

SOLUTIONS

2011

SAVING WATER FOR THE FUTURE



**USE ONLY
WHAT YOU
NEED.SM**

 DENVER WATER

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Denver Water recently updated our mission statement to better reflect our commitment to the environment and our community:

Denver Water will be a responsible steward of the resources, assets and natural environments entrusted to us in order to provide a high-quality water supply, a resilient and reliable system, and excellent customer service.

One of the ways we're working to achieve this mission is through a diverse plan with a three-pronged approach: conserve, recycle, supply.

Our mission is about much more than just the obligation to our Denver-metro area customers, though. We have a broader obligation to our neighboring communities, to our watersheds, and to the rivers from which we derive our supply.

The future of water in Colorado took a positive step forward this past spring with the announcement of the proposed Colorado River Cooperative Agreement. This unprecedented agreement brings together 35 entities from Grand Junction to the Denver-metro area to work together as partners on a path to responsible water development. The proposed agreement is the largest of its kind in the history of the state, and it sets the stage for changing how Colorado's water resources are managed.

The 2011 issue of *Solutions* highlights some of Denver Water's programs and projects on which we are working to meet supply challenges while maintaining our commitment to managing water in a way that benefits both Denver and the state of Colorado. Our customers continue to prove they are up to the challenge of helping us use water responsibly, and we'll keep providing them with progressive ideas and projects to ensure a secure water future.

Sincerely,



Jim Lochhead
CEO/Manager, Denver Water



The Use Only What You Need campaign helps visitors to the Belmar shopping center in Lakewood visualize how much water their lawn actually needs versus what people usually give it.



Using only what they need

Helping customers use only the water they need is one of Denver Water's most important goals. Nearly a decade after one of Colorado's worst droughts, customers are clearly embracing that mission. These days, customers are using 20 percent less water than they were using before the 2002 drought, even though there are 10 percent more of them.

The decline in water use can, in part, be credited to the variety of programs Denver Water offers to encourage conservation. Each summer, Denver Water hires temporary workers to serve as a roving crew of Water Savers. The Water Savers ride bicycles or drive fuel-efficient cars, educating thousands of customers about water waste and enforcing summer watering rules. Denver Water's soil

Customers are using 20 percent less water than they were before the 2002 drought.

amendment program, which requires developers to till compost into soil prepped for landscaping, also has been a success. In 2010, staff performed 1,097 soil amendment inspections on more than 5 million square feet of land. Requiring soil amendment on all that land has the potential to reduce those yards' water needs by more than 20 million gallons of water per year.

Denver Water's popular rebate program continues to help customers use less water. In 2010, outdoor commercial rebates were up 62 percent compared with 2009, and residential outdoor rebates were up 19 percent in that same time period. Also, residential indoor rebates were up about 45 percent from 2009. There are a number of other successful approaches that help customers conserve – from offering incentive contracts to high water users for reducing their water use to dispatching the award-winning *Use Only What You Need* advertising campaign throughout the city.

Every high-efficiency toilet installed or sprinkler turned off in the rain helps us all. Denver Water knows this, and will continue challenging customers to use only the water they need.

Customers lead the way to smart water use

In the summer, Dagny Bruus' yard is an urban forest, lush with evergreens, maple and linden trees, and surrounded by a fence swallowed in wood ivy. She also enjoys bargain summer water bills. The highest, in fact, topped out at \$23.

"I water when it needs it," said the Denmark native, who now lives in central Denver. "Just think about how many people there are and how much water is wasted every day. We need to educate ourselves on using water."

Customers are reducing their water use, not because it's saving them money on their water bill (that helps, of course), but because they believe it's the right thing to do. Today, customers are using 20 percent less water than they did before the 2002 drought, even though there are 10 percent more of them.

"Our customers are leading us," said Greg Fisher, Denver Water's manager of demand planning. "We're just trying to help them."

The peak daily usage, which is the highest amount of water used in one day, also has decreased. In 1989, Denver Water customers used 553 million gallons of water in one day – the highest on record. In 2010, the most water used in one day was 365 million gallons, 34 percent less than in 1989.

Bruus, who has lived in her Denver house since the late 1980s, pays close attention to her outdoor water use. She waters her yard by hand in the evenings to avoid evaporation loss, washes her dishes in the sink and takes her laundry to a nearby laundry facility, which, she says, prevents her from washing partial loads.

"I don't want to die of thirst," she said with a laugh. "Respect nature. Be more in tune with nature."

Bruus isn't the only one with strong thoughts about the importance of conservation. Since 2006, Denver Water has

given customers more than 12,000 *Use Only What You Need* yard signs, one of the many advertising campaign elements that encourage customers to reduce their water use.

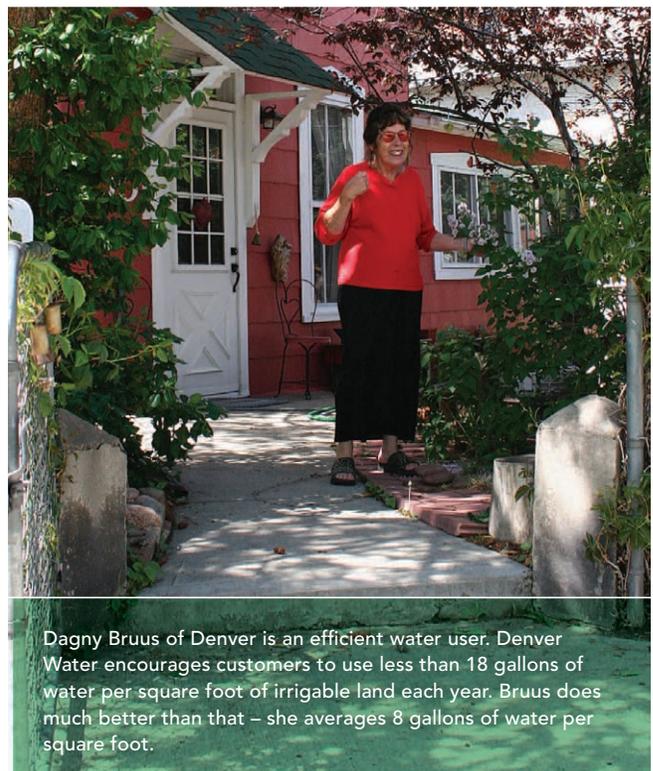
"People tell us they requested the sign to send a message to their neighbors," said Melissa Essex Elliott, Denver Water's conservation manager. "Our customers are incensed when they see water waste."

Denver Water's water waste hotline receives 2,500 calls a year from people reporting wasteful neighbors, businesses or parks. "We've even had people rat out their spouses," Elliott said.

Surveys have shown that people support water conservation. One recent study found 75 percent of customers understand and comply with Denver Water's summer watering rules and 80 percent support Denver Water's *Use Only What You Need* message.

It's an important mission that's clearly resonating with customers.

"You can't take water for granted," Bruus said.



Dagny Bruus of Denver is an efficient water user. Denver Water encourages customers to use less than 18 gallons of water per square foot of irrigable land each year. Bruus does much better than that – she averages 8 gallons of water per square foot.

Homeowners association reduces water use by 40 percent

When neighbors Mitch Albert and Ernie Joas first joined the board of their homeowners association, they inherited a \$500,000 problem: a 35-year-old irrigation system in rough shape. They knew there had to be a better way to fix the problem than to replace the entire irrigation system for such a large sum. If not, they faced having to raise dues for the 446 homes in Centennial's Heritage Place neighborhood just to keep 11 acres of greenbelts and common areas green and healthy.

They turned to Denver Water, which offers rebates and incentive contracts to large water users to help offset the cost of upgrading or installing new conservation equipment. Knowing that effective irrigation scheduling would be essential to saving water, they installed eight new weather-based smart controllers to regulate the irrigation system based on precipitation, soil makeup, wind and other factors. That project, along with rebates, earned the association roughly \$17,000 from Denver Water.

"The whole program makes good sense," Albert said.

But they didn't stop there. They overhauled the neighborhood's irrigation management, rebuilt the area's storm drainage to allow more water to soak into the plants rather than rushing to the streets, and pruned bushes to give sprinklers a clear, unimpeded spray to the grass.

They require the association's lawn care service to keep the grass height at 3.5 inches, which helps retain soil moisture better than short grass. They monitor the water meters every week to make sure the homeowners association is on track to meet its conservation goal. They also shortened the neighborhood's irrigation season. In the past, the sprinklers came on in April. Now, to take advantage of wet springs, the sprinklers don't go on until May.

And they were militant about finding and fixing leaks, often a major water-wasting culprit.

"We're obsessive about leak control," Joas said.

Their hard work has paid off, big time. Since their 2010 landscape overhaul and Denver Water incentive contract, Heritage Place has cut its water use by roughly 3 million gallons a year, which is about a 40 percent reduction, and is now saving about \$14,000 annually on the association's water bills.

That's a major improvement, and one Albert and Joas hope becomes permanent.



Mitch Albert, board treasurer, and Ernie Joas, board president, helped their homeowners association cut its water use by 40 percent by making major water-saving changes.



Invesco Field at Mile High has undergone a water-conservation overhaul, saving it millions of gallons of water each year.
Photo courtesy of Invesco Field at Mile High

Mile-high water savings

Denver's famous football stadium has undergone a water-conservation overhaul, saving millions of gallons of water each year. "When you have a big complex like we do, small changes make a very, very big difference," said Andy Gorcho, general manager of Invesco Field at Mile High. "You can't be wasteful."

Invesco Field at Mile High has two Denver Water conservation projects in the works. One is a toilet retrofit project, in which Invesco replaced 142 toilets with high-efficiency models (1.28 gallons per flush), with help from more than \$17,000 worth of Denver Water toilet rebates. Swapping out those toilets is saving the stadium thousands of gallons of water each time it hosts an event.

The second project, which has cut the stadium's irrigation water use almost in half, is a Denver Water irrigation efficiency contract. Denver Water helps large-scale industrial and commercial customers tackle water-saving projects by providing them with incentive contracts to offset the cost of installing water-efficient irrigation equipment or low-water use landscape. In 2008, the stadium upgraded to a central control system that efficiently irrigates more than 230 zones surrounding the stadium.

The central control system allows the stadium's turf manager to adjust watering schedules on the stadium's 30 acres of land based on the plant's needs, Gorcho said. The new system cuts down on unnecessary watering by using

weather data from an on-site weather station, as well as information about precipitation rates, soil type, sun exposure and other factors, to adjust irrigation schedules accordingly.

Since installing the system in 2008, the stadium has saved an average of 6.8 million gallons a year in irrigation water use, and has received more than \$55,000 in Denver Water incentive payments. The stadium also has saved an average of \$25,000 a year on its water bills.

"These things make very good business sense," Gorcho said. "It's very expensive to waste."

Water Savers hit the streets

Denver Water's crew of Water Savers has been patrolling the streets again this year, educating customers who are wasting water and rewarding those using water wisely.

A crew of summer employees, called the Water Savers, uses bright orange Use Only What You Need bicycles and fuel-efficient cars to comb neighborhoods in Denver Water's service area, looking for customers who aren't

following the summer watering rules. During the 2010 irrigation season, Water Savers made more than 5,000 stops to inform customers about watering rules and to educate them about the importance of conservation.

Often, the Water Savers notice people using water wisely – customers who used shut-off nozzles when washing their car, for example – and reward them with a Use Only What You Need freebie.

Summary of Denver Water Conservation Goals

(ACCELERATED CONSERVATION PLAN: 2007 - 2016)

Five years ago, Denver Water launched an aggressive 10-year plan to speed up the pace of conservation in its service area. The goal is to reduce overall water use 22 percent by 2016 in order to provide a secure water future for Denver Water customers. The following data provides a look at the different elements of the 10-year plan; however, this snapshot does not account for water savings achieved through customer behavior changes, which has been significant.

Accelerated Conservation Target (2007 – 2016) 22% Reduction from Pre-Drought Use
 Current Customer Demand 20% Reduction from Pre-Drought Use
 Remaining 2016 Conservation Target Additional 2% Reduction from Pre-Drought Use

Program Activities, Incentives Paid and Estimated Savings: 2007-2010

Program	Activity Level	Primary Customer Type	Incentives Paid	Estimated Savings
Conservation Outreach to City and County of Denver	66 contracts	Government	\$2.9 million	388 AF
Conservation Outreach to Suburban Government	16 contracts	Government	\$2.23 million	376 AF
Indoor Commercial/Industrial Incentive Contracts	37 contracts	Commercial/Industrial	\$991,382	385 AF
Commercial/Industrial Audits	214 audits	Commercial/Industrial	–	24 AF
Commercial/Industrial and New Construction Rebates	12,762 rebates	Commercial/Industrial	\$862,709	726 AF
Washing Machine Rebates	33,965 rebates	Residential	\$5.1 million	874 AF
Toilet Rebates	24,007 rebates	Residential	\$2.7 million	828 AF
Outdoor Residential Rebates	10,752 rebates	Residential	\$104,283	41 AF
Low Income Audits/Fixture Replacement	8,593 audits/8,210 toilet retrofits	Residential	–	535 AF
Irrigation Efficiency Incentive Contracts*	63 contracts	Commercial/Industrial	\$699,290	437 AF
High Bill Audits	1,300 audits	Residential	–	90 AF
Water Waste Rules Enforcement	11,305 stops	All	–	168 AF
Fixture Distributions	3,481	All	\$253,594	147 AF
Car Wash Recertifications	149	Commercial/Industrial	–	9 AF
Soil Amendments	2,026	–	–	131 AF
Outdoor Audits	214	All	–	27 AF
Multi-Family Audits/Units Audited	49 audits/6,120 units audited	Residential	–	189 AF

Total acre-feet savings from programs: 5,374 acre-feet

* Irrigation efficiency incentive contracts are paid over five years. The incentives paid (\$) amount reflects incremental annual payments made for contracts in progress, not full payment in one year.

Master plan sets the path for recycled water's future

The last time Denver Water updated its master plan for its recycled water system was in 2004 – the same year the recycled water treatment plant opened. “We’ve gathered a lot of information since then,” said Abigail Holmquist, Denver Water’s recycled water program manager.

Denver Water recently revised its Recycled Water Master Plan, a document that helps plan for future growth. It outlines potential customers, details what infrastructure should be installed and analyzes the expense of adding different customers to the system.

The master plan identifies almost 300 potential customers – up from 100 in the 2004 update – which will help Denver Water reach its goal of delivering 17,500 acre-feet of recycled water each year. Recycled water is treated wastewater used for irrigation, commercial and industrial use, freeing up drinking water for other purposes.

Once build-out is complete, expected in the next decade, Denver Water’s recycled water system will free up enough drinking water to serve almost 43,000 homes. So far, Denver Water is about one-third of the way toward its goal.

In 2010, Denver Water expanded the recycled water system to serve irrigation customers, including:

- East High School grounds
- Sixth Avenue median, between Uinta Parkway and Roslyn Street in Lowry
- Ulaanbaatar Park in Lowry
- Fifth Avenue median, from Roslyn Street to Quebec Street in Lowry
- Stanley British Primary Soccer Field in Lowry
- Montclair Recreation Center Playing Fields in Lowry
- Westerly Creek School grounds in Stapleton
- Stapleton Central Park Recreation Center



The last time Denver Water updated its master plan for its recycled water system was in 2004 – the same year the recycled water treatment plant (pictured) opened.

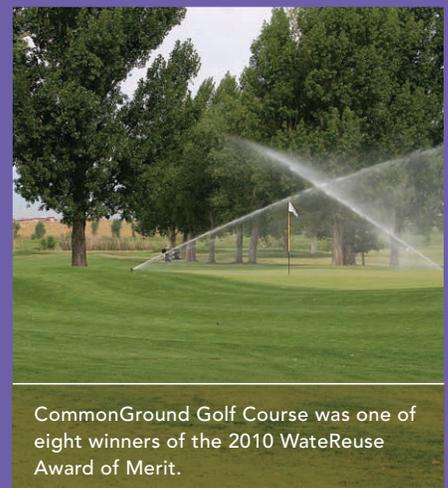
In addition to adding recycled water service at the Rocky Mountain Arsenal and expanding its use at the Denver Zoo, Denver Water plans to add parks and schools in the Montbello neighborhood and irrigation customers near Peña Boulevard and Interstate 70, eventually supplying recycled water to Denver International Airport. In the next decade, Denver Water plans to extend service to areas that include the University of Denver and Observatory Park.

Golf course receives recycled water award

CommonGround Golf Course, which irrigates its course with Denver Water’s recycled water, was one of eight winners of the 2010 WateReuse Award of Merit.

The award, presented by the WateReuse Association, recognizes projects for their significant contributions to the water reuse and desalination industry.

CommonGround Golf Course, a public course that opened in 2009 on the site of the former Mira Vista Golf Course southeast of Lowry, hooked onto Denver Water’s recycled water system to help make the course as water-efficient and environmentally friendly as possible.



CommonGround Golf Course was one of eight winners of the 2010 WateReuse Award of Merit.

Arsenal's lakes and wetlands rely on recycled water

The Rocky Mountain Arsenal site will soon add another link to its century-long connection with Denver Water. In the late 1800s, farmers and ranchers in the Manhattan-sized expanse of land northeast of Denver diverted water from the High Line Canal to fill their reservoirs with water for irrigation and livestock.

During World War II, after the U.S. Army had converted the area to a chemical arms manufacturing facility, Denver Water installed a 3-foot-diameter conduit to provide the Rocky Mountain Arsenal with a nearly unlimited source of potable water in support of the war effort.

Now, after almost three decades of environmental cleanup efforts, Denver Water will begin supplying the Rocky Mountain Arsenal National Wildlife Refuge with recycled water – filling lakes and wetlands to coax hundreds of wildlife and vegetation species to the rehabilitated area.

“Recycled water is our assurance that for the majority of the time, the lakes and wetlands will have water,” said Tom Jackson, the refuge’s cleanup coordinator. “That’s a critical feature.”

During World War II, the military needed places to manufacture chemical arms to compete with similar weapons used by Germany and Japan. The 27 square miles of farmland northeast of Denver seemed like the perfect place. It was close to a major city, had railroad access and utility service, and was far from the range of enemy attacks.

Construction began almost immediately, and by 1943, the \$50 million Rocky Mountain Arsenal was producing mustard gas, napalm, incendiary bombs and other chemical arms.

After World War II ended, the U.S. Army leased a portion of the facility to Shell Oil Company to produce pesticides and herbicides. During the Cold War, the Rocky Mountain Arsenal continued to produce chemical arms and began manufacturing rocket fuel.

But as chemical production wound down, major environmental cleanup began. In the 1980s, the Army, Shell and the U.S. Fish and Wildlife Service started a joint venture to safely clean the area, tear down the buildings and turn it into a protected site for wildlife.

Thirty years and more than \$2 billion later, the site’s cleanup program is officially complete, and the Rocky Mountain Arsenal National Wildlife Refuge is one of the largest urban

wildlife refuges in the country. The site no longer receives raw water from the High Line Canal, mainly because the canal lost water to seepage and often washed sediment, pesky weed seeds and nonnative fish larvae into the lakes.

Instead, Denver Water will start delivering recycled water to the site, expected by late 2011, where it will be dechlorinated and sent to three lakes – Lake Ladora, Lower Derby Lake and Lake Mary – as well as to four wetlands. The refuge also plans to send recycled water through 30 miles of cast-iron pipes, which the Army installed in the 1950s, to irrigate freshly planted short-grass prairie, helping the native grassland establish and fend off noxious weeds.

“We’re essentially bringing this area back to the way it was in the 1850s,” Jackson said.

The refuge plans to supplement recycled water with well water, but recycled water is crucial to re-creating that stable ecosystem.

“Absent the recycled water,” Jackson said, “we’d be in a world of hurt.”



White pelicans relax at the Rocky Mountain Arsenal National Wildlife Refuge. Denver Water will begin supplying the refuge with recycled water, filling lakes and wetlands and coaxing hundreds of wildlife and vegetation species to the rehabilitated area. Copyright Wendy Shattil/Bob Rozinski

Denver Zoo's new exhibit uses recycled water

Elephants, rhinoceroses and tapirs in one of North America's largest elephant habitats will soon swim and bathe in recycled water from Denver Water.

Denver Zoo's Asian Tropics, the largest project in the zoo's history, is under construction and plans to open in 2012. Once finished, the 10-acre Asian Tropics site will contain more than 1 million gallons of water – more than the rest of the zoo combined – but its impact on drinking water supplies will be minimal. All of the water used for exhibits and irrigation will come from Denver Water's recycled water system, freeing up drinking water for other purposes, and 900,000 gallons of it will be recirculated through the site's filtration building.

If all goes as planned, Asian Tropics will achieve the highest standard in Leadership in Energy Efficiency Design (LEED) from the U.S. Green Building Council. Doing so will acknowledge the site's environmentally sustainable practices. And one of the components of LEED certification is using recycled water, something the zoo has done since 2004.

"The ability to reuse our natural resources fits perfectly with Denver Zoo's core values of conservation," said Steve Salg, Denver Zoo project manager.

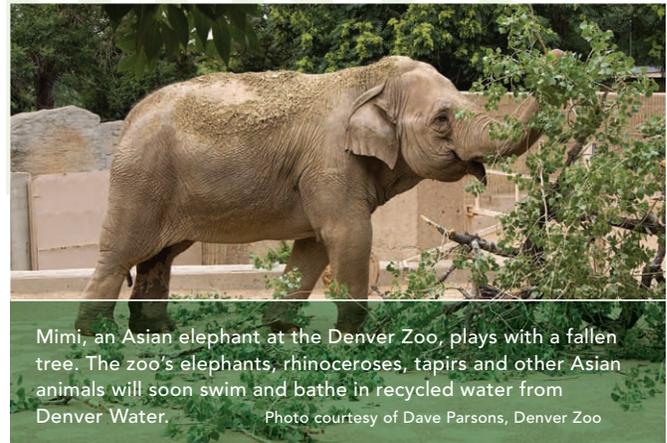
Denver Zoo's Front Entry/Predator Ridge exhibit, built in 2004, was the first area of the zoo to use recycled water. Now, the zoo uses about 2 million gallons of recycled water each year for irrigation, enclosure washdown and animal swimming pools. Because Denver Water's recycled water rates are roughly 70 percent less than potable water rates, the Denver Zoo saves more than \$100,000 each year in water costs.

"The zoo has been extremely progressive with their use of reclaimed water," said Abigail Holmquist, Denver Water's recycled water program manager.

Though recycled water is not meant for human consumption, the zoo's veterinarians have found it perfectly suitable for Asian elephants, clouded leopards, Asian small-clawed otters,

Malayan tapirs and other animals that will soon call Asian Tropics their home. The animals will roam 10 acres of mud wallows, scratching trees and pools in a \$50-million facility with state-of-the-art efficient features.

The site's biomass gasification system, for example, will allow the zoo to use 90 percent of its animal waste and human trash to generate clean energy for Asian Tropics, reducing the zoo's landfill trash by 1.5 million pounds per year.



Mimi, an Asian elephant at the Denver Zoo, plays with a fallen tree. The zoo's elephants, rhinoceroses, tapirs and other Asian animals will soon swim and bathe in recycled water from Denver Water. Photo courtesy of Dave Parsons, Denver Zoo

And expanding the zoo's recycled water service to include Asian Tropics will help the zoo achieve its goal of using more recycled water. In fact, once the zoo's master plan buildout is complete, recycled water will account for 90 percent of the zoo's total water consumption, freeing up enough drinking water to serve roughly 1,250 houses.

Recycled Water 101

Several schools in Denver Water's service area receive recycled water to irrigate their fields and landscaping. Why not teach students at those schools – and others – about the benefits of using recycled water?

Denver Water's Youth Education Program focuses on outreach and educational support to kindergarten through 12th grade students, their teachers and school district.

Every sixth-grade Earth science classroom in Denver Public Schools receives a copy of Denver Water's *Teacher Resource Packet*, full of water curriculum-supporting materials. For schools that receive recycled water for irrigation, Denver Water supplements the resource packet with literature about recycled water. Denver Water also offers tours of the recycled water plant, and staff members have visited several schools to talk to students about recycled water.

Proposed agreement sets the stage for regional cooperation

The way water is managed in Colorado is about to change, thanks to the recent announcement of the proposed Colorado River Cooperative Agreement. With 35 partners, stretching from Grand Junction to the Denver-metro area, the proposed agreement is the largest of its kind in state history. This agreement demonstrates that “collaboration works, and collaboration can move mountains,” said Gov. John Hickenlooper at the announcement, before joking, “Collaboration can move water lawyers.”

Focused on cooperation, the proposed agreement brings parties who traditionally have been at odds together as partners on a path to responsible water development benefitting both the East and West Slopes. It achieves better environmental health for the Colorado River Basin, maintains high-quality recreational use and improves economics for many cities, counties and businesses impacted by the river. The proposed agreement, which was five years in the making, will now be considered by towns, counties, and water entities from the headwaters to the Utah state line.

“We negotiated hard,” Denver Water’s CEO/Manager Jim Lochhead said. “We had a number of

objectives, and I believe we’ve achieved them with this agreement.”

In addition to its benefits for Denver Water and the West Slope, the proposed agreement will trigger a major water-sharing and conservation arrangement between Denver Water, Aurora Water and water providers in the South Denver-metro area. Taken as a whole, these landmark agreements mark the most significant change Colorado has seen in how the state’s water resources are managed.

The comprehensive proposed agreement focuses on significantly enhancing the environmental health of much of the Colorado River Basin and its tributaries, as well as supporting many West Slope cities, towns, counties and water providers as they work to improve the quality and quantity of water through new municipal water projects and river management initiatives.

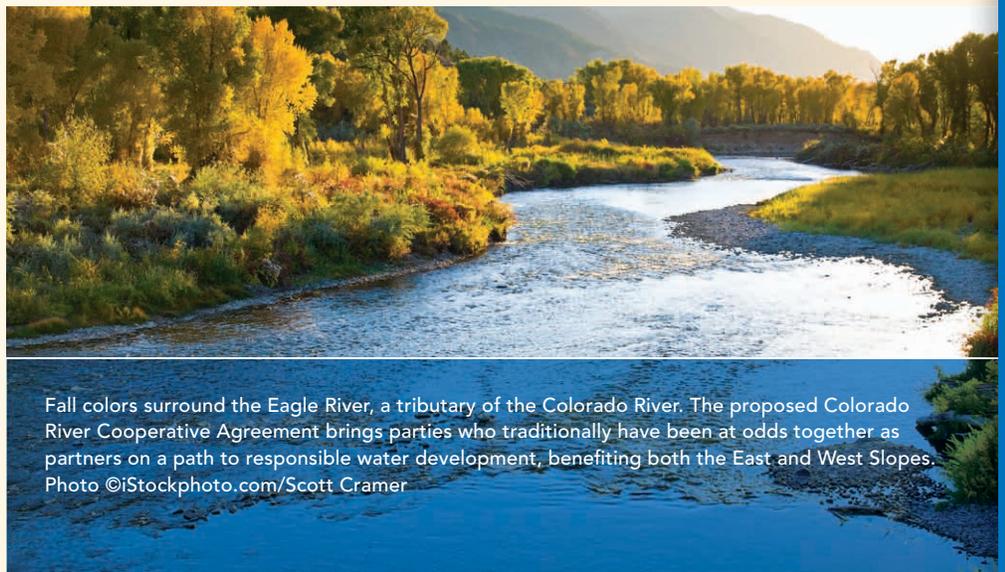
In exchange for environmental enhancements, including financial

support for municipal water projects, additional water supply and service area restrictions, the agreement will remove opposition to Denver Water’s Moffat Collection System Project.

The Colorado River Cooperative Agreement also establishes a process, dubbed Learning by Doing, by which Denver Water, Grand County, the Colorado River District, the Middle Park Water Conservancy District and others will use the flexibility in Denver Water’s water system to manage river flows for the benefit of the environment in Grand County.

There is still plenty of work to do. Eighteen parties must sign the agreement, without making changes, before it becomes official. Lochhead said the group’s goal is to have the agreement fully executed by the end of 2011.

“It positions Denver Water and our system to develop additional supplies,” Lochhead said. “It positions Colorado to use water efficiently and use the water supplies we have in the best way.”



Fall colors surround the Eagle River, a tributary of the Colorado River. The proposed Colorado River Cooperative Agreement brings parties who traditionally have been at odds together as partners on a path to responsible water development, benefiting both the East and West Slopes. Photo ©iStockphoto.com/Scott Cramer

Regional partnership works to meet future water needs

Seventeen entities, including Denver Water, are joining forces on a project that may supply customers with more water while minimizing the need to buy new water rights.

Denver Water is moving forward with the partnership called WISE, which stands for Water, Infrastructure and Supply Efficiency. If implemented, the partnership will provide new supply by combining unused capacities in Aurora Water's Prairie Waters Project with unused water supplies from Denver and Aurora. Then, during years Denver and Aurora don't need all of that water, the 15 Douglas County entities that constitute the South Metro Water Supply Authority can buy the unused water to help reduce their reliance on nonrenewable groundwater.

"It's a great example of a cooperative regional effort that benefits everybody," said Dave Bennett, project manager for WISE. "It's also the most complex project we've ever worked on."

The partnership has not been finalized and much work remains. But if all goes as planned, Denver Water will start capturing its unused water and selling it to South Metro in the next few years. Initially, that will provide Denver Water with up to \$2.25 million per year in revenue.

This cooperative effort is rare in Colorado, which divvies water based on a first-in-time, first-in-line style of water rights called prior appropriation.

"The way Colorado water has historically been developed has been every man for himself," Bennett said.

"That has produced a lot of haves and have nots. Whoever got there first, like Denver Water, got senior rights. Water providers that came later, like South Metro, didn't get those rights."

Those kinds of rules brought about years of legal wrangling over every drop of water.

But WISE is different.

After the 2002 drought, Aurora Water knew it needed to find more water

continued>



supplies and fast. If the city had another horribly dry year after 2002, “they would’ve been in trouble,” Bennett said.

So Aurora, which is one of the largest water providers in the state, built the Prairie Waters Project. The \$653 million operation began in fall 2010, increasing Aurora’s water supply by 20 percent. The project allows Aurora Water to collect South Platte River water it owns from wells just north of Brighton. The water is then piped 34 miles south to a new purification facility near Aurora Reservoir, where it is treated and delivered to Aurora customers.

Such a massive project required a lot of infrastructure. And during the winter, when people aren’t watering their lawns and putting such a demand on the system, Aurora has extra capacity in its infrastructure.

Denver Water saw that underused infrastructure as an opportunity to capture reusable water in the South Platte River for a new emergency supply. At the project’s completion, Denver Water expects to capture about 15,000 acre-feet of unused supply – enough to serve almost 38,000 homes. When Denver Water doesn’t need that emergency supply, it plans to sell the excess to South Metro, which relies heavily on nonrenewable aquifers and wells.

The water that Denver will put into WISE is primarily reusable return flows from its Blue River supplies. No new diversions will be needed in Denver’s mountain system to provide WISE water.

Front Range Water Council unites water suppliers

Front Range water suppliers face very similar challenges and issues. In an effort to work cooperatively on a variety of issues of mutual interest, the Front Range Water Council was created in 2008. Its members include:

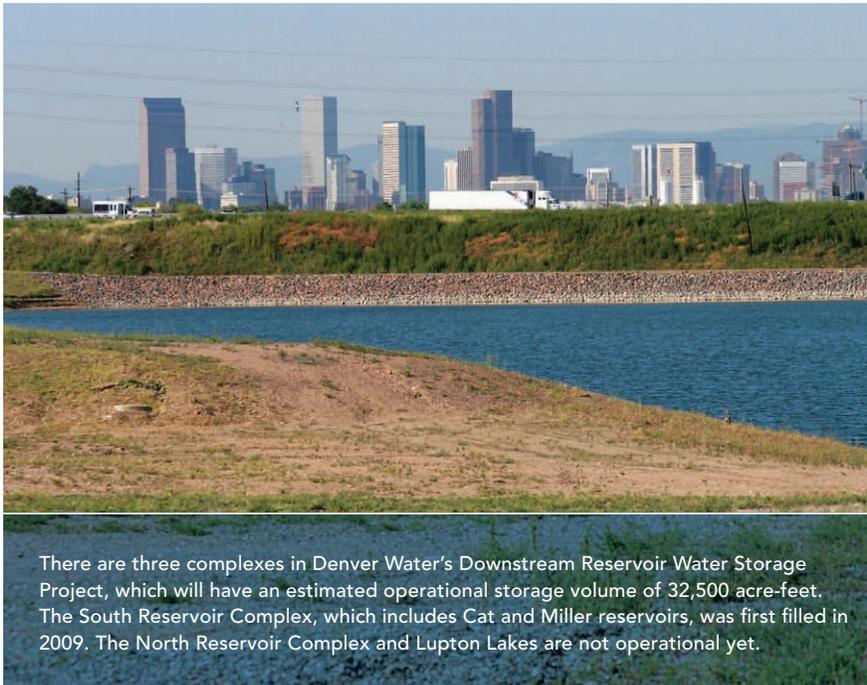
- Denver Water
- Aurora Water
- Colorado Springs Utilities
- Northern Water
- Pueblo Board of Water Works
- Southeastern Colorado Water Conservancy District
- Twin Lakes Reservoir and Canal Company

These utilities and districts meet the water demands of 4 million people – 82 percent of Colorado’s population – with just 20 percent of the state’s total water supply. Most of this water supports agriculture; just 6.5 percent serves municipal and industrial purposes. And more than 80 percent of Colorado’s economy and tax revenue comes from the areas served by the Front Range Water Council.

In addition to investing in water conservation, efficiency and recycled water, Front Range Water Council members are meeting future water demands through innovative water supply projects. Council members have invested more than \$1.4 billion in recent capital projects, and have budgeted another \$4.6 billion for such projects in the next decade. This will ensure that future water needs are met while creating jobs and growing the state’s economy.

The Front Range Water Council works closely with the Colorado Water Conservation Board and the environmental community to develop credible future project planning scenarios and measurement metrics to close Colorado’s water supply gap. In order to successfully meet Colorado’s water needs, the Front Range Water Council supports the position that identified projects and processes, new supply development, agriculture-to-urban water partnerships and conservation must be simultaneously pursued.

Gravel pits find new life



There are three complexes in Denver Water's Downstream Reservoir Water Storage Project, which will have an estimated operational storage volume of 32,500 acre-feet. The South Reservoir Complex, which includes Cat and Miller reservoirs, was first filled in 2009. The North Reservoir Complex and Lupton Lakes are not operational yet.

One of the best things about using old gravel pits for water storage is that usually, someone else does much of the work to build them. "Mining companies have to reclaim the land they mine," said Greg Gulley, project engineer for Denver Water's Downstream Reservoir Water Storage Project. "Turning them into reservoirs is a way to reclaim a gravel pit after it's mined."

In 2009, Denver Water filled its first two gravel pits with water. That was the first time Denver Water has converted gravel pits into reservoirs, and it won't be the last.

The Downstream Reservoir Water Storage Project, which has been in the works for more than a decade, allows Denver Water to store and release reusable water in its system through the

use of old gravel pits that have been improved to store water.

With this project, Denver Water can keep upstream water while releasing water from gravel pits north of the city to meet water requirements of downstream users.

There are three complexes in the project, which will have an estimated operational storage volume of 32,500 acre-feet. The South Reservoir Complex, which includes Cat and Miller reservoirs, was first filled in 2009.

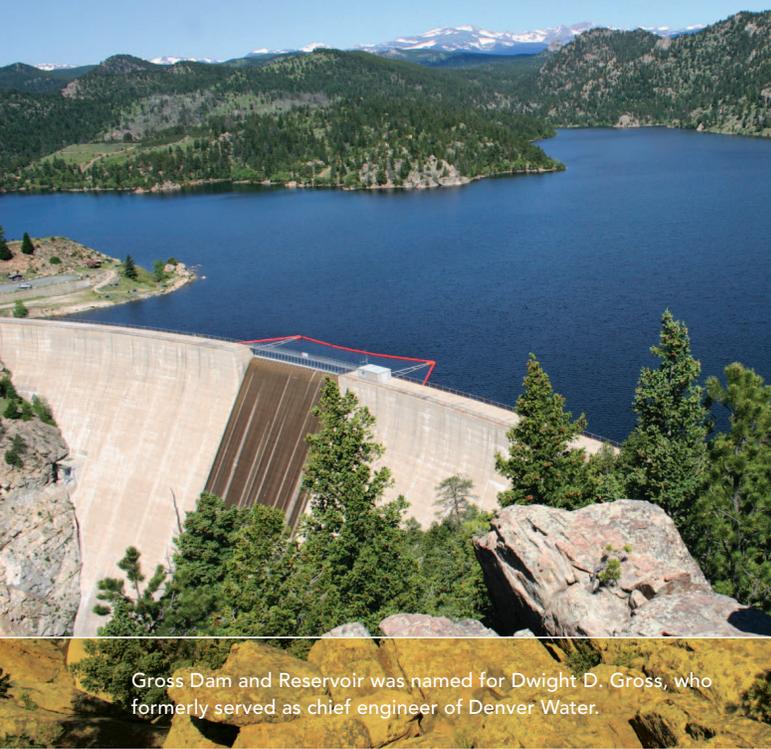
Now, Denver Water is moving forward with its North Reservoir Complex, south of 120th Avenue and east of the South Platte River. There are five gravel pits in the complex, including Howe-Haller A, Howe-Haller B, Hazeltine, Dunes and Tanabe reservoirs.

To prepare those gravel pits for their water-storing future, Denver Water needs to construct infrastructure at the site. In 2010, Denver Water built the Fulton Inlet Pipeline to deliver water from the Fulton Ditch to reservoirs in the North Complex. Crews also continue to mine the Hazeltine Reservoir site and remove excess material to increase the reservoir's storage capacity.

In 2011, Denver Water plans to build an outlet structure for Dunes Reservoir and a connection to the Fulton Inlet Pipeline so water can be moved in and out of Dunes. If all goes as planned, the North Complex reservoirs will be fully operational in 2016.

There's still plenty to do between now and then, though. Denver Water needs to line Hazeltine Reservoir to stabilize the slopes. Denver Water also must build a pump station at Hazeltine to release water from the North Complex into the South Platte River and to pump water into Tanabe and Dunes reservoirs. That station, which is partially designed, will be the most expensive portion of the North Complex aside from land acquisition, Gulley said.

At the same time, Denver Water continues to move forward on its third complex. The Lupton Lakes complex, near Fort Lupton, is still being mined and is expected to begin operating sometime after 2020.



Gross Dam and Reservoir was named for Dwight D. Gross, who formerly served as chief engineer of Denver Water.

Moffat project looks to minimize impact

Several projects that will benefit the environment in Grand County, Summit County and the Colorado and Fraser rivers, among other areas, hinge on the approval of the Moffat Collection System Project.

“We’re not looking at enhancing just one thing,” said Travis Bray, project manager for the Moffat project. “We’re doing several. We’re improving fisheries. We’re helping stream habitat. We’re improving water quality. What can we do to meet everybody’s requests?”

The Moffat Collection System Project will more than double the capacity of Gross Reservoir, located west of Boulder, providing Denver Water with 18,000 acre-feet of additional supply – enough water to serve about 45,000 households annually.

But the project will do much more than provide Denver with more water. About 80 percent of Denver Water’s raw water comes from the south end of its system. The Moffat project, located on the north end of the system, will ease some of the pressure on the south side and improve Denver Water’s operational flexibility, ensuring Denver

Water will continue to supply customers with a reliable water supply, especially during droughts and emergencies.

The U.S. Army Corps of Engineers continues to study the project and respond to public comments. The Corps plans to release a Final Environmental Impact Statement by the end of 2011, and if all goes as planned, the project will be operational in next decade.

Once that happens, the flexibility gleaned from such an important project will allow Denver Water to provide environmental enhancements, while ensuring an adequate water supply for customers.

Denver Water is proposing several mitigation and enhancements projects if the Moffat project is built. Among those include:

- 1,000 acre-feet of additional flows each year for the Fraser River. That extra water will help improve fisheries and stream habitat.
- More water in the Fraser River for Grand County to use as its population grows.
- Money to improve aquatic habitat and water quality in Grand County.
- Money for Summit County projects to enhance the environment, such as making improvements to a wastewater treatment plant that will improve effluent water quality.
- 1,000 acre-feet of water in Williams Fork Reservoir.
- Stream restoration work below Windy Gap Reservoir to improve the Gold Medal fishery.
- 5,000 acre-feet of water in Gross Reservoir to improve aquatic habitat in South Boulder Creek.

The Colorado Wildlife Commission and the Colorado Water Conservation Board recently approved Denver Water’s plan to alleviate impacts to fish and wildlife caused by the proposed Moffat project. For more information, visit www.denverwater.org/moffat.



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