The Water Report™
Water Rights, Water Quality & Water Solutions in the West

In This Issue:

Upcoming Stories:

Niobrara River Purchase

ESA Challenges

Innovative Water Management

& More!

DEEP INFILTRATING STORMWATER

AN EVOLUTION IN STORMWATER MANAGEMENT

by Jim Mayer, Torrent Resources (Phoenix, AZ)

INTRODUCTION

Until recently, stormwater was considered a nuisance that should be directed off-site and into the street or other conveyance as quickly as possible. This approach unfortunately impacted waterways across the country in very negative ways, causing erosion, sedimentation, and possible pollution transport, as well as downstream flooding. With impacted waterways and drought conditions plaguing large parts of the country, stormwater is coming to be viewed as a valuable resource. Beneficial stormwater management is now often considered in the planning stages of new projects. Any current discussion of stormwater management includes phrases like: low impact development; green infrastructure; drawdown; biofiltration; mitigation; and this article's principle focus — infiltration.

The main components of hydrology related to property development are runoff, infiltration, and evapotranspiration. Runoff increases in direct proportion to the increase in impervious area, which includes buildings, pavement, and hardscape. Conversely, infiltration generally decreases by a similar amount as once vacant land is now covered. As shown in the figure below, in the absence of beneficial stormwater management there is a nearly complete reversal in the percentage of runoff and infiltration when going from pre- to post-development, which contributes directly to impaired waterways and depleted aquifers. However, research has shown that by using a decentralized approach to stormwater management, pre-development hydrology can be closely matched. Decentralization in this context means catching rainfall where it lands, keeping it on-site, and infiltrating it into the ground — as opposed to directing it off-site to join with other runoff.

Figure 1

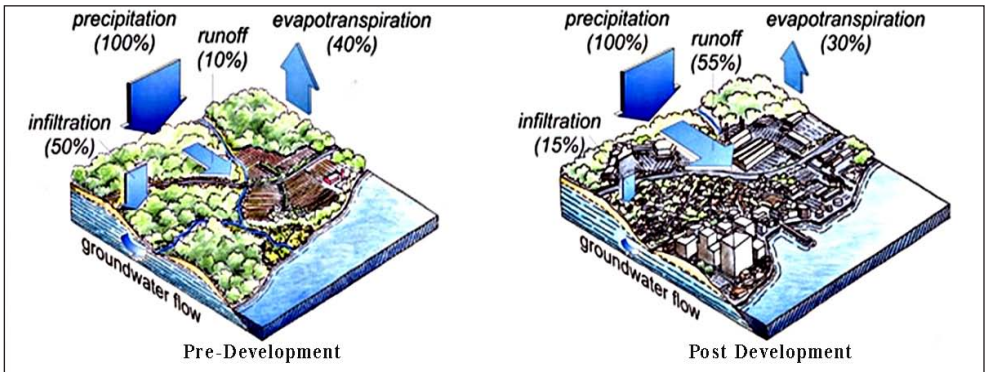


Figure 1: Development & Precipitation Fate

Stormwater Infiltration

Valued Resource

Infiltration

Permeability Differences

Head Pressure

Drywells

The Water Report
(ISSN 1946-116X)
is published monthly by
Envirotech Publications, Inc.
260 North Polk Street,
Eugene, OR 97402

Editors: David Light
David Moon

Phone: 541/ 343-8504
Cellular: 541/ 517-5608
Fax: 541/ 683-8279
email:
thewaterreport@yahoo.com
website:
www.TheWaterReport.com

Subscription Rates:
$299 per year
Multiple subscription rates available.

Postmaster: Please send address corrections to
The Water Report,
260 North Polk Street,
Eugene, OR 97402

As designs for stormwater management shift from regional to local (decentralized), infiltration is transitioning into the spotlight as the primary means of disposing of accumulated stormwater. Concurrently, stormwater has come to be recognized as something to be valued. Its usefulness as a water resource — for example, to aid in groundwater recharge — is being exploited. Even environmental advocacy groups have embraced this concept. In fact, a 2014 article produced by the National Resource Defense Council (NRDC) concluded that "…stormwater capture, using infiltration to recharge groundwater resources is a strong option for improving the resilience and sustainability of water supply for the cities and suburban areas of California."

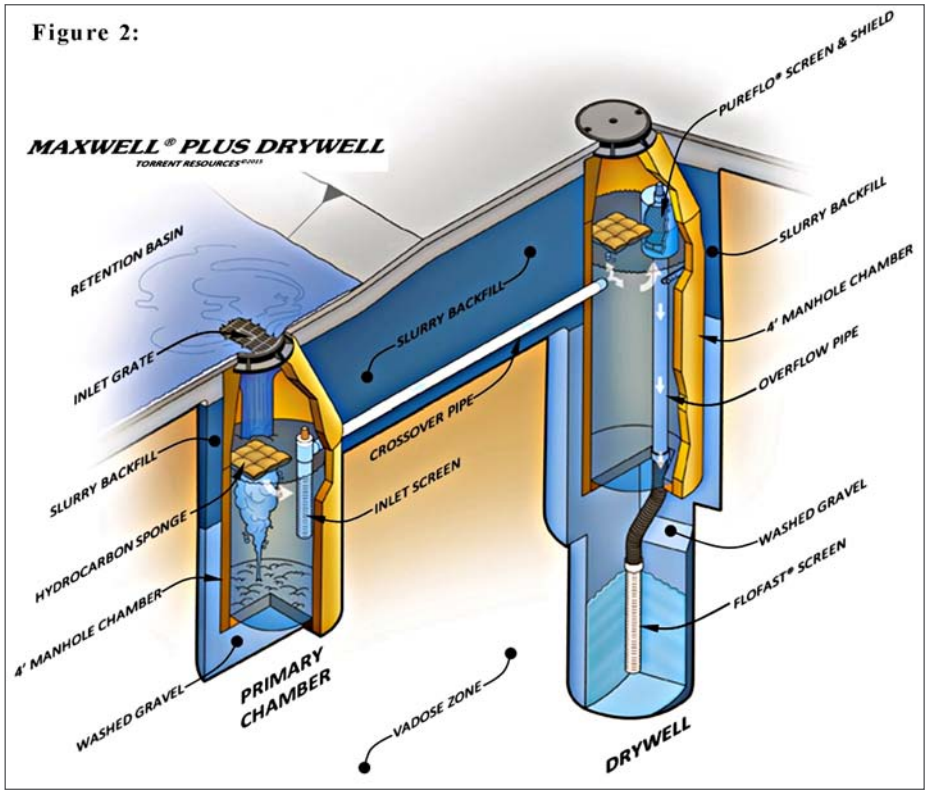
DEEP INFILTRATION & ENGINEERED DRYWELLS

Stormwater infiltration is generally broken down into two categories, shallow and deep. Shallow infiltration systems, of which there are many (StormTech, StormTrap, StormCapture), are typically installed less than 10 feet below finished grade and rely on a thick, gravel base course to infiltrate collected stormwater over a large area (e.g., beneath a parking lot). In contrast, deep infiltration systems typically only include such things as drywells, which are installed at depths ranging from 20 feet to more than 115 feet below finished grade and have a very small footprint.

When considering performance, there are two primary differences between shallow and deep infiltration: soil permeability and head pressure. First, experience has shown that soils closest to the surface (upper 15–20 feet) are typically comprised of clays, silts, and otherwise consolidated materials that tend to be very poorly drained (USDA Natural Resources Conservation Service Soil Classes C and D). Shallow infiltration, therefore, may not contribute to significant aquifer recharge. However, at depths greater than 20 feet, soils tend to be very well drained and often include alluvium, sand, and gravel (Soil Classes A and B). The other big differentiator between shallow and deep infiltration is head pressure. Water exerts a pressure of 0.43 pounds **p**er **s**quare **i**nch (psi) for every foot of depth, which means that a 70-foot deep infiltration system exerts approximately 30 psi at its bottom (typical passenger car exerts about 30 psi on the ground at each of its four tires). The increased pressure supplied by increased depth helps press the water out into the aquifer as fast as the soils will allow.

As mentioned above, deep infiltration involves drywells. In its simplest form, a drywell is nothing more than a hole in the ground filled with rock. While they are effective when first constructed, such simple drywells are very susceptible to clogging and tend to have a short life span. Since the 1970s, however, drywells have evolved into engineered infiltration devices used to dispose of retained stormwater quickly and efficiently. They are installed regularly on developments such as residential, commercial, retail, warehouse, industrial, municipal, and also in the public right-of-way on roadway and green infrastructure projects.

Figure 2:



Stormwater Infiltration

Settling Chamber

The single largest evolution in drywell technology occurred in the early 1970s, with the creation of a drywell that included an integrated settling chamber specifically designed to trap out the trash and sediment that comes with urban runoff. This single innovation turned the drywell into a maintainable device and increased its longevity from a few years to many decades.

Since the early 1970s, my employer (Torrent Resources, formerly McGuckin Drilling) has designed and installed more than 75,000 drywells for the purpose of managing stormwater through deep infiltration. As a pretreatment device, an appropriately designed drywell does an excellent job of removing trash and sediment as well as skimming floating hydrocarbons from incoming stormwater. Our drywell, the MaxWell Plus, removes trash and sediment at rates that exceed 80%, which qualifies for LEED Point 6.2, Quality Control, under Sustainable Sites (*see* www.usgbc.org/leedonline). As an infiltration device, a good drywell releases exceptionally clean water into the vadose zone (i.e., the unsaturated zone above groundwater) where it can percolate down to the aquifer below.

ARIZONA: AHEAD OF THE CURVE WITH STORMWATER INFILTRATION

Early Infiltration Policy

Phoenix, Arizona, lies within the Sonoran Desert. Most of the region receives less than 10 inches of rainfall per year, so managing *all* of our water resources is critically important. In the early 1970s, the City of Phoenix instituted a drastic change in stormwater policy by requiring all new development to capture, retain, and infiltrate the 100-year, 2-hour storm event (approximately 8,000 cubic feet/acre) on-site within 36 hours. With that first step, most of the other cities in the Phoenix Metropolitan Area followed suit and project grading designs in the Valley were forever changed. Out of those new policies was born the need for a different method of disposal, because it was quickly discovered the infiltration capacity of surface soils degrades quickly, leaving impounded stormwater sitting for days and even weeks. These poorly drained surface soils set the stage for the engineered drywell.

Regulation Development

With the emergence of the drywell as a new stormwater **b**est **m**anagement **p**ractice (BMP) — considered a Class V Underground Injection Control (UIC) Well by the US Environmental Protection Agency (EPA) — regulations governing their installation, operation, and closure were necessary. Foreseeing the coming of regulatory changes, in 1988 the Arizona Department of Environmental Quality proposed and adopted regulations which set up the framework for the regulation of engineered drywells in Arizona. Following these new state statutes, local governments began to create their own policies and guidelines for the use of engineered drywells (*see* Arizona Revised Statutes, Title 49, Article 8, 49-331 – 49-336; online at: www.azleg.gov/ArizonaRevisedStatutes.asp?Title=49). Now, cities such as Phoenix, Chandler, Gilbert, Tempe, Goodyear, and others, each have their own set of rigorous drywell policies that govern everything from design and location to performance and registration. The use of engineered drywells in the Valley has become a given.

Engineered Drywells

Arizona Lead

As counties and cities in other states (e.g., California) begin to embrace drywells as an effective infiltration BMP, they need not contemplate a drywell as some new thing that must be "figured out" in order to create regulations for their use. They can look to Arizona and its cities to help craft policies that will be both user friendly and protective at the same time.

STUDYING DRYWELLS: WATER QUALITY

Water Quality Impacts

As infiltration devices, drywells have been studied for decades to ensure that they are not contributing to contamination in the underlying aquifers. Study after study reveals that the quality of groundwater beneath the drywell is not only not being compromised, but is often improved. As noted in a 1984 study conducted at a small retail center in Central Phoenix, "…none of the potential pollutants present in the storm runoff were found in the groundwater around the drywells…storm runoff from the drywells had actually improved the inorganic chemical quality of the local groundwater…" (Schmidt, 1984. *Results of Dry Well Monitoring for Commercial Area at 28th Street and Indian School Road*).

Reclamation Study

In a large US Bureau of Reclamation study entitled *Los Angeles Basin Water Augmentation Study Cite/Availability*, infiltration devices at a number of sites with varying hydrogeologic conditions were monitored over a number of years in the early 2000s. Study conclusions stated "there were no apparent trends to indicate that stormwater infiltration negatively impacted groundwater quality." Indeed, the final report went on to state "concentrations of certain constituents actually decreased." (*See*: www.usbr.gov/lc/socal/reports/LASGwtraugmentation/report.pdf.)

Ambient Groundwater

Another study conducted on a commercial property in Chandler, Arizona in 2010, noted that "…the quality of the ambient groundwater at the facility meets drinking water standards, even three years after the continuous use of the MaxWell Plus Drainage System." The conclusions went on to support the use of the MaxWell Plus and that using this deep infiltration device "…does not pose a significant threat to the quality of the underlying groundwater." Finally, using the MaxWell Plus "allows a significant portion of stormwater runoff to be recharged into the subsurface instead of being routed to storm drains or flood control channels." (Study unavailable online, contact author for further information.)

Stormwater Infiltration

Recharge Benefit

Urbanization Effects

Recharge Rates

Water Resources Benefits

STORMWATER RETENTION = GROUNDWATER RECHARGE

As noted above, everything related to stormwater in the Phoenix Metro Area changed in the early 1970s, when the City of Phoenix rolled out a new stormwater retention policy that subsequently rippled out across the Valley. Infiltrating massive quantities of retained stormwater was initially a necessity just because it had nowhere else to go. However, groundwater recharge quickly emerged as an unanticipated benefit that would pay huge dividends. The recharging of groundwater that arose as a byproduct of managing stormwater in a decentralized manner became the proverbial icing on the cake. Since Arizona began infiltrating stormwater into the vadose zone more than 40 years ago, most of its groundwater stores have increased or remained stable despite the dramatic increase in population over that same time period.

To understand and quantify this benefit, the City of Chandler hired GeoSystems Analysis (GSA) to study the effects of urbanization on their groundwater resources. The 2004 study showed that due to the use of stormwater retention and drywells during the urbanization process (which, as noted above, in the absence of these BMPs typically increases runoff and reduces infiltration), the volume of water recharged to the aquifers beneath Chandler was actually substantially increased. (*See*: www.g-a-l.info/ChandlerRecharge.pdf.)

Based on regional studies, the undeveloped groundwater recharge rates were estimated to be 191 acre-feet per year, which was considered negligible by GSA because it represents a depth of only 0.005 ft across Chandler's 39,000 acres. Urbanized groundwater recharge estimates were determined by defining imperviousness from both Land Use Category and Land Surface Cover. According to the Land Surface Cover calculations, which were the more conservative of the two estimates, the average groundwater recharge volume was 2,080 acre-feet per year. This equates to a 990% increase in annual groundwater recharge when going from undeveloped to developed conditions. Further, the study also defined the dry year and wet year recharge rates for fully developed land at 770 acre-feet per year and 8,700 acre-feet per year, respectively. These annual recharge rates equate to a 300% increase in a dry year and a 4,400% increase during a wet year. The study concluded by stating that urbanization and stormwater retention in Chandler had a very beneficial effect on their aquifer volumes and created a significant water resource for the City's future. Chuck Graf from the Arizona Department of Environmental Quality conveyed a similar sentiment in a brief published in 2012 by the International Rainwater Harvesting Alliance. In his concluding paragraph he stated, "[D]rywells may prove to be an important component in developing sustainable technologies for the world's water management." (Graf, 2012. *International Rainwater Harvesting Alliance Newsletter #45, see* www.irha-h2o.org/?wpfb_dl=248.)

CALIFORNIA: ISSUES & ACTIONS

Is California Sinking?

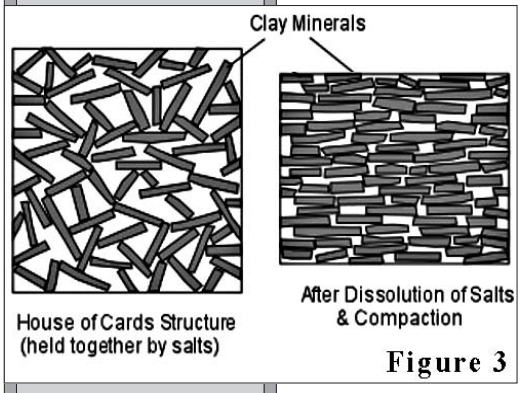


Figure 3

Actually, the correct term is "subsiding" not "sinking" and it may sound totally ridiculous — but it's true. The San Joaquin Valley in central California is sinking at a very measurable rate. In some areas, NASA estimates the ground is currently dropping as much as two inches per month. It's been happening for decades, but the increased groundwater pumping for agricultural purposes has increased the rate of subsidence across the region. There is no shortage of both technical and editorial information about California's Central Valley subsidence, which seems to be yet another casualty of the current drought.

Examining subsidence more closely shows that it occurs many feet below the ground surface as a result of groundwater withdrawal in combination with limited stormwater infiltration or other recharge. It happens when clay particles — which, when hydrated, typically form loose, random patterns — get dried out and then flatten and collapse. Once such collapse occurs, the effect cannot be reversed.

Subsidence Impacts

Subsidence can sometimes be hard to recognize because it happens on such a massive scale, such as the area within the San Joaquin Valley, which is approximately 180 miles long and 30 miles wide (Figure 4). Besides losing elevation at the ground surface, subsidence can wreak havoc on infrastructure such as streets, bridges, and underground utilities. It can also reduce the overall capacity of groundwater aquifers for the future. There is no way to specifically anticipate which infrastructure components will fail, when they will fail, or what the impact will be — but the direct financial costs alone are likely to be many millions of dollars.

Despite the serious consequences, farmers say they have the right to pump and they're correct, because California only recently passed legislation for groundwater management, most of which won't take effect for years. Rather than let their fields go fallow or let their crops to die, Central California farmers are shelling out hundreds of thousands of dollars to drill record numbers of new water wells, often to depths

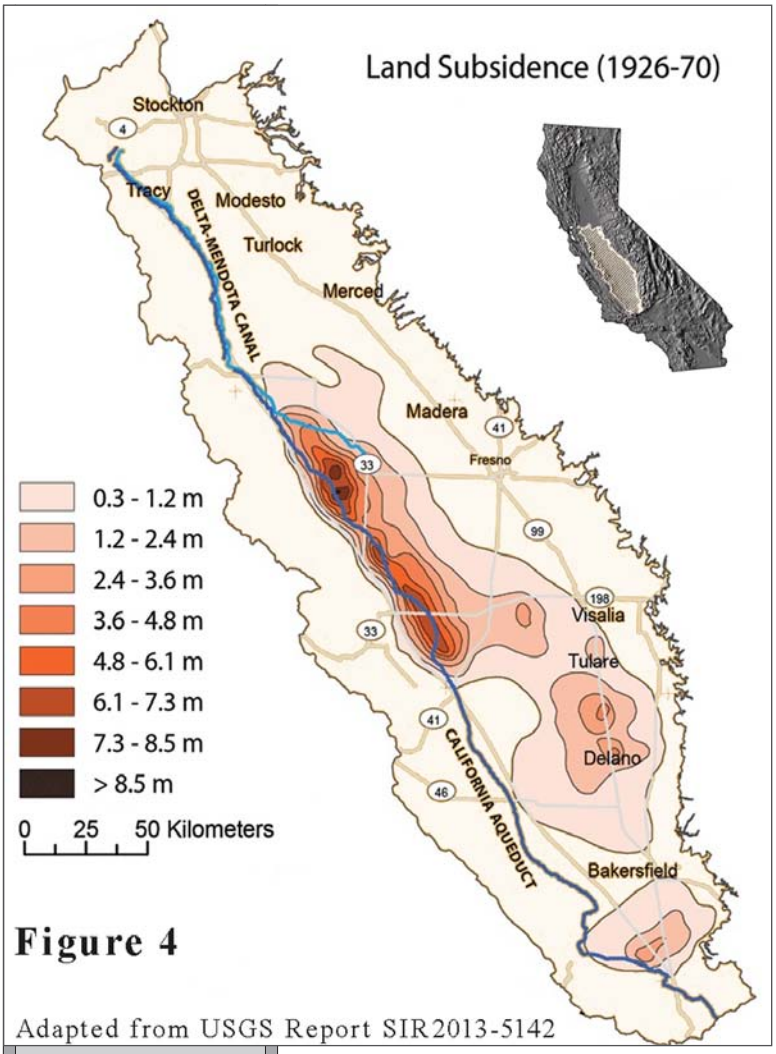


Figure 4

Adapted from USGS Report SIR2013-5142

of more than 1,000 feet. During the first third of 2015, there were 660 water well permits issued, which was up more than 72% over the same time period the year before. (Richtel, NY Times, 6/7/2015, "*California Farmers Dig Deeper for Water, Sipping Their Neighbors Dry*.")

As the drought continues, it is very unlikely that groundwater pumping will be reduced. However, crafting policies aimed at capturing stormwater to increase infiltration could help to slow subsidence across San Joaquin Valley. Using drywells to recharge stormwater into the vadose zone beneath the agricultural region could help keep those clay particles hydrated, which would then prevent their collapse. As noted, such policies have been used in Arizona for more than 40 years and have been hugely successful at not only minimizing subsidence, but actually increasing groundwater levels.

California Embraces Infiltration

Over the past few years, the City of Los Angeles has been on a serious mission to manage stormwater differently by installing green infrastructure projects that create beauty, reduce flooding and erosion, and increase groundwater recharge. It may seem like the current drought is the driving force behind these projects, but their green efforts started long before the drought began. Perhaps the drought conditions merely served to crystallize the importance of managing water resources responsibly and amplify the willpower to take action. In any event, Los Angeles streets are turning green one after another and the primary talking points have shifted to stormwater and aquifer recharge.

The following examples represent some prominent Green Projects from across Los Angeles, all of which were funded by both public and private sources:

Los Angeles Recharge Projects

Avalon Green Alley Demonstration Project

The Avalon Green Alley Demonstration Project constructed in 2015, was meant to be a replicable model for use across Los Angeles. The project had a 35-acre watershed and a total recharge potential of two million gallons annually. The project included: planter boxes; landscaping; permeable pavement; infiltration trenches; and drywells. From the outset, project maintenance was slated to be a collaboration between city staff and neighborhood residents.

Figure 5 – Avalon Green Alleys Artist's Rendering

Figure 5

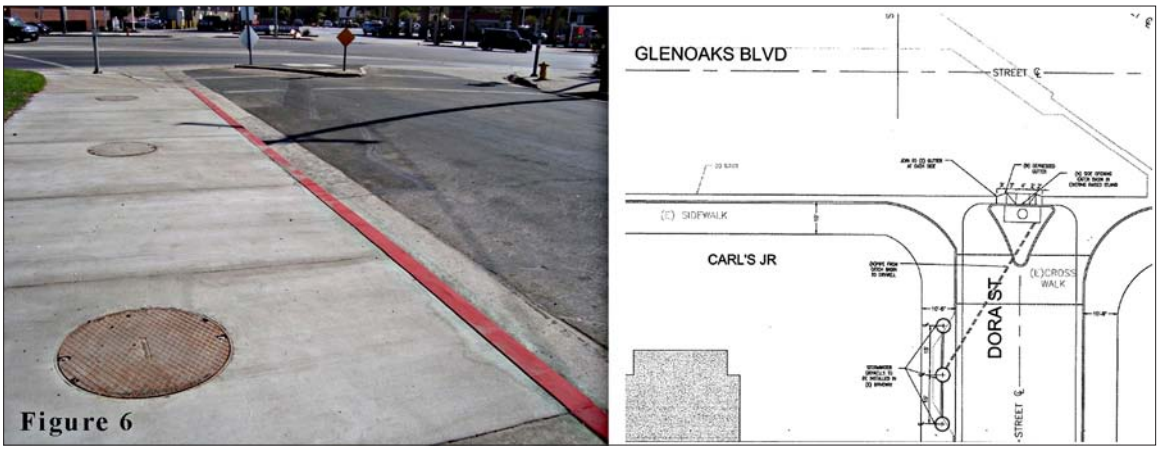
Stormwater Infiltration

Drywells

Glen Oaks and Sunland Avenue Project

The 2013 Glen Oaks and Sunland Avenue Project, which used funding from Proposition O, installed a number of green infrastructure improvements, including bioswales and drywells. The project had a 30-acre watershed and a total recharge potential of 9.3 million gallons annually. The project included: parkway planters; bioswales; catch basins; and drywells. One Proposition O Committee Member said the Glen Oaks Project was "[T]he most 'cost effective' of all Prop O Projects — considering dollars per acre feet of stormwater diverted into groundwater."

Figure 6 – Glen Oaks Boulevard Installed Drywells and Plan View



Recharge Gallery

Elmer Avenue Retrofit Project

The 2010 Elmer Avenue Retrofit Project was borne out of the Los Angeles Water Augmentation Study (mentioned above), which called for a decentralized approach to managing stormwater. The project had a 40-acre watershed and a total recharge potential of 5.2 million gallons annually. The project included: new curb, gutter, sidewalk, and landscape material; bioswales; infiltration galleries; and open bottom catch basins. Again, project maintenance was to be a private/public collaboration.

Figure 7 – Elmer Avenue Infiltration Gallery under Construction

Stormwater Infiltration

Green Infrastructure

Laurel Canyon Boulevard Project

The Laurel Canyon Boulevard Project in Pacoima, CA, is an upcoming project that has gained much media attention. It is scheduled for completion in 2017. While considered a green infrastructure project, groundwater recharge is the primary focus of this exciting new project. The proposed plans include: new curb, gutter, sidewalk, and landscape material; bioswales; and drywells. With a 124-acre watershed, the project can capture and recharge up to 13 million gallons of stormwater annually — enough water to support 120 homes a year.

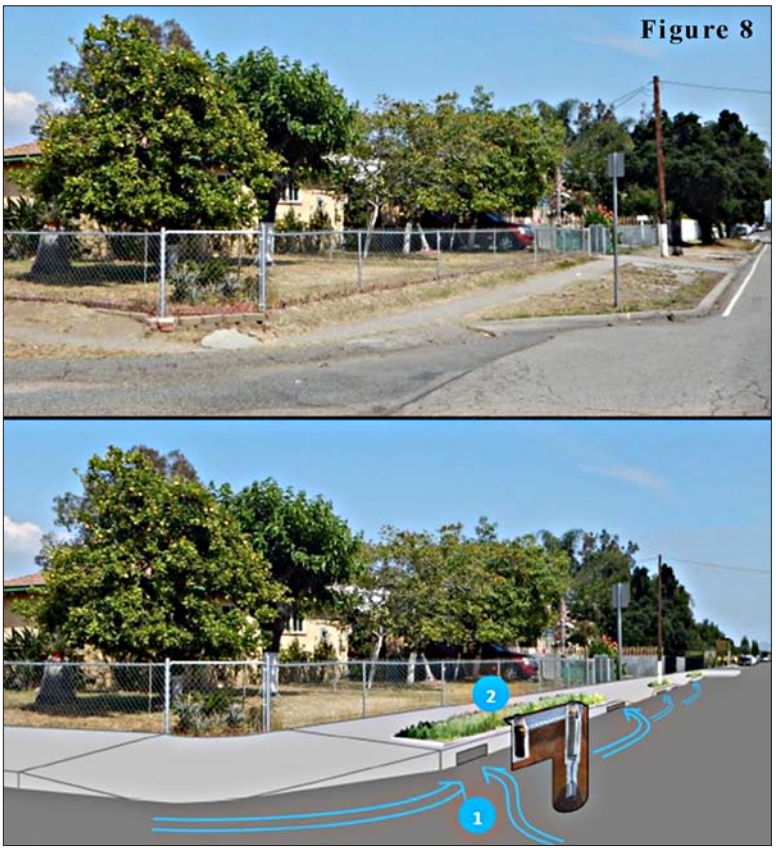


Figure 8 – Proposed Drywell Installation on Laurel Canyon Project

Deep Infiltration

Regulatory Changes

CONCLUSION

THE FUTURE OF DRYWELLS FOR DEEP INFILTRATION IS VIRTUALLY UNLIMITED

As Chuck Graf of the Arizona Department of Environmental Quality predicted in his 2012 IRHA article noted above, "…drywells are still viewed primarily as a tool for stormwater disposal, not for their effectiveness in recharging the aquifer. However, it is only a matter of time before drywells are recognized and studied for their recharge effectiveness as well." It seems that the secret is out and where site conditions allow, deep infiltration provides enormous benefits over traditional stormwater treatment devices and shallow infiltration systems because modern drywell construction has greatly enhanced groundwater recharge.

With the stormwater management paradigm shifting — from "get it off-site as quickly as possible" to "keep some of that stormwater on-site so it can either be recycled or put back in the ground" — the regulatory environment is changing quickly to meet the demand for green infrastructure and green infrastructure principles. Since infiltration is a primary measure within green infrastructure and green infrastructure designs, infiltration BMPs have become their very own industry over the past 10 years. Dozens of shallow infiltration products have entered the market. As mentioned above, however, poorly drained surface soils often make any kind of shallow infiltration infeasible for groundwater recharge.

Time after time, engineered drywells, which easily bypass these upper soils, have made onsite aquifer infiltration not only possible, but highly performing.

For Additional Information:
Jim Mayer, Torrent Resources, 602/ 268-0785 or JMayer@torrentresources.com

Jim Mayer has been in the engineering industry for more than 20 years, beginning as an environmental engineer in 1994. He has seen the commercial development industry from the municipal side as part of the City of Scottsdale's development review department, from the consulting side as senior project manager, from the developer side as development manager for a publicly traded REIT, and from the design/build contractor side where he served as project manager. He now serves as technical marketing engineer at Torrent Resources, where he provides technical expertise in the siting, design, and installation of engineered drywells and directs the company's education and outreach to civil, geotechnical, and municipal professionals across the country.

Stormwater Capture

LA'S STORMWATER CAPTURE PLAN

EXCERPTS FROM THE LOS ANGELES STORMWATER CAPTURE MASTER PLAN

Editors' Introduction: As noted in the previous article, the City of Los Angeles is undertaking a substantial effort to better utilize stormwater. In August, 2015, the Los Angeles Department of Water and Power, in partnership with Los Angeles public interest group TreePeople, released the *Los Angeles Stormwater Capture Master Plan* (available online at: www.ladwp.com/scmp). In order to provide a brief view of the Plan's findings, we provide excerpts from the Plan below. The 144-page Plan provides a wealth of detailed cost-benefit analysis and implementation scenarios on a range of stormwater capture alternatives.

Background & Overview

Water Sources

The City of Los Angeles Department of Water and Power (LADWP) is responsible for providing the City of Los Angeles (City) with a safe and reliable supply of water for residential, commercial, governmental, industrial, and institutional uses. Since the early 1900s, the City has supplied water from a variety of sources. Today, the City's water comes from the Owens Valley via the Los Angeles Aqueduct; purchased water from the Metropolitan Water District of Southern California (MWD) imported from Northern California via the California Aqueduct and the Colorado River via the Colorado River Aqueduct; and several local water sources including groundwater, recycled water, and conservation.

Import Reductions

Future water supplies from distant sources are becoming more restricted and less reliable. Environmental commitments, periods of dry years, low snowpack, and judicial decisions have all contributed toward significant cuts in imported supplies. These threats and the need for action were recently highlighted in the Mayoral Directive Number 5 which calls for a 20% reduction in the City's fresh water use by 2017 and a 50% reduction in LADWP's purchase of imported potable water by 2024. To ensure a safe and reliable water supply for future generations of Angelenos, one of the City's key strategies is to increase the local water supply and decrease the need to purchase imported water. However, in large part due to urbanization, the majority of precipitation that falls onto the City flows into storm drains and out to the ocean. In light of these conditions, stormwater is an increasingly viable supply.

Managing Runoff

Los Angeles has a long history of managing stormwater runoff. For most of its history, the primary objective of "stormwater management" has been to control catastrophic flooding. To this end, a regional flood control system was developed consisting of conveyances, impoundments, spreading grounds, flood control basins, and debris basins.

Groundwater Recharge

Over the past few decades, as imported water has become more expensive, less reliable, and more susceptible to limitations, stormwater flowing to the ocean has been recognized as an increasingly valuable resource for the region. As a result, existing flood control facilities and individual parcels have been and continue to be retrofitted, and new large-scale facilities are being developed to infiltrate stormwater for groundwater recharge. In the past 40 years, stormwater capture in centralized facilities has increased 50 percent.

Capturing and using stormwater on-site can offset potable water demand. Capturing and infiltrating stormwater into subsurface groundwater aquifers increases local groundwater reserves. Both infiltration and capture for direct use enhance the reliability of the City's water supply. Projects to capture and conserve stormwater runoff comprise an important component of the City's water supply portfolio. The City is a part of a complex multi-jurisdictional region. As such, implementing effective and comprehensive local stormwater capture projects involves a collaborative effort between several agencies including LADWP, the Los Angeles County Flood Control District (LACFCD), the Los Angeles Bureau of Sanitation (LASAN), the Los Angeles Bureau of Street Services (LABSS), the Los Angeles Bureau of Engineering (LABOE), and the US Army Corps of Engineers (USACE). Additionally, LADWP partners with many community-based organizations to leverage their relationships with the residents of the City. Working together on projects that have multi-benefits for multiple agencies allows for the opportunity to cost-share and reduces the financial burden.

Collaborating Agencies

Currently LADWP and its partners actively capture and recharge approximately 29,000 acre-feet per year of stormwater, along with another 35,000 acre-feet per year infiltrating into the potable aquifers through incidental recharge. This water source represents approximately 10% of the City's annual water demand. Through the work on LADWP's Stormwater Capture Master Plan (SCMP), it has been demonstrated that an additional 68,000 to 114,000 acre-feet per year could be realistically captured through a suite of projects, programs, and policies over the next 20 years to allow for a more streamlined approach…The approximate value of this water to LADWP over the same 20-year time period is $1,100 per acre-foot for recharged water and $1,550 per acre-foot for directly used water, which represents a sound investment in the City's future water supply portfolio.

Recharge Amounts

Water Value

Centralized Capture

Centralized stormwater capture facilities are engineered features located in specific locations that perform well at capturing large flows when available. In general, these facilities can capture and infiltrate more than 100 acre-feet per year.

Stormwater Capture

Urban Setting

Capture Potential

Flood control facilities within the Los Angeles region protect the highly urbanized regions and provide significant groundwater replenishment. However, the highly urbanized nature of the region leaves limited opportunities for new large-scale conservation projects within the Los Angeles River watershed. Therefore, optimization of the existing infrastructure, along with focused efforts to maximize the use of open space (such as parks, power line easements, gravel pits, and unlined portions of existing channels) and multi-use stormwater capture projects, provides the best opportunities for increased stormwater capture and conservation.

Preliminary SCMP model results show that the long-term capture potential (by year 2099) from centralized projects could provide an additional 77,000 to 142,000 acre-feet per year for groundwater recharge. This amount of water could be used to recharge the San Fernando, Central, and West Coast Groundwater Basins, and would be in addition to the current baseline amount of approximately 29,000 acre-feet per year that is recharged through the existing centralized facilities in the Tujunga Wash Watershed. The 44 centralized project concepts identified in…this report each have a capture capacity ranging between 100 and 10,000 acre-feet per year, and average approximately 1,200 acre-feet per year.

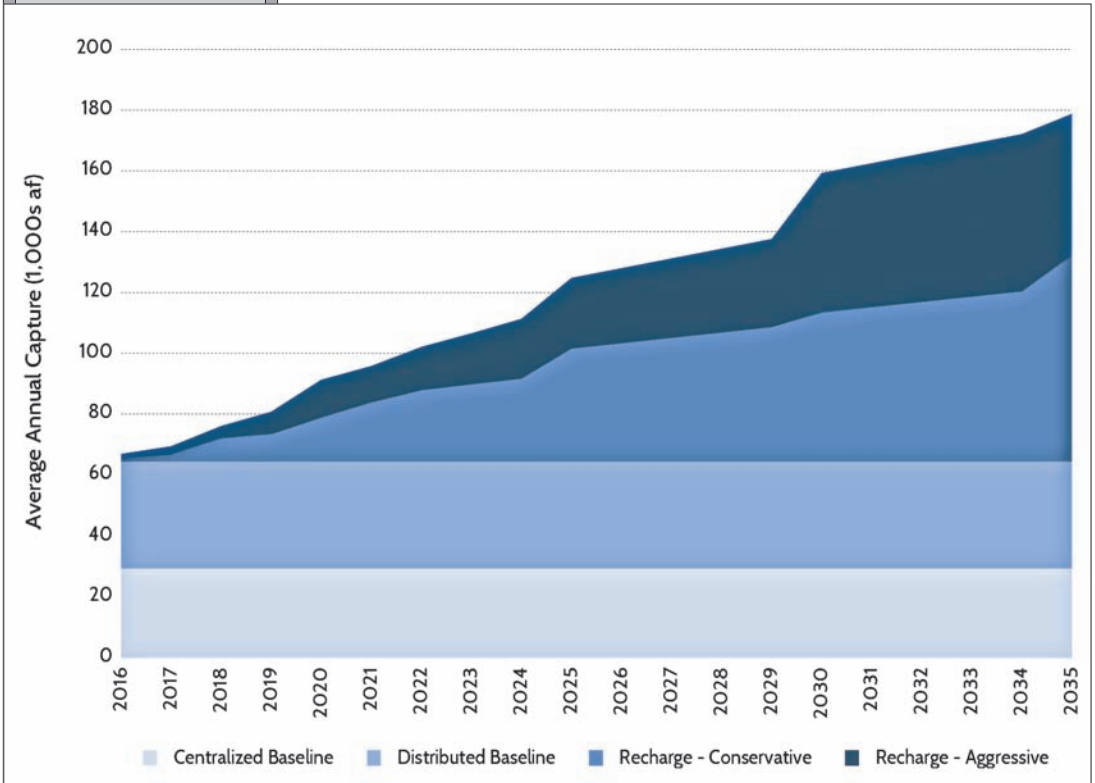
Distributed Facilities

Distributed Capture

Distributed stormwater capture includes stormwater management Best Management Practices (BMPs) that utilize vegetation, soils, and natural processes to manage stormwater runoff close to the source. Distributed facilities can be placed throughout the City on any landscape, including parks, public and private development, public infrastructure and rights of way, and entire residential blocks. Therefore, they can be installed within the highly developed landscape of Los Angeles. Distributed stormwater facilities in the City are important for future stormwater capture efforts.

Multiple Benefits

Distributed facilities are versatile in their applicability and are garnering support from a wide range of organizations because of the multitude of benefits that they can provide. Not only can distributed facilities augment groundwater supplies, but they also can provide wildlife habitat, flood protection, cleaner air, cleaner water, and recreation opportunities. Distributed projects also have the benefit of raising awareness of water resource issues. The multi-benefit nature of these projects facilitates funding by incentivizing multiple agencies to share construction and maintenance costs and by increasing grant opportunities.



Baseline and Potential Stormwater Capture Within the City of Los Angeles

Adapted from the Los Angeles Stormwater Capture Master Plan

The regulatory landscape is also encouraging the development of distributed stormwater capture. The City of Los Angeles and Los Angeles County both have LID Ordinances that mandate the inclusion of distributed projects in new development and significant redevelopment projects. The new Los Angeles County MS4 Permit [i.e., the Municipal-Separate-Storm-Sewer-System permit issued pursuant to the federal Clan Water Act] also calls for increased local stormwater capture through LID and regional infiltration projects. The City of Los Angeles further encourages distributed stormwater capture projects through existing incentive programs.

SCMP model results show that the long-term capture potential (by year 2099) from distributed programs ranges from approximately 30,000 to 50,000 acre-feet per year.

…As this plan to increase the capture of this valuable local water supply is realized, additional benefits to the City will be gained, including water quality improvements, improved green spaces for habitat and recreation, and reduced peak flows in the region's waterways.

For Additional Information:

The *Los Angeles Stormwater Capture Master Plan* available online from: www.ladwp.com/scmp)

Alaska Instream Decision

ALASKA INSTREAM WATER APPLICATIONS DECISION

"PUBLIC INTEREST" AND THE "MOST BENEFICIAL USE"

by David Moon, Editor

Introduction

1st Private Entity

Instream flow reservations are water rights granted for beneficial uses (e.g., fisheries, water recreation) which rely on steamflow. Unlike many western states, Alaska law allows instream flow reservations to be held by a private entity. The first such privately held water reservation was granted by the Alaska Department of Natural Resources on October 6th to the Chuitna Concerned Citizens. The decision was made amidst ongoing controversy surrounding mining operations planned for the Chuitna River basin, west of Anchorage.

Instream Flow Reservation

The Alaska Department of Natural Resources' (ADNR's) Division of Mining, Land and Water Resources Section (WRS) issued its decision on three Reservation of Water applications. The applications were filed by the Chuitna Concerned Citizens (CCC) requesting instream flows for the purpose of protection of fish and wildlife habitat, migration, and propagation for three reaches of Middle Creek. Middle Creek is a tributary of the Chuitna River, which flows into Upper Cook Inlet. The WRS granted an Instream Flow Reservation (IFR) — also known in Alaska as a "water reservation" — for only one of CCC's three applications.

The main opposition to CCC's applications is PacRim Coal LLP (PacRim), which has a coal strip mine project planned in the area. PacRim has competing applications for water use for the mine.

Stream Reaches

A water reservation was granted to CCC for the lower reach of Middle Creek (aka Stream 2003); the applications for the main reach and the middle reach were denied. CCC's two applications that were denied are for segments of the stream located within the footprint of PacRim's proposed Chuitna Coal project, whereas the lower reach was below any direct mining activities. *Middle Creek on Middle Creek/Stream 2003, Reservations of Water LAS 27340, LAS 27437 and LAS 27436* (October 6, 2015) (*Middle Creek*).

Competing Applications

It's important to note that WRS' review was not limited *solely* to deciding on CCC's instream flow applications, since competing water use applications filed later by PacRim to support its proposed coal strip mine on Middle Creek are also pending. Alaska law requires that when applications for competing uses from the same source of water have been filed and there is not enough water to supply all applicants, the competing applications are subject to a preference determination among the proposed beneficial uses as part of the permit granting process. AS 46.15.090, Preference in Granting Permits.

WRS' decision granted the one Instream Flow Reservation to CCC, but did not award any rights or permits to PacRim for mining-related activities. As part of its decision, WRS concluded that PacRim's water use applications and the Alaska Department of Fish & Game's (ADF&G's) reservation of water application for the Chuitna River (LAS 20335) "currently do not require a decision and do not have complete case file records upon which the decisions could be made." *Middle Creek* at 41. Those applications will go through their own permitting process later.

Reservations' Purposes

The WRS decision set forth the basic purpose of a "water reservation" in Alaska: "A reservation of water, sometimes referred to as a reservation in this document, is an appropriation of water the purpose of which is to reserve sufficient water to maintain a specified instream flow or level of water at a specified point on a stream or body of water, or in a specified part of a stream, throughout a year or for specified times, for one or a combination of the following purposes: (1) protection of fish and wildlife habitat, migration, and propagation; (2) recreation and park purposes; (3) navigation and transportation purposes; and (4) sanitary and water quality purposes." *Middle Creek* at 2.

Litigation to Compel Agency Action

CCC Applications

CCC is a group of community residents of Tyonek and Beluga, Alaska, and fishermen who rely on the Chuitna River and its watershed. As noted on their website (http://chuitna.org/about/), "[C]ommunity members came together when they learned of PacRim Coal's plans to start a coal strip mine in the Chuitna River Valley."

CCC filed three applications for water reservations (IFRs) on Middle Creek in 2009. The initial application was filed on June 3, 2009. Two additional applications were filed on August 21, 2009, to address ADNR concerns about discrete "reaches" of the stream.

ADF&G also has a IFR related to Middle Creek, filed in 1996, which is still pending. According to the Alaska Superior Court in 2013, ADNR "appears to be waiting to receive an appropriation request from PacRim Coal for Stream 2003 before adjudicating ADF&G's application." Summary Judgment Order, *CCC*

Alaska Instream Decision

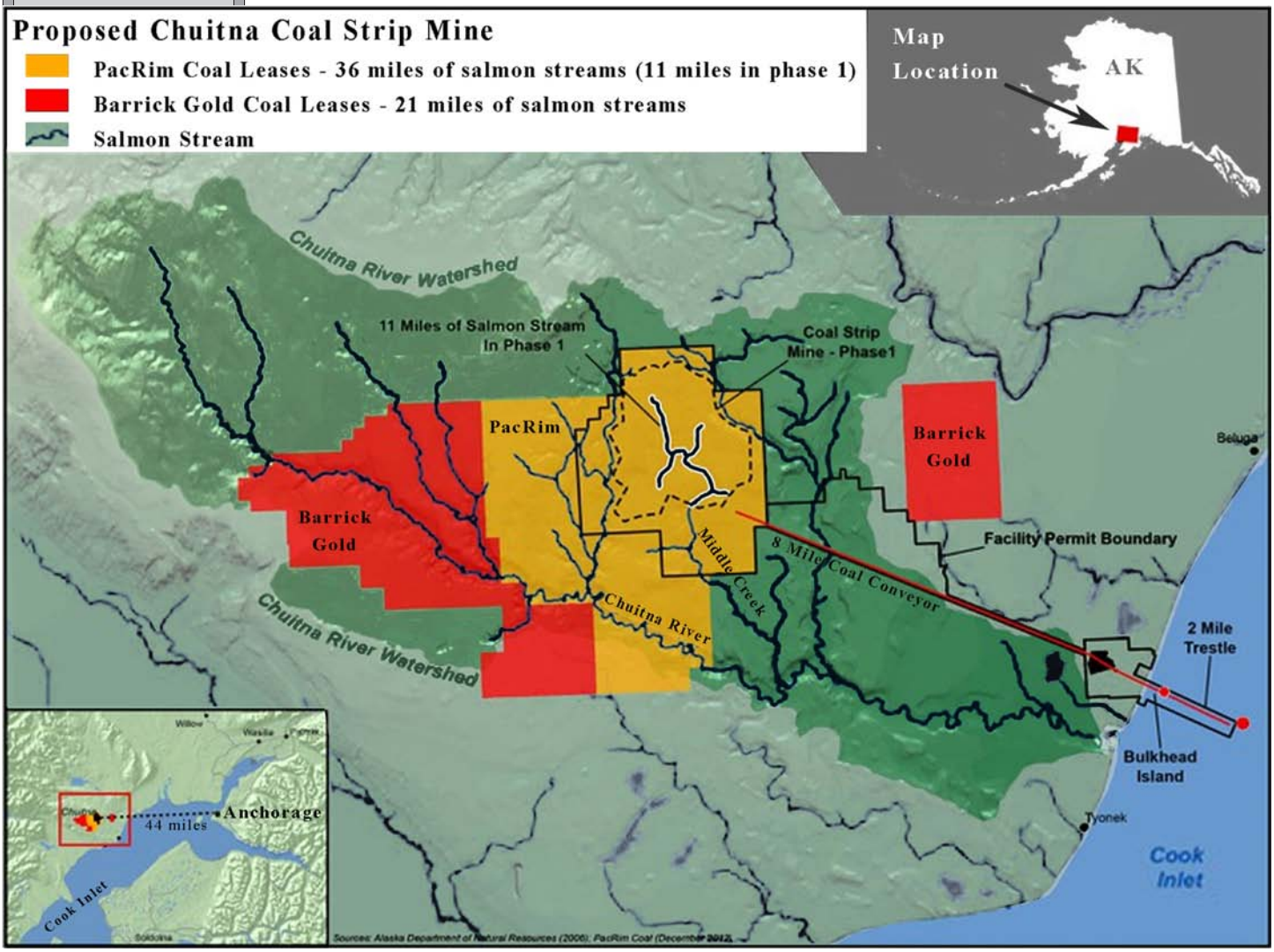
Court Ruling

v. ADNR, Case No. 3AN-11-12094CI, page 9 (Oct. 14, 2013). The Court also commented on CCC's then pending applications: "Despite the inactivity on Chuitna's [CCC's] IFR applications, DNR has granted TMUPs [Temporary Water Use Permits] related to Stream 2003 to PacRim coal since Chuitna [CCC] submitted its June 2009 application." *Id*.

Due to ADNR's lack of progress in adjudicating (processing) its three Instream Flow Reservation applications, CCC sued the state to protect its rights in 2011. In 2013, the Alaska Superior Court (Court) ruled the ADNR violated the Alaska Constitution as well as Alaska Statutes by failing to adjudicate CCC's claims. *CCC v. ADNR*, Case No. 3AN-11-12094CI (October 14, 2013). "In sum, DNR's justifications for its delay are insufficient to support its decision to take no action on Chuitna's [CCC's] application. Chuitna [CCC] has a due process right to a prompt and fair adjudication of its applications. Chuitna [CCC] is prejudiced by DNR's continuing failure to act, and DNR's justifications are insufficient to support the lengthy delay in this case. Therefore, the Court grants Chuitna's [CCC's] motion for summary judgment on Count 6 and hereby orders DNR to begin adjudicating Chuitna's [CCC's] IFR applications within thirty days of the date of this order." *Id*. at 51.

PacRim Assumptions

Following that court decision, WRS decided it had no choice but to proceed with the determination (adjudication) on CCC's three water reservations, even though it did not have all the additional information concerning PacRim's proposed use of water that it would normally use to weigh the competing uses against one another. "At this time, PacRim's water rights applications are substantially complete, but details of its proposed water use are still being developed as part of the mine permitting review processes. Because ADNR has been ordered by the court to adjudicate CCC's applications now (*CCC v. ADNR*, Case No. 3AN-11-12094CI), without waiting for additional information concerning PacRim's proposed use of water, ADNR must make certain assumptions about the PacRim project in order to analyze the need for CCC's proposed reservation. The Department therefore will assume, for the purpose of analyzing the need for CCC's requested reservations, that PacRim's coal mine can be fully permitted for development, and that development will occur in the foreseeable future." *Middle Creek* at 21-22.



Alaska Instream Decision

The WRS Press Release of October 7, 2015, further spelled out the Department's view of the Court Order and its own action in issuing the October 6th *Middle Creek*: "By issuing this decision, the Department has complied with and fulfilled an Alaska Superior Court order to issue a decision on the Chuitna Citizens Coalition's Reservation of Water applications."

Standard for Granting a Water Reservation

Permit Process

This case presented a somewhat unusual situation regarding state agency permit decisions for new water uses. Although other western states have "preference" statutes or rules governing water use, those preference situations generally arise where there are competing uses of water rights during a drought or water shortage. In other words, after the respective water rights have been approved, preferences are used to determine which right can be utilized during a shortage — the water rights continue to exist and after the shortage return to normal usage. *See* Clyde, *TWR* #85. Here, the preference statute is being imposed as part of the *permit granting process* to determine what water rights should be granted in the first place.

Necessary Findings

Before granting a Reservation of Water, WRS must make four findings required by AS 46.15.145(c):

> "The commissioner shall issue a certificate reserving the water applied for under this section if the commissioner finds that,
> (1) The rights of prior appropriators will not be affected by this reservation;
> (2) The applicant has demonstrated that a need exists for the reservation;
> (3) There is unappropriated water in the stream or body of water sufficient for the reservation; and
> (4) The proposed reservation is in the public interest."

Preference Statute

In addition to those four findings, the "Preference" statute may come into play. AS 46.15.090 Preference in Granting Permits:

> When there are competing applications for water from the same source, and the source is insufficient to supply all applicants, the commissioner shall give preference first to public water supply and then to the use that alone or in combination with other foreseeable uses will constitute the most beneficial use.

See also Alaska Constitution, art. VIII, sec. 13.

Competing Uses

WRS Chief David Schade discussed the uniqueness of his agency's decision with *The Water Report*. "This is the first time we've had competing direct uses — a direct conflict between them where a compromise of uses cannot be reached. It's definitely the first time where reservations of water for instream use are competing against traditional water use applications."

Need Determination

Instream Needs

Under AS 46.15.145(c)(2), the applicant must demonstrate that a need exists for the reservation. *Middle Creek* discusses instream needs:

> The primary purpose of CCC's reservation applications is the protection of fish and wildlife habitat, migration, and propagation. Each application states that the reservation of water is needed to protect and maintain fish production within Middle Creek/Stream 2003. Where there is a competing use of water that is apparent or reasonably anticipated, the need for a reservation of water must be evaluated, at least in part, with respect to that competing use. If there is no apparent or reasonably anticipated competing use of water, the need for a reservation is generally more speculative.

Middle Creek at 21.

Competing Applications

Under AS 46.15.145(c)(2), PacRim's applications for water use represent a "reasonably anticipated competing use of water" when determining if a need exists for the proposed instream water use. WRS pointed to the PacRim applications and their impact on the proposed water reservations in the decision, as follows: "In this case, PacRim has applied for water rights that, if granted, would directly compete with the proposed reservations at issue over portions of the Middle Reach and the Main Reach. In fact, its proposed use would completely de-water portions of those reaches. PacRim's proposed water rights would not directly compete with the proposed reservation for the Lower Reach, but the Lower Reach could be indirectly impacted by PacRim's upstream activities." *Middle Creek* at 21.

WRS concluded that CCC had "demonstrated that a need exists for the proposed reservations of water" for all three reaches.

Needs Determination

An interesting sideline of that need determination is that an argument made by Cook Inletkeeper and others who supported the water reservations — "that a coal mine in the area is not economically viable due to current economic conditions" — ended up being cited as a factor weighing *against* a finding of need for the reservations. The argument was intended to "dissuade ADNR from considering the impacts to PacRim or from assuming PacRim's project will be permitted and developed." *Id*. at 22-23. Eventually, WRS found that "given the incomplete record regarding the scope and viability of the proposed competing

Alaska Instream Decision

use, on which ADNR is adjudicating CCC's applications, ADNR must assume that PacRim's project will go forward." The argument that no mine will be developed was viewed by WRS as problematic for a need determination in CCC's favor: "Nevertheless, if, as the applicant's supporters allege, no mine will be developed, there will be no competing use of the water and the need for a reservation of water becomes more speculative." *Id*. at 23.

Instream Support

Following *Middle Creek*'s need discussion, Chief Schade discussed the overall rationale that supports the protection of instream flows (citing Annear, T., I. Chisholm, H. Beecher, A. Locke, et al. 2004. *Instream Flows for Riverine Resource Stewardship*, revised edition. Instream Flow Council, Cheyenne, WY): "On the other hand, whether or not this coal mine is developed, the experience of other western states suggests that it is prudent to protect instream flows early, and perhaps without as much concern about whether or not there is an apparent or reasonably anticipated competing use, in order that these flows and the uses that depend upon them are fully protected at a future time when available water may be more scarce or a proposed competing use actually arises." *Middle Creek* at 23. The "potential impacts of PacRim's proposed competing use" were "considered in deciding the need for a reservation." The potential impacts of PacRim's use to the Chuitna River downstream of the proposed reservation, as well as to Middle Creek/Stream 2003 itself, were part of WRS' considerations. *Id*. at 24.

Lower Reach Granted

The WRS ultimately granted one Instream Flow Reservation to the CCC in the lower reach of Middle Creek/Stream 2003 and denied the other two applications for water reservations (main reach and middle reach). The two reservations that were denied (discussed below) lie within the boundaries of PacRim's controversial proposal to strip mine through nearly 14 miles of salmon stream, whereas the approved reservation covers a stretch of water just downstream from the proposed mine. These applications were requested to protect flows for the purpose of protection of fish and wildlife habitat, migration, and propagation — one of the four purposes authorized by Alaska Statute 46.15.145. The decision did not award any water rights or permits for mining-related activities.

Public Interest Requirement

As noted above, this case did not present a simple case of instream flow applications and determinations relating to those applications. Instead, the competing application of PacRim coupled with Alaska statutes regarding the permitting process make the case much more complex.

PacRim's Competing Application

> The Department must consider the effect of a reservation on PacRim's competing traditional water right applications, and the potential loss of that alternate use of the water. However, as noted by ADF&G, the applicant, and many other interested parties, much of the pertinent information concerning costs and benefits, permit requirements and mitigation for the proposed PacRim project are not currently known. In fact, ADNR informed the applicant that it would be difficult to adjudicate the reservation applications prior to the above noted permitting process being completed because the effect of the loss of the alternate use of water could not be fully analyzed without complete information. It further explained that proceeding now, before the permitting process is complete, would require it to make certain assumptions to adjudicate these applications.

Middle Creek at 38.

Public Interest Arguments

In the decision, Schade wrote that he found two arguments regarding the public interest to be compelling. First, the applicant made a "compelling argument" that the Department of Natural Resources "should not allow PacRim to develop a coal mine that would significantly and negatively impact the Chuitna River watershed" (*Middle Creek* at 41), and second, the Alaska Mental Health Trust Authority and others made the compelling argument that "while the State and Federal permitting processes must be stringent, they must also allow for a predictable and complete [permitting] process" that allows "all available information" to be "compiled and presented by all participants in each permitting process. At the conclusion of such a process, there will be sufficient information to allow a full analysis of the effects of the project on state resources, including water, fish, and game, and which use of water may be most beneficial and in the public interest." *Middle Creek* at 41-42.

Permitting Process Dilemma

In effect, CCC's two rejected applications ended up being caught in a "Catch 22" due to a combination of the Court's decision and the strictures of Alaska's permitting process. The Court decision forced WRS to make its determination *now* on all three water reservations. Two of CCC's three water reservations applications "compete" with PacRim applications — which requires determining a "most beneficial use" preference. "Public interest" requires the PacRim permitting review process to be completed before that preference determination can be made. *Middle Creek* found that "a reservation of water on the Main or Middle Reaches of Middle Creek/Stream 2003 at this time…could prematurely prevent the mine project from receiving fair consideration during a full and complete permitting review process." *Id*. at 42. In winning the decision to have their applications acted upon in a timely fashion, the priority dates for two of CCC's applications were lost due to Alaska's permitting process.

Alaska Instream Decision

"Public Interest" Finding

After laying out the "public interest" finding which results in rejecting the two water reservations, the decision goes on to explain WRS' view that the water and fishery resources are not put at risk by its decision since "those resources will not be affected or at issue until such time as the mine project is fully permitted for development." (*Id.* at 42):

> The Department finds that it is in the public interest to allow the PacRim permitting review process to be completed, and therefore that it would not be in the public interest to issue a reservation of water on the Main or Middle Reaches of Middle Creek/Stream 2003 at this time. Such an action could prematurely prevent the mine project from receiving fair consideration during a full and complete permitting review process. On the other hand, not issuing reservations on these reaches will not place the water and fish resources of Middle Creek/Stream 2003 in immediate danger of being negatively affected; those resources will not be affected or at issue until such time as the mine project is fully permitted for development. In turn, the mine cannot be developed without water permits from ADNR. In the event PacRim receives the other necessary permits, ADNR will be able to conduct a full and complete analysis of all water rights applications and the public interest with respect to them. ADNR has the ability to impose stipulations and conditions on any water right that may be issued in order to protect water and fish resources.

Case Files Incomplete

> The Department finds that the public interest would not be served if ADNR grants the reservation applications on the Main and Middle Reaches, which may completely preclude a significant alternative use of the water and harm other persons, before all the competing application case files are complete with all available information included. Only then will the Department be in a position to make a fully informed decision that determines and serves the public interest. In the meantime, the purposes for which the reservation applications were submitted can be fully protected without issuing a reservation.

Id. at 42.

Thus, the PacRim applications will receive a full and complete permit review process at a later time, while two of the CCC's water reservations have been denied by this decision.

Order to Adjudicate

The Water Report asked WRS Chief David Schade about the Court's order and how it impacted CCC's applications in this case. "The court ordered us [DNR] to adjudicate the CCC water reservation applications. In following the order to adjudicate, our decision granted the lower reach application (as modified), and denied the main and middle reach applications — you either accept and/or modify the applications in a decision to grant a certificate or you reject the application. They aren't put on hold," Schade said.

Lower Reach Analysis

The location of the Lower Reach reservation resulted in a different "public interest analysis" for that application:

> Because the application for the Lower Reach is outside the mine site and issuance of a reservation on that reach would not preclude the potential development of a mine (if development is otherwise appropriate), this same public interest analysis does not apply to it. Without the concern that the Lower Reach reservation would completely prohibit a competing, alternate use of the water or cause harm to others, the public interest factors weigh in favor of granting the reservation. Further, a reservation on that reach would be a tool to ensure the least impact on the downstream, Chuitna River system.

Middle Creek at 43.

"Most Beneficial Use" — Competing Uses

Preference Determination

Near the end of the decision, WRS turned to its discussion on the "most beneficial use" provision of AS 46.15.090 and how it applies in this case.

> Even where applications for appropriation of water meet all the statutory requirements for the type of appropriation applied for, including the public interest, competing applications for appropriations of water are subject to preferences among beneficial uses. When there are applications for competing uses from the same source of water and there is not enough water to supply all applicants, ADNR is required to balance the interests involved and give preference to "the use that alone or in combination with other foreseeable uses will constitute the most beneficial use." Alaska Constitution, art. VIII, sec. 13; AS 46.15.090. Accordingly, even if ADNR could determine that the proposed reservations for the Main and Middle Reaches were in the public interest and otherwise met the statutory criteria to be granted, it would then have to determine whether or not PacRim's

Alaska Instream Decision

Incomplete Record Impact

Lower Reach: No Competing Use

Remaining Applications

Limited Scope

Court Order

Impacts of Mine Plan

> proposed appropriations were in the public interest and otherwise met the statutory criteria to be granted, and finally ADNR would have to determine if the reservations or PacRim's proposed use was "the most beneficial use."

Middle Creek at 43.

Regarding the Main and Middle Reaches of Middle Creek, WRS explained that it was necessary to consider any proposed projects in relationship to their effects upon the entire Chuitna watershed. That being the case, "ADNR cannot yet determine, on this incomplete record, which of the competing applications for the same water would be given a preference as the most beneficial use. For the same reasons as stated in the discussion concerning the public interest, including the fact that much of the pertinent information concerning costs and benefits, permit requirements and mitigation for the proposed PacRim project are not currently known, it is not possible, on an incomplete record concerning the proposed alternate use, for ADNR to make a 'most beneficial use' determination." *Id*.

Concerning the Lower Reach, however, Chief Schade's decision simply found that the location of the reach downstream of the footprint of the mining project was conclusive. "Because there are no competing applications for use of water from the Lower Reach, there is no beneficial use determination." *Id*. Thus, the Lower Reach water reservation could be granted without the need to make a "most beneficial use" preference determination between CCC's instream flow use and the mining use of PacRim.

Competing Water Use Applications Remaining

In addition to CCC's water reservation applications, PacRim's competing applications for water use for its coal mine project in the Middle Creek watershed remain to be processed (adjudicated). Also, ADF&G's reservation of water application for the Chuitna River (LAS 20335) has yet to be determined by WRS. "The Water Resources Section will analyze the entire Chuitna watershed and the consequences and protections of the different proposed uses. This review will occur after other mine-related permitting is complete and the best information is available for all the Chuitna water right applications," Schade said. WRS Press Release, October 7, 2015.

WRS' Decision specifically addressed the limited scope of its October 6th *Middle Creek* ruling, as follows:

> However, the only applications currently requiring a decision are the Middle Creek/Stream 2003 reservation of water applications. The PacRim water right applications and the ADF&G's reservation of water application for the Chuitna River (LAS 20335) currently do not require a decision and do not have complete case file records upon which the decisions could be made. Although the Department normally would have adjudicated all of the applications (CCC's, PacRim's, and the ADF&G's) at the same time in order to have the best, most complete information available to determine the most beneficial use(s) of the water and what is in the public interest, the Department must nevertheless consider what action to take in the public interest right now on these reservation applications because of a court order. ADNR cannot consider the entire Chuitna River watershed in the context of these reservation applications alone as it does not have complete information on the potential impacts of the mine or the mitigation measures that will be taken by PacRim to reduce any impacts on the watershed. An analysis of the entire Chuitna watershed and the consequences and protections of the different proposed uses must be conducted when all the applications are ready for review.

Middle Creek at 41.

On the ADNR website (http://dnr.alaska.gov/mlw/water/reservations/chuitna.cfm), the agency described its decision in this case and laid out the approach it will take on the remaining applications:

> This decision is a reasoned approach that reached conclusion on the lower reach of Middle Creek/Stream 2003 while denying the applications for reservations on the main and middle reaches because they are not ready for decision. The division cannot not yet determine, on this incomplete record, which of the competing applications for the same water would be subject to a preference as the most beneficial use. The division will adjudicate any remaining requests for water rights or instream flow applications in the Chuitna River watershed after the Clean Water Act 404, Surface Mining Coal Regulatory Act (SMCRA) and Title 16 fish habitat permits are done so that we can consider impacts to the watershed by an approved mine plan. We will not approve significant impacts to the Chuitna River.

Alaska Instream Decision

"Significant Impacts"

PacRim Mitigation

Appeals Filed on IFR

The Water Report asked Chief Schade about that last sentence regarding "significant impacts to the Chuitna River" and how it will effect WRS' actions as the PacRim applications are addressed. Schade replied, "[T]he statement speaks for itself. Impacts on flows of 20% or greater on a system is going to have a detrimental effect. It's all a matter of scale. Mitigation will be part of the PacRim plans we have to look at, but we don't have that in front of us yet." Schade further explained that the "flow impact of 20% or greater" was a "standard used by the USGS [US Geological Survey] and the Instream Flow Council."

Mitigation by PacRim for loss of the stream flow in Middle Creek that is expected from coal mine operations has been preliminarily discussed. "PacRim, for example, has said that they will mitigate the stream flow loss by diverting water around the mine site, and/or will use groundwater to supplement the system flows [while the mining operations alter the streambed]. Eventually, we will consider the PacRim water right applications at the same time as the State of Alaska Department of Fish & Game reservation of water application on the Chuitna River. But again, we don't yet have all these details in front of us to make a decision on those applications," Schade told *The Water Report*.

Appeals Filed in Support of Coal Mining

The *Middle Creek* decision was appealed to the Commissioner of the Department of Natural Resources within 20 days. Ten appeals were filed with the Commissioner's office by PacRim and other parties who oppose the granting of the water reservation for the lower reach. No appeals were made on WRS' denial of water reservations for the main reach and middle reach of Middle Creek.

The appellants are: PacRim Coal, LP; Alaska Miners Association; Alaska Mental Health Trust Lands Office; Council of Alaska Producers; Alaska Oil and Gas Association; Resource Development Council; Steve Borell, Borell Consulting Services, LLC; Howard Grey; Pacific Seafood Processors Association; and the Alaska Chamber of Commerce.

The appeal period closed on Monday, October 26th. CCC did not appeal the two denials, but as the applicant will be participating in the industry appeals, accordingly to Valerie Brown of the Trustees for Alaska, attorney for CCC.

Any participant of an appeal to the Commissioner can then appeal the Commissioner's decision to State Superior Court.

Conclusion

The Water Report asked Chief Schade if there was any part of the decision that people seem to be overlooking. "There may be some misunderstanding about the effect of denying the two applications. No one is precluded from participating in future water adjudication process, just because of the denial of CCC's other two applications. There is still full public participation. Members of the public will have the right to object as to individual harm or harm to the public trust, in regards to the PacRim water right applications, when they come up."

CCC, meanwhile, took a harsh view of WRS' decision to grant only one of the three water reservations. "Make no mistake, DNR is saying that a potential coal strip mine is more valuable to the public than protecting wild salmon habitat. This decision doesn't do enough to protect fish in the Chuitna River because it doesn't keep water flowing in the salmon-spawning areas of Middle Creek," said Ron Burnett, a Beluga homeowner and founding member of the Chuitna Citizens Coalition. "We remain deeply concerned with PacRim Coal's proposal to mine directly through nearly 14 miles of wild salmon habitat directly upstream from our Instream Flow Reservation, and will be looking to Alaska Department of Fish and Game to stand strong and vigorously protect critical spawning and rearing habitat in the headwaters of Chuitna watershed." CCC Press Release, October 7, 2015.

With the filing of ten appeals to the one Instream Flow Reservation on the Lower Reach that was granted, not to mention the eventual processing/adjudication of the PacRim and ADF&G water rights applications, the process is obviously far from over. How Alaska eventually ends up addressing the relative rights of instream flows versus mining applications in this case and others remains to be seen.

For Additional Information:
Decision available at: http://dnr.alaska.gov/mlw/water/reservations/chuitna.cfm
Copies of Appeals available upon request to *TWR* — TheWaterReport@yahoo.com
Alaska Superior Court Decision available upon request to *TWR*

ARCHES NATIONAL PARK WATER RIGHTS

SETTLEMENT OF FEDERAL RESERVED WATER RIGHT CLAIMS FOR ARCHES NATIONAL PARK

by James Greer (Assistant Utah State Engineer for Technical Services)
and
Norman K. Johnson, (Division Director, Natural Resources Division, Utah Attorney General's Office)

Arches Park Water Rights Agreement

Federal Reserved Rights

Prior Appropriation Doctrine

State Primacy

Federal Reservations

Winters

Equitable Remedy

Introduction

Western water rights are created under state law. Decades ago, when Congress and the President set aside federal lands in the West for specific purposes — like Indian reservations and national parks — they established no water rights to accompany the federal lands. In the *Winters* case the United States Supreme Court determined that the creation of an Indian reservation in Montana impliedly reserved water rights for that reservation. The Supreme Court later held that the reserved water rights doctrine applied to non-Indian reservations as well. Most reserved water rights remain unquantified to this day, and their quantification stands to impact many less-senior-priority water rights created under state laws and upon which the economy of the West depends. Understanding the relationship between federal reserved water rights and state appropriative water rights will help policy makers accomplish the difficult task of integrating federal and state water rights while minimizing the impact on existing water rights — most of which have been beneficially used for many years. In this regard, negotiation offers a flexible alternative to litigation.

This article examines the route Utah has chosen to resolve federal reserved water right claims, particularly with respect to the most-recently negotiated water right settlement for Arches National Park.

Background

WESTERN WATER LAW AND THE RESERVED WATER RIGHTS DOCTRINE

Water is a scarce, finite resource in the arid West, which early cartographers called the "Great American Desert." While water availability in this area has remained mostly static over time, water demand for a variety of critical beneficial uses constantly increases.

In the mid-1800s, miners and irrigators in western states and territories built diversion and conveyance facilities to move precious water supplies to necessary uses. The "first in time, first in right" principle of mining law transferred to water uses, giving birth to the Doctrine of Prior Appropriation under which a hierarchy of water rights is created where those with the earliest priority dates are protected from impairment by later-created rights. *See* Clyde, TWR #117

The federal government supported development of this "new" water law. Through passage of the Mining Act of 1866, the Desert Land Act of 1877, the Homestead Act, and the Reclamation Act, among other legislation, Congress approved then-existing appropriations of water on public lands in the West which had been made pursuant to local laws and customs and at the same time established the primacy of state water law in the West for future appropriations. The US Supreme Court (Supreme Court) held that the Desert Land Act severed the land and water estates in the public domain and directed that users establish water rights under state law independently from land rights. *See California-Oregon Power Co. v. Beaver Portland Cement Co*., 295 U.S. 142, 158 (1935).

At the same time western water law developed, Congress and the President from time to time set aside, or "reserved" for specific purposes, tracts of land from the vast publicly owned real estate in the West. These areas included Indian reservations, national parks and monuments, military posts, forests, and others. Unfortunately, no reservations of water accompanied these sometimes very extensive reservations of federal land. This oversight went unnoticed for many years, but competition for water was inevitable.

In 1906, after Congress had several times approved the primacy and implementation of state water law in the West, conflict arose between holders of water rights based on state law and the inhabitants of federal reservations. The United States brought suit on behalf of the Indians on the Fort Belknap Reservation in Montana. The complaint asserted the Indians needed virtually all of the water in the Milk River for reservation purposes. Montana citizens' water rights, created under Montana law, diverted a significant amount of water from that river for farming and domestic uses. They maintained they would be forced to abandon their homes and farms if deprived of water. They stressed their role in the settlement of Montana, based on the validity of their state-created water rights.

This case presented the Supreme Court with a genuine dilemma. Had Congress set aside a water right to accompany the Indian land, the case would have been straightforward. But Congress reserved no such water right specifically. In the meantime, Montana settlers beneficially used water on farms and ranches as their Montana water rights allowed. This conflict led the Supreme Court to fashion an equitable remedy.

Arches Park Water Rights Agreement

Implied Rights

In *Winters v. United States*, 207 U.S. 564 (1908), the Supreme Court held that when Congress created the Fort Belknap Reservation it must have intended to reserve water as well as land because the Indians needed such water to become a "pastoral and civilized" people. *Id.* at 576. Thus came into being the implied, Indian "reserved water rights" doctrine, which at first was thought to be an anomaly of Indian law.

Primary Purpose

Later federal court decisions defined certain characteristics of Indian reserved water rights and, in *Arizona v. California*, the Supreme Court held that the reserved rights doctrine applied to *all* federal reservations, not just Indian reservations, and that the quantity of the reserved water right was the amount of water necessary to fulfill the primary purpose of the reservation. *Arizona v. California*, 373 U.S. 546, 601 (1963). Subsequent federal case law helped define these non-Indian reserved water rights to a certain extent, although many questions remain to this day. *See*, *e.g.*, *Cappaert v. United States*, 426 U.S. 128 (1976); *United States v. New Mexico*, 438 U.S. 696 (1978).

Un-quantified Rights

Reserved water rights have different characteristics than appropriative water rights and, because their priority date is the date of the creation of the reservation — which is often very early compared to water rights obtained by appropriation — recognition of such rights may conflict with appropriative water rights. The most pressing problem is that most reserved water rights remain un-quantified. Also, in many areas, the quantification of reserved water rights will displace other hydrologically-connected water rights that may be decades old and may have been used regularly for important beneficial purposes. Martha C. Franks, *The Uses of the Practicably Irrigable Acreage Standard in the Quantification of Reserved Water Rights*, 31 Nat. Resources J. 549, 551 (1991) noted, "[T]herefore, the award of a large reserved right, whether federal or Indian, may preempt present water users and entirely deprive non-federal appropriators of water upon which they have — possibly ill-advisedly — relied." Some 45 years ago western water expert Frank Trelease wrote that federal reserved water rights "hang like the sword of Damocles over every title to water rights on every stream which touches a federal reservation." Frank Trelease, *Federal-State Relations in Water Law* 160 (1971) (prepared for the National Water Commission). This idea may seem melodramatic, but the drama is real for those whose water rights may be impacted by quantifying reserved water rights.

Negotiation Option

State officials have taken different approaches to dealing with reserved water rights. Some states have for years more or less ignored the existence of such rights. Others have litigated with Indian tribes and the federal government. *See In re The General Adjudication of All Rights to the Use of Water in the Big Horn River System* (*Big Horn I*), 753 P.2d 76 (Wyo. 1988). Still others have pursued negotiation as the preferred method of quantifying reserved rights. While it has its own weaknesses, this approach allows the possibility of relative "win/win" results without the expense and uncertainty of litigation. It also puts modern parties in the role of problem solvers with respect to a challenging situation they did not create, but must deal with, and provides a degree of flexibility that is typically unavailable through litigation.

Utah's Approach

Utah has chosen to negotiate reserved water rights. S. Con. Res. 2, 2015 Leg., Gen. Sess. (Utah 2015). Such negotiations require commitment, patience, and trust. They often take many years to complete. Utah has negotiated reserved water right settlements for: Zion National Park; Cedar Breaks, Hovenweep, Promontory Point, Rainbow Bridge, Timpanogos Cave, and Natural Bridges National Monuments; and the Shivwits Indian Reservation. It is currently working with federal officials on the settlement of the reserved water rights for Bryce Canyon National Park. The latest settlement was recently completed and signed for Arches National Park (Arches) in southeastern Utah near Moab — the Arches National Park Water Rights Agreement (*Agreement)*.

The Arches National Park Reserved Water Right Settlement

1999 Start

Negotiations to quantify the reserved water right for Arches National Park (Park or National Park) began in 1999. The negotiated settlement involved recognizing a water right for the Park that included instream and in-situ uses, as well as a right for administrative uses and needs.

Data Needs & Studies

Groundwater System

Early in the process negotiators realized that before they could begin in earnest they needed more data to understand the water systems and water-related needs of the Park so that the in-situ and administrative rights could be accurately identified and quantified. While the Park is located in a desert environment where water is very scarce, it has washes and spring areas, among other water-dependent locations, which are fed by local groundwater aquifer systems that were not well defined.

To better understand the sources of Park water, negotiators commissioned a study to determine the origins of water in the Park's natural flowing spring areas. Hugh A. Hurlow & Charles E. Bishop, *Recharge Areas and Geologic Controls for the Courthouse-Sevenmile Canyon Spring System, Western Arches National Park, Grand County, Utah*, published as Utah Geological Survey, Special Study 108 (2003). The study, which began in 2001, was funded by the Utah Division of Water Rights and the National Park

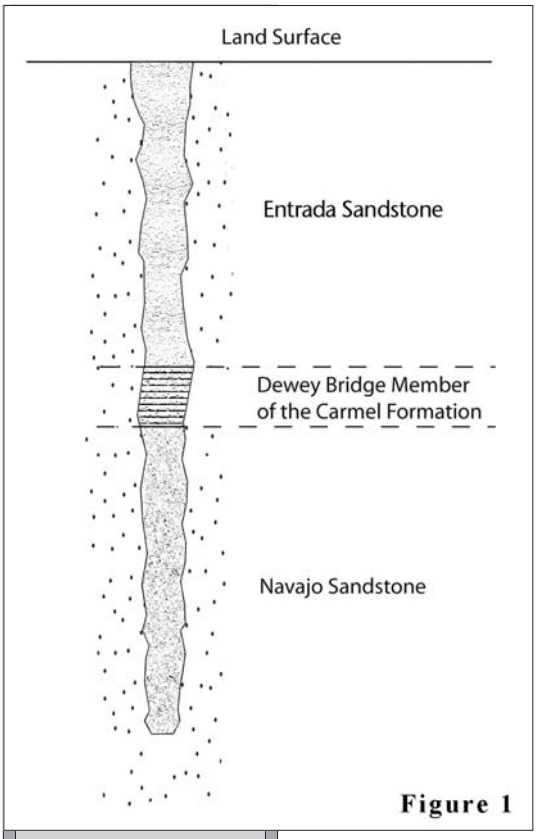


Figure 1

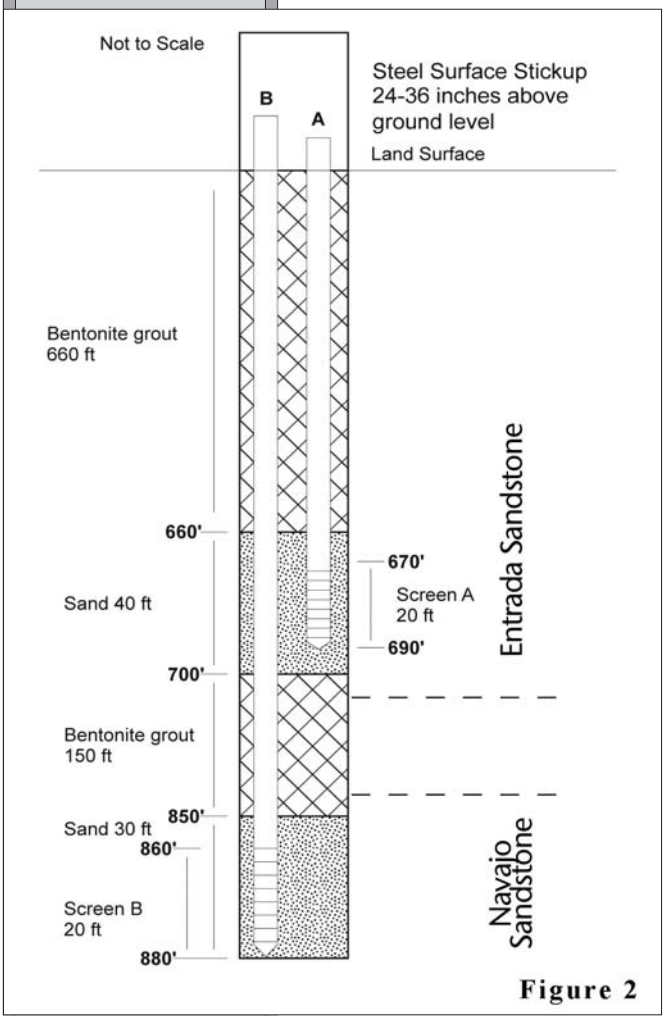


Figure 2

Service. Published in 2003, the results indicated that the water which supplied the Park's springs originated in a groundwater aquifer system that extended beyond the Park's boundaries. Negotiators determined that developing water within the areas near but outside the Park could impair spring flow. Water was being used from wells in these areas and more water development was expected in the future to meet growth demands. This direct conflict between the state-based water rights and the federal reserved water right delayed the negotiations for a time and ultimately was the catalyst for an additional study.

Prior to completion of the 2003 study, data was inconclusive about the overall depth of the aquifer units that contributed water to the springs located within the National Park. In this area two principal aquifer units had been generally identified: the upper aquifer, called the Entrada Aquifer; and the lower aquifer, called the Navajo Aquifer. Researchers assumed that the thin geologic layer called the Dewey Bridge Member that separated these two units was possibly a barrier to groundwater flow (*see* Figure 1). The unique geology of this area, including the Dewey Bridge Member, which separates the two aquifers, has contributed over geologic time to the Park having the densest concentrations of natural stone arches in the world.

To test the hydrologic connection between the two aquifers a second study was commissioned to drill a monitoring well up-gradient of the major springs and conduct analysis on the two aquifer units. Stefan M. Kirby, J. Lucy Jordan & Gary Hunt, *Summary Results from the Courthouse Wash Monitoring Well*, published as Utah Geological Survey, Open File Report 606 (2013). The monitoring well was drilled as a single borehole that penetrated both the Navajo and Entrada aquifers. The borehole was completed with two separate piezometers, one near the base of the Entrada Aquifer and the other near the top of the Navajo Aquifer (*see* Figure 2). The well was equipped such that the piezometer in each aquifer was sealed off from the opposite aquifer. Water level and chemistry samples were taken from each aquifer and analyzed. Hydologists discovered that the difference in water levels between the two aquifers at the location of the well was approximately 43 feet. Additionally, the groundwater chemistry data showed that the water did not have the same chemical signatures. The upper Entrada Aquifer had significantly poorer quality than the lower Navajo Aquifer. The results of the study demonstrated little if any connection between the Entrada and Navajo aquifers at the monitoring well site. Investigators completed this study, which was commissioned by the Utah Division of Water Rights, the National Park Service, Grand County, and the Utah School and Institutional Trust Lands Administration in 2011, over a period of about two years.

Protection Zone Established

Based on the results of the two studies negotiators delineated a Protection Zone, comprised of the area as shown on Figure 3, based on the aquifer areas determined to be hydrologically connected to the springs. The Protection Zone's depth extends from the surface down to the base of the Entrada Aquifer. This limit is based on the observation well data showing that the lower Navajo Aquifer is not hydrologically connected. To protect the aquatic features of the Park, the State agreed not to approve any new diversions that would constitute the withdrawal of a new or increased quantity of surface water or groundwater from the Protection Zone. The Protection Zone was established "to protect the flow of perennial,intermittent, and ephemeral streams, seeps, springs, and other naturally-occurring water within the Park whose source is surface water or groundwater from the Entrada aquifer." *Agreement* at 5.

Arches Park Water Rights Agreement

Subordination

Depth Requirement

To minimize displacement of existing appropriative water rights in the area, the United States in turn agreed to subordinate the portion of its federal reserved water right held for in-situ uses to all state-based water rights approved before the date of the agreement. Thus, all currently existing water right uses would be permitted to continue, but no future development would be permitted within the Protection Zone. The subordinations, however, do not apply to the federal reserved water right held for administrative uses (see below).

New wells may be permitted in the area, but the wells must be drilled to the deeper Navajo Aquifer and carefully sealed from the upper Entrada Aquifer. This means such wells must be drilled to an average depth of 850 feet, ending below the average depth of the Entrada Aquifer. This provides for some continued development in these areas, an important need of local landowners, and also protects the National Park's water rights from impairment. This requirement to drill to the lower Navajo Aquifer adds expense to water development, but it was necessary in many situations to obtain good quality water. Understanding and working within these hydrologic considerations became critical to the success of the negotiations. The State of Utah, through the Division of Water Rights, has adopted as policy the necessary Groundwater Protection Zones as outlined in Figure 3 (Policy at: www.waterrights.utah.gov/wrinfo/policy/wrareas/01_ArchesPolicySigned.pdf; see also www.waterrights.utah.gov/wrinfo/policy/wrareas/area01.asp).

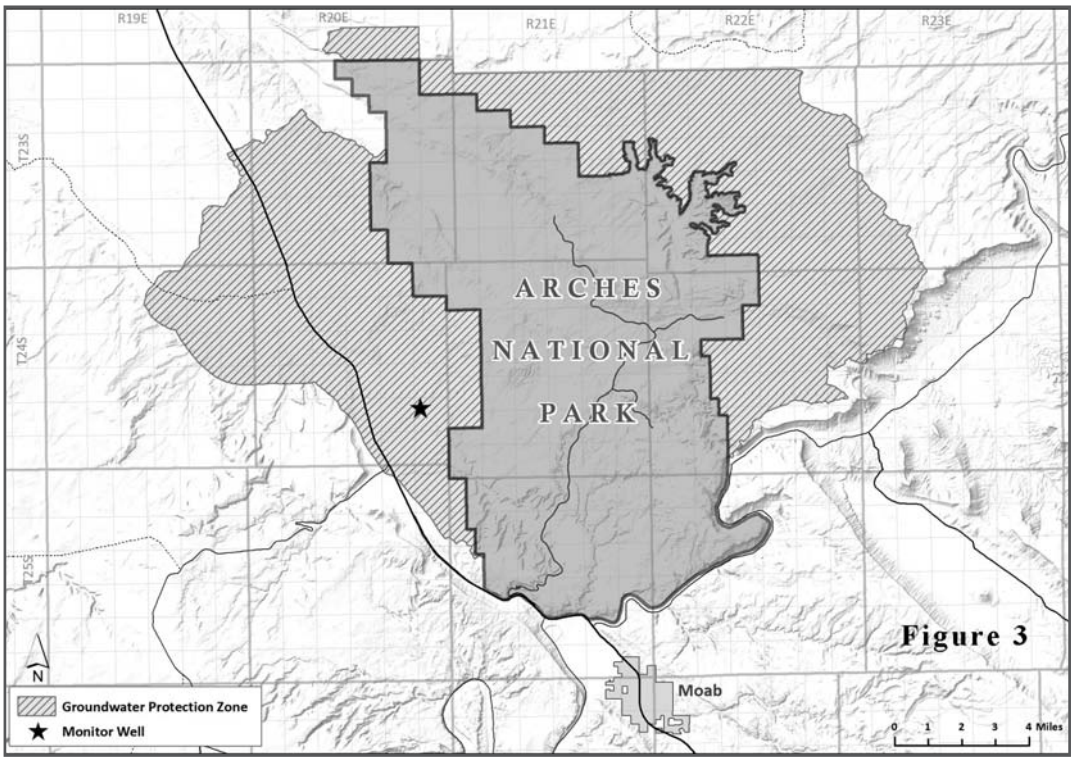


Figure 3

Uses Described

In Situ and Instream Uses

The in situ and instream uses were described in the Agreement at pages 3-4. "The remainder of the water reserved…shall remain in its free flowing and natural condition for in situ and instream uses (collectively 'in situ uses') that shall satisfy and promote the purposes for which the Park was established. Such in situ uses include but are not limited to providing water for: riparian and wetland vegetation and ecosystems; hanging gardens; geomorphologic processes; wildlife habitat and watering; and other uses that shall satisfy and promote the scenic, conservation, preservation, protection, recreational, and other purposes for which the Park was established."

Priority Varies

Priority Dates

The Agreement delineated the priority dates for the federal reserved water right at page 3 of the Agreement as follows: "The United States' federal reserved water right shall have a single priority date of April 12, 1929 for the administrative uses…and seven separate priority dates for the in situ and instream uses…, which priority dates shall correspond to the seven dates on which the lands comprising the Park were reserved from the public domain or otherwise acquired for Park purposes: April 12, 1929, November 25, 1938, July 22, 1960, January 20, 1969, November 12, 1971, December 9, 1998, and April 4, 2000, with the priority date of a particular place of use being the date of reservation or acquisition of those lands, as shown in Appendix A."

Arches Park Water Rights Agreement

Administrative Rights

Administrative Uses

In addition to the in-situ and instream uses that were defined and protected, a water right for the administrative uses for the National Park was also included in the agreement. The right was quantified as the diversion of 120 acre-feet per year and the depletion of 60 acre-feet per year. This quantity is based on the current water use and the projected water needs calculated for the future development and administration of the National Park. This water is used to satisfy the existing and future requirements for the construction, operation, and maintenance of visitor facilities, campgrounds, landscaping and other uses within the Park boundaries. The priority date for the administrative uses is April 12, 1929 — the date the Park was first established by Presidential Proclamation No. 1875. 46 Stat. 2988 (1929) (establishing Arches National Monument). The Monument, expanded by additional presidential proclamations, was later converted to a park and likewise expanded, most recently in 1998. *See* Pub. L. No. 105-335, 112 Stat. 3139 (1998); as implemented by Exchange Patent No. 19221, dated December 9, 1998; and Exchange Patent No. 19310, dated April 4, 2000. The purposes for the monument and park are outlined in 54 U.S.C. § 100101.

Public Involvement

Public Process - Education

A process to involve and educate the public as negotiations progressed was vital to the success of the agreement. A small work group of state and federal representatives studied and negotiated agreement concepts, but shared their work with interested parties and local government entities, particularly county commissioners, as negotiations went forward. Many public meetings kept water users and the public informed of negotiation developments and were used to gather public comments and address concerns. In the end, all interested parties supported the finalized *Agreement* because, to the extent possible, concerns were addressed as they arose.

Agreement and Approval

The *Agreement* was signed on May 22, 2015, by Utah Governor Gary Herbert, Deputy Regional Director of the National Park Service, Laura Joss, and other State and federal officials. This was a significant accomplishment that will help provide certainty in the area into the future and protection for a valuable resource — which is closely associated with Utah's heritage and image — Arches National Park. Delicate Arch, an iconic natural formation often associated with Utah outdoor activities, is located in Arches National Park.

Judicial Approval

In the near future the agreement and the water rights addressed therein will be submitted to the state court in Utah for approval and entry of an interlocutory decree to confirm the water rights it quantifies. State officials anticipate that the judicial approval process will generally follow the same sequence of events used to decree the Zion National Park reserved water rights settlement, which included publication of a **p**roposed **d**etermination (PD) based on the negotiated agreement, the opportunity for other water users to file objections to that PD, and a process to settle those objections, or litigate them if necessary, as Utah's general adjudication law provides. *See* Utah Code §§ 73-4-11(2) and (3); -12; -13 and -15 (West 2004 and 2015 Supp.) State officials hope, and expect, that education and outreach efforts will have been sufficient to minimize the number of objections that may be filed regarding the Arches *Agreement*. This occurred with the PD filed to judicially confirm the Zion National Park settlement.

General Adjudication

Conclusion

Using good scientific data, a willingness to cooperate, and an open public process, state and federal negotiators have learned they can negotiate a "win/win" result that meets all parties' needs, including local water users. Such agreements take tremendous amounts of time and resources to accomplish, but comprehensively resolve federal reserved water rights in relation to state-based rights in perpetuity. Utah officials hope to quantify all reserved water rights through negotiation and agreement.

James Greer is the Assistant Utah State Engineer for Technical Services.

Norman Johnson is the Division Director, Natural Resources Division, Utah Attorney General's Office. They have been involved in the negotiated settlement of federal reserved water right claims in Utah, both Indian and non-Indian.

For Additional Information:

Norman K. Johnson, Natural Resources Division, Utah Attorney General's Office
801/ 538-7227 or normanjohnson@utah.gov;

Arches *Agreement* available on Utah's website for Compacts and Agreements:
www.waterrights.utah.gov/wrinfo/policy/compacts.asp

References

Mining Act of 1866: Ch. 262, 14 Stat. 251 (1866) (codified as amended at 43 U.S.C. § 661)
Desert Land Act of 1877: Ch. 107, 19 Stat. 377 (1877) (codified as amended at 43 U.S.C. § 322)
Homestead Act: Ch. 75, 12 Stat. 392 (Repealed 1976)
Reclamation Act: Ch. 1093, 32 Stat. 388 (1902) (codified as amended at 434 U.S.C. §§ 371-616 (1988)

INSTREAM FLOWS AND THE PUBLIC INTEREST

WASHINGTON STATE PERMIT WITH MITIGATION CONDITIONS OVERTURNED

by David Moon, Editor

Instream Flows & Public Interest

Mitigation Package

"OCPI"

Mitigation for Impairment

Ecology Approval

Minimum Flows Impaired

Factors Supporting OCPI Exception

On October 8, the Washington State Supreme Court (Court) reversed a decision by Washington's Department of Ecology (Ecology) to issue a water right permit to the City of Yelm (Yelm) to meet anticipated community water needs for future growth. In a 6-3 decision authored by Associate Chief Justice Charles Johnson, the Court determined that Ecology erred in approving the permit because it will impair minimum instream flows already established in the Deschutes and Nisqually basins. Ecology had conditioned approval on an extensive mitigation package to offset the water use from the permit. Mitigation included retiring existing water rights, habitat protection, and stream restoration. *Foster v. Dept. or Ecology, City of Yelm and WA PCHB,* Case No. 90386-7 (Oct. 8, 2015) (*Yelm*).

Overriding Considerations of Public Interest

This significant case has statewide implications because the Court determined that Ecology unlawfully applied "**o**verriding **c**onsiderations of **p**ublic **i**nterest" (OCPI) in making its decision. Ecology uses OCPI as a tool to approve water right permits when water availability is limited, but it appears the public benefits of approval outweigh any impacts on stream flows.

Ecology decided to issue a water right permit to Yelm allowing the city to receive an additional 840,000 gallons per day of new water. This water increase was expected to meet Yelm's anticipated growth over the next 20 years. The Court set out some basic facts of the case, especially regarding the proposed "mitigation" conditions for the proposed permit, as follows:

> Because this new appropriation would impair the minimum flows of waterways connected to the Deschutes and Nisqually Basin, Ecology conditioned approval of Yelm's application on an extensive mitigation plan. This mitigation plan would use a variety of devices to offset the impact of the new appropriation. For example, it would retire existing water rights and reintroduce reclaimed water back into the stream system in order to offset new water uses (called water-for-water or in-kind mitigation). Yelm's mitigation plan also proposed improvements for stream conditions and protection of habitat by stream restoration, historical farmland acquisition, and stream-side crib wall construction (called out-of-kind mitigation).

Yelm at 2.

Ecology approved Yelm's permit based on the extensive mitigation plan. "The permit was issued pursuant to RCW 90.54.020(3)(a), which allows Ecology to authorize withdrawals of water that impair minimum flows where it is determined that overriding considerations of the public interest (OCPI) are established by the applicant." *Yelm* at 1.

For the Court, however, impairment to the minimum flows — despite the mitigation plan — was a critical fact. "The parties do not dispute that even with the mitigation plan, Yelm's new permit will impair minimum flows, most likely during 'shoulder seasons,' which are the weeks in April and October that are not covered by the retirement of irrigation water rights. Nevertheless, Ecology argues that there will still be a net ecological benefit resulting from the mitigation plan, despite the net loss of water resources. Because of the impairment of minimum flows, Ecology claims authority to approve Yelm's permit only under the OCPI exception at issue." *Yelm* at 2-3.

Yelm resident Sara Foster appealed approval of the Yelm permit to the state Pollution Control Hearings Board (PCHB). On March 18, 2013, PCHB found in Ecology's favor and upheld approval of the permit to Yelm. PCHB's decision was then appealed to the Thurston County Superior Court, which affirmed the PCHB decision.

PCHB and the lower court upheld the permit. "…Ecology properly considered all impacts to the minimum flows and mitigated those impacts through the use of in-kind [water rights retirement and reclaimed water] and out-of kind mitigation [land acquisition, stream restoration]. PCHB also concluded that the mitigation plan would clearly benefit fish and wildlife habitat, outweighing any negative effects that would result from the impairment of minimum flows. Finally, although it rejected Ecology's existing three-step test as not sufficiently stringent, PCHB concluded that Ecology had met the statutory standard under the OCPI exception. PCHB's conclusion relied on 12 factors that it found supported the use of the OCPI exception." *Yelm* at 3.

Foster appealed Ecology's decision to issue the permit, as upheld by the Thurston County Superior Court, to the Supreme Court. Foster argued that Ecology exceeded its statutory authority in approving Yelm's water permit based on the OCPI exception.

Instream Flows & Public Interest

Minimum Flows and OCPI: Prior Appropriation Doctrine

In its analysis of the case, the Court turned to what it called "several foundational principles of water law" and discussed how "minimum flows" (instream flows) function in Washington's system. "Minimum flows are established by administrative rule and have a priority date as of the rule's adoption. These flows are not a limited water right; they function in most respects as any other water appropriation. As such, they are generally subject to our State's long-established 'prior appropriation' and 'first in time, first in right' approach to water law, which does not permit any impairment, even a de minimus impairment, of a senior water right. Minimum flows, however, differ from other water appropriations in one respect: 'withdrawals of water' that would impair a minimum flow *are* permitted, but only under the narrow OCPI exception." *Yelm* at 4-5 (emphasis in original).

Narrow OCPI Exception

The OCPI exception is found in the last sentence of RCW 90.54.020 (emphasis added):

> (3) The quality of the natural environment shall be protected and, where possible, enhanced as follows: (a) Perennial rivers and streams of the state shall be retained with based flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values. Lakes and ponds shall be retained substantially in their natural condition. *Withdrawals of water which would conflict therewith shall be authorized only in those situations where it is clear that overriding considerations of the public interest will be served*.

After noting the criteria for evaluating applications for water permit under RCW 90.03.290(3) — which includes the requirement that "an appropriation will not impair existing rights" — the Court found that "Yelm's water permit will impair the existing minimum flows; therefore, all parties agree that Yelm's permit application must be denied unless the OCPI exception applies." *Yelm* at 6.

***Swinomish* Reference**

The Court referred back to its decision in *Swinomish Indian Tribal Community v. Department of Ecology*, 178 Wn.2d 571, 311 P.3d 6 (2013). *See* Moon, *TWR* #116 for additional information on the *Swinomish* case. The Court noted that the "facts of this case somewhat mirror those in *Swinomish*" (*Yelm* at 6) and then reiterated its crucial findings in *Swinomish* concerning OCPI:

"Extraordinary Circumstances" Requirement

> This conflicts with the principle that statutory exceptions are construed narrowly in order to give effect to the legislative intent underlying the general provisions. Moreover, we emphasized that the OCPI exception is 'not a device for wide-ranging reweighing or reallocation of water.' *Swinomish*, 178 Wn.2d at 586-87. Rather, '[t]he [OCPI] exception is very narrow…and requires extraordinary circumstances before the minimum flow water right can be impaired.' *Swinomish*, 178 Wn.2d at 576. Ecology's use of the exception was an end-run around the normal appropriation process, conflicting with both the prior appropriation doctrine and Washington's comprehensive water statutes.

Yelm at 7.

"Withdrawal"

The Court then discussed withdrawal of water and how the term "withdrawal" has been used throughout Washington's water code. Eventually, the majority found that "when the legislature intends for the assignment of a permanent legal water right, it uses the term 'appropriation'; when it intends for only the temporary use of water, it uses the term 'withdrawal.'" *Yelm* at 9-10. Applying that interpretation of "withdrawal" the Court further found that "the statutory scheme as a whole rigorously protects minimum flows/essential minimums by not permitting the temporary withdrawal of water that would impact essential minimums even in the case of drought." *Id*. at 10.

OCPI Limitation (Temporary)

These findings led to the Court's ruling regarding the narrow use of OCPI. The *Yelm* decision goes beyond the Court's earlier decision in *Swinomish* in holding that the OCPI exception allows only temporary — not permanent — rights to withdraw groundwater. "We hold that the OCPI exception does not allow for the permanent impairment of minimum flows. If the legislature had intended to allow Ecology to approve permanent impairment of minimum flows, it would have used the term 'appropriations' in the OCPI exception. It did not. The term 'withdrawals of water,' however, shows a legislative intent that any impairment of minimum flows must be temporary. The plain language of the exception does not authorize Ecology to approve Yelm's permit, which, like the reservations in *Swinomish*, are permanent legal water rights that will impair established minimum flows indefinitely." *Yelm* at 10.

Mitigation Plan "Irrelevant"

Mitigation Irrelevant

The Court found that Yelm's extensive mitigation plan to offset the impact of the new appropriation "…largely irrelevant to the analysis." *Id.* at 11. First of all, the Court disagreed with Ecology that Yelm's mitigation plan presented the "extraordinary circumstances" that the Court held in *Swinomish* "are required to apply the OCPI exception." According to the Court, "…the mitigation plan is just that: a plan

Instream Flows & Public Interest

Legal Injury

Strict Limitation To OCPI

De Minimus Impact v. Mitigation

meant to offset the impairment of the minimum flows. The mitigation plan itself is not the 'extraordinary circumstances' meant to justify use of the OCPI exception. Quite the opposite: the reason Yelm seeks a new water permit is to meet its municipal water needs — not improve habitat conditions. And municipal water needs, far from extraordinary, are common and likely to occur frequently as strains on limited water resources increase throughout the state." *Id*. at 11.

The Court goes on to draw an interesting distinction between *legal* injury — which the Court says the water code is concerned with — versus "ecological" injury. Washington's strict "de minimus" injury standard once again underlies the Court's decision. "Our cases have consistently recognized that the prior appropriation doctrine does not permit even de minimis impairments of senior water rights. *Postema*, 142 Wn.2d at 90. Therefore, we reject the argument that ecological improvements can 'mitigate' the injury when a junior water right holder impairs a senior water rights."

Supreme Court's Holding

The Conclusion of the decision concisely pulls together the main points of the decision, as follows:

> We hold that Ecology exceeded its authority by approving Yelm's water permit under the narrow OCPI exception. The exception, by its terms, permits only temporary impairment of minimum flows. Municipal water needs do not rise to the level of "extraordinary circumstances" that we held are required to apply the OCPI exception, nor can a mitigation plan "mitigate" by way of ecological benefit the legal injury to a senior water right. We reaffirm our holding in *Swinomish*: the OCPI exception is not an end-run around the appropriation process or the prior appropriation doctrine.

Yelm. at 12.

Reconsideration Sought

Both Yelm and Ecology asked the Court to reconsider its decision in *Yelm*. On October 28, 2015, Yelm filed a motion asking the Court for "reconsideration and correction" of the decision. Attorneys for Yelm argue that the decision "will set this state on a course that results in proliferation of unpermitted, exempt groundwater wells as a means for addressing public water supply demand, with greater harm to the very resources the State's instream flow rules seek to protect, and will encourage, rather than discourage, urban sprawl." This assertion refers to the current ability of water users to use groundwater for domestic purposes — obtaining the groundwater by means of an "exempt well," i.e. a well that is exempt from the requirement to obtain a permit for the water use.

Ecology's motion for reconsideration, also filed October 28th, seeks clarity of the terms "withdrawal" and "appropriation" as used in the Court's decision and raises concerns about "withdrawal" being defined as a "temporary use of water." Ecology asserts in its motion that "[D]efining 'withdrawal' to refer exclusively to temporary water use is inconsistent with statutory language, this Court's prior opinions, and Ecology's longstanding application of the water code." The motion argues that the new definition of withdrawal "will lead to unnecessary confusion and unintended consequences in the implementation of provisions of the groundwater code, RCW 90.44, that rely heavily upon a broader application of the term 'withdrawal.'" *Ecology Motion* at 1. Ecology's motion also supports Yelm's argument that OCPI was properly applied in issuing the Yelm water right permit and that the permit should be affirmed.

The Court may invite plaintiff Sara Foster to submit briefs in support of the Court's decision or rule on the motions for reconsideration without additional input.

Conclusion

The *Yelm* decision by Washington's Supreme Court has definitively ruled that minimum flows (instream flows) are fully protected water rights, and senior existing rights cannot be impacted — to even a de minimus degree — by a new permit, despite mitigation plans that may provide ecological benefits. Although the Motions for Reconsideration may provide some clarity regarding Washington water law and the use of the term "withdrawals of water," the 6-3 majority in *Yelm* could be difficult to sway on its basic determination of the narrow exception allowed by OCPI. Reconsideration of a Supreme Court decision rarely occurs, even when — as in this case — a strong dissent argues for changes.

The overriding dilemma this case highlights is that western water law, on the one hand, needs protection of instream water rights or they will become merely an illusion that is overcome by the push for future growth. The other horn of the dilemma, however, is that water law also needs the *flexibility* to reach agreements and implement mitigation that allow the water system to adapt and move forward, without sacrificing senior water rights or instream flows.

Washington's Department of Ecology and the state's water users are struggling to find that balance — *Yelm* for the moment is a stop sign that may require a new route.

For Additional Information: Decision and Motions for Reconsideration available at: www.ecy.wa.gov/programs/wr/swro/fostervecology.html

WATER BRIEFS

WATER ENFORCEMENT **CA**

CONSERVATION & REGULATION

The lastest report from the California State Water Resources Control Board (SWRCB), issued October 30, shows that Californians reduced water use by more than 26% during September, exceeding Governor Brown's 25% conservation mandate for a fourth straight month. Nearly all water suppliers in the state complied with the conservation standards. However, a few have not complied, despite warnings that failure to meet conservation targets could result in penalties. On October 29th, SWRCB's Office of Enforcement issued enforcement actions against four urban water suppliers.

Penalized suppliers are the cities of Beverly Hills, Indio and Redlands, and the Coachella Valley Water District. Each of these suppliers has been issued a complaint for a $61,000 penalty based on SWRCB's authority to issue fines of $500 per day for violations of its emergency regulation. SWRCB also has the ability to issue penalties of up to $10,000 per day for violations of a Cease and Desist Order. The Board has not issued any Cease and Desist Orders to date. Water suppliers have 20 days to appeal.

Suppliers reported 77,763 compliance and enforcement actions taken in September, a significant decrease from the 92,868 actions reported in August. Since June, SWRCB has issued: eight conservation orders; 99 information orders; 68 warning letters; and seven alternative compliance orders.

Despite September's lower overall savings rate, the number of suppliers in compliance with the emergency regulation remained similar to August.
For info: Drought Information website at: www.swrcb.ca.gov/waterrights/water_issues/programs/drought/index.shtml; Enforcement Page at: www.waterboards.ca.gov/water_issues/programs/conservation_portal/enforcement.shtml

WETLANDS REPORT **US**

WEST CONDITIONS LAG

Forty-eight percent of the wetlands in the US are in "good" condition, 20% is in fair condition, and the remaining 32% are in poor condition according to EPA's 118-page draft report — "*National Wetland Condition Assessment*" (NWCA 2011) — which is open for a 30-day public comment period ending on December 7, 2015. The NWCA 2011 is the first national assessment of the ecological condition of the nation's wetlands. The draft report describes the results of a nationwide probabilistic survey of wetlands conducted in the spring and summer of 2011 by EPA and its state and tribal partners.

Wetlands in the West — one of four regions assessed — are in the worst condition, with only 21% rated as "good." The Coastal Plains, Eastern Mountains and Upper Midwest, and Interior Plains have a range of 44% to 52% wetland area in good condition.

The focus of the surveys is on water bodies as groups or populations, rather than as individual waters.
For Info: www2.epa.gov/national-aquatic-resource-surveys/national-wetland-condition-assessment

RIPARIAN BUFFERS **OR**

TEMPERATURE REQUIREMENTS

On November 6, the Oregon Board of Forestry (OBF) voted to more than double streamside (riparian) shade buffer requirements within the Oregon Forest Practices Act to protect cold water in western Oregon fish-bearing streams. Board members voted four to three to develop administrative rules that create a 60-foot buffer on each side of small fish-bearing streams and an 80-foot buffer on medium-sized fish-bearing streams. Within those buffers, logging will be either not allowed or restricted. The streamside, or riparian, buffer rules are designed to shade Oregon's streams and provide a blueprint for where to leave trees during a timber harvest. The rule concepts will now go into the formal rulemaking process. OBF's decision is for private timberlands and does not impact streams on public lands under different buffer restrictions.

OBF's vote exempted the "Siskiyou Region" in southern Oregon from the proposed rules. OBF concluded that the Region has increased wildlife risk and that keeping the current 20-foot buffer in that region makes sense.

In 2012, as part of their adaptive management approach, the Board began analyzing streamside buffer rules based on Oregon Department of Forestry (ODF) monitoring results for small and medium fish streams. The research showed that the rules fell short of the "protecting cold water (PCW)" standard of the Clean Water Act, which means stream temperature should not rise more than one-half degree Fahrenheit due to human activity, where salmon, steelhead, and bull trout are present.
For info: Mike Cafferata, OBF, 503/961-2022 or Mike.J.Cafferata@oregon.gov

WATER & POWER **US**

RECLAMATION RESEARCH INVESTMENT

To ensure a sustainable and reliable supply of water for irrigation, municipal, hydropower generation, and other uses, the federal Bureau of Reclamation (Reclamation) is investing $9.17 million for 157 science and technology development projects. Research proposals were sought in nine subject areas: water operations and support; environmental issues in water delivery and management; conserving and expanding water supplies; advanced water treatment; climate change and variability; sustainable water infrastructure and safety; renewable energy and energy conservation; invasive zebra and quagga mussels; and open water data.

Research projects are identified using "solicited research" and "brokered research." In solicited research, Reclamation hosts an internal competition. Through brokered research, Reclamation's Research and Development Office identifies specialized research teams from a mix of federal and nonfederal experts.

An example of solicited research is the study, "*Development and Commercialization of Chlorine Resistant Membranes.*" Chlorine is one of the most effective pretreatment strategies of water, but chlorine will oxidize filtration membranes, reducing their effectiveness, so the water must be dechlorinated before membrane treatment, adding an additional step to the treatment process. The development of membranes that are resistant to chlorine will reduce the steps and costs associated with treating water, make alternative water treatment technologies more affordable, and expand Reclamation's capabilities to expand water supplies through treatment of various non-traditional sources — including inland brackish groundwater, seawater, municipal wastewater, and produced waters.

An example of brokered research is a new cooperative agreement with the University of California, San Diego Scripps Institution of Oceanography,

WATER BRIEFS

where researchers will study the "*Seasonal and Extended-Range Predictability of Atmospheric Rivers and their associated Precipitation.*" Atmospheric rivers — which are narrow regions in the atmosphere that are responsible for most of the horizontal transport of water vapor outside of the tropics — are an important source for water supplies in the Western US. In California, just a few atmospheric river events each year contribute a significant percentage of the total annual precipitation. A better understanding of the seasonal predictability of atmospheric river activity will support improved water supply forecasts and management for local and regional water resources managers.

Reclamation was able to leverage its $9.17 million with $9.14 million from other Reclamation, federal, and nonfederal sources for a total investment of $18.3 million in research projects to manage water and generate hydropower.
For info: Reclamation's website at: www.usbr.gov/research.

QUALITY UNCERTAINTY US

TMDLs & CLIMATE CHANGE

EPA and its state and local partners develop implementation plans designed to meet **t**otal **m**aximum **d**aily **l**oad (TMDL) water quality standards. Uncertainty regarding the impacts of climate change and other drivers may make it difficult for these plans to meet their goals. EPA's *"Managing Water Quality in the Face of Uncertainty*" report uses two pilot case studies to explore how robust decision making methods could help develop implementation plans that are more robust to future change.

EPA's National Water Program has also redesigned and launched the website: "*Addressing Climate Change in the Water Sector.*"
For Info: Water Quality Report available at: www.rand.org/pubs/research_reports/RR720.html; Climate Change website available at: info: www2.epa.gov/climate-change-water-sector

STORMWATER STRATEGY CA

OPTIMIZE MANAGEMENT

The California State Water Resources Control Board (SWRCB) is in the process of developing a "Strategy to Optimize Resource Management of Storm Water" (Storm Water Strategy). The purpose of the Storm Water Strategy is to direct future improvements to the Storm Water Program by identifying goals, mission, objectives, and projects for implementation through a phased approach. The Storm Water Strategy is intended to guide the Storm Water Program for at least the next ten years.

The SWRCB will consider adoption of a Resolution in support of moving forward with the Storm Water Strategy and certain projects under the Strategy at its regularly scheduled meeting. The public may provide oral comments on the Storm Water Strategy at this meeting (see Calendar).
For info: Annalisa Kihara, SWRCB, 916/ 324-6786 or Annalisa.Kihara@waterboards.ca.gov; Storm Water Strategy available at SWRCB's website: www.swrcb.ca.gov/water_issues/programs/stormwater/strategy_initiative.shtml

FISH CONSUMPTION WA

STATE V. FEDERAL RULES CONTROL

EPA is requiring Washington State to update its clean water rule. Due to Washington's delay in doing so, in September EPA released its own draft rule proposing stricter standards, which are based on the assumption that Indian tribes consume more fish than previously accounted for. People who eat more fish face greater exposure to pollutants that accumulate in fish tissue. EPA said it will adopt the new standards if Washington does not proceed with a new proposal. EPA has indicated that if the state submits a new proposal, it will pause the process on its rule. *See* Water Brief, *TWR* #139. EPA extended the comment period for revisions by 45 days, until December 28, 2015.

On October 8, Governor Jay Inslee announced that he is directing Washington's Department of Ecology to draft a new clean water rule that will preserve the state's decision-making control over how to meet federal requirements. The Clean Water Act (CWA) requires states to establish standards for how clean waters need to be and to control pollution limits for businesses and municipalities that are permitted to discharge wastewater.

Governor Inslee lauded the inclusion of implementation tools and timelines to provide more flexibility for businesses to comply, in Washington's proposal. EPA's proposed rule doesn't include implementation tools.

Ecology will begin drafting the rule immediately and make it available for public comment in early 2016.
For info: Sandi Peck, Ecology, 360/ 407-7004 or Ecology's website: www.ecy.wa.gov/water/standards/

GW ADJUDICATION CA

LEGISLATIVE REFORM PASSED

In 2015, the California Legislature enacted reforms to the groundwater adjudication process. The legislation has three main objectives: 1) make the adjudication process more cost-effective; 2) ensure that the process is fair and comprehensive; and 3) harmonize the process with the Sustainable Groundwater Management Act (SGMA).

The legislation is divided into two bills, SB 226 and AB 1390, which are designed to work together. AB 1390 codifies the rules for basin-wide groundwater adjudications and amends the Code of Civil Procedure. SB 226 has additional rules that apply to adjudications in basins that must develop management plans under SGMA and adds a chapter to SGMA in the Water Code.

The legislation applies to all basin-wide groundwater adjudications. These comprehensive adjudications may include federal agencies and tribes, and may include rights to interconnected surface water when it is necessary for an effective adjudication. The court may exclude small pumpers up to five acre-feet-per-year, which could make the adjudication more manageable. (Code of Civ. P., §§ 830 and 833.)

The court has discretion to use the process if existing adjudications are expanded into areas currently governed by SGMA. The adjudication process does not apply to small disputes, such as well interference actions. (Code of Civ. P., § 833.) The court may — but is not required to — determine the priority of unexercised water rights, consistent with the principles articulated in *In re Waters of Long Valley Creek System*. (Code of Civ. P., § 830.)

The legislation uses the same boundaries — and the same process for adjusting boundaries — as SGMA. The court may review DWR's decision via a traditional petition for writ of mandamus, which would be coordinated with the adjudication. (Code of Civ. P., § 841.)
For info: Sustainable Groundwater Management website at: http://groundwater.ca.gov/

CALENDAR

November 15-19 UT
American Water Works Association (AWWA) 2015 Water Quality Technology Conference & Exposition, Salt Lake City. The Grand America Hotel. For info: www.awwa.org/conferences-education/conferences/water-quality-technology.aspx

November 16-19 CO
AWRA 2015 Annual Water Resources Conference, Denver. Grand Hyatt. Presented by American Water Resources Ass'n. For info: www.awra.org

November 17 WEB
Clean Water Initiatives Workshop: An Overview of Texas Land Trends, WEBINAR. Presented by Houston-Galveston Area Council. For info: www.h-gac.com/community/water/cwi/

November 17-18 England
Water 2015 Conference - UK's Premier Water Conference, London. Radison Blu Portman. For info: www.marketforce.eu.com/events/water/water-2015-complex

November 18 PA
Hydraulic Fracking, Horizontal Drilling & Development of the Marcellus Shale Seminar, Pittsburg. Omni William Penn. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

November 18 CO
The Great Divide: The Destiny of the West is Written in the Headwaters of the Colorado - Film & Discussion, Colorado Springs. Colorado College, Palmer Hall (Gates Common Room). For info: www.colorado.edu/law/research/gwc/events

November 18-20 UT
American Water Works Association (AWWA) Financial Management Seminar, Salt Lake City. The Grand America Hotel. For info: www.awwa.org/store/productdetail_event.aspx?productId=52606069

November 19 CA
Enhancing Urban Biodiversity: A Multi-Sector Approach for a Sustainable Los Angeles, Los Angeles. South Gate. Presented by Council for Watershed Health. For info: Margaret de Larios, margaret@watershedhealth.org

November 19-20 ID
32nd Annual Water Law & Resources Issues Seminar, Boise. The Riverside Hotel. Presented by Idaho Water Users Ass'n. For info: IWUA, 208/ 344-6690 or www.iwua.org/2015%20Fall%20Seminar.pdf

December 1-4 OR
Oregon Water Resources Congress Annual Conference, Hood River. Best Western Hood River Inn. For info: OWRC, 503/363-0121, kenc@owrc.org or www.owrc.org

December 3 WA
Water Law & the Public Trust: Living Within Our Water Means - CLE, Seattle. 2100 Building, 2100 24th Ave. S. Presented by Center for Environmental Law & Policy. For info: www.celp.org

December 5-9 NV
Growing Agriculture's Sphere of Influence: 97th Annual Meeting California Farm Bureau, Reno. Peppermill Resort Spa Casino. For info: www.cfbf.com/am2015/

December 7 CA
Urban Water Conservation - Public Workshop, Sacramento. CalEPA Hdquarters Bldg., 1001 I Street. Presented by SWRCB; written comments by 12/2. For info: Kathy Frevert, SWRCB, (916/ 322-5274 or kathy.frevert@waterboards.ca.gov

December 7 WA
Toxics & Water Quality Conference, Seattle. Washington Convention Ctr. For info: Environmental Law Education Center, Holly Duncan, 503/ 282-5220, hduncan@elecenter.com or www.elecenter.com

December 8-9 OR
Northwest Environmental Conference & Trade Show, Portland. Red Lion on the River, Jantzen Beach. Presented by Northwest Environmental Business Council. For info: www.nebc.org/EventDetail.aspx?Id=161

December 10 OR
Integrating Floodplain Management Policies Workshop, Portland. Columbia River Inter-Tribal Fish Comm'n Offices, 700 NE Multnomah Street, Rm 502. Presented by CRITFC & Oregon Law Institute of Lewis & Clark Law School. For info: www.critfc.org

December 10-11 CA
CEQA Conference - 11th Annual, San Francisco. BASF Conference Ctr. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

December 14 CA
Wine & Water Law Conference, San Francisco. Hotel Nikko, 222 Mason Street. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

December 14-15 NV
Applications of Groundwater Geochemistry Course, Las Vegas. Westgate Resort. Presented by Nat'l Groundwater Ass'n. For info: www.ngwa.org/Events-Education/shortcourses/Pages/485dec15.aspx

December 15 CA
Storm Water Strategy - Public Meeting of SWRCB, Sacramento. CalEPA Hdquarters Bldg., 1001 I Street. Presented by State Water Resources Control Board. For info: Annalisa Kihara, SWRCB, 916/ 324-6786 or Annalisa.Kihara@waterboards.ca.gov

December 15-17 NV
Groundwater Expo '15: The Intersection of Today & Tomorrow, Las Vegas. Westgate Resort & Casino. Presented by National Ground Water Ass'n. For info: http://groundwaterexpo.com/

January 13-14 TX
10th State of the Bay Symposium: 20 Years of Successfully Preserving Galveston Bay, Galveston. Moody Gardens Hotel & Convention Ctr. Presented by TCEQ & Galveston Bay Estuary Program. For info: www.tceq.state.tx.us/p2/events/State-of-the-Bay-Symposium

January 14 CO
Future Grid Conference, Boulder. Wolf Law Bldg., Wittemyer Courtroom. Presented by Silicon Flatirons Center. For info: www.silicon-flatirons.org/events.php?id=1610

January 19-21 ID
Idaho Water Users Ass'n Annual Convention, Boise. The Riverside Hotel. For info: IWUA, 208/ 344-6690 or www.iwua.org/

January 21-22 WA & WEB
23rd Annual Endangered Species Act Conference, Seattle & WEB. Washington Athletic Club, 1325 6th Avenue. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

January 28-29 TX
Texas Wetlands Conference, Houston. JW Marriott. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

February 4-5 NV
Law of the Colorado River Conference, Las Vegas. The Wheelhouse. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

February 7-8 CA
Ocean Desalination in California Seminar: Examining Technical, Regulatory & Practical Solutions, Santa Barbara. Fess Parker's DoubleTree Resort. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

February 18-19 NV
2016 Family Farm Alliance Annual Conference, Las Vegas. Monte Carlo Resort. For info: www.familyfarmalliance.org

The Water Report
Water Rights, Water Quality & Water Solutions in the West
260 N. Polk Street • Eugene, OR 97402

CALENDAR

(continued from previous page)

February 23-25 CO
2016 UIC Annual Conference, Denver. Embassy Suites Downtown. Presented by Groundwater Portection Council. For info: www.gwpc.org/events

February 24-27 CA
Water Environment Federation (WEF) 2016 Utility Management Conference 2016, San Diego. Hilton San Diego Bayfront. Presented by Water Education Foundation. For info: http://wef.org/conferences/

February 26 OR
Freshwater Trust's Annual Gala & Auction, Portland. Portland Art Museum. For info: www.thefreshwatertrust.org

February 26 CA
Endangered Species Act Conference, San Diego. The Westin. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

February 29-March 1 OK
Oklahoma Water Law Conference, Oklahoma City. Skirvin Hilton. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

March 3-4 CA
California Wetlands Conference, San Francisco. Hotel Nikko, 222 Mason Street. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

March 7-10 RI
American Water Works Association (AWWA) Sustainable Water Management Conference, Providence. Providence Biltmore. For info: http://www.awwa.org/conferences-education/conferences/sustainable-water-management.aspx

March 21 AZ
Water Resources Research Center Annual Conference 2016, Tucson. UA Student Union. For info: https://wrrc.arizona.edu

March 29-30 TX
34th Annual ABA Water Law Conference, Austin. Hyatt Regency Austin. For info: http://shop.americanbar.org/ebus/ABAEventsCalendar/EventDetails.aspx?productId=202302853

April 7-8 TX
Water Acquisition & Management for Oil & Gas Development: Legal & Regulatory Requirements, Houston. TBA. Presented by Rocky Mt. Mineral Law Foundation & Institute for Energy Law. For info: www.rmmlf.org