



The Water Report™

Water Rights, Water Quality & Water Solutions in the West

In This Issue:

**Albuquerque
Water Resources
Management 1**

**Colorado Instream
Leasing 10**

**Regional Water
Collaboration
Survey 17**

Water Briefs 27

Calendar 30

Upcoming Stories:

**Stormwater LID
Update**

**Water Quality
Trading**

**South Platte
Groundwater Study**

& More!

ALBUQUERQUE'S WATER RESOURCES MANAGEMENT

INTEGRATED STRATEGY MEETS AREA CHALLENGES

by John M. Stomp III, P.E., Chief Operating Officer
Albuquerque Bernalillo County Water Utility Authority

BACKGROUND

TWO HISTORIC COMPACTS AND THE SAN JUAN-CHAMA PROJECT

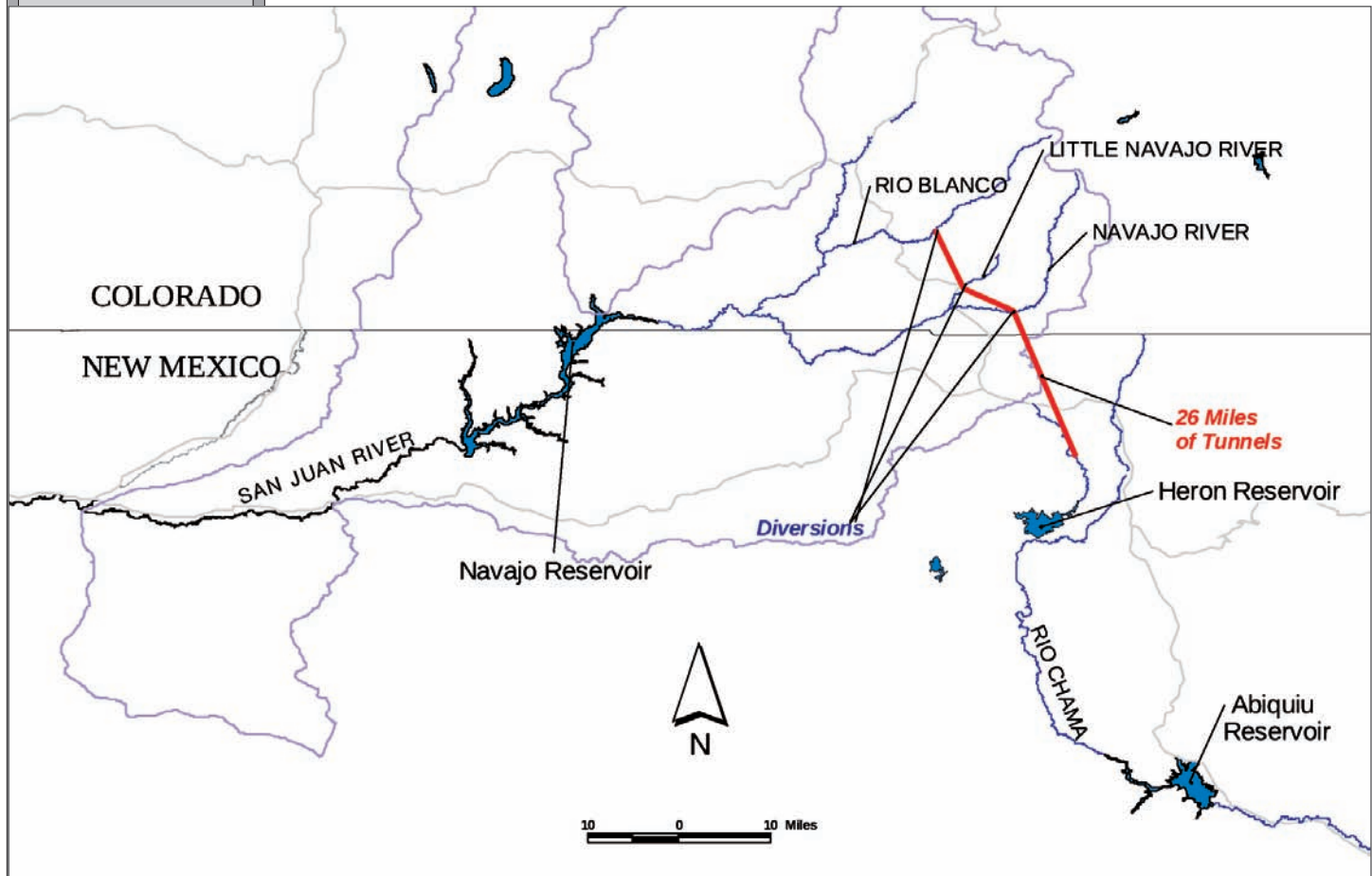
During the negotiation of the Rio Grande Compact in the 1930's, it was clear that the State of New Mexico would not have sufficient "native water" (i.e., local and unaugmented from another source) for future growth and economic development in the Middle Rio Grande basin — specifically for the City of Albuquerque. Under this Compact, Rio Grande water allocation was divided in an attempt to maintain the status quo of uses that existed in the late 1800's. Technical investigations corresponding to the Rio Grande Compact included the concept of transporting Colorado River water into the Rio Grande. This transbasin water transfer (later authorized as the San Juan-Chama project, see below) would supplement the water supplies for municipal and industrial use.

Under the Upper Colorado River Basin Compact, approved in 1948, New Mexico is entitled to 11.25% of the waters of the Upper Basin. In the early 1950's, the New Mexico State Engineer, working with the US Bureau of Reclamation (Reclamation), developed two projects to utilize New Mexico's apportionment of this Compact: 1) the Navajo Indian Irrigation Project (NIIP); and 2) the San Juan-Chama project. Both of these projects were authorized together by Congress in 1956 as participating projects of the Upper Colorado River Project Storage Act.

Coincidentally, in 1956, the New Mexico State Engineer declared the underground basin in the Middle Rio Grande recognizing that the Rio Grande and the aquifer were hydrologically connected. This declaration gave jurisdiction to the State Engineer to limit appropriations of groundwater, to both protect senior water rights holders and to meet Rio Grande Compact delivery requirements. The 1956 declaration required that groundwater appropriations that cause an effect on the surface water system be offset with purchase or retirement of valid surface water rights, primarily from irrigation in the Middle Rio Grande, or other sources like imported San Juan-Chama water. In other words, municipalities that relied solely on groundwater would be required to keep the river whole — this included the City of Albuquerque (Albuquerque).

The San Juan-Chama project imports about 110,000 acre-feet per year from three tributaries of the San Juan River (which is a tributary of the Colorado River) into the Rio Grande basin just above Heron Reservoir. Construction was completed in 1971 with operations beginning in 1972.

Figure 1 – San Juan-Chama Transbasin Project

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Albuquerque signed a contract with the US Secretary of Interior in 1963 for 53,200 acre-feet of water from the San Juan-Chama project. In 1965, Albuquerque relinquished 5,000 acre-feet of water for the establishment of a recreational pool in Cochiti reservoir. When the San Juan-Chama contract was signed, the original concept was that the imported water would be used to repay the Rio Grande from groundwater depletions. Note that the water and wastewater utility for Albuquerque was separated from the city's administration by the New Mexico State Legislature in 2003, establishing a new entity named the Albuquerque Bernalillo County Water Utility Authority (Water Authority). Following that action, the San Juan-Chama contract was assigned to the Water Authority.

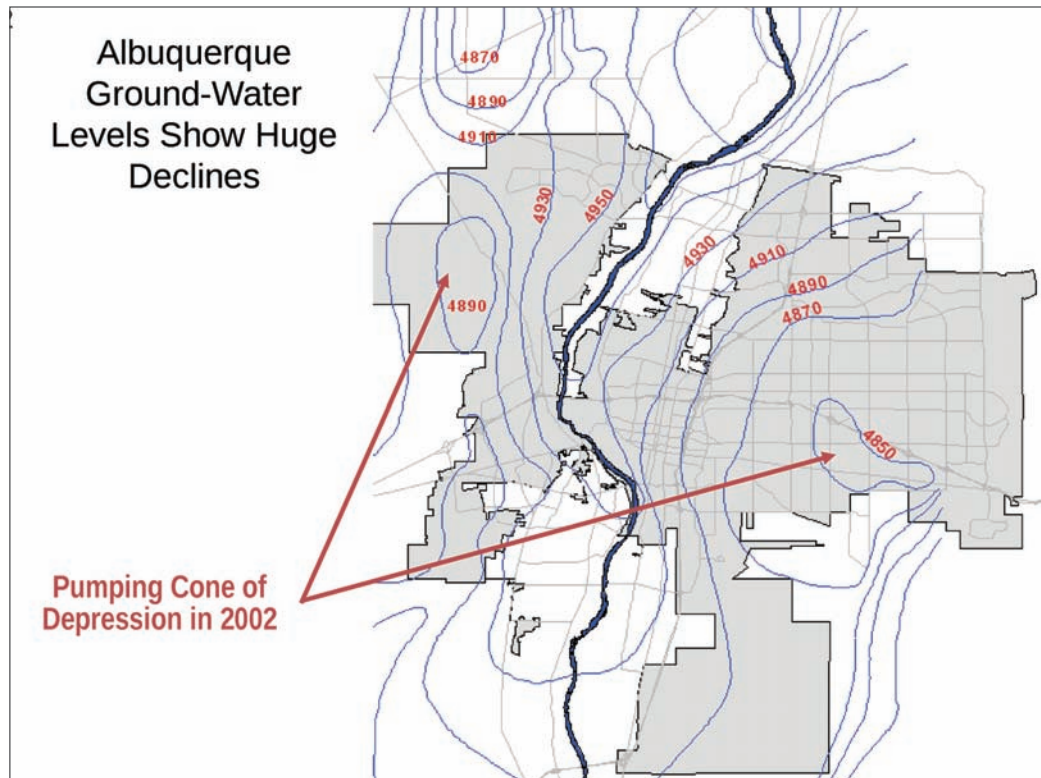
ALBUQUERQUE'S WATER RESOURCES MANAGEMENT STRATEGY

Historically, Albuquerque's water resources plan was very simple. Albuquerque would rely on groundwater from the aquifer, this aquifer pumping would cause an increase in leakage from the Rio Grande, and San Juan-Chama water would be released to make up for that increased leakage, keeping the Rio Grande whole.

In 1993, the US Geologic Survey (USGS) dispelled the myth that the aquifer underneath the metropolitan area was infinite. Even more importantly, the USGS found that that the Rio Grande and the aquifer were *not* connected in such a way that the amount of groundwater pumped from the aquifer was being replenished by like amounts of increased Rio Grande leakage. In fact, intensive field hydrologic investigations and development of a three-dimensional groundwater flow model clearly showed that only half of the groundwater that was pumped was being recharged by the Rio Grande. As a result, some areas have experienced more than 150-feet of aquifer level decline over the last thirty years. Excessive groundwater pumping has completely changed the groundwater flow pattern on the east and west side of the Rio Grande creating two large cones of depression — one on the east side and one on the west side of Albuquerque's metropolitan area.

Albuquerque Water

Figure 2 – Water Table Declines in Albuquerque in 2002



Management Strategy

It was apparent that the old water resources plan would no longer suffice and, in 1995, Albuquerque began evaluating its water resources management options. After two years of technical evaluations of 32 alternatives, countless public meetings, and the establishment of a Customer Advisory Committee, Albuquerque adopted the Water Resources Management Strategy (Strategy) in April 1997.

The Strategy consisted of: water conservation; water reuse and reclamation projects; and direct diversion and use of the San Juan-Chama water. The purpose of the Strategy was to preserve and protect the aquifer and create a long-term drought reserve.

The primary component of the Strategy was to divert and fully use the San Juan-Chama water. Designated the “Drinking Water Project” — this component required the construction of more than \$450 million of new facilities. By direct diversion and use of San Juan-Chama water, the aquifer could begin to recharge for use during peak times and drought.

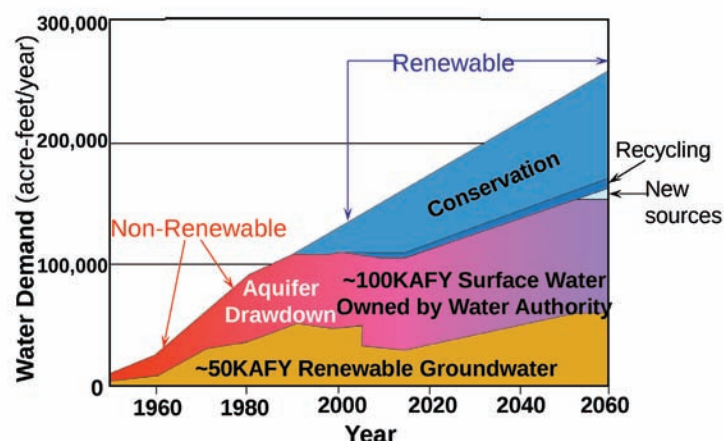
Through the extensive hydrologic investigations by the USGS, Reclamation, and numerous State and local agencies, it became very clear that water conservation and reuse alone could not solve the dwindling aquifer problem for the metropolitan area. The Water Authority needed to utilize the San Juan-Chama to avoid long-term irreversible damage to the aquifer. Studies showed that diversion and direct use will protect the aquifer in both the short- and long-term. The Strategy also includes implementing an Aquifer Storage and Recovery program to inject and store San Juan-Chama water during the winter months and to provide flexibility in the operation of the Drinking Water Project (see below).

In 2007, the Water Authority completed an extensive public process and adopted an update to the 1997 Water Resources Management Strategy. The overall policies related to preserving and protecting the aquifer were maintained, along with additional policies to prevent water quality degradation, shallow groundwater depletions in the Bosque (a cottonwood forested river corridor), and land surface subsidence. The Strategy continues to be a long-term environmental project preventing the damage associated with continued “mining” of the aquifer. [Editor’s Note: aquifer “mining” refers to a situation where more groundwater is pumped from an aquifer than is replaced by recharge].

Aquifer Recharge

Figure 3
2007 Water Resources Management Strategy (Supply/Demand)

Water Authority’s Water Resources Management Strategy included:



WATER CONSERVATION

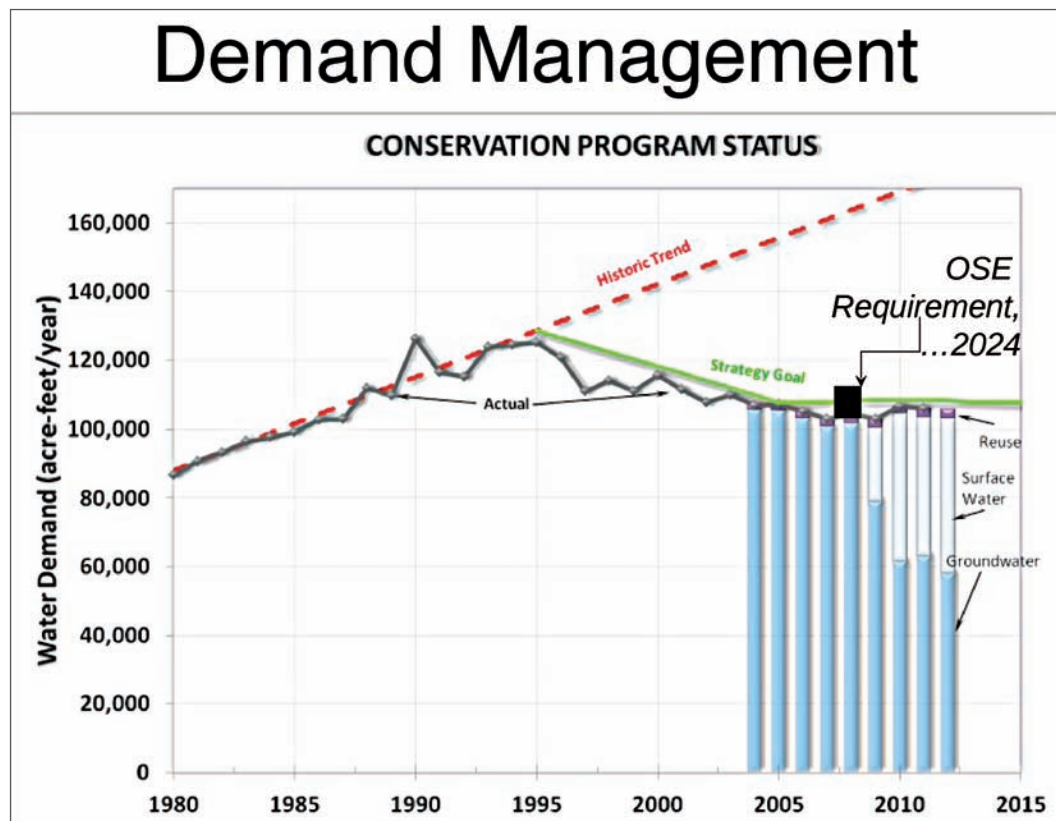
Albuquerque
WaterGoals
Met Early

Use Reductions

In response to the new hydrologic information in 1993, Albuquerque began to develop a water conservation program which started in 1995. The original goal of the water conservation program was to reduce overall use 30% from 251 gallons per person per day (gpcd) to 175 gpcd over ten years. The 30% reduction goal was achieved in 2004 and a new goal adopted to reduce an additional 10% over the next ten years or 175 gpcd to 150 gpcd by 2014. The 150 gpcd goal was reached in 2011. In 2013, an updated water conservation program was adopted with a new goal to reduce per capita use from 150 gpcd to 135 gpcd by 2024. Water use plummeted during the drought of 2013 and per capita use dropped to 136 gpcd by the end of 2013.

Thus, per capita water use which started at 251 gpcd in 1995 has been reduced to 136 gpcd by the end of 2013. Overall water diversions have been reduced from 125,000 acre-feet in 1995 to around 100,000 acre-feet in 2013, despite a more than 40% increase in population.

Figure 4 – Water Conservation and Overall Reduction in Use



Albuquerque's program has been recognized by Time Magazine as one of the most successful water conservation programs in the United States.

The conservation program consists of the following elements:

- Dedicated water conservation funding through rate increase
- Education: children and adults
- Irrigation and watering seminars
- Rebates: xeriscape, toilets, washing machines, and more
- Inclined block rate structure with surcharges for excessive use
- Water waste enforcement: fines for water leaving property
- Water Budgets for large turf areas
- Industrial/Commercial Rebates
- Free water audits
- Leak Detection
- New development standards and incentives
- Drought Management Plan: increased awareness, additional fines and surcharges
- Automatic metering project: send excessive usage (leak) letters

Conservation
Elements

2024 Water Conservation Plan, Goal and Program Update July 2013 (from Executive Summary):

PROPOSED NEW PROGRAMS:

- 1) Education — expand education programs to serve the Middle Rio Grande region and a greater number of students in our service area. Offer our customers more opportunities for input with quarterly public meetings and quarterly field trips.
- 2) Building Codes — work with both State, municipal, and county agencies and area stakeholder groups to develop legislation to require updates to current building codes that will benefit conservation without being financially burdensome to new development.
- 3) Test Your Toilet Month — promote a month when all customers are encouraged to test their toilets for leaks and make repairs with particular emphasis on multi-family housing.
- 4) Rebate Donation Program — Customers will have the option to donate 10-100% of their water conservation rebate to help fund new conservation programs. Customers will be able to select the program they wish to help fund from a list of several options.
- 5) Xeriscape Program Enhancement — expand the flexibility of this program, make the forms easier to complete, ensure that all customers who participate understand the watering needs of their new landscape and increase the amount of the rebate for non-residential customers where we particularly want to increase xeriscape efforts.
- 6) Rainwater Harvesting — develop a program to encourage installation of rainwater harvesting systems beyond the current rain barrel rebate program.
- 7) Cooling Tower Rebate — develop a rebate program for equipment to increase the cycles of concentration for cooling towers and for projects that would reuse cooling tower wastewater for landscape irrigation. This program was removed from discussion after the first round of public meetings because it is easily implemented and did not require further public comment to establish that it was a good idea.
- 8) Low Income Credit Customer Audits and Retrofits — develop a pilot program to assist new low-income credit customers with a free water audit and installation of low-flow fixtures to ensure that customers receiving the low-income credit are conserving as much as possible.

From website of Albuquerque Bernalillo County Water Utility Authority: www.abcwua.org/uploads/files/2024_Water_Conservation_Plan_Update.pdf

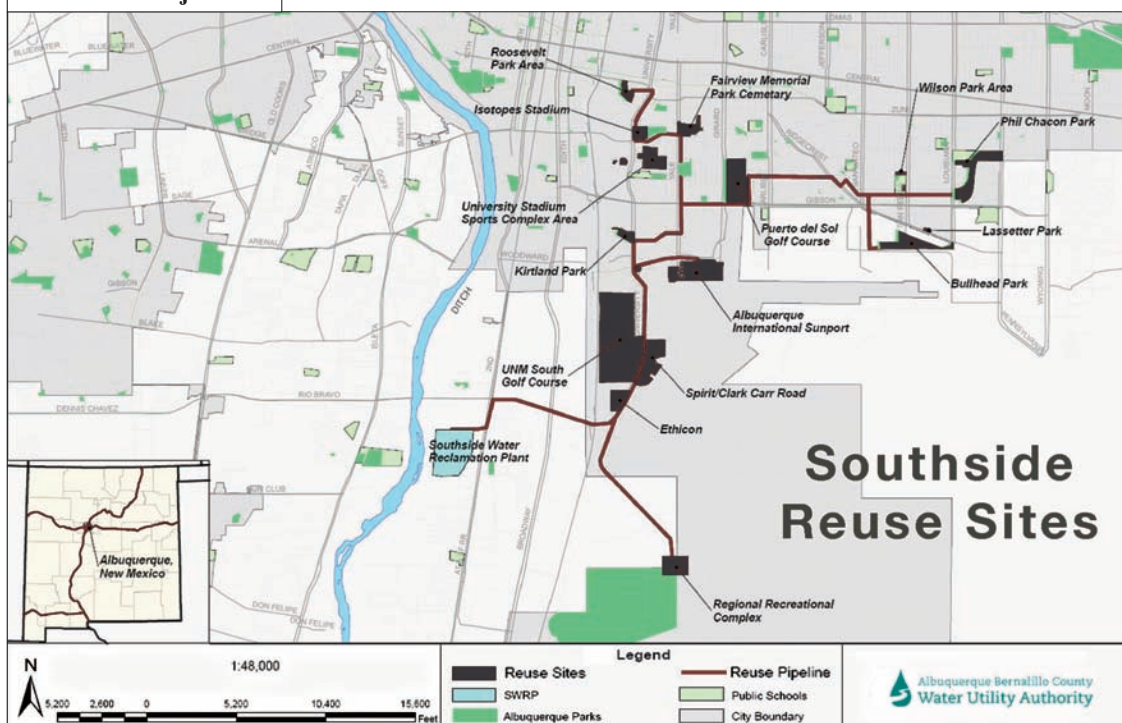
Albuquerque Water

WATER REUSE AND RECYCLING

**Figure 5
Southside
Reuse Projects**

There were a series of water reuse and recycling projects to be constructed in the Strategy. The first reuse project (North I-25 Industrial and Non-potable Surface Water Reuse Project) began operations in 2003 and includes the construction of a Ranney-type diversion on the Rio Grande. This collection well employs horizontal pipes radiating below grade in the river's alluvium out from a central collection basin. The amount of diverted non-potable water is within the amount added from the San Juan-Chama. This water is blended with industrial wastewater from a local chip manufacturer for irrigation of large turf

areas in the north valley and northeast heights. Additional wastewater effluent is polished and used for irrigation and industrial use in the south valley and south east heights under the Southside Municipal Effluent Reuse Project. The total volume of water that is currently reused/ recycled under these projects is about 4,000 acre-feet per year, which represents about 10% of the total consumptive use for the Water Authority. There are plans to construct a new reuse project for municipal effluent on the west side of Albuquerque.

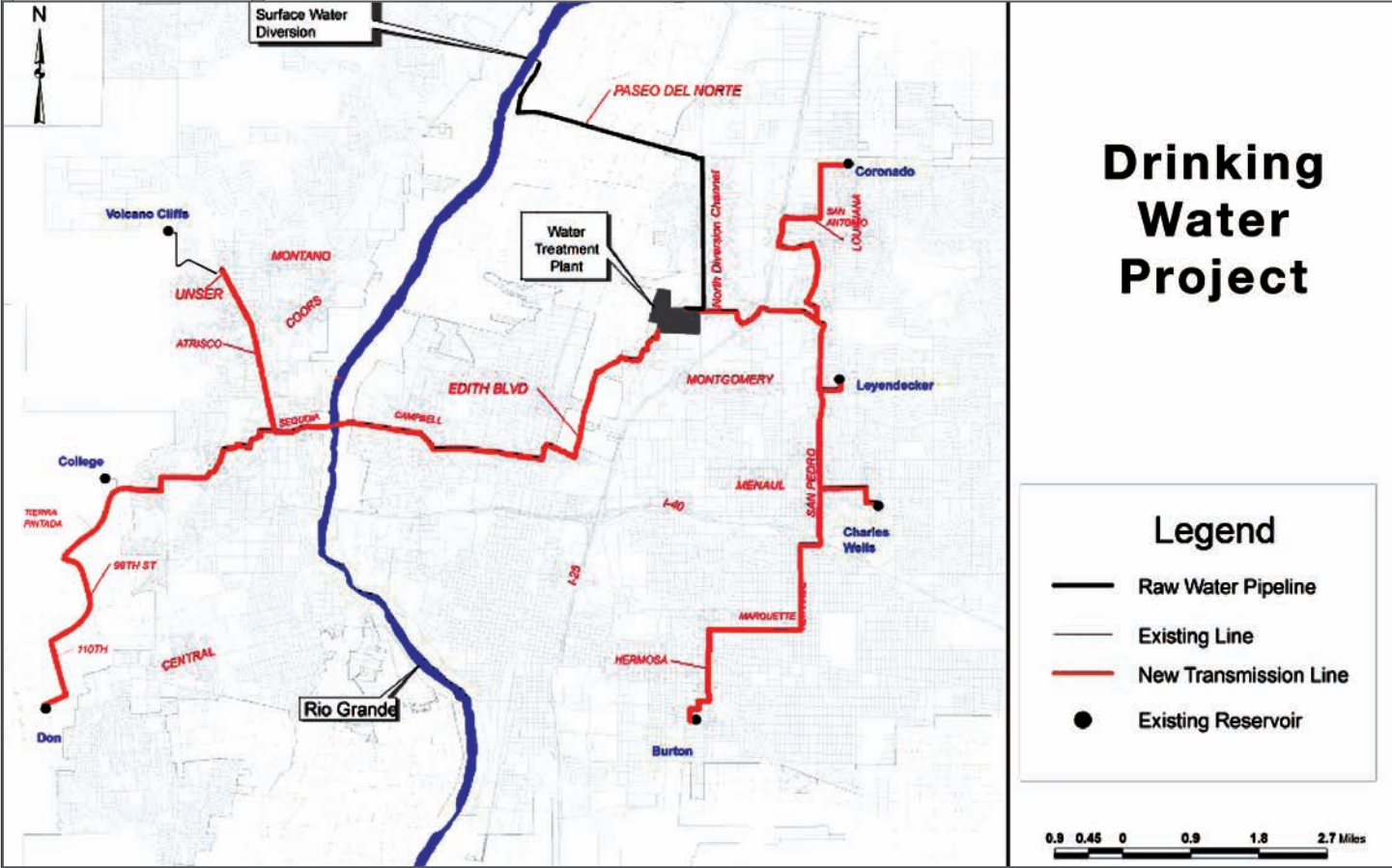


Albuquerque
Water
DWP Elements

DRINKING WATER PROJECT

The Drinking Water Project was the most complex component of the Strategy in terms of permitting and construction. This Project, which cost more than \$450 million, included: new drinking water infrastructure (including a new diversion on the Rio Grande); a water treatment plant; and transmission pipelines to connect the surface water with the existing distribution system.

Figure 6 – Drinking Water Project



Drinking
Water
Project

Legend

- Raw Water Pipeline
- Existing Line
- New Transmission Line
- Existing Reservoir

0.9 0.45 0 0.9 1.8 2.7 Miles

- Diversion
- Fish Passage
- Water Treatment
- Low Flow Restrictions

The Drinking Water Project was permitted by the New Mexico State Engineer in July 2004 for diversion of up to 96,200 acre-feet. A new diversion structure was constructed about 1000-feet south of the Alameda Boulevard river bridge. The diversion structure is a four-foot high inflatable dam with twenty-one independent sections that can be raised or lowered to control water and sediment movement in the Rio Grande.

A fish passage structure was constructed to allow for free movement of fish. However, the operation of the diversion dam also allows for always having some sections of the inflatable dam be completely flat, which allows connectivity without the need for the fish passage structure. Fish screens were also constructed to protect entrainment of the Rio Grande Silvery Minnow, a species listed as endangered under the federal Endangered Species Act.

The water treatment plant was constructed to purify 90 million gallons per day (MGD) initially, with expansion capabilities to 120 MGD. More than 44-miles of large diameter pipelines were constructed to bring the surface water from the Rio Grande to the water treatment plant and then distribute it throughout the metropolitan area.

The first construction project started with the river crossing transmission pipeline in September 2004. Full operation of the Drinking Water Project commenced in December 2008. Since that time, the Water Authority has produced surface water ranging from 25 to 45-percent of the overall demand. Due to New Mexico State Engineer’s Office diversion permit restrictions during low flows, the Water Authority had to cease diversions during critical high usage periods in 2011, 2012, and 2013 due to drought. Since the drought has continued in 2014, diversions are anticipated to be around the same level as 2013 — about 40 to 45-percent of overall demand.

AQUIFER STORAGE AND RECOVERY

Albuquerque
WaterGroundwater
Reserve

Another important aspect of the Strategy is to store San Juan-Chama water in the aquifer during the winter months to assist in creating and maintaining a groundwater drought reserve. The Water Authority is working on three different Aquifer Storage and Recovery (ASR) projects that include infiltration, direct injection of surface water into a dedicated injection/recovery well, and direct injection into an existing well that has high arsenic concentrations.

The infiltration project, entitled the Bear Canyon Arroyo project, consists of the release and infiltration of San Juan-Chama water into an existing unlined arroyo. To date, the Water Authority has stored about 1,000 acre-feet in two winter seasons. The second and third projects involve direct injection and are being designed as part of a demonstration project.

Figure 7 — Bear Canyon ASR Project

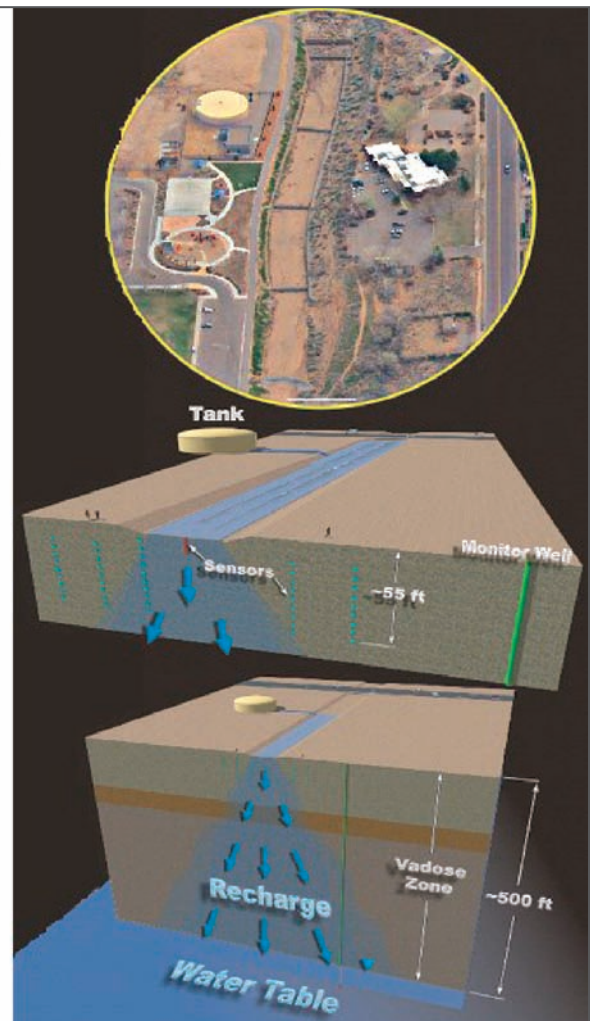
ASR PROJECTS

Bear Canyon Arroyo ASR Project

- Completed two seasons of pilot testing
- Application for full scale permit to be submitted in Feb 2014

Large Scale ASR

- Direct injection
- Existing Wells – high arsenic
- In design and testing phase



AQUIFER REPLENISHMENT

MONITORING INDICATES PROGRESS

As part of the Water Authority's ongoing hydrologic research projects, a network of groundwater monitoring wells was constructed and is maintained by the United State Geological Survey (USGS) throughout the metropolitan area. These monitoring wells provide information as to the depth and changes in aquifer levels in the shallow, intermediate, and deep aquifer. Water table measurements are also taken at Water Authority groundwater wells in the winter months and that data is combined with the monitoring well data to create water table maps of the groundwater resources in the Middle Rio Grande. The USGS has been working with the Water Authority for decades and publishes water table maps periodically, including maps for each year since the Drinking Water Project came on-line in 2008.

Aquifer Monitoring

Albuquerque Water

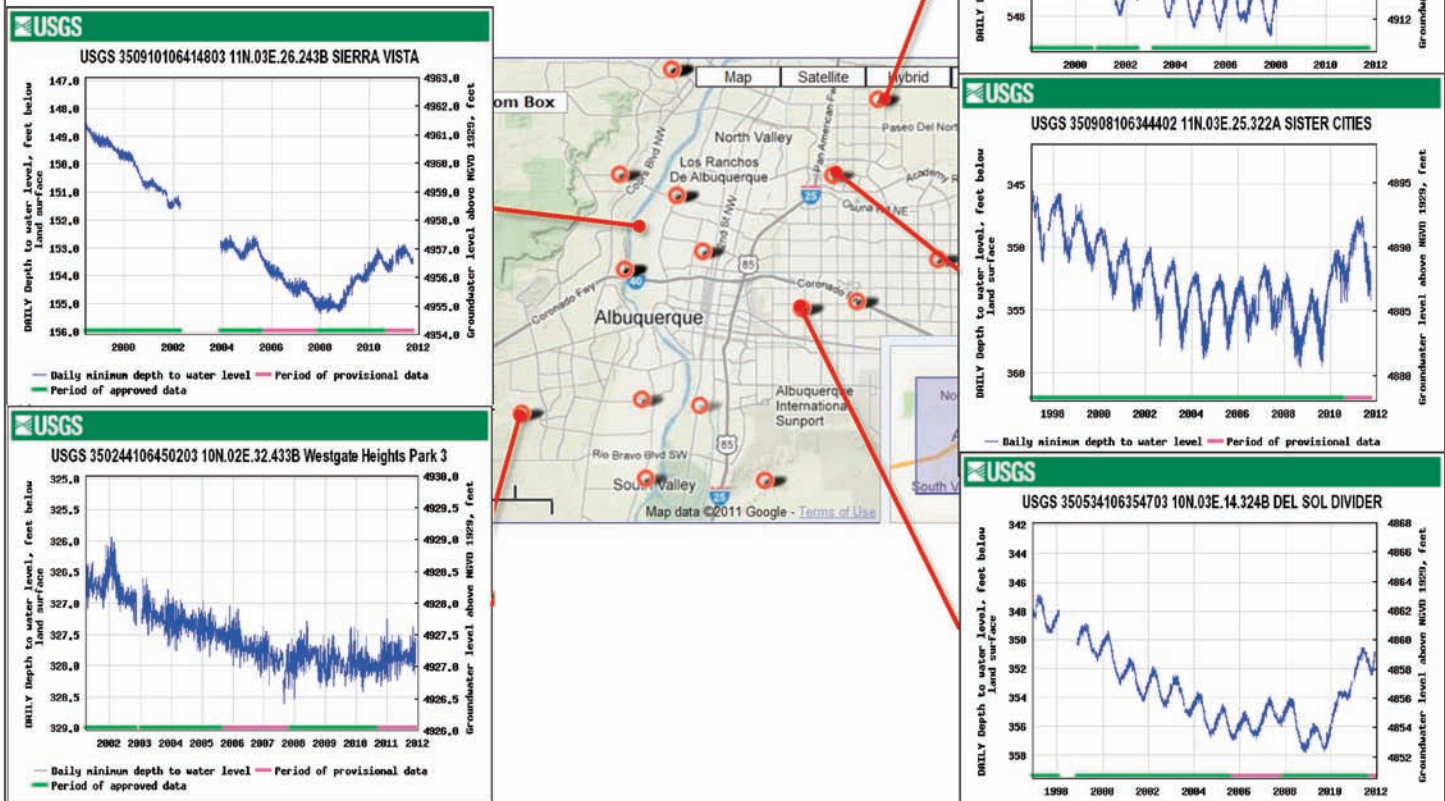
Water Table Rises

As depicted on Figure 8, there are many groundwater monitoring wells in the metropolitan area that show a clear rise in the water table starting in 2008. Some of the increases in the water table have been dramatic and were predicted by USGS in a groundwater model study of the impacts of implementation of the Drinking Water Project (*see* <http://pubs.usgs.gov/wri/wri034040/>).

The water table rises have been documented not only in the groundwater monitoring network and the Water Authority production wells, but recent monitoring of a local groundwater contamination site show serious water table increases.

Figure 8 – USGS Water Monitoring Well Information at Various Locations

Groundwater Storage and Water Levels - Recent trends with DWP



Sustainable Supply

CONCLUSIONS

The Water Authority has implemented a large portion of the comprehensive Water Resources Management Strategy intended to provide a safe and sustainable water supply by preserving and protecting the aquifer. Water conservation has been the backbone of the plan and the savings have been incredible, including a total reduction of about 45% in usage even though there has been an increase of more than 40% in population since 1995.

Water reuse and recycling projects have been constructed to match the quality of the water with the use and represent about 10% of the total consumptive use for the Water Authority.

The Drinking Water Project — the most important project in the Strategy — came on-line in 2008. Total diversion of San Juan-Chama water have been limited during the drought over the last three years, but diversion use has still reduced groundwater use by more than 40% since 2008. We are just getting ready to implement large scale ASR projects over the next few years to continue to supplement the groundwater drought reserve.

Albuquerque Water

Declines Reversed

Since 2008, groundwater levels in the Middle Rio Grande have significantly improved. Groundwater table declines have been completely reversed and the water table elevations are generally increasing at all of the monitoring and groundwater production wells. Even with drought over the last three years, the water supply in the Middle Rio Grande is increasing.

All of the technical information developed for the Strategy predicted that water table increases would occur, ranging from a few feet to more than 50-feet. The future of the Middle Rio Grande and Albuquerque hinges on our ability to preserve and protect the aquifer. While we are not done yet, it is encouraging that all of the Water Authority's efforts thus far are being rewarded.

FOR ADDITIONAL INFORMATION:

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John Stomp is the Chief Operating Officer for the Albuquerque Bernalillo County Water Utility Authority. In that capacity, he is responsible for managing the operations of the Plant, Field, Compliance and the Water Resources, Engineering and Planning Divisions. More specifically, his responsibilities consist of managing the operations to provide 95 million gallons of drinking water, treating 55 million gallons per day of wastewater, and providing five million gallons per day of non-potable reuse water for more than 600,000 residents in the metropolitan area. Mr. Stomp is a native New Mexican and holds a Bachelor's and Master's of Science in Civil Engineering from the University of New Mexico. He is also a registered professional Engineer in New Mexico and is certified as a Level III Water and Wastewater Operator.

SAN JUAN-CHAMA — NEW MEXICO SUPREME COURT RULING

PERMIT LEGALITY UPHELD

In early February, the New Mexico Supreme Court (Supreme Court) declined to review a ruling affirming the legality of the permit governing the San Juan-Chama Drinking Water Project (Project). The Supreme Court's decision lets stand a ruling by the New Mexico Court of Appeals that found that the Project does not impair the water rights of downstream users or violate the terms of the Rio Grande Compact. The Albuquerque Bernalillo County Water Utility Authority's permit allows the diversion of water imported by the US Bureau of Reclamation to the Rio Grande Basin from Colorado via the San Juan-Chama Project and diversion of natural Rio Grande water.

An application for the Project permit was submitted to the New Mexico Office of the State Engineer in 2001 and, after extensive hearings, a permit was granted in July 2004. The permit includes a number of requirements and conditions to ensure that the Water Authority's diversions of San Juan-Chama water do not have a negative impact on the Rio Grande. Project opponents took their protest of the permit to State District Court, which in turn ruled that the permit was valid. This ruling was appealed to the New Mexico Appeals Court in February 2006, with a final opinion being handed down from that court late in 2013 supporting the permit.

The Project, which required construction of some \$500 million in new infrastructure, was intended to take pressure off an overtaxed aquifer. It added surface water imported from southern Colorado to the local water supply; rights to the imported water were purchased in perpetuity in the 1960s. According to the Albuquerque Bernalillo County Water Utility Authority (Authority), the Project — which just finished five full years of operation — is credited with a significant rebound in groundwater levels at various locations around the city.

For info: Authority website: www.abcwua.org/

Instream
FlowsSnowpack
VarianceDrought
ResponseFishery
Impacts

INSTREAM FLOW LEASING IN COLORADO

by Zach Smith and Edalin Koziol, Colorado Water Trust (Denver, CO)

INTRODUCTION

Closing Day at Arapahoe Basin Ski and Snowboard Area is a rowdy day, full of beer drinking, t-shirt wearing, and slush skiing.

In 2011, Closing Day was July 4. That year, besides spoiled skiers and snowboarders, grateful water managers watched their reservoirs fill, and streamflow projections indicated far above average predictions. These conditions meant that even water users with more “junior” water rights under Western Water Law’s prioritized distribution system could receive their water allocation. They also meant healthy flows for many fish in Colorado’s basins — basins which had above 200% of average snowpack statewide.

Less than a year later, in 2012, the Arapahoe Basin Ski and Snowboard Area closed on May 6, with rocks poking out of the snow nearly two months earlier. Statewide snowpack stood at 20% of average on May 2, 2012. Water managers with reservoirs retaining water blessed the previous year’s bounty, but flows for fish, which in Colorado generally rely on native flows and junior instream flow water rights, were mostly out of luck.

With dire snowpack conditions evident as early as March 2012, Colorado Water Trust Board members asked staff if the Trust would have a drought response. The Trust is a nonprofit that works statewide to restore and protect streamflows using voluntary, market-based tools. To do this work, the Trust brings senior water rights into the State’s Instream Flow Program, managed by the Colorado Water Conservation Board (CWCB), a State agency.

In one month’s time, staff had Board approval to launch a Request for Water, in which the Trust asked Colorado’s water users — the irrigators, state agencies, special district managers, and water providers — to step up and lease water to the CWCB to protect water instream through critical reaches during a summer that would set records for low flows. The Trust would help facilitate and pay for the leases.

This article will discuss: the impact of drought on aquatic habitat; how the Trust built the pilot Request for Water Program in 2012; the previously unused tool that the Program utilized; the Program’s challenges and successes; and overall results. It also touches at times on improvements and results that occurred during the release in 2013, when snowpack in that spring once again looked dire.

IMPACTS OF DROUGHT

Drought is a part of life in the American Southwest. The Southwest’s 2002 drought triggered concerns, and studies, on the impact of drought on aquatic wildlife. Generally, lower precipitation means lower flows in rivers. Lower water volume results in dewatered riffles and runs, which limits the ability of fish to move up and down a river. As a river continues to dry, fish must retreat to deeper pools, where they face increased risk of parasitism and predation, as well as increased competition for scarce food resources. Yet even these pools can dry, leaving fish with nowhere to go. A full year-class of a species of fish can die, impacting future population rates, and entire isolated populations can go extinct. Where water doesn’t dry up completely, drought creates significant problems that cause reductions in the populations of aquatic species. A single year’s drought can have dramatic after-effects. Alternatively, a single year’s protection against drought can have benefits extending far beyond that one year.

Three well-documented examples of drought impacts include:

The Mancos River In 2002, the Mancos River through Mesa Verde National Park dried up as a result of water diversions for irrigation and paltry runoff due to a continuing long-term drought in the area. The Mancos contains flannelmouth sucker, bluehead sucker, roundtail chub and speckled dace. All of them are native to the San Juan River ecosystem in Colorado, but as of yet none have been federally listed under the Endangered Species Act. Currently, their status is as follows: speckled dace (no designation/ listing); bluehead sucker (BLM & USFS sensitive species); flannelmouth sucker (BLM & USFS sensitive species); and roundtail chub (BLM & USFS sensitive species, Colorado State species of special concern, New Mexico endangered status). Preceding the 2002 drought and 2001 fires in the Mesa Verde area, roundtail chub populations were doing well in the Mancos. But after a paltry runoff in 2002, the roundtail chub was on the brink of disappearing from the Mancos River. In June, a fish salvage operation

Instream Flows	<p>rescued 28 roundtail chubs from the few isolated and shrinking pools left in what was previously a 40-mile stretch of the Mancos River and relocated them to the Mumma Native Aquatic Species Restoration facility. The rescue came just in time for some of the roundtails — one of the pools had been discovered by common mergansers, a fish-eating duck. Many of the roundtail chubs from this pool had scrapes and abrasions from their encounters with the mergansers. Of the 28 roundtails rescued from the Mancos, only 22 survived the ordeal of being moved. <i>See</i> “Back From the Brink...A Fish Tale about Coping with Drought and Fire in Four Corners Country,” Mike Japhet www.utemountainteenvironmental.org/umep/assets/File/Water/Backfromthebrink.pdf)</p>
Trout Salvage	<p><u>Colorado Parks and Wildlife Interventions</u> In 2002, Colorado Division of Wildlife (CDOW), now Colorado Parks and Wildlife) had to rescue a number of trout populations across the state from at-risk headwater streams and transport them to fish hatcheries or lakes. One of Colorado’s three species of cutthroat trout is listed at the state and federal level as “threatened” (greenbacks) and the other two are both Colorado species of concern and considered by federal agencies to be sensitive species (Rio Grande and Colorado cutthroats). As reservoir and lake levels decreased, CDOW had to move trout populations to other deeper reservoirs, but many of the salvaged trout died due to the additional stress of the move. While CDOW was successful in salvaging some populations, others were destroyed, including several cutthroat trout populations in the Rio Grande and the trout fishery in Antero Reservoir. <i>See</i> Colorado Water Conservation Board, Department of Natural Resources, 2010. <i>Colorado Drought Mitigation and Response Plan</i>.</p>
Food for Fish	<p><u>Macroinvertebrates</u> Macroinvertebrates occupy a vital position in streams — they process the leaves, algae, and organic material in streams and are, in turn, food for fish and other predators. Due to their reliance on water bodies during most stages of their lives, macroinvertebrates are significantly impacted by the changes in water quality and quantity that accompany drought in Colorado. A study conducted on Trout Creek, in the upper South Platte River basin, during the 1974-1978 drought found that invertebrate abundance was reduced by 50% during drought years. Mayflies common to the stream before the drought became less common as Trout Creek’s flows diminished and had disappeared entirely from the stream by the time the drought broke. Other mayflies and caddis suffered low population levels during the drought but were able to recover after the drought. Canton et al. (1984). <i>The Macroinvertebrates and Fish of a Colorado Stream During a Period of Fluctuating Discharge</i>. <i>Freshwater Biology</i> 14:311-316.</p>
Long-Term Benefits	<p>Getting these populations through a bad year can be critical to their long-term survival. Short-term leasing, then, becomes an important tool with long-term benefits.</p>
<p style="text-align: center;">COLORADO INSTREAM FLOW WATER RIGHTS</p>	
Instream Flows	<p>Under Colorado law, instream flow water rights — i.e., water rights held for the preservation or improvement of the natural environment between two points on a stream — must be held by the CWCB. The Stream and Lake Protection Section of the CWCB is made up of six employees, and together they manage nearly 1600 water rights covering 9,120 miles statewide. The Section appropriates new instream flow water rights, protects these rights from physical impairment and from legal challenges, and acquires senior water rights to change and use for instream flows. More than 98% of the CWCB’s instream flow water right portfolio (by number of water rights) is junior to 1973 (when instream flow was recognized by the State legislature as a beneficial use), often making them some of the most junior water rights in the State’s prior appropriation system. Moreover, the instream flow water rights often begin in headwater regions of the state, and end above or at the first major diversion on a stream. Recently, however, the CWCB has appropriated or is in the process of appropriating larger instream flows on the middle and downstream segments of streams, including on the San Miguel, the Eagle, the Colorado, the Roaring Fork, and the Dolores (<i>see</i> http://cwcb.state.co.us/environment/instream-flow-program/Pages/main.aspx).</p>
Junior Rights	<p>The Trust works exclusively within the CWCB’s acquisition program, working to bring senior water rights with the ability to restore flows to streams into the CWCB’s portfolio. The acquisition program requires two main steps after a water right owner is willing to convey the water right: 1) a CWCB Board approval process governed by a set of administrative rules; and 2) the water court application and decree process. 2 CCR 408-2:6 (2013). The water court process is identical to the process any entity in Colorado must navigate to change the use of a water right. The result is water court approval of the new use, preservation of the original priority date of the senior water right, and the ensuing obligation of the State’s water administrators (Colorado Division of Water Resources (CDWR)), to administer that new use of the water right under its already-existing priority (<i>see</i> http://water.state.co.us/Home/Pages/default.aspx).</p>
Acquisition Program	
Change of Use	

COLORADO'S TEMPORARY LOANS FOR INSTREAM FLOWS TOOL

UN-USED FOR NINE YEARS

Instream
FlowsFlow
ProtectionTemporary
Instream UseRequirements
&
LimitsShort-Term
Lease Process

Outreach

Background: The 2002 Experience

During the drought of 2002, some water managers, including Colorado Parks and Wildlife (CPW), offered to supply the CWCW with water available under their water rights in order to protect fish species on rivers around the State. However, the CWCW pointed out that while the water was desperately needed, CDWR would not have the authority to protect the water instream from diversion by other water right holders because “instream flow” was not a recognized use for the water rights being offered. To have the water protected instream, the CWCW would first have to work through its Board approval process and then the water court process. Unfortunately, by the time these processes could be worked through, the critical protection window would have closed. Consequently, local users hammered out informal agreements instead. On the White River, CPW and local diverters allowed water to flow down to protect habitat and the native whitefish population. (See http://pubs.usgs.gov/sir/2006/5322/downloads/sir06-5322_508.pdf and www.yourwatercolorado.org/headwaters-archive-template/278-drought-2002).

The 2002 experience drove change. During the legislative session in 2003 and as refined in 2005, the Colorado General Assembly recognized the need for a quick-response tool to protect flows in streams. With bi-partisan support HB-1320, passed, authorizing CDWR to quickly add temporary instream flow use as a use to a water right through an administrative approval process, rather than the water court process. CDWR's new authority came with important restrictions.

Highlights of CDWR's Temporary Loans for Instream Flows authorization:

- Allows for the temporary use of water for instream flow
- Must be used in conjunction with an already existing instream flow right
- CDWR approves the leases upon a showing of no injury to water rights holders
- Requires a “reasonable estimate” of historical consumptive use
- CDWR may only protect the leased instream flow water up to the decreed amount of the existing instream flow (i.e. if the existing instream flow is met, no additional water from the leasing water right can be protected)
- Approval lasts for 10 years
- Instream flow use may only occur during three of those years, and only for 120 days in a calendar year
- 10-year approval is renewable once if not used during first 10-year approval
- In years water is used for instream flows, no diminishment in record of historical consumptive use of the water right. In other words, any year a lease is operated the water right gets an N/A in its record, thereby protecting the right from forfeiture due to non-use.

§ 37-83-105, C.R.S. (2013).

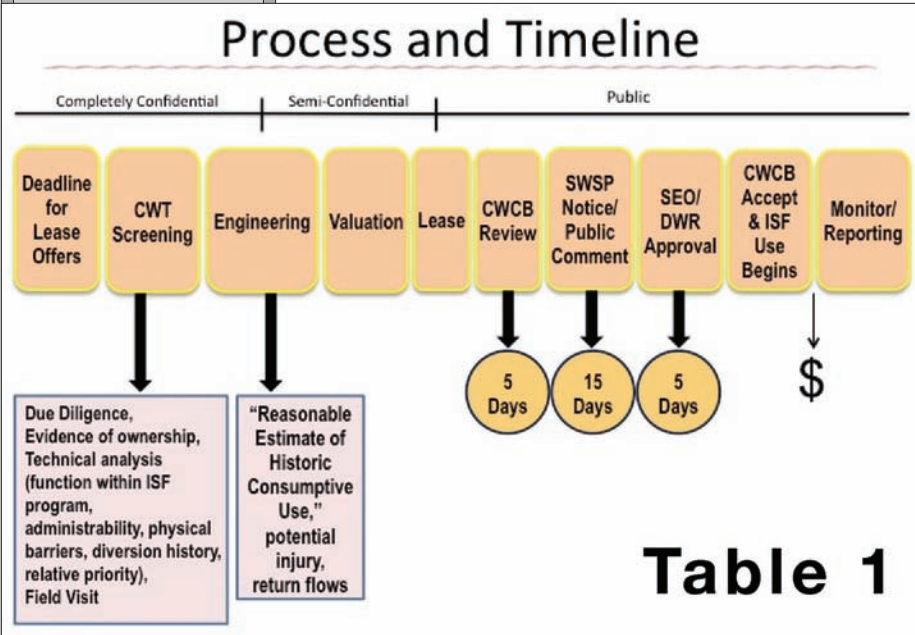
Upon receiving an offer for a short-term lease under the statute, the CWCW Director has five days to determine it has value for instream flow. If a lease is determined to have value, the CWCW requests approval by CDWR and the appropriate CDWR division engineer, and provides notice of the application to all parties on the substitute water supply plan notification list for the water division in which the proposed loan is located. The division engineer approves the loan after consideration of any comments — so long as operation and administration of the proposed loan will not cause injury to other decreed water rights, and will not affect Colorado's compact entitlements. Formal hearings or proceedings are not required prior to approval, but the division engineer may conduct such hearings if he or she finds it necessary to address the issues. CDWR's process by statute takes 20 days — the division engineer has five days to approve or deny the lease following a 15 day public comment period. After approval, parties have 15 days to appeal the division engineer decision. After the lease has been approved, the CWCW Board of Directors votes to ratify the CWCW Directors decision at their next board meeting. (§ 37-83-105, C.R.S. (2013), 2 CCR 408-2:6(k) (2013)).

Colorado's Temporary Loans for Instream Flows tool sat on the books, un-used, for nine years. In preparing the Request for Water Program, the Trust met with CWCW and CDWR to discuss how to implement the statute.

THE REQUEST FOR WATER PROGRAM

With low snowpack and the leasing tool in hand, the Trust ultimately decided to issue an outreach campaign to see if water rights owners throughout the State would lease senior water to the Trust and CWCW to shore up junior instream flows in a dry year.

Instream Flows	Building the program required many components, including: <ul style="list-style-type: none">• Outreach to the water community• Developing Priorities• Building Infrastructure internally to triage offers• Fundraising• Coordination with the CWCB and CDWR• Completion and Implementation of leases• Monitoring and Reporting
Offer to Lease	Outreach: We tapped our network of listservs, media contacts, partners, friends, and enews subscribers to widely circulate our offer to lease water rights for flows. Our website dedicated a web page to the effort (<i>see</i> www.coloradowatertrust.org/campaigns/request-for-water-2013). The outreach webpage also included downloadable offer forms, terms and conditions of offering water, and a frequently asked questions guide.
Prioritizing	Priority Basins: Initially, the Trust’s Board feared that Trust staff would be overwhelmed by responses if the Request for Water was issued statewide. In response to that concern, Staff developed priority basins using several metrics. Staff looked at: where the CWCB had historically placed administrative calls for its water rights; where CPW had identified critical streams during the 2002 drought; and where streams with instream flows and water rights lined up. In the end, the Trust had designated 19 priority basins around the State.
Screening Tool	Infrastructure: Staff developed: (a) a quick screening tool to determine if an offered water right met the criteria required for leasing; (b) a network of engineering consultants to outsource the quantification of “reasonable estimates of historical consumptive use”; (c) a valuation process performed by WestWater Research, LLC; (d) a form lease; and (e) a form application to CDWR. Generally speaking, water rights that survived the screening tool were those senior enough to provide benefits during drought conditions that were located within or upstream of an instream flow water right predicted to be short of its water allocation.
Agency Coordination	Fundraising: Trust staff met with and raised money from a number of funding sources, including: the Gates Family Foundation; Bonneville Environmental Foundation; the City of Steamboat Springs; and the National Geographic Society.
Terms	Coordination: As mentioned before, Trust staff met with CDWR and CWCB staff before unveiling the program to discuss: how to apply for the approval; what details CDWR needed; how to handle comment letters; and how to track the use of the water for instream flow in CDWR’s records. Implementation of Leases: Trust staff met and negotiated with water lessors over terms, including price and start date of the lease. Staff coordinated with local water commissioners to see how the water could be administered instream. Implementation also included providing affidavits to CDWR to prove “dry-up” had occurred for temporarily changed irrigation water rights. Trust staff also worked closely with CWCB and CDWR staff to install gages and make streamflow measurements.



Monitoring and Reporting: Staffs at the Trust, CDWR, and CWCB all worked closely together to monitor streamflows once water was instream. At the end of the season, Trust staff compiled water use records on behalf of the CWCB for CDWR.

Table 1

Table 1 graphically represents the Trust’s entire Request for Water Process process.

Table 1

REQUEST FOR WATER RESULTS

The Trust ran the Request for Water in 2012 and 2013. In terms of total numbers and percentages of water rights that passed through the Program's processes, the results tracked closely between the two years of the programs existence — as is represented in Table 2.

Table 2

RFW Stats	2012	2013
Water rights offered for lease	94	130
Number of entities offering water rights	21	19
Passed initial screen	56 (59%)	86 (66%)
Passed engineering review	13 (14%)	34 (26%)
Number of water rights leased	6 (6.3%)	7 (5.3%)
Number of leases approved	4	3
Ongoing leases (10-year approvals)	3 leases	3 leases
Divisions Offered	6 of 7 (all but San Juan basin)	5 of 7 (all but the, Arkansas and Rio Grande)
Divisions Leased	Colorado & Yampa/White	Gunnison, Colorado & Yampa/White
Total Miles Approved for Protection	106	125

REQUEST FOR WATER CASE EXAMPLES

Winter Park Ranch Water and Sanitation District:

Two water rights, 10-year term, implemented in 2013, Fraser River

For years, Kirk Klancke, the general manager of Winter Park Ranch Water and Sanitation District (WPR), and the Trust had discussed using some of WPR's water rights to improve flows in the Fraser River basin — a river heavily-used for municipal and irrigation needs. In 2013, the Trust and WPR entered into a lease for 1.03 cubic feet per second (cfs) of water to improve flows on St. Louis Creek and the Fraser River.

This lease is noteworthy because it pioneered the concept of tying the amount of water protected under the lease to the climatological conditions in a particular year. For example, typical instream flow leases generate water based on average historical use during a representative period. Instead, in the WPR lease, the Trust asked CDWR to approve the protection of different amounts of water based on an index that predicts the amount of water available in a particular basin — called the "Surface Water Supply Index." This is important because in dry years, senior water rights typically divert *more* than average. Depending on the prediction in a given year, water available to the WPR lease will more closely follow historical operations in a similar climatological year, resulting in potentially greater benefits to the stream (depending on the quality of the water right) and less risk of injury to other water rights.

McKinley Ditch:

Four water rights, 10-year term, Little Cimarron River (tributary to the Gunnison River)

The Little Cimarron River flows out of the Uncompahgre Wilderness Area in the Gunnison River basin. In its headwaters, wildlife managers classify the Little Cimarron as a wild trout stream. However, diversions lower down the valley reduce flows, often leaving a dry stream. In 2013, the Trust leased 5.89 cfs of water from one such diversion, the McKinley Ditch. At that time, the water and the land was owned by Western Rivers Conservancy.

Instream
Flows

Results

Supply Index
Trigger

Dry Stream

Instream Flows	<p>Physical infrastructure was a challenge for this lease. Because the infrastructure of the ditch automatically divides up the shares among the shareholders and delivers the pro rata amount to their fields, any removal of water impacts the amount of water delivered to each shareholder. The Trust worked closely with the other shareholders on solutions to the infrastructure issue and eventually came to a mutually acceptable solution.</p>
"Split-Lease"	<p>This lease also pioneered the "split-lease" concept in Colorado, whereby irrigation continues on the land through June or July, then is used to benefit instream flows later in the season. After the Trust obtained CDWR and shareholder approval to operate and measure the lease, late rains rendered the instream flow water right completely satisfied, which closed the window on the leasing tool. However, the 10-year terms allows the lease to be reactivated in another future dry-year.</p>
Storage Releases	<p>Upper Yampa Water Conservancy District: Multiple storage rights, Stagecoach Reservoir Two one-year leases implemented in 2012 and 2013, Yampa River</p> <p>This lease operated in both 2012 and 2013. Upper Yampa offered the Trust 4,000 acre-feet of water after the Trust issued its first Request for Water in the spring of 2012. Biologists worried that streamflows below Stagecoach reservoir would be low in 2013, including flows through the endangered fish reach farther downstream. The water would fill holes down the Yampa with the help of many different entities.</p> <p>The Trust based its releases on recommendations from local CPW biologist Bill Atkinson. Releases augmented flows in the Yampa through Steamboat Springs in amounts ranging from 20–30 cfs, supplementing instream flow shortages.</p>
Flow Reach	<p>Because of the limitations of the leasing tool, the protected segment of flows was quite short — around five miles from the outlet of Stagecoach to the inlet of Lake Catamount. In order to maximize the benefit of the released water, Catamount Development, Inc. and Tri-State Generation and Transmission Association, Inc., stepped up to help bring the water farther downstream.</p> <p>Upper Yampa released the water through their jet turbine, first generating electricity. The water then traveled downstream, protected as instream flow to Lake Catamount. Catamount Development then allowed the water to run through Lake Catamount and on to Steamboat Springs. Farther downstream, the Trust signed a water use agreement with Tri-State for the water to be used more than 40 miles downstream in Tri-State's power plant at Craig. When flows dropped sufficiently, DWR could deliver this same water all the way down to Craig — extending unofficial flow benefits to that entire reach.</p>
Coordinated Approach	<p>Bunte Highline Ditch: Three water rights, 10-year term, implemented in 2012 and 2013 Willow Creek (tributary to the upper Colorado River)</p> <p>The Bunte Highline lease can put nearly 12 cfs of previously diverted water back into the headwaters of the Colorado River just downstream from Rocky Mountain National Park. Implementation of this lease required coordination with a large local water provider, Northern Water. Northern operates a reservoir upstream of the Bunte Highline ditch on Willow Creek, as well as Windy Gap, an on-channel reservoir downstream of the Bunte Highline. To implement this lease, the Trust, the lessor, and CWCB coordinated for releases from Northern's Willow Creek Reservoir, protected the water downstream to Windy Gap, coordinated again with Northern to ensure that water was bypassed, and then protected again downstream to the confluence with the Blue River.</p>
Success Factors	<p>PROGRAM CHALLENGES AND SUCCESSES</p> <p>The most consistent challenge to the Request for Water program over both years was the ability to line up a willing lessor of a water right within the constraints of the law. Specifically, this challenge entailed: 1) finding a willing lessor; 2) who had a water right with good consumptive use in drought years; 3) which diverted out of a stream with an existing instream flow; 4) that staff could predict would be water-short. Even with willing lessors in the program, less than 10% of the water rights offered ended up being leased.</p>
Irrigation "Dry-Up"	<p>Many other challenges existed, however. Because the Trust was managing water, and because CDWR required dry-up of lands historically irrigated as a condition of approving leased irrigation water rights, the Trust found itself in the role of a water operator and land manager. As such, each lease came with unique challenges. Trust staff and their partners on the ground cleaned out ditches, ran off beavers, and built new infrastructure to measure and then deliver water into a stream.</p>

**Instream
Flows****Varying
Conditions****Return Flows****Education****Dry-Year
Yield****Split-Season****Outreach**

Trust staff also kept an eye on the sky. Snowfall in early spring of 2013 tracked just above 2012, but then heavy snows in April and massive late-season rains filled streams. Unpredictable weather continued to flout some efforts. For example, as flows began to fall on the Fraser River late during the summer of 2013, the Trust worked with Winter Park Ranch Water and Sanitation District, who had leased one cfs into the program, to prep for low flows. Staff and the CWCW installed and rated staff gages and locked headgates, waiting for flows to drop below the instream flow level. And then the sky opened up, and the Fraser, bordering on severe low flows, nearly hit new highs.

One major technical hurdle that hounded each lease was the need to replace return flows to prevent injury (i.e., impairment of any other water rights), especially the need to replace lagged return flows. Solutions were lease-specific: the Trust used lessor's own augmentation water sources, contracted for replacement water from the Colorado River District, and built seepage ponds on historically irrigated ground. Return flow, as defined by the Colorado Supreme Court, "is not waste water. Rather, it is irrigation water seeping back to a stream after it has gone underground to perform its nutritional function." *City of Boulder v. Boulder & Left Hand Ditch Co.*, 557 P.2d 1182, 1185 (Colo. 1976).

Successes also came in different types, from cultural to technical. For one, the drought and the proposed leasing brought Colorado's Instream flow Program to the front page of the Denver Post. The average Coloradoan is unlikely to understand how water works and moves in Colorado, much less how streams they love in the mountains and on the plains can go dry, and how there are tools to restore them. A firm the Trust hired to evaluate the program concluded that the leasing program had "moved the needle" in terms of better educating people about river protection.

The Trust also had several technical successes. For example, Trust staff used historical dry-year flows for two leases to more accurately quantify the amount of water that would be available to a leased water right in a dry year. Another example is split-season leasing for instream flows — in which an irrigator could apply water through June or July, and then shut off the irrigation when streamflows drop in the late season. This idea has garnered support from agricultural producers as a way to keep ground wet while still improving stream habitat. Although used in other states' instream flow programs, this was the first time this tool had been used for instream flows in Colorado.

To further evaluate Program challenges and successes, in 2012 the Trust hired a consulting group to evaluate the effectiveness of the project — everything from how well the Trust talked about its goals to whether the Program changed the conversation around instream flows in Colorado. One of their recommendations was to concentrate more on outreach. In 2013, Trust staff scheduled two webinars and four basin visits to talk about the program. Ironically, the basin visits were scheduled in April, when the snow finally came. One staff member expressed that it was hard to talk about the need for leasing when the staff member couldn't get over the newly-snowed-in passes.

CONCLUSION**THE REQUEST FOR WATER PROGRAM'S FUTURE**

Snowpack in Colorado this year is trending above average, so the Trust will likely not roll out the Program again in 2014. However, the Trust considers the Program a very useful tool in its toolkit, and may apply it in different, and more strategic, ways in the future. The Trust also learned lessons from the leasing that can be applied to its permanent projects — including the dry-year yield and split-season use ideas. One lasting change staff hopes for is that when water attorneys, engineers, managers, or providers look at their water rights portfolio, they consider creative ways to combine their consumptive needs with the needs of rivers.

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Edalin Koziol is the Colorado Open Lands Fellow, working at the Colorado Water Trust. Edalin has always been passionate about maintaining and improving the health of the nation's rivers and streams. She has an M.S. in aquatic sciences, environmental policy, and conflict resolution from the University of Michigan and received her J.D. from Vermont Law School, where she focused on water and environmental law and alternative dispute resolution. She has served as a mediator in Vermont and New Hampshire courts and as a clerk for the Office of General Counsel at the US EPA's Office of Water.

Regional Water Management

Case Study

Unique Organizations

Groundwater Overdraft

Tucson Water Providers

REGIONAL WATER MANAGEMENT COOPERATION

STUDY COMPARES FOUR CASES IN THE WEST

by Nathaniel Delano and Sharon B. Megdal (The University of Arizona)

INTRODUCTION

This article provides the results of a study of four approaches to regional water collaboration in the West. Following up on a recommendation from water thought leaders from the Tucson, Arizona area to examine regional frameworks employed elsewhere, the University of Arizona Water Resources Research Center (WRRC) investigated the following four entities: the Southern Nevada Water Authority, the San Diego County Water Authority, the Santa Ana Watershed Project Authority, and Denver Water. This article presents summary information on the history, organization, and formal powers of each specific water authority. Each water authority's past is examined to shed light on the historical drivers that led to greater collaboration. Organization structures are outlined to show the various forms of representation these authorities utilize to give voice to their member agencies or customers. Finally, each section concludes by laying out the powers given and denied to each authority.

Not surprisingly, we find that each organization is unique. Levels of authority, funding mechanisms, and institutional scope vary across the four water entities examined. The Southern Nevada Water Authority, for example, has broad powers to safeguard continued water supply and water sustainability for Clark County, Nevada, whereas the Santa Ana Watershed Project Authority focuses on planning and environmental issues that transcend its member agencies' boundaries. Nevertheless, there are some interesting similarities across the entities studied. In particular, both the Southern Nevada Water Authority and the San Diego County Water Authority provide wholesale water service to their member agencies, but leave wastewater treatment to those agencies and other entities. Whereas the other three authorities function as primarily independent public agencies, Denver Water is a public utility situated in the Denver municipal government. While this study represents an initial look at just a few water organizations in the West, the information and context included about each authority and Denver Water provides some blueprints for those considering enhanced regional approaches to addressing water management challenges.

BACKGROUND

WATER PROVISION IN THE TUCSON REGION AND MOTIVATION FOR THE STUDY

The City of Tucson, with a population of nearly 525,000 people covering an area of 227 square miles, is part of a larger metropolitan area of approximately 992,000 people. "Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2010 to July 1, 2012." U.S. Census Bureau. N.p., n.d. Web. 23 Jan. 2014 ([see www.census.gov/popest/data/metro/totals/2012/tables/CBSA-EST2012-01.csv](http://www.census.gov/popest/data/metro/totals/2012/tables/CBSA-EST2012-01.csv)). In this article, we will refer to the greater region as Tucson. Reliance on groundwater defined much of Tucson's water history, which resulted in significant overdraft of regional aquifers in the 1960s and 1970s. The WRRC publication, *Water Resource Availability for the Tucson Metropolitan Area*, explains efforts to combat this overdraft: "In 1980 Arizona adopted the Groundwater Management Act (Act) to address the serious groundwater overdraft — or mining — that was occurring in several regions of the state, including Tucson...Since 1993, Colorado River water has been delivered to the Tucson region through the Central Arizona Project (CAP) canal. In addition, treated wastewater, or effluent, has been increasingly recognized as a source of water for meeting community needs." Megdal, Sharon, prepared with the assistance of Kelly Lacroix. *Water Resource Availability for the Tucson Metropolitan Area*. Water Resources Research Center, July 2006. Web. 23 Jan. 2014 (https://wrrc.arizona.edu/sites/wrrc.arizona.edu/files/megdal.az_water_resource.avail_for_tucson.pdf).

The complex legal and geophysical history that created the challenging water situation in Tucson is further complicated by the many stakeholder and political groups involved in Tucson's water management process. These groups include the City of Tucson (and the city's water utility, Tucson Water), Pima County (and its regional wastewater utility), the business community, other incorporated towns, some with their own municipal water companies (Oro Valley, Marana), private water companies, water districts, Native American Nations, community organizations, and others. Figure 1 shows the largest eight water providers in the Tucson region in terms of annual water demand. Tucson Water demanded around 133,000 acre-feet in 2008, as compared to the second highest demander, the Town of Oro Valley Water Utility, which

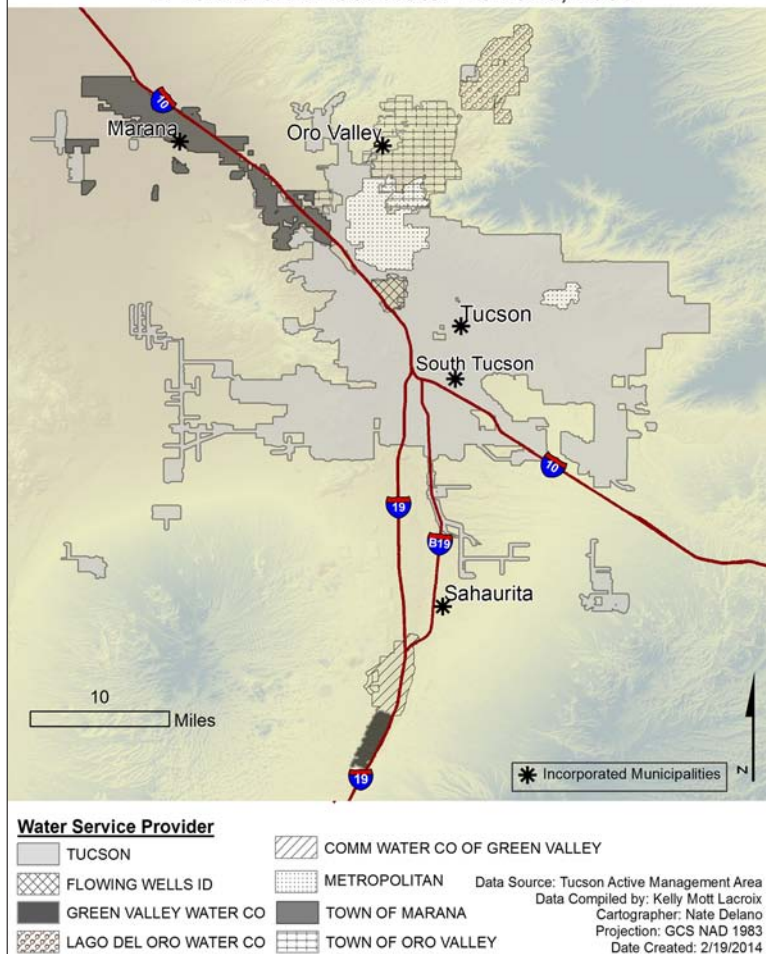
Regional Water Management

Regional Approach

Survey Process

Figure 1
Large Water Providers in Tucson

Largest Water Providers in the Tucson Region In Terms of Annual Water Demand, 2008



used only 43,000 acre-feet. Tucson Water has the largest customer base in the region (around 710,000), about 33% of whom live outside the city's borders. Tucson Water. "Water Rates FY 2014 Information Presentation." Tucson Water, 7, 9, 14, 15, May 2013. Web. 23 Feb. 2014 ([see www.tucsonaz.gov/files/water/docs/Town_Hall_Rate_Information_for_FY_2014.pdf](http://www.tucsonaz.gov/files/water/docs/Town_Hall_Rate_Information_for_FY_2014.pdf)).

The diverse landscape of water providers and stakeholders, overlaid on one of the most water-stressed regions of the United States, led to the belief by some that water management in Tucson could be conducted more effectively and efficiently if there was greater collaboration in the Tucson region to streamline infrastructure development, environmental impact analysis and mitigation, water purchasing, and other aspects of water management.

A major attempt to share information and consider a regional approach to addressing water management challenges began in 2008 with the commission of the *Water and Wastewater Infrastructure, Supply, and Planning Study* (www.tucsonpimawaterstudy.com) by the City of Tucson Mayor and Council and the Pima County Board of Supervisors. The study collected information about the state of water infrastructure and available water supplies for the Tucson region, and worked towards creating a more comprehensive and inclusive water plan by publishing a set of joint city/county goals and recommendations. This report generated initial momentum for greater regional collaboration, but was also criticized for being too limited in its engagement of Tucson's water stakeholders, as not all interested and invested parties were given a seat at the study table.

In order to broaden the organizations involved in the discussion, the Regional Water Assessment Task Force formed in 2011. This five-member volunteer group was composed of representatives from the Community Water Coalition, WRRRC, Southern Arizona Water Users Association, Tucson Regional Water Coalition, and Pima Association of Governments. In an effort to receive broad input from a diverse group of regional participants on the future of water management in Tucson, the Task Force designed and implemented a computer-based real-time canvassing of viewpoints. This interactive and partially anonymous survey process, which utilized the software tool Think Tank, was completed by representatives of a wide range of community sectors and interest groups in the Tucson area, including: elected officials;

municipal managers; public utilities including water and wastewater; private water utilities; CAP Board and staff; state and federal agencies; Indian nations; agricultural interests; mining interests; the University of Arizona; environmental advocates; land management groups; economic development interests; and individuals with long-term involvement in water issues, including attorneys. Kiser, Madeline, Sharon Megdal, Mark Stratton, Vince Vasquez, and Claire Zucker. "Report of the Regional Water Assessment Task Force 'ThinkTank' Process." Water Resources Research Center, 1 Aug. 2011. Web. 1 Nov. 2013 (<http://wrrc.arizona.edu/sites/wrrc.arizona.edu/files/RWATF%20Report%20August%202011%20LowRes.pdf>).

The results of the effort, summarized in the *Report of the Regional Water Assessment Task Force "Think Tank" Process*, indicated that there was strong agreement among stakeholders in the Tucson metropolitan region that although there were existing instances of regional coordination, greater cooperation and collaboration would be beneficial for the area. As quoted in the Think Tank Report, "[P]articipants recognized that regional cooperation and coordination should be based on a shared vision regarding the desirable balance in the region of urbanization, agriculture, industry and natural desert. Coordination among political bodies, between governments and water bodies, and between entities that manage groundwater, surface water and effluent was supported by Think Tank participants." *Id.*

The enthusiasm for collaboration was tempered, however, by a lack of agreement on how it should be structured. "Some participants favored a loose affiliation of entities that would collectively uphold an agreed-upon water management framework, supporting continued primacy of individual entity's decision-making. Others favored cooperation on individual efforts, such as project-specific

Regional Water Management

Conservation Needs

Supply Management

Figure 2
Southern Nevada Water System



infrastructure development, supply acquisition or standardized conservation programs.” This led the Task Force to recommend case study investigation of other successful instances of regional collaboration for water resource management. As stated above, this report represents work the WRRC undertook on its own to fulfill partially this recommendation. The four cases to be studied were selected by the authors as representing interesting and varied regional entities in the West. Three are actually organized as authorities; Denver Water is a large city-owned water provider that more resembles Tucson Water. Each entity is described in what follows, using publicly available information, in its own section.

SOUTHERN NEVADA WATER AUTHORITY

Facts

- Population Served: Approximately 2 million
- Area Served: Approximately 600 square miles in the Las Vegas Valley, Clark County, Nevada.

History

The 1970’s and 80’s were a time of rapid population growth and land development in Southern Nevada, and consequently swift development of the region’s water resources. Local leaders recognized the unsustainable nature of water use in the Las Vegas Valley, and, in 1990, Southern Nevada water providers and municipalities began a comprehensive analysis of existing water resources and facilities for the region, known as the “WRMI process,” named after the consulting group Water Resources Management, Inc. that completed the process. The results outlined a demonstrated need for regional water conservation across water providers. As outlined in the *Water Resource Plan for the Southern Nevada Water Authority*, “[T]he 1991 published results were clear — without serious conservation, Southern Nevada would reach the limit of its existing Colorado River water supply by the mid-1990s; with conservation, the limit could be extended to 2007. The WRMI Process provided the impetus for creation of the SNWA, a study of water-facility expansion, implementation of an ongoing search for new water supplies and a renewed commitment to regional water conservation efforts.” *Southern Nevada Water Authority Water Resource Plan*. Southern Nevada Water Authority, 2013. Web. 01 Nov. 2013 (*see* www.snwa.com/assets/pdf/wr_plan.pdf).

The completion of the WRMI process additionally led to the temporary cessation of all new water allocation in the study area. This measure was taken to give the water providers of southern Nevada, specifically the Las Vegas Valley Water Authority, an opportunity to identify and quantify the water rights that had already been granted to users. Additionally, this cessation of new water rights “awakened the community to the gravity of the water situation. This elevated awareness contributed in large part to the subsequent success of regional water management initiatives.” *Id.* In fact, this initial shutdown of new water right allocations was the first of many instances of conservation measures and heightened water restrictions during times of reduced water supply that have come to define a portion of the SNWA’s mode of operations during its 20 plus years of existence. SNWA now employs landscape water restrictions, rebate programs for removal of traditional grass lawns and purchase of pool covers (among other types

of rebates), and water conservation public outreach in its effort to reduce municipal water demand. *Conservation*. Southern Nevada Water Authority, n.d. Web. 24 Feb. 2014 (*see* www.snwa.com/conservation.html).

SNWA’s role in management of existing supplies was greatly expanded in the late 1990’s through the gradual transfer of control of the Southern Nevada Water System (SNWS) from the Colorado River Commission of Nevada to the Southern Nevada Water Authority. Completed in 1971, the SNWS “consisted of intake facilities and the Alfred Merritt Smith Water Treatment Facility at Lake Mead, eight pumping stations, a pipeline to Boulder City, a four-mile-long tunnel through the River Mountains and about 34 miles of major pipelines to deliver treated water into the Las Vegas Valley.” *Id.* The facilities in this Water System have gradually expanded from their original capacity of 200 million gallons/day to over 900 million gallons/day today. The geographic extent of the SNWS is shown in Figure 2.

Regional Water Management

Legal Entity Formed

Organization

SNWA is a cooperative organization whose stated mission is “acquiring and managing water resources for Southern Nevada, constructing and managing regional water facilities, and promoting responsible water use.” *Id.* The organization was formed out of the WRMI process, and in its 1996 update to the Amended Cooperative Agreement, codified the benefit to regional collaboration by saying, “[T]he securing of additional supplies of water and the effective management of existing supplies can best be achieved through the cooperative action of the Members, operating through a separate legal entity which will undertake the conferred functions (of the SNWA).” Southern Nevada Water Authority. *1995 Amended Cooperative Agreement Among Big Bend Water District, City of Boulder City, City of Henderson, City of Las Vegas, City of North Las Vegas, Clark County Sanitation District, Las Vegas Valley Water District.* Comp. Judith Vandever. *Southern Nevada Water Authority Browseable Documents.* Southern Nevada Water Authority, 01 Jan. 1996. Web. 15 Oct. 2013 (see http://water.nv.gov/hearings/past/springetal/browseabledocs/Exhibits%5CSNWA%20Exhibits/SNWA_Exh_197_Amended%20Cooperative%20Agreement.pdf). There are seven member water districts that work collaboratively to provide water and wastewater services to the residents of Clark County, Nevada. The names and water and wastewater responsibilities of each member organization are listed in Table 1.

Governance

A Board of Directors comprised of representatives from each member agency governs the SNWA. A joint Executive Team, shared by SNWA and the Las Vegas Valley Water District, oversees daily operations. There is additionally a 29-member Integrated Water Planning Advisory Committee which meets regularly to advise the Board of Directors and Executive Team. This is a wide-ranging group comprising officials, informed civilians, and representatives from areas where the SNWA holds water rights.

Table 1- Water and Wastewater Responsibilities for Member Agencies of the SNWA

(*Southern Nevada Water Authority Water Resource Plan, supra*; see www.snwa.com/assets/pdf/wr_plan.pdf)

Members

Name	Water Services To:	Wastewater Services To:
Big Bend Water District	Laughlin	None
City of Boulder City	Boulder City	Boulder City
City of Henderson	Henderson	Henderson
City of Las Vegas	None	Las Vegas
City of North Las Vegas	N. Las Vegas, adjacent parts of Las Vegas, unincorporated Clark County	North Las Vegas
Clark County Water Reclamation District	None	Laughlin, unincorporated Clark County
Las Vegas Valley Water District	Las Vegas, portions of unincorporated Clark County	None

Major Functions

Powers

The Southern Nevada Water Authority operates as an overarching water authority, controlling the distribution and treatment of water, and conservation efforts in the Las Vegas Valley. The 1995 Amended Cooperative Agreement lays out the functions of SNWA and the powers conferred on the organization. Three major functions set SNWA’s institutional focus as one of supply acquisition and demand management: control of water rights related to providing municipal water service; modification of the SNWS; and implementation of a regional shortage sharing plan. Those major functions, along with the other roles conferred on the SNWA, are enumerated in the *1995 Amended Cooperative Agreement* (see website cited above).

Powers Conferred

The powers conferred on the SNWA are generally broader than those available to the other authorities examined in this report, with the SNWA controlling infrastructure, distribution, conservation planning, and playing a role in final water pricing for consumers. The powers conferred on the SNWA to complete its functions are also listed in the *1995 Amended Cooperative Agreement* (above).

Powers Denied

Three powers are explicitly denied to SNWA: except to the extent permitted by applicable law including, without limitation, the Transfer Act, nothing in the Agreement shall be construed as authorizing the Authority to perform any function or to exercise any power that is not performable or exercisable by at least one of the Members without reference to this Agreement; absent written consent of the affected Member’s governing body, the Authority shall not (i) render any service rendered by a Member to others within the Member’s service area or boundaries, (ii) render any service which a Member has the authority to render to others within its service area or boundaries, or (iii) acquire any water right or property of a member; and the Authority shall not acquire, construct, or operate Facilities to treat municipal sewage. *Id.*

There have been major projects undertaken by SNWA that characterize the broad functions and powers listed above. As Las Vegas continues to grow, water right acquisition, supply infrastructure development,

Regional Water Management

Third Intake

Overarching Powers

and conservation practices have continued to be central to SNWA's mission. The Water Authority has recently been involved in litigation related to the acquisition of water rights for the Las Vegas Valley totaling 84,000 acre-feet per year from four valleys straddling the Nevada-Utah state line: Spring Valley, Cave Valley, Dry Lake Valley, and Delamar Valley. Moon, David. "Las Vegas Water Rights Decision." *The Water Report* #119 (15 Jan. 2014).

While fighting to secure additional water rights, SNWA is simultaneously working to ensure continued availability of the water rights they do control, primarily through the construction of a third, deeper intake for drinking water from Lake Mead. A final illustration of the functions and powers SNWA holds was alluded to earlier in this section — the authoritative water conservation efforts that are undertaken in the Las Vegas Valley are primarily conceived and implemented by the Southern Nevada Water Authority.

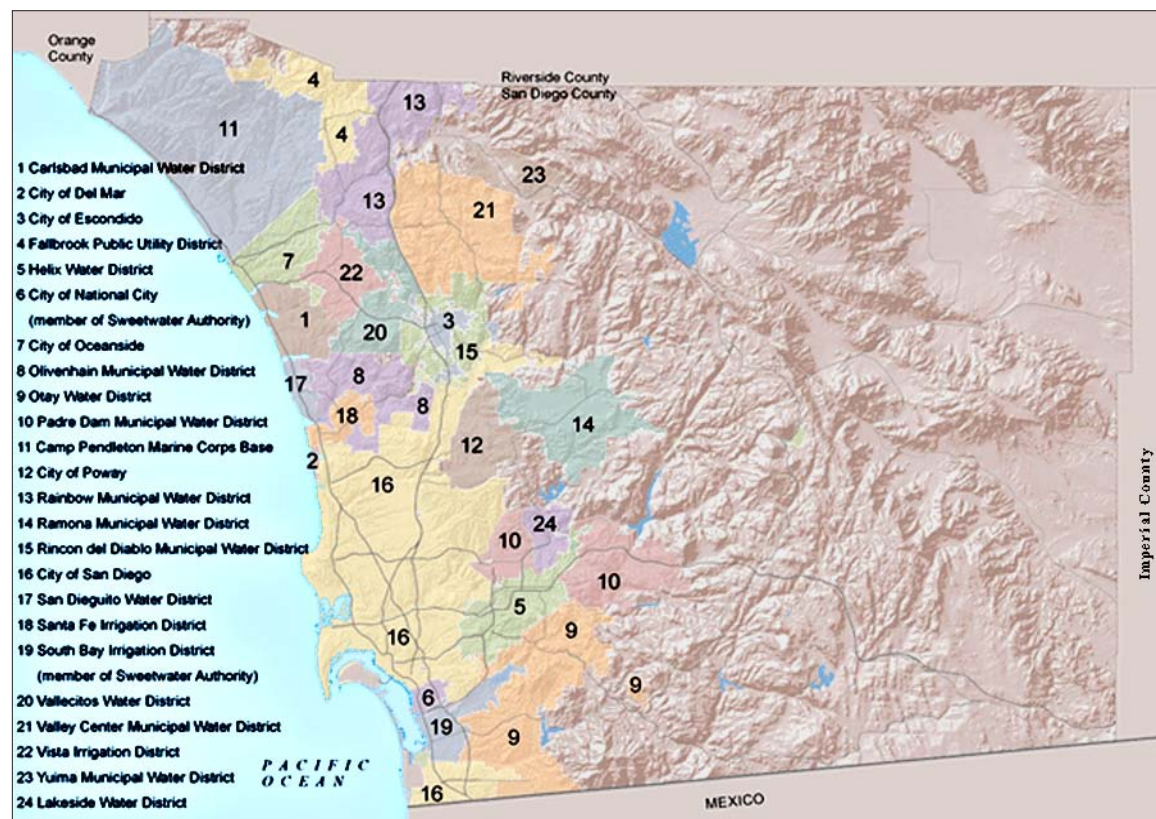
The water districts involved in the creation of the Southern Nevada Water Authority were made aware through the WRMI process of the dire situation the Las Vegas Valley was facing in the early 1990's. This awareness spurred the need for the Southern Nevada Water Authority, an entity with overarching powers that help to ensure Las Vegas' continued water supply availability through a variety of means.

SAN DIEGO COUNTY WATER AUTHORITY

Facts

- Population Served: Approximately 3 million
- Area Served: 1,486 square miles in San Diego County, California

Figure 3: Water Districts in the San Diego County Water Authority



Source: *Member Agencies*. San Diego County Water Authority, n.d. Web. 13 Nov. 2013
(see www.sdcwa.org/sites/default/files/images/agencies-map-big-view.gif).

History

The San Diego County Water Authority (Authority or SDCWA) was formed out of a need for greater regional collaboration because of increased water stress in the County following rapid population growth during World War II. Prior to SDCWA's formation, the region was served primarily by private water companies that maintained individual dams, reservoirs, and distribution systems for their customers. The state legislature stepped in and created SDCWA in 1944 to ensure security of the region's Colorado River water rights. One of the first acts of the Authority was construction of two large diameter pipelines linking San Diego County and the Colorado River Aqueduct, to supply water to a burgeoning population and bolster San Diego's claim to that water source. "History." San Diego County Water Authority, n.d. Web. 24 Feb. 2014 (see www.sdcwa.org/history).

Colorado River Rights

Regional Water Management

Desal Plant

Ag-to-Urban Transfers

Voting Structure

Water Wholesaler

Facilities

No Wastewater Treatment

Many major collaborative acts have been undertaken by the SDCWA in its 70-year history. As the region continued to grow over the second half of the 20th century, the Authority added three more high-diameter pipelines. In 1989, the Authority initiated the Capital Improvement Program (CIP) to plan and implement projects to meet the region's future water needs. The CIP is designed to reduce the County's overall reliance on Colorado River water by diversifying the water portfolio for SDCWA. This was accomplished through infrastructure development, including the planning and construction of the nation's largest desalination plant, which continues to this day. "Construction Projects." *Construction Projects*. San Diego County Water Authority, n.d. Web. 24 Feb. 2014 (see www.sdcwa.org/construction-projects).

In 2003, the Authority completed many years of work with other major water institutions around southern California to implement the Quantification Settlement Agreement (QSA) to enhance San Diego County's long-term water supply reliability. The QSA utilized agriculture to urban water transfers and canal relining projects to reduce California's overall demand to their allocated 4.4 million acre-feet (annually) of Colorado River water. *Quantification Settlement Agreement*. San Diego County Water Authority, n.d. Web. 24 Feb. 2014 (see www.sdcwa.org/quantification-settlement-agreement).

Organization

SDCWA functions as an independent public agency and water wholesaler, purchasing the majority of the water for San Diego County from the Metropolitan Water District of Southern California and the State Water Project, and then reselling the water to SDCWA's 24-member agencies. Figure 3 (page 21) shows the location of these water agencies.

The 24 agencies shown above include six cities, five water districts, three irrigation districts, eight municipal water districts, one public utility district, and one military base. SDCWA is not part of either the city or county of San Diego governments. SDCWA is incorporated under the State of California's County Water Authority Act, Chapter 45, section 2, which lays out the organizational structure of the Authority. Governed by a board of directors consisting of at least one member from each of the water agencies represented, decisions are made based on the number of votes allocated to each water agency. Votes are assigned based on total financial contribution to SDCWA over its entire existence, with the limitation that "no public agency shall have votes that exceed the number of the total votes of all the other public agencies," and that "[I]f the public agency member having the largest total financial contribution to the authority has more than 38 percent of the total financial contribution to the authority, the affirmative votes of members representing more than 55 percent of the number of votes of all the members shall be necessary, except as herein provided, to carry any action coming before the board of directors." *County Water Authority Act (As of January 1, 2008)*. N.p.: West's Annotated California Codes, Chapter 45, n.d. *Documents & Forms | San Diego County Water Authority*. San Diego County Water Authority. Web. 22 Oct. 2013 (see www.sdcwa.org/sites/default/files/files/CWA_Act.pdf). As each agency pays more money to SDCWA, the allocation of votes is adjusted. As of 1997, Pendleton Military Reservation has contributed the smallest amount of money of all the member districts to SDCWA (\$10,921,265), and thus was allocated only 2.18 votes on the board of directors. On the high end, the City of San Diego has contributed \$1,864,642,414, and has a vote allocation of 372.97. *Id.*

Powers

San Diego County Water Authority is a water wholesaler, giving the many water districts in San Diego County a method to reduce purchasing and infrastructure costs for delivery of water from external sources, as well as complete large-scale institution to institution agreements that would not have been possible absent the larger authority. Standing committees that administer SDCWA's vested powers are: Administration and Finance; Engineering and Operations; Imported Water; Legislation, Conservation, and Outreach; and Water Planning.

Many of the major recent accomplishments of the San Diego County Water Authority were already mentioned above. Since its inception, SDCWA has grown from maintaining just two major pipelines to its present day administration of five pipelines that deliver water from the Municipal Water District of Southern California and the State Water System to San Diego County. It maintains pumping stations, a dam and a reservoir, as well as a recently constructed water treatment plant. This plant, the Twin Oaks Valley Water Treatment Plant, was completed to give SDCWA greater flexibility in terms of providing treated water to its customers. Prior to the construction of this plant, all of the potable water, and approximately half of the total water that was delivered to SDCWA was treated by the Metropolitan Water District of Southern California at the Skinner Filtration Plant in Riverside County. Continued population growth in both San Diego and Riverside counties necessitated the construction of a treatment plant in San Diego County. The Twin Oaks Valley Water Treatment Plant now treats around 50% of incoming water. Local water districts currently treat the remaining half of SDCWA water across the county. *Twin Oaks Valley Water Treatment Plant*. San Diego County Water Authority, n.d. Web. 24 Feb. 2014 (see www.sdcwa.org/twin-oaks-valley-water-treatment-plant-old). Wastewater treatment is not undertaken by SDCWA, but instead by multiple wastewater treatment plants maintained by the individual water districts.

San Diego County Water Authority's control of infrastructure is expected to continue to increase as population and land development continue to rise in San Diego County. In addition to the recently negotiated Quantification Settlement Agreement — which has reduced California's overall Colorado

Regional Water Management

Desal Supply

Conservation & Responsibility

Comparison

Joint Powers Authority

River demand and firmed San Diego's water supply through large scale water transfers from the Imperial Irrigation District — SDCWA is currently facilitating the Carlsbad Desalination Project, which is scheduled to be completed in 2016, and will be the largest desalination plant in North America. Although a private company (Poseidon Resources) will own and operate the plant, SDCWA has signed a 30-year purchasing agreement for 56,000 acre-feet of water per year from the plant, and is currently expanding and modifying its infrastructure to accommodate this new supply.

Given its role as the water supplier to practically all of San Diego County, SDCWA plays a big role in the drought preparedness and conservation initiatives that are undertaken in the region. SDCWA has various incentive programs to encourage sustainable residential water use, and has developed a four-tiered drought response conservation plan. In contrast to the Southern Nevada Water Authority, SDCWA does not have the authority to specifically limit water use or mandate conservation practices. It merely passes the drought response recommendations on to the member agencies, and they decide whether to implement water use restrictions for their customers.

There are many similarities between the San Diego County Water Authority and the Southern Nevada Water Authority. Both agencies maintain control of Colorado River water rights, are invested heavily in firming their respective cities' water supplies, control wholesale water pricing to their member agencies, and both are denied the authority to control wastewater treatment in their service areas. Mandating conservation measures falls under the purview of SNWA, though SDCWA is more restricted in this case. Given San Diego's heavy reliance on water from sources outside the region, SDCWA's role as a large scale water purchaser has helped give the county the strength to secure necessary water rights for 70 years.

SANTA ANA WATERSHED PROJECT AUTHORITY

Facts

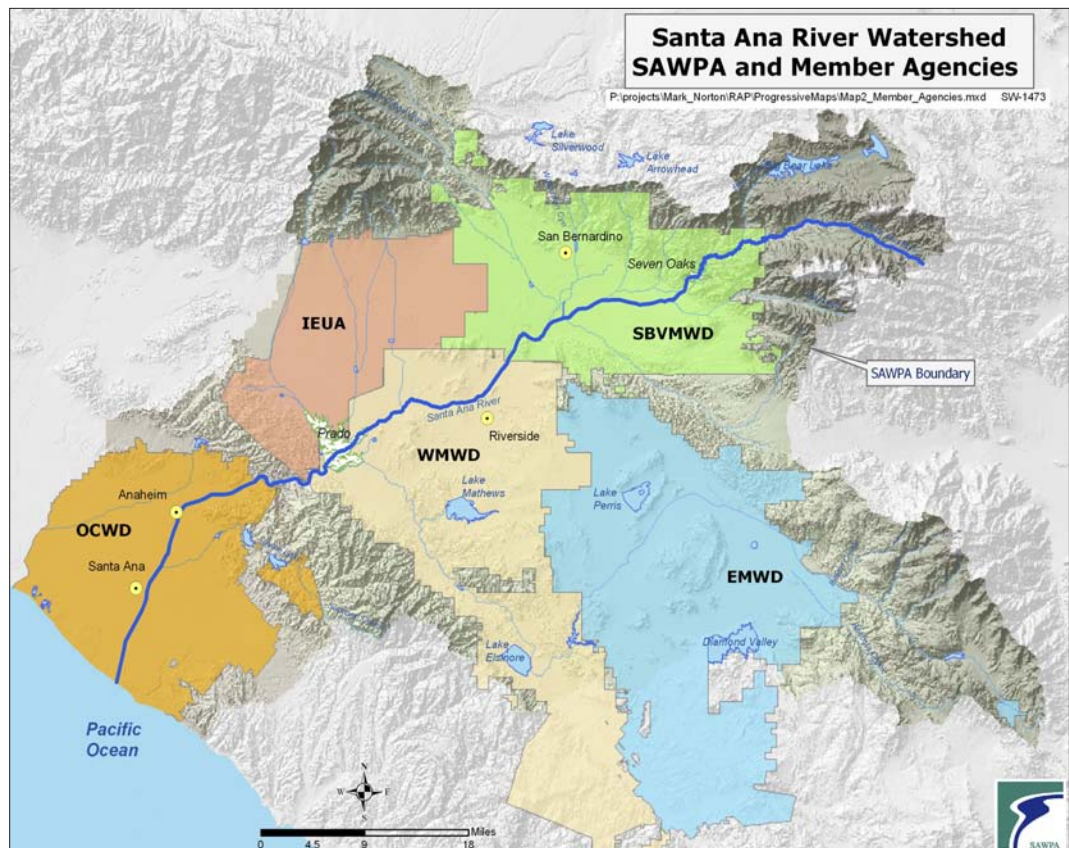
- Population Served: Approximately six million residents
- Area Served: 2,650 square miles in the Santa Ana Watershed Basin, composed of portions of four different counties in southern California: Riverside, Los Angeles, San Bernardino, and Orange counties

History and Organization

The Santa Ana Watershed Project Authority (SAWPA) was created in January of 1975 as a Joint Powers Authority under Article 1, Chapter 5, Division 7, Title 1 of the Government Code of California. SAWPA has five member agencies: Eastern Municipal Water District (joined in 1984), Inland Empire Utilities Agency, Orange County Water District, San Bernardino Valley Municipal Water District, and Western Municipal Water District, all five of which maintain operations within the hydrological extent of the Santa Ana Watershed. *Santa Ana Watershed Project Authority*, n.d. Web. 24 Feb. 2014 (see www.sawpa.org/). The locations of the watershed and the SAWPA member agencies are shown in Figure 4.

Figure 4
Santa Ana River
Watershed SAWPA
and Member
Agencies

Source: *Member Agencies | Santa Ana Watershed Project Authority*, n.d. Web. 13 Nov. 2013 (see http://sawpa.org/documents/roundtable/map-1152_Member_Agencies_1_A.pdf)



<div data-bbox="115 180 342 310">Regional Water Management</div> <div data-bbox="115 380 342 485">Environmental & Planning</div> <div data-bbox="115 695 342 730">Implementation</div> <div data-bbox="115 940 342 976">Powers Granted</div> <div data-bbox="115 1150 342 1186">Collaboration</div> <div data-bbox="115 1325 342 1396">Salt Disposal</div> <div data-bbox="115 1640 342 1675">Competition</div> <div data-bbox="115 1850 342 1921">Service Area Limits</div>	<div data-bbox="375 149 1529 310"> <p>A ten-person board of directors manages the authority, with a commissioner and alternate commissioner serving from each of the five member agencies. Each member agency is given one vote on the commission. There are additional task force groups that operate under SAWPA's facilitation and address specific integrated water resource programs, beneficial use assurance, or watershed improvement. <i>Collaboration</i>. SAWPA, n.d. Web. 24 Feb. 2014 (<i>see</i> www.sawpa.org/collaboration/).</p> <p>Powers</p> <p>The Santa Ana Watershed Project Authority functions primarily as an environmental and planning organization. SAWPA allows its member districts to retain purchasing power of water and infrastructure control, but gives them an avenue for collaborative environmental mitigation efforts that fall on a truly regional scale. SAWPA's founding document explains its role by saying, "[T]he purpose of this Agreement is to create a public agency to undertake and implement the common power of undertaking projects for: water quality control; protection and pollution abatement in the Santa Ana River Watershed, including development of waste treatment management plans for the area within the Santa Ana River Watershed; construction, operation, and maintenance and rehabilitation of works and facilitates for the collection, transmission, treatment, disposal and/or reclamation of sewage, wastes, wastewaters, poor quality groundwaters and stormwaters; the construction, operation, maintenance and rehabilitation of projects for irrigation and municipal and industrial water supplies; projects for aquifer rehabilitation; projects for reclamation, recycling and desalting of water supplies for irrigation and municipal and industrial purposes."</p> <p>"These purposes may be implemented by utilizing funds contributed by the members and grants received from Federal and/or State Government, by issuing bonds, notes, warrants and other evidences of indebtedness to finance costs and expenses incidental to said projects, and by contracting with the United States pursuant to Federal Reclamation laws and the laws amendatory and supplementary thereto." <i>Joint Exercise of Power Agreement Creating the Santa Ana Watershed Project Authority</i>. N.p.: n.p., n.d. <i>Santa Ana Watershed Project Authority</i>. Santa Ana Watershed Project Authority, 6 Dec. 1974. Web. 30 Nov. 2013 (<i>see</i> www.sawpa.org/wp-content/uploads/2012/06/JPA1975-Amends1-5.pdf).</p> <p>In order to fulfill the functions described above, the joint powers authority gives SAWPA the power to: make and enter contracts; employ agents and employees; acquire, construct, manage, maintain and operate any buildings, works or improvements, both inside and outside the boundaries of the parties hereto; acquire, hold or dispose of property, both inside and outside the boundaries of the parties hereto; incur debts, liabilities or obligations; issue bonds, notes, warrants and other evidences of indebtedness to finance costs and expenses incidental to the projects of the Agency; sue and be sued in its own name, provided that the Agency shall not commence or convene in any lawsuit without the approval of all of its members; exercise jointly the common power of the parties hereto set forth; and to exercise the power of eminent domain (added in 1991). <i>Id.</i></p> <p>The forum provided by the Santa Ana Watershed Project Authority for its member agencies to meet and collaborate has yielded many regional environmental and planning projects. The recently released One Water, One Watershed 2.0 plan represented a collaborative effort between all member water agencies in SAWPA, and works to identify projects and programs that will address unique water resource challenges in the Santa Ana watershed. SAWPA additionally maintains the Inland Empire Brine Line, the largest collaborative environmental effort undertaken to date by SAWPA, which is designed to provide cost-effective disposal of salts generated by utilities and industry within the watershed.</p> <p>SAWPA has a different institutional focus than the Southern Nevada Water Authority or the San Diego County Water Authority. It functions primarily as a planning and environmental organization, giving the member agencies a forum for productive collaboration and a mechanism to facilitate regional-scale environmental projects to ensure sustained water supply and water quality.</p> </div> <div data-bbox="846 1486 1062 1514">DENVER WATER</div> <div data-bbox="375 1518 1529 1982"> <p>Facts</p> <ul style="list-style-type: none"> • Population served: Approximately 1.3 million • Area served: 336 square miles in the Denver metro area and surrounding suburbs <p>History and Organization</p> <p>Denver Water was born out of fierce competition between private water companies that characterized the early settlement of the Denver area from the 1860's to 1918. As this period progressed, smaller companies were acquired or purchased by what became the dominant private water company during the time, Denver Union Water Company (predecessor to Denver Water). In 1918, the citizens of Denver voted to create a five-member Board of Water Commissioners and to purchase the Denver Union Water Company infrastructure, which at that point included a large dam and reservoir, a water treatment plant, and several miles of mains. "History of Denver Water." Denver Water, n.d. Web. 24 Feb. 2014 (<i>see</i> www.denverwater.org/AboutUs/History/). Today, Denver Water serves over 1.3 million people in the Denver metro area and surrounding communities. Figure 5 below shows the service area map for Denver Water. As shown in Figure 5, there are several areas in the Denver metro area that are not served by Denver Water. These municipalities, including Englewood, Aurora, and Arvada, control and manage their water systems as divisions of their respective city governments.</p> </div>
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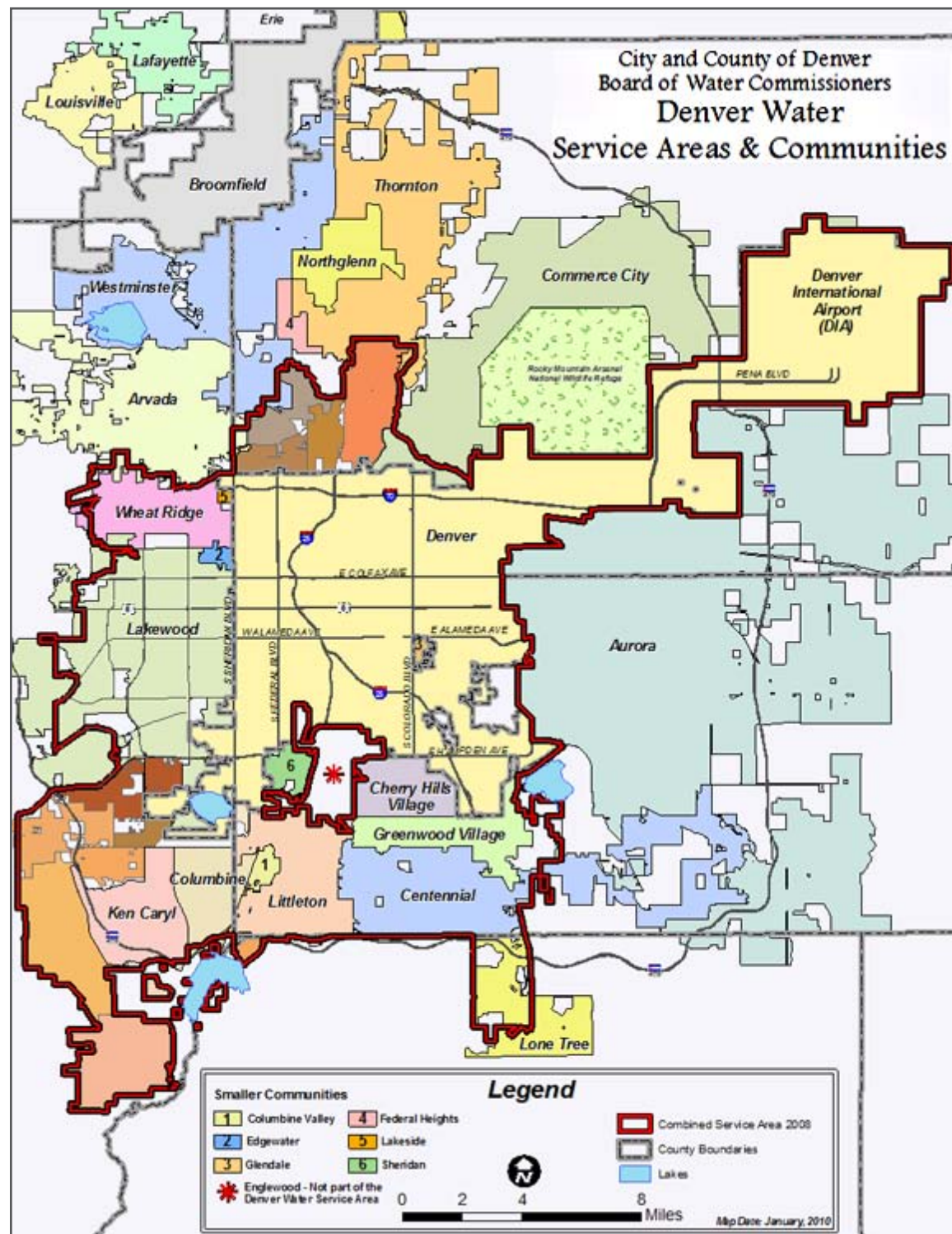
Regional Water Management

Figure 5
Denver Water Service Area Map

Independent Water Provider

A five-member Board of Water Commissioners is appointed by the Mayor of Denver to staggered six-year terms, and the Board then in turn appoints a manager, who controls day-to-day operations.

Denver Water operates as a large-scale municipal operated water provider, and is responsible for collection, storage, quality control, and distribution of water within its service area. The infrastructure it manages includes three water treatment plants, 18 pumping stations, 30 underground reservoirs, and over 3,000 miles of water mains. Denver Water's funding mechanism and decision-making capabilities operate independently from Denver's city government.



Source: *Denver Water Service Area Map.*

City and County of Denver Board of Water Commissioners, 01 Jan. 2010. Web. 04 Jan. 2014
(see www.denverwater.org/docs/assets/3F32FA08-CF24-1D76-BEABACA2D2AC9627/csa_metro_area_20091.pdf)

Regional Water Management

City Separation

District Needs

Unique Characteristics

As explained on Denver Water's website: "This arrangement allows Denver Water to operate as an independent municipal governmental agency funded by water rates, new tap fees and the sale of hydropower. We are not funded by taxes. Denver Water is an enterprise under TABOR, which means we do not derive any revenue from taxes. Under Denver's charter, all of our revenues go into the water works fund, and the money in the fund may not be used for any purpose other than the water system. This arrangement ensures separation between City Hall and Denver Water. Denver's city government has no access to the water works fund, and Denver Water has no access to the city's general fund." *Funding | Denver Water*. Denver Water, n.d. Web. 07 Jan. 2014 (*see* www.denverwater.org/AboutUs/KeyFacts/Funding/).

CONCLUSION

While a complete history and full description of each organization are beyond the scope of this limited investigation, it is clear and not surprising that each has unique hydrologic, demographic, and political drivers. Out of these diverse sets of drivers grew four water entities that are tailored to serve the distinct needs of their specific region. Powers given or denied to each authority help to determine each entity's relative autonomy from city or state governments, funding mechanisms, and institutional focus. Southern Nevada and San Diego Water Authorities function as strong, overarching organizations, dedicated to supply acquisition and infrastructure management. Santa Ana Watershed Project Authority is primarily focused on planning and environmental collaborative activities, giving its member agencies a forum to express regional concerns and a method to address those concerns. Finally, Denver Water is a large-scale, municipally operated water provider serving suburban areas as well as those within the city limits. Its financial framework is separate from Denver's city budget and ensures reliable revenue streams for the utility.

This article reports on an initial, self-funded, and primarily web-based study of four regional approaches to water management/collaboration. While further work could include interviewing agency representatives and stakeholders, along with additional case studies, the conclusions for Tucson — and likely other regions — from this effort are expected to be as follows. Like each of the cases studied, the Tucson region has unique characteristics, with its own political, hydrological, and demographic factors driving the development and use of water. The *Report of the Regional Water Assessment Task Force "Think Tank" Process* recommended an examination of instances of water collaboration in other locations, with the goal of discovering approaches that could enhance Tucson's water management collaboration. This examination shows that collaborative efforts typically grow out of distinctive regional needs. Additional efforts toward greater cooperation among water stakeholders in Tucson should focus on Tucson's unique water situation rather than an externally divined roadmap for water collaboration.

FOR ADDITIONAL INFORMATION:

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Sharon Megdal is Director of The University of Arizona Water Resources Research Center and C.W. and Modene Neely Endowed Professor in the College of Agriculture and Life Sciences. Her work focuses on water resources management and policy, on which she writes and frequently speaks. She also holds the titles Professor, Department Soil, Water, and Environmental Science, and Distinguished Outreach Professor. She serves as Director of the Water Sustainability Program and Co-Director of The University of Arizona Water, Environmental and Energy Solutions Program, both of which are funded by the Technology Research Initiative Fund (TRIF). Dr. Megdal places particular emphasis on how to achieve desired policy objectives in terms of institutional structures and possible changes to them. Current projects include: comparative evaluation of water management, policy, and governance in growing, water-scarce regions; meeting the water needs of the environment; groundwater management and governance; groundwater recharge; and transboundary aquifer assessment. She is the lead editor of the book, *Shared Borders, Shared Waters: Israeli-Palestinian and Colorado River Basin Water Challenges*. Dr. Megdal teaches the multi-disciplinary graduate course Arizona Water Policy. She serves as President-Elect of the National Institutes for Water Resources (NIWR) and is a member of the board of the Universities Council on Water Resources (UCOWR) and the Western Rural Development Center. As an elected member of the Central Arizona Water Conservation District Board of Directors, Dr. Megdal is responsible for the policies, rates and taxes associated with delivering Colorado River water through the Central Arizona Project. She holds a Ph.D. degree in Economics from Princeton University.

Nathaniel Delano is a graduate student at the University of Arizona. He is studying under Dr. Megdal in pursuit of his Master's Degree in Water, Society, and Policy, and graduate certificate in Geographic Information Systems. He is also a researcher at the University of Arizona Water Resources Research Center. Prior to coming to Arizona, Nate earned Bachelor's Degrees in Geography and History from the University of Mary Washington in Fredericksburg, Virginia, and served as a Peace Corps Volunteer in Paraguay. His research interests include the application of GIS to solve water management issues, sustainable water use in agriculture, and the economics of water and environmental policy.

WATER BRIEFS

**KLAMATH AGREEMENT OR/CA
UPPER BASIN COMPREHENSIVE AGREEMENT**

In what is being hailed as an historic agreement, on March 5th the Klamath Tribes, the U.S. Department of the Interior, Oregon Governor John Kitzhaber, Senator Ron Wyden, Senator Jeff Merkley, and Upper Klamath Basin irrigators announced that they have completed negotiations on the Upper Klamath Basin Comprehensive Agreement (Agreement). The Agreement covers water and natural resource management issues in the Upper Basin and brings in additional parties that were not part of earlier Klamath Basin settlement agreements. The proposed Agreement will now go to the Klamath Tribes' General Council for approval and to irrigators for their endorsement. (Additional background, *see* Water Briefs, *TWR* #118). Negotiators have been working daily for more than eight months to develop solutions to water and natural resource management issues in the Upper Klamath Basin. The Comprehensive Upper Basin Agreement includes three key elements. First, a Water Use Program (WUP) has been designed to permanently increase stream flows into Upper Klamath Lake while creating a stable, predictable setting for agriculture to continue in the Upper Klamath Basin. Next, a Riparian Program will re-establish and/or maintain a healthy and sustainable riparian plant community that will improve and maintain water quality and fish habit. As with the water program, the Riparian Program will be carried out through agreements with willing landowners. Finally, an Economic Development Program for the Klamath Tribes is designed to create economic opportunities for the Tribes and its members, including increased opportunities for the exercise of tribal cultural rights.

The WUP does two things. First, it permanently increases flows into Upper Klamath Lake by 30,000 acre-feet by decreasing the net consumptive use of water. Participation in the WUP is voluntary. The Agreement includes limits on how much land may be retired from irrigation (18,000 acres) in order to share the effects of the program fairly among areas in the Upper Basin. The WUP will reduce water use through permanent water right retirement and also through other ongoing measures to reduce net consumptive use of water in a predictable, quantifiable manner. Those measures include water right leasing (including split

season leasing); water conservation and efficiency measures; water use rotation agreements among water right holders; management of water to meet flows during low flow periods; and upland management (juniper removal, crop rotations, improved soil conditions and management).

The second thing the WUP does is to use performance standards to determine when water uses above Upper Klamath Lake will be regulated to protect the Tribal water right. The standards are designed to distribute the increase in flows into the lake on an equitable basis among the basins and provide for healthy fisheries throughout the Off-Project Area.

The WUP is carried out by a "Landowner Entity" made up of irrigator representatives from each of the major basins above the lake who are participating in the program. It is to be overseen by a "Joint Management Entity" (JME) directed by the Klamath Tribes, the Landowner Entity, and state and federal representatives. The Landowner Entity will take the lead in negotiating agreements with willing irrigators to reduce water use, and the agreements will be implemented following approval by the JME.

The Agreement includes details on how groundwater wells will be regulated in years when stream flows are not met. These details are designed to provide predictability to water users, while recognizing the role of groundwater in the Upper Basin's hydrology.

Funding for restoration projects in the Agreement will come largely through the Klamath Basin Restoration Agreement (KBRA), signed in 2010. The overall cost of the Upper Basin settlement agreement and the Klamath Agreements of 2010 is approximately \$545 million, a significant reduction from the original cost of the Klamath Agreements, which was estimated to cost \$1 billion.

The new Agreement also resolves water right disputes that were not addressed in the KBRA. The most senior water rights above Upper Klamath Lake are held by the Klamath Tribes and full exercise of those rights would preclude irrigation in many years. Under the Agreement, the Klamath Tribes conditionally agree to share in times of shortages, limiting regulation to specified in-stream flows, and allowing some water for water rights holders with rights junior to the Klamath Tribes. In exchange, the Tribes will receive active landowner involvement in riparian

restoration, resolution of ongoing water litigation, and economic development funding to create employment opportunities and aid in the exercise of tribal cultural rights.

Don Gentry, Chairman of Klamath Tribes, said, "I am very pleased with the Klamath Tribal Council's support of the Proposed Agreement. If approved, we will see an increase in water flows, improved habitat for current and future fish populations, and economic opportunities for our Tribe and Tribal members. It will help us restore our homeland and honor the Treaty our ancestors signed 150 years ago."

Cattle rancher Roger Nicholson of the Wood River Valley said the benefits will be felt across the region. "Settlement will allow the social and economic healing of the agricultural and Tribal community, and once again establish a united community." Becky Hyde, rancher and board member of the Upper Klamath Basin Water Users, added, "We look forward to sharing the agreement's details with our neighbors in the Upper Basin and the broader community. For the first time in decades, there is a light at the end of the tunnel."

For info: Full Agreement and an agreement summary available at: www.oregon.gov/gov/GNRO/Pages/index.aspx

**RIPARIAN RESTORATION WY
LIVESTOCK GRAZING**

EPA is touting a success story in Wyoming, where a stream has responded favorably to coordinated resource management and riparian restoration. Livestock grazing practices resulted in damaged riparian areas and eroding streambanks along Whitelaw Creek, leading to poor water quality and degraded fisheries. Local landowners, the US Forest Service (USFS), and other partners worked through a process known as Coordinated Resource Management (CRM) to implement improved grazing management practices. After two decades of improved management, monitoring data indicate improved water quality, restored riparian areas, and improved fisheries.

Whitelaw Creek is a 2.4-mile-long tributary to Beaver Creek in the Belle Fourche River Basin of northeast Wyoming. The creek's headwaters originate at approximately 6,100 feet in the Black Hills National Forest. Whitelaw Creek is protected by the Wyoming Department of Environmental

WATER BRIEFS

Quality (WDEQ) for drinking water, cold-water game and non-game fisheries, fish consumption, aquatic life (other than fish), recreation, wildlife, industry, agriculture, and scenic value.

Season-long livestock grazing practices in the mid- to late 20th century resulted in damaged upland and riparian areas and degraded stream banks, which consequently led to increased sediment loading, elevated water temperatures, and reduced dissolved oxygen in the creek. Biological information from the 1980s indicated the cold-water game fishery consisted entirely of brook trout in low densities. In 1988 USFS implemented a two-pasture, deferred-rotation livestock grazing system along Whitelaw Creek. Unfortunately, poor water distribution and a lack of late-season water limited opportunities to implement the new grazing system, resulting in minimal benefits.

In 1992 WDEQ partnered with landowners and grazing permittees, USFS, the Natural Resources Conservation Service, the Wyoming Riparian Association, the Wyoming Game and Fish Department, the Crook County Natural Resource District, and the Wyoming Department of Agriculture to initiate CRM in the watershed to address the known water quality issues, including water quality problems from overgrazing. As part of the CRM, the collaborators managed a Clean Water Act section 319 project, known as the Whitelaw Riparian Improvement Project (WRIP), in the early to mid-1990s. The partners implemented numerous agricultural best management practices (BMPs) that focused on improving riparian conditions, stabilizing stream banks, and enhancing water quality through short-duration, multi-pasture rotational grazing, development of off-channel water sources, and cross-fencing to limit pasture access for rotational grazing purposes. Signs were installed and tours conducted to provide education about time-controlled grazing management and improvements in the resource that benefit multiple uses. Project partners monitored the effectiveness of the BMPs from 1992 to 2012 by periodically collecting fish and macroinvertebrate data, conducting vegetative surveys, and gathering chemical and physical water quality data.

WRIP has successfully improved riparian and water quality conditions throughout the length of Whitelaw Creek. Monitoring data collected from 1992 through 2012 show that

the combination of improved water distribution and short-duration rotational grazing has improved riparian conditions. Assessments of four riparian vegetation transects all show an appreciable increase in desirable species. The increased density and diversity of riparian vegetation have stabilized segments of streambanks by allowing the channel to narrow and deepen and to become more sinuous. Approximately 20 percent of streambanks experienced improved stability and increased riparian vegetative cover between 1992 and 2012; nearly all stream banks are now at optimal stability and cover conditions. These enhancements have significantly reduced sediment loading to the stream. The reduction is most apparent within the lower segment of Whitelaw Creek, which had been the segment most negatively affected by excess sediment. Data show that mean embeddedness (percent of coarse substrate covered or surrounded by sand and silt) in riffle substrates in this lower segment declined by approximately 30% between 1992 and 2012. Reductions in fine sediment corresponded to coarsening of the riffles, with 35-45% increases in gravel composition throughout Whitelaw Creek (most notably in the lower segment) during the same period.

In-stream and riparian changes, combined with reductions in sediment loading, have translated to cooler instantaneous water temperatures (a reduction of approximately 5 to 8°C) and improved instantaneous dissolved oxygen concentrations (an increase of approximately 1 milligram per liter) during early autumn over the 20-year monitoring period. Temperature and dissolved oxygen levels now meet WDEQ's water quality standards. The biological condition of Whitelaw Creek has improved with the decreases in sediment loading and water temperature, and the increase in dissolved oxygen.

WRIP addressed water quality issues on nearly 3,400 acres of federal and private lands. The project received a total of \$9,635 of Clean Water Act section 319 funds and used \$10,839 of non-federal matching funds. Funding supported BMP implementation, educational deliverables, and effectiveness monitoring of the management changes.

For info: Jennifer Zygmunt, WDEQ, 307-777-6080 or jennifer.zygmunt@wyo.gov; EPA website: http://water.epa.gov/polwaste/nps/success319/wy_whitelaw.cfm

BAY-DELTA EIR/EIS

CA

COMMENT PERIOD EXTENDED

State and federal agencies have extended the public comment period for the Draft Bay Delta Conservation Plan (BDCP) and associated Draft EIR/EIS by 60 days, for a total 180-day review period. The comment period began on December 13, 2013, and will now conclude on June 13, 2014. This extension allows the public more time to review and comment on the public draft documents.

All substantive comments received on the Draft EIR/EIS will be considered in the Final EIR/EIS and decision-making process. No final decisions have been made regarding going forward with the BDCP or in selecting an alternative; those decision will occur after the completion of the CEQA and NEPA processes.

For info: BDCP website at: <http://baydeltaconservationplan.com/Home.aspx>

FRACKING GUIDANCE

US

UIC GUIDANCE - DIESEL FUEL

On February 11, EPA released revised underground injection control (UIC) program permitting guidance for wells that use diesel fuels during hydraulic fracturing activities. EPA developed the guidance to clarify how companies can comply with a law passed by Congress in 2005, which exempted hydraulic fracturing operations from the requirement to obtain a UIC permit, except in cases where diesel fuel is used as a fracturing fluid.

EPA is issuing the guidance alongside an interpretive memorandum, which clarifies that class II UIC requirements apply to hydraulic fracturing activities using diesel fuels, and defines the statutory term diesel fuel by reference to five chemical abstract services registry numbers. The guidance outlines for EPA permit writers, where EPA is the permitting authority, existing class II requirements for diesel fuels used for hydraulic fracturing wells, and technical recommendations for permitting those wells consistently with these requirements. Decisions about permitting hydraulic fracturing operations that use diesel fuels will be made on a case-by-case basis, considering the facts and circumstances of the specific injection activity and applicable statutes, regulations and case law, and will not cite this guidance as a basis for decision.

WATER BRIEFS

Although developed specifically for hydraulic fracturing where diesel fuels are used, many of the guidance's recommended practices are consistent with best practices for hydraulic fracturing in general, including those found in state regulations and model guidelines for hydraulic fracturing developed by industry and stakeholders. Thus, states and tribes responsible for issuing permits and/or updating regulations for hydraulic fracturing may find the recommendations useful in improving the protection of underground sources of drinking water and public health more broadly.

EPA is moving forward on several initiatives, such as the diesel guidance, to provide regulatory clarity with respect to existing laws and using existing authorities where appropriate to enhance public health and environmental safeguards.

For info: Cathy Milburn, 202/ 564-7849 or Milbourn.cathy@epa.gov; Guidance available at: <http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/hydraulic-fracturing.cfm>

ARIZONA WATER SUPPLY AZ VISION FOR SUSTAINABILITY

On January 14, Arizona released the "Strategic Vision for Water Supply Sustainability" (Strategic Vision) and has just completed a series of public meetings to receive input from interested parties. The Arizona Department of Water Resources (ADWR) developed the Strategic Vision, which provides a comprehensive water supply and demand analysis for Arizona. Recent studies have identified the potential for a long-term imbalance between available water supplies and projected water demands over the next 100 years if no action is taken. The Strategic Vision creates the framework for the development of potential strategies to address the projected imbalances. It provides context for maximizing the effectiveness of these strategies to address the needs of multiple water users across Arizona.

ADWR's website notes that while Arizona "as a whole is not currently facing an immediate water crisis, Arizona is at a point where it must begin to face future water supply and management challenges. We are at the crossroads of having to decide what actions we will take to face those challenges. The Strategic Vision for Water Supply Sustainability is a necessary next step in continuing to

ensure that Arizona has sufficient and sustainable water supplies. Over the next 25 to 100 years, Arizona will need to identify and develop additional water supplies to meet projected growing water demands. While there may be viable local water supplies that have not yet been developed, water supply acquisition and importation will be required for some areas of the State to realize their full growth potential. The Strategic Vision is essential to guide and ensure Arizona's future economic stability."

For info: ADWR website: www.azwater.gov/AzDWR/Arizonas_Strategic_Vision/

INSTREAM FLOW REPORT WA LEGISLATIVE REPORT

The Washington Department of Ecology (Ecology) recently released its *2013 Report to the Legislature: Statewide Progress on Setting Instream Flows*, authored by Ann Wessel. Ecology has prepared this report to the Legislature on the progress of setting instream flows, as required by RCW 90.82.080(6). For more information on Instream Flows in Washington go to Ecology's webpage at: www.ecy.wa.gov/programs/wr/instream-flows/isfhtm.html

For info: Ann Wessel, Ecology Water Resources Program, 360/ 407-6872 or Ann.Wessel@ecy.wa.gov; Full Report at: <https://fortress.wa.gov/ecy/publications/SummaryPages/1311004.html>

NUTRIENT POLLUTION US EPA RESEARCH GRANTS

On January 30, EPA Administrator Gina McCarthy announced grants to four research institutions for innovative and sustainable water research to manage harmful nutrient pollution. Nutrient pollution is one of America's most widespread, costly and challenging environmental problems, and is caused by excess nitrogen and phosphorus in waterways. When excessive nitrogen and phosphorus enter waterways — usually via stormwater runoff and industrial activities — the water can become polluted. Nutrient pollution has impacted many streams, rivers, lakes, bays and coastal waters for the past several decades, resulting in serious environmental and health issues, and negatively impacting the economy. Nutrient pollution can reduce oxygen levels in water, leading to illnesses in fish and the death of large numbers of fish. In some cases nutrient pollution

leads to elevated toxins and bacterial growth in waters that lead to human health problems.

The Science to Achieve Results (STAR) grants are an integral part of EPA's research on water quality and availability. Improving existing water infrastructure is costly, which makes creating new and sustainable approaches to water use, reuse, and nutrient management important. These grants support sustainable water research and demonstration projects consistent with a comprehensive strategy for managing nutrients and active community engagement throughout the research process.

The following institutions received grants: Pennsylvania State University Center for Integrated Multi-scale Nutrient Pollution Solutions, to focus on nutrient flows in Pennsylvania and the Chesapeake basin; University of South Florida Center for Reinventing Aging Infrastructure for Nutrient Management, to support Tampa Bay and similar coastal areas as they face problems of aging wastewater collection and treatment systems, and rapid population growth; Colorado State University, Center for Comprehensive, Optimal, and Effective Abatement of Nutrients, for linking physical, biological, legal, social and economic aspects of nutrient management in the Western and Eastern United States; and Water Environment Research Foundation, (Alexandria, Virginia), National Center for Resource Recovery and Nutrient Management, for innovative research in nutrient reduction through resource recovery and behavioral factors affecting acceptance and implementation.

For info: Cathy Milburn, EPA, 202/ 564-7849 or milbourn.cathy@epa.gov; for Grants and Projects, website at: <http://epa.gov/ncer/nutrient>; EPA-funded research supporting water quality and availability at: www.epa.gov/research/waterscience

GROUNDWATER PERMITS SD FULLY APPROPRIATED AQUIFERS

The South Dakota legislature has passed a bill designed to fairly apportion (permit) groundwater rights when an aquifer is fully appropriated. HB 1015 was passed by both the House and the Senate and sent to Governor Dennis Daugaard for his signature on March 4th. The purpose of the bill is to create an equitable process to handle water right applications submitted for aquifers that have been determined

WATER BRIEFS

to be fully appropriated by the Water Management Board — in the event the aquifer is once again deemed to have water available for appropriation. The bill was sponsored by the Committee on Agriculture and Natural Resources at the request of the South Dakota Department of Environment and Natural Resources (DENR).

South Dakota appropriates groundwater like most other western states, with permits granted on a first come first serve basis. Current state water law protects aquifers for use by future generations by prohibiting additional water right permits if the aquifer has been found to be fully appropriated by the South Dakota Water Management Board (Board). SDCL 46-6-3.1 provides: “No application to appropriate groundwater may be approved if ... the quantity of water withdrawn annually ... will exceed the quantity of the average estimated annual recharge of water to the groundwater source.”

Complaints arose that the current process was inequitable due to the fact that when an aquifer is opened up again for new water right permits upon a finding that groundwater is available, people wanting to use water may or may not know of the new opportunity to apply.

To provide a level playing field, HB 1015 puts a public notice process in place so potential water users find out at the same time that the aquifer (groundwater source) has been determined to be fully appropriated by the Chief Engineer. A public notice is published describing the decision (that the aquifer is fully appropriated) and provides notice that applications for future water rights will be accepted during a 30-day window, to be held by the Chief Engineer for future consideration if the aquifer is later determined to have water available. The Board then prioritizes each application received during that 30-day window using a random selection process to determine the priority; applications will be held in that order by DENR. At least every five years, the board will conduct a review of each fully appropriated aquifer to determine if unappropriated water is available.

For info: HB 1015 available at: <http://legis.sd.gov/docs/legsession/2014/Bills/HB1015ENR.pdf>

WATER RATES RULING CA COLORADO RIVER AQUEDUCT

On February 25, San Francisco County Superior Court Judge Karnow tentatively ruled that in setting rates for 2011, 2012, 2013 and 2014, the Metropolitan Water District of Southern California (MWD) violated cost of service requirements of California’s Constitution, statutes, and common law. The decision provides a major victory for the plaintiff, San Diego County Water Authority (Water Authority), with its ruling that MWD illegally overcharged for transporting water on the Colorado River aqueduct. The tentative ruling came in lawsuits filed in 2010 and 2012 by the Water Authority challenging rates imposed by the Los Angeles-based MWD for 2011-2014. Parties have 15 days to file objections to the Court’s order, after which the Court will issue a final statement of decision. A second phase of the trial will be scheduled on the Water Authority’s claims based on breach of contract and preferential rights.

The litigation stems from historic agreements the Water Authority signed a decade ago to secure independent sources of water from the Colorado River and reduce its once near-total reliance on MWD for water. To transport these Colorado River water supplies to San Diego County, the Water Authority must use pipelines controlled by MWD, which has a monopoly on imported water distribution facilities in Southern California.

The Water Authority asserts that MWD’s current rates were expressly designed to protect MWD’s monopoly and to discriminate against the Water Authority by shifting water supply costs to transportation rates and keep rates for purchasing MWD’s water artificially low. MWD asserted in court it can set its rates without regard to the actual costs of service, and that it can even collect more than the costs of the services it provides, as long as a majority of its board votes for it. MWD also argued that it is exempt from Proposition 26, a voter-approved initiative in November 2010 that amended the California Constitution.

According to the Water Authority, the judge’s tentative ruling agreed with their long-standing position that MWD’s rates must be based on the actual costs of providing service and must be reasonably related to the burdens imposed and benefits received

by MWD’s member agencies. Judge Karnow also tentatively ruled that MWD’s rates for 2013 and 2014 are subject to Proposition 26, approved by voters in November 2010. That proposition, now embodied in California’s Constitution, shifted the burden to public agencies to prove they are not charging more than the actual cost of the services they provide. Judge Karnow tentatively ruled in MWD’s favor on the question of whether or not its rates fairly account for the costs of dry-year peaking by its member agencies.

Judge Karnow is expected to set a date to hear the Water Authority’s two remaining causes of action. One alleges MWD breached its 2003 contract with the Water Authority in which it pledged to set lawful rates — rates the court has now ruled were illegal. The other claim alleges MWD has under-calculated the Water Authority’s preferential right to MWD water by illegally excluding hundreds of millions of dollars of payments the Water Authority has made to MWD since 2003 to transport the agency’s independent Colorado River supplies. In Phase 2 of the litigation, if the court finds MWD breached its contract with the Water Authority, MWD will be required to refund tens of millions in disputed payments the Water Authority has made since 2011.

Jeffrey Kightlinger, general manager of MWD, issued the following statement: “Metropolitan is confident that its structure of charging all agencies the same rates for the same services is both logical and legal. This is one initial step in a very long process. Metropolitan has prevailed in previous challenges, including SDCWA’s last challenge to Metropolitan’s rates, in which an adverse lower court decision was reversed on appeal. We look forward to the coming steps in the judicial process to demonstrate that a rate structure that fairly and equitably recovers all the cost of delivering safe, high-quality, and reliable water is in the interest of all Southern Californians.”

MWD is a cooperative of 26 cities and water agencies serving nearly 19 million people in six counties. The district imports water from the Colorado River and Northern California to supplement local supplies

For info: Court decision and background available at: www.sdcwa.org/mwdrate-challenge; Armando Acuna, MWD, 213/ 217-6853

- March 16-18 CA**
2014 WaterReuse California Annual Conference, Newport Beach. Marriott Hotel. Presented by WaterReuse Ass'n. For info: www.waterreuse.org/conferences/california/14
- March 17 CO**
Inaugural Distinguished Lecture with Bruce Babbitt, Boulder. Wolf Law Bldg., 5:30-8pm. Presented by Getches-Wilkinson Center. For info: <http://lawweb.colorado.edu/events/details.jsp?id=5438>
- March 17-18 CO**
Conservation Excellence 2014 - Colorado Coalition of Land Trust Annual Conference, Denver. University of Denver. For info: www.cclt.org/cclt/unlisted/819-conservation-excellence-2014-main.html
- March 17-18 CA**
Tribal Water in California Seminar, Cabazon. Morongo Casino Resort & Spa. For info: LawSeminarsInt'l, 800/854-8009, registrar@lawseminars.com or www.lawseminars.com
- March 17-19 UT**
2014 Utah Water Users Water Law & Policy Seminar, St. George. The Dixie Center. For info: <http://conference.usu.edu/uwuw/>
- March 18 MT**
Riverscapes in Flux: Current Challenge in the Conservation of Native Fish - Lecture, Missoula. University of Montana. University Center Theatre, 7-8:30 pm. For info: www.grizalum.org/
- March 19 GA**
13th Annual Georgia Water Law & Regulation Seminar, Atlanta. Marriott Midtown Suites. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net
- March 19 OR**
The Portland Harbor Clean-up: The Role Insurance Companies May Play in a Potential \$2 Billion Liability (Panel), Portland. Benson Hotel, 309 SW Broadway. Presented by Business Litigation Section, Oregon BAR. For info: www.osbar.org
- March 21 CA**
ACWA Small Hydro Workshop & Tour, Rancho Cucamonga and Rialto. Presented by Ass'n of California Water Agencies. For info: www.acwa.com/events/small-hydro-workshop-tour
- March 25 MT**
Are We Running Out of Water? Challenges & Opportunities for Water Management in Western Montana - Lecture, Missoula. University of Montana. University Center Theatre, 7-8:30 pm. For info: www.grizalum.org/
- March 25-26 WA**
Science Making a Difference - Northwest Fisheries Science Center 4th Symposium, Seattle. NOAA Western Regional Ctr., 7600 Sand Point Way. For info: www.nwfsc.noaa.gov/news/events/symposia/symposium4.cfm
- March 25-28 LA**
Advanced Environmental Awareness Bootcamp, New Orleans. Hilton Garden Inn CBD/French Quarter. For info: www.epaalliance.com/advenvironmentalbootcamp-mar14.html
- March 26-27 CA**
18th Children's Water Education Festival, Irvine. University of California. For info: www.childrenwaterfestival.com/
- March 26-28 BC**
GLOBE 2014: 13th Biennial International Conference & Exhibition on Business, Sustainability & the Environment, Vancouver. Vancouver Convention Ctr. For info: <http://2014.globeseries.com/>
- March 27 AZ**
Santa Cruz River Research Days - 6th Annual, Tucson. Joel D. Valdez Downtown Library. Presented by Sonoran Institute. For info: <http://tiny.cc/sccrrd>
- March 27 CA**
2014 Executive Briefing -The Water Education Foundation, Sacramento. Red Lion Hotel Woodlake & Convention Ctr. For info: www.watereducation.org/doc.asp?id=850
- March 27-28 TX**
Texas Water Law Conference, San Antonio. La Cantera. For info: CLE Int'l, 800/ 873-7130 or www.cle.com
- March 27-28 UT**
National Parks: Past, Present & Future - 19th Annual Symposium, Salt Lake City. University of Utah, S.J. Quinney College of Law. Presented by the Wallace Stegner Center. For info: WSC, 801/ 585-3440 or law.utah.edu/stegner
- March 30-April 2 CO**
Sustainable Water Management Conference, Denver. The Curtis Hotel. Presented by American Water Works Ass'n. For info: www.awwa.org/conferences-education/conferences/sustainable-water-management.aspx
- April 1-4 DC**
Western States Water Council's 174th (Spring) Council Meeting, Washington. Crystal Gateway Marriott Hotel. For info: www.westernstateswater.org/
- April 2 NE**
The Potential to Increase Agricultural Water Use Efficiency through Variable Rate Irrigation Seminar, Lincoln. UNL East Campus, Hardin Hall Auditorium, 3:30-4:30pm. Presented by Nebraska Water Center. For info: <http://watercenter.unl.edu/>
- April 3-4 CA**
California Water Policy Conference 23: Tangled Up in Blue, Claremont. Claremont McKenna College, Roberts Environmental Ctr. For info: www.acwa.com/events/california-water-policy-23-tangled-blue
- April 4 ID**
Resilient Cities - Environment/Economy/Equity: Idaho Law Review Symposium 2014, Boise. For info: Stephen Miller, UI, millers@uidaho.edu or www.uidaho.edu/law/law-review/symposium
- April 6-9 DC**
Water Policy Conference, Washington. The Liason. Presented by Ass'n of Metropolitan Water Agencies. For info: www.amwa.net/cs/conferences/future
- April 7 AZ**
The Future of Arizona Water in Natural Areas - WRRRC Regional Workshop, Tucson. U of A Student Union. For info: Water Resources Research Center, <https://wrrc.arizona.edu/>
- April 7-8 France**
Global Water Summit 2014 - Water for Growth, Paris. For info: www.watermeetsmoney.com/?utm_source=linkedin&utm_medium=social&utm_content=3902894
- April 7-9 DC**
National Ass'n of Clean Water Agencies Water Policy Forum & Fly-In, Washington. Capital Hilton. For info: www.nacwa.org/index.php?option=com_content&view=article&id=7&Itemid=4
- April 8 AZ**
Closing the Gap Between Water Supply & Demand - WRRRC 2014 Annual Conference, Tucson. University of Arizona. Presented by Water Resources Research Center & the Arizona Dept. of Water Resources. For info: www.wrrc.arizona.edu
- April 8-10 MT**
Curbing the Flow: Positive Solutions for Storm Water Management Conference, Billings. Holiday Inn Grand Montana. For info: <http://mtwatercourse.org/home/page.php?pageID=46>
- April 9 NE**
Nitrate & Uranium in Drinking Water Seminar, Lincoln. UNL East Campus, Hardin Hall Auditorium, 3:30-4:30pm. Presented by Nebraska Water Center. For info: <http://watercenter.unl.edu/>
- April 10 CA**
Paying for Water in California Conference, Sacramento. Sacramento Convention Ctr. Presented by Public Policy Institute of California. For info: www.ppic.org/main/event.asp?i=1447
- April 10-11 NM**
Law of the Rio Grande Conference, Santa Fe. Hilton Historic Plaza. For info: CLE Int'l, 800/ 873-7130 or www.cle.com
- April 10-11 CA**
Sea to Sierra Water Tour: Rolling Seminar on California Water Issues, Emeryville. Amtrak Train. Presented by Water Education Foundation. For info: www.watereducation.org/toursdoc.asp?id=2979
- April 10-11 CA**
Endangered Species Act Conference, San Diego. The Westin. For info: CLE Int'l, 800/ 873-7130 or www.cle.com
- April 10-11 OK**
Oklahoma Water Law Conference, Oklahoma City. Skirvin Hilton. For info: CLE Int'l, 800/ 873-7130 or www.cle.com
- April 14 CO**
River Management Conference, Denver. Renaissance Hotel. For info: CLE Int'l, 800/ 873-7130 or www.cle.com
- April 14-17 TX**
Texas Water 2014 Conference, Dallas. Hilton Anatole Hotel & Convention Ctr. For info: <http://www.texas-water.com/>
- April 16 CA**
Climate Change & the Future of Groundwater in California Workshop, Davis. UC Davis Conference Ctr, 2nd Annual Climate Change Water & Society State of Science Workshop. For info: http://ccwas.ucdavis.edu/State_of_the_Science_and_Policy_Workshop/2014/
- April 17-18 OR**
Pacific Northwest Timberlands Management Seminar, Portland. World Forestry Center. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net
- April 22-25 NV**
The Environmental Bootcamp, Las Vegas. Residence Inn Hughes Center. For info: www.epaalliance.com/environmentalbootcamp-apr14.html
- April 23 NE**
Managing Water Resources for Multiple Benefits Seminar, Lincoln. UNL East Campus, Hardin Hall Auditorium, 3:30-4:30pm. Presented by Nebraska Water Center. For info: <http://watercenter.unl.edu/>



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(continued from previous page)

April 23-25 CA

Central Valley Tour, Sacramento. Presented by Water Education Foundation. For info: www.watereducation.org/toursdoc.asp?id=2979

April 24 WA

Wild & Scenic Film Festival, Seattle. SIFF Uptown Cinema. Presented by Washington Water Trust. For info: www.washingtonwatertrust.org

April 25 WA

Climate Change: The Rules are Changing CLE, Seattle. Seattle University. Presented by Center for Environmental Policy. For info: www.celp.org/

April 30-May 2 WA

2014 Salish Sea Ecosystem Conference, Seattle. Washington State Convention Ctr. Presented by Puget Sound Partnership. For info: www.wvu.edu/salishseaconference/

May 1-2 PA

Special Institute on Shale Plays, Pittsburgh. Sheraton Station Square. For info: Rocky Mt. Mineral Foundation: www.rmmlf.org

May 4 CO

Estimating Rates of Groundwater Recharge Course, Denver. Presented by National Ground Water Ass'n. For info: www.ngwa.org/Events-Education/shortcourses/Pages/125may14.aspx

May 4 CO

Introduction to Mountain Hydrogeology Course, Denver. Presented by National Ground Water Ass'n. For info: www.ngwa.org/Events-Education/shortcourses/Pages/322may14.aspx

May 4-7 CO

NGWA Groundwater Summit 2014, Denver. Westin Downtown. Presented by the National Ground Water Ass'n. For info: <http://groundwatersummit.org/>

May 5-6 CA

California Wetlands Conference, San Francisco. Hotel Nikko. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

May 5-6 WA

Clean Water & Stormwater Seminar, Seattle. TENTATIVE. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

May 6-7 TX

2014 Environmental Trade Fair & Conference, Austin. Convention Ctr. Sponsored by Texas Commission on Environmental Quality. For info: www.tceq.texas.gov/p2/events/etfc/etf.html

May 6-9 CA

ACWA 2014 Spring Conference & Exhibition, Monterey. Portola & Marriott Hotels. Presented by Ass'n of California Water Agencies. For info: www.acwa.com/events/acwa-2014-spring-conference-exhibition

May 7-9 CN

Third International Forum on Integrated Water Management, Quebec City. For info: <http://rv-eau.ca/en/call-for-communication/>

May 7-9 OR

American Water Works Ass'n Annual Pacific Northwest Section Conference, Eugene. Hilton Hotel & Conference Ctr. For info: www.pnws-awwa.org/

May 8 CO

Characterization of Deep Groundwater Conference, Denver. Presented by National Ground Water Ass'n. For info: www.ngwa.org/Events-Education/conferences/Pages/5042may14.aspx

May 8-9 CO

Environmental Forensics Course, Denver. Presented by National Ground Water Ass'n. For info: www.ngwa.org/Events-Education/shortcourses/Pages/183may14.aspx

May 9 OR

Tight Lines: Auction & BBQ Dinner, Bend. Aspen Hall, Shevlin Park, 5 pm. Presented by Deschutes River Conservancy. For info: www.deschutesriver.org/

May 12 OR

4th Annual Water Research Symposium, Corvallis. OSU - CH2M Hill Alumni Ctr. Highlighting Student Research. For info: <http://groups.oregonstate.edu/hydro/2014-water-research-symposium-oregon-state-university>

May 12-13 CA

Tribal Environmental Quality Protection Seminar, Cabazon. Morongo Casino Resort & Spa. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com