the Xeriscape demonstration garden at Northern Colorado Water Conservancy District in Berthoud.

The second phase of the Statewide Water Supply Initiative led to the formation of four technical roundtables to foster an ongoing dialogue on how Colorado water suppliers can understand and implement measures for planning and meeting future needs. A Water Conservation and Efficiency Roundtable—stakeholders, technical advisers, municipal providers, and agricultural, environmental and recreation representatives—was formed to develop "a deeper understanding and greater consensus" on conservation and efficiency. The goal is to help providers reach projected water demands for 2030, while also protecting the environment and recreation.

The roundtable identified various levels of conservation and potential water savings from a range of programs—rated as basic, moderate and aggressive measures—with consideration for associated benefits and impacts to different entities among the state's river basins. The subsequent report produced by the group identifies technical, legal, political and financial obstacles to implementation of conservation and efficiency strategies, serving as a valuable starting point for providers to craft and implement conservation plans.

More information on the Water Conservation and Efficiency Roundtable and its work is available online at http://cwcb.state.co.us/IWMD/SWSITechnicalResources/TRTs/WaterEfficiency/WaterEfficiency.htm. ❑

Emmett Jordan (4)

By Lori Ozzello

Finite Supply, Infinite Possibilities

"The earthen Plains of Colorado had long been labeled unfit to grow anything other than buffalo, snakes, cactus and antelope."

—C.R. Shwrayder

Unstable commodity prices, rising costs for agricultural inputs such as feed and fertilizer, and competition for a finite water supply hasn't dampened the enthusiasm of agriculture officials in the Lower South Platte River basin.

Canals, ditches, man-made streams and reservoirs, fed by return flows, native surface water, transmountain imports and the alluvial aquifer weave through the basin. Maligned by Mark Twain and a list of explorers and travelers, the hard-working South Platte has a lot to do between Greeley and the Nebraska state line.

The South Platte and Metro roundtables—water purveyors, agriculture experts, environmentalists, and state and local governments—are in the process of determining whether municipal and industrial demands can be met reliably without permanently drying up irrigated agriculture. Buying agriculture land and using the water to meet municipal demands, also known as buy and dry, is the least expensive way to acquire water, but it means sacrificing irrigated agriculture and possibly reducing groundwater tables if historic return flows diminish.

Said Colorado Agriculture Commissioner John Stulp: "How much water can you continue to take from agriculture? That will change the way we look as a state if we continue to buy 1 or 2 percent (of farm land) yearly. It will have an impact over time.

"It comes back to how much growth you can have in relation to ag production."

In the midst of the uncertainties, throw in a burgeoning ethanol industry, the location of a cheese factory in Greeley, and innovations in irrigation. The result: A lot of interest and even more questions about how the river is used.

Kersey-area farmer Lelyn Larsen (left) harvests corn for silage. At top, chopped corn, which will be fed to cattle, is ensiled (center image) at the Kuner feedlot east of Greeley.

"Will there be less irrigated agriculture over time?" asked Weld County Commissioner and South Platte Roundtable Chair Bill Jerke. "Without a doubt."

"Will there be less irrigated agriculture over time?" asked Weld County Commissioner and South Platte Roundtable Chair Bill Jerke. "Without a doubt."

Said Stulp, "There's no question there are a lot of people who are nervous, but overall, it's positive.

"In the long term, (the basin) will be strong for commodities. And there will be demand from emerging countries for more meat products, such as beef, pork and lamb."

The question is, how will it shake out?

Eight of the state's top 10 agricultural producing counties are in the Lower South Platte basin and account for 70 percent of Colorado's agriculture sales. Cattle production is first in Weld, Morgan, Yuma and Logan counties, followed by crops including wheat, sugar beets, corn, hay and pinto beans.

Various state statistics show agriculture uses more than three-quarters of the available water, but the South Platte also sends more water, by percentage, to cities, towns and industries, than any other river basin in the state. According to Jim Hall, Division 1 Engineer, the breakdown of surface water use in the basin is approximately 71% for irrigation, 5% for industrial, and 24% for municipal purposes. These percentages include diversions for recharge and augmentation.

The numbers will change if more water is transferred from irrigated farms to municipal and industrial uses. According to a 2007 Colorado State University report and survey, the South Platte "expects to fallow as many as 266,000 (22 percent) of its irrigated acres in the next 25 years," leaving about 750,000 available for agriculture. The river transects the most populated and productive areas of the state. The state demographer forecasts the basin's population, meanwhile, is expected to increase by nearly 2 million people by 2030.

Each irrigated acre, said the report, "generates significant economic activity in the basin, so potential losses are substantial in sparsely populated rural areas with few other alternatives."

One of report's authors, James Pritchett, is an agribusiness specialist and Colorado State University professor. He believes "this is a good time to plan for the next 30 years. Municipalities have to start thinking about it, whether they want vibrant agriculture."

The authors, including Pritchett, wrote that the direct impact of buy and dry or fallowing is a loss of crop sales. That in turn means lost revenues for agribusinesses, such as tractor, seed and fertilizer suppliers, and lost wages for employees.

Pritchett said farmers will continue to sell land near transportation corridors, such as Interstate 76 and U.S. Highway 85, for development.

Municipalities, said Pritchett, identify buy and dry hot spots, areas where water is affordable and available, as well as less costly to treat and move.

"It looks like Colorado doesn't want to do anything to limit growth," Pritchett said. "As long as that happens, the value of water will continue (to increase). Senior water rights are likely to be transferred."

Water Colorado's Joe O'Brien said prices range from $30,000 per acre foot to $500, depending on the intended use. If the water is going to be used to irrigate a greenbelt or park, it's possible to buy it for as little as $500 per acre foot.

Besides buy and dry, two relatively new industries—cheese production and ethanol—are already having an effect. In January 2008, Mayor Ed Clark announced Leprino Foods would build a mozzarella factory in Greeley. The result: Dairies east of Greeley are expanding and their water needs are year-round. Hay prices are on the rise. Dairy hay is around $200 per ton, pushing cow hay to $140. In Nebraska, cow hay sells for $85 per ton.

The burgeoning ethanol industry adds another element. A National Research Council committee found in 2007 that "a biorefinery that produces 100 million gallons of ethanol each year would use the equivalent of the water supply for a town of about 5,000 people." The committee noted, though, that ethanol pro-

Kevin Moloney (3)

"In the long term, (the basin) will be strong for commodities. And there will be demand from emerging countries for more meat products, such as beef, pork and lamb." —John Stulp

ducers are recycling water and developing new methods while reducing their water demands.

Different ways to reduce or shift demand are already in the works. A South Platte Roundtable subgroup is exploring interruptible supplies. It's one of a handful of options, Jerke says.

"A lot of what this study will show is that various tools are going to work better than others," Jerke explained.

Under interruptible contracts, "the farmer still gets paid and the city gets what it needs." A city, for instance, would have a long-term lease with a farmer. If the city needs water, it activates the contract, Jerke said. It only works with water rights holders who can deliver water to a treatment plant.

"I'm really positive about a lot of things that are going on out there," Jerke said. He points to the roundtable, which includes agriculturists and water providers along with environmentalists. "There are people I wouldn't have dreamt of (sitting down with) 10 years ago, and the fact that we're actually doing something—I feel good about those things. The more partnerships we wind up having, the more win-win strategies."

All of this is on the heels of the well shutdown in May 2006. That spring, under an order of the Division 1 Water Court, 440 wells were shut down. Central Colorado Water Conservancy District and its Water Augmentation Subdistrict appealed some aspects of Klein's decree. Central's WAS, as well as the cities and water providers who say pumping endangers their senior rights, await a Colorado Supreme Court decision.

After a 45-day trial in 2007, Weld County Judge Roger Klein issued a decree. A Colorado Supreme Court decision is pending. As the case wends its way through water court, high value acreage loss is significant. Some farmers in the basin gave up and moved. Others fallowed land or tried dryland farming, said CCWCD Executive Director Tom Cech.

Colorado State Extension's Troy Bauder, a research scientist and water quality specialist, said drying up some fields wasn't the best idea. Many are "sitting, growing weeds," said Bauder.

"When a field's been in irrigated crops for 100 years, you can't just plant native grasses," Bauder said. Native grasses are hardy once they're established, but that takes time. The extension agency is testing cover crop demonstrations near LaSalle, to take an experimental field back to nonirrigated grass.

Some growers, he said, tried dryland farming and had success downstream of Fort Morgan. Bauder said most farms work with a combination, "some dryland, some ditch water, little or no well water. It's soup to nuts."

For growers who continue farming, innovations are emerging. In the Arkansas Valley, Super Ditch proponents say they'll pool water and fallow 25 percent of members' lands to lease water to municipalities and prevent buy and dry deals on land between Pueblo and the Kansas state line. The idea still has to clear water court hurdles.

Near Parker, Frank Jeager's 20-year promotion of Rueter-Hess Reservoir has drawn new partners from the aquifer-reliant south metro area. The reservoir, slated to begin filling in 2011, is expected to ease dependence on the Denver Basin aquifers, avert buy and dry, and provide a sustainable supply.

But not everyone sees the Parker project as a way to prevent buy and dry.

"I am not sure that the reservoir will accomplish this and in fact it is most likely a storage bucket for large amounts of changed agricultural water," said Joe Frank, general manager at the Lower South Platte Water Conservancy District. "They won't be able to fill that reservoir off Cherry Creek and reusable effluent. I'm not the developer, but it's my understanding that agriculture will be one of the sources."

Along the lower river Bauder said the efforts now aren't as collective as something like the Super Ditch. He said growers are installing

more efficient irrigation and fertilization systems, experimenting with nontraditional crops and finding creative ways to share water.

"I see more center pivot (sprinklers) going in in the South Platte basin since I started working there 10-15 years ago," Bauder said. "Mostly, it's being driven by labor and application efficiency. A grower doesn't have to set irrigation tubes every eight hours."

The systems, Bauder said, improve irrigation efficiency by 50 percent or more over traditional furrows, but reduce return flows. Growers' options are greater with pivot irrigation because they can pinpoint fertilizer and chemical applications, cutting waste, expenses and runoff. Better efficiency may ease nitrogen management, too.

Growers also have begun to experiment with nontraditional crops. Among them is camelina, or wild flax, a relative of rapeseed and Brussels sprouts. It can be fed to livestock, cold pressed into an edible oil, or used to produce alternative fuel, such as biodiesel. Early word is that it's not particular about soil and isn't thirsty.

The state agriculture department, said Commissioner Stulp, "funded a research project on camelina as feedstock. The effort is to see if we can find a variety that will adapt to Colorado's climate. The pros are that it's supposed to be more adaptable. Once you've crushed the oil, what's the quality of the byproduct? Is it good enough to feed cattle? The jury's still out."

Growers are "trying soybeans near Iliff," said Pritchett. "They may be a real alternative. And sugar beets might be a possibility if we cut down the size." If the sugar beet size is reduced, he explained, sugar content "goes up." The idea is to use less water while producing profitable foodstuffs.

Experiments, tests, development and transitions continue. Meanwhile, ag producers must factor in the unpredictable as well as the unimaginable.

The bottom line, said Stulp: "Farming has never been easy." ❑

SPDSS and Historical Crop Consumptive Use Analysis

Between 1950 and 2006, groundwater pumping in the South Platte basin averaged 525,000 acre feet per year.

The estimate is a result of data collected for the South Platte Decision Support System, developed by the Colorado Water Conservation Board and Division of Water Resources. The system, known as SPDSS, consists of hydrologic and hydrogeologic features of the basin. It's intent is assist water administration and planning efforts.

The recently released Historic Crop Consumptive Use Analysis estimates the amount of groundwater that is pumped, the amount crops use, and how much goes back to the stream. Planners can use this information in both surface and groundwater modeling, and as a starting point for individual ditch analyses.

The SPDSS Historic Crop Consumptive Use Analysis Final Report is available on the CDSS Web site, http://cdss.state.co.us. ❑

A flock of birds flies above cattle grazing cornstalks near the line of cottonwood trees that mark the South Platte River on Colorado's eastern plains. Photo by Kevin Moloney.

Well Users Await Supreme Court Decision

Greeley "remembers its agricultural roots," but wants to be certain well pumping in the South Platte River basin doesn't injure senior water rights holders, including itself.

Last May, Division 1 Water Court Judge Roger Klein issued a final decree in one of the most complicated water court decisions ever. The case began in 2002, when well depletions required more augmentation water. Now, both sides are waiting on a Colorado Supreme Court decision. Oral argument will be scheduled when all of the briefs in the case have been filed by the parties.

At issue: the fate of pumping by the Well Augmentation Subdistrict, and whether its augmentation plan to replenish South Platte River water was sufficient to satisfy objectors and protect senior water rights holders. Augmentation plans are detailed engineering plans that allow junior water rights holder—in this case, well users—to pump water out of priority. The plans define how, where and in what amount the well users will replenish the water so senior water rights will not be affected.

WAS's main objections to Klein's final decree are:

- The court's treatment of junior replacement/augmentation water rights. The court found that junior water rights and recharge aren't reliable enough to prevent long-term river depletions.
- Limits on pumping augmentation wells. The wells are far from the river and can deliver replacement water, but may also cause more depletions.
- Treatment of water depletions in Box Elder Creek. Central Colorado Water Conservancy District unsuccessfully petitioned the state to designate Box Elder Creek drainage basin separate from the South Platte.

WAS, established in 2004, is part of the CCWCD. The district stretches from Commerce City north to Greeley and east to Fort Morgan, serving parts of Weld, Adams and Morgan counties.

Central formed WAS from the disbanded Groundwater Appropriators of the South Platte. Hit by the 2002 drought and unable to meet augmentation requirements, GASP folded. Once 3,000 wells strong, it sold the last of its assets in 2006. That May, then-State Engineer Hal Simpson ordered 440 WAS wells in the South Platte River basin shut off because they didn't have adequate replacement water. Some still aren't pumping.

During a 45-day trial in spring 2007, WAS and the 18 objectors exchanged proposed decrees and objections, and the water rights case went to trial in March 2007. CCWCD faced its opponents, at least one of whom had offered water loans or leases to bail out growers when the wells were shut down. Among the objectors: the cities of Greeley, Boulder, Sterling, Thornton, the city and county of Denver, and Centennial Water and Sanitation District and South Adams Water and Sanitation District.

Klein issued a 101-page decree Oct. 18, 2007 and ordered WAS to submit a proposed decree consistent with the order.

The opposition responded. After more proposals and objections to settle points of the first decree, Klein issued a final decree May 14, 2008. WAS appealed the decree and associated orders to the Colorado Supreme Court. "Greeley remembers its agricultural roots, and has leased Central and the owners of other former GASP wells over 8,000 acre feet of water since 2004 for replacement of well depletions," said Greeley water attorney Jim Witwer. "What Greeley wants for Central and WAS…(is) to get a decree that allows well pumping with full replacement…so that senior rights decreed to ditches and reservoirs are protected." ❑

Metro Providers Hunt for Options

By Jayla Poppleton

As far as surface water and prior appropriation in Colorado go, south Denver metro missed the first boat. It wasn't due to shortsightedness, but rather lack of necessity, that the aquifer-reliant region didn't lay claim to the South Platte River basin waters early enough. Many of south metro's communities weren't even around when that boat shoved off. If they were, they were pumping groundwater.

"In the 1980s, the area joined dozens of Denver-area providers to promote Two Forks, a project that would have included a 1 million acre foot reservoir to store water from the East and West slopes.

"'Don't worry about it,' they said. 'Just pump the Denver Basin. It still has 500 million acre feet,'" remembered Frank Jaeger, Parker Water and Sanitation District manager. "When Two Forks went belly up, it was vetoed partly because of 'Lake Erie.' What they didn't take into account is that all of that water is in solid rock. You can't just suck it out of the ground with a straw."

Indeed, relying primarily on the four Denver Basin aquifers is no longer an option. Jaeger and others have fought a long, uphill battle to convince people: The bedrock aquifers recharge so slowly they are essentially a nonrenewable resource. And though the aquifers still hold an estimated 200 million acre feet of recoverable water, wells are not physically capable of draining them to their last drop.

Drilling deeper to keep up with falling water tables is costly. Plus well-to-well interference—the phenomenon where each successive well drilled causes the productivity of existing wells to drop—is expected to make drilling cost-prohibitive within 20 years.

By 2035, state demographers project the area's population of nearly 300,000 will more than double. Such rapid growth is not a recent phenomenon for Douglas County. Between 1990 and 2000, the population swelled by 191 percent. As people moved into Parker, Castle Rock and Highlands Ranch, water levels in aquifers dropped in localized areas. Up to 40 feet per year was withdrawn, according to the State Engineer's records.

In 2004, the Colorado Water Conservation Board's Statewide Water Supply Initiative, or SWSI, assessed the gap between projected water demand in 2030 and estimated supply based on current and planned future projects. The area with the largest gap in the state was south metro, which includes Douglas and parts of Arapahoe counties.

The region's water providers are searching diligently for renewable water supplies to diversify their water portfolio. If they succeed, and can use more surface water in combination with groundwater, they should be able to look to "Lake Erie" as less of a staple and more of a backup plan.

Their tangled web of planning includes everything from water rights acquisitions, to reuse and recycling, to aquifer storage, to interconnecting systems for maximum efficiency. A few elements of the framework stand out.

SAVE MORE, DEMAND LESS

Douglas County, after years of work on water conservation, is counting on 15 to 20 percent savings across the board.

"We take very seriously that we're on a diminishing resource," said Tim Murrell, Douglas County water resources planner. "As we look to acquiring renewable water, the less we can prove we need, the less expensive it will be to the end user."

Indicative of their confidence in their ability to use less, county water planners use lower than average numbers to calculate projected demand.

The figure generally used for an average family's annual water consumption is between 0.5 to 0.65 acre feet, but Douglas County uses 0.4 acre feet for an average household size of 2.8 people. The county aims to drop to a mere 0.3 acre feet per household.

"We're working on the last 25 percent of conservation that's even possible," said Douglas County Commissioner Steve Boand.

In 2009, Douglas County plans to kick off a county-wide conservation plan and hopes to team up with water utilities through coordinated conservation efforts. The first step will be to take on the county itself.

"I call it a lead-by-example program," said Murrell. "We're going to take a look at all the county facilities and at how we, as a water user, can save water."

Current Douglas County regulations limit the amount of high-water use landscaping—to 1.5 percent of the total site footprint—for commercial developments in urban areas. The county doesn't intend to impose such restrictions on homeowners, but they will explore rebates, education and regulatory protocols. One proposal allows residents to use approved gray water devices in new developments in order to reuse household water.

Murrell also expects to see the issue of small-scale rainwater harvesting come up in the general assembly next session. The practice is currently not allowed.

"There's a lot of fear," said Murrell, "that the diminished surface water return flows will impact senior water users. But you could make the argument that urban areas have more impervious surfaces and already provide more direct surface water flows from rain."

If the state approves, Douglas County will adopt regulations to allow rainwater use for outdoor watering.

WASTE NOT, WANT NOT

Rod Kuharich likes to emphasize another strategy: efficiency.

Kuharich is the executive director for the South Metro Water Supply Authority, a conglomerate of 13 water providers. Together, they serve 80 percent of Douglas and 10 percent of Arapahoe County.

"We're in a water poor area, so every drop of water has to be accounted for," said Kuharich.

One way SMWSA shows off its drop-for-drop frugality is through its water

recycling program. Currently, the group recycles 11,900 acre feet of water from its own wastewater stream. By 2030, the goal is to increase to 24,000 acre feet. At that point, they plan to recycle or reuse 90 percent of their water.

In some cases, under Colorado water law, water reuse is not allowed. Return flows are supposed to reach downstream users. Denver Basin groundwater, however, is considered nontributary; it was never linked to surface rivers and streams, therefore it doesn't fall under the same regulations as native water and can be used to extinction.

SMWSA is exploring collaborative projects with Denver Water and Aurora Water to optimize each of the three systems.

"This is one of the most important things that is happening," said Kuharich. "Our communities are realizing we're all in this together."

Though the details have to be worked out, Boand said both Denver Water and Aurora Water have reusable water supplies from imported water they're not using. The water is designated fully consumable, which means, like the non-tributary groundwater, it can also be used to extinction.

If SMWSA can capture and transport the water from downstream of Denver and Aurora, it may be able to purchase it from those entities. Boand said the plan could provide close to 40,000 acre feet of water that would come from wastewater treatment plants or irrigation return flows.

"That's the challenge," said Boand. "The water is not pure pristine mountain water. The quality is not as high. We'd have to treat it by reverse osmosis."

Reverse osmosis is used when total dissolved solids are high. The technology, while expensive, is half the price it was 10 years ago, said Boand. It will be implemented at several SMWSA projects, including the Joint Water Purification Plant, and East Cherry Creek Northern Project Water Plant. With a total capacity of 19 million gallons per day, the group expects the plants to go online in late 2009.

The facilities will complement the $29 million Lone Tree Creek Water Reuse Facility, constructed to treat recycled water. It began operations in September and can treat between 3.6 to 7.2 million gallons, or 11 to 21.6 acre feet per day.

IMPORT NEW SUPPLIES

The strategies are part of the SMWSA's three-stage regional water master plan. The first relies on existing infrastructure and temporary renewable supplies. The midterm focuses on phasing in the infrastructure to begin sharing water among SMWSA members to optimize each system, while acquiring 25- to 30,000 acre feet of the new renewable water to meet demands through the 2020s.

The long-term plan is to identify one or more major projects and acquire the remaining renewable water to meet projected demand at buildout—75,000 to 148,000 acre feet of new supplies, depending on whether the water is fully reusable.

As a temporary fix, SMWSA is participating in a pilot program with Denver Water through 2011. Denver makes surplus water from the South Platte River available for purchase. In the spring, SMWSA purchased 1,500 acre feet, and it bought another 2,300 acre feet last fall. The water is only available at times of surplus.

"In the long term, this allows us to extend our supplies," said Kuharich. "But the devil's in the details. It may not be available next year."

To acquire a more permanent supply, the organization studied agriculture in the South Platte and Arkansas basins, in addition to pumpback projects on the West Slope. Douglas County officials said they are determined to look for water from their own basin first, yet the South Platte basin's water is fully appropriated. Traditional or alternative ag transfers are the only means of acquiring South Platte rights. At the same time, commissioners announced Oct. 1 they would not seek a buy and dry project due to their expressed commitment to protect north-central and northeastern Colorado agriculture.

Instead, they will work with Denver Water and Aurora to cooperate through various water reuse strategies. Buy and dry, as Boand put it, will be a last resort.

Parker Water and Sanitation District is assessing additional alternatives, backed by a $1 million study in partnership with Colorado State University. CSU is testing methods to reduce crop water use. What's saved could be used by municipalities. Jaeger said the results are encouraging.

"There is adequate water in the state of Colorado," affirms Jaeger. "The questions are: How do we treat it? How do we manage it? How do we move it?"

> "This is one of the most important things that is happening. Our communities are realizing we're all in this together."
> —Rod Kuharich

BANK THE WATER

Storage is part of the strategy. Said Kuharich, "What you've got are two components: the actual water itself, which is often not available when you need it, and the need for storage so you can utilize that water year 'round."

In 2000, SMWSA found itself way below the line in a region already short on storage. The entire organization had 4,000 acre feet of surface water storage. Today, it has 27,200, including 6,400 in Centennials's South Platte Reservoir and additional storage in Chatfield Reservoir. The goal is 93,200 acre feet by 2015.

The region is also about to complete the Front Range's first major storage project in more than 30 years: Reuter-Hess Reservoir. Three miles southwest of downtown Parker, the reservoir will store stormwater, groundwater and reusable return flows. It's slated to be operational in 2011. An approved expansion means more storage, to 70,000 acre feet from 16,200.

Parker originally filed for the project in 1985. The moment it got the permit, said Jaeger, neighbors asked if they could join.

"When they came in at that late date," said Jaeger, "we said we'd go after the expansion, but they'd have to pay for it."

With the increase, Castle Rock, Castle Pines North and Stonegate secured space, and Parker doubled its original storage. Now they're opening it up to others to purchase the space for their own reuse water or new renewable supplies.

AQUIFER RECHARGE

Without storage facilities, some utilities went underground. Centennial, Highlands Ranch's provider, has an aquifer storage and recharge project that has allowed it to sustain aquifer water levels for the past 15 years. Centennial injects treated surface water back to aquifers and capitalizes on spillover during wet years. In 2007, 924 acre feet went back into the ground, and to date, approximately 8,200 has been injected. Aquifer recharge has other advantages: no water loss to evaporation or exposure to surface contaminants.

With a $100,500 grant from the Metro Roundtable of the Interbasin Compact Committee, the SMWSA will explore an expansion of Centennial's program.

"We'll begin looking at areas where we can expand our recharge," said Kuharich. "Look at the Denver pilot program as an example--when water is available in wet years, we could take it and put it in the ground."

Boand was one of the visionaries behind the proposed Palmer Divide project, yet another example of recharge. The project, which is still undergoing feasibility studies, would make use of excess divertible flows under Denver Water's existing rights from the Blue River system, which passes through Lake Dillon. During wet years, excess flows for which Denver has no firm storage capacity could be diverted for use in portions of Douglas County. Current customers would take a share, and the rest would go underground. In dry years, Douglas County would return stored water to Denver.

"It essentially allows Denver to increase their firm yield," said Boand.

Firm yield is the amount of water that can be counted on even in dry years. Palmer Divide could provide 10,000 acre feet of firm yield to Denver water and another 7,500 to 10,000 annually to Douglas County.

By recharging aquifers, water levels would oscillate so that the water supply in the aquifers becomes permanently sustainable, said Boand. Groundwater would continue to be a source of supply, but on a much more limited scale.

It's not a done deal. In fact, the SMWSA has been asked to look at including the Palmer Divide project in its master plan to help move it forward.

"We think it has technical merit," said Kuharich. "The question is, would the aquifer accept that much water in that area, or sustain that level of withdrawal."

According to Boand, if Palmer Divide and the SMWSA's mid-term plan are successful, the group is 80 percent of the way to securing a permanent water supply for everyone in the county at buildout.

"Six years ago we were still denying that we had an issue," said Boand.

RURAL WATER USERS COME TOGETHER

Particularly vulnerable to drops in water levels and lower well productivity are people who live in unincorporated areas, outside of a municipal or water utility umbrella. To provide a forum for individual well owners, the Rural Water Association of Douglas County started up Oct. 1. The association includes more than 8,000 individual well owners and 25 small water providers, which in total represent between 30,000 and 40,000 people or about 12 percent of the county.

The association gives these users the ability to discuss their issues and collectively participate in projects that were formerly out of reach.

Said Jack McCormick, an individual well owner who has been engaged in the search for a more sustainable water supply for his small community, Grand View Estates, "It gives us a little more clout."

McCormick's involvement has paid off. Commissioner Boand said it's no accident that Palmer Divide's pipeline cuts through the northwest part of the county, right by Grand View Estates—not just because of one 29-home community, but because it is the part of the county that needs water the most.

"...we saw new subdivisions being approved at the same time municipalities were enforcing strict watering restrictions. It was an example of a disconnect between the people approving the development and those trying to provide water to service those areas." —Rep. Kathleen Curry

Brian Gadberry

The proposed pipeline for the Palmer Divide project runs right by Jack McCormick's subdivision, which Douglas County Commissioner Steve Boand said is no accident. McCormick was profiled in the CFWE Citizen's Guide to Denver Basin Groundwater 2007. As a rural well owner, he and his neighbors were incredibly vulnerable. They were on their own to figure out a long-term solution to falling water levels and increased drilling costs. Now they are part of the Rural Water Association, and stand to benefit from the project if it is successful. The pipeline was designed to run through the northwest part of the county, where water is most needed. Photo by Brian Gadbery.

RETHINK LAND USE PLANNING

As south metro's providers and local governments work to provide for growth, others question whether past zoning decisions should be revisited.

State Rep. Kathleen Curry (D-Gunnison) thinks Coloradans should at least ask the question: Should landowners be compensated to reach an agreement to lower previously agreed-upon densities for development?

"We're stuck with zoning that didn't take into account water supply challenges that we face today. That's the train wreck," said Curry.

In the meantime, Curry's HB08-1141, "Concerning Sufficient Water Supplies for Land Use Approval," passed, giving local officials the necessary facts to make informed development decisions. Developers will have to show an adequate water supply exists before a development is approved.

"In 2002, during the drought, we saw new subdivisions being approved at the same time municipalities were enforcing strict watering restrictions," said Curry. "It was an example of a disconnect between the people approving the development and those trying to provide water to service those areas."

Curry said this was the first time in more than a decade the general assembly linked land use and water planning.

No one wants to touch the issue.

Some claimed the bill was an anti-growth measure, an accusation Curry felt was unfounded.

"It's a smart growth piece of legislation," she said. "Growth should not be allowed to occur if it doesn't have an adequate water supply behind it."

The bill's creators, including state Sen. Bob Bacon (D-Fort Collins), looked to Douglas County as a model.

"My only concern with the bill," said Boand, "was that I wanted to make sure it didn't cause us to go backward. It's basically where we were six years ago. We are continually changing our requirements to make sure folks have a permanent water supply."

What Douglas County already has, and what Curry and others at the state capitol want to encourage, is an ongoing conversation between planning commissions and water providers.

"They ought to be meeting regularly to compare notes," said the Gunnison Democrat. And, she adds, "The West Slope will be more comfortable when the Front Range can point to its process and say, 'Look, we are going about this the right way,' rather than approving development and then coming back and saying, 'Now we need more water.' It doesn't create a very good working relationship between the two sides."

When Jaeger considers the future, he said Coloradans have to come to grips with the fact that it's all Colorado's water.

"We need to develop it in a manner that benefits everyone in the state. Everybody's got to move a little bit, including me." ❑

River of Words

Every year, young Colorado K-12 poets participate in the national River of Words water and environmental poetry contest. Entries are submitted to the national contest by Feb. 15; then all Colorado entries are returned to Colorado Humanities for judging. Details for poem submittals and an on-line course, "Teaching the Poetry of Rivers" by Colorado Book Award poetry winner Kathryn Winograd, are available at http://www.coloradohumanities.org/ccftb and the Foundation's Web site at www.cfwe.org. With the permission of CH, the Foundation is pleased to celebrate the 2008 Colorado award-winning poets and poems *(additional winning entries at cfwe.org/row.asp).*

National Awards

Sewer

Rats roaming down here.
Water flowing like music from the oboe.
Dangerous gasses float in the air.
Down here underground.

Jack Baker
River of Words National Winner, Category I
2nd grade, Polaris at Ebert Elementary
Karin Johnson, Teacher

Wordy

Talkative Beauty
Words shine in the morning light,
Verbs and similes

Isabel Levine-Clark
River of Words National Finalist, Category I
2nd grade, Polaris at Ebert Elementary
Doris Garrett, Teacher

Colorado Awards

Graceful Raindrop

A silky drop of heaven that gives life to our world.
Falling with style and shining like the stars in outer space.
A drop of nothingness.
Moist, like the mud between the toes.
Felling the light drop calms me in the sweetest of ways.
I think to myself "how can a tiny thing be so graceful and beautiful?"
I feel chilly even in my sweater.

Malia Olson
River of Words Category I (Grades K-2), 1st Place
2nd Grade, Crested Butte Community School in Crested Butte
Amelia Peacock, Teacher

The Life of a Mountain Tree

The music of the blue bird calling to the trees
Dripping with sap as much as they please.
Scratched from the black bears marking their territory,
Cried on by the wolves when the full moon rises.

They tell many stories with their plain brown rings, telling
years of age, if thirsty, if hungry, if sick or pleased.
Giving us a token, a token of air that we breath.
They tell the story of the hawks, searching for
Creatures hidden in leaves.

Animals make their homes among their arms.
The tree's death occurs with the fire of nature, the chip from
the ax man, or the poison of the beetle scavenging for supper.

Trees make up our mountains
Along with water, air, rock and more.
For this is the life of a mountain tree.

Elise Guyot
River of Words Category II (Grades 3-5), 1st Place
4th Grade, Hunters Glen Elementary in Thornton
Jamie Olson, Teacher

Thread

The tranquil river
travels through the underbush
pushing its way
towards its destination.

It follows the needle
to where the compass points,
sewing its seamless work,
for the river is a thread
binding together the unknown
cross-stitching the squares of farmland,
weaving veins into leaves.

It unites the unrelated
spiraling its way
towards the end it knows is coming,
but when the river is finished,
its stitching will still be there
sewn into the cloth
that everyone bears on their back.

Sarah Hamilton
River of Words Category III (Grades 6-8), 1st Place
8th Grade, Good Shepherd Catholic School in Denver
Linda Keller, Teacher

Somewhere in the West

There is a stream somewhere in the west,
Where I go when my feet need a rest.

It welcomes me every time I stop for a bit,
And I think about the beauty where I sit.

I immerse my feet into the clear blue,
And everything in the world becomes new.

My heart slows to match the pulse of the stream,
And I slip into a sort of dream,
Of a place where everything is gentle.

Where people don't go mental,
Over the small trifles that come their way,
And they give thanks for being given that day.

I awake at the sound of the water trickling,
As it slides over my feet tickling.

Some say it's not alive because it doesn't breathe,
But this I refuse to believe.

For the spirit that surrounds this place,
Is undeniable to any face,
That glances into their reflection,
And finds that all their tension,
Has been carried away by the current,
And for a second they have contentment.

Moriah Van Cleefa
River of Words Category IV (Grades 9-12), 1st Place
11th Grade, Arapahoe High School in Littleton
Marlys Ferrill, Teacher

City Lake

A freezing sheet of water.
A rush of traffic,
grass, fish, and little pieces of sand speeding away past me.
A blur of blue and green.
I smell muddy flowers all around me, like a garden when the tide comes.
A gorgeous
city lake.

Catherine Washburn
River of Words Category I (Grades K-2) 2nd Place
2nd Grade, Crested Butte Community School in Crested Butte
Amelia Peacock, Teacher

The Life of a River

Flowing down and down
the rocks against my body
mother deer and their babies drinking out of me

people putting me into a bucket
to take me to their tiny villages

going up and down on rough terrain
being soaked up by the roots of a giant tree
moving through little tubes to keep the tree alive

sun shining on my skin
as people look into me and see themselves
as if I were them and they were me.

I evaporate into the sky like a fast moving bird
and then pour down into a new place
I have never been before.

Juliann Richardson
River of Words Category III (Grades 6-8), 2nd Place
8th Grade, Good Shepherd Catholic School in Denver
Linda Keller, Teacher

Half-Full Lotus

The sun warm on the face
And the light cotton draping over the frame
Are two of the things it will notice.

Soles meld to souls
As roots meld to earth
As hearts meld to leaves.

Dirt lies beneath its bones,
Water babbles beside its flesh,
Sky floats above depths of its dreams.

Respiration knows no bounds
Just as circulation denies nothing
And natural cadence refuses the definite.

Here next to this half-filled creek
Breaths are composed of a planet
And the mind of nostalgia.

Logan Jacobson
River of Words Category IV, 2nd Place
11th Grade, Individual Entry from Centennial
Beth Hanson, Parent

2009 President's Award Reception

Honoring Dick Bratton | Friday, April 3, 2009 | Cableland Mansion, Denver

Please join us for an evening reception featuring cocktails and hors d'oeuvres, presentations from CFWE officers and a tribute to Dick Bratton. Tickets are available for a suggested donation of $75 per person. Visit cfwe.org/2009Reception/default.asp to register.

Each year the Foundation's Board of Trustees solicits nominations from our members for our annual President's Award. The award is bestowed on a Coloradan who meets a predetermined set of criteria, including: a body of work in the field of water resources benefitting the Colorado public; reputation among peers; commitment to balanced and accurate information; geographical, gender, ethnic, and constituency diversity.

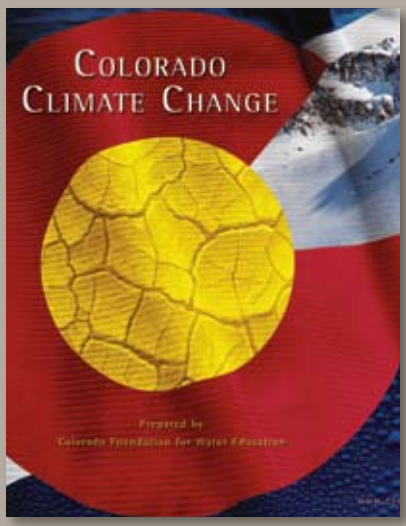
Past recipients include John Fetcher (2007) and Ken and Ruth Wright (2008).

Citizen's Guide to Colorado Climate Change

The Colorado Foundation for Water Education is pleased to announce the publication of the latest installment in the Citizen's Guide series.

Written by Colorado experts and peer reviewed, the ***Citizen's Guide to Colorado Climate Change*** includes an overview of Colorado's climate and historic climate events; factors influencing global climate change and what the models predict; possible impacts to Colorado energy production, agriculture, tourism, recreation, urban health and water supplies; and actions citizens and government are taking.

All CFWE publications, and membership information, are available at cfwe.org, or by calling 303-377-4433.



2009 CFWE Rio Grande Basin Tour

Please plan to join the Foundation for our 2009 Tour of the Rio Grande Basin. Staff is creating a 2.5 day educational adventure that will focus on the challenges and successes of water management and use in the San Luis Valley. Look for details in February 2009.

MWH and the Colorado Water Conservation Board funded production of the Citizen's Guide to Colorado Climate Change.

Colorado Foundation for Water Education

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