



# The Water Report™

*Water Rights, Water Quality & Water Solutions in the West*

## In This Issue:

**Drought-Proofing  
Oklahoma ..... 1**

**Crude Oil by Rail:  
ESA Issues ..... 11**

**Southern California  
Water Conservation.. 16**

**Hydropower &  
Ditch Easements ..... 22**

**Water Briefs ..... 23**

**Calendar ..... 27**

## Upcoming Stories:

**Anti-Speculation  
& Climate Change**

**Desalination  
Permitting**

**Groundwater  
Governance**

**California  
Conservation**

**& More!**

## ~~~~~ DROUGHT-PROOFING OKLAHOMA ~~~~~

by J.D. Strong, Executive Director, Oklahoma Water Resources Board (Oklahoma City, OK)

### INTRODUCTION

As Oklahoma enters the fifth year of crippling drought, it is imperative that state leaders continue their resolve and double down on efforts to help agriculture producers, communities, businesses, and industries develop better drought-proofing strategies both for the current drought and the inevitable droughts of the future.

Since 2012, the Oklahoma Water Resources Board (OWRB) has been providing drought grants and loans from funds Governor Mary Fallin and the state legislature secured to bolster the agency's financial assistance programs. Improved data and regulatory reform have enabled struggling communities to make more efficient use of existing water supplies, as well as locate new sources of water. Agency resources are being aligned and focused on helping regions plan and develop the types of projects that will make Oklahoma communities more drought-resistant both now and in the future.

Recognizing that the costs will be borne ultimately by ratepayers and taxpayers, OWRB is determined to partner with regional and local water users to develop projects that are both feasible and economical. This means making the most of existing sources of water through: serious conservation efforts; improved efficiency (e.g., repairing leaking or outdated infrastructure); combining or interconnecting existing systems to create redundancy; and wastewater reuse and repurposing.

Across the state, regional water plans are being developed that demonstrate a desire to maximize the water resources and storage opportunities around them through: the improvement of reservoir infrastructure; development of new groundwater well fields; treatment of marginal quality water; and exploration of aquifer storage opportunities. If more drastic measures are needed to meet remaining needs for water, it may be necessary to invest hundreds of millions, if not billions, of dollars to build new reservoirs and pipelines to tap existing reservoirs.

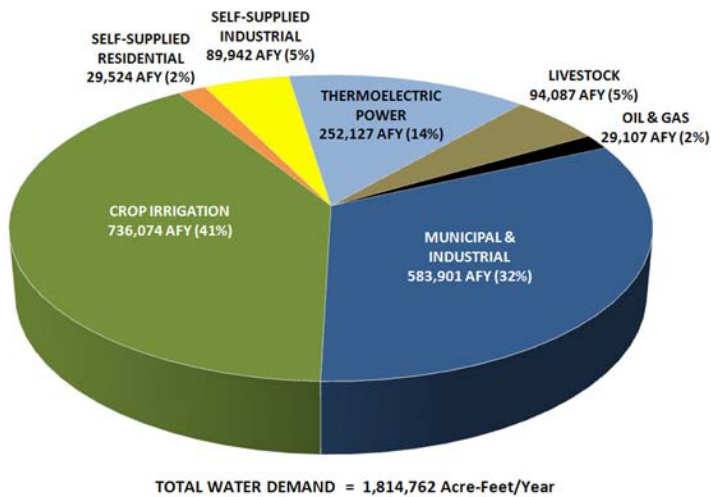
Oklahomans must make the most efficient use of their water resources to endure the current drought. As for the droughts to come, Oklahoma must plan ahead, plan for the worst, and develop projects that will ensure a drought-resistant future without increasing the economic burden on citizens. The best solutions will be those that benefit everyone rather than further dividing competing interests for the state's water resources. This is not the time to panic. It is, rather, the time to stay the course and work together with the kind of dogged determination that brought Oklahoma through the Dust Bowl and transformed it into the vibrant, bustling state it is today.

### OKLAHOMA'S WATER RESOURCES

Oklahoma's abundant water resources propel the wheels of economic development and growth in the state, providing supplies for the state's two largest water use sectors — crop irrigation and municipal/industrial use — which together accounted for 72% of the

## Oklahoma Water Plan

state's water demand in 2010 (1.9 million acre-feet per year). Total consumptive use water demand for the state is projected to increase to almost 2.5 million acre-feet per year by 2060. Nonconsumptive beneficial uses — such as recreation, navigation, and environmental flows — also provide an enormous benefit to Oklahoma's economy and will continue to be important considerations.



**Figure 1: Statewide Water Demand by Sector (2007)**

Oklahoma lies entirely within the drainage basins of two major stream systems, the Arkansas and Red Rivers, both of which flow in a predominantly southeast direction. Oklahoma's six neighboring states contribute flow through these two large rivers and their tributaries. The Arkansas River flows 1,460 miles and drains 161,000 square miles to its confluence with the Mississippi River in Arkansas. The Red River has a drainage area of 93,200 square miles and a length of 1,290 miles and empties into the Atchafalaya and Mississippi Rivers in Louisiana. In all, Oklahoma has approximately 167,600 miles of rivers/streams.

A century of water resources development in Oklahoma has resulted in the construction of 52 major lakes with at least 1,000 acres of surface area each and totaling more than 14 million acre-feet (AF) of water in storage. In addition, there are approximately 3,000 lakes and ponds that are ten acres or greater in size, totaling more than 1,000 square miles of surface area and 10,000 miles of shoreline. An estimated 387,000 smaller lakes and ponds also dot the

## Groundwater Ownership

state's landscape totaling close to 2,600 miles of shoreline and more than 400 square miles of water area. Average annual lake evaporation in Oklahoma ranges from 48 inches in the extreme east to 65 inches in the southwest.

In addition to abundant surface supplies, Oklahoma's 22 major groundwater basins store an estimated 386 million AF of water, with smaller amounts available in at least 150 minor basins. While only a portion of this water may be recoverable, Oklahoma's aquifers provide enormous benefits for multiple uses. However, in many areas, groundwater is susceptible to local depletion, as well as pollution from sources that can be extremely challenging and expensive to remediate.

Excluding domestic/household purposes, one must obtain a permit from the Oklahoma Water Resources Board (OWRB) in order to use surface or groundwater in Oklahoma. Groundwater is private property that belongs to the overlying surface owner and is subject to reasonable regulation by the OWRB, while surface water is publicly owned.

## 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

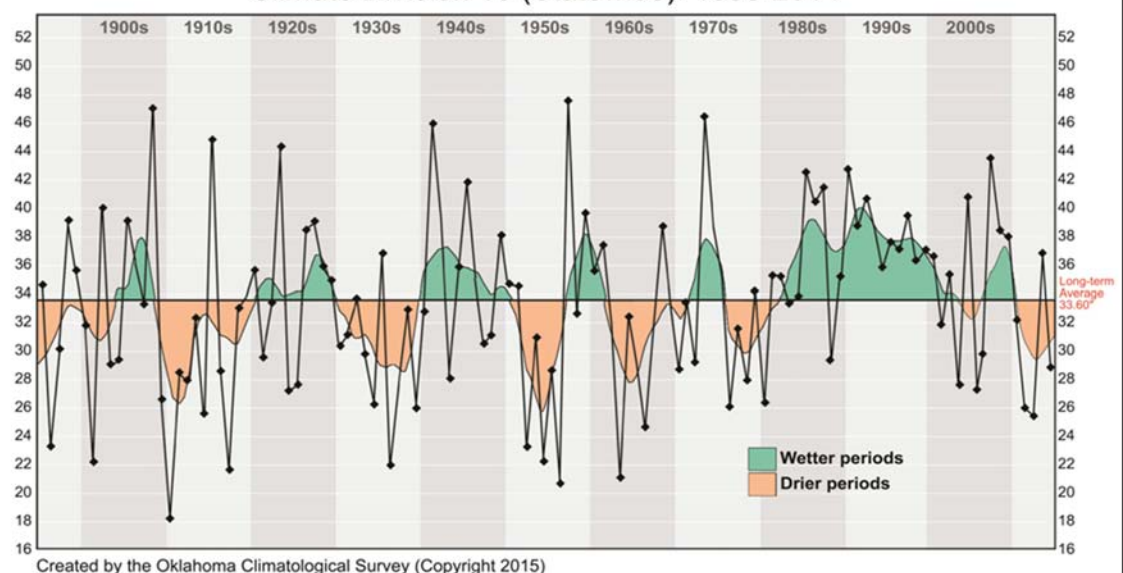
Phone: 541/ 343-8504  
Cellular: 541/ 517-5608  
Fax: 541/ 683-8279  
email:  
thewaterreport@yahoo.com  
website:  
www.TheWaterReport.com

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

Copyright© 2015 Envirotech  
Publications, Incorporated

## Annual Rainfall History with 5-yr Tendencies Climate Division 10 (Statewide): 1895-2014



**Figure 2: Statewide Historical Precipitation  
(showing alternating multi-year dry and wet periods)**

## Oklahoma Water Plan

### Prolonged Droughts

### Planning Critical

### Water Access

### Hydrological Connection

### Identified Themes

## HISTORICAL DROUGHT IMPACTS

Droughts are one of the most costly hydrologic hazards in the United States. In terms of dollars, of the top 10 declared “disasters” in the US, three are droughts (1988, 1980, and 2012), costing the nation tens of billions of dollars in damage during each of those years. Researchers at Oklahoma State University estimate that Oklahoma suffered more than \$2 billion in agricultural losses from the 2011 and 2012 drought years alone.

Like most other states in the Great Plains, Oklahoma has historically experienced prolonged periods of drought as part of its climate cycle. Since modern climatological record-keeping began in the 1890s, the state has suffered six major drought events, including the current drought, which is now entering its fifth year. These major droughts are separated by multi-year periods of above average rainfall, making long-range water planning difficult, yet critical, for the state.

The severity of hydrologic drought is not always obvious until water supplies are critically depleted. Multi-season and multi-year drought episodes severely impact Oklahoma’s streamflows, reservoir levels, and soil moisture, and can lead to declining water levels in the state’s aquifers. The impacts of drought in the state are numerous, affecting all major water uses, including: agriculture; public water supply; industry; tourism; recreation; and navigation. Economically, the agriculture industry has suffered the most in Oklahoma, where most farmland is non-irrigated and dependent on rainfall.

Oklahoma’s climate history provides a warning that once a drought cycle begins it could last for many years. Because of the dramatic impacts of drought on the state’s economy, water planning has become critical for managing and protecting Oklahoma’s water resources.

## OKLAHOMA’S COMPREHENSIVE WATER PLAN

The Oklahoma Comprehensive Water Plan (OCWP) is the roadmap for the state’s water future, balancing economic development and the environment, addressing competing water interests, identifying the water/wastewater infrastructure needs of a growing population, and reducing vulnerability to drought both at the statewide and system levels. It was first developed in 1980 and updated in 1995 and 2012.

Although Oklahoma is blessed with an abundance of water, many citizens lack access to dependable sources due to distance to supplies, insufficient infrastructure or storage, water quality constraints, and other limiting factors. While both surface water and groundwater supplies are susceptible to drought, in many areas surface water supplies are subject to seasonal fluctuations and supplies are frequently at their lowest when demand is the highest. Groundwater supplies, particularly bedrock aquifers, are less susceptible to seasonal fluctuations, yet concentrated demands or prolonged periods of decreased recharge can cause deficits. In relatively shallow alluvial aquifers, the aquifer and overlying stream can be linked hydrologically with each resource capable of impacting the other.

It was the recognition of these factors, combined with a devastating drought in 2006, which provided the impetus for development of the 2012 OCWP Update by OWRB. It is the most detailed and inclusive water planning effort in the state’s history, containing extensive analyses of Oklahoma’s water past, present, and future, focusing on supply and demand through the year 2060.

The 2012 OCWP Update utilized an innovative two-pronged approach: inclusive and robust public participation complemented by expert technical evaluation to build sound water policy. This approach ensured comprehensive analysis and the development of realistic management strategies backed by broad public input from across the state.

### Public Input

Early in the development of the 2012 OCWP Update, OWRB contracted with an outside agency, the Oklahoma Water Resources Research Institute (OWRRI), to initiate an intensive public participation process. Local Input Meetings, or “listening sessions,” were held at 42 locations statewide. The meetings were well-attended and drew a wide variety of comments on Oklahoma’s priority water issues.

Regional Input Meetings were held during the second phase in each of Oklahoma’s 11 Council of Government (COG) regions. At these meetings, the OWRRI facilitated discussions among 340 appointed participants and additional members of the public at large about issues raised in the Local Input Meetings. The purpose of these meetings was to ensure that the full range of Oklahoma’s water issues — and eventual policy recommendations — were identified for inclusion in the final statewide plan.

Based on an analysis of the Regional Input Meeting discussions and comments, the following ten themes were identified for evaluation at planning workshops: Balancing Water Supply and Demand; Water Conservation; Water Availability; Surface Water-Groundwater Relationships; Land Use Practices; Water Sales and Transfers; Inter-Governmental Water Resource Management; Inter-Agency Water Resource Management; Stakeholder Involvement and Conflict Management; and Consideration of Local and Regional Issues.

## Oklahoma Water Plan

### Water Availability

### Watersheds

### Water Use Sectors

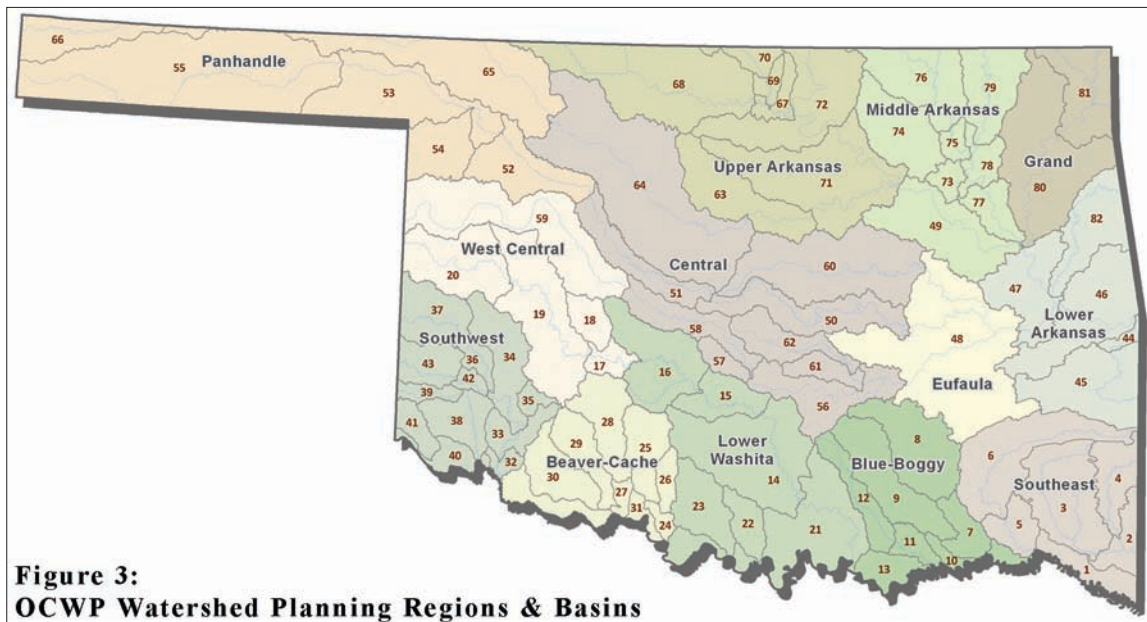
### Depletions Calculated

The third phase of the Water Plan's public participation process consisted of a series of ten planning workshops (one for each of the ten themes identified above), where 20 participants were invited to outline water management alternatives that satisfactorily address concerns and suggestions produced by participants in the first two phases.

Resulting recommendations were the focus of a three-day Town Hall meeting, hosted by the Oklahoma Academy, followed by OCWP Feedback Meetings held across the state to provide a forum for citizens to review draft findings for both technical evaluations and policy recommendations.

#### Technical Analysis

A statewide water supply availability analysis was performed on a watershed basis by subdividing the state into 82 surface water basins using an adaptation of USGS 12-digit Hydrologic Unit Code (HUC) boundaries and OWRB stream system boundaries. Where practical, OWRB stream system boundaries were revised to include a USGS stream gage with a long-term, continuous streamflow record at or near the basin outlet.



**Figure 3:**  
**OCWP Watershed Planning Regions & Basins**

For each basin, analyses included projected surface water and groundwater consumptive demands for seven water use sectors in 10-year increments through 2060 and projections of available groundwater and surface water supplies (both physical and permitted quantities). The water use sectors are Crop Irrigation; Municipal & Industrial; Thermoelectric Power; Self-Supplied Industrial; Self-Supplied Residential; Livestock; and Oil & Gas. From this, the magnitude and probability of annual groundwater storage depletions and surface water gaps were calculated, and water supply options and effectiveness were summarized for each basin. To facilitate consideration of regional supply challenges and solutions, the 82 basins were aggregated into 13 watershed planning regions and summarized in 13 regional reports.

The 2012 OCWP Executive Report includes: background information on water planning and management in Oklahoma; a statewide assessment of water supplies; future projections of demand; potential options to alleviate shortages; and policy recommendations. [See [www.owrb.ok.gov/supply/ocwp/ocwp.php](http://www.owrb.ok.gov/supply/ocwp/ocwp.php) >> "OCWP Executive Report"] Total water demand statewide is projected to increase from almost 1.9 million acre-feet per year (AFY) in 2010 to 2.5 million AFY in 2060. In 2010, the Crop Irrigation demand sector accounted for 40 percent of the state's total demand and the Municipal and Industrial (M&I) demand sector accounted for 32 percent. Those percentages are projected to remain relatively constant throughout the forecast period.

Characterization of bedrock and alluvial groundwater and surface water supplies included an evaluation of the extent to which each source is projected to be limited in its ability to meet 2060 demands. Several parameters were considered, including: future physical availability; permit availability; and current water quality trends.

### Magnitude and Probability of Annual Gaps and Storage Depletions Southwest Region, Basin 43

Planning Horizon	Maximum Gaps/Storage Depletions			Probability of Gaps/Storage Depletions	
	Surface Water	Alluvial Groundwater	Bedrock Groundwater	Surface Water	Alluvial Groundwater
	AFY			Percent	
2020	0	40	60	0%	2%
2030	10	70	110	2%	26%
2040	10	110	170	2%	41%
2050	10	170	230	3%	43%
2060	20	260	290	38%	47%

**Figure 4: Estimated Gaps and Depletions for Basin 43**  
(analysis was provided for each of the state's 82 basins)

## Oklahoma Water Plan

### Options' Effectiveness Analysis

### Supply Deficits

### "Hot Spots"

## Water Supply Options & Effectiveness

■ Potentially Effective  
■ Likely Ineffective

### Demand Management

■ Moderately expanded permanent conservation activities in the Municipal and Industrial and Crop Irrigation demand sectors could reduce surface water gaps by about 19% and groundwater depletions by about 10%. Temporary drought management activities will likely be ineffective since gaps will occur in almost every year and aquifer storage could continue to provide supplies during droughts.

### Out-of-Basin Supplies

■ Out-of-basin supplies could mitigate gaps and storage depletions. The OCWP *Reservoir Viability Study*, which evaluated the potential for reservoirs throughout the state, identified two potentially viable out-of-basin sites in the Southwest Region: Port in Basin 34 and Mangum (Lower) in Basin 39. However, due to the distance to reliable surface water supplies and the availability of in-basin groundwater supplies, out-of-basin supplies may not be cost-effective for many users.

### Reservoir Use

■ New reservoirs may be an effective option to mitigate surface water gaps and the adverse effects of localized storage depletions. A new river diversion and 3,900 AF of reservoir storage at the basin outlet could meet the entire growth in demand from 2010 to 2060. The use of multiple reservoirs in the basin or reservoirs upstream of the basin outlet may increase the size of storage necessary to mitigate future gaps and storage depletions.

### Increasing Reliance on Surface Water

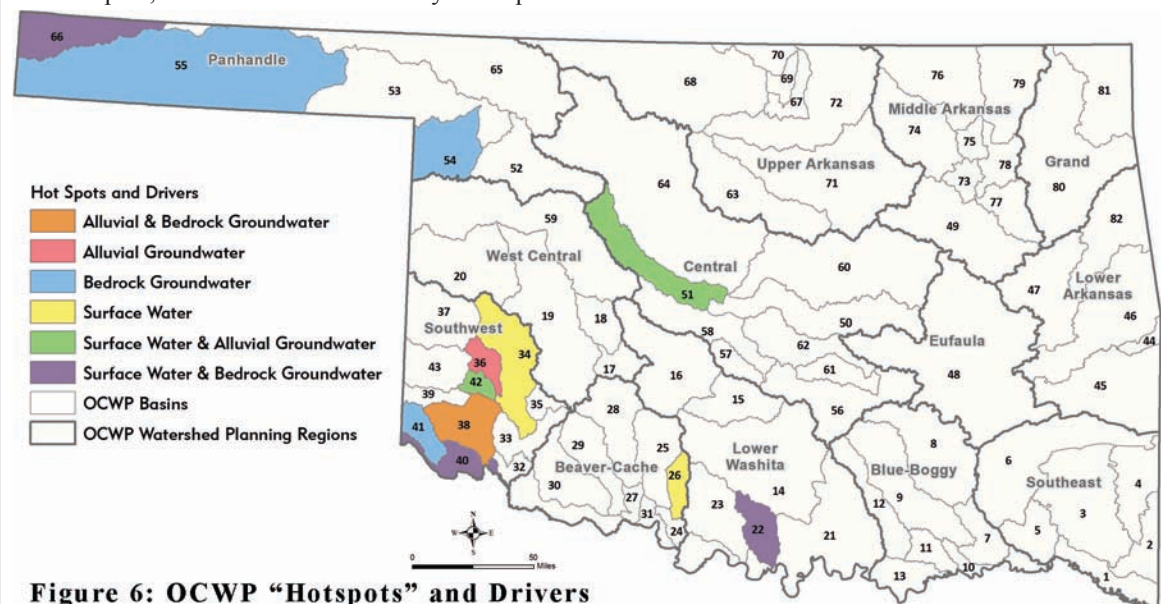
■ Increased reliance on surface water through direct diversions, without reservoir storage, will increase surface water gaps and is not recommended.

### Increasing Reliance on Groundwater

■ Basin 42 has substantial groundwater recharge and storage from the North Fork of the Red River aquifer. Increased reliance on this aquifer could mitigate surface water gaps and adverse effects of localized bedrock groundwater storage depletions, but would increase the amount of storage depletions. Any increases in storage depletions would be small relative to the volume of water in aquifer storage in the basin. A shift from surface water to alluvial groundwater could potentially decrease the size of surface water gaps, but may not decrease the probability of remaining surface water gaps due to the interconnection between the supply sources. Bedrock groundwater supplies are from non-delineated minor aquifers; therefore, increased reliance on these supplies is not recommended without site-specific information.

**Figure 5: Water Supply Options and Effectiveness for Basin 43**  
(analysis was provided for each of the state's 82 basins)

The amount and probability of future water supply deficits — characterized by surface water gaps or groundwater storage depletions — for each basin were compiled for statewide analyses. Over half of the state's 82 2012 OCWP basins were projected to experience gaps and/or depletions. Many of these water supply shortages are relatively minor, but others will require more immediate attention to mitigate large and recurring water deficiencies. The 12 basins with the most significant water supply challenges, referred to as "hot spots," were identified and analyzed in particular detail.



**Figure 6: OCWP "Hotspots" and Drivers**

## Oklahoma Water Plan

### Shortage Options

### Issue Reports

### Priorities Identified

### 2060 Conservation Goals

### Freshwater Goal

### Special Focus

Several components of the 2012 OCWP focused on options for reducing and eliminating future water supply shortages. Five primary options were evaluated for their effectiveness in addressing each basin's shortages: (1) demand management; (2) use of out-of-basin supplies; (3) reservoir use; (4) increasing reliance on surface water; and (5) increasing reliance on groundwater. Additionally, in four separate statewide studies, expanded options for reducing or eliminating future water supply shortages were analyzed. These studies focused on: (1) expanded conservation measures; (2) potential reservoir development; (3) marginal quality water use; and (4) managed aquifer recharge projects.

Additional technical information gained during the development of the 2012 OCWP was provided in various background reports. These reports outlined assessments of water availability and demand, including study methodologies, conducted by OWRB and its technical partners. The reports also detailed such issues as Tribal water claims, instream flows, climate change, marginal quality water use, managed aquifer recharge, statewide water conveyance systems, and reservoir yield analysis.

#### Policy Recommendations

Current and future policies regarding the management and protection of Oklahoma's water resources are critical for ensuring a reliable future supply.

The 2012 OCWP Update identified eight priority needs:

- Water Project & Infrastructure Financing — Addressing Oklahoma's projected \$82 billion water and wastewater infrastructure need between now and 2060
- Regional Planning Groups — Creating non-regulatory Regional Planning Groups consisting of local stakeholders and agency representatives to assist in planning, establishing priorities, and solving problems at the local level, as well as implementing OCWP initiatives at the regional level
- Excess and Surplus Water — Establishing a legal definition that will protect local water needs to ensure that the area of origin (planning basins) will never be made water deficient while addressing statewide demands
- Instream/Environmental Flows — Recognizing non-consumptive water needs and supporting recreational and local economic interests while assessing the suitability and structure of a potential instream flow program for Oklahoma
- State/Tribal Water Consultation and Resolution — Building cooperation to avoid future conflict and remove uncertainties related to water use by establishing a formal consultation process involving the Governor, State Legislature, and Oklahoma's 39 Federally-Recognized Tribes
- Water Conservation, Efficiency, Recycling, & Reuse — Identifying innovative solutions to forecasted water shortages with the goal of maintaining fresh water use at 2010 levels through 2060
- Water Quality & Quantity Monitoring — Creating a permanent statewide water quality and quantity monitoring program to ensure better data for improved decision-making
- Water Supply Reliability — Ensuring water availability for future growth through fair and sustainable water allocation backed by aquifer yield studies, stream water allocation models, and innovative permitting approaches

#### OCWP Implementation

The OCWP projected numerous water deficits will occur in Oklahoma by 2060. To combat these deficits and prepare Oklahoma for cyclical drought events, innovative solutions were identified with the goal of maintaining water use at current levels through 2060.

#### Water for 2060

In a broader 2012 OCWP study — documented in the report "*Conservation and Climate Change Addendum*" — both moderately and substantially expanded conservation activities were analyzed for the state's two largest demand sectors: Municipal & Industrial and Crop Irrigation. [See [www.owrb.ok.gov/supply/ocwp/ocwp.php](http://www.owrb.ok.gov/supply/ocwp/ocwp.php) >> Technical Background Reports >> "*Conservation and Climate Change Addendum*"] The 2012 OCWP Update indicates that full implementation of moderate conservation scenarios would reduce 2060 water demands for these sectors to levels approaching those forecasted for 2020. Additionally, full implementation of more aggressive conservation scenarios exceeds the goal of using no more water in 2060 than was used in 2007.

The recommended goal of maintaining current (2010) freshwater use through 2060 was embraced by the Oklahoma Legislature and Governor Mary Fallin through passage of the Water for 2060 Act in 2012. The resulting Water for 2060 Advisory Council is currently analyzing strategies and incentives for water conservation, efficiency, and recycling/reuse to recommend to the state legislature in late 2015, including opportunities for regionalization.

The Advisory Council utilized information from the OCWP process to develop strategies for inclusion in its final recommendations. Two areas of special focus were OCWP findings on expanded conservation measures (including increased efficiency) and marginal quality water use (including water reuse).

## Oklahoma Water Plan

### Conservation

#### Expanded Conservation Measures

Water conservation was considered an essential component of the “demand management” option in basin-level analysis of options for reducing or eliminating gaps and storage depletions. Both moderately and substantially expanded conservation activities were analyzed at a statewide and county level for the state’s two largest demand sectors: Municipal and Industrial (M&I) and Crop Irrigation. For each sector, two scenarios were analyzed: Scenario I — moderately expanded conservation activities, and Scenario II — substantially expanded conservation activities.

**Figure 7: OCWP Conservation Scenarios**

Demand Sector	Conservation Scenario	Description
Municipal & Industrial*	Scenario I: Moderately Expanded Conservation	<ul style="list-style-type: none"> <li>Passive conservation achieved by 2060 for Public-supplied Residential Sector and by 2030 for Public-Supplied Nonresidential Sector. Passive conservation is defined as conservation that can be achieved through government plumbing codes as part of the Energy Policy Act.</li> <li>At least 90% of water providers in each county will meter their customers.</li> <li>Non-revenue water loss will be reduced to 12%, where applicable.</li> <li>Conservation pricing will be implemented by 20% of water providers in rural counties, 40% in mostly urban counties, and 60% in counties with high metropolitan populations.</li> <li>Water conservation educational programs will be implemented by all providers (including billing inserts and conservation tip websites) which is estimated to reduce demands by 3%.</li> </ul>
	Scenario II: Substantially Expanded Conservation	<ul style="list-style-type: none"> <li>Passive conservation (as described in Scenario I).</li> <li>All water providers will meter their customers.</li> <li>Non-revenue water loss will be reduced to 10% where applicable.</li> <li>Conservation pricing will be implemented by 60% of providers in rural counties, 80% in mostly urban counties, and 100% in counties with high metro populations.</li> <li>Water conservation education programs will be implemented to reduce demands by 5% including school education programs and media campaigns in addition to billing inserts and a conservation tip website.</li> <li>High efficiency plumbing code ordinance will be implemented. This ordinance requires use of high efficiency fixtures with lower maximum flow rates than those required under the Energy Policy Act.</li> </ul>
Agricultural Irrigation	Scenario I: Moderately Expanded Conservation	<ul style="list-style-type: none"> <li>The field application efficiency of surface irrigation systems for Harmon, Jackson, Tillman, and Kiowa counties will increase to 80% beginning in 2015 (all of Basins 40 and 41, portions of Basins 34, 36, 38, and 42).</li> <li>In Harmon, Jackson, Tillman, and Kiowa counties, 10% of the land irrigated by surface irrigation will shift to micro-irrigation beginning in 2015 (all of Basins 40 and 41, portions of Basins 34, 36, 38, and 42).</li> <li>All sprinkler systems will have a field application efficiency of 90% beginning in 2015, representing implementation of low energy precision application (LEPA) nozzles on existing sprinkler systems.</li> <li>Water saved through conservation activities is not applied to a water scheme elsewhere, such as expanding the number of irrigated acres, thus achieving true conservation.</li> </ul>
	Scenario II: Substantially Expanded Conservation	<ul style="list-style-type: none"> <li>All assumptions from Scenario I are applicable.</li> <li>Shift all acres of water-intensive crops (corn for grain and forage crops, including alfalfa and pasture grass) to less water-intensive crops (grain for sorghum) beginning in 2015. While it is highly unlikely that all water-intensive crop production will stop, this assumption allows for analysis of full implementation of the “what if” scenario.</li> </ul>

\*also includes self-supplied residential demand where appropriate.

### Marginal Quality Sources

#### Marginal Quality Water

To further address water supply shortages due to drought and increased demand, the OCWP included an analysis of the use of marginal quality water, including treated wastewater effluent, stormwater runoff, oil and gas flowback/produced water, brackish water, and water with elevated levels of key constituents. Marginal quality water sources were quantified and characterized across the state (*see* Figure 8, next page).

#### Hot Spot Basin Studies

During the spring of 2014, four public meetings were held in western Oklahoma at Guymon, Quartz Mountain, Duncan, and Yukon to share information and obtain feedback on water conservation strategies that could mitigate projected water shortages in Oklahoma’s most compromised areas. The meetings were attended by agriculture producers, water providers, and interested citizens residing in and around twelve basins determined in the OCWP to have the potential for the most significant water supply challenges within the next 50 years.

OWRB and its planning partners are now initiating three in-depth pilot studies. Each study will focus on one of the following strategies: water conservation initiatives; public water supply system regionalization; and the use of marginal quality water supplies. The studies will help address the needs of the basins and demonstrate the effectiveness of these strategies for use in other areas of the state.

### Pilot Studies (Strategies)

## Oklahoma Water Plan

### Marginal Quality Water Sources

Feasibility of MQW Sources to Meet Water Demands					
Category	MQW Source Category				
	Treated Wastewater	Stormwater Runoff	Oil and Gas Flowback/Produced Water	Brackish Water	Waters with Elevated Levels of Key Constituents
M&I - potable	☹️ WQ, PUB	❌ WQ, LOC, REL	❌ WQ, LOC, PUB	☹️ AT	☹️ AT, PUB
M&I - non-potable	🟢 WST	🟢 WST, PT	❌ LOC	☹️ AT	🟢 CT, AT
Self-Supplied Residential	☹️ WQ, LOC, PUB	❌ WQ, LOC	❌ WQ, LOC, PUB	☹️ WQ	☹️ WQ, PUB
Self-Supplied Industrial	🟢 WST	☹️ LOC, PT, CT	❌ WQ, LOC	☹️ CT, AT	☹️ CT, AT
Thermoelectric Power	🟢 WST	☹️ LOC, PT, CT	❌ WQ, LOC	🟢 CT, AT	🟢 CT, AT
Oil and Gas	❌ LOC	❌ LOC	☹️ CT, AT, PT, WQ, LOC, REL	☹️ CT, AT, PT, WQ, LOC, REL	🟢 CT, AT, PT, WQ, LOC, REL
Crop Irrigation	🟢 LOC, PUB	❌ LOC	❌ WQ, LOC	☹️ CT, AT	🟢 CT, AT
Livestock Watering	☹️ LOC	❌ LOC	❌ WQ, LOC	☹️ AT	☹️ CT, AT

🟢 Potentially feasible, depending on site-specific conditions  
 ☹️ Less feasible, depending on site-specific conditions  
 ❌ Not feasible, on a wide-scale basis for indicated reason(s)

WST May require additional Wastewater or Stormwater Treatment beyond that required for discharges, depending on specific use  
 PT Passive treatment may be required  
 CT Conventional treatment may be required  
 AT Advanced treatment may be required  
 WQ Treated water quality requirements would prohibit use or make treatment economically infeasible for indicated user  
 LOC Location of supply may not be near location of significant demand  
 REL Reliability of supply inadequate to meet demand without significant storage infrastructure  
 PUB Public Perception

Figure 8:  
OCWP Marginal Quality Water Feasibility

### Monitoring and Hydrologic Studies

Other strategies outlined by the OCWP have also been embraced by state leaders. The 2012 OCWP Update emphasized that statewide water planning cannot be effective without reliable water data, including both water quality and quantity monitoring. A priority recommendation to the Oklahoma Legislature resulted in additional funding for a comprehensive groundwater monitoring program, the first ever implemented in Oklahoma, and additional hydrologic studies of the state's stream systems and groundwater basins to facilitate more accurate allocation of water rights and gain a better understanding of the state's water supply availability.

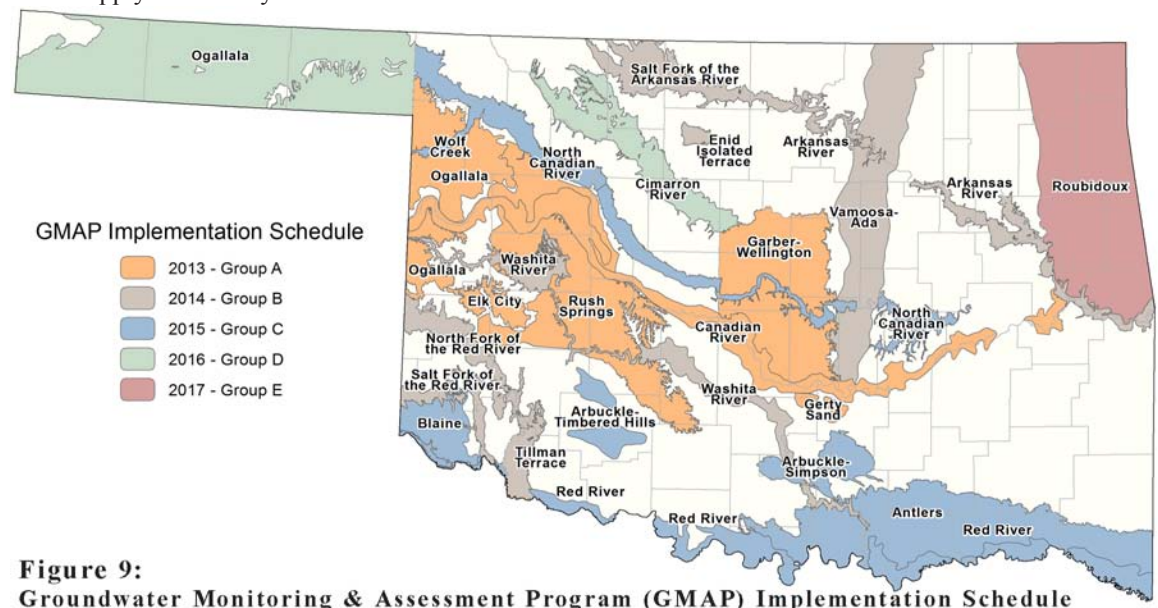


Figure 9:  
Groundwater Monitoring & Assessment Program (GMAP) Implementation Schedule

### Water Data Needs

### Groundwater Monitoring

## Oklahoma Water Plan

### Regional Planning

### Reclamation Studies

### Supply Planning Guide

### Drought Mitigation Fund

### Bedrock Aquifer Decreases

Regional planning was another priority recommendation of the 2012 OCWP. Oklahoma's climate ranges from humid subtropical in the east to semi-arid in the west. Humidity and precipitation in the southern and eastern portions of the state are much greater than in the western and northern sections due to the influence of warm, moist air moving northward from the Gulf of Mexico. Oklahoma's diverse geography and distribution of water resources make regional and local planning essential. For example, water issues in the western half of the state are often focused on limited supply, whereas water users in the east may be more concerned about stream flows or surface water quality issues. Since the statewide plan was released, several regional groups have sprung up across the state, utilizing OCWP data and initiating more intensive studies to focus on specific needs within the region. Regardless of the issues of respective regions, these groups have all turned their attention to water planning in order to better prepare for the next drought cycle.

The OWRB has also been successful in securing funding from the US Bureau of Reclamation for two cooperative basin/region studies in western Oklahoma. The Upper Washita Basin study in the West Central Watershed Planning Region and the Upper Red River Basin study in the Southwest Watershed Planning Region will update water supply and demands to include climate variability scenarios and will develop water management and infrastructure alternatives aimed at making these drought stricken areas more resistant to future drought.

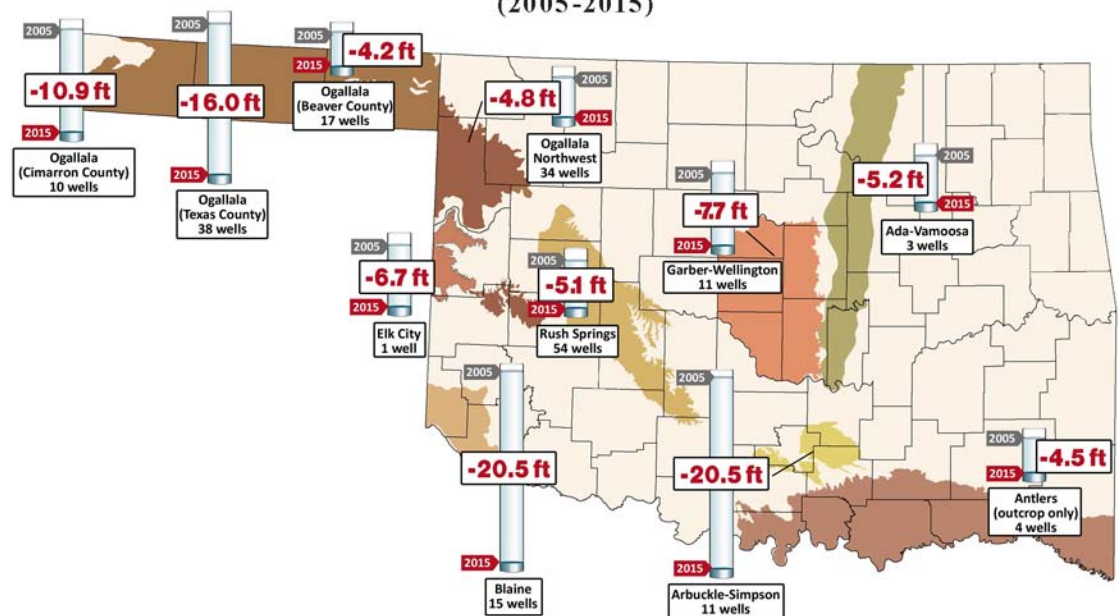
#### System-Level Planning

It is important to recognize that Oklahoma's anticipated water shortages and related problems are exhibited most acutely at the local or system level. The OCWP Public Water Supply Planning Guide, available online and distributed to all the state's major water supply systems, encourages system-level planning. [See [www.owrb.ok.gov/supply/ocwp/pdf\\_ocwp/WaterPlanUpdate/OCWPWaterProviderPlanningGuide.pdf](http://www.owrb.ok.gov/supply/ocwp/pdf_ocwp/WaterPlanUpdate/OCWPWaterProviderPlanningGuide.pdf)] The Planning Guide stresses the importance for each system to understand the vulnerabilities of their water supply sources and the limitations of their infrastructure, and have a plan in place for impending drought emergencies. A major impetus for creating the Planning Guide was to demonstrate how information provided in the 2012 OCWP Watershed Planning Region Reports could assist public water suppliers in developing a water plan specific to their system.

#### Financing

Oklahoma's Emergency Drought Relief Fund, enabled through passage of Enrolled House Bill 1923 in 2012, provides funding for drought mitigation and related projects in Oklahoma in conjunction with a formal gubernatorial drought declaration. Specific assistance projects are limited to drought-affected counties and must be approved by the Oklahoma Emergency Drought Commission, consisting of the Secretary of Agriculture and Executive Directors of the OWRB and Oklahoma Conservation Commission. The Emergency Drought Commission also serves as a permanent drought advisory panel to the Governor and relevant state agencies.

**Figure 10: Bedrock Aquifers  
Mean Water Level Changes  
(2005-2015)**



Sources: OWRB Groundwater Monitoring and Assessment Program and OWRB Water Well Mass Measurement Program

## Oklahoma Water Plan

### Use Efficiency

### Reclaimed Water

### Drought Portal

### Drought Tool

### Alluvial Aquifer Decreases

In September 2014, limited grant funding was made available to water suppliers under the Water for 2060 Drought Grant Program. Projects eligible for this funding had to demonstrate water efficiency and support drought resiliency within the community or water/wastewater system. Replacing inefficient infrastructure, leak detection, and water reuse projects are a few examples of eligible projects.

As a result, earlier this year Water for 2060 grants were awarded to four communities in western Oklahoma for water system improvement projects that are expected to save a total of 23.5 million gallons of water per year. All four projects are focused on water use efficiency through water loss reduction. Three of the projects focused on replacing water lines experiencing exorbitant water losses due to age and deterioration. The fourth project focused on installation of automatic radio-read meter systems.

#### Water Reuse Regulations

In 2010, continuing drought conditions led representatives from a number of Oklahoma municipalities to seek use of reclaimed water to augment dwindling supplies. These representatives met with the Oklahoma Department of Environmental Quality (ODEQ) to form a working group to help the agency create water reuse regulations appropriate for the state. Oklahoma's current water reuse regulations provide communities with a means to access reclaimed water for non-potable uses such as irrigation, industrial cooling towers, and fire protection. SB 1187, signed by the Governor of Oklahoma in May of 2014, also paves the way for indirect potable reuse by allowing the ODEQ to receive, review, and evaluate permit applications for discharges to water bodies for water reuse projects.

The citation and internet availability are as follows: OAC 252:627 Water Reuse (Operations Standards) at: [www.deq.state.ok.us/rules/627.pdf](http://www.deq.state.ok.us/rules/627.pdf); and OAC 252:656-27 Wastewater Reuse (Construction Standards) at: [www.deq.state.ok.us/rules/656.pdf#page=50](http://www.deq.state.ok.us/rules/656.pdf#page=50).

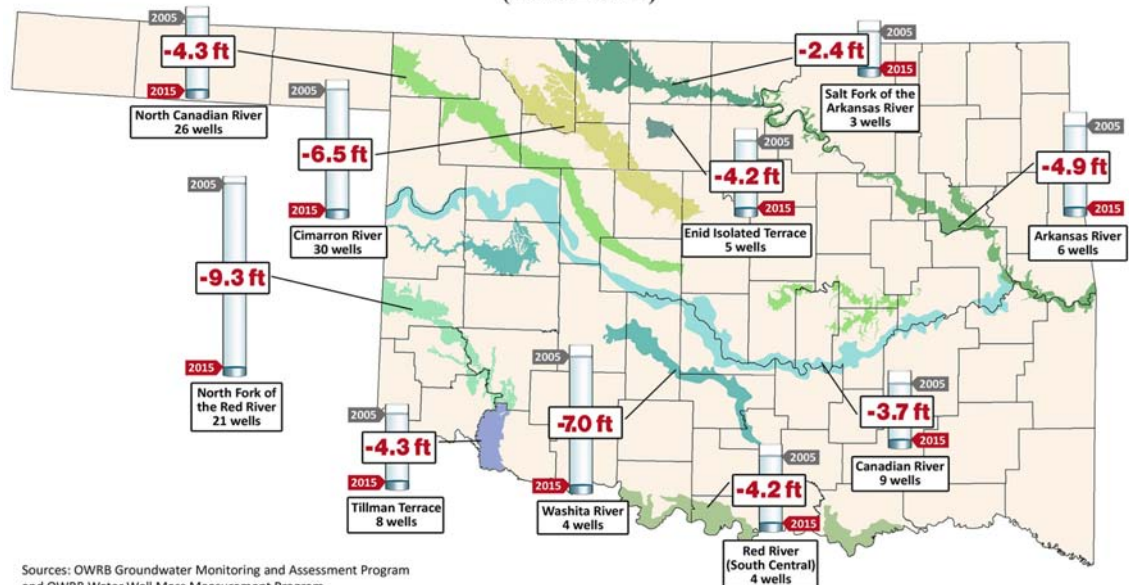
#### Drought Management Team and Drought Portal

Since 1996, the Oklahoma Drought Management Team has been charged with the development of a coordinated, long-term plan to deal with current and future drought problems in the state. The Director of the Oklahoma Department of Emergency Management serves as coordinator.

As Chair of the Water Availability and Outlook Committee, the OWRB publishes the Oklahoma Water Resources Bulletin on a monthly basis and has developed the Oklahoma Drought Portal ([www.owrb.ok.gov/drought/](http://www.owrb.ok.gov/drought/)). This web page provides links to a number of state and federal drought related/response resources and valuable information for monitoring drought conditions, including weather/climate data from the Oklahoma Climatological Survey and Oklahoma Mesonet, as well as community rationing status from the Oklahoma Department of Environmental Quality. The portal also features the Oklahoma Drought Tool, a resource for system-level drought planning developed by the OWRB and US Bureau of Reclamation.

The Oklahoma Department of Emergency Management continues to monitor and communicate with communities dealing with drought issues. Emergency disaster funding in conjunction with the 2013 State of Emergency for Drought (E.O. 2013-36) was awarded to several cities for reimbursement of drought-related damages to their water systems.

**Figure 11: Alluvial Aquifers  
Mean Water Level Changes  
(2005-2015)**



Sources: OWRB Groundwater Monitoring and Assessment Program and OWRB Water Well Mass Measurement Program

## Oklahoma Water Plan

### CONCLUSION

Climatologists predict that in the near future, drought will only become more frequent and severe. Thanks to Oklahoma's Comprehensive Water Plan, its recommendations, and resulting implementation, state leaders and citizens are now better prepared to meet the many challenges of drought across the state. The OWRB and its partner agencies are committed to working with regional and local community groups to develop projects necessary to ensure a more drought-proof Oklahoma.

### FOR ADDITIONAL INFORMATION:

J.D. STRONG, Oklahoma Water Resources Board, 405/ 530-8800 or [jd.strong@owrb.ok.gov](mailto:jd.strong@owrb.ok.gov)  
Oklahoma Comprehensive Water Plan and associated materials available at:  
[www.owrb.ok.gov/supply/ocwp/ocwp.php](http://www.owrb.ok.gov/supply/ocwp/ocwp.php)

**J. D. Strong** was named Executive Director of the Oklahoma Water Resources Board (OWRB) in October 2010. He previously served as Oklahoma's Secretary of Environment, where he coordinated activities of the Environmental Cabinet, including the Department of Environmental Quality, Water Resources Board, and Department of Wildlife Conservation. Under Strong's leadership, the OWRB updated the Oklahoma Comprehensive Water Plan, a 50-year water supply assessment and policy strategy to meet Oklahoma's future water needs. Strong represents Oklahoma on the Western States Water Council and Chairs its Water Quality Committee, and also serves as Oklahoma's Commissioner on four Congressionally-approved interstate water Compact Commissions.

## Crude Oil by Rail

### CRUDE OIL-BY-RAIL

&

### THE ENDANGERED SPECIES ACT

COMING SOON TO TRAIN TRACKS NEAR YOU?

by Kristen L. Boyles, Staff Attorney, Earthjustice (Seattle, WA)

### INTRODUCTION

On July 6, 2013, railroad tank cars filled with crude oil from the Bakken shale fields of North Dakota derailed and exploded, devastating a small Quebec town and killing 47 people. Canadian Prime Minister Stephen Harper described the scene as a "war zone." Ian Austen, *Deadly Derailment Underlines Oil Debate*, NY Times, July 8, 2013, at A4. This devastating accident brought to the public eye the risks of a new wave of fossil fuel transportation — crude-by-rail.

Crude-by-rail or "CBR" is the short-hand for the transport of crude oil by unit trains from drilling/pumping fields to refineries and/or coastal destinations for further shipping by boat or barge. Unit trains are trains that carry a single product (in this case crude oil). These trains consist of 100-120 tank cars and run about 1.5 miles long. These trains rumble through towns and cities, along rivers and streams, and beside fragile marine shorelines across the nation. The first such crude oil unit train rolled into western Washington on September 4, 2012, with no public review or even notification. The tragedy at Lac-Mégantic forced this issue into the open, and the steady drumbeat of horrifying near-miss accidents since then have continued that focus. This article gives a broad overview of the status of crude-by-rail in the US, as well as highlighting legal issues under the Endangered Species Act to watch for going forward.

### MORE OIL TRAINS, MORE OIL TRAIN EXPLOSIONS

Development of new fracking and drilling technologies have created an oil boom in North Dakota and Alberta, Canada, and oil companies have rushed crude to market using railways. See Sightline Institute, *The Northwest's Pipeline on Rails* (May 2014), available at: [www.sightline.org/research/the-northwests-pipeline-on-rails/](http://www.sightline.org/research/the-northwests-pipeline-on-rails/). As one oil industry document explained, this oil is "inconveniently located mid-continent." And as the ongoing permitting process for the Keystone XL pipeline has reaffirmed, new oil pipelines require a lengthy and often multi-jurisdictional process to permit and build. Railroad tracks, however, already exist.

The oil train onslaught happened fast. "As recently as 2008, U.S. Class I railroads originated just 9,500 carloads of crude oil. By 2011, this had jumped to 66,000 carloads, and in 2012 will exceed 200,000." Ass'n of Am. Railroads, *Moving Crude Petroleum by Rail 1* (Dec. 2012), available at: <http://googl/x0fdS>. In 2013, U.S. railroads shipped about 400,000 carloads of oil — approximately 11.5 billion gallons.

Unit Trains

ESA Issues

Oil Train  
Use Expansion

## Crude Oil by Rail

### Proposed Projects

### Inherent Risks

### 2015 Accidents

### Accidents & Activism

### New Safety Standards Inadequate

The unprecedented increase in crude-by-rail transport has led to an unprecedented increase in oil spills. More crude oil spilled from rail tank cars in 2013 (1.15 million gallons) than the total spilled from 1975-2012 (a little under 800,000 gallons). See McClatchy DC, Tate, Curtis, available at: [www.mcclatchydc.com/2014/01/20/215143/more-oil-spilled-from-trains-in.html](http://www.mcclatchydc.com/2014/01/20/215143/more-oil-spilled-from-trains-in.html).

There are now eleven crude-by-rail projects operating or proposed in Washington and Oregon. If all are built and operated, they would put 12 mile-and-a-half-long oil trains on tracks through Washington every day. If all are built, they would be capable of delivering more than 858,000 barrels of oil per day — a larger capacity than Keystone XL or Kinder Morgan's TransMountain Pipeline expansion in Canada, and larger than the refining capacity in Washington State. In total, potentially 36,036,000 gallons per day of crude-by-rail transport would be supplying these proposed projects.

The disturbingly persistent occurrence of oil train derailments, explosions, and accompanying oil spills over the last three years have all-too-clearly demonstrated the environmental and health risks inherent in transporting crude-by-rail. The number of new explosions and accidents has grown so quickly that any attempt to list them all is quickly out of date. The list of accidents to date in 2015, alone, is startling. On May 6, an oil train derailment and fireball forced the evacuation of Heimdal, North Dakota; on March 7, a Canadian National Railway train carrying Alberta crude oil derailed outside of the tiny town of Gogama in northern Ontario, and five of the 38 cars that came off the tracks fell into the Mattagami River. The accident caused a massive fire and leaked oil into the waterways that are used by locals, including a nearby indigenous community, for fishing and drinking. On March 5, a BNSF oil train with 103 tank cars carrying explosive Bakken crude oil from North Dakota derailed just south of Galena, Illinois. Twenty-one cars derailed and a black-plumed fire continued to burn a day later. Between February 14 and 16, three major crude-by-rail accidents occurred in Canada and the United States, with the last derailment culminating in an enormous fireball that forced the evacuation of a West Virginia town and threatened local drinking water.

These latest derailments and explosions are part of a pattern of horrifying accidents occurring with alarming frequency over the last two years (See map below, adapted from the Earthjustice website: <http://earthjustice.org/features/map-crude-by-rail>). Incidents include those in: Edmonton, Alberta; rural Alabama; Casselton, North Dakota; Plaster Rock, New Brunswick; Philadelphia, Pennsylvania; LaSalle, Colorado; Lynchburg, Virginia — all US and Canadian towns that have seen accidents, fireballs, oil spills, water contamination, and near misses of direct injury to people.



Unfortunately, the pattern of oil train accidents and explosions is unlikely to end soon. On May 8, 2015, the US Department of Transportation (DOT) published long-awaited new standards for oil tank cars and oil train safety. PHMSA/DOT, *Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains*, 80 Fed. Reg. 26644 (May 8, 2015). These rules, too long in coming, are woefully inadequate. While the new rules establish stronger standards for newly built tank cars, they set weaker standards for retrofitting existing tank cars, and DOT is allowing these hazardous tank cars to continue shipping explosive crude for almost a decade, with even the most dangerous tank cars remaining in service until 2018. See Earthjustice, *Analysis of 7 Hidden Dangers in the New Federal Oil Tank Car Rule*, available at: <http://earthjustice.org/sites/default/files/files/7%20Things%20CBR%20Rule%205%2013.pdf>.

## GROWING COMMUNITY OPPOSITION

Crude Oil  
by RailNew  
Infrastructure?New  
Terminals  
Proposed'Issues  
Raised

## EIS Review

Existing  
Puget Sound  
Terminals  
ExpansionColumbia River  
Terminals

The crude-by-rail boom has left towns across the nation unable to determine for themselves how to safeguard their communities, people, water, and wildlife. In much of the US, tracks run through the middle of cities and towns and along the banks of rivers and streams. As a result, communities are beginning to mobilize to stop new or expanded infrastructure projects that would invite more oil trains through their cities and towns.

A quick look at several proposals in Washington and Oregon shows the range of projects and impacts:

**Grays Harbor, Washington: Three Oil Shipping Terminals**

Three oil shipping terminals have been proposed for Grays Harbor, Washington, which combined would ship 48 million barrels of crude oil per year through the harbor, with over 800 unit trains of oil per year coming in and 640 marine vessel transits to ship the oil out. In Spring 2013, the City of Hoquiam issued Shoreline Substantial Development permits to two proposed crude-by-rail terminals (Westway and Imperium). Litigation on behalf of the Quinault Indian Nation, Friends of Grays Harbor, Sierra Club, Grays Harbor Audubon, and Citizens for a Clean Harbor challenged these permits and the truncated environmental and public health review underlying them. Issues raised in the case included: harm from increased train traffic; risks of oil spills — both large and small — from trains, storage tanks, and marine vessels; increased vessel traffic and its impact on Treaty-protected tribal fishing and gathering; harm to fishing areas and shellfish bed; impacts to wetlands and streams; climate change impacts; and harm to threatened and endangered species.

In November 2013, the Washington Shorelines Hearings Board agreed that a complete and open environmental review was necessary to analyze and understand the impacts of these oil terminals. *Quinault Indian Nation v. Hoquiam*, SHB No. 13-012c, Order on Summary Judgment (Dec. 9, 2013). Even on issues the Board did not reach, it found “troubling questions of the adequacy of the analysis done regarding the potential for individual and cumulative impacts from oil spills, seismic hazards, greenhouse gases, and impacts to cultural resources.” *Id.* The Board vacated the permits with instructions for a full and transparent environmental review. The two proposed projects and a third oil shipping terminal (US Development) are undergoing full environmental impact statement (EIS) review under Washington’s State Environmental Policy Act.

**Anacortes, Washington: CBR Facility at Shell Refinery**

Washington hosts five oil refineries in Puget Sound, four in the northern part near Anacortes and Bellingham, with the fifth refinery in Tacoma, Washington, in south Puget Sound. Four of these refineries quietly sought and obtained local land-use permits to build crude-by-rail facilities before public awareness of the risks and harms had grown. Shell Refinery on March Point in Anacortes, stating its desire to obtain “crudes of opportunity,” sought its permits for a crude-by-rail facility last. The failure of the county planning department to require a full, public environmental review was challenged by RE Sources, Washington Environmental Council, Friends of the San Juans, ForestEthics, Evergreen Islands, and Friends of the Earth. In February 2015, RE Sources’s litigation successfully halted Shell’s planned crude-by-rail expansion pending a full EIS review. Further work on the EIS is likely to continue into spring-summer 2016; Shell’s initial appeal in Skagit County state court was dismissed.

**Vancouver, Washington: Tesoro-Savage Project**

Tesoro-Savage has proposed a crude-by-rail terminal on the banks of the Columbia River to receive and ship over 360,000 barrels of oil a day. This one oil shipping terminal would take four full oil trains into the facility each day, with 730 ship transits out the Columbia River expected per year. Due to the massive size of this project, it requires state-licensing and governor approval. Local and state opposition to Tesoro-Savage is broad: eight conservation and community groups, three tribes and tribal organizations, three cities, a local developer, and the local international longshoremen’s union have intervened in the proceedings to oppose the project.

**Clatskanie, Oregon: Global Partners**

A currently operating crude-by-rail terminal, on a former ethanol facility site on the Oregon side of the Columbia River, is seeking to expand. In 2010, the ethanol facility went bankrupt and was acquired by Cascade Kelley Holdings LLC, which in turn was acquired by Global Partners LP. Global started shipping large amounts of oil from the facility without first obtaining a Prevention of Significant Deterioration permit, a requirement under the federal Clean Air Act for major sources of pollutants. The Clatskanie oil terminal is a major source of volatile organic compounds (VOC) air pollutants. Northwest Environmental Defense Center, the Center for Biological Diversity, and Neighbors for Clean Air filed a Clean Air Act citizen suit to compel Global to obtain a major source permit under the Clean Air Act. The case is set for trial in the fall of 2015.

## Crude Oil by Rail

### Current Export Ban

### Exemptions

### Foreign Origin Crude

### Regulatory Definition Revised

### Inappropriate Process

### ESA Scope

### Consultation Requirements

### Jeopardy Determinations

## FEDERAL CRUDE OIL EXPORT BAN

Looming over all these projects is the push to lift the current federal crude oil export ban. The oil industry and certain members of Congress hope to lift or at least loosen the strict US requirements that prevent most international export of domestically produced unrefined crude oil. The push to permit more crude oil export sharpens the need to slow and halt the current rush to build crude-by-rail infrastructure. Once the infrastructure is in place, should the export ban be lifted or loosened, the amount of oil shipped through the Pacific Northwest could increase dramatically.

The 1970s Arab oil embargo spurred Congress to enact laws establishing a crude oil export ban. The key law — the Energy Policy and Conservation Act of 1975 (EPCA) — directed the President to promulgate a rule banning the export of crude oil produced in the United States. 42 U.S.C. § 6212(b)(1). EPCA permitted the President to create specific exemptions based on the purpose of the export, the class of seller or purchaser, or the country of destination, upon finding the oil export to be consistent with the national interest and statute purposes. 42 U.S.C. § 6212(b). Other laws have similarly authorized Presidential exemptions from the crude oil export ban. *See, e.g.,* Trans-Alaska Pipeline Authorization Act, 30 U.S.C. § 185(s)(1), which directed creation of an exemption for North Slope oil transported by the pipeline unless the President finds it is not in the national interest. While the ban is expansive, each exemption is narrowly tailored to promote certain purposes consistent with congressional intent.

Legislative lifting of the crude export ban is not the only way the ban may be loosened. The Department of Commerce's Bureau of Industry and Security (BIS), which regulates crude oil exports under its Short Supply Controls, will grant export licenses for crude oil that fall into certain limited categories. 15 C.F.R. § 754.2. Foreign origin crude that has not been co-mingled with crude of US origin — Alberta tar sands crude for example — is not subject to the export ban. In 2014, BIS unilaterally revised the regulatory definition of crude oil that is subject to the crude oil export ban in two important ways. First, in July 2014, BIS issued letter rulings to at least two companies indicating that their crude oil lease condensate could be exported without an export license. Second, on December 30, 2014, BIS posted guidance on its website similarly indicating that BIS had revised its regulatory definition of crude oil to exclude some lease condensate, despite express language in the regulation stating that lease condensate is "included" in the definition.

This issue is hugely controversial. Such a significant change (and arguably in direct violation of the existing regulations) is inappropriate for secret letter rulings and informal agency pronouncements. Departures of this magnitude, in accordance with longstanding interpretations and regulatory language, should be undertaken with appropriate notice and comment rulemaking, which would enable BIS to obtain input from all interested perspectives and to amass expertise from academics, independent scientists, and nongovernmental organizations, as opposed to only from businesses seeking to export crude oil and industries and trade groups that support them.

## ENDANGERED SPECIES ACT ISSUES

The projects discussed above are proceeding through permitting and review almost entirely under local or state land-use laws. It is useful, however, to look at how broader federal Endangered Species Act (ESA) requirements could come into play in the future.

The US Supreme Court has called the ESA "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation." *Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 180 (1978). "The plain intent of Congress in enacting [the ESA] was to halt and reverse the trend toward species extinction, whatever the cost." *Id.* at 184. The ESA reflects "a conscious decision by Congress to give endangered species priority over the 'primary missions' of federal agencies." *Id.* at 185. To accomplish this goal, the ESA includes both substantive and procedural provisions designed to protect and recover imperiled species.

For federal actions, the heart of the ESA is section 7(a)(2), which requires that every federal agency insure that its actions are not likely to "jeopardize" a listed species or "adversely modify" its critical habitat. 16 U.S.C. § 1536(a)(2). The obligation to "insure" against a likelihood of jeopardy or adverse modification requires the agencies to give the benefit of the doubt to endangered species and to place the burden of risk and uncertainty on the proposed action. *See Sierra Club v. Marsh*, 816 F.2d 1376, 1386 (9th Cir. 1987). To ensure that this strict substantive mandate is carried out, agencies must engage in a consultation process with the appropriate expert wildlife agency on the impacts of any federal action to listed species.

The formal consultation process commences when a federal agency determines that a proposed federal action "may affect listed species or critical habitat." 50 C.F.R. § 402.14(a). Consultation is complete when the National Marine Fisheries Service (NMFS) or the US Fish and Wildlife Service (FWS) issues a "biological opinion" that determines if the action is likely to jeopardize the species. If so, the opinion may specify alternatives that will avoid jeopardy while still allowing the agency to proceed with the action. 16 U.S.C. § 1536(b)(3)(A); 50 C.F.R. § 402.14(g)(5)-(6); (h)(3); (i)(1)-(2). NMFS or FWS may also suggest modifications to the action to limit negative impacts even when it concludes that jeopardy is unlikely.

## Crude Oil by Rail

### Strict Compliance

### Procedural Requirements

### "Action" Area

### National Parks Impacts

### Park Service Statement

### High Risk/ Low Chance Considerations

### Deepwater Horizon Consequences

### Spill Response Plans Consultation

*Id.*; 50 C.F.R. § 402.13. Under this framework, federal actions that may affect a listed species may not proceed unless and until the federal agency insures, through completion of the consultation process with the issuance of a biological opinion, that the action is not likely to cause jeopardy. *See* 16 U.S.C. § 1536(a); 50 C.F.R. §§ 402.13, 402.14. In carrying out these duties, agencies are required to use the best scientific information available. 16 U.S.C. § 1536(a)(2).

The courts have emphasized that strict compliance with the ESA's procedures is critical to the success of the ESA, because only through the consultation process can the effects of agency action on listed species be fully and objectively evaluated. *See Thomas v. Peterson*, 753 F.2d 754, 764 (9th Cir. 1985); *PCFFA v. U.S. Bureau of Reclamation*, 138 F. Supp.2d 1228, 1248-50 (N.D. Cal. 2001); *Greenpeace v. NMFS*, 106 F. Supp.2d 1066, 1073 (W.D. Wash. 2000) ("*Greenpeace II*"). Accordingly, scrupulous adherence to the letter and spirit of the ESA consultation process is to be strictly enforced by the courts.

"[T]he strict substantive provisions of the ESA justify *more* stringent enforcement of its procedural requirements, because the procedural requirements are designed to ensure compliance with the substantive provisions...If a project is allowed to proceed without substantial compliance with those procedural requirements, there can be no assurance that a violation of the ESA's substantive provisions will not result. The latter is, of course, impermissible." *Thomas*, 753 F.2d at 764 (emphasis in original); *see also Pacific Rivers Council v. Thomas*, 30 F.3d 1050, 1056-57 (9th Cir. 1994) (enjoining logging, grazing, and road-building activities for failure to reinstate consultation on forest plans upon listing of salmon species).

#### Crude-by-Rail Consultations

For ESA consultations that involve crude-by-rail terminals, the definition of the "action" area — "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" — could become central. 50 C.F.R. § 402.02 (Definitions). This definition requires a broad look at impacts caused by proposed projects — impacts and risks likely far removed from the oil shipping terminal storage area. Similarly, consultation under the ESA must encompass all aspects of the agency action. 50 C.F.R. § 402.14(c) (agency must consider effects of action "as a whole"). The law does not allow agencies to segment agency action into separate components to be viewed in isolation.

Such ESA consultations would be extensive. The National Park Service pointed out in a December 20, 2013 comment letter on the proposed Tesoro-Savage project, that impacts on national parks alone would encompass Glacier National Park, Fort Vancouver National Historic Site, Lewis and Clark National Historic Park and National Historic Trail, and the Ice Age Floods National Historic Trail. [For more information on crude-by-rail risks to national parks, *see "Oil Trains" Pose A Significant Threat To National Parks* at: [www.nationalparkstraveler.com/2015/05/traveler-special-report-oil-trains-pose-significant-threat-national-parks26595](http://www.nationalparkstraveler.com/2015/05/traveler-special-report-oil-trains-pose-significant-threat-national-parks26595).]

This type of broad review would not be unique to the ESA; instead, it would complement federal and state environmental and public health reviews. As the Park Service stated, "[t]he Tesoro-Savage EIS should fully evaluate all direct and indirect effects of the crude oil distribution project, including rail shipment from the Midwest, Port operations, marine vessel shipment and climate change impacts associated with eventual fuel refining and combustion." By requiring review of all potential risks and harms caused by projects on threatened and endangered species, ESA section 7 review could serve a vital function as a check on unbearable impacts to fish and wildlife stemming from these projects.

Such consultations, however, will not be easy undertakings. The Deepwater Horizon disaster showed clearly that NMFS and FWS struggle to deal with such low probability — yet devastating consequence — events. In ESA consultations on the Gulf oil leases for example, a large oil spill was found to be "too improbable to warrant analysis." The inability of the federal agencies to assess high risk/low chance situations with crude-by-rail and oil shipping terminals will continue to be an issue.

Deepwater Horizon also illustrated that the agencies can have the wrong focus when assessing oil spill risks in ESA consultations. An underwater blowout, like that at Deepwater Horizon, was not an anticipated type of oil spill. With crude-by-rail terminals, FWS and NMFS must consider oil spills from multiple scenarios: derailments; explosions; oil storage tank leaks or rupture; spills in oceans, rivers, and estuaries; marine and in-river vessel accidents; open ocean spills; and long-term versus short-term harms.

Deepwater Horizon also saw the untested use of two million gallons of chemical oil dispersants on the Gulf ecosystem. Clearly, while in the midst of an oil spill emergency, ESA consultation cannot be fully undertaken, but in oil spill response plans and planning, analyzing alternatives to chemical dispersants is vital to fish and wildlife protection. This last point is one where FWS and NMFS have failed to undertake ESA section 7 consultation at all.

ESA consultation on Area Contingency Plans (required under the Oil Pollution Act of 1990, enacted in the wake of the Exxon Valdez oil spill), would force a review of worst-case scenarios and proposed mitigation and prevention measures. ESA Section 7(a)(2) consultation would give spill response or in-situ burning options and perhaps even result in species-specific rescue plans. Again, none of this planning can be accomplished in an emergency; consultation on oil spill response plans and measures would allow the ESA to act as a planning tool.

## Crude Oil by Rail

### Risks Recognized

The federal biological agencies are not blind to the risks and harms posed by crude-by-rail: Based on the information that is available to us today, the [US Fish and Wildlife Service] believes that this proposal to bring a crude-by-rail facility to properties managed by the Port would pose unacceptable risks to fish and wildlife trust resources managed and co-managed by the Service. The possibility of a future oil spill(s), and the potential for resulting impacts, cannot be fully discounted. The proposed facility would have direct impacts to sensitive aquatic and terrestrial resources, and would present a cumulative risk of future oil spills and resulting damages, that are unacceptable to the Service and other stakeholders.

FWS SEPA scoping comment letter on US Development Terminal Proposal (Oct. 30, 2014).

ESA section 7 consultation provides a path to a more detailed and reasoned assessment of risks, harms, mitigation, and options if the consultation can take place before an emergency occurs.

### CONCLUSION

While the amount of oil riding the rails will hopefully decrease in coming years as more communities oppose and halt new or expanded oil terminals and more oil is left in the ground, it is likely that some amount of crude-by-rail oil shipping is here to stay. Where required, ESA section 7 consultation could bring a powerful tool for conservation analysis, planning, and mitigation to the question of shipping crude oil by rail.

*This article was adapted from an Endangered Species Act Continuing Legal Education presentation given on January 23, 2015, at a seminar presented by The Seminar Group in Seattle, Washington.*

### FOR ADDITIONAL INFORMATION:

KRISTEN BOYLES, Earthjustice, 206/ 343-7340 x1033 or kboyles@earthjustice.org

**Kristen Boyles** is a staff attorney in Earthjustice's Northwest office. She has worked for Earthjustice since 1993, except for a two-year stint as a staff attorney with Pacific Rivers Council. For many years, Kristen's work has focused on public lands and wildlife issues such as Pacific NW forestry, Columbia and Klamath River salmon protection, and the national Roadless Rule. Kristen currently coordinates Earthjustice's work to stop crude-by-rail and other efforts to turn the Pacific Northwest into a fossil fuel transport and export hub.

## California Conservation Incentives

## URBAN WATER CONSERVATION IN SOUTHERN CALIFORNIA

ENCOURAGING CONSERVATION THROUGH TRADEABLE ALLOCATIONS & MARKET MECHANISMS

by Jim Bond, Mary-Sophia Motlow, Lauren Steely, Dean Wang,  
& Dr. Gary D. Libecap, Professor

Bren School of Environmental Science and Management, University of California, Santa Barbara

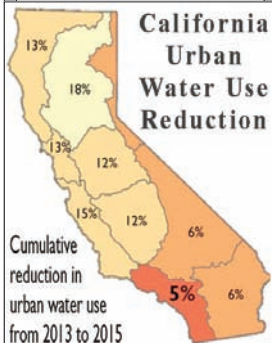
### INTRODUCTION

Most of Southern California's urban water is provided by the Metropolitan Water District of Southern California (Met), which is the largest wholesale distributor of water in the United States. Met provides water from the Colorado River and the California State Water Project to approximately 19 million people via 26 member agencies within six Southern California counties. These member agencies are represented by individual city water utilities and local water districts who themselves then distribute water to their customers.

In January 2014 — year four of one of the worst droughts in California history — Governor Jerry Brown declared a state of emergency and urged water agencies throughout the state to voluntarily reduce use by 20% below 2013 levels. By February 2015, more than a year later, water agencies in Southern California, however, had reduced usage by only 5% below 2013 levels. Southern California's reductions were the least of any region in the state.

Recent research conducted by faculty and students at the Bren School of Environmental Science and Management, University of California, Santa Barbara (Researchers) examined how the current water allocation system used by Met for its member agencies has the unintended effect of penalizing conservation. Researchers devised an alternative allocation system that corrects for this problem and also allows for water trading, providing additional flexibility for managing water.

This article presents an overview of this research project's findings. The full, 85-page, final report — "*Motivating Water Conservation in Southern California through Allocation and Market Mechanisms*" — is available online at: [www2.bren.ucsb.edu/~urbanwater/](http://www2.bren.ucsb.edu/~urbanwater/).



### METROPOLITAN'S WATER SUPPLY ALLOCATION PLAN (WSAP)

In times of drought, when Met's supplies are limited, Met enacts a Water Supply Allocation Plan (WSAP). This plan defines new water allocations for member agencies based on percentage reductions of each agency's normal water demand. Although a number of factors are used in WSAP, the major factor is an agency's most recent water use. WSAP allocations may also include adjustments for past conservation, but these allowances do not reward conservation measures taken preemptively to meet drought.

Under WSAP, most agencies may purchase their allocated water quantity at Met's lowest volumetric price, known as the Tier I rate. Depending on the level of drought, agencies may be allowed to purchase additional water beyond their allocation, but with a significantly higher surcharge. By basing each agency's allocation on recent use, WSAP actually rewards agencies with increasing water use with a larger share during times of drought as compared to agencies that may have adopted aggressive past conservation. Disincentives of WSAP for conservation are clear:

1. Under WSAP, water that is conserved after the baseline period is deducted from an agency's allocation. While the WSAP includes a "conservation credit," this credit represents only a small portion of an agency's conservation reductions.
2. A member agency's allocation is largely based on a rolling historical average of the most recent years such that the more it uses, the more it is apportioned.

Thus, under current "conservation" scenarios, agencies are better off increasing their water demand in advance of a drought in order to secure a larger share of supply during a shortage, rather than conserving water to prepare for when supplies are limited. Ironically, this behavior can actually increase the probability that the entire Met system will go into shortage and also increase the shortage severity.

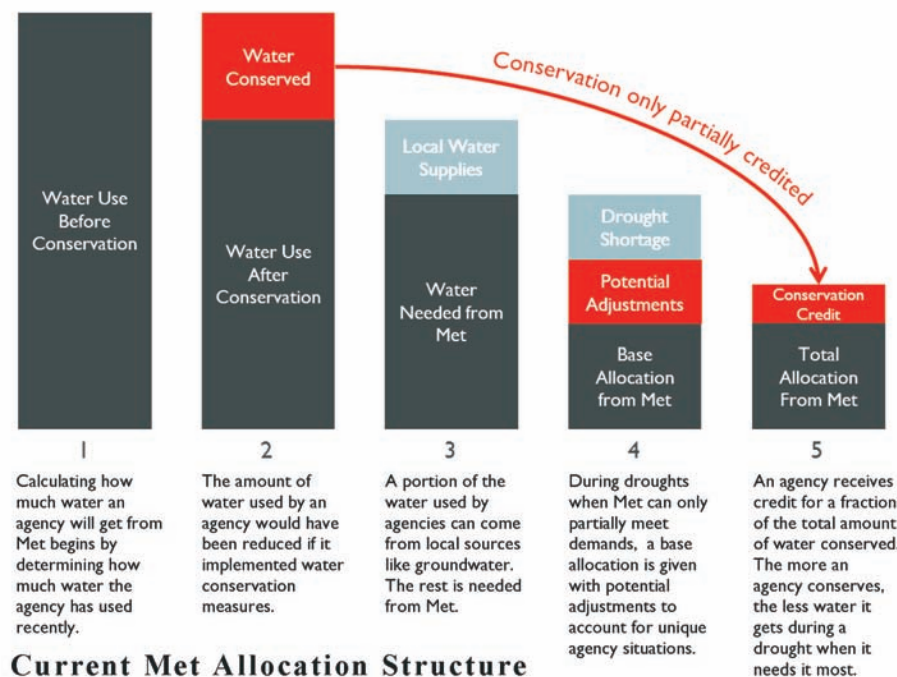
The WSAP is designed to satisfy much of each member agency's demand for water, regardless of whether the agency's per capita usage is high or low. In this regard, the WSAP avoids large reductions to an agency's allocation that might be politically controversial. However, in aiming for political expediency, the WSAP fails to promote conservation.

### WSAP CONSERVATION AFFECTS

In order to understand how the conservation efforts of agencies affect their water allocation, Researchers examined formulas and data used by Met in the WSAP process. Researchers used available data for each Met member agency's water demand, population, water use (gallons per capita per day (gpcd), and other factors. The estimated WSAP outcomes were then used to model hypothetical increases and decreases in conservation by member agencies to simulate how these changes would alter their actual WSAP allocations. To examine the effects of conservation on water allocation at the individual agency level, Researchers selected three agencies with high, medium, and low per capita usage (gpcd) to test how allocations during drought may differ according to past water usage. WSAP includes a small conservation credit, but at maximum this credit reflects only 33% of water conserved. To assess the effect of this credit and the overall allocation formula, Researchers compared how much water agencies in these three groups have conserved and how much water they receive under WSAP.

Examination of the status quo and the estimated water allocations reveals two factors in WSAP that adversely affect incentives for conservation. One factor relates to the baseline period from which an allocation is calculated, and the other relates to the lack of a secure use right associated with an allocation.

Concerning baseline, WSAP only accounts for an agency's most recent year's water use when determining an allocation. As such, WSAP provides water to anticipate current demand but does not acknowledge the benefits from conservation that an agency has provided in reducing demand over time. Furthermore, there is no claim that an agency can make on the quantity of water it has conserved historically for later use or trading. The conservation efforts of an individual agency benefits the rest of the system by providing more water to distribute, but the conserving agency itself is hurt by receiving an allocation that is lowered due to its already reduced demand.



California  
Conservation  
Incentives

Predictable  
Allocation

Long Beach  
Conservation

WSAP  
Conservation  
Adjustment

Alternative’s  
Advantages

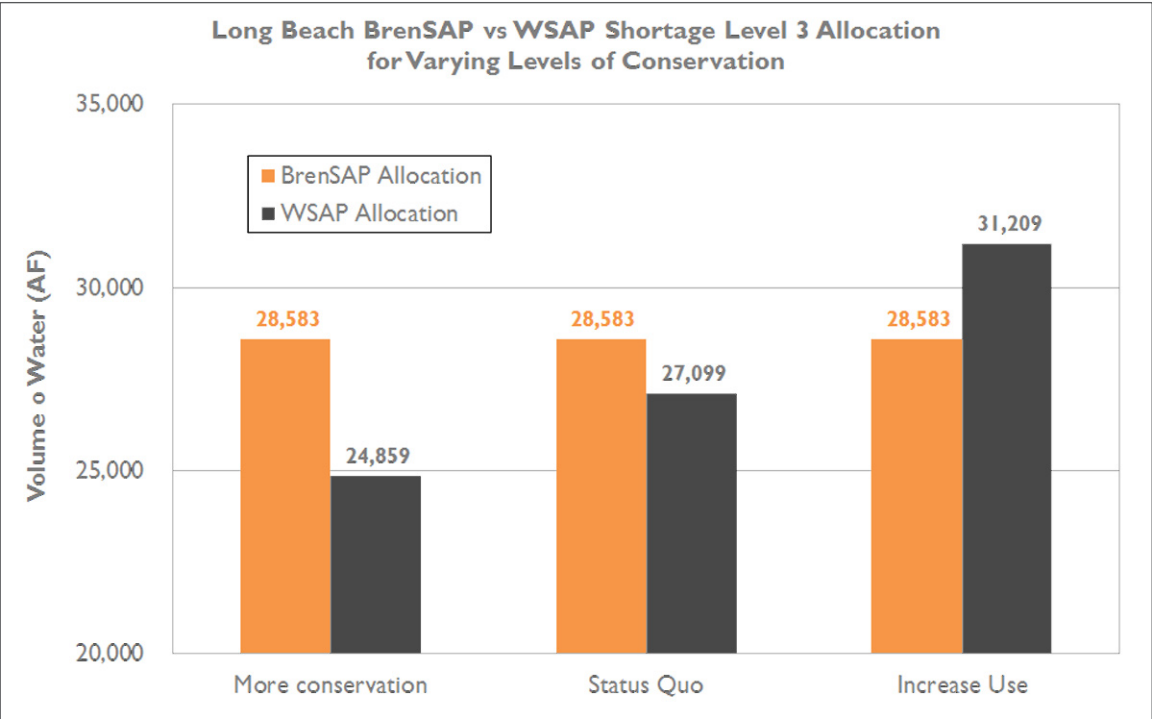
The WSAP also does not provide a well-defined and secure use right to purchase water. The WSAP reflects all agencies’ demands and provides flexibility to adapt to an agency’s changes over time. However, the WSAP allocation does not define a pre-determined quantity that can be purchased. Rather, the WSAP is a form of price control, determining the amount of water an agency may purchase at a given price (under shortage) as a function of their demand. This distinction between the WSAP and any other guaranteed right-to-water system is significant when it comes to conservation. If an agency had a predictable and guaranteed allocation, then conservation could provide value by creating a surplus that could then become an asset for storage or for trading.

To assess the cumulative impact of differing levels of conservation, Researchers modeled the effect on the Met system as a whole. This exercise illustrated how the current lack of conservation incentives could place the Met system at greater water supply risk.

**WSAP Consequences: The Long Beach Example**

The City of Long Beach provides a good example of both what successful water conservation programs can accomplish and the disincentive for conservation under the WSAP’s current allocation protocol. The Long Beach Water Department (LBWD) conducts one of the most progressive water conservation campaigns in Southern California. Through initiatives like their Lawn-to-Garden turf replacement program, public awareness campaigns, and water use restrictions, LBWD has created long-term reductions in water use since the 1980s. Long Beach succeeded in reducing water use from 177 gpcd in 1983 to 110 gpcd in 2014. In comparison, the average water consumption in Southern California is currently over 180 gpcd. [Water use data from 1977-2013 provided by Matt Lyons at the Long Beach Water Department.]

Met’s WSAP conservation adjustment is, in part, a function of the level of the declared supply shortage. For example, if Met called for a 15% reduction in deliveries (Level 3 shortage), on average the conservation demand hardening adjustment would account for approximately 5% of an agency’s total Met allocation, with a range of 1% - 11%. Under this scenario, the conservation adjustment would account for 5% of Long Beach’s Met allocation.



**AN ALTERNATIVE WATER ALLOCATION SYSTEM**  
**THE BREN SYSTEM ALLOCATION PLAN**

Researchers developed an alternative approach that improves conservation incentives — the Bren System Allocation Plan (BrenSAP). This method combines historical use benchmarks, water use targets (in gpcd), and the assignment of shares with associated use rights to promote conservation and efficiently distribute water. Under the BrenSAP, historical water demand benchmarks are established for each member agency and shares to aggregate water are generated accordingly. Any conservation resulting in water use below the benchmark can be banked or traded.

## California Conservation Incentives

### Allotment Guaranteed

### BrenSAP Components

### Effects Calculation

### Identified Conservation Incentives

### Water Trading

### Trading Platform

The BrenSAP partitions an agency's allocation into two tiers.

The first tier ("lifeline allocation") provides a minimum guaranteed allotment of water. This water would be available at the lowest cost and is intended to ensure a minimum allocation to satisfy basic agency water needs. The BrenSAP provides each agency with 100 gpcd of lifeline allocation. [This amount was described as a minimum allocation target in the 20x2020 urban conservation legislation (*see: 20x2020 Water Conservation Plan* (California Department of Water Resources, February 2010); [www.swrcb.ca.gov/water\\_issues/hot\\_topics/20x2020/docs/20x2020plan.pdf](http://www.swrcb.ca.gov/water_issues/hot_topics/20x2020/docs/20x2020plan.pdf)). This amount is also already guaranteed to every agency by the existing WSAP (*see* Board Letter 8-8. The Metropolitan Water District of Southern California Water Planning and Stewardship Committee Board Meeting. August 17, 2010).]

The second tier addresses additional uses.

#### Central BrenSAP components include:

##### Tier 1: Lifeline Allocation

- 1) Calculating what each individual agency demand for Met water would be today if gpcd and local supply quantities had not changed from benchmark.
- 2) Calculating the sum of water demands for all Met agencies and calculating a percentage for each agency relative to the total aggregate demand.
- 3) Multiplying the percentage share for each agency by the total available Met supply for the allocation year (2015).
- 4) Lifeline allocation is 100 gpcd multiplied by the 2015 population.
  - An agency's local supplies count towards satisfying lifeline demand first. Local supply in this context simply refers to any water used to meet demand not provided by Met.
    - \* If local supply exceeds lifeline demand, then there is no lifeline allocation from Met, and extra local supply carries over into determining benchmark allocation.
    - \* If local supply is less than lifeline demand, then remaining lifeline demand is allocated by Met, regardless of share % determined allocation (step 3).

The next tier of allocations provides additional water for uses such as landscape irrigation, commercial, and industrial water. The "benchmark allocation" provides water corresponding to the agency's benchmark year water use rate (gpcd), at a price reflective of the revenue requirements of Met to recover fixed costs. As with the WSAP, water demanded in excess of the benchmark allocation may be available, but that water would include a significant surcharge.

##### Tier 2: Additional Allocations

- 5) The benchmark allocation for uses additional to the lifeline allocation is the total allocation calculated in step 3 minus the lifeline allocation from step 4.
  - If an agency's benchmark allocation is greater than remaining demand, it has a surplus.
  - If an agency's benchmark allocation is less than remaining demand (including negative), then it has a deficit.

Similar to the analysis for the WSAP, the BrenSAP model was used to test the effects of an individual agency increasing or decreasing conservation as well as the cumulative effects of multiple agencies increasing or decreasing conservation. The same agencies were tested for the BrenSAP as for the WSAP so that a direct comparison could be made between the two.

The BrenSAP provides incentives for conservation. In using a historical use benchmark from which to establish an agency's allocation, a measuring stick by which to gauge water use was created. Conservation actions over time benefit the conserving agency by creating a surplus quantity of water that may be claimed by the agency as a bankable or tradable use right. Use rights for conserved water create added benefit by providing opportunities for water trading that previously did not exist. For agencies with surplus allocation, they have the option to sell the surplus to other agencies, store the surplus for future years, or provide the water to new users within the agency service area. Furthermore, given that the opportunities for conservation will vary depending on an agency's preferred water use, their local conditions and alternative supply options, and their costs of conservation, the use rights associated with an allocation provide an opportunity for an agency to seek conservation through subsidizing another agency at a cost less than they would have to pay had they conserved on their own. Agencies that can conserve more are encouraged to do so and rewarded in profit by those agencies where conservation is more locally cost prohibitive. The BrenSAP alternative allocation system therefore motivates conservation, and provides benefits to both individual agencies and the system as a whole.

The Metropolitan Water District of Southern California service area represents an ideal platform for such a market because its member agencies share a robust and interconnected water infrastructure. Most trades could therefore be reduced to transfers of paper water rights in which conveyance is not a concern, keeping transaction costs low. The BrenSAP assumes that agencies with a surplus would have the

## California Conservation Incentives

### Water Trading Issues

opportunity to sell their surplus. However, the available opportunities for trade and subsequent outcomes are dependent upon a number of conditions, rules, and mechanisms to facilitate transactions. Although exploring the outcomes of different potential market rules is beyond this report, Researchers provide a set of components that would need to be addressed to enable trade among Met member agencies.

#### Necessary water trading determinations include:

- What is being traded: an allocation, purchased water from Met, or delivered water from Met?
- What options are available to an agency with a surplus? Can an agency store surplus water?
- What options are available to an agency with a deficit?
- What is the mechanism for matching buyers and sellers in the market, and who administers transactions?
- What are the price bounds on water for sale on the market?
- How do water and money move after the sale?

### BrenSap Advantages

#### The Case for the Bren System Allocation Plan

From the perspective of conservation, the BrenSAP allocation system provides a number of advantages over the current WSAP used by Met. The BrenSAP encourages conservation, not just in times of drought, but during all supply conditions. As more agencies proactively manage their demand, there is greater potential for Met to avoid instituting a shortage allocation plan, or if they do, reduce the severity of the required reductions.

### Benchmark Uses

The BrenSAP is able to do this because it establishes a static benchmark from which to compare water use over time. The benchmark reflects per capita water use for each agency and allocates a share of Met's total supply accordingly. This provides flexibility to allow for future population growth, and also provides a guide to compare an agency's use with their allocation. If an agency maintains per capita water use, even as population increases, no significant effect occurs. If an agency's per capita water use increases, it will have to reduce demand or find additional water from a source other than Met. If an agency is proactive and reduces per capita water use, it is rewarded with a surplus. In doing so, the agency creates opportunity that did not exist under the WSAP — i.e., the opportunity to better evaluate water use and, if desired, to manage water use through storage or trade. The allocation and any conserved surplus becomes an asset that agencies can incorporate into management decisions. With that asset come options. An agency could potentially use their full allocation, trade a portion for profit, or even store some of it as insurance for future shortages.

### Surplus Trading

Under the BrenSAP, agencies receive enhanced benefits from conservation when they can trade their surplus water to other agencies. In a market, the surplus water is redistributed to those agencies who value it most. Agencies that can afford to conserve will receive an additional incentive from doing so, and those agencies that demand more than their allocation are able to get more water by purchasing it on the market, at costs likely lower than what they would pay under Met's shortage surcharge. The Met service area represents an ideal platform for such a market because its member agencies share an interconnected water infrastructure that allows for low cost exchange. Met also has the information necessary to effectively track transfers and ensure deliveries, and the authority and resources to administer such a program.

### Interagency Opportunities

Providing agencies a claim to their conserved water can provide conservation incentives beyond just the trading among surplus and deficit agencies that result from the allocation. A use right to conserved water creates the opportunity for the agencies to engage with each other to conserve water and meet water demands at a lower cost than would be otherwise possible.

### Conservation Costs

The true cost for an agency to conserve water includes the physical cost of implementing a conservation measure, but also includes the forgone value that could have been derived had water not been conserved at all. Because of this, the cost of conservation across Met member agencies differs. An agency's decision to engage in conservation will depend not only on what conservation opportunities are available, but also how an agency's customers value each unit of water. Under the BrenSAP, the ability for agencies to keep the surplus generated by conservation and trade that portion of their allocation to other agencies allows agencies with high conservation costs to pay agencies with low conservation costs to conserve in exchange for the surplus water. This kind of transaction benefits the high conservation cost agencies because they have the option to meet their water demands or conserve water at a price lower than if they had to pursue conservation on their own, and the transaction benefits the low conservation cost agencies because they can receive payment that exceeds their cost of conservation.

### Drought Vulnerabilities

Both of Met's water sources are vulnerable to shortages brought about by increasingly frequent droughts. When the Colorado River and State Water Project cannot supply enough water to meet demand, Met and its member agencies must seek costly additional supplies. For example, agencies may increase groundwater withdrawals, plan new desalination plants, or purchase water from irrigation districts. In the

## California Conservation Incentives

### Water Market Advantages

### Environmental Benefits

### Complex Variables

### Motivating Conservation

### Market Incentives

short term, Met can pay farmers north of the Delta to fallow their fields, often at a steep price. In the past, Met has been able to offer a high enough price to entice some farmers to sell or lease their water. However, this tactic may be more difficult in the future in California, as premium crops become more prevalent and water prices rise throughout sectors. If this trend continues, Southern California may not be able to rely on Central Valley agriculture for supplemental water as it has in the past.

A market system would also increase the reliability and resilience of the Met system. By reducing system-wide demand, such a system could decrease the frequency of shortages and reduce the duration and severity of shortages when they do occur. This is important because droughts in California are predicted to become more frequent and more severe due to climate change.

Finally, reducing Southern California's need for imported water may include environmental benefits. By providing agencies the ability to generate and sell surpluses, a market system provides opportunities for that water to be purchased or designated for environmental uses. Having more water in surface storage could also provide enhanced riparian habitat. Avoiding the construction of new infrastructure such as desalination plants and aqueducts reduces further degradation of our already sensitive ecosystems.

## CONCLUSION

The BrenSAP allocation system illustrates some of the benefits that could be found in applying a new method for distributing and managing water. However, this process is presently only a rough sketch for what might be done through allocating water to promote conservation. While the BrenSAP presents a conceptual example of how agencies may interact, a more predictive look at the full range of interaction between all Met member agencies is subject to many complex and highly dynamic variables. For instance, the ability of an agency to secure the benefits of their conservation will depend on: that agency's costs of conservation; the other Met member agencies' costs of conservation; the prices of water established by Met; the design of the allocation system; the constraints imposed by the market platform structure and conditions of trade; and, doubtless, other factors.

The BrenSAP is not intended to be "the" solution; rather the goal is to explore the potential for change to occur that would better address increasing demands for water on an increasingly limited supply. The BrenSAP assigns shares to users of a scarce resource. In doing so, the allocations effectively produce winners and losers in terms of how those shares meet the demands of each agency. Therefore the assignment shares, and the opportunities provided to agencies through allocation, would inherently generate debate, especially for those agencies whose allocation is reduced from previous amounts. Adoption of a new system is therefore not only a logistical problem but a political one as well. This is particularly true under Met governance where member agencies themselves have representation and influence in the management of Met water supplies. However, as difficult as the political negotiations might be, it is evident that new and better mechanisms to motivate conservation and efficiently distribute water supplies are needed.

The challenge for Southern California over the next century is to live within its current water supplies even as its population and economy grow. We now find ourselves in a new era of scarcity when water reliability will have to come from better managing our demand. When designing systems to allocate our scarce water supplies, we therefore have to consider the incentives for conservation as a key component. Markets may well be one increasingly important tool for achieving these goals.

### FOR ADDITIONAL INFORMATION:

GARY LIBECAP, Bren School of Environmental Science and Management  
805/ 893-8611 or [glibecap@bren.ucsb.edu](mailto:glibecap@bren.ucsb.edu)

**Gary D. Libecap** is Professor of Corporate Environmental Management, Bren School of Environmental Science and Management and Department of Economics, University of California, Santa Barbara and Research Associate, National Bureau of Economic Research, Cambridge, Massachusetts. His research focuses on the role of property rights and markets in the use of natural resources, including fresh water and fisheries. His most recent book, coauthored with Terry Anderson is *"Environmental Markets: A Property Rights Approach"* (Cambridge University Press, 2014).

# **SMALL SCALE HYDROPOWER & DITCH EASEMENTS**

COLORADO DECISION APPLIES “NO INJURY RULE” AND MAXIMUM USE

by David Moon, Editor

## Ditch Easements

## Hydropower Application

## Ditch Easement

## “Physical Water”

## “Usufructuary” Rights

## No Injury Rule

## Maximizing Use

## Ditch Alterations

In an en banc decision authored by Justice Gregory Hobbs entered on June 1, the Colorado Supreme Court (Court) decided a case of first impression concerning the use of a ditch and water right for small hydropower production. The case involved the owners of an easement for a water ditch and a pre-existing water right objecting to the owners of the property through which the ditch passes obtaining a junior water right for hydropower purposes. The Court framed the case: “[M]ay the land owner whose property is burdened by an easement across his or her property for a water ditch obtain a junior conditional water right at the headgate of that ditch for non-consumptive hydropower use of water that the neighbor is diverting from the stream under a senior water right for irrigation use through that headgate?” *Frees v. Tidd*, 2015 CO 39 – 14SA234 (June 1, 2015), Advance Sheets at 3.

The Court upheld the water court’s declaratory judgment and a conditional water right decree in the amount of 0.41 cubic feet per second (cfs) with a 2010 priority for non-consumptive hydropower use to Charles and Barbara Tidd (Tidds). The case concerned the “dominant” and “servient” interests in property burdened by an easement for a water ditch (i.e., the property is obligated to serve the dominant easement interest). The new water right for hydropower use applied for by the property-owning Tidds utilized the ditch easement of the plaintiffs/appellants (the “Frees”), as well as water flowing in the ditch, to generate hydropower while the water ran through the Tidds’ property (the servient estate). The Frees’ ditch easement is the “dominant estate” at issue.

The Frees asserted that the water court lacked authority to decree this water right to the Tidds over their objection. The objection was based on their ownership of a water right with an 1890 priority that diverts up to 6.4 cfs of water for irrigation use on the Frees’ property. “The Frees own an easement across the Tidds’ property for delivery of the water diverted under their 1890 water right to the Frees’ land. The Frees contend that Colorado water law prevents any other person from appropriating the ‘same physical water as the [Frees] have already appropriated through Garner Creek Ditch No. 1,’ despite the fact that all parties concede that the decree issued by the water court contains sufficient conditions preventing injury to the Frees’ water and ditch rights.” *Id.* at 4.

The Court found that the water court’s decision was supported, in part, by the water law principle that water rights are “usufructuary” rights — i.e., a water rights holder only owns the right to use the water and does not actually own the water itself. “The water court found that water is available for the Tidds’ non-consumptive hydropower use, and the Frees cannot exclude them from that use because the Frees do not own the physical water they divert from Garner Creek. Instead they ‘only own the right to use that water for irrigation purposes.’” *Id.*

The Court also found that the water court had resolved the “differences between these dominant and servient land owner interests. It found that the Tidds have the right to use and make necessary alterations to the Garner Creek Ditch No. 1 to allow them to divert water from it for hydropower purposes so long as such use and alteration does not interfere with the quantity, quality, or timing of the water to be delivered to the [Frees] under their prior water rights. The water court’s decree contains detailed conditions applicable to the construction, operation, and maintenance of the hydropower facility and the measurement of flows through that facility and the ditch necessary to prevent injury to the Frees’ water and ditch rights.” *Id.* at 5. The Court described how the water was diverted from the ditch, piped to the hydropower facility, and then “returned via a discharge pipe to the ditch before the place of use of the Frees’ water right.” *Id.* at 7.

“After observing that the amended application identifies a point of diversion on Garner Creek and noting Colorado’s public policy in favor of maximizing the use of a limited water supply while protecting decreed water rights, the water court found and determined that water is available at the Garner Creek Ditch No. 1 headgate for appropriation by the Tidds for their non-consumptive hydropower use. The parties subsequently crafted terms and conditions for the decree to ensure that the Tidds’ 2010 appropriation will not injure the Frees’ water right.” *Id.*

After discussing applicable Colorado water law, the Court pointed out how the “no injury rule” applies when a ditch easement is concerned. “To apply the water decreed for their hydropower use, the Tidds must first make several alterations to the ditch. In *Roaring Fork Club, L.P. v. St. Jude’s Co.*, we held that the owner of property burdened by a ditch easement has no right to alter an easement without the consent of the benefitted owner unless he or she first obtains a declaration by a court that such alterations will cause no damage to the benefitted owner. 36 P.3d at 1239. The Frees own an easement across the Tidds’ property for the ditch, and therefore the Tidds were required to show that their proposed alterations to the ditch would not injure the Frees’ vested property rights.” *Id.* at 11.

## Ditch Easements

## Water Rights Protection

## Multiple Use Favored

## Small-Scale Hydro Support

In regard to the Frees' assertions concerning the Tidds attempt to use the "same physical water" Justice Hobbs set forth the Court's reasoning: "...the Tidds do not attempt to appropriate the Frees' water right nor change the Frees' water right to allow the Tidds to add a use to the senior right. Instead, the Tidds applied for, and received, a conditional water right to appropriate water from Garner Creek at the ditch headgate for hydropower use. Indeed, the Tidds cannot seek to make changes to the Frees' water right — only the owner of a decreed water right may seek changes to that decree." *Id.* at 12 (citations omitted).

The Court's opinion further explained how Colorado water law views such a situation. "Although the Tidds intend to use the same point of diversion on Garner Creek, and some of the same physical water as the Frees, this is not merely permissible, Colorado water law favors such multiple uses if injury to senior water rights will not occur. *See Nichols v. McIntosh*, 34 P. 278, 279 (Colo. 1893) (observing that the same 'ditch may have two or more priorities belonging to the same party or to different parties'). We conclude the water court did not err in decreeing the non-consumptive, non-injurious, hydropower conditional water right the Tidds sought in this case; it is legally separate and distinct from the Frees' irrigation water right." *Id.* at 12-13.

The Court discusses additional aspects of Colorado water law, including the "can and will" statute and beneficial use that will also be of interest to water practitioners. "Small-scale hydropower projects benefit the public because they offer an alternative source of energy that has generally minimal environmental impacts, diverts less water, is less susceptible to blackout and damage as a result of storms, and does not require the creation of dams or reservoirs because they rely on existing infrastructure. Gina S. Warren, *Hydropower: Time for a Small Makeover*, 24 Ind. Int'l & Comp. L. Rev. 249, 249-50 (2014). In granting the Tidds' non-consumptive conditional water right application, the water court followed Colorado law allowing the public's scarce water resource to be put to multiple beneficial uses while protecting decreed senior water rights." *Id.* at 19-20.

### FOR ADDITIONAL INFORMATION:

Case available at: [www.courts.state.co.us/Courts/Supreme\\_Court/Case\\_Announcements/](http://www.courts.state.co.us/Courts/Supreme_Court/Case_Announcements/)

## WATER BRIEFS

### GROUNDWATER ORDER NV

#### VEGAS WATER APPLICATION

On May 21, the Nevada Supreme Court issued two orders, denying Southern Nevada Water Authority's (SNWA's) and the State Engineer's petitions for "writs of mandamus" — asking the Supreme Court to review an earlier district court decision. That earlier decision imposed a requirement that SNWA must demonstrate and the State Engineer must find conclusively that SNWA's proposed groundwater mining and export operation will be sustainable, and will not cause impermissible impacts on the environment and senior water rights holders. *See Moon, TWR #119* (Jan. 15, 2014). The Supreme Court orders require SNWA and the State Engineer to comply with Judge Estes's order issued December 10, 2013. The 2013 decision by district court Judge Estes also overturned the State Engineer's allocation of some 84,000 acre-feet /year of groundwater in four rural valleys that SNWA planned to pump and pipe to Las Vegas. The two orders just issued by the Nevada Supreme Court are "unpublished" orders, meaning that they cannot be regarded as precedent and are not to be cited as legal authority in other cases.

SNWA issued a statement regarding the decision. "SNWA is disappointed that the Supreme Court denied SNWA's petition for review of Judge Estes' December 13, 2013, decision. Had the Court acted on the petition, it would have heard the merits of the matter at this critical time for the people of Southern Nevada, who rely on the drought-ravaged Colorado River for 90 percent of their water supply. However, the Court's decision is procedural in nature and does not address any substantive issues for the State Engineer. SNWA remains confident that the additional data Judge Estes required can be gathered and presented to the State Engineer so that this unused, available groundwater can be developed for the benefit of two million Nevada citizens in accordance with Nevada water law."

The decision does not end the case. As noted in the Orders, the Supreme Court found that SNWA and the State Engineer have an "adequate remedy in the form of a petition for judicial review, or subsequent appeal, from any adverse decision on remand." Thus, the case goes back on remand to the State Engineer for further proceedings in accordance with Judge Estes' December 2013 decision.

There are several important actions that the State Engineer must comply with on remand, including: undertaking a recalculation of water available for appropriation from Spring Valley to ensure that the basin will reach equilibrium between discharge and recharge in a reasonable time; defining standards, threshold or triggers so that mitigation of unreasonable effects from pumping of water are neither arbitrary nor capricious in Spring Valley, Cave Valley, Dry Lake Valley and Delamar Valley; and recalculating the appropriations from Cave Valley, Dry Lake and Delamar Valley to avoid over appropriations or conflicts with down-gradient, existing water rights. *See December 10, 2013, Slip. Op.* at 23.

**For info:** December 10, 2013 Decision and May 21st Order Denying Petitions available at: <http://greatbasinwaternetwork.org/litigation.htm#65775>

## WATER BRIEFS

**CLEAN WATER ACT****US****CWA JURISDICTION RULE**

On May 27, the US Environmental Protection Agency (EPA) and the US Army issued a finalized Clean Water Rule. According to their press release, the rule ensures that waters protected under the Clean Water Act (CWA) are more precisely defined and predictably determined, making permitting less costly, easier, and faster for businesses and industry.

On June 3, EPA published a new fact sheet that serves as a fact check for some of the common inaccuracies about the Clean Water Rule currently being circulated. The document cites exactly where in the rule and preamble the facts can be found. The rule only protects the types of waters that historically have been covered under the CWA. The rule does not create any new permitting requirements for agriculture and maintains all previous exemptions and exclusions. It does not regulate most ditches and does not regulate groundwater, shallow subsurface flows, or tile drains. It does not make changes to current policies on irrigation or water transfers or apply to erosion in a field. The Clean Water Rule protects waters from pollution and destruction — it does not regulate land use or affect private property rights. These statements are directly supported by the text of the rule and its preamble. *See* [>> Fact Sheets >> Fact Check](http://www2.epa.gov/cleanwaterrule).

EPA noted that about 117 million Americans — one in three people — are get drinking water from streams that lacked clear protection before the Clean Water Rule.”

Protection for many of the nation’s streams and wetlands has been confusing, complex, and time-consuming as the result of Supreme Court decisions in 2001 and 2006 (*Rapanos* and *Carabell* cases). *See* Bricker, *TWR* #29; Walston, *TWR* #30; and MacDougal, *TWR* #47 for additional information. EPA and the Army took action after receiving requests for over a decade from members of Congress, state and local officials, industry, agriculture, environmental groups, scientists, and the public for a rulemaking.

The new rule says that a tributary must show physical features of flowing water — a bed, bank, and ordinary high water mark — to warrant protection. The rule provides protection for headwaters that have these features and

science shows can have a significant connection to downstream waters. The rule protects waters that are next to rivers and lakes and their tributaries because science shows that they impact downstream waters. Science shows that specific water features can function like a system and impact the health of downstream waters. The rule protects prairie potholes, Carolina and Delmarva bays, pocosins, western vernal pools in California, and Texas coastal prairie wetlands when they impact downstream waters. The rule focuses on streams, not ditches: it limits protection to ditches that are constructed out of streams or function like streams and can carry pollution downstream. The rule maintains the status of waters within Municipal Separate Storm Sewer Systems, since it does not change how those waters are treated and encourages the use of green infrastructure. Finally, the press release noted that the rule reduces the use of case-specific analysis of waters when determining if a CWA permit is required. Previously, almost any water could be put through a lengthy case-specific analysis, even if it would not be subject to the Clean Water Act. The rule significantly limits the use of case-specific analysis by creating clarity and certainty on protected waters and limiting the number of similarly situated water features.

**For info:** Robert Daguillard, EPA, 202/ 564-6618 or [daguillard.robert@epa.gov](mailto:daguillard.robert@epa.gov); EPA Rule Website: [www.epa.gov/cleanwaterrule](http://www.epa.gov/cleanwaterrule).

**AQUIFER RECHARGE****NE****FLOOD MITIGATION**

Nebraska is using floodwater management to address drought. The Nebraska Department of Natural Resources (DNR), local natural resources districts (NRDs), and irrigation districts in the Platte River Basin have taken steps to divert floodwaters out of the South Platte, North Platte, and Platte rivers as the water is expected to move into Nebraska from Colorado. These efforts will help to minimize flooding, protect lives and property and benefit future water use, DNR noted in its May 14 press release.

The National Weather Service has issued a warning for flooding along the South Platte River in western Nebraska. The combination of heavy rain in northeast Colorado and snowmelt from the mountains was expected to

engorge the river and cause significant flooding. Since early May, DNR has been in contact with NRDs and irrigation districts discussing logistics and budgets, finalizing agreements, and monitoring river conditions. The agreements allow for coordination regarding timing of the diversions of this flow in an attempt to reduce the peak flows. Diversion of these floodwaters will have the added benefit of recharging the aquifer as these waters seep into the ground beneath the canals and lakes along the South Platte, North Platte, and Platte rivers. Diverting water into the canals allows the water to soak into the bottom of the canal and travel downward through the soil profile into the aquifer. In addition to the canals themselves, flood flows will also be diverted into off channel ponds and reservoirs and water allowed to soak into the ground from those areas. Recharge water is important because it increases the water in aquifer storage and results in an increase of groundwater flow to the stream compared to what would have occurred without the recharge event.

These diversion projects were set up in a very short time frame as Nebraska prepared for the expected high flows. The groundwater recharge benefits will be realized in both the Platte and Republican River basins as this groundwater slowly percolates through the ground into these rivers and their tributaries over time.

These efforts are similar to the diversion of flood waters along the Platte River in 2011 and in 2013 by DNR, NRDs, and irrigation districts, which provided significant flood mitigation and aquifer recharge benefits at that time. The 2011 flooding diversion efforts included 23 participating irrigation districts and five participating NRDs which resulted in diverting more than 77,000 acre-feet (AF) in spring and 67,000 AF in fall. The estimated 10-year accumulation of streamflows to the Platte River resulting from the 2011 recharge is more than 15,000 AF. The 2013 flooding diversions included seven participating irrigation districts and four participating NRDs, which resulted in diverting more than 44,000 AF in fall. The estimated 10-year benefit to the Platte River from that recharge event is 5,600 AF.

**For info:** Jen Rae Wang, DNR, 402/ 416-0739 or [jenrae.wang@nebraska.gov](mailto:jenrae.wang@nebraska.gov)

## WATER BRIEFS

**COLORADO RIVER WEST  
“MOVING FORWARD” REPORT**

On May 12, the US Bureau of Reclamation (Reclamation) and Basin stakeholders released the *Moving Forward Phase 1 Report*, which documents opportunities and potential actions to address future water supply and demand imbalances projected in the 2012 Colorado River Basin Water Supply and Demand Study (Basin Study). The *Phase 1 Report*, funded jointly by Reclamation and the seven Colorado River Basin States, is part of the Colorado River Basin Study Moving Forward effort launched in May of 2013. The Moving Forward program is an effort by the Department of the Interior and stakeholders throughout the Basin to respond in a coordinated and collaborative manner in identifying and implementing actions that address projected water supply and demand imbalances, have broad-based support, and provide a wide range of benefits.

The *Phase 1 Report* notes the importance of the Colorado River for the West: “Today, between 35 and 40 million people rely on the Colorado River and its tributaries for some, if not all, of their municipal water needs. These same water sources irrigate nearly 4.5 million acres of land in the Basin and the adjacent areas that receive Colorado River water, generating many billions of dollars a year in agricultural and economic benefits. There are 22 federally recognized tribes in the Basin for whom the Colorado River and its tributaries are essential as a physical, economic, and cultural resource. The Colorado River and its tributaries provide habitat for a wide range of species and flows through seven national wildlife refuges and 11 National Park Service units; and provide a range of recreational opportunities which add significant benefits to regional economies. Hydropower facilities in the Basin can supply more than 4,200 megawatts of vitally important electrical capacity to assist in meeting the power needs of western states, reducing the use of fossil fuels. In addition, the Colorado River is vital to the United Mexican States (Mexico).” *Report*, Executive Summary, page 1.

A potential future water supply shortfall in the Colorado River Basin compels action. “The Basin Study confirmed that, absent future action, the Basin faces a wide range of plausible future long-term imbalances between

supply and demand. This imbalance, computed as a 10-year running average, ranges from no imbalance to 6.8 million acre-feet (MAF) with a median of 3.2 MAF in 2060.” *Id.* at 3.

In Moving Forward Phase 1, over 100 stakeholders spanning all water use sectors engaged in three workgroups focused on water use efficiency (urban and agricultural) and environmental and recreational flows. The Phase 1 Report describes the activities of the workgroups during the approximately 18-month long Phase 1 and includes a chapter contributed by each workgroup.

Twenty-five opportunities were identified by the workgroups. Similar components resulting from each workgroup’s individual set of findings include opportunities related to funding and incentives, data and tools, outreach and partnerships, coordination and integration, infrastructure improvements, and flexible water management. Building from the *Phase 1 Report*, Phase 2 of the Moving Forward effort will be underway later this year and includes the selection and implementation of several pilot projects.

Comments on the report are encouraged and may be directed until approximately August 12th to: [ColoradoRiverBasinStudy@usbr.gov](mailto:ColoradoRiverBasinStudy@usbr.gov); 702/ 293-8500; or fax: 702/ 293-8418. A public webinar will be offered to present an overview of the *Phase 1 Report*, with the date and time for the webinar announced in the near future. For any water user or practitioner based in the Colorado River Basin the *Phase 1 Report* and Basin Study provide essential information.

**For info:** *Phase 1 Report* and additional information available at: [www.usbr.gov/lc/region/programs/crbstudy/MovingForward](http://www.usbr.gov/lc/region/programs/crbstudy/MovingForward)

**FISH PASSAGE WA  
AWARD FOR INNOVATION**

Tacoma Power in Tacoma, Washington, received its fourth straight “Outstanding Stewards of America’s Waters Award” from the National Hydropower Association on April 28th. The award, for Recreational, Environmental & Historical Enhancement, honors a pioneering fish passage project at Little Falls on the North Fork Skokomish River.

The latest project was part of Tacoma Power’s hydroelectric program on the North Fork of the Skokomish River, which came about as part of a

2009 settlement with the Skokomish Tribe. While adjustments have made to the dams on the river to allow for improved fish passage, a natural feature called Little Falls, two miles downstream from Cushman Dam No. 2, was too steep for fish to pass. The flow of the river at Little Falls is divided into two channels, both of which were previously identified as barriers to fish.

Tacoma Power collaborated with the Skokomish Indian Tribe and regulatory agencies to carve fish ladders into existing bedrock and conceptualize potential future modifications using innovative construction techniques. The project eases fish passage, preserves the beauty of the culturally significant location and helps secure salmon and steelhead populations. Both channels at Little Falls are now open to fish passage.

**For info:** Tacoma Power, [www.mytpu.org/tacomapower/fish-wildlife-environment/cushman-hydro-project/](http://www.mytpu.org/tacomapower/fish-wildlife-environment/cushman-hydro-project/)

**DAM REMOVAL US  
USGS STUDY**

On May 1, the journal *Science* announced a study entitled *1000 Dams Down and Counting* by J.E. O’Connor, J.J. Duda, and G.E. Grant, of the United States Geological Survey (USGS). Since [1975], dams have been taken down in increasing numbers as they have filled with sediment, become unsafe or inefficient, or otherwise outlived their usefulness... Last year’s removals of the 64-m-high Glines Canyon Dam and the 32-m-high Elwha Dam in northwestern Washington State were among the largest yet, releasing over 10 million cubic meters of stored sediment. Published studies conducted in conjunction with about 100 U.S. dam removals and at least 26 removals outside the United States are now providing detailed insights into how rivers respond.” *1000 Dams and Counting*, excerpt.

The USGS has also compiled a database which is the result of an extensive literature search aimed at identifying documents relevant to the emerging field of dam removal science. In total, the database contains 179 citations that contain empirical monitoring information associated with 130 different dam removals across the United States and abroad. Data includes publications through 2014 and supplemented with the US Army Corps of Engineers National Inventory of

## WATER BRIEFS

Dams database, USGS National Water Information System, and aerial photos to estimate locations when coordinates were not provided.

**For info:** Study available at: [www.sciencemag.org/content/348/6234/496](http://www.sciencemag.org/content/348/6234/496); Database at: [www.sciencebase.gov/catalog/item/55071bf9e4b02e76d757c076](http://www.sciencebase.gov/catalog/item/55071bf9e4b02e76d757c076)

### CONSERVATION PROGRAM CA MET PROGRAM EXPANSION

Facing unprecedented drought, the Board of Directors of the Metropolitan Water District of Southern California (Met) on May 26th approved the nation's largest turf removal and water conservation program. Over the next decade the program is expected to generate enough water savings to save about 80 million gallons of water a day for Southern California, or enough water for 160,000 households. The significant expansion of the turf removal component is expected to remove about 175 million square feet of lawn — more than tripling Gov. Jerry Brown's goal for the entire state.

Met's board at a special meeting added \$350 million to the district's conservation budget for a new total of \$450 million over two years. Together with local rebate programs of more than \$50 million, the total regional investment will be more than half a billion dollars and using existing revenues will be done without impacting water rates.

Met's board also modified the agency's turf removal program to ensure rebates continue to be available to homeowners, businesses, and public agencies during the drought. Program changes establish rebate tiers based on the amount of turf being removed, with the intent of reaching as many residents and businesses as possible. The program changes will allow more households throughout the region to access funding, reaching up to more than 400,000 consumers. In addition, funding will be specifically set aside for water efficient devices to ensure customers who live in multifamily housing and represent about half of Southern Californians also will have access to rebates.

Met has paid out more than \$88 million of the \$100 million in its previous conservation budget. Public

interest in water-saving rebates, primarily turf removal incentives, continues to set records. Earlier in May, Met reached a new weekly record of \$49 million for conservation rebate reservations. Met's turf removal program currently has requests for more than 100 million square feet, the equivalent of about 60,000 front yards. Since Gov. Brown's April 1 executive order to reduce statewide residential water use by 25 percent, monthly applications have increased 20-fold to up to 10,000 applications.

Under changes to the turf program, residential customers can receive \$2/square foot for up to 3,000 square feet of turf removed or as much as \$6,000. About 90 percent of residential rebate requests are for less than 3,000 square feet. Many local agencies provide additional incentives that can increase the funds available to homeowners.

Public agencies are eligible for an incentive of \$2/square foot for the first 3,000 square feet and \$1/square foot of turf removed above that, up to a total annual limit of \$50,000 per property. Commercial and other non-residential applicants are eligible for a turf removal incentive of \$1/square foot up to a total annual limit of \$25,000 per property. About 85 percent of commercial applications are for 25,000 square-feet or less.

**For info:** Bob Muir, Met, 213/ 217-6930 or [bewaterwise.com](http://bewaterwise.com)

### ALGAL TOXINS

US

#### EPA HEALTH ADVISORIES

On May 5, EPA issued health advisory values that states and utilities can use to protect Americans from elevated levels of algal toxins in drinking water. Algal blooms in rivers, lakes, and bays sometimes produce harmful toxins. Because utilities often use these water bodies as sources of drinking water, EPA has determined algal toxin levels in tap water that are protective of human health based on the best available science. EPA is also recommending how utilities can monitor and treat drinking water for algal toxins and notify the public if drinking water exceeds protective levels.

EPA will issue the final documents containing the health advisory values, recommended monitoring and treatment

approaches, and all supporting technical information before summer — which is the prime season for algal blooms because of warmer temperatures.

Health advisories are not regulations, but provide technical guidance to help state and local officials and managers of water systems protect public health. They identify concentrations of contaminants above which adverse health effects are possible and provide testing methods and treatment techniques.

The health advisory values for algal toxins recommend 0.3 micrograms per liter for microcystin and 0.7 micrograms per liter for cylindrospermopsin as levels not to be exceeded in drinking water for children younger than school age. For all other ages, the health advisory values for drinking water are 1.6 micrograms per liter for microcystin and 3.0 micrograms per liter for cylindrospermopsin. Potential health effects from longer exposure to higher levels of algal toxins in drinking water include gastroenteritis and liver and kidney damage.

Nutrient pollution of water is one of America's most widespread, costly and challenging environmental problems, caused by excess nitrogen and phosphorus in the air and water. More than 100,000 miles of rivers and streams, close to 2.5 million acres of lakes, reservoirs and ponds, and more than 800 square miles of bays and estuaries in the United States have poor water quality because of nitrogen and phosphorus pollution. Harmful algal blooms can also create dead zones in water, killing aquatic life, raising treatment costs for drinking water, and hurting businesses and jobs that depend on clean water.

EPA recently announced it is developing an early warning indicator system using historical and current satellite data to detect algal blooms. EPA researchers will develop a mobile application to inform water quality managers of changes in water quality using satellite data on cyanobacteria algal blooms from three partnering agencies — NASA, NOAA, and USGS.

#### **For info:**

Algal blooms: [www2.epa.gov/nutrient-policy-data/cyanohabs](http://www2.epa.gov/nutrient-policy-data/cyanohabs)  
Nutrient pollution: [www2.epa.gov/nutrientpollution](http://www2.epa.gov/nutrientpollution)

<b>June 15-16</b> <b>GA</b> <b>Municipal Wet Weather Stormwater Conference, Atlanta.</b> Holiday Inn Atlanta-Perimeter. Presented by EPA Region 4 & the Southeast Chapter of the Int'l Erosion Control Ass'n Region One. For info: <a href="http://www.ieca.org/conference/roadshow/atlantams4.asp">www.ieca.org/conference/roadshow/atlantams4.asp</a>	<b>June 22-23</b> <b>CA</b> <b>Tribal Environmental Quality Protection Seminar, Cabazon.</b> Morongo Casino Resort. For info: Law Seminars Int'l, 800/ 854-8009, <a href="mailto:registrar@lawseminars.com">registrar@lawseminars.com</a> or <a href="http://www.lawseminars.com">www.lawseminars.com</a>	<b>June 25</b> <b>DC</b> <b>Basics of the Clean Water Act Brownbag, Washington.</b> Environmental Law Institute, 1730 M Street NW, Ste. 700. WEBINAR also. For info: <a href="http://www.eli.org">www.eli.org</a>	<b>July 16-18</b> <b>AK</b> <b>Rocky Mt. Mineral Law Foundation 61st Annual Institute, Anchorage.</b> Dena'ina Convention Ctr. For info: <a href="http://www.rmmlf.org">www.rmmlf.org</a>
<b>June 15-16</b> <b>CA</b> <b>2015 California Water Law &amp; Policy MCLE Conference, San Francisco.</b> Hotel Nikko. For info: <a href="http://www.bbklaw.com/?t=40&amp;an=38936">www.bbklaw.com/?t=40&amp;an=38936</a>	<b>June 22-23</b> <b>ID</b> <b>IWUA Summer Water Law &amp; Resource Issues Seminar, Sun Valley.</b> Presented by Idaho Water Users Ass'n. For info: <a href="http://www.iwua.org/">www.iwua.org/</a>	<b>June 25</b> <b>TX</b> <b>Environmental Flows Standards Stakeholder Meeting, Austin.</b> TCEQ's Complex, 12100 Park Thirty-Five Circle, Bldg. E, Room 201, 10:00am. Presented by TCEQ. For info: Dr. Kathy Alexander, TCEQ, 512/ 239-0778, <a href="mailto:kathy.alexander@tceq.texas.gov">kathy.alexander@tceq.texas.gov</a> or <a href="http://www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/eflows/rulemaking">www.tceq.texas.gov/permitting/water_rights/wr_technical-resources/eflows/rulemaking</a>	<b>July 20</b> <b>CA</b> <b>Municipal Water Utility Ratemaking Seminar, Sacramento.</b> Courtyard Marriott Midtown. For info: Law Seminars Int'l, 800/ 854-8009, <a href="mailto:registrar@lawseminars.com">registrar@lawseminars.com</a> or <a href="http://www.lawseminars.com">www.lawseminars.com</a>
<b>June 15-17</b> <b>LA</b> <b>AWRA 2015 Summer Specialty Conference on Climate Change Adaptation, New Orleans.</b> Hyatt Regency French Quarter. Presented by American Water Resources Ass'n. For info: <a href="http://www.awra.org">www.awra.org</a>	<b>June 23</b> <b>WEB</b> <b>Drought &amp; Water Markets: Water Pricing &amp; Market Strategies for Coping with Drought Conditions Webinar, WEB.</b> 1pm-2:30pm Eastern time. Presented by WestWater Research. For info: <a href="http://www.informationforecastnet.com/email/Droughts-Panelists.html">www.informationforecastnet.com/email/Droughts-Panelists.html</a>	<b>June 30</b> <b>DC</b> <b>Hazardous Waste &amp; Sites Brownbag, Washington.</b> Environmental Law Institute, 1730 M Street NW, Ste. 700. WEBINAR also. For info: <a href="http://www.eli.org">www.eli.org</a>	<b>July 22-24</b> <b>OR</b> <b>Oregon Assoc. of Clean Water Agencies Annual Conference, Bend.</b> Mt. Bachelor Village Resort. For info: <a href="http://www.oracwa.org">www.oracwa.org</a>
<b>June 16</b> <b>DC</b> <b>Critical Oil Pollution Issues: Transportation, Spills, Cleanup &amp; Damages Brownbag Seminar, Washington.</b> Squire Patton Boggs, 2550 M Street, NW, Patton Conference Ctr. Presented by Environmental Law Institute. Register by June 12. For info: <a href="http://www.eli.org/">www.eli.org/</a>	<b>June 23-24</b> <b>OR</b> <b>Extreme Events &amp; Climate Adaptation Planning, Free EPA Workshop for the Water Utility Sector, Portland.</b> Portland State University, Smith Memorial Student Union, Room 238. For info: Michael Cox, EPA, <a href="mailto:Cox.Michael@epa.gov">Cox.Michael@epa.gov</a> ; EPA Climate Ready Water Utilities website: <a href="http://www.epa.gov/climatereadyutilities">www.epa.gov/climatereadyutilities</a>	<b>July 8</b> <b>TX</b> <b>Dam Safety Workshop, Kilgore.</b> Devall Student Ctr., 8am-2pm. Presented by TCEQ. For info: <a href="http://www.tceq.texas.gov/p2/events/dam-safety.html">www.tceq.texas.gov/p2/events/dam-safety.html</a>	<b>July 26-29</b> <b>NC</b> <b>70th Annual SWCS International Conference: Coming Home to Conservation - Putting Science Into Practice, Greensboro.</b> Sheraton Four Seasons Hotel. Presented by the Soil & Water Conservation Society. For info: <a href="http://www.swcs.org/en/conferences/2015_annual_conference/">www.swcs.org/en/conferences/2015_annual_conference/</a>
<b>June 16-18</b> <b>NV</b> <b>Water Is Not for Gambling: Utilizing Science to Reduce Uncertainty - 2015 UCOWR Conference, Las Vegas.</b> Green Valley Ranch. Presented by Universities Council on Water Resources. For info: <a href="http://acwi.gov/ACWI-features-box/UCOWR_2015_call_for_abstracts.pdf">http://acwi.gov/ACWI-features-box/UCOWR_2015_call_for_abstracts.pdf</a>	<b>June 24-26</b> <b>NV</b> <b>Western Governors' Association Annual Meeting, Lake Tahoe.</b> For info: <a href="http://www.westgov.org/">www.westgov.org/</a>	<b>July 8-10</b> <b>NV</b> <b>Summer (178th) Council Meeting &amp; WSWC 50th Anniversary, Lake Tahoe.</b> Hard Rock Hotel & Casino. For info: Western States Water Council, <a href="http://www.westernstateswater.org/summer-178th-council-meeting-50th-anniversary-commemoration/">www.westernstateswater.org/summer-178th-council-meeting-50th-anniversary-commemoration/</a>	<b>July 27-28</b> <b>WA</b> <b>Washington Water Law Seminar, Seattle.</b> Courtyard Pioneer Square. For info: Law Seminars Int'l, 800/ 854-8009, <a href="mailto:registrar@lawseminars.com">registrar@lawseminars.com</a> or <a href="http://www.lawseminars.com">www.lawseminars.com</a>
<b>June 16-19</b> <b>NV</b> <b>The New MODFLOW Course: Theory &amp; Hands-On Applications Course, Las Vegas.</b> The Orleans Hotel. Presented by Nat'l Groundwater Ass'n. For info: <a href="http://www.ngwa.org/Events-Education/shortcourses/Pages/258jun15.aspx">www.ngwa.org/Events-Education/shortcourses/Pages/258jun15.aspx</a>	<b>June 25</b> <b>TX</b> <b>Dam Safety Workshop, Austin.</b> J.J. Pickle Center Austin, 8am-2pm. Presented by TCEQ. For info: <a href="http://www.tceq.texas.gov/p2/events/dam-safety.html">www.tceq.texas.gov/p2/events/dam-safety.html</a>	<b>July 15</b> <b>NM</b> <b>Hydrology and the Law Seminar, Santa Fe.</b> La Fonda Hotel. For info: Law Seminars Int'l, 800/ 854-8009, <a href="mailto:registrar@lawseminars.com">registrar@lawseminars.com</a> or <a href="http://www.lawseminars.com">www.lawseminars.com</a>	<b>August 4-6</b> <b>CA</b> <b>Western Water Seminar, Monterey.</b> Hyatt Regency Monterey. Presented by National Water Resources Ass'n. For info: <a href="http://www.nwra.org/upcoming-conferences-workshops.html">www.nwra.org/upcoming-conferences-workshops.html</a>
	<b>June 24-26</b> <b>CA</b> <b>Bay-Delta Tour 2015, Bay Delta.</b> Presented by Water Education Foundation. For info: <a href="http://www.watereducation.org/tour/bay-delta-tour-2015">www.watereducation.org/tour/bay-delta-tour-2015</a>	<b>July 16-17</b> <b>NM</b> <b>Natural Resources Damages Seminar, Santa Fe.</b> La Fonda Hotel. For info: Law Seminars Int'l, 800/ 854-8009, <a href="mailto:registrar@lawseminars.com">registrar@lawseminars.com</a> or <a href="http://www.lawseminars.com">www.lawseminars.com</a>	<b>August 11</b> <b>Utah</b> <b>Snowpack Monitoring for Streamflow Forecasting &amp; Drought Planning Workshop, West Jordan.</b> Jordan Valley Water Conservancy District's Conservation Garden Park Education Center; RSVP to Tim Bardsley, 801/ 524-5130 x336 or <a href="mailto:www.bardsley@gmail.com">www.bardsley@gmail.com</a> . For info: <a href="http://www.colorado.edu">http://www.colorado.edu</a>



260 N. Polk Street • Eugene, OR 97402

PRSRT STD  
US POSTAGE  
PAID  
EUGENE, OR  
PERMIT NO. 921

## CALENDAR

(continued from previous page)

### **August 13** **CA**

**Sustainable Erosion Control: Effective Best of the BMPs Course, Sacramento.** Sutter Square Galleria Center, 2901 K Street. For info: UC Davis Extension, <https://extension.ucdavis.edu/section/sustainable-erosion-control-effective-best-bmps>

### **August 14** **CA**

**Habitat Conservation Planning Course, Sacramento.** Sutter Square Galleria Center, 2901 K Street. For info: UC Davis Extension, <https://extension.ucdavis.edu/section/habitat-conservation-planning>

### **August 17-19** **CA**

**Smart H2O Summit: Focus on Technology Solutions to Water Crisis, San Francisco.** Marriott Marquis. For info: [www.smarth2osummit.com/](http://www.smarth2osummit.com/)

### **August 18-21** **SC**

**Environmental Awareness Bootcamp, Hilton Head.** Holiday Inn Resort Beach House. Presented by EPA Alliance Training Group. For info: [www.epaalliance.com/environmentalbootcamp-aug15.html](http://www.epaalliance.com/environmentalbootcamp-aug15.html)

### **August 19-21** **SC**

**SPCC & Stormwater Compliance Workshop, Hilton Head.** Holiday Inn Resort Beach House. Presented by EPA Alliance Training Group. For info: [www.epaalliance.com/spccstormwaterworkshop-aug15.html](http://www.epaalliance.com/spccstormwaterworkshop-aug15.html)

### **August 19-21** **CO**

**Colorado Water Congress Summer Conference, Vail.** Vail Cascade Resort. For info: [www.cowatercongress.org/cwc\\_events/Summer\\_Conference.aspx](http://www.cowatercongress.org/cwc_events/Summer_Conference.aspx)

### **August 20-21** **AZ**

**Arizona Water Law Conference, Scottsdale.** Camelback Golf Club. For info: CLE Int'l, 800/873-7130 or [www.cle.com](http://www.cle.com)

### **August 27** **WY**

**Snowpack Monitoring for Streamflow Forecasting & Drought Planning Workshop, Lander.** The Inn at Lander. Presented by Western Water Assessment, National Integrated Drought Information System, Wyoming State Engineer's Office, Wyoming Water Ass'n & University of Wyoming Water Resources Data System. RSVP to Matt Hoobler, 307/ 777-7641 or [Matt.Hoobler@wyo.gov](mailto:Matt.Hoobler@wyo.gov) For info: <http://www.colorado.edu>

### **August 27** **CA**

**Wetlands Regulation & Mitigation Course, Sacramento.** Sutter Square Galleria Center, 2901 K Street. For info: UC Davis Extension, <https://extension.ucdavis.edu/section/wetlands-regulation-and-mitigation>

### **August 28-29** **CA**

**DesalTech 2015 International Conference: Innovative Research & Approaches for Seawater & Brackish Water Desalination, San Diego.** San Diego Convention Ctr. For info: [www.desaltech2015.com/](http://www.desaltech2015.com/)

### **September 9** **CO**

**Snowpack Monitoring for Streamflow Forecasting & Drought Planning Workshop, Broomfield.** RSVP to Jeff Lukas, 303/ 735-2698 or [lukas@colorado.edu](mailto:lukas@colorado.edu). Presented by Western Water Assessment, National Integrated Drought Information System, Colorado Basin River Forecast Center, Natural Resources Conservation Service Colorado Snow Survey & Colorado Water Conservation Board. For info: <http://www.colorado.edu>