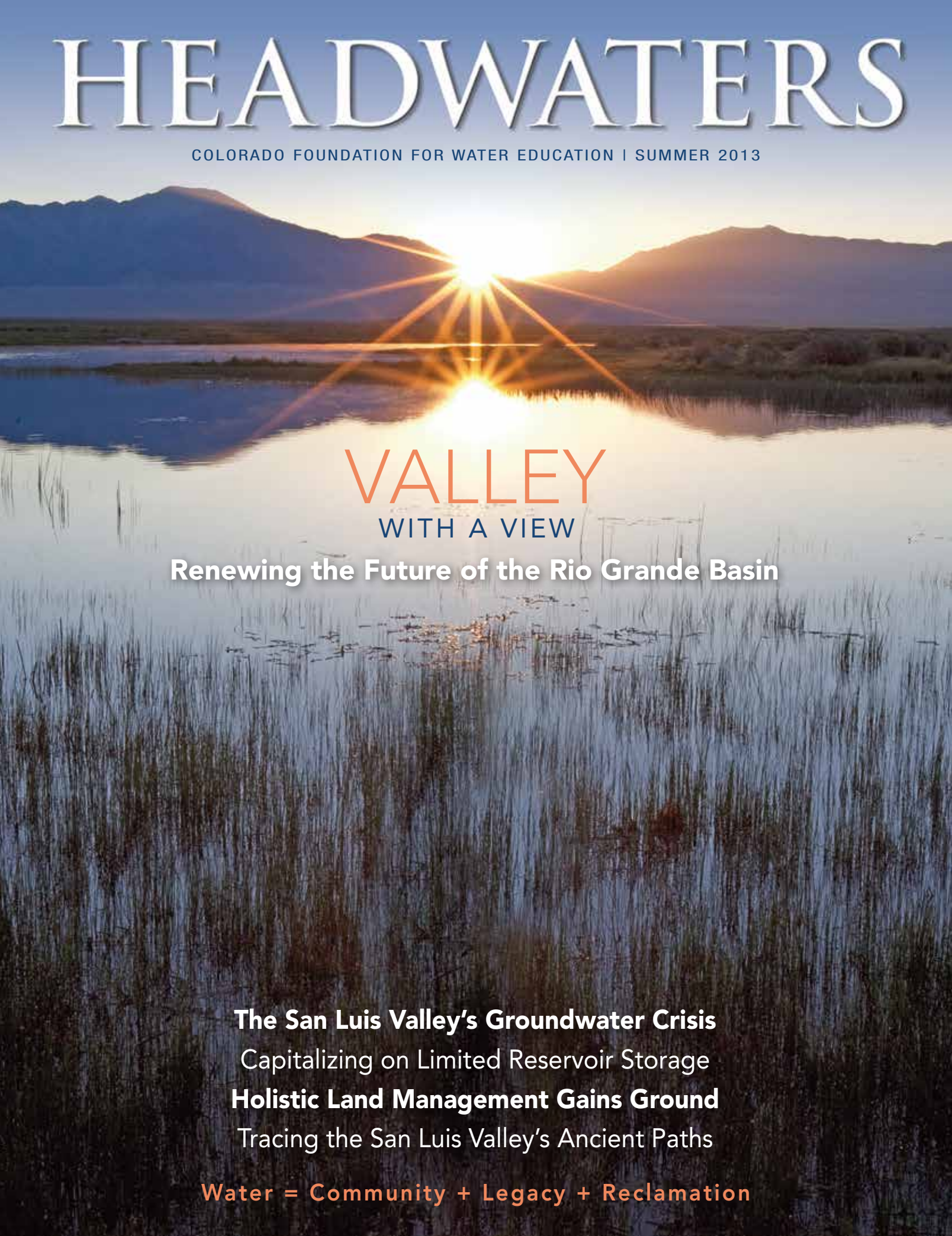
HEADWATERS

COLORADO FOUNDATION FOR WATER EDUCATION | SUMMER 2013



VALLEY
WITH A VIEW

Renewing the Future of the Rio Grande Basin

The San Luis Valley's Groundwater Crisis

Capitalizing on Limited Reservoir Storage

Holistic Land Management Gains Ground

Tracing the San Luis Valley's Ancient Paths

Water = Community + Legacy + Reclamation

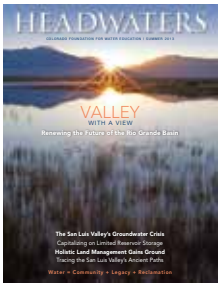
GROWING CAPACITY

Advertise With CFWE Online

Many of you already follow the "Your Water Colorado" blog and visit our website to learn about our programs and find important water information. As we look to the second half of 2013 and strive to sustainably grow capacity for our efforts, we will be making space available on both the blog and website for advertising. Contact Adam Hicks at adam@yourwatercolorado.org to connect with the unique crowd that congregates around CFWE!

INCREASING AWARENESS

Headwaters Up Close and Personal



Headwaters is hitting the road! Our stories will step off the page at an evening reception on August 1, 2013, at the breathtaking Gilmore Ranch in Alamosa. Hear directly from people interviewed for this issue's "Aquifers in Free Fall" (page 20), covering the unique dynamics of groundwater in the San Luis Valley and steps being taken toward sustaining the resource for the long haul. Save the date to mix and mingle with local water experts, community members and CFWE's 2013 Water Leaders class.

DEFINING VALUES

On Tour with CFWE

CFWE has been burning miles this year leading interactive tours to help participants understand the many values associated with Colorado's water. From learning about how the Grand Valley manages water for agricultural, municipal and environmental uses to investigating the relationship between transbasin diversions and river health in the upper Colorado Basin, we don't rest until everyone has a chance to get on the bus! Join us in exploring the value of water in your life at any of these upcoming CFWE tours:

- July 10-12, 2013—Broaden your perspective on interstate water issues on the Platte River Tour in Colorado, Wyoming and Nebraska.
- Fall 2013—Get a glimpse of water management in the South Metro area and energy development in northeastern Colorado.
- March 2014—Learn how climate science and water resources are connected at the National Ice Core Laboratory in Lakewood.
- June 2014—Explore the water wonders of the Yampa River Basin.

Joseph Burtard

Participants on CFWE's Lower Colorado Basin Tour in May 2013 make a stop at Jerry Creek Reservoirs northeast of Grand Junction.

iStock.com

CFWE on the Air

Get ready for a new way to receive unbiased water information—come July 2013, CFWE will bring you the quality reporting you crave over radio airwaves. That's right! We've partnered with community radio stations across Colorado to create regular water programming over the next year. Expect monthly segments that complement and build on what you're reading in *Headwaters*, plus special talk shows touching on other water resource topics. Visit yourwatercolorado.org for links to our radio spot as well as sponsorship opportunities. Haven't you always wanted to hear your name on the air?

Take the Next Step

Visit the "Your Water Colorado" blog to get information, share thoughts and discuss Colorado water with experts. Better yet, subscribe and we'll send the RSS feed straight to your inbox: blog.yourwatercolorado.org.

floo-uh nt
water fact

CFWE has graduated five classes of water leaders, for a total of 66 alumni, since the inception of its Water Leaders Program in 2006.

The 2013 Water Leaders class visits Thornton's water treatment plant during its first training session.

STRENGTHENING LEADERSHIP

The Next Generation of Water Leaders

The 2013 Water Leaders class is underway! Fifteen professionals have embarked on a year of leadership assessment, management training, in-the-field exploration and personal networking that will set them up for years of success. In March, the class focused on team building and approaches to water project development. In May, they visited Summit County for two days on change management and upper Colorado River issues. In August, they'll explore handling conflict and groundwater issues in the San Luis Valley. The class will wrap up in Denver in September with a focus on building a professional network. Congratulations to these emerging Colorado water leaders:

Heather Beasley, Town of Castle Rock
Drew Beckwith, Western Resource Advocates
Jenny Bishop, Colorado Springs Utilities
Sean Chambers, Cherokee Metro District
Kelly Close, Leonard Rice Engineers, Inc.
Brian Epstein, Colorado Water Conservation Board
Nathan Fey, American Whitewater
David Graf, Colorado Parks and Wildlife
Katie Knoll, Denver Water
Brian Murphy, CDM Smith
Sarah Parmar, Colorado Open Lands
Kim Raby, Formation Environmental
Travis Robinson, Sanchez Ditch & Reservoir Co.
Zachary Smith, Colorado Water Trust
Dana Strongin, Northern Water

CREATING KNOWLEDGE

Attend CFWE's Watersheds Conference

Join CFWE for two days of speakers, workshops and networking at the annual Sustaining Colorado Watersheds conference in October 2013. Hosted together with the Colorado Watershed Assembly and Colorado Riparian Association, the event promises to be an informative, engaging and fun opportunity to explore everything from emerging trends in restoration to hydraulic fracturing and source water protection. For more information, see the back cover of this issue and visit Colorado.org/conferences.

Colorado Watershed Assembly
Colorado Foundation for Water Education
Colorado Riparian Association

CULTIVATING PARTICIPATION

President's Award

Each year, CFWE pays homage to extraordinary men and women who exemplify commitment to water resource stewardship and education by recognizing them publicly. In 2013, CFWE proudly bestowed its President's Award for lifetime achievement in water education to Jim Isgar. And the Emerging Leader Award went to Amy Beatie. The awards were presented during an annual reception on May 3 at the History Colorado Center in Denver.

By Justice Greg Hobbs

Jim Isgar
President's Award Honoree

Looking at Jim Isgar, a bit grizzled from recent chemotherapy treatments, I see a generous man who stands as tall as Mt. Hesperus, a peak in Colorado's La Plata Mountains that rises due north of Isgar's family farm and ranch.

Isgar irrigates off the La Plata River outside of Breen, southwest of Durango. Like his father, Art, Isgar has served on the H.H. Ditch Company board of directors, including 25 years as its president. And following in his footsteps, Isgar's son Matt now runs the ranch and has taken positions on the boards of the H. H. Ditch Company and the La Plata Water Conservancy District.

Under the 1922 La Plata River Compact between Colorado and New Mexico, the scanty flow of the La Plata, a tributary to the San Juan, is divided based on the flow at Hesperus, 23 miles north of the state line. New Mexico is entitled to half the water flowing at Hesperus, up to 100 cubic feet per second, but when the river gets low, it can take the entire flow at Hesperus to get New Mexico's share to the border. It's an aggravating arrangement for both man and the environment. Now the Long Hollow Reservoir is being built to stabilize flows for both states.

Also in preparation is a pipeline to deliver water from the Animas-La Plata Project (A-LP) to the "dry side" of western La Plata County for domestic use. Listen to Isgar talk about the "dry side" and you'll hear a story of disappointed expectations. From the 1940s on, people living on this water-scarce mesa worked hard for construction of the A-LP.

Authorized by Congress in 1968 as a participating feature of the Colorado River Storage Project Act, the A-LP contemplated many uses, including delivery of irrigation water from the Animas River to the Hesperus area. "I was 16 years old when the A-LP was authorized," Isgar recalls, "and spent much of my life helping to get it built."

Isgar knows what tough negotiation is about. He was a member of the La Plata Water Conservancy District board during the 1980s and '90s. In 1986, the Southern Ute and Ute Mountain Ute tribes agreed with the state of Colorado to settle their 1868 federal reserved water rights in return for the A-LP. Environmental concerns, lawsuits and escalating project costs resulted in the non-Indian irrigation uses being stripped from the project. Despite his great disappointment, Isgar urged continued support for the tribes in their effort to build the project. He became a member of the Animas-La Plata Water Conservancy District board in 1994, after his father stepped off.

Continued on page 2

Stephen Cardinale (4)

Jim Isgar (left) accepts the CFWE President's Award from CFWE board president Gregg Ten Eyck (right) and Colorado Agriculture Commissioner John Salazar (middle). Amy Beatie (above, right), winner of CFWE's Emerging Leader Award, holds son Cormac up as a representative of Colorado's future—and the reason the Colorado Water Trust's work is invaluable.

The Democrat in Isgar came alive at a young age when he, with his father, met President John F. Kennedy at the White House in 1962. He attended rural elementary schools in Hesperus, followed by middle and high school in Durango, where his mother, Anne, ran a family-owned motel. Graduating in 1969 and setting off for the University of Colorado to study engineering, he soon returned to help as his father recovered from his own bout with cancer.

Isgar completed his bachelor's degree in accounting at Fort Lewis College in 1973, became a Certified Public Accountant, studied taxation at Colorado State University, and worked for an accounting firm in Longmont. He was accepted to the University of Denver law school in 1976, but his parents said "they would sell the farm if I didn't come back and take it over," he recalls.

After returning home and marrying Chris Roberts, he became the father of four children, Sarah, Matt, Andy and Kate. Through participation in many local and statewide organizations, he earned recognition as a steady and trusted voice and decision-maker. Gov. Roy Romer appointed him in 1988 to the State Board of Agriculture, overseeing Fort Lewis College, the University of Southern Colorado and Colorado State University.

When state Sen. Jim Dyer resigned in 2001, Isgar was appointed by the vacancy committee, stood for election, and served in the Colorado General Assembly as a senator until July 2009. President Obama then appointed him to be state director of the U.S. Department of Agriculture Rural Development.

Isgar co-sponsored with Rep. Diane Hoppe the 2002 legislation establishing the Colorado Foundation for Water Education and became a member of CFWE's first board of directors. Isgar was instrumental in persuading legislators to attend the summer CFWE tours of Colorado's river basins. "The drought really heightened their interest in getting good water knowledge," he says.

During the first decade of the 21st century, a period of significant innovation in water legislation, Isgar sponsored, co-sponsored or worked on virtually every successful water bill. These included the 2003 leasing statute for instream flows during drought periods, as well as the 2001 recreational in-channel diversion statute.

With the USDA, Isgar helped make hundreds of millions of dollars of loans and grants of vital importance to farmers, ranchers, rural communities and homeowners in need of housing assistance. After resigning from his position in December 2012, he's happily back on the farm and ranch with three of his children and his second wife, Brenda. He's fighting the cancer and looking forward to the time when he can continue assisting his neighbors in getting some water for the "dry side."

Amy Beatie

Emerging Leader Honoree

Amy Beatie fights drought by putting water back into parched Colorado streams for fish, wildlife and people. In the summer of 2012, when Western Slope streams were running precariously low, the nonprofit Colorado Water Trust she leads helped to hold some of the hardest-hit waters together.

In 2003, another crucially short water year, Colorado's General Assembly enacted a short-term water lease statute to aid the Colorado Water Conservation Board's instream flow program in drought years. Because Colorado's instream flow law wasn't adopted until 1973, CWCB's instream flow water rights are junior, or lower in priority, to senior rights under Colorado's system of water administration. The 2003 law allowed the temporary use of leased senior water rights owned by irrigators and other water users to shore up those junior instream flow rights using an expedited approval process.

"The question we were facing in 2012 was whether the leasing law would actually work," Beatie explains. "Between March and May, we pushed to identify critically short stream reaches; contacted potential funders; put out bids to farmers, ranchers, and all other water users; and worked with water users to help make water available to the state's rivers."

The Colorado Water Trust scrambled successfully under intense time pressure to raise money to keep the streams running by changing water rights and putting them back into the river. Funding came from many sources, including the Gates Family Foundation, the Walton Family Foundation, National Geographic, the Bonneville Environmental Foundation, the Kenney Brothers Foundation plus the city of Steamboat Springs. "We simply could not have done the program without this funding," says Beatie.

The 2012 program benefitted the Yampa, the upper Colorado, the lower Colorado, and the White river watersheds. Beatie also remarked that partnerships were critical to the program's success: "Of course, the staff and members of the Colorado Water Conservation Board were indispensable. Colorado Parks and Wildlife, the Colorado River District and Northern Water were also very helpful, each in very different ways."

CFWE vice president Justice Greg Hobbs recognizes Headwaters *editor Jayla Poppleton for her contribution to the magazine at the May 3 event.*

Beatie's staff is lean and effective. "When our board said, 'Go,' we went to work. We have a water rights specialist who works with an aquatic biologist to identify the most critically needed water rights in the hardest-hit stream reaches. They worked with our staff attorney and field specialist to complete transactions."

Harnessing the law for the environment brings together Beatie's education, passion and training. Her undergraduate school is Dartmouth where she majored in religious studies. Her law school is the University of Denver; she served there as editor-in-chief of the university's *Water Law Review* before clerking with the Colorado Supreme Court and practicing law with the Porzak and White & Jankowski law firms. She's a graduate of CFWE's Water Leaders Program.

Through it all, she says, "My greatest source of strength and joy is my home life with Declan and our 2-year-old son Cormac!" ❑

Currents

Winter finally arrived in Colorado this year…

Nicole Seltzer shares a laugh with 2013 President's Award winner Jim Isgar.

in April. Area headlines sum up the odd weather situation. On April 3, the *Denver Post* proclaimed that "Back-to-back, drought-plagued winters have prompted Colorado water users and providers to prepare for another dry year." One week later, on April 11, there was this *Loveland Reporter-Herald* headline: "Climatologist airs brighter drought outlook for Colorado." Fast forward again to an April 24th *Grand Junction Daily Sentinel* headline: "Better late than never, snow eases drought."

What is a water education organization to make of all this? While no one wishes for dry conditions, in the spirit of capitalizing on a crisis, CFWE was ready with several drought-related educational programs, ranging from fact sheets to presentations. But after many weeks of spring storms, that content seemed a bit less urgent.

Fortunately, CFWE has both a structure and a staff that can keep up with the variability Mother Nature throws our way. While CFWE plans its programs several months in advance (you didn't think it took only a few weeks to publish this issue of *Headwaters* did you?), we also maintain a flexibility that allows us to take advantage of last-minute opportunities, or change course if an idea doesn't pan out. From impromptu tours to eleventh-hour conference panels to news articles needed yesterday, it's this adaptability that keeps CFWE relevant and useful, no matter what is going on with Colorado water.

Much of CFWE's work, from the magazine in your hands to the summer tours that are right around the corner, would be impossible without hours of dedicated volunteer time. Volunteering with CFWE isn't a typical charitable experience—our volunteers don't plant trees or call their representatives in Congress. Instead, CFWE volunteers use their contacts and expertise to open doors, brainstorm topics and review content. This issue of *Headwaters,* for example, involved dozens of hours of meetings and review from more than 25 people in the Rio Grande Basin and elsewhere. Without their commitment to water education and to CFWE, *Headwaters* would not be the reliable information source you've come to expect. So while their work is behind the scenes, they deserve a very public thank you.

We invite you to celebrate the result of our combined efforts to put together this issue of *Headwaters* at an evening reception in Alamosa on August 1, 2013. Wishing you a wonderful summer season,

Nicole Seltzer
Executive Director

Kevin Moloney

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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.

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Summer 2013

The outlet at Terrace Reservoir releases into the Alamosa River. For full story, see page 28.

Kevin Moloney (6)

WATER IS...

On the Cover: The upper Rio Grande on the Oxbow Ranch photographed by John Fielder.

CONTRIBUTORS

Jerd Smith is a Boulder-based writer and editor with a special interest in water and conservation issues. She formerly reported for the *Rocky Mountain News* and has received numerous awards, including Stanford University's Risser Prize for environmental reporting. She is now editor of the *Northern Colorado Business Report.*

Lauren Krizansky is a journalist with a background in agroecology rooted in both the United States and abroad. She has studied energy and agriculture in Wisconsin and Norway and managed diverse agricultural systems in Spain, Portugal and Greece. In 2011, she returned to the San Luis Valley to report on and participate in the region's agriculture.

Colorado photographer **John Fielder** has used his work to champion land protection in Colorado for more than 30 years, earning him awards from both the Sierra Club and Aldo Leopold Foundation, among others. His photos appearing throughout this issue can mostly be found in three of his 40 published books: *Ranches of Colorado, Guide to Colorado's Great Outdoors: Lottery-Funded Parks, Trails, Wildlife Areas & Open Space,* and *Colorado's Great Outdoors: Celebrating 20 Years of Lottery-Funded Lands.* He lives in Summit County, and most recently published *Denver Mountain Parks: 100 Years of the Magnificent Dream.*

Kevin Moloney is a photojournalist descended from holders of Colorado's oldest water right—The San Luis People's Ditch. His work has regularly appeared in *Headwaters*, as well as the *New York Times,* publications of The National Geographic Society and many others.

Watermarks

Jayla Poppleton, Editor

John Fielder (background)

Ten Things To Do In This Issue:

1. Get on the bus with CFWE for one of its summer or fall educational tours *(inside front cover).*
2. Connect with your basin roundtable to get in the know about local water issues and explore opportunities to get involved *(page 9).*
3. Investigate the Rio Grande Basin's geography, including the location of its two aquifers and many wells *(page 15).*
4. Check out Colorado's Climate Center for information on Colorado's diverse regional climates, current drought conditions and forecasts for the future *(page 17).*
5. Read up on Colorado's many water-sharing agreements with downstream states *(page 19).*
6. Take a visual tour of the San Luis Valley's shrinking aquifers—and the plan to recover them *(page 24).*
7. Tap into Colorado's Decision Support System database to access surface water rights, well permits, streamflows, hydrologic models and more *(page 27).*
8. Find out which species in Colorado receive special protections *(page 33).*
9. Plan a weekend to travel Los Caminos Antiguos Scenic Byway and explore the San Luis Valley's story of water up close *(page 37).*
10. Attend CFWE's Sustaining Colorado Watersheds conference *(back cover).*

Visitors from nearby tribes once called the Ute Indians who inhabited the Rio Grande Basin's San Luis Valley the "Blue Sky People," and it's no wonder.

In this high desert valley in south-central Colorado, cloudy skies are rare. The clear vistas make you want to sink your teeth into the raw beauty of this place. But it isn't an easy life. Some think the region, already hard-hit by the dry years of the past decade, is one or two droughts shy of a dust bowl. Long-dependent on groundwater, the valley has seen rapid declines in its aquifers. Over the next two decades, farmers will take tens of thousands of acres of land out of production. In a region where agricultural sales trickle down to every small business, the entire community will be impacted by cutbacks in production.

Living in a small, water-short river basin with limited infrastructure for capturing and storing seasonal mountain runoff, residents have accepted the necessity of working together—approaching a more communal way of living long practiced by the Hispanic acequia farmers who dug the region's first canals. While disagreements persist, many in the valley now recognize that they can either solve their problems collectively—or perish. Indeed, that's how dire the water issues the basin is facing are today.

Yet there is cause for hope. While the valley's agriculture economy will have to re-balance on a "new normal" in order to remain sustainable for the long term, farmers and ranchers are putting aside old grudges and making sacrifices for the greater community. Water managers and environmentalists are working together to adapt canal and reservoir management strategies in ways that benefit both irrigators and streams. Government agencies, land trusts and private landowners are linking protection of both the valley's cultural and natural heritage through collaborative land management and preservation agreements.

This ability to come together has earned the Rio Grande Basin a nickname—the "Kum-bay-yah" basin—and the characters who stand around the circle inspire confidence that the region will pull through these tumultuous times. Take Steve Vandiver, who for 24 years worked as the local division engineer before assuming management of the Rio Grande Water Conservation District eight years ago, and is now charged with restoring the basin's aquifers. Or Karla Shriver, whose resume reads like a who's who list for government and natural resource management organizations. In losing husband Doug Shriver three years ago, she also lost a confidante and fellow leader, but continues to fight for the valley wherever she can—it's how she was raised. And then there's Heather Dutton, a 20-something raised in the valley, who left to earn dual degrees at Colorado State University and then returned, just as her ranch manager father had foretold, to invest her career locally. She now oversees restoration of 91 miles of the Rio Grande.

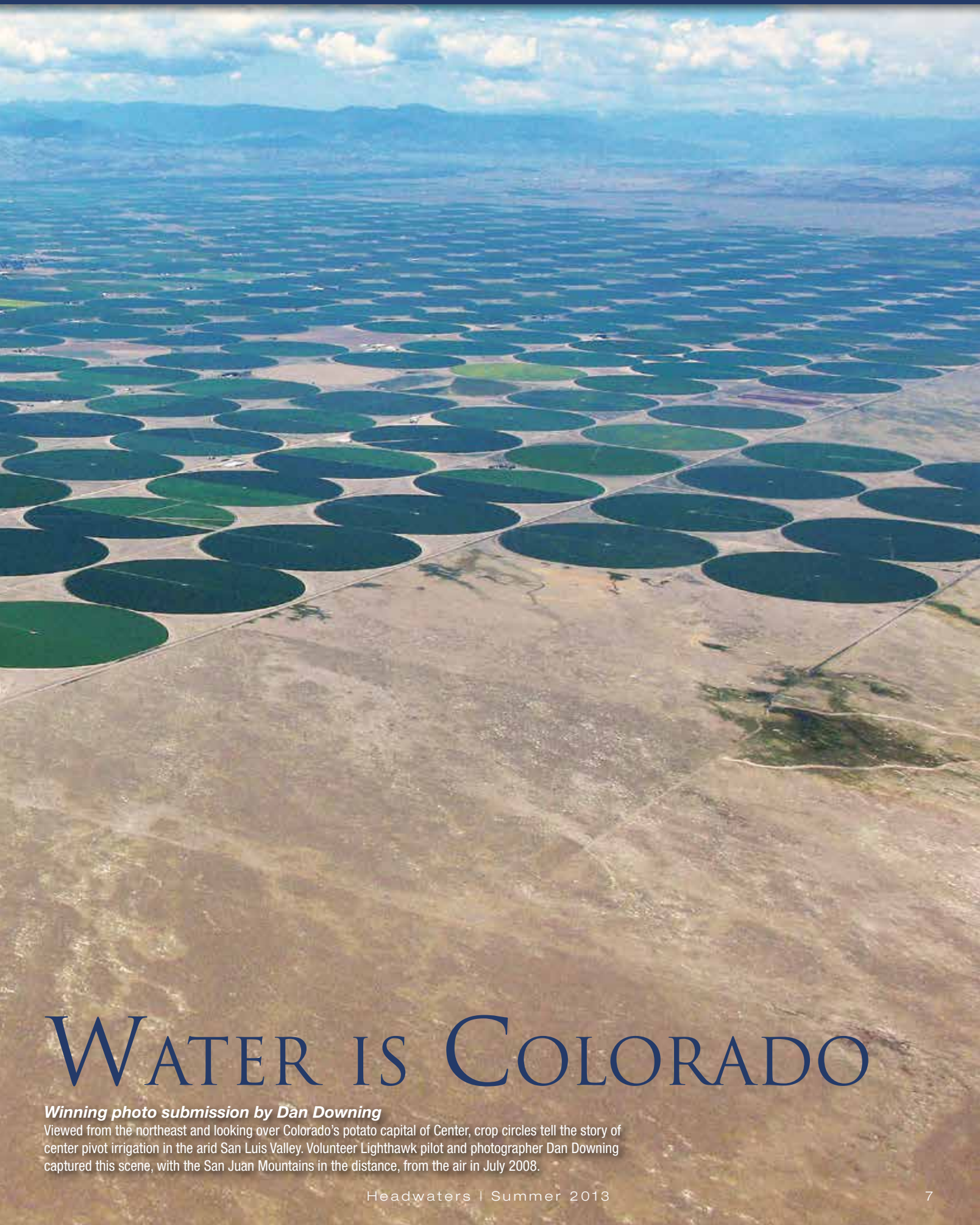
The list of such undeterred individuals goes on and on—they are the region's greatest asset, and its promise for the future. Read on to take a walk in their shoes, and investigate the water issues of Colorado's Rio Grande Basin and its San Luis Valley.

Jayla Poppleton
Editor

Kevin Moloney

Headwaters Photo Contest

See your photo in the next issue of *Headwaters* magazine! The Colorado Foundation for Water Education is now accepting entries of professional and amateur photographs that tie in with the topical focus of upcoming issues. The winning photo will appear on this two-page format, while other photos may be used throughout the magazine. Find contest rules and details on future topics at yourwatercolorado.org.



Water is Colorado

Winning photo submission by Dan Downing

Viewed from the northeast and looking over Colorado's potato capital of Center, crop circles tell the story of center pivot irrigation in the arid San Luis Valley. Volunteer Lighthawk pilot and photographer Dan Downing captured this scene, with the San Juan Mountains in the distance, from the air in July 2008.

John Fielder

Flood irrigation on the Cross Arrow Ranch is reflective of land—and water—protected under a conservation easement held by the Rio Grande Headwaters Land Trust.

Water Planning at the Roundtable

Walk in late to a meeting of the Rio Grande Basin Roundtable and prepare to be put on the spot. With his English charm and warm demeanor, the roundtable's chair Mike Gibson will ask you to stand up and introduce yourself to the group. If you've attended once or twice before, he'll likely call you out by name.

Gibson leads a welcoming bunch, where nearly every meeting sees at least as many members of the broader public as that of the official roundtable group. The 22-member roundtable is one of nine formed in 2005 under the bottom-up statewide planning effort enacted by the Colorado Water for the 21st Century Act. The roundtables are charged with evaluating local water supplies and demands, future needs, and ways to meet those needs, all while balancing traditional utilitarian water uses with recreational and environmental values.

Members represent a diversity of local leadership, industry and expertise, ranging from city managers to nonprofit coordinators, mining engineers to county commissioners, plus water users—irrigation companies and water conservancy and conservation districts.

A major goal of the roundtable process is to facilitate communication across river basins to ensure Colorado, as a whole, has enough water for the future. Still, the San Luis Valley remains protective of its water, and for good reason—a sustainable water supply is foundational to the region's ability to maintain a viable agricultural economy.

"We feel we're addressing some very critical water issues here," says Gibson, who also manages the San Luis Valley Water Conservancy District and is part of the majority who adamantly claim the basin doesn't have water to spare for other thirsty regions. The issues of aquifer depletion and meeting Rio Grande Compact delivery requirements while minimizing the impact on irrigators and the environment are two of the roundtable's highest priority concerns.

Organizations throughout the basin have adeptly taken advantage of funding offered through the Colorado Water Conservation Board's severance-tax-funded Water Supply Reserve Account in order to address some of those concerns. By helping entities refine their proposals and then forwarding them for final approval from the state, the roundtable has infused money into every corner of the basin—projects have ranged from river restoration and land and water protection to structural improvements on ditches and reservoirs.

The roundtable also has a more informed membership than it did seven years ago—an important accomplishment, says Gibson. "Our members are more informed about what the state will be confronting in the future and the so-called gap between supply and demand. And they have a better understanding of issues confronting the basin going forward." *—Jayla Poppleton*

WSRA Funding Infusion

Through the Water Supply Reserve Account, the Rio Grande Basin Roundtable has supported funding proposals from local organizations to the tune of approximately $1.7 million from a designated basin account and $7.4 million from a statewide account, for which projects undergo a more competitive statewide application process. Here's a sampling of the 38 projects supported since 2005:

Conejos Gauging Stations Project

$407,280 to Conejos Water Conservancy District (2012)

Funded: Installation of 72 solar-powered gauging stations and automation of four existing headgates on Conejos River system to improve measurement and supply better data to Division of Water Resources, which curtails irrigators based on forecasted streamflows to meet Rio Grande Compact obligations.

Goal: Minimize impact on irrigators whose collective losses can exceed $13,000 per day when they are mistakenly curtailed due to inaccurate measurements and forecasts.

Hydrogeologic Study

$99,564 to Rio Grande County (2012)

Funded: A study near Del Norte and South Fork to assess potential pathways between water stored in deep geologic structures and shallower aquifers and streams used for domestic, municipal, commercial and agricultural purposes.

Goal: Help the county assess drilling permits for oil and gas wells and the potential impact on water quality.

Rio Grande Initiative

$1,995,000 to Rio Grande Headwaters Land Trust (2008, 2011, 2012)

Funded: The purchase of conservation easements on working ranches along the Rio Grande to prevent development and fragmentation of large ranch properties and to permanently tie associated senior water rights to the land.

Goal: Together with many partners, protect 25,000 acres and their associated senior water rights along the Rio Grande to preserve the local agricultural economy, historical streamflow patterns, wildlife habitat, designated wetlands and a functioning floodplain.

Vallejos Ditch Headgate Replacement

$100,000 to Sangre De Cristo Acequia Association (2013)

Funded: A priority project identified by the association's Culebra Watershed Assessment and Management plan—replacement of a crumbling 50-year-old diversion structure and nearly inoperable headgate on Vallejos Creek, managed by the Vallejos Ditch Association, an unincorporated acequia established in 1854.

Goal: Restore functionality of structures to maximize benefit of senior water rights and prevent flooding, sedimentation and erosion—problems identified throughout the Culebra watershed. *—Jayla Poppleton*

floo-*uh*nt
water fact

Nine basin roundtables are actively planning Colorado's water future, representing metro Denver plus Colorado's eight major river basins—the South Platte, Arkansas, Rio Grande, Southwest (including the San Juan and Dolores), Gunnison, Colorado, Yampa/White/Green, and North Platte.

Hands-On Water Education

The Rio Grande Watershed Conservation and Education Initiative is up to its elbows converting students, teachers and community members into soil and water conservation gurus. Between field work, conservation camps and community workshops, the organization is taking San Luis Valley residents' water-IQ up a few notches.

Now in its 23rd year, the initiative was founded by a consortium of conservation districts. Since director Judy Lopez took the lead in 2005, the scope of the initiative's programs has broadened considerably. An interactive river dynamics trailer once saw about 1,500 school children a year; that's up to 10,000. A two-week teachers' workshop with a three-year component has graduated 160 teachers from around the state in six years and keeps a waiting list.

There's more: Four years ago, the initiative took over a week-long youth conservation camp that engages 70 elementary and middle school kids at a time; donations by partner organizations keep the price down in a region where many kids live in poverty. Lopez also enrolls up to 130 high school students in four-year field research projects; several students have received college scholarships based on their projects.

Five years ago, the initiative began hosting water 101 workshops in the broader community. A $23,500 grant awarded through the Rio Grande Basin Roundtable will enable them to continue that work. "It's going to be about helping people understand where they fit," says Lopez. "We need to get kids and community members to buy into the process of resource management. By helping them see a broader picture, they'll understand that these things are more than just sound bites." *—Jayla Poppleton*

Judy Lopez (2)

Kids experiment with streamflow dynamics using an interactive trailer (above). Teachers attend a workshop learning to identify stream macro-invertebrates (right) to use as an activity in their classrooms.

Take the Next Step

Attend a meeting of the Rio Grande Basin Roundtable, held monthly in Alamosa. Contact the roundtable's chair Mike Gibson at slvwcdco1@qwestoffice.net. Or find out more about your local basin roundtable: cwcb.state.co.us/water-management/basin-roundtables/.

The Rio Grande Watershed Conservation and Education Initiative's work is made possible through financial support from: Rio Grande Water Conservation District, San Luis Valley Water Conservancy District, Conejos Water Conservancy District, San Luis Valley Irrigation District, Trinchera-Blanca Foundation, Rio Grande Watershed Association of Conservation Districts, and many small ditch organizations.

A Community Resource

Hispanics who settled the southern San Luis Valley beginning in the 1850s brought with them an ancient irrigation method that originated in the Middle East. By way of North Africa, the acequia tradition arrived in Spain with the Moors in 710; it was later carried to Mexico, then Texas, New Mexico and Colorado, picking up indigenous customs along the way. Today, acequias are still the primary method of irrigation used in many parts of New Mexico and southern Colorado, notably Costilla, Conejos, Huerfano and Las Animas counties.

The acequia system evolved in arid, mountainous lands where streams could be channeled from foothills to irrigate lower-lying fields. Much traditional wisdom came along with the technology. As Melecio Lopez, a fourth-generation farmer on El Codo Ditch, the oldest in Conejos County, recounts, "Que la tierra no sirve sin agua," land is useless without water. And "La gente neccesita trabajar juntos para poder producir," the people have to work together in order to produce anything.

The word acequia, which means "water bearer," refers to both an irrigation ditch as well as the community of neighbors who contribute labor to build and maintain it. Each participant, regardless of the acreage owned, has one vote to elect a mayordomo, who oversees ditch maintenance and distribution of water. Fields were originally laid out in long, narrow strips perpendicular to the main ditch, allowing for fair distribution of water among members.

While the acequia way of life has persisted in Colorado for more than 100 years, the pressures of an extended drought, declining aquifers and development now impinge on these communities. When water was abundant, Colorado's acequia farmers raised a variety of crops for home use and for market, but today few are able to support a family on small holdings—instead many have become weekend farmers who hold jobs as far away as Denver. Particularly in Conejos County, where ditches fed by the Conejos River are subject to curtailment under the Rio Grande Compact, many small farmers raise stock on native hay but plant no crops due to early runoff and lack of water during the short growing season.

Acequia farmers in Costilla County, where streams are not subject to the compact, still produce heirloom crops such as bolitas, habas, and chicos, along with grass-fed beef, and market their goods through the Rio Culebra Agricultural Cooperative. *—Bea Ferrigno*

The Colorado Congreso

In 2012, the Sangre de Cristo Acequia Association organized the first annual Colorado Congreso de Acequias. A diverse group of farmers, county and state officials, water lawyers, scholars, and activists gathered in San Luis to discuss the future of acequias under changing conditions. As Junita Martinez, a community activist and acequia farmer, summed it up: "The Congreso reinforced the concept that we are caretakers of a critical water resource that is more than a commodity for our villages; it is the source of life." *—Bea Ferrigno.*

The San Luis People's Ditch has Colorado's oldest water rights—they are the No. 1 court decree, appropriated April 10, 1852, or 24 years before Colorado became a state.

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water fact

Richard Stenzel

The San Luis People's Ditch, an acequia which today irrigates more than 2,000 acres of hay and other crops, diverts from the Culebra River near the town of San Luis.

Incorporating Age-Old Customs

Although many Colorado acequias were established in the mid-1850s and hold senior water rights under the state's prior appropriation system, the traditional view of water in acequia communities is fundamentally at odds with Colorado's statutory view of water rights as property, a commodity that can be sold. Still, due to their historically communal nature, many acequias have no legal framework and are thus legally vulnerable if a member opted to sell his or her shares. "For a cooperatively managed, gravity-fed ditch, the loss of water could be disastrous," says Sarah Parmar, program director for the Sangre de Cristo Acequia Association.

Acequias were recognized to some extent in statutes from the late 1800s, but it was only in 2009 that the Acequia Recognition Law passed. It applied to acequias where at least two-thirds of the land remained in original "varas," or long lots, and required them to incorporate and put their traditional practices into bylaws. This presented difficulties to communities with long traditions but few written records and didn't apply to some acequias, particularly in Conejos County, where many long lots had been consolidated.

In 2013, the law was amended to eliminate the long lot provision and to recognize unincorporated acequia associations, making it more applicable in Conejos County. Conejos County Clerk Lawrence Gallegos welcomed the revisions, particularly a provision reserving the first right of refusal on sales, leases or exchanges of acequia waters.

The Sangre de Cristo Acequia Association and Colorado Open Lands have recruited 30 law students from the University of Colorado Law School's Getches-Wilkinson Center to help acequias compile documentation for incorporation or to assert rights that have never been recorded with the state. Their Acequia Assistance Project is most active in Costilla County where only three acequias are incorporated.

In Conejos County, many acequias became mutual ditches in the early 1900s. Some traditional practices persist despite the seemingly incompatible legal structure. For instance, members of a mutual ditch might vote on the basis of their shares but distribute water according to custom. And each spring, the acequias are cleared of silt and willow roots by hand in a community effort that traditionally ends with a festive meal.

"Acequias are unique in our system of western water law, because value is placed on equity and community problem solving, in addition to the value of the water resource itself," explains Parmar. "As we look to the future, acequias will offer an interesting model of alternative water administration and use." *—Bea Ferrigno*

Heather Dutton (2)

A riparian stabilization project restored the integrity of a formerly eroding streambank (left), preventing further sedimentation and loss of upland and riparian habitat along the Rio Grande (after completion, right).

Rio Grande Restoration Flows Forward

In the rural San Luis Valley, farmers congregate in coffee shops or stroll around the Monte Vista Co-op, a farm supply store, gossiping about their irrigation ditches.

Rural rumors can be frustrating small-town hearsay, but the reputation of the Rio Grande Headwaters Restoration Project (RGHRP) has travelled the grapevine in a good way, says Heather Dutton, coordinator of the project. "I don't spend a lot of time going out and rustling up projects," Dutton says, which wasn't the case a decade ago. "We have more projects than we can handle because word of our successes has travelled."

The RGHRP is the result of a 2001 study conducted at the request of local stakeholders—farmers, ranchers, state and federal employees, environmentalists and others—who recognized there were problems with sedimentation as well as the condition of riparian areas, floodplains and irrigation diversions along the Rio Grande and wanted to fix them.

The study examined 91 miles of the Rio Grande, identifying restorative projects such as re-crafting streambanks, planting vegetation and updating irrigation dams. To target those projects over the next 30 to 50 years, a group of people formed the RGHRP.

That community buy-in remains the key to the organization's success; nearly all of its projects are on private land. By the end of 2013, RGHRP will have completed work on 50 projects covering nine miles of the river. Dutton estimates they are about a sixth of the way toward their goal of implementing the priority projects from the 2001 study. They've raised nearly $6 million to pay for the work, including more than $1.6 million appropriated from the Colorado Water Conservation Board's Water Supply Reserve Account.

"There's too much dirt in the river," says Dutton. By reducing sediment, RGHRP will help move water downriver to meet Rio Grande Compact obligations; they'll also save critical habitat and structures from washing away, improve fisheries, prevent flooding, and maintain better water quality.

These benefits derive from the organization's work on bank stabilization projects as well as old diversion dams and headgates, many of which have been in use for 80 years or more. "Sometimes the farmer just pushed up enough rocks to force the water into his headgate," Dutton says. The practice stirred sediment—killing macro-invertebrates and changing fish habitat patterns.

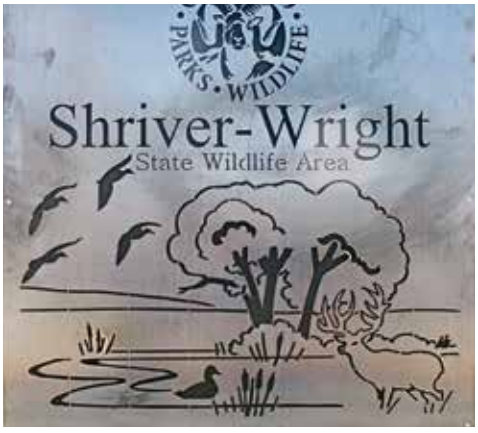
Updated diversions and headgates will eliminate a source of sedimentation and also allow irrigators to more efficiently use and measure water, says Ron Riggenbach, district conservationist with the Natural Resources Conservation Service, who has provided engineering assistance and cost-share for RGHRP projects.

Jamie Hart, president of the McDonald Ditch Company, approached Dutton in search of funding to update his diversion dam and headgate in 2010. "I was in a hurry but they convinced me to wait and do things right," Hart says.

The McDonald Ditch contains some of the most senior water rights on the Rio Grande, but has only seven irrigators. To justify spending large sums on such a small ditch, RGHRP partnered with the nearby Silva, Atencio and Prairie ditch companies, Rio Grande County and other stakeholders. The small project Hart envisioned ballooned into a $1.3 million endeavor. He is now working with RGHRP not only to fix his headgate and diversion, but also to rebuild a wetland, remove old bridge piers from the river, and protect adjacent properties from flood danger.

"It's kind of snowballing," Hart says. "Now there are more and more ditch companies saying, 'Jamie, how did you start this?' or 'How did you do this, I want to do the same thing.'" —*Caitlin Coleman*

Not Forgotten: Ray Wright and Doug Shriver



Rio de la Vista

The Shriver-Wright State Wildlife Area, dedicated in March 2012, is just east of Monte Vista.

Three years after their untimely deaths, Ray Wright and Doug Shriver's names continue to be spoken repeatedly in San Luis Valley circles. The two friends, each native to the valley, were both farmers and community leaders committed to local land and water conservation efforts. Shriver served on the Colorado Groundwater Commission and was president of the Rio Grande Water Users Association when he died. Wright was president of the Rio Grande Water Conservation District and a member of the Interbasin Compact Committee. The two were killed in a snow-slide accident at Wright's cabin near Creede in 2010.

A 120-acre state wildlife area now memorializes Shriver and Wright's service to the community. Colorado Parks and Wildlife and the Rio Grande Headwaters Land Trust worked to get the western portion of the existing Rio Grande State Wildlife Area re-named in recognition of Shriver and Wright, who were avid sportsmen. The new Shriver-Wright State Wildlife Area is near both men's family farms.

The area's dedication in March 2012 included a proclamation issued by Governor Hickenlooper: "Colorado is only as good, as visionary, and as capable as its citizens. We hope that Shriver and Wright's intelligence, diligence, and caring natures will inspire others to likewise take on the responsibilities of leadership and local problem solving that are their lasting legacy." —*Jayla Poppleton*

Citizens Act to Reclaim Willow Creek

Mining has captured the imagination of many a tourist. The town of Creede boasts some of the most-photographed mine structures in Colorado and a great museum, says Guinevere Nelson, watershed coordinator with the Willow Creek Reclamation Committee.

The Creede mining district was discovered in 1889 and boomed into one of the nation's top silver producers. Early miners were focused on making money as quickly as possible, not on protecting water quality.

In the late 1980s, the Colorado Department of Public Health and Environment (CDPHE) found high levels of cadmium, zinc, lead and copper in Willow Creek—levels warranting Superfund designation by the U.S. Environmental Protection Agency. Creede's citizens saw Superfund listing as another bust in their now budding tourism-based economy. Rather than have the federal agency reclaim the site, citizens reached an agreement with the EPA to improve the watershed themselves.

Willow Creek Reclamation Committee volunteers sampled water from 1999 to 2003, then initiated projects like isolating waste rock and routing drainages to avoid tailings piles. Projects are funded by the CDPHE's Nonpoint Source Program, the Colorado Water Conservation Board, the Colorado Brownsfield Foundation, the Colorado Division of Reclamation, Mining and Safety, and the Rio Grande Water Conservation District.

The greatest obstacle still ahead is the Nelson Tunnel, an old mine adit that connects and discharges water from six abandoned mines; it continues to account for about 50 percent of metal loading in the watershed. "The Nelson Tunnel is a kicker," says Guinevere. Upstream of the tunnel, fish have returned to the creek, which is promising, she says. "We've done everything we can [upstream] but are hoping a solution for the Nelson Tunnel will come soon." *—Caitlin Coleman*

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In December 2012, the U.S. Environmental Protection Agency cleared the way for third-party organizations to more readily assist in cleaning up Colorado's more than 7,000 abandoned hard rock mines, by issuing a new policy protecting such "Good Samaritan" groups against assumed liability risk. Source: The office of U.S. Senator Mark Udall

Heather Dutton

Remnants of the historic Summitville town that sprang up after gold was discovered nearby in 1870 still stand. The area is now a ghost town—and the site of environmental clean-up.

Alamosa River Revival

"The fish are back," says Cindy Medina of the Alamosa Riverkeeper, a nonprofit organization working to improve the Alamosa River under the auspices of the Valle del Sol Community Center. "Fish were killed during the Summitville disaster, and now the fish have returned."

Characterized as one of Colorado's worst environmental disasters, costing more than $220 million in remediation, Summitville was mined intermittently since the 1870s. The mine, 25 miles south of Del Norte, reopened most recently in 1984 when the Summitville Consolidated Mining Company piled ore from an open pit mine in the San Juan Mountains onto clay and synthetic-lined heap leach pads, then doused it with a cyanide solution to extract gold.

Almost immediately, a leak was detected—cyanide and heavy metals were draining into Wightman Fork, a tributary to the Alamosa River. Acidic water and heavy metals killed fish, but conditions weren't severe enough to impact human health. After the mining company declared bankruptcy in 1992, the U.S. Environmental Protection Agency, in partnership with the Colorado Department of Public Health and Environment (CDPHE), assumed responsibility for clean up. The EPA placed Summitville on the National Priorities List of Superfund sites in 1994.

Later, a former president of the mining company was sued, and a $28.5 million settlement agreement was reached—funding that helped cover the cost of remediation efforts such as plugging adits, capping leach pads and re-vegetating the river area. Most recently, $17 million from the American Resource and Recovery Act enabled the CDPHE to build a water treatment plant. Completed in August 2012, the plant has already improved water quality on the Alamosa River.

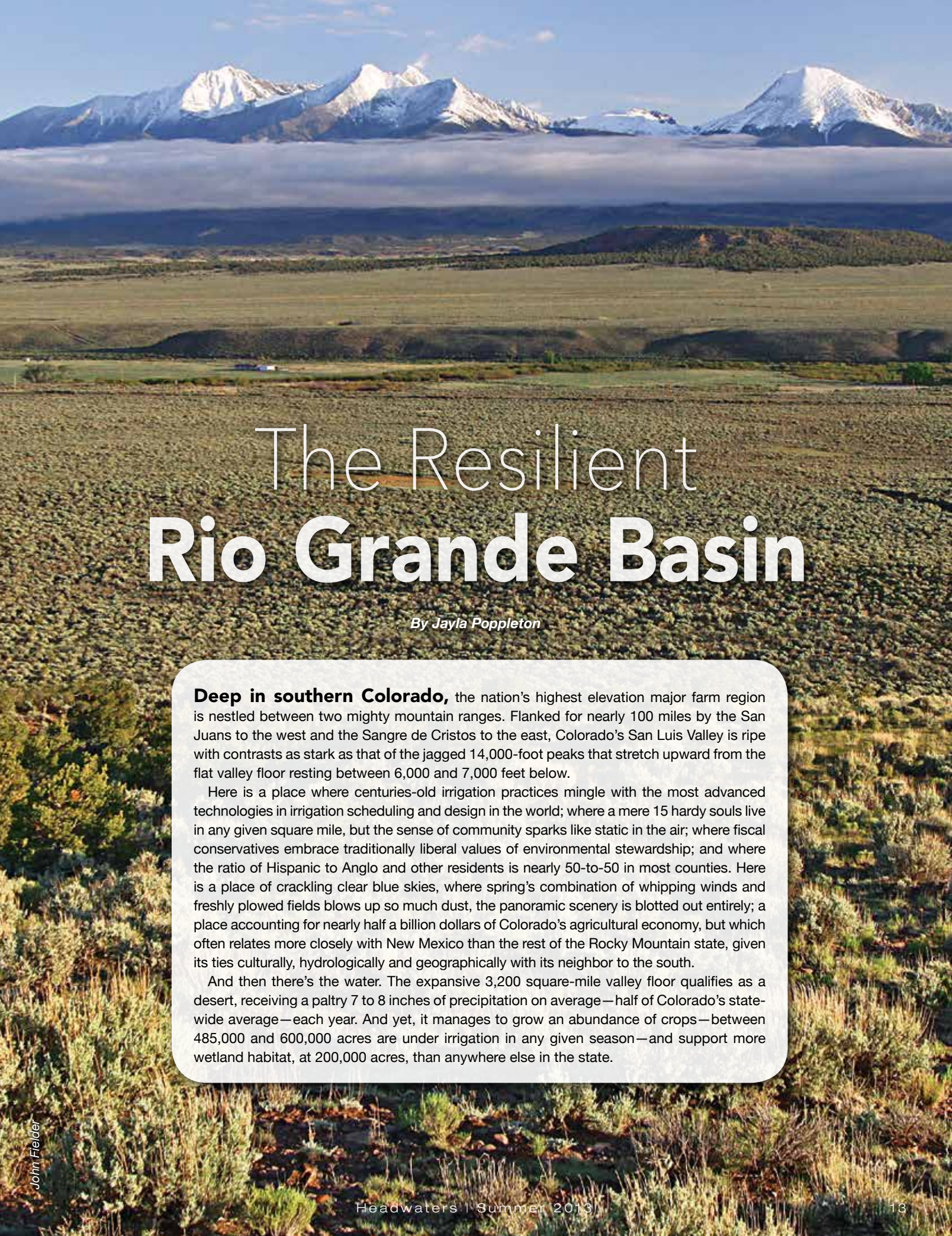
"It was the collaborative efforts of government agencies and the local community working together, and the construction of the new water treatment plant, that helped reclaim a dead river," says Medina. *—Caitlin Coleman*

Clean Up at Kerber Creek

"We've been able to engage with the local community on a number of different levels," says Trevor Klein, an AmeriCorps VISTA volunteer coordinating the Kerber Creek Restoration Project. "They've made good friends [through the project], and they've improved the quality of their land."

The Kerber Creek project depends on the involvement of private landowners to remediate the Kerber Creek drainage, which encompasses the Bonanza Mining District in the Rio Grande National Forest. Bonanza was mined for zinc, copper, silver and gold from the early 1880s through the 1930s. Abandoned mine waste contributed to acidic and metal-loaded water in the creek and on surrounding land. The American Smelting and Refining Company initiated cleanup in 1994, but after it went bankrupt around 2002, the Bureau of Land Management stepped in.

"It was a bit complicated because most of the floodplain in the watershed, 95 percent of it, is private land," Klein says. Early cooperative efforts between the BLM and landowners led to further partnerships with the Natural Resources Conservation Service, Trout Unlimited, the U.S. Fish and Wildlife Service, the U.S. Forest Service and other organizations. Together they formed the Bonanza Stakeholders Group, which provides access to degraded lands and waters, as well as equipment and labor for restoration work. The Kerber Creek project has worked on the property of about 20 different landowners, covering 60 acres, or about a third of the land area impacted by mine pollution in the watershed. *—Caitlin Coleman*



The Resilient Rio Grande Basin

By Jayla Poppleton

Deep in southern Colorado, the nation's highest elevation major farm region is nestled between two mighty mountain ranges. Flanked for nearly 100 miles by the San Juans to the west and the Sangre de Cristos to the east, Colorado's San Luis Valley is ripe with contrasts as stark as that of the jagged 14,000-foot peaks that stretch upward from the flat valley floor resting between 6,000 and 7,000 feet below.

Here is a place where centuries-old irrigation practices mingle with the most advanced technologies in irrigation scheduling and design in the world; where a mere 15 hardy souls live in any given square mile, but the sense of community sparks like static in the air; where fiscal conservatives embrace traditionally liberal values of environmental stewardship; and where the ratio of Hispanic to Anglo and other residents is nearly 50-to-50 in most counties. Here is a place of crackling clear blue skies, where spring's combination of whipping winds and freshly plowed fields blows up so much dust, the panoramic scenery is blotted out entirely; a place accounting for nearly half a billion dollars of Colorado's agricultural economy, but which often relates more closely with New Mexico than the rest of the Rocky Mountain state, given its ties culturally, hydrologically and geographically with its neighbor to the south.

And then there's the water. The expansive 3,200 square-mile valley floor qualifies as a desert, receiving a paltry 7 to 8 inches of precipitation on average—half of Colorado's statewide average—each year. And yet, it manages to grow an abundance of crops—between 485,000 and 600,000 acres are under irrigation in any given season—and support more wetland habitat, at 200,000 acres, than anywhere else in the state.

John Fielder

The hidden lifeline supporting this apparent discrepancy lies beneath the loamy topsoil that has nurtured many a potato. That secret is groundwater, stored in two vast, underground aquifers layered one over the other, which have varying degrees of connectivity to each other and to wetlands and river systems at the surface.

The region's major artery, the Rio Grande, is modestly sized for a Colorado river, receiving runoff from the forested San Juans above—the mountains surrounding the valley can receive up to 50 inches of precipitation each year. That runoff, however, has been fully claimed since the early 1900s, and its use later restricted by legal obligations to downstream states under the Rio Grande Compact, established in 1938. What the valley lacked in access to surface flows in the past, it made up for with groundwater. But that's changing.

An Unsustainable Dynamic

At one time, the use of groundwater was more supplemental, withdrawn to finish a crop late in the season when streamflows fell off. But some well owners had no access to surface water at all. With rapid advances in both irrigation technology and the rate at which wells could draw water, the valley became a profit-turning checkerboard of crop circles fueled by its aquifers. In a merciless cycle, the more efficient irrigation methods became, the less water soaked into the ground to recharge the aquifers. Mother Nature did little to help; decades of drought accelerated already-falling water tables, which in turn proved to further diminish lackluster streamflows in the rivers—to the dismay of those whose surface water rights now often go unfulfilled. With less water in the rivers throughout the growing season, the valley continued—and continues today—to sip away at its most valuable resource.

No one knows exactly where the bottom is. It was once believed that more than 2 billion acre feet of groundwater lay beneath the valley floor, as much as would flow down the Rio Grande through Colorado over a 3,000-year span. Researchers today believe the aquifers never contained more than half that amount, and that much of what's there is either economically unrecoverable or too poor in quality to be useful. Although long-term data for much of the valley is lacking, where water levels have been closely monitored aquifer storage has dropped precipitously over the past decade. In short, the dynamic is no longer considered sustainable. Gone are the days when the valley's 6,000 wells can flow freely to sate the fields of barley, potatoes, alfalfa and grass hay, and vegetables that comprise the region's agricultural economy.

"There's just a puddle left down there of the bounty that was here," says George Whitten, whose family has ranched in the north part of the valley since the late 1800s. Whitten, who has served on the board of the Rio Grande Water Conservation District for more than 25

John Fielder

A small region in south-central Colorado gives rise to the nation's second-longest river: The Rio Grande flows 2,000 miles from its headwaters in Colorado's San Juan Mountains to its delta at the Gulf of Mexico. Containing all or part of six counties, Colorado's upper Rio Grande Basin is a diverse landscape of alpine tundra, forested slopes and windswept grass and shrublands. Bounded by two major mountain ranges, the basin cradles the high desert San Luis Valley, where a rich agricultural tradition persists largely due to once-plentiful groundwater resources.

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San Luis Valley wetlands are a critical stopover point for more than 35 species of migratory birds passing through the high desert, including 20,000 greater sandhill cranes that refuel there each spring and fall during their long migration. Source: U.S. Fish and Wildlife Service

The forested slopes and uplands of the basin are largely public lands, managed by the Bureau of Reclamation and U.S. Forest Service, while the valley is mostly private land. The valley is also known for watchable wildlife; many species rely on its extensive wetlands and protected areas. The largest towns are Alamosa, population 9,000, and Monte Vista, population 4,435.

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Kevin Moloney

Trust for Public Land

The northern third of the upper Rio Grande Basin is hydrologically disconnected from the southern portion at the surface. In this "closed basin," streams are birthed and die again without ever reaching the Rio Grande, although modeling has shown underground pathways between the closed basin's aquifers and the Rio Grande exist.

The Rio Grande Basin

Groundwater is held in two vast aquifers beneath much of the valley floor—a shallower unconfined aquifer, which fluctuates more readily along with surface conditions, and a deeper confined aquifer, which is trapped and pressurized in layers of clay. Approximately 6,000 high-capacity wells have been drilled to tap these two aquifers across the valley.

years and is its current president, supports efforts the local community is undertaking, under the district's oversight, to cut back on its use of groundwater while the aquifer recharges. He points to the large economic gains reaped from the land in the past: "You can't consume your resources and ignore things like organic matter or an aquifer for very long. I think you have to give something back."

Whitten knows a thing or two about giving back. For years, he voluntarily stopped pumping his own well, aware of the shrinking aquifer beneath his land and the impact of pumping on nearby surface streams. He got frugal and lived off his surface water, thinking that, by showing a measure of goodwill, he might influence others to do the same. His passion is for long-term sustainable agriculture, and he walks the talk. He mindfully grows specific crops in rotation with grazing, using his livestock to "heal the land" and return nutrients to the soil. He gets most excited talking about young farmers in the valley making headway in the realm of soil health, like-minded souls returning to a focus on smaller farms tended to with greater consciousness.

It's not only future-minded farmers and ranchers who now recognize solutions must be implemented lest the valley's soils dry up and blow away, but local water managers, conservationists and state and federal agencies as well—and a host of complementary efforts are underway. "A lot of this is being forced on people," says Whitten. "That's when change happens, when there's a crisis, and we're in a huge crisis."

A United Front

Unlike some regions in the state, the San Luis Valley doesn't have a lot to fall back on. According to the San Luis Valley Development Resources Group, agriculture accounts for at least one-third of the local economy. Oil and gas hasn't taken off here. And tourism exists only to a limited extent: The Great Sand Dunes National Park draws visitors, and several wildlife refuges offer unique opportunities for birders, while Penintente Canyon is a premier rock climbing spot. Wolf Creek Ski Area is popular locally and among powder hounds willing to travel, but there are no full-fledged ski resorts.

Nor is the valley facing a population boom or heavy municipal demands for water. Mike Gibson manages the San Luis Valley Water Conservancy District, which provides water that homeowners and industrial users can purchase to offset their well depletions. He says the valley is growing at less than 2 percent per year, and the Rio Grande Basin Roundtable he chairs does not expect meeting the needs of new residents will be an issue. It's those other water-dependent values, not only agriculture but also the rich environmental resources such as wetlands and migratory bird habitat, that the community is rallying to sustain.

When threatened, the valley's small community has been known to rally before. In the late 1980s, American Water Development, Inc. (AWDI) attempted to virtually mine, with more than 100 wells, 200,000 acre feet of water underlying the privately owned Baca Ranch—a remnant of the Luis Maria Baca land grant—to ship to the Front Range. The valley wouldn't have it. "Historically, the greatest thing that ever happened to the Rio Grande Water Conservation District was AWDI," says Whitten, who recalls a dramatic shift in the district board's view of its role in the valley. "That united the whole valley—ranchers, environmentalists and farmers—where we had an outside entity who was easy to fight and easy to hate."

The Rio Grande Water Conservation District sued AWDI, and ultimately won in court. However, AWDI was quickly followed by another effort, this time by a rancher named Gary Boyce together with Stockman's Water, to push a similar scheme through via the public vote in 1998. Again the community rallied, and referendums 15 and 16 were shot down by what was once the largest margin of defeat in the state's history, according to Karla Shriver, Rio Grande County Commissioner and long-time water resource advocate in the valley, who helped organize the opposition at that time. "It was amazing to see the 'barbed-wire network' across Colorado come alive to defeat them," she says.

The Baca Ranch was permanently closed to such development after The Nature Conservancy was brought on board to acquire the property. The nonprofit fronted around $30 million until Congress approved funds to flip the land from private to public ownership, tacking it on to the Great Sand Dunes National Monument and boosting the dunes to National Park status. The deal also created the Baca National Wildlife Refuge, the third such sanctuary in the valley.

Much earlier, the valley had faced another challenge to its ability to use water originating in its rivers. In 1938, Colorado signed the Rio Grande Compact with Texas and New Mexico, downstream states that share the river. The agreement stipulated how much Rio Grande and Conejos River water Colorado could use. By 1968, Colorado was enforcing water use restrictions. Then and now, irrigators, beginning with those last in line to receive water, have been cut off from diverting in order to ensure enough water crosses the state line. The compact plays an omnipresent role in water's administration in the basin. "The way water is administered here, the compact becomes the No. 1 priority on the river by default," explains Gibson.

LeRoy Salazar, the elder brother of both Colorado Commissioner of Agriculture John Salazar and former U.S. Secretary of the Interior Ken Salazar, grew up on a farm and ranch

Kevin Moloney

LeRoy Salazar, farmer and agricultural engineer, prepares a potato field for planting on leased land in Costilla County. Here he irrigates with surface water stored in Sanchez Reservoir, but on other family farmland in Conejos County, he expects to be impacted by cutbacks in well pumping.

originally settled by his great-grandfather in Conejos County and recalls that the compact affected them severely. "On the San Antonio River, even our junior water rights used to run 80 or 90 days a year. Once the compact became the calling water right, those same water rights became 35 to 40 day water rights," he says.

Salazar, whose parents raised eight children on part of a shared 160-acre homestead, witnessed other evolutions in the valley, including farm sizes growing to keep up with economies of scale. "You cannot raise a family on a small farm anymore, it's impossible," he says. Salazar farms the original homestead near Manassa, plus 1,600 acres of leased land. He worries about the future and his family's ability to continue to farm: "Agriculture has always been in our life and in our blood."

Though farming was always his first love, Salazar led a successful engineering career, founding Agro Engineering Company in 1982, which he later sold. The company continues to offer support to local farmers and ranchers for everything from irrigation systems and scheduling design to conservation tilling practices, soil fertility and crop selection. All of these practices have water-saving benefits, and are one more step in the direction of water sustainability.

Despite his concerns, Salazar remains hopeful about the valley's potential. Having consulted for farm communities all over Latin America, Bangladesh and India during his career, Salazar recognizes the San Luis Valley is fortunate to have farmers with both a fairly high level of education and a concern for the land and water resources. "Not only do they have the ability to run farms as a business," he says, "but we are also a community that has really become concerned about how we can make the best use of resources in every which way."

Conservation Network

The valley has a certain "culture of conservation," says Rio de la Vista, who came here in 1999 after being introduced to the valley's vast conservation potential and now serves as vice chair of the Rio Grande Basin Roundtable. "Because of the dryness and the harsher climate, it hadn't grown as fast as other areas in the state," she says. "It gives us a chance to protect some of the key areas before they become fragmented and transitioned to other uses."

De la Vista works with the Rio Grande Headwaters Land Trust (RiGHT), whose founders saw land protection as a mechanism to also protect the valley's water. RiGHT's work is part of a larger network of conservation groups including Ducks Unlimited, Colorado Cattleman's Agricultural Land Trust, The Nature Conservancy, Colorado Open Lands and the Trust for Public Land, plus state and federal agencies such as the U.S. Fish and Wildlife Service, which have collectively protected 340,000 acres across the valley through conservation easements. By preserving working ranches, particularly along the river corridor, the organizations conserve not only important wetlands and wildlife habitat, but also the water rights associated with that land.

The work of keeping wetlands wet could have additional, far-reaching benefits. After the 2002 drought, a few years of decent snowpack didn't manifest in the increased streamflows people expected, says de la Vista. "If you dry up a sponge, you can't really get water through it again until it gets wet. The forest/land was so dry, nature took the first drink," she explains. "We don't know what the critical mass is, we haven't done the engineering, but if we lost too much of the wetlands, it would be like a permanent manmade drought. It's harder to move water down the river to meet compact obligations if the river corridor wetlands are dry."

De la Vista is pursuing a similar concept outside of her work with RiGHT, looking at ranch—and range—management techniques such as rotational grazing that could lead to improved water absorption. The idea is that if the water-holding capacity of the land could be improved, it would act as a reservoir, slowing snowmelt's path across the mountains and down to the river and making the water available over a longer period of time. "It's something we can do. We can't make it rain more, but we can affect the condition of our land," she says.

The questions inherent in these uncertain times keep coming: Will Mother Nature ease the relentless drought that has plagued the San Luis Valley? Will the region's agricultural community weather the coming years as it rebalances its groundwater use, learning to live within its means?

In this place of contradictions, families with long histories on the land are now poised for change. And even as water managers race the clock to implement solutions, time can stand still for a moment as the valley's heart—its land, water and wildlife—prevails. "When you see the cranes that have been coming through here for thousands of years, it brings you back to Earth," says Gibson, "All the things you worry about in the big scheme of things seem smaller. It becomes very grounding." ❑

Jayla Ryan Poppleton is the editor of Headwaters *magazine.*

Take the Next Step

Find out about drought and the unique microclimates affecting different regions around Colorado at the Colorado Climate Center: ccc.atmos.colostate.edu.

John Fielder

The Rio Grande Compact

By Caitlin Coleman

The Rio Grande flows 200 miles from southern Colorado's high country before crossing into New Mexico, Texas, and Mexico—finally releasing into the Gulf of Mexico. Like all rivers that originate in-state, Colorado must share the Rio Grande's waters with its downstream neighbors. In the San Luis Valley, the 75-year-old Rio Grande Compact governs all things water.

"The ultimate goal is to keep our depletion of the river the same as it was in the 1920s and 1930s," says Craig Cotten, division engineer for Colorado's Water Division 3, which administers water in the upper Rio Grande Basin.

Around the turn of the 20th century, irrigators in the San Luis Valley diverted much of the Rio Grande's flow, worrying downstream states. From 1927 to 1936 engineers studied the river's flows and uses; when it was signed in 1938, the compact adopted the results of those studies to fairly allocate the river between the three states.

Today, the compact dictates how much water Colorado must send across the New Mexico border from both the Conejos River and Rio Grande mainstem. Depending on the year's flows, Colorado must send between 35 percent and 70 percent of the rivers' water downstream. The percentage increases on a sliding scale in correlation with the rivers' flows. Although the Conejos is a tributary of the Rio Grande, Colorado measures and delivers water from these two streams separately.

During the 1950s and 1960s, Colorado ignored the compact, using water freely and accruing more than 900,000 acre feet in water debt. In 1966, New Mexico and Texas sued Colorado, and in 1968, the U.S. Supreme Court ordered Colorado to meet its compact obligations each year and repay the debt over time.

After the ruling, Colorado's Division of Water Resources began curtailing use for the first time in the San Luis Valley; irrigation ditches were closed so water would flow to the border. In 1985, the Rio Grande carried enough water to fill and spill Elephant Butte Reservoir in New Mexico, which, under the compact, allows Colorado to use as much water as it wants to—and clears Colorado's debt. The 1985 spill wiped away about 500,000 acre feet of water debt. "It was a very good thing," Cotten says.

Now Colorado remains vigilant to abide by its compact obligations. Each spring, the Division of Water Resources uses snowpack and streamflow forecasts to predict how much water will be in the rivers

The Conejos River (right) joins the Rio Grande on the 3,200-acre Cross Arrow Ranch southeast of Alamosa.

Take the Next Step

Get the backstory and dive into the details of Colorado's various water-sharing agreements with other states in CFWE's Citizen's Guide to Interstate Water Compacts. *Find it at yourwatercolorado.org.*

that year—and how much will need to be sent downstream. As summer wanes and flows actualize, Colorado adjusts its curtailment to meet its obligation without sending too much water to New Mexico.

Flows are so tenuous that this watchful approach to administration is necessary, yet it hasn't kept Colorado out of conflict. Today, three potential legal battles loom, each aggravated by drought.

When Colorado sends more water downstream than it is required to, that water can be stored in Elephant Butte Reservoir and credited to Colorado to offset future under-deliveries. Having credit water in Elephant Butte also allows Colorado the possibility to store water in Rio Grande Basin reservoirs that post-date the compact. In 2011, Texas faced drought conditions, and the Bureau of Reclamation, which manages Elephant Butte, sent Colorado and New Mexico's credit water down to Texas during the heat of summer, replacing it in the fall. "They paid back the water they took, but allowed Texas to use our credit water without us getting any benefit of that—any benefit of us being able to store more water up here," Cotten says. The same was true for New Mexico. New Mexico sued, and Colorado filed briefs agreeing with New Mexico's position. The case is now in the New Mexico Federal District Court.

Texas filed a separate suit against New Mexico in January 2013 for alleged compact violations, arguing that New Mexico's failure to regulate well pumping south of Elephant Butte Reservoir deprives Texans of water they would otherwise receive. "They don't have any direct claims against Colorado," Cotten says. Still, Colorado is preparing for a potential lawsuit to protect its allocation.

The most recent threat to Colorado's compact apportionment also came in January 2013, when the U.S. Fish and Wildlife Service (USFWS) designated critical habitat for the endangered southwestern willow flycatcher along the Rio Grande and Conejos River in Colorado, along with an area surrounding the upper part of Elephant Butte in New Mexico. The USFWS could use the designation to require the delivery of more water downstream, beyond what is required under the compact.

Though the compact can feel burdensome, it gives the state certainty in the amount of water it can use. "We believe we are protected by the compact, and we will follow the compact," Cotten says. "It has, in general, worked fairly well for the last 75 years." ❑

Aquifers in

Western History Collection, Denver Public Library

Kevin Moloney (2)

An 863-foot deep artesian well tapped by the Alamosa Water Works in October 1911 discharged 13,320 gallons per hour (left) with J. A. Pfeifer, well constructor, thought to be standing alongside. Fast forward to 2013 and Steve Vandiver (right), general manager of the Rio Grande Water Conservation District, examines the Mumm Well, an artesian water source used to seasonally recharge wetlands on the Alamosa National Wildlife Refuge. Valley-wide, groundwater isn't as plentiful as it once was, and Vandiver is overseeing efforts to cut back on pumping.

Dan Downing

Free Fall

The San Luis Valley's Race to Rebalance its Overdrawn Groundwater Supply

By Jerd Smith

Workers inspect freshly cut seed potatoes before planting near Center.

Early on a March morning, high above the floor of the San Luis Valley, pale blue skies are just gaining light and the glamorous white peaks of the Sangre de Cristo and San Juan mountains form an elegant, fluted rim around the top of one of Colorado's most productive farm regions.

Far below on the flats, it is a typical, early spring workday. Farm trucks roll up and down Highway 160 between Monte Vista and Alamosa, gas stations and seed stores open for business, and dozens of potato warehouse workers report for duty. This is big farm country, where the hard work of cultivating potatoes, barley, alfalfa, carrots and lettuce is done by people whose hands are rough and who wear uniforms of insulated coveralls and heavy work boots.

Rich in culture, this closely knit community of 50,000 people is locked in a fierce internal struggle over how to save itself from a historic water crisis. If left unresolved, the crisis could force state regulators to shut down hundreds of irrigation wells, crippling the valley's robust farm economy.

At issue is an aquifer so stressed by overuse and chronic drought that it is in a virtual free fall. Since local water managers started monitoring in 1976, groundwater storage has dropped 1.2 million acre feet in the unconfined aquifer of the valley's closed basin region. Some irrigation wells are so hampered by the aquifer's decline that they can no longer pump, many surface water users with senior rights are being short-changed, and high commodity prices are making it difficult to convince people who still have adequate water to cut back their water use. "It really is a perfect storm," says Steve Vandiver, general manager of the Rio Grande Water Conservation District, the local water agency that monitors groundwater levels and is now charged with raising them.

Similar crises have played out in Colorado's South Platte Basin, on the Front Range, as well as the Arkansas Basin, in southeastern Colorado. In those instances, the state ultimately did shut down wells because the pumping was reducing surface flows in the rivers that others relied on. Thousands of acres of farmland are now dry.

Guardians of the San Luis Valley—including ranchers and farmers whose families have been here since the 1850s—are racing to keep that from happening here. Working from a plan first conceived by local potato farmer and water leader Ray Wright before his death in 2010, the local water community has developed an innovative framework of self-governance, including levying assessments on irrigated land, imposing fees to pump wells and providing payments to fallow ground. But after nearly 10 years of legal and regulatory battles, much of the hard work needed to bring the aquifer back into balance has yet to occur.

And time is short. In 2004, the state legislature directed the State Engineer's Office to regulate San Luis Valley groundwater use in such a way as to maintain a sustainable water supply while protecting senior surface water users. State Engineer Dick Wolfe in turn has given the Rio Grande Water Conservation District until 2032 to stabilize the unconfined aquifer in the most heavily-impacted area, meaning the amount of water flowing in equals the amount leaving. The district must also implement annual water replacement plans to offset impacts of well pumping to senior surface water rights.

After one year of implementing the first of six planned groundwater management subdistricts, there has been no physical improvement in the unconfined aquifer. Most believe the state will intervene and start shutting down wells if progress isn't shown within the next three years, according to Vandiver. In the meantime, up to two additional subdistricts with their own groundwater management plans are being evaluated outside of the Rio Grande Water Conservation District's boundaries, and Wolfe is developing pumping rules and regulations to have at-the-ready if any subdistrict plan is unsuccessful at protecting surface water users with senior rights.

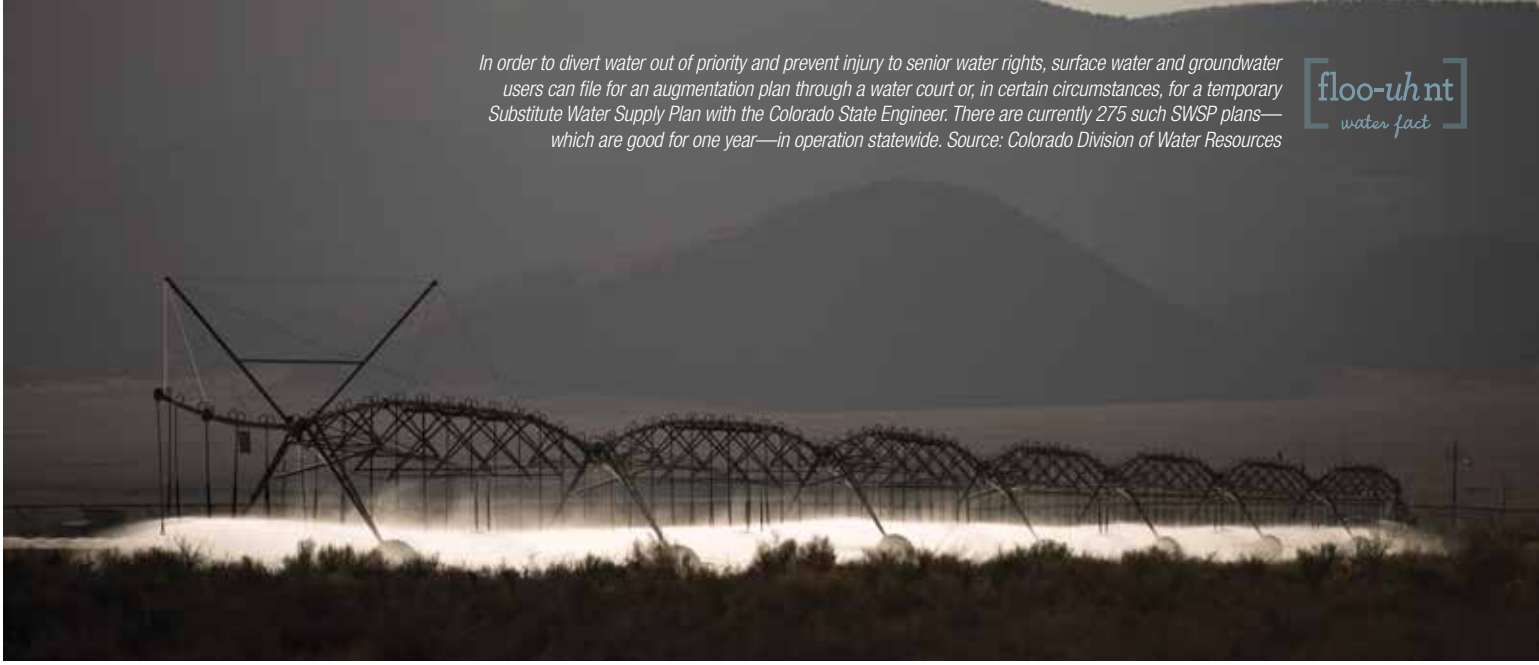
Everywhere people are worried and impatient. "We should have been trying to get the aquifer into balance all along," says James Ehrlich, executive director of the Monte Vista-based Colorado Potato Administrative Committee. "But it's not as simple as it seems."

Aquifers in Decline

Behind the court cases and regulatory delays is a complex set of hydrologic and geologic formations that scientists have spent years working to analyze and document. These include a pair of stacked underground aquifers, which serve as the primary source of water for the highest value crops: potatoes, barley and alfalfa.

The San Luis Valley is one of the highest altitude agricultural regions in the world—*the* highest in the United States. Semi-arid, with just 7 to 8 inches of average precipitation annually on the valley floor, it is dependent on snowpack from the surrounding mountains for river flows. Its cool nights and dry climate minimize disease and pests—and make it an ideal growing region.

By the early 1900s, however, all available surface water in the valley was claimed, first by Hispanic, and later European, settlers, who battled the Ute Indians for a chance to farm along the banks of the region's rivers starting in the 1850s. Though little was known then about the unique hydrologic formations that lay beneath the fields, farmers had springs that literally bubbled to the surface. When the Dust Bowl struck in the 1930s, they began drilling wells to tap those artesian springs.



floo-uh nt
water fact

In order to divert water out of priority and prevent injury to senior water rights, surface water and groundwater users can file for an augmentation plan through a water court or, in certain circumstances, for a temporary Substitute Water Supply Plan with the Colorado State Engineer. There are currently 275 such SWSP plans—which are good for one year—in operation statewide. Source: Colorado Division of Water Resources

The San Luis Valley began a large-scale transition from flood irrigation to center pivot sprinkers in the 1950s—and became increasingly dependent on groundwater in the process.

As hydrological science advanced in the mid-1900s, engineers and state water regulators came to understand that a second "confined" aquifer lay below the upper water formation. A layer of clay separates the two aquifers, and wells were drilled into the confined aquifer as well. The connection between the two aquifers is still not well understood, although it's believed that the confined aquifer recharges itself at a much slower rate than its upstairs neighbor. Some, but not all, of the water pumped from these aquifers is tributary to nearby surface streams and must be replenished to keep senior surface water users from being harmed. But the relationship between pumping and depletions to the river is not one-to-one and remains much less clear than in places such as the South Platte and Arkansas basins.

The region's unique hydrology doesn't end there. The valley is also home to a large "closed basin," a sprawling, fertile area where the Rio Grande and its tributaries deliver water each year through ditches, but from which no water returns to the river farther downstream, as it does in almost every other river system in the state. Those return flows are critical to downstream users. To keep senior water right users in the lower valley from being harmed, and to ensure Colorado could meet its obligations to New Mexico and Texas under the Rio Grande Compact of 1938, the U.S. Bureau of Reclamation spent much of the 1980s and '90s building the Closed Basin Project. It consists of a series of well fields that pump water from the closed basin into a set of canal systems, creating artificial return flows to the Rio Grande. The project continues today, moving an average of 17,000 acre feet out of the closed basin into the Rio Grande each year to partially replace depletions in the river.

From the 1930s through the 1970s, encouraged by the state and the seemingly endless supply of groundwater, farmers and ranchers drilled nearly 6,000 wells in the valley, helping create the third largest potato-growing region in the nation, and hearty barley, alfalfa and lettuce crops as well. Of those, 3,400 were drilled into the unconfined aquifer within the closed basin. "The State Engineer allowed people to drill wells whether they had surface [water] rights or not," says Colorado Agriculture Commissioner John Salazar, a valley native. "That was a huge mistake, but at the same time it provided a huge economic benefit to the valley."

With up to 600,000 acres of irrigated land, the valley now has nearly the same number of active irrigation wells—about 4,500—as the much larger South Platte Basin, which has 900,000 acres of irrigated land and over 5,000 active wells. The South Platte boasts the state's largest agricultural economy, with a market value of $3.2 billion, while the San Luis Valley's is approximately $475 million, according to Tom Lipetzky, director of marketing programs at the Colorado Department of Agriculture.

In 1972, the state sharply curtailed drilling of new wells in the confined aquifer and the alluvial aquifers in the valley, and in 1976 the Rio Grande Water Conservation District began formally monitoring groundwater levels. In 1981, a moratorium was placed on drilling wells in the unconfined aquifer of the closed basin area as well.

By the 1970s, the practice of recharging the unconfined aquifer using surface water supplies from the river had also expanded, with irrigators filling large holding ponds where water could slowly seep underground to supply their wells. Thanks to abundant snowfall throughout the 1980s and 1990s, the aquifer, though lower, continued to function as a renewable water supply. That peaceful period ended abruptly in 2002 when a record-breaking drought struck, robbing the Rio Grande and its tributaries of the plentiful water that Mother Nature and the irrigators had used to keep the aquifer balanced. In less than 18 months, groundwater levels plummeted 650,000 acre feet, a shocking change no one had ever witnessed. Less dramatic declines began again in 2010, accelerating in 2011 and 2012 for a total loss of another 450,000 acre feet. "It just fell out from underneath us," Vandiver says.

The fragility of the aquifer was plain to see. Still high levels of pumping continued so that farmers could continue to cultivate, despite the drought.

Race to Recharge

Unlike the South Platte and the Arkansas basins, the San Luis Valley is almost totally reliant on agriculture for jobs and income. The valley is one of the poorest regions in Colorado, with per capita income of $18,396, well below the state average of $30,151. Farmers who can make $126,000 per quarter section growing barley for MillerCoors cannot afford to accept, say, $28,000 for a season of fallowing that land. For potato growers, that margin leaps upward; in a good year, they can make as much as $500,000 on a quarter section, which is 160 acres. "It's easy for me to sit back and say this guy should pump less water, but he has to make a living," says Ehrlich. "And not everyone is in a situation where they can afford to pump less water."

And yet, they may have to. In 2012, the initial phase of the Rio Grande Water Conservation District's first subdistrict groundwater management plan was put into action. Subdistrict No. 1, which encompasses 179,000 acres in the closed basin, spent $1.2 million to buy 5,006 acre feet of stored surface water that was released into the river to offset well pumping. It also convinced its members to fallow 8,400 acres of land and reduce pumping by 20 percent. Despite

Continued on page 26

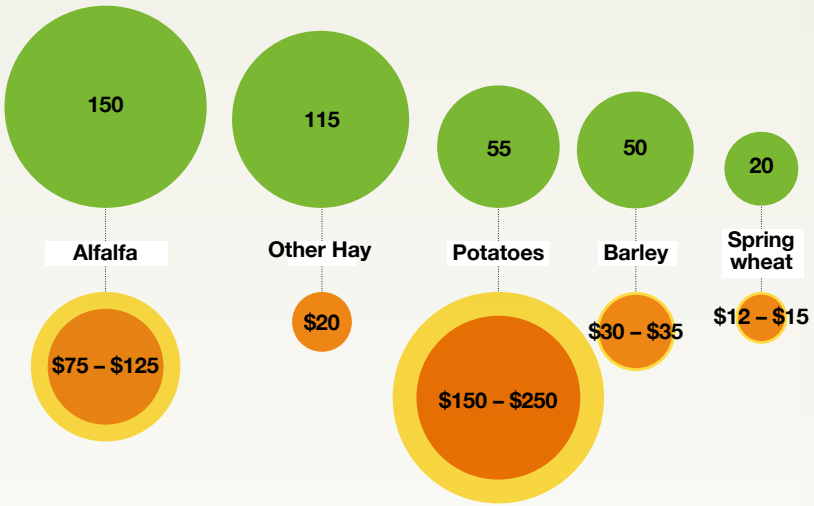
The San Luis Valley's Shrinking Aquifers

Groundwater in Colorado's San Luis Valley once bubbled to the surface, but since 2002, aquifer levels have fallen significantly. Drought and overuse have created a tremendous imbalance between groundwater recharge and withdrawal, and the social, economic and environmental implications are worrisome. The valley has a state-mandated goal to recharge and balance its aquifers—the deadline is 2032 in Subdistrict No. 1.

MAJOR CROPS CULTIVATED IN THE SAN LUIS VALLEY

Up to 600,000 irrigated acres support a $475 million ag economy; groundwater dominates as a water source, especially during drought.

Crops cultivated, in thousands of acres in 2010, and the crop's approximate value in 2010, in millions



Additional crops: Lettuce, spinach and carrots. Irrigated meadows on ranches are not included.

FARMERS' ALTERNATIVES

Groundwater management subdistricts will levy assessments on well users who keep pumping in exchange for providing services to restore the aquifers and offset depletions to nearby streams. Irrigators will face tough financial decisions.

Growers could keep planting and pay:

$75 per acre foot of water withdrawn from wells

$7 per acre of ground planted

Planting could lead to earnings of:

$785 per acre growing barley

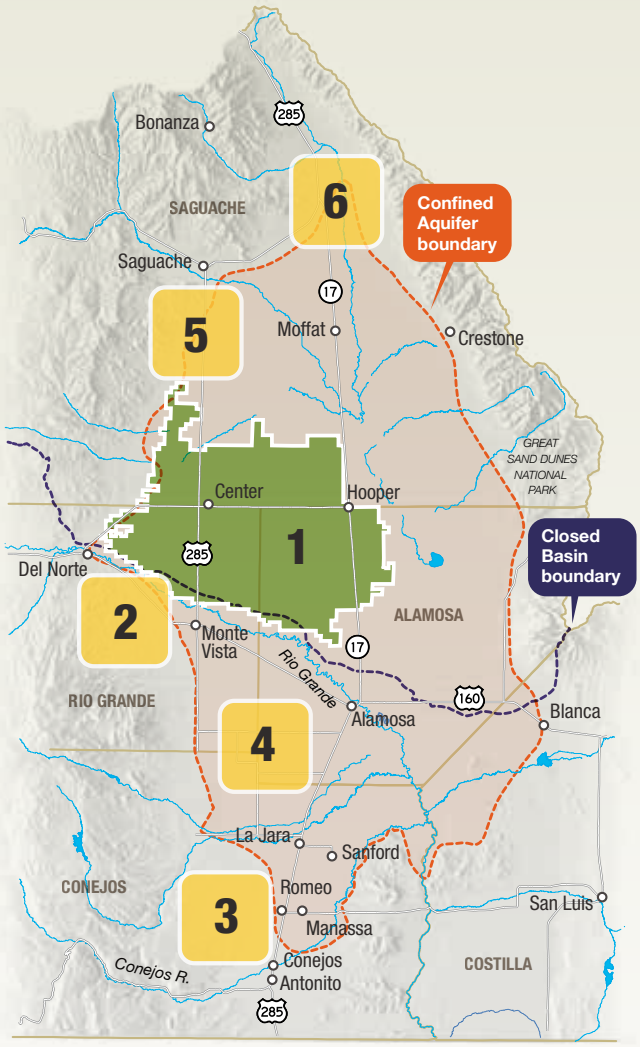
$3,125 per acre growing potatoes

Growers could forgo planting and accept incentive payments up to:

$175 per acre from Conservation Resource Enhancement Program

$150-$300 per acre from subdistrict bonuses

Note: Average estimated water application across all crop types in Subdistrict No. 1 is 2 acre feet per acre.



SUBDISTRICTING THE SAN LUIS VALLEY

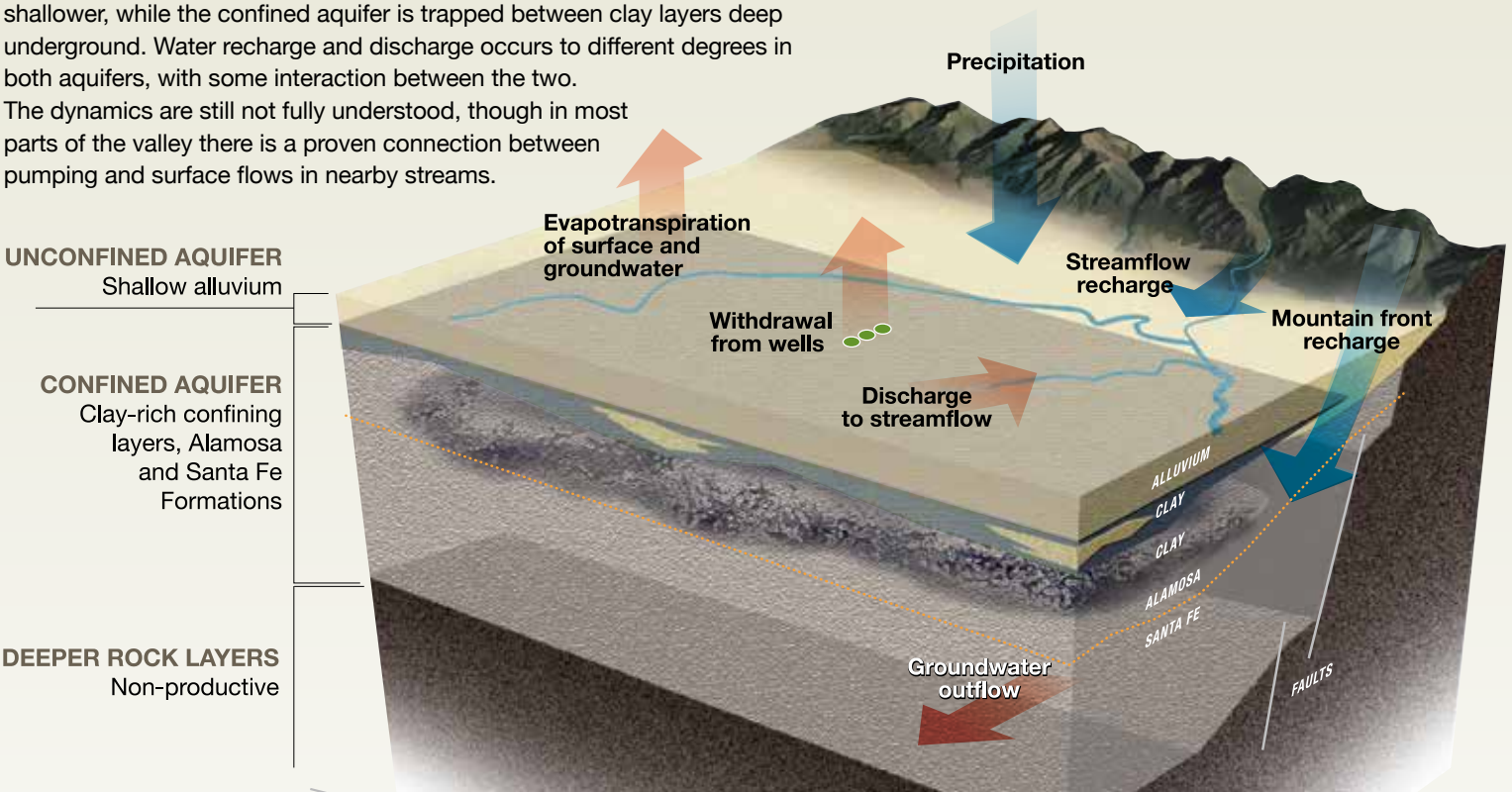
The first groundwater management subdistrict of the Rio Grande Water Conservation District came on-line in 2012. Subdistrict No. 1 is in the most heavily affected area, where the unconfined aquifer has fallen by as much as 30 feet since 2000. Five more subdistricts are slated for the valley, under the district's oversight.

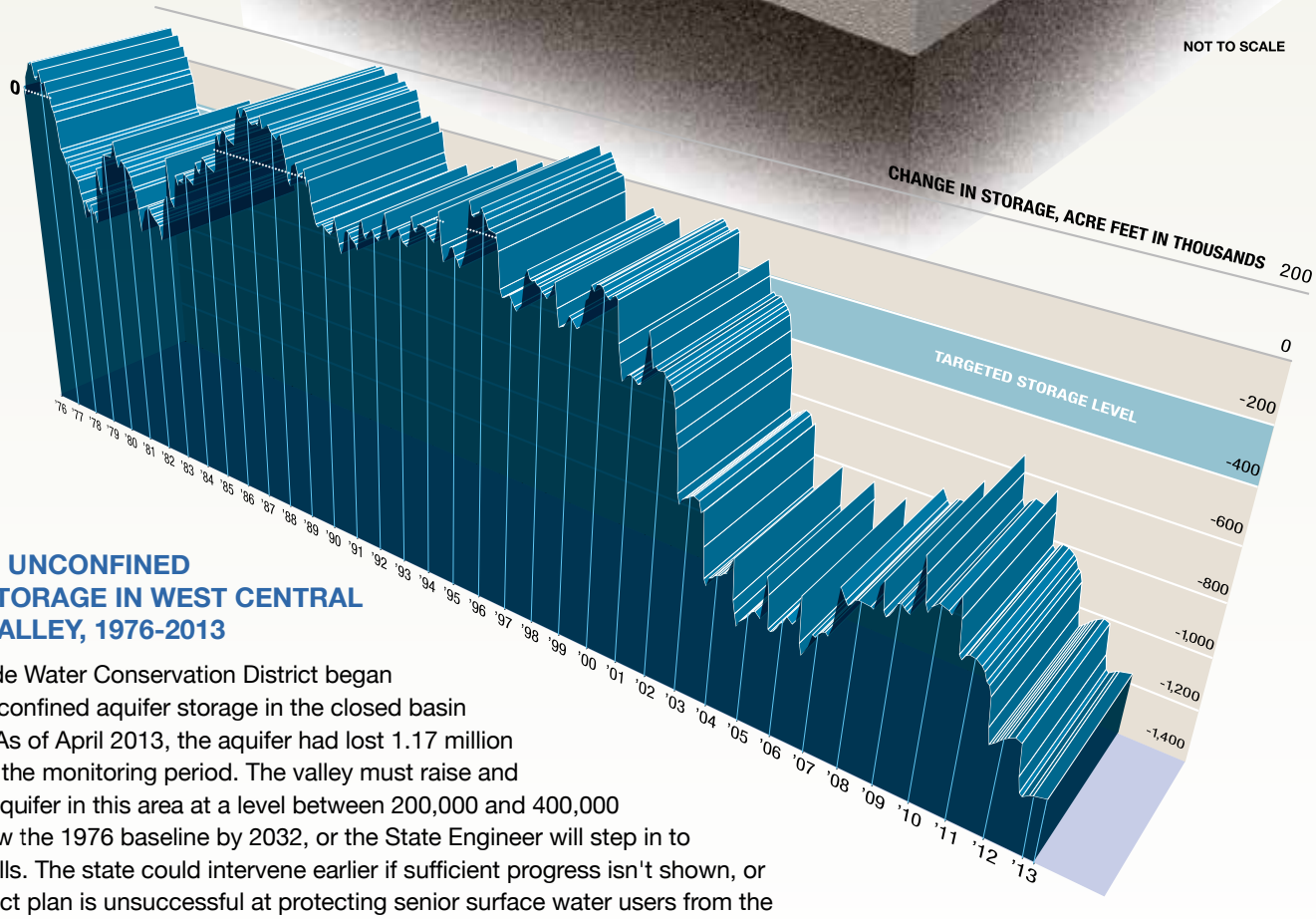
SUBDISTRICT		NUMBER OF WELLS
1	Closed Basin	3,395
2	Alluvial	230
3	Conejos River	140
4	Alamosa/La Jara	400
5	Saguache Creek	190
6	San Luis Creek	110

Note: Additional subdistricts are being considered.

SAN LUIS VALLEY AQUIFER DYNAMICS

Two stacked aquifers lie beneath the valley floor. The unconfined aquifer is much shallower, while the confined aquifer is trapped between clay layers deep underground. Water recharge and discharge occurs to different degrees in both aquifers, with some interaction between the two. The dynamics are still not fully understood, though in most parts of the valley there is a proven connection between pumping and surface flows in nearby streams.





CHANGE IN UNCONFINED AQUIFER STORAGE IN WEST CENTRAL SAN LUIS VALLEY, 1976-2013

The Rio Grande Water Conservation District began monitoring unconfined aquifer storage in the closed basin area in 1976. As of April 2013, the aquifer had lost 1.17 million acre feet over the monitoring period. The valley must raise and maintain the aquifer in this area at a level between 200,000 and 400,000 acre feet below the 1976 baseline by 2032, or the State Engineer will step in to shut down wells. The state could intervene earlier if sufficient progress isn't shown, or if the subdistrict plan is unsuccessful at protecting senior surface water users from the impacts of well pumping.

SOURCES: Rio Grande Water Conservation District; U.S. Department of Agriculture; Colorado Division of Water Resources; Davis Engineering Service, Inc.; HRS Water Consultants, Inc.

Illustrations by Charles Chamberlin

Valley native Doug Messick works on a temperamental center pivot sprinkler on the 4,000-acre Spud Grower Farms near Center, where he has been farm manager for 18 years.

those efforts, the aquifer fell another 123,000 acre feet.

Drought isn't the only problem. Court battles have also delayed the subdistricts repeatedly, with one case reaching the Colorado Supreme Court in 2011. While most objectors to the subdistrict plan are now reconciled to the need for it, a small group of farmers, led by long-time valley resident Kelly Sowards, continue to challenge the subdistricts in court.

Sowards, who lives and farms in Manassa, leads a group known as the San Antonio, Los Pinos and Conejos River Acequia Preservation Association. They recently asked the court to throw out a key part of the Rio Grande Water Conservation District's "Plan of Water Management," which calls for a portion of the Closed Basin Project water to be reallocated and used to augment three reaches of the Rio Grande so farmers in Subdistrict No. 1 can continue to pump. But Sowards is adamant that the reallocation of that water violates the law and will continue to harm his surface water rights, which date to 1855.

The court decided in favor of the subdistrict on April 11, 2013, finding it appropriate to use Closed Basin Project water for replacing well depletions. If Sowards' group had been successful in court, Vandiver says it would have derailed the subdistricts again because they would have been forced to find and purchase new—and extremely scarce—surface water in the basin. Still, Sowards says he and his fellow farmers in the south part of the valley feel they have no choice but to fight on. "A lot of folks don't want much to do with me anymore," he says. "And I'm sorry about that. I'm not a devil, but I want fair play."

Also holding the subdistricts back are updates to a crucial groundwater model—needed to accurately calculate how much water must be repaid to the river to offset pumping from the aquifer each year—which are not yet complete. In the meantime, roughly half the wells in the valley can't be regulated, delaying the formation of the remaining five subdistricts and hampering efforts to engage farmers valley-wide in the effort to save the aquifers.

Mike Sullivan, deputy state engineer of the Colorado Division of Water Resources, is overseeing work on the model. He says the state has been diligent, but it has been slowed by the complex hydrology, the court cases, and the need for better data. State regulators had forced irrigators to begin metering all the wells in the valley in 2007, measuring the water withdrawn. "In Subdistrict No. 1, we had lots of science and lots of measurements. We looked at the numbers and compared them with our model, and the numbers made sense. They matched the meter readings," Sullivan explains.

Though the numbers calculated by the model for Subdistrict No. 1 matched the meter readings, they didn't line up as well in other parts of the valley. The state went back to work, gathering more data and revising the modeling tool. Sullivan's staff reviewed every satellite photo available from the past 25 years to estimate what the consumption would have been on each parcel. "We did not want to hand somebody an estimate that they were pumping 30,000 acre feet of water when the metering showed they were actually pumping 20,000 acre feet," Sullivan says. "We've spent time trying to get the numbers right, both for pumping and the depletions that need to be replaced. I think we're close." The state anticipates delivering the model runs in June 2013.

Sam Vance, vice president of Conejos County Water Conservancy District, is among dozens of people who are anxious to see what the model will tell the growers. Vance's land lies in what will become Subdistrict No. 3 in Conejos County. He says most of his district's issues with the new management approach have been resolved, but it's been difficult. "The problem is that as we start to develop technology, people get jealous and they think someone else is getting a better deal," Vance says.

Across the valley, there are large variations in the water levels in the aquifer, and it's become clear that some farmers will have enough water to continue farming while others will have to cut back dramatically. It all depends on location, whether they have surface water rights to offset their pumping, and what the modeling ultimately shows about connections between surface flows and groundwater. "Our position is that we support the science that develops through the model," says Vance. "If the impacts [to the river] are coming through the wells, and some of it is, then we are going to have to deal with that. I'm not minimizing anyone's injury. But at the end of the day, we have to let the science dictate what's going to happen, and we have to be as fair as we can be."

Enduring Economically

The U.S. Department of Agriculture has approved $120 million to help pay farmers in Subdistrict No. 1 to stop planting through a program known as the Conservation Resource Enhancement Program (CREP). The goal is to idle at least 40,000 acres of land in Subdistrict No. 1. Elsewhere across the valley, Vandiver expects an additional 40,000 acres to be fallowed, but that number may vary as pumping effects on various streams are further evaluated.

To gain historical perspective on the Rio Grande's current challenges, view an interactive timeline tracing settlement, water development and legal actions that continue to play out today. For this web extra, visit yourwatercolorado.org.

Take the Next Step

John Salazar, along with his brother LeRoy Salazar, who farms, is a long-standing rancher in the southern part of the valley. He has worked closely with the U.S. Department of Agriculture to get the CREP plan authorized, though the Salazar family lands lie far south of the areas where the CREP program will be implemented.

According to Salazar, the CREP program will help farmers who choose to transition out of farming by providing annual payments of $175 per acre over a 10- to 15-year period. Subdistrict No. 1 may offer additional bonus payments for CREP sign-up in specific areas. Whether enough farmers will choose to participate, given strong commodity prices, isn't clear yet. "We have severe concerns," Salazar says, "but this allows us an opportunity to turn this thing around."

Salazar and others also believe that the valley can shrink its agricultural economy and survive, in part by transitioning land to other uses, such as the huge solar power developments that are now underway. The valley already is home to three large-scale solar projects, and another is in the planning stages. According to the San Luis Valley Development Resources Group, an organization working to oversee economic development in the valley's 18 communities, the latest solar project, SolarReserve, would replace a 6,200-acre farm that consumed about 6,300 acre feet of water per year with an energy project that will consume about 150 acre feet of water per year. The project will also provide 250 to 600 construction jobs over a 30-month period and create 50 permanent jobs when it is complete.

Michael Wisdom, executive director of the San Luis Valley Development Resources Group, is working with the state to understand exactly how much damage to local incomes and the tax base will occur as the farm economy changes. Roughly 21 percent of the 22,118 jobs in the valley, nearly 4,650, are directly tied to agriculture, according to the resources group.

Wisdom is optimistic the rising demand for food worldwide will help boost commodity prices and that the valley will prevail in protecting the lion's share of its farms. "Some are worried about smaller water; some are worried about the next steps they're going to take to stay on the farm," Wisdom says. "I believe the focus and culture of agriculture will still be here in 20 years."

Many are also hopeful that a new drip irrigation pilot program, funded in part by the state's Water Supply Reserve Account and the valley's potato growers, could reduce the amount of water needed to grow high value crops by as much as 25 to 30 percent. "They do this all over the world," Ehrlich says. "We just have to see if it is economical here."

In the meantime, back out on the flats of the valley, farmers are girding for another dry year. Doug Messick was born in the valley on a potato farm near Center, and he now manages a significant operation for another company. Messick is one of the farmers who went door-to-door back in 2006, talking to friends and neighbors about the need to create the first subdistrict and gathering the signatures required for the courts to approve the plan. Six years later, though, the aquifers are still struggling, and as Messick drives his fields in the morning, he sees clearly which growers still have access to water and which do not. "A lot of the people out here are only farming half their ground now," he says. And more and more fields in the valley have taken on a look of desolation.

"It just doesn't look as prosperous as it once did. Over there," Messick says, gesturing toward one set of well-tended fields, "it's the Holy Land…those folks still have access to groundwater and they have good surface supplies, but over there," he says, gesturing toward abandoned fields covered in scrub growth known as chico, "It's the Little Sahara." ❑

Take the Next Step

Tap into Colorado's Decision Support System database to view hydrologic data from around the state and download modeling tools that demonstrate interrelationships between water sources and use: cdss.state.co.us.

Water in the Bank

Richard Stenzel

Platoro Reservoir was built on the Conejos River starting in 1949.

With water storage becoming more critical than ever, Colorado's Rio Grande Basin moves to capitalize on existing reservoirs

By Caitlin Coleman

Bruce Bagwell saunters into the Conejos Water Conservancy District office, housed in an old bank on Manassa's Main Street. Bagwell casually nods hello to Nathan Coombs, who is busy at work, and pulls up a chair; he's here to visit.

"Right now, I'm working up the ambition to start a fire," Bagwell says. It sounds like an expression, but isn't. Bagwell is a ditch rider, hired by the Manassa Land and Irrigation Company to maintain its irrigation channel and check on the headgates that allow water to flow, or not flow, off the ditch and onto private land. During irrigation season he drives up and down the Manassa system nearly all day long. In late March, Bagwell clears debris that filled the ditch over the winter, sometimes by burning it, to prepare for water to start flowing come April.

Coombs and Bagwell talk and laugh like old friends but both get more than good company from the visit—it's about the water. The Conejos Water Conservancy District manages Platoro Reservoir, which can store nearly 60,000 acre feet of water to irrigate 100,000 acres of land. Much of the water that flows in the Manassa and other ditches along the Conejos, or beyond those ditches to reach the Rio Grande and flow out of state, is delivered from the reservoir.

Coombs must release the right amount of water from Platoro Reservoir each day to meet the rights of downstream users. He and Bagwell have installed automatic headgates along the Manassa and will soon do the same elsewhere in the Conejos system. The new headgates help ensure each user is drawing precisely the right allocation of water. According to the Colorado Water Conservation Board, water in the Rio Grande Basin is over-allocated and has been since the 1890s, plus most water here is subject to the terms of the Rio Grande Compact—not a drop should go to waste. If one person draws too much, another suffers.

Chatting with ditch riders like Bagwell helps Coombs groundtruth, or compare, the remote readings he gets from those headgates against actual measurements from along the ditch. "If this place is all on the same page, it simplifies everybody's life," Coombs says. As with most reservoirs, "this place" begins at Platoro, but the reservoir manager's job extends downstream. "You do the best you can do for all the water rights," Coombs says.

Colorado's Rio Grande Basin has 13 major reservoirs, totaling nearly 350,000 acre feet of water storage potential—a quarter of what's available in the mainstem Colorado River Basin's reservoirs and significantly less than most other basins in the state. Yet, the Rio Grande Basin is intent on capitalizing on that storage to the greatest degree possible, as evidenced by recent, large investments made in reservoir upgrades and repairs. The basin has applied for, and received, more state funding through the statewide Water Supply Reserve Account than any other region in Colorado, according to Greg Johnson of the Colorado Water Conservation Board's Water Supply Planning section.

In the arid San Luis Valley, investment in a reservoir is an investment in the future. Impacted by persistent drought conditions and a runoff period coming three weeks earlier than it has historically, the importance of banking water for use throughout the year has never been more apparent.

Rethinking Limited Storage

The shortage of reservoir storage in the valley ties to the Rio Grande Compact, which allocates the river between Colorado, New Mexico, Texas and Mexico. The need for the compact arose when San Luis Valley water users built irrigation ditches and canals in the late 1800s—river flows declined and downstream users blamed Colorado. In 1896, the Secretary of the Interior embargoed additional reservoir development on federal lands along the Rio Grande in Colorado.

"We got shut out on any reservoir development from 1896 to 1907," says Travis Smith, superintendent of the San Luis Valley Irrigation District and the Rio Grande's representative on the Colorado Water Conservation Board. "1907 was a significant date. The federal embargo was lifted and you have this huge effort of reservoir development in the valley."

Disputes continued and additional embargoes were placed on the Rio Grande until the compact was signed in 1938. Reservoirs installed after that date must now meet certain conditions—which are more difficult to meet during drought periods—before storing water.

Between replacing aging infrastructure and creatively meeting a multitude of needs through new operating schemes, opportunistic planning is helping the region take advantage of what limited storage it has.

"We have to do some innovative thinking to utilize the capacity of our reservoirs," says Rod Reinhardt, former president of the Terrace Irrigation Company board and manager of Terrace Reservoir's new spillway project. "We're trying to stretch a drop of water as far as it will go. I think we need to come up with ways to think outside the box a little bit to make our water serve all the purposes that it needs to serve."

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water fact

As of May 1, 2013, Rio Grande Basin reservoirs were at 54 percent of average storage levels. Across the state, reservoirs were at 83 percent. Snowpack, which accounts for four-fifths of Colorado's water supply, was at 83 percent of median levels statewide, but only 41 percent in the Rio Grande Basin. Find updated information at co.nrcs.usda.gov/snow/. Source: USDA Natural Resources Conservation Service

John Fielder

Meeting Multiple Needs

Terrace Reservoir is on the Alamosa River, which doesn't reach the Rio Grande at the surface and is not administered under the Rio Grande Compact. The reservoir was built in 1912 and is still used for irrigation; Reinhardt himself pulls water as a farmer. However, following the Summitville Mine disaster of the late 1980s—where heap leach gold mining polluted the Alamosa River above the reservoir—Terrace has also been instrumental as a water quality buffer. That buffering and ability to store water have been connecting environmentalists and irrigators in recent years.

"It's a long story," Reinhardt begins. The story starts in 1976, when a rogue storm system came north from the Gulf of Mexico and caused flooding in northern Colorado. A dam safety crackdown followed—dams had to be large enough to accommodate estimated levels of flooding or were restricted in their storage capacity. For Terrace, that meant being able to absorb and slow 60,000 cubic feet per second of storm-induced runoff.

"There was no way we could pass it; our spillway was too small," Reinhardt says. The Terrace Irrigation Company didn't have the money to build up the spillway, so the state put a storage restriction on the reservoir in the 1980s. Although Terrace has a capacity of just over 15,000 acre feet, the top 2,000 acre feet has been left empty, awaiting a flood, for nearly 30 years. "We have a reservoir and we can't use the whole thing," says Reinhardt. "That's kind of a shame."

About a decade ago, the nonprofit Alamosa Riverkeeper partnered with Terrace Irrigation Company. The nonprofit wanted to secure water that could be released below the reservoir to improve riparian health and supplement the river during low flows; the irrigation company wanted to build a new spillway.

Together the organizations raised $4.5 million for spillway replacement. The Alamosa Riverkeeper helped secure $2 million in Natural Resource Damage settlement funds related to the Summitville Mine, which were instrumental in leveraging a $1.5 million Water Supply Reserve Account grant and $1 million Colorado Water Conservation Board loan. With funding in place, Terrace agreed to donate the 2,000 acre feet of storage space to the Alamosa Riverkeeper's project to hold water for instream flows. To date, the Alamosa Riverkeeper, with technical assistance from the Colorado Water Trust, has acquired more than a third of the water rights it needs to fill that space and transferred them to the Colorado Water Conservation Board's Instream Flow Program.

Without the partnership, storage would have been nearly unattainable for her group, says Riverkeeper Cindy Medina. She estimates the 2,000 acre feet of existing storage space at Terrace is worth about $15 million.

Today the spillway is complete, and awaiting approval for the storage restriction to be lifted. Terrace Irrigation Company won't receive any

Kevin Moloney

The upper Rio Grande (top) flows near Rio Grande Reservoir, which was constructed in 1912. Still drawn down from the 2012 irrigation season (above), Terrace Reservoir, which for years has had its capacity restricted and inflows limited due to drought, reveals layers of dry silt in April 2013.

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water fact

The Rio Grande Canal is one of the state's largest irrigation networks, with 210 miles of conveyance servicing 96,000 acres. Source: Santa Maria Reservoir Company

Kevin Moloney

Cindy Medina and Rod Reinhardt are meeting needs for irrigators and the environment through improvements to the spillway for Terrace Reservoir, located on the Alamosa River above Capulin.

additional storage for irrigation purposes, but that doesn't mean the project is without benefits for everyone. Between riparian health, aquifer recharge, and keeping the streambed wet so less irrigation water is soaked up and lost, most irrigators seem to be on board with the idea, Reinhardt says. "There's a lot of common ground on what people want. It's a matter of thinking creatively and coming up with solutions."

Thinking Cooperatively

To the northwest, at the headwaters of the Rio Grande, the San Luis Valley Irrigation District has formed a similar partnership to manage the Rio Grande Reservoir, which it owns and operates.

The Rio Grande Reservoir can store just over 52,000 acre feet of water. Water held there is used for irrigating 62,000 acres farmed by about 170 landowners—plus meeting the terms of the Rio Grande Compact; controlling floods; and now, in the past few years, storing water for Colorado Parks and Wildlife to benefit recreation and the environment. It also holds water used to offset well depletions for the San Luis Valley Water Conservancy District and the Rio Grande Water Conservation District's first groundwater management subdistrict.

These newer storage and operating agreements keep the reservoir filled to a higher level for more months of the year than when it is used just for irrigation, exacerbating dam seepage issues on the 100-year-old reservoir's north side. All dams have seepage issues, says Smith, the district's superintendent, but this could be unsafe. When the reservoir is used just for irrigation, it will fill to 80 percent of capacity after spring runoff but fall back down to less than 20 percent by late fall. "We're changing the historical carryover storage pattern that we've seen in the past," Smith says.

Fixing the dam will be a $25 million rehabilitation project, says Smith. The state has approved $20 million in combined loan and grant funding through the Colorado Water Conservation Board, but to provide the remaining funds for the project, the district's board has been open to forming new partnerships and leasing storage space—prompting further operational changes.

Nearby, on the south fork of the Rio Grande, lies the 4,400 acre-foot Beaver Park Reservoir, owned and managed by Colorado Parks and Wildlife. Beaver Park's 100-year-old dam is also in disrepair and in need of rehabilitation. Since dam safety issues were discovered in 2010, the reservoir has been kept half-full.

Heather Dutton

A 7-foot-diameter pipeline carries water 1.5 of the 8 miles between the Continental and Santa Maria reservoirs.

During the 2002 drought, the San Luis Valley Irrigation District began talking with Parks and Wildlife about a partnership where the Rio Grande Reservoir would store more water imported by the agency from streams in the neighboring Southwest Basin. The two entities would jointly operate their systems to manage that water, while also facilitating the reservoir drawdowns necessary to make repairs.

By 2004, they initiated a temporary storage agreement, and since then, Parks and Wildlife has stored as much as 8,000 acre feet of water in the Rio Grande Reservoir. The agency is able to better coordinate releases and keep streambeds wet for wildlife, while still meeting the needs of domestic and agricultural water users. "It's about rethinking, re-administering and re-timing reservoir operations," says Smith.

Before establishing a permanent operating agreement, the reservoir managers have been testing their ideas and working in tandem to make some repairs. The Rio Grande Reservoir will install a clay lining to control seepage in 2013; also in 2013, Beaver Park will be drained and its spillway repaired.

"[The Rio Grande Cooperative Project] is built on this idea of a partnership in how to operate these two reservoirs for multiple benefits," Smith says. "It's revolutionary because it causes people to rethink how we're doing business."

Readying Storage for Subdistricts

The Santa Maria Reservoir Company feels pressure to meet some of the same emerging needs as the San Luis Valley Irrigation District. The company owns and manages the Santa Maria and Continental reservoirs, sending 90 percent of the stored water into the Rio Grande Canal and 10 percent into the Monte Vista Canal. Another 100-year-old system, the reservoirs and the 8-mile conveyance channel between them are in need of repair, which is becoming increasingly apparent as the reservoirs store more water for replacing well depletions, says the company's manager, Jay Yeager.

The Continental Reservoir holds about 22,500 acre feet, but is currently restricted to two-thirds of that. The Continental sits above the Santa Maria, which is nearly double in size. Both are fed by Clear Creek, just northeast of the Rio Grande Reservoir. Water is delivered to the Santa Maria Reservoir via the 8-mile-long conveyance system, which includes a 7-foot-diameter pipeline and open ditch. Water stored in both reservoirs is used to irrigate about 70,000 acres divided among 225 stockholders.

The Continental and Santa Maria were built to meet the needs of irrigators in the early 1900s, but new uses have emerged. Since Subdistrict No. 1 was formed and the first official efforts were made in 2012 to require local well owners to replace a percentage of their groundwater use to nearby streams, the Santa Maria Reservoir Company has been storing water used to offset those groundwater depletions. The reservoir's stockholders are paid well for leasing their supplies and also want to see the subdistrict succeed, Yeager says.

The reservoir company has a two-phase project planned. They hope to first repair supports on part of the conveyance pipeline to ensure the structure won't fail and finish lining the open canal portion with concrete so the reservoir can capture as much water as possible. Then they will fix a seepage issue in the Continental dam by replacing the liner. They will also add a new spillway—that repair will remove the restriction so the reservoir can fill to capacity. The reservoir company received approval in March 2013 for $1.8 million in Colorado Water Conservation Board funding—broken into a 25 percent grant and 75 percent loan—clearing the way for the first stage of repairs to begin soon.

"We'll be able to store another 12,000 acre feet," Yeager says. "They proposed six or seven more subdistricts in the San Luis Valley; some will probably need storage too. Not knowing where the water will come from, we want to have our facility all ready to go to be able to do what we need to do."

Utilizing Technology

Back at Platoro Reservoir, Nathan Coombs continuously seeks to improve the system's ability to meet the needs of its irrigators. Platoro is newer than most reservoirs in the San Luis Valley; it was built starting in 1949, after the Rio Grande Compact was signed. The compact limits the Conejos Water Conservancy District from storing water in Platoro unless there's more than 400,000 acre feet of water in Elephant Butte, a compact-related reservoir in New Mexico.

Uses haven't changed much along the Conejos River since Platoro was built, but the ability to store water has. In the 1990s, the district obtained a direct flow decree—transferring the point of diversion for pre-compact irrigation water rights along the river so they could be stored in the reservoir and used later in the season. Without that direct flow decree, Platoro would continue to store little water.

The district has also been focused on modernizing to improve efficiency. With support from the Rio Grande Basin Roundtable and Colorado Water Conservation Board, local ditch companies and the district have together received three-quarters of a million dollars in state Water Supply Reserve Account funds—all to further the more precise allocation of water that comes with better gauging and automatic headgates. "It's more surgical. Now we're looking at where our problems really are," says Coombs.

This is important when you're stretching water as far as it can go. "The drier it gets, the harder it is to deliver water," Coombs says. "We have got to do something or else we keep falling farther and farther back." ❑

Caitlin Coleman is program associate for the Colorado Foundation for Water Education and writes regularly for Headwaters.

Digging Deep

Holistic approaches to land management could sustain land, water and wildlife into the future

By Lauren Krizansky

Their methods are as diverse as the problems they are trying solve, yet the desired result is constant: keep the water flowing to keep life on the land. In the San Luis Valley, land managers face water shortages and environmental changes that could not only hinder the future of local agriculture, but also affect the quality and availability of wetlands and wildlife habitat.

In the foothills and mountainous regions to the east and west of the valley, decades of natural forest fire suppression have led to conditions now primed for massive, unpredictable burns. And along the southern reaches of the Rio Grande, unsupervised animal grazing is despoiling valuable riparian areas that serve as habitat for many species, including the endangered southwestern willow flycatcher.

These realities have some land managers turning to both historical and innovative practices that not only preserve what lives today, but also stabilize and enrich the many ecosystems—forest, farm and ranch—that make the San Luis Valley's precious landscape productive and full of promise for coming generations.

Beneath three 14,000-foot Sangre de Cristo mountain peaks rests the largest conservation easement in the nation. The Trinchera and Blanca ranches comprise 170,000 acres of safeguarded land near Fort Garland, and are considered the foundation for the new Sangre de Cristo Conservation Area. The conservation area, established in 2012 after the ranches' owner Louis Bacon committed additional acres to the conservation easement, is one of the world's longest protected wildlife corridors, expanding from southern Colorado into New Mexico.

The Trinchera Ranch was already partially protected through a Colorado Open Lands easement, and last year Bacon entered into an agreement with the U.S. Fish and Wildlife Service to continue ongoing conservation efforts across the Blanca Ranch with an easement's added protections for water rights and limits against subdivisions.

The Trinchera and Blanca ranches' main conservation goal is to improve wildlife habitat. In cooperation with Colorado Parks and Wildlife, the ranches have piloted Ranching for Wildlife, a program to provide public hunting opportunities.

The ranches are managed with wildlife and the role they play in the ecosystem in mind—in part to maintain a healthy herd of 3,500 elk. But, says second-generation Trinchera Ranch

Landowners in Colorado will receive up to $34 million in tax credits in 2013 for placing their properties in conservation easements. The state now has nearly 2 million acres of protected private land under easement, accounting for 3 percent of its total land area. Source: Colorado Coalition of Land Trusts

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water fact

Kevin Moloney (3)

A fence made from felled dead conifers protects a sensitive aspen stand on the Blanca Ranch.

John Fielder

The Trinchera Ranch entered a conservation easement with Colorado Open Lands in 2004. Current ranch owner Louis Bacon added additional protections in late 2012 on the Trinchera and his adjacent Blanca Ranch. At 170,000 acres, the Trinchera Blanca Ranch is the largest contiguous ranch property in Colorado, extending to the top of one of Colorado's highest peaks, Mt. Blanca, seen here to the right.

Blanca Trinchera Ranch environmental manager Craig Taggart has erected fences to protect young aspen from foraging deer and elk.

manager Ty Ryland, "When we look at habitat improvement, we don't look at just deer and elk. We look at all of the species that are on the land from an environmental standpoint. We are trying to look at it from a broad base to help everything that we can."

That broad base leads to conservation practices that include aspen regeneration, conifer rehabilitation, 16 center pivots and 25,000 acres of flood-irrigated ground, plus stream restoration and sustainable crop rotations alongside unique habitat improvements designed to keep and attract wildlife. In addition to rotating crops, the ranch plants cover crops following its harvests. "We use those crops mainly to help retain moisture and to use as a forage for elk in the winter," says Ryland.

Above the fields, Ryland has witnessed prescribed burns, used as a conservation tool both on public and private lands, slowly stabilize his forest. "Suppressing all of the fire has made the forest too thick and there are too many stems per acre," Ryland says. "We are trying to get back to that sustainable level where the trees have enough moisture to grow."

The burns are resulting in improved habitat for antelope, deer and elk while also satisfying other ranch conservation goals, including capturing water that once flowed without direction. "We try to encourage the native grasses to grow back within those areas and it has been a great success," Ryland says. "It has reduced our erosion on the ground by at least 80 percent, and the overland flow of water is now absorbed."

Take the **Next** Step

Find out what species receive special protections in Colorado by checking out Colorado Parks and Wildlife's list of threatened and endangered species. Scan this QR code with your smart phone or go to wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/ThreatenedEndangeredList.

Kevin Moloney (3)

Mike Spearman, retired L-Cross Ranch manager, helped create a conservation easement on the property near La Garita before it recently changed hands, ensuring it will remain a working ranch.

"In this part of the world, when you ranch, you have to figure out how to do that with wildlife. You co-exist with all living things."

–Mike Spearman

In the heart of San Luis Valley crop country, Brendon Rockey looks out over his Center potato fields in a spring windstorm, watching his soil stick to the ground while sand stirs for miles around. It is what he expects, and he relishes in his resilient creation that is in tune with Mother Nature. For several years, he has been repairing what he views as man's land management mistakes, which include neutralizing the soil with powerful chemical fertilizers and pesticides.

"Soil health has come in and is gaining a lot of momentum now, but all we are doing is solving the problems we created ourselves," says Rockey, who leads the local soil health group and won the 2011 Colorado Association of Conservation Districts Conservationist of the Year award. Now, in a course correction, Rockey and others are going back to the past. "We are moving back to the way that we used to farm," he says.

Rockey and his brother Sheldon practice holistic potato management, which began two generations ago with their grandfather and uncle. The practice focuses on all the living organisms in a farming system instead of just the final product or cash crop's health and yield. It analyzes the effect of one input on the many factors that create the "whole" and aims to develop a balanced agroecosystem. Management decisions are made only after considering the impact to system components like insect populations and purpose, irrigation frequency, soil microbiology and soil structure. Specifically, Rockey Farms develops soil aggregates—clusters of bound soil particles that aid retention and exchange of air and water—through diverse microbiology and a strict irrigation regimen. If over-irrigated, the soil can become waterlogged, enabling certain pathogens and weeds to thrive in the anaerobic environment, Rockey explains.

Two major holistic management components Rockey Farms incorporates are green manure crops in the potato rotation and companion crops, like peas, in the potato fields during the growing season. "Adding companion cropping has increased the amount of carbon being added back to the soil, especially when my peas germinate and grow a whole new crop after potato harvest," explains Rockey. And the multi-species green manure crop—which can include sudan grass, peas, common vetch, buckwheat, tillage radish, turnips and oats—out-competes weeds and also adds carbon to the soil, striking chemical products entirely from the equation.

"[Conventional farmers] think inorganic chemicals were the savior of agriculture," Rockey says about modern practices blamed for weakening the soil so it cannot process nutrients or retain water. "It is actually what has led our agriculture down this downward spiral."

With his own farm's soil health ever improving, Rockey says that when the water stopped coming from the sky, their work had unintended yet beneficial consequenc-

Brendon Rockey (center) and brother Sheldon raise a variety of seed potatoes on their farm near Center, rotating their crops to maintain bio and nutrient diversity.

A green manure seed mix is planted, grown, then plowed under to nourish Rockey Farms' soil.

es. They have reduced water use an average of 9 inches per acre compared to the conventional 15 to 22 inches for a two-year potato and grain rotation.

"Through the addition of carbon to the soil and the soil structure, we increased infiltration and water-holding capacity," says Rockey. "When we started down this path, the water savings wasn't a huge issue to us. Then the water savings came along, which worked out really well because we were already so far ahead of the curve when we hit a drought in the San Luis Valley."

To the west of Center sits La Garita, a tiny town hidden off the main road in the vast high desert and nestled in the San Juan Mountain foothills. Mike Spearman, a retired rancher, has called La Garita home for more than 30 years. Today, he has the privilege of watching what was once his livelihood—the L-Cross Ranch—pass to the hands of another without fear development will devour decades of labor and love.

"The type of agriculture might change, but [the land] is still going to be in agriculture," says Spearman, who also formerly served as Saguache County Commissioner. "You can't take the water away from it," he continues, explaining that the easement binds the water rights permanently to the land. "That improves the odds that the land will stay in agriculture and those special places will remain protected."

In 1998, Spearman worked with The Nature Conservancy to place the 6,000-acre L-Cross Ranch into a conservation easement that fit the area's unique characteristics including wildlife and people. "In this part of the world, when you ranch, you have to figure out how to do that with wildlife," Spearman says. "You co-exist with all living things."

The Nature Conservancy describes its easements as selectively targeting "those rights necessary to protect specific conservation values"—like Spearman's desire to enable co-existence. The land remains in private ownership, and continues to provide economic benefits for the area in the form of jobs, economic activity and property taxes into the future. A conservation easement is legally binding, even if the property is sold or passed on to heirs.

Outside of the conservation easement, elk

"When we started down this path, the water savings wasn't a huge issue to us. Then the water savings came along, which worked out really well because we were already so far ahead of the curve when we hit a drought in the San Luis Valley."

–Brendon Rockey

and cattle co-exist with help from the U.S. Forest Service and Bureau of Land Management through Spearman's implementation of a rapid rotational grazing program, a land management regimen that moves a large number of animals quickly through specified pastures. The goal is to have the animals remove a percentage of available forage in a short time, then relocate the herd to allow the grasses to recover.

"A 45-day period with no grazing allows grass to manifest itself very well," Spearman says. "Once cattle return they love the re-growth. We validated this concept on the forest by noting that the elk were seen grazing just ahead of when the cattle were due back in the pasture." In addition, the pasture re-growth creates a ground canopy that enables water to remain in the soil profile longer without running off.

Carnero Creek Rio Grande cutthroat trout are also recognized in Spearman's land management plan. Their stream habitat is protected with aid from the U.S. Department of Agriculture's Environmental Quality Incentives Program (EQIP), a voluntary program providing financial and technical assistance to agricultural producers through contracts. The contracts help land managers plan and implement conservation practices addressing natural resource concerns including soil, water, plant and animal resources with assistance from Natural Resources Conservation Service specialists. The practices are subject to NRCS technical standards tailored for local environments.

The L-Cross Ranch conservation easement also designates preexisting sites called "building envelopes" that allow people to build homes in La Garita, but not too close to fragile riparian areas. "You have to have an affinity for riparian areas and how important those types of ecosystems are to us all," Spearman explains. "Not every state has them. Gobs of things depend on that water source coming through this desert." The easement, he adds, is one action that keeps the streams and riparian zones intact and migration corridors open.

Jim Rorabaugh/USFWS

As of February 2013, the endangered southwestern willow flycatcher's critical habitat spans 1,227 stream miles and 209,000 acres in six southwestern states.

"It is so future generations can see what the natural habitat was to begin with," says Spearman, who is now working to put easements on other, smaller nearby ranches. "You have to have some kind of action that keeps the land from being developed."

Far from Carnero Creek, in the southern end of the San Luis Valley, abandoned and feral horses are exhausting many natural resources on public lands and causing mixed reactions. Early in 2013, the U.S. Fish and Wildlife Service declared parts of the San Luis Valley critical habitat for the endangered southwestern willow flycatcher in spite of a costly Habitat Conservation Plan created by local entities to avoid such federal designation. The plan was crafted to protect both agriculture and the songbird, while implementing abandoned and feral horse management techniques.

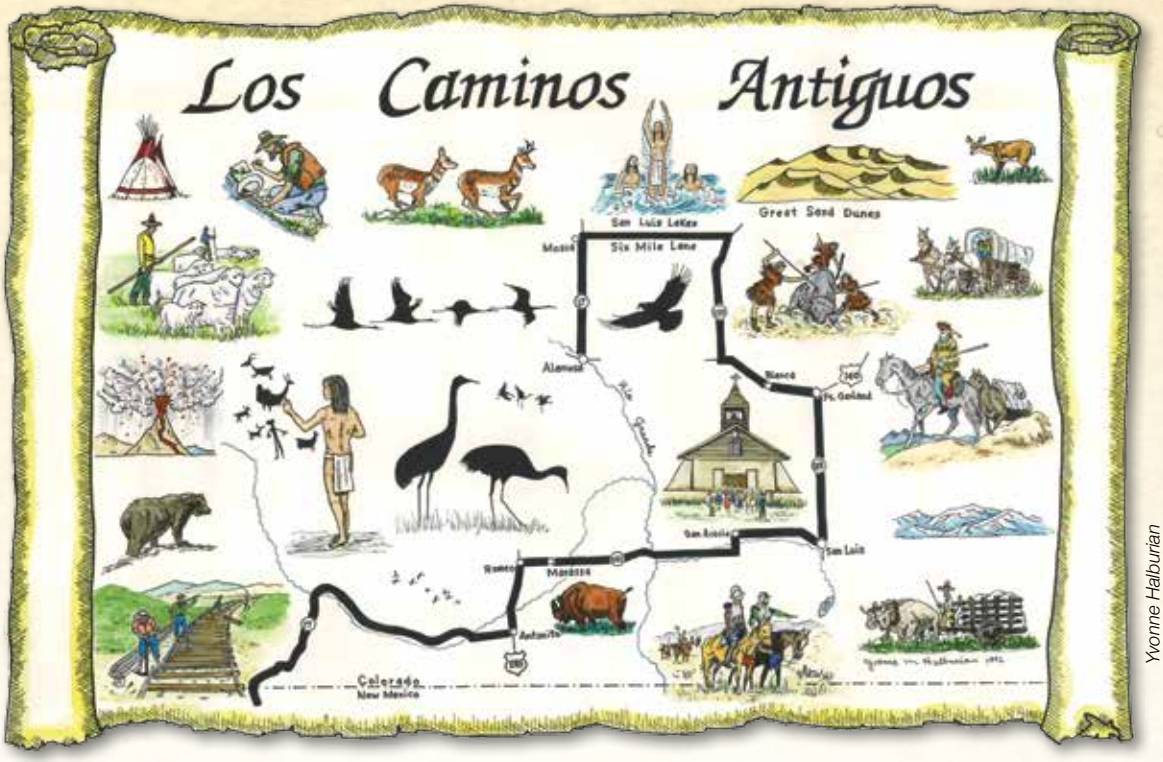
The horses are a threat to the rangeland because, when left to their own devices, they can eat grasses and shrubs down to the soil and beyond. Their teeth allow them to access roots under the ground, which can enable weaker pioneer plants to propagate. The weaker plants struggle to maintain the riverbank's integrity and permit the riverbed to recede. There is potential for improved habitat for many wildlife species if the grazing can be brought under control.

In 2006, the Rio Grande Natural Area was established to conserve, restore and protect a 33-mile stretch of the Rio Grande, including land where the abandoned horses roam. In partnership with the BLM, the area's managers have prioritized the problem and are hoping to work with local landowners to develop solutions through education and cooperative efforts to improve management of the area.

Up the road, Ryland has observed southwestern willow flycatchers living in riparian corridors near both the Trinchera and Blanca ranches and sees opportunity to invest in the bird's future. "It is just a matter of trying to help where we can," Ryland says. "We do have considerable willows on the ranch, and we work to protect that species. Any of that we can help restore—we want to."

Ultimately, it's that personal investment and cooperation between man and nature, public agencies and private landowners, that will ensure the region's farms, ranches and public lands continue to thrive. ❑

Go. See. Do. Act.



Yvonne Halburian

For the Historian: **Investigate Forces Past and Present Shaping the San Luis Valley**

By Nicole V. Langley

To travel the "caminos antiguos," or ancient pathways, of today's San Luis Valley is to travel the many stories of water that have shaped the upper Rio Grande Basin. Entering the valley over one of the passes, you will descend through snowpack-nourished conifer and aspen forests to the flat, wind-swept grasslands of the thirsty valley floor. The best way to trace the valley's water story is to follow the Los Caminos Antiguos Scenic and Historic Byway, with a few additional side trips.

GO: You can enter the San Luis Valley from the Front Range, by driving over La Veta Pass from Walsenburg on Highway 160. In Fort Garland, stop at La Entrada Visitors Center, at the beginning of the Los Caminos Antiguos byway. "Entrada" means entry or beginning, and also penetration or invasion. The valley's more than 7,000-foot altitude and its isolated geography mean that entradas have never been easy. Explore historical entradas, allegiances and conflict at the Fort Garland Museum, the preserved 1858 military outpost where Kit Carson and his men served during the Civil War: museum-trail.org/fortgarlandmuseum.asp.

West of Fort Garland, turn north off Highway 160 to the Great Sand Dunes National Park and Preserve. Gaze west across the 75-mile-wide valley and imagine this as the floor of ancient Lake Alamosa. From the Pliocene to the Middle Pliocene era, a period of about 3 million years, an inland sea expanded and contracted, filling the valley with sediment. Exhibits at the Great Sand Dunes Visitor Center tell how wind, sand and water have shaped the spectacular contours of Medano Creek, the San Luis Lakes and the tallest dunes in North America: www.nps.gov/grsa.

SEE: Along the southern arm of Los Caminos Antiguos, between the towns of San Acacio and Manassa, the Rio Grande crosses today's border between Costilla and Conejos counties. The river here is a quiet remnant of the Rio Bravo, or "fierce river," of Spanish land grant days. Signage at the bridge's west end tells of numerous Spanish and Mexican entradas made to the valley at that spot. If you look about a half-mile south, you can also see evidence of a big spill of water. About 440,000 years ago, Lake Alamosa overtopped a low sill of volcanic rocks in the San Luis Hills, and the entire sea coursed southward, carving the Rio Grande Gorge.

Whether to conquer or settle, entradas required determination and sacrifice, with clashes and compromises creating the next generation. This cultural, economic, and linguistic drama is evident today in the counties of Costilla, Conejos and Alamosa. In 2009, then-Secretary of the Interior Ken Salazar helped get this 3,000-square-mile region designated as the Sangre de Cristo National Heritage Area, preserving a special place in history for villages like San Luis, San Acacio, Conejos, and the city of Alamosa, some of America's earliest Spanish settlements. Check the area's events schedule before you go: sdcnha.org. At the south end of San Luis, a bronze plaque marks The People's Ditch, the earliest priority water right in Colorado. Take a quiet walk alongside this meandering acequia and enjoy the peaceful, grassy meadow of La Vega, the last remaining grazing commons in the United States.

DO: As you head back north and westward into the mountains, visit the galleries, saloons and shops in Mineral County's old mining town of Creede. Just south of town, take a walk along Willow Creek, a tributary to the Rio Grande, where riparian areas now thrive with birds and wildlife, thanks to the work of the Willow Creek Reclamation Committee: www.willowcreede.org. North of the valley's urban hub of Alamosa on Highway 17 is the spiritual retreat town of Crestone; stop for a blissful, hot mineral-water soak at one of several spas. Villa Grove offers art and pottery on your way out of the valley.

ACT: If you leave the valley at Poncha Pass, you will soon reach Salida, which means "departure." From entrada to salida, remember that you have traveled over water—the valley's critically depleted aquifer. The community's goal is to restore this storehouse of winter's precious snowmelt—this reservoir for tomorrow's way of life. Follow local progress or get involved via the Rio Grande Water Conservation District: rgwcd.org. Or lend a hand to improve the watershed by volunteering with the Rio Grande Headwaters Restoration Project: www.riograndeheadwaters.org. ❑

Nicole V. Langley lives and works off the grid in the Sangre de Cristo Ranches near Fort Garland, providing bilingual coordination and funding assistance for water projects: Nicole@nvlangley.net.

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