



# The Water Report™

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

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## WATER BANKING IN THE WEST

WHERE DOES WASHINGTON STATE FIT

by Dan Haller, Principal, Aspect Consulting (Yakima, WA)

### Summary

While limited water banking was first authorized in Washington state (Washington) in 1989, it was seldom used until the last 15 years. That time period has been marked by a rapid increase in the number of water banks operating in Washington, fueled by regulatory changes that have influenced the market on the demand side, and new funding and regulatory direction that have influenced the supply side market.

This article:

- Provides summaries of water banking and water banking seeding options
- Examines how Washington compares to other western states' water banking efforts
- Describes barriers to banking in Washington
- Provides an update on changes in Washington that are facilitating the boom in banking

Key conclusions of this article are:

- Washington banks currently operate on a much smaller scale than other states
- Washington currently applies most of its banking energy to the smallest users in the state
- Geologic and administrative barriers exist that are likely to constrain water banking opportunities in the future
- Recent Legislative changes have incentivized water banking, including:
  - Revised Code of Washington (RCW) 90.90 (2006): Created Ecology's Office of Columbia River (OCR) with a water supply mission and the first large-scale state-focused water bank efforts
  - SB 6179 (2016): Required Washington State Department of Ecology (Ecology) to maintain comprehensive water banking information online to increase price and transaction transparency
  - ESSB 6091 (2018): Created mitigation obligations which drives demand for banking and a \$300-million dollar program in part to fund water supply projects

### Water Banking 101

The traditional definition for water banking is an institutional mechanism used to facilitate the legal transfer and market exchange of water. However, the term "water banking" is used to refer to a variety of water management practices that extend beyond the traditional definition. In Washington, there are many types of "water banks"—although some do not use that title directly. Irrespective of the name, the general goal is to move water in time and space to new users who could not otherwise access it, or to existing users who might otherwise be curtailed in response to priority "calls." [Editor's Note: in a priority call, a senior water user "calls" for regulation of junior users such that the senior user obtains *all* of their water right.]

## Water Banks

### Trust Program

### Overview

### Legislation Objectives

### The Water Report

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Water banking is facilitated by an institution (the water bank) that operates as a broker, clearinghouse, or market-maker. Generally, a water bank sets the rules of water bank operations, determines which rights can be banked, certifies water quantities entering and leaving banks, sets terms and prices, and facilitates the regulatory requirements (Figure 1). In Washington, water banks typically use Ecology's Trust Water Right Program (Trust Program), which is authorized in RCW 90.38 and RCW 90.42 and allows the State to hold water rights for themselves or on behalf of others, and to perform water banking functions with those held assets. When holding water rights for others, a contract called a Trust Water Right Agreement (TWRA) between Ecology and the original owner typically clarifies how water can be banked.

**Figure 1: Water Banking Overview**



The overall goal of a water bank is to facilitate water transfers using market forces. In Washington, the Legislature has identified objectives of water banking in RCW 90.42.100, which include:

- Making water supplies available when and where needed during times of drought;
- Improving streamflows and preserving instream values during fish critical periods;
- Reducing water transaction costs, time, and risk to purchaser;
- Facilitating fair and efficient reallocation of water from one beneficial use to another;
- Providing water supplies to offset impacts related to future development and the issues of new water rights; and
- Facilitating water agreements that protect upstream community values while retaining flexibility to meet critical downstream water needs in times of scarcity.

### Overview of Washington Water Banks

To date, water banks in Washington have operated under four general operational structures. Selection of the type of model depends on the regulatory environment, timing of regulatory action and water bank need, and how Ecology and Washington Counties have historically implemented standards for legal and physical availability of water.

Operational structures in Washington State include:

**PUBLIC:** Public entities for the purpose of this section are considered to be State, County, City, or other local governments. Many public entities in the State operate water banks.

**QUASI-GOVERNMENT:** Quasi-government organizations are considered to be entities formed by the legislature (i.e., Irrigation Districts, Walla Walla Watershed Management Partnership).

**NONGOVERNMENTAL ORGANIZATIONS (NGOs):** Nongovernmental Organizations (NGOs) are entities operating under IRS tax code Section 501(c)(3) (e.g. Washington Water Trust).

**PRIVATE:** Private entities are considered to be private for-profit organizations incorporated under State and Federal Law.

There are approximately 33 water banks in Washington (Figure 2).

### Water Bank Metrics

Water banks transact quantities of water for a variety of purposes — from groundwater use under Washington's permit exemption of generally less than one acre-foot (i.e., indoor and outdoor domestic use for a single residence) to permitted water rights in the tens, hundreds, or thousands of acre-feet (i.e., irrigation, industrial and municipal uses). For example, one transaction from a private water bank in Kittitas County conveyed 0.137 acre-feet per year (consumptive) for indoor domestic use and irrigation of 500 square feet. Another transaction from OCR for the Sullivan Lake Water Bank conveyed 1,100 acre-feet per year to the City of Bridgeport as a new water right permit for municipal use.



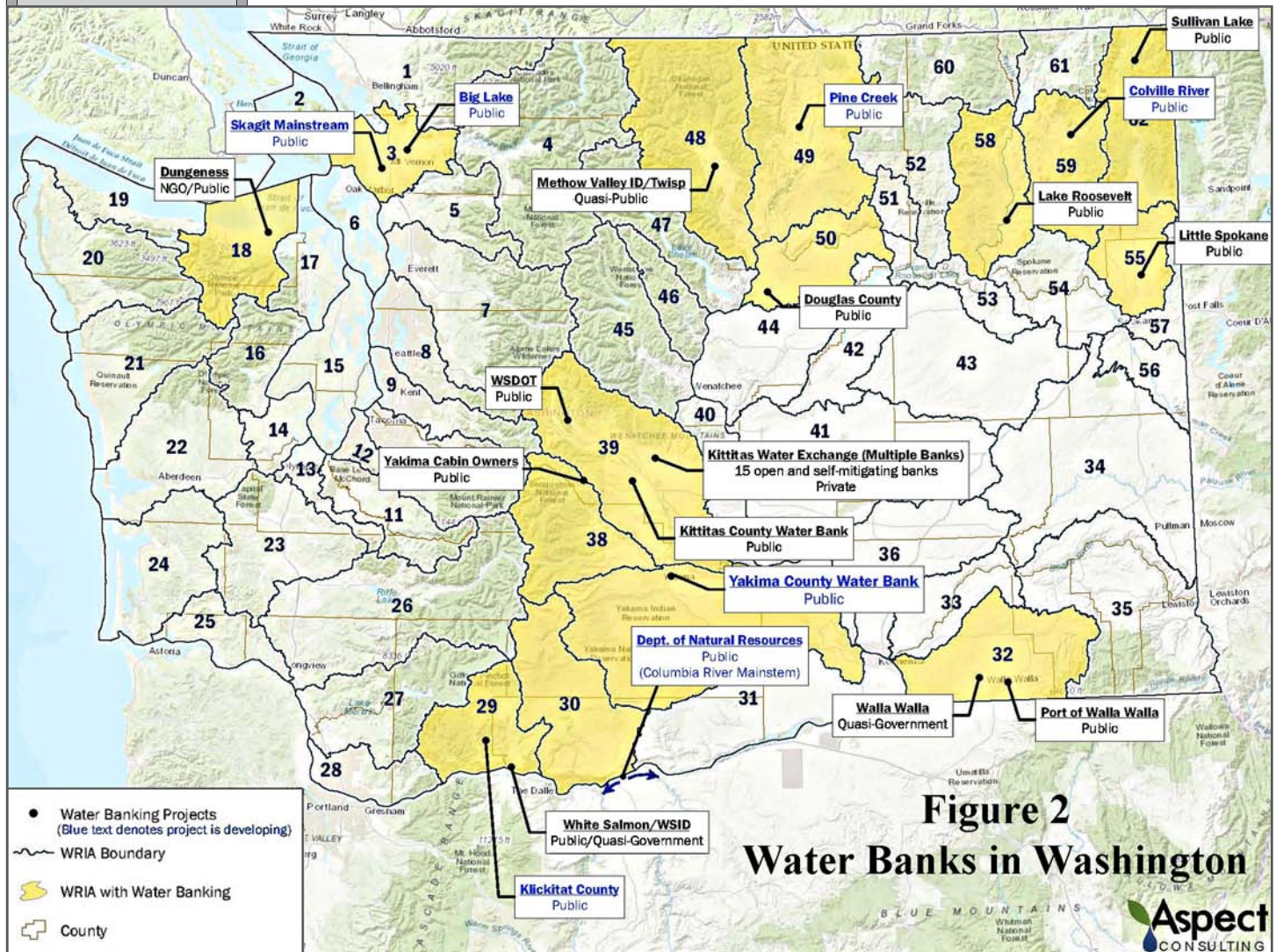
## Water Banks

### Suitability Maps

### Consumptive Metric

In Washington, there are three primary factors that help illuminate water bank metrics. This information is generally tracked on Ecology's website ([see https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-rights/Trust-water-rights/Water-banks/Tracking-water-banks](https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-rights/Trust-water-rights/Water-banks/Tracking-water-banks)).

- **What geographic area does the bank operate in?** These are typically defined by "suitability maps" which include the geographic boundary of the bank, with areas illuminated in green (suitable), red (unsuitable), and yellow (additional information required in some areas). The suitability of a bank to sell or lease water in that area is heavily influenced by geology and how Ecology manages water to protect senior water rights in that location.
- **How does the bank measure its supply?** Water banks in Washington typically use either acre-feet or acre-feet consumptive to measure and transact supplies. Acre-feet is the traditional volume measurement for water rights in Washington, while acre-feet consumptive refers to that portion of the use that historically was consumed (e.g., evapotranspired) and not returned to waters of the State. Because impairment to senior water rights typically occurs as a result of consumptive uses, most banks in Washington operate on the consumptive metric. Consumptive use under a water bank is measured from total use (either metered or estimated) along with "return flow" credits adopted in Ecology rule or guidance documents (e.g. 70% to 90% return flow credit for indoor use when served by a septic tank).

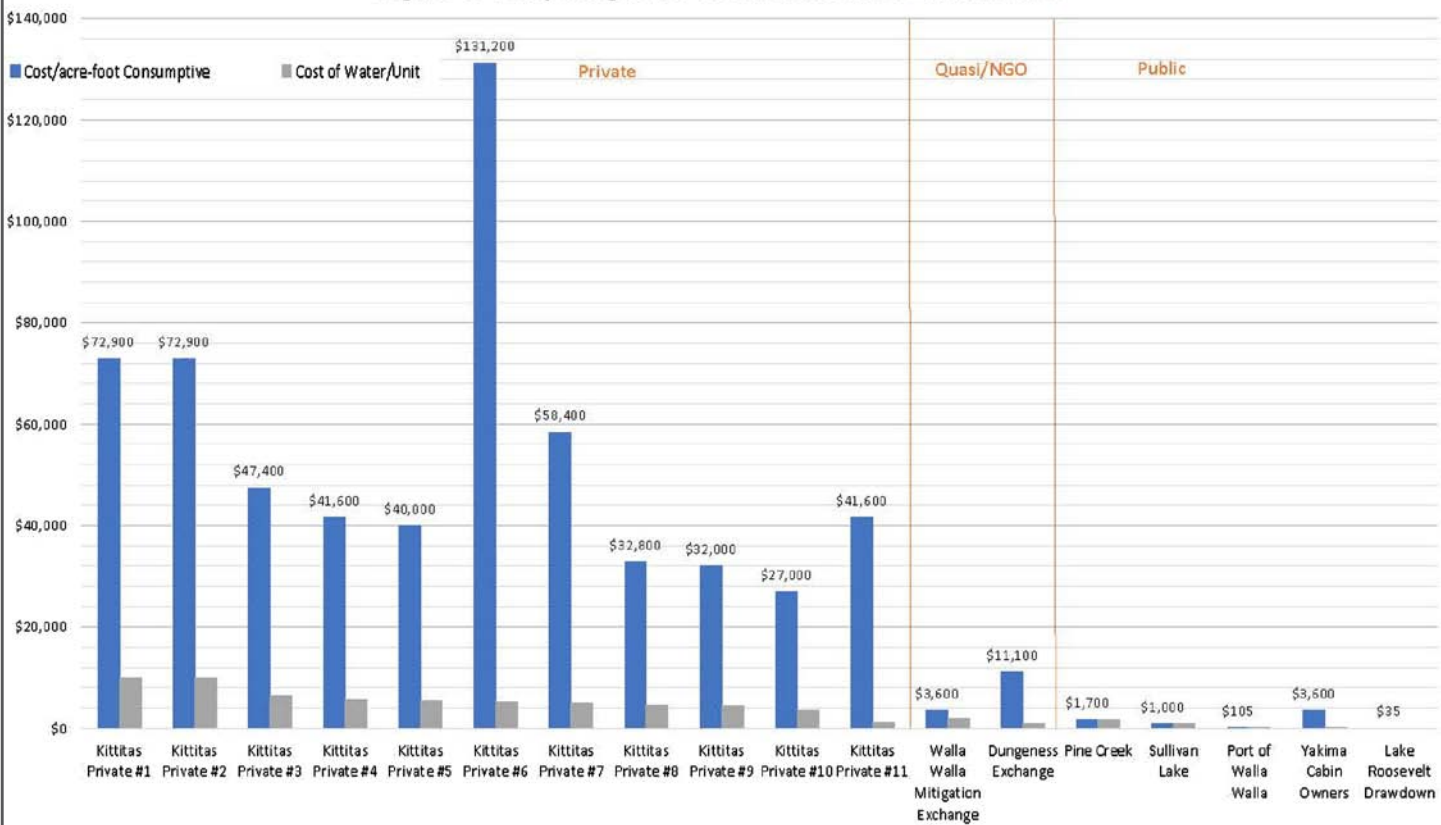


Water Banks

Price Drivers

• **How much does the bank charge?** Price, or the amount of money paid for one unit, as well as volume of units transacted is highly variable between water banking models, as shown in Figure 3 (Ecology et al., 2016). This figure contains data through 2015 from the 2016 Water Supply and Demand Forecast (Ecology, OCR, Washington State University (WSU), University of Utah (UU), Aspect). More recent price data is available on Ecology’s website (*see* For Additional Information, below). The banker (e.g. public, private, NGO) has historically influenced price points significantly. The presence/absence of a regulatory imperative (e.g., a closure of groundwater that *requires* mitigation) has also been a significant driver in the price of water.

Figure 3. Comparing Price of Different Water Bank Models



Water Bank Seeding

There are two primary types of water availability that drive water bank seeding: physical availability and legal availability. Some water banks make water physically available from their supply for withdrawal/diversion. These are infrastructure models of water bank seeding, which includes groundwater storage, surface storage, conservation, and pump exchanges. Other water banks address legal availability so a new diversion/withdrawal will not impair another user, thereby allowing the new use to be permitted. These water banks are generally seeded through retirements of senior water rights.

Physical Availability Water Bank Seeding Example in Washington

An example of a water bank that supplies physical water is the Lake Roosevelt Incremental Storage Release Project from OCR. For this bank, water is made physically available for use by storing and releasing water from Lake Roosevelt behind Grand Coulee Dam under a cooperative agreement with the United States Bureau of Reclamation (Reclamation). *See* Figure 4. Individual users who desire water from this bank must enter into a water service contract with OCR and obtain a permit to use water with an annual mitigation fee of \$35/acre-foot/year (*see* <https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-supply-projects-EW>). All the users from this bank physically access some of the water that is released, although there is some flexibility on the timing of releases relative to the timing of diversions, which are intended to maximize fish benefit in the Columbia River rather than offset water strictly in-time and in-place.

Water Availability

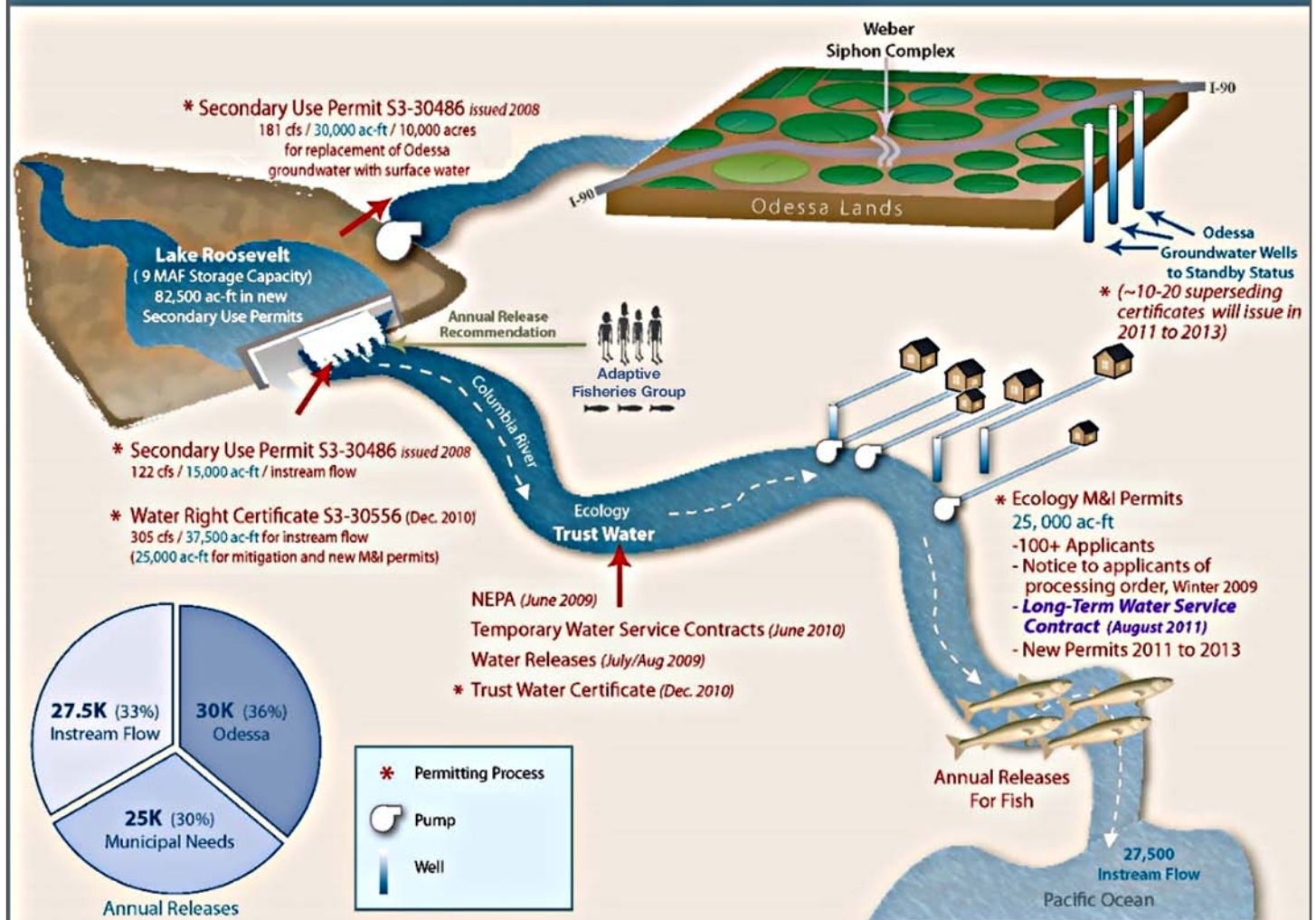
Physical Access

Timing of Releases



**Figure 4: Lake Roosevelt Water Bank (Ecology)**

### Lake Roosevelt Incremental Storage Releases Permitting Process & Timeline



#### Legal Availability Water Bank Seeding Example in Washington

Examples of banks trying to solve legal availability issues include Yakima Basin water banks in Central Washington. In the Yakima Basin, Reclamation withdrew all unappropriated water on May 10, 1905 for the development of several irrigation projects. Because of this withdrawal, any new use in the Yakima basin must be water budget neutral with respect to the Yakima Basin's total water supply available (TWSA), as measured at a gaging station on the Yakima River near Parker (labeled PARW on Figure 5; see [www.usbr.gov/pn/hydromet/yakima/yaktea.html](http://www.usbr.gov/pn/hydromet/yakima/yaktea.html)).

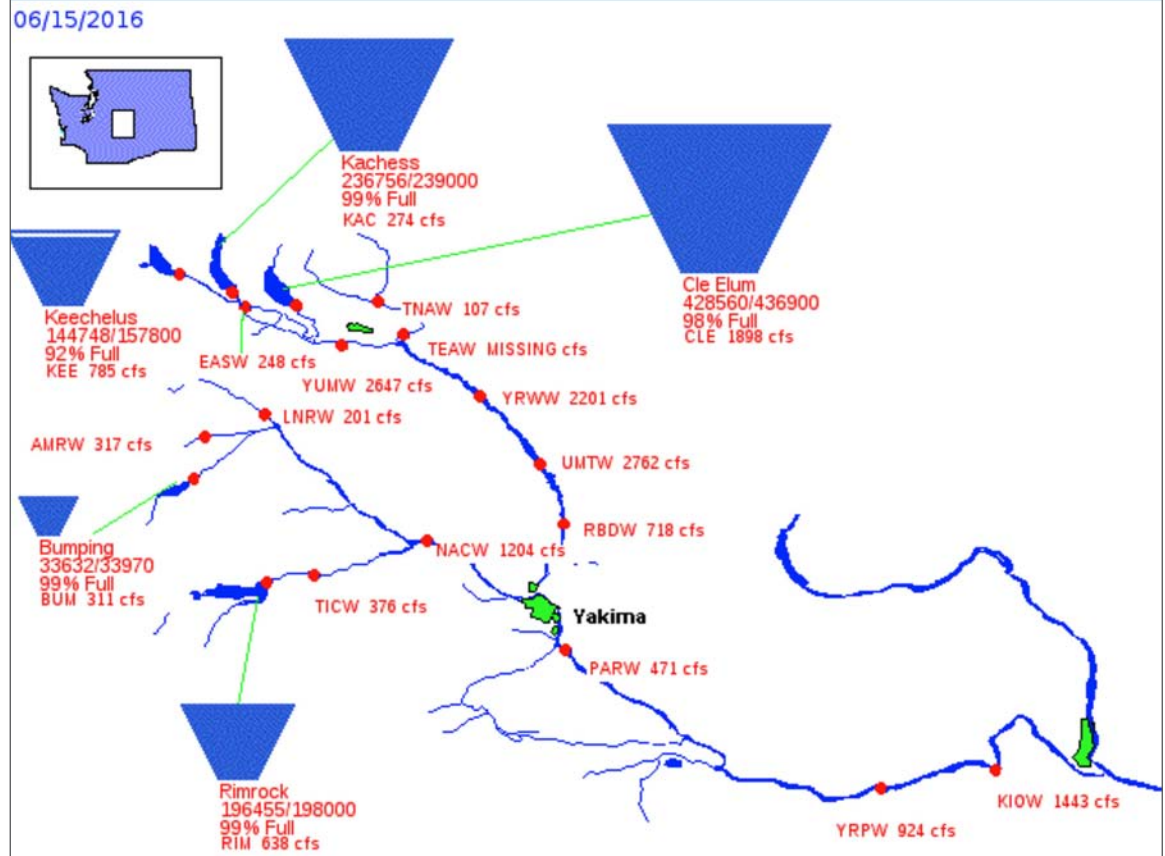
TWSA neutrality prevents impairment of senior water rights in the basin. To meet this requirement, water rights have been placed into Ecology's Trust Program to offset new uses and ensure TWSA is not impacted at Parker. However, new uses are not necessarily coupled to the banked water in a way that ensures physical access to the water in the bank. In this example, it can be possible to mitigate for impacts to other water users, address legal availability of water, and not physically divert any of the banked water. As shown in Figure 5 (next page), water is released from five reservoirs to meet downstream water right holders' diversionary rights and instream flow targets adopted by Congress for the basin.

**Legal  
Availability**

**Prevent  
Impairment**

## Water Banks

Figure 5: Water Banking in the Yakima Basin



## Bank Types

## Primary Water Bank Categories in Washington

Water banks in Washington can be roughly grouped into four main categories:

- 1) State-Run water banks developed under a water supply mandate
- 2) Open customer public and private banks to mitigate for exempt uses
- 3) Open customer public or private banks to mitigate for non-exempt uses
- 4) Closed customer public and private banks to solve a discrete local or regional issue

## State Water Bank Examples

The Office of Columbia River (OCR) was created in 2006 to develop water supply projects for both instream and out-of-stream uses. They have been very successful, developing over 410,000 acre-feet in water supply projects through 2017 (*see* <https://fortress.wa.gov/ecy/publications/documents/1812001.pdf>). Examples of State Water Banks include:

- Lake Roosevelt Incremental Storage Release: Reoperation of Grand Coulee Dam making 82,500 acre-feet available for municipal use, instream flow use, and source exchange for Odessa-area farmers dependent on declining groundwater supplies, plus 50,000 acre-feet in drought years for instream flow and mitigation of interruptible users on the Columbia River (*see* Figure 4).
- Sullivan Lake Project: Reoperation of 14,000 acre-feet for new users in six northeastern counties in Washington, at an annual cost of \$60 acre-foot/year for 25 years.
- Cabin Owners Water Bank: Retirement of water rights totaling 57 acre-feet to mitigate for hundreds of cabin owners in the greater Yakima basin in Central Washington. These water rights rely on springs that are junior to senior adjudicated water rights and have been ordered to curtail during droughts since 2001. Water costs are \$3,643/acre-foot consumptive plus processing fees. However, these cabins are: typically seasonal; located on US Forest Service lease land with no outdoor irrigation allowed; and the bank runs on consumptive use with a credit for septic tank return flow — therefore, each cabin only uses a fraction of a consumptive acre-foot with a proportionally lower price.

## Water Supply Projects

## Reservoir Reoperations

## Retirement of Water Rights

<b>Water Banks</b>	<b>Open Customer Permit Exempt-Use Bank Examples</b>
<b>Exempt Wells</b>	<p>A combination of Washington State Supreme Court cases, groundwater closures, and changing interpretations on long-standing Ecology-adopted instream flow rules from approximately 2000 to present created increasing regulatory pressure to mitigate for permit-exempt wells. Exempt wells in Washington historically could use 5,000 gallons per day (gpd), plus ½ acre of lawn, plus 5,000 gpd for industrial use, and unlimited quantities of water for stockwatering. Kittitas County became the focal point for new mitigation requirements around these small uses in 2009 when Ecology adopted a groundwater closure (WAC 173-539A) and both private and public water banks were established:</p>
<b>Groundwater Closure</b>	<ul style="list-style-type: none"> <li>• Private Kittitas County Water Banks: Private water banks were the first to fill the void in Kittitas County in response to the groundwater closure in the late 2000's. More than a dozen still operate (see Figures 2 and 3 for location and price information, and Ecology trust website for current transaction details).</li> <li>• Kittitas County Water Bank: Kittitas County founded a public water bank in 2015 in response to concerns that private water banks fees were too high and to support its mission to provide a minimum safe and reliable supply of water for county residents (see <a href="http://www.co.kittitas.wa.us/health/services/water-banking-building-permits.aspx">www.co.kittitas.wa.us/health/services/water-banking-building-permits.aspx</a>). The County spent several million dollars acquiring senior water rights and enrolling them in the Ecology Trust Program. This action created a water supply for the next 20 years of growth and “back-mitigating” for historic exempt groundwater uses that could be at risk from future curtailment.</li> </ul>
<b>Public Bank</b>	
<b>Surplus Water Portfolio</b>	<b>Open Customer Permitted-Use Bank Example</b>
	<p>Exempt-use mitigation banks have dominated Washington water banking for the last 10 years because of the strong regulatory imperative that has forced demand. In recent years, some non-State banks have emerged to supply larger non-exempt uses either on a temporary or permanent basis.</p>
	<ul style="list-style-type: none"> <li>• Public Water Banks: The City of White Salmon, City of Mabton, Klickitat Public Utility District, and White Salmon Irrigation District all recently created water banks based on surplus water in their water right portfolios. Lease options in the hundreds to thousands of acre-feet are available. These types of banks mark a growing trend in Washington where public entities are trying to leverage their existing water right assets — reserved for long-term growth — for temporary financial gain to offset water right acquisition costs.</li> </ul>
<b>Relinquishment Exemption</b>	<b>Closed Customer Water Banks Example</b>
	<p>Water banking laws in Washington are often more advantageous than traditional transfers of water under the Prior Appropriation Doctrine in Washington. Trust Program rights are exempt from relinquishment for non-use. Also, the method for quantification of trust water rights can result in greater transferrable quantities because certain statutory calculations around consumptive use (e.g. the “annual consumptive use” formula required under RCW 90.03.380 for transfers) have an averaging component, whereas water banking typically does not. As a result, some banks have formed to serve only the membership of their group (e.g., irrigation district members).</p>
<b>Upgrading Project</b>	For example:
	<ul style="list-style-type: none"> <li>• Methow Valley Irrigation District (MVID)/Twisp/OCR: This \$10M+ project led by Trout Unlimited upgraded the MVID canal system to modern piping and well diversions instead of surface diversions that were impacting the Twisp River. Surplus water was banked with expanded irrigation supplies, improved instream flow, and a portion sold to the Town of Twisp through the creation of a water bank. The only bank customers that can utilize this water are members of MVID and Twisp.</li> </ul>
<b>Other States' Water Banks</b>	<b>How Washington's Water Banking System Compares to Other Western States</b>
	<p>In the <i>OCR 2016 Water Supply and Demand Forecast</i>, a comparison of Western States water banks was completed (see <a href="https://fortress.wa.gov/ecy/publications/SummaryPages/1612001.html">https://fortress.wa.gov/ecy/publications/SummaryPages/1612001.html</a>). Table 1 (next page) summarizes some of the key attributes of these water banks. In general, several contrasting themes are evident compared to Washington Water Banks:</p>
	<ol style="list-style-type: none"> <li>1) Banked volumes are orders of magnitude larger than in Washington.</li> <li>2) Bank seeding largely operates on physical availability rather than retiring existing water rights.</li> <li>3) Agricultural users and large municipal users are the primary bank customer, whereas in Washington small rural uses are the most common customers.</li> </ol>



Water Banks	Table 1: Out-of-State Banking Examples			
	State	Date Began	Summary and Seeding	Water Bank Activity/Capacity/Users
	Arizona (Drought Bank)	1996	Provides long-term supply security in-state (100-year supply) and interstate banking. Seeded from Central Arizona Project water. Operates by issuing storage credits from groundwater storage that can later be redeemed in times of shortages.	Through 2014, Arizona banked 4M acre-feet of long term storage credits; 3.4M acre-feet to provide back-up supplies during shortages to Arizona cities and Indian communities, and 600,000 acre-feet for interstate purposes for Nevada
	California	1980s	Provides groundwater supplies to balance physical water availability. In water rich years, water is injected or recharged into aquifers, and then pumped out in water short years.	Examples: Semi-Tropic Water Bank – 1.65M acre-foot capacity; 90K acre-feet recovery capacity Kern Water Bank – 1.5M acre-foot storage capacity, 240K recovery capacity
	Idaho (Water Supply Bank)	1979	Lease-based water transaction program based on temporary land following	250,000 acre-feet leased into the Water Supply Bank
	Oregon (Deschutes Conservancy)	2003	Lease-based and permanent water transaction program	From 2003-2012, leases ranged from 500 to 3,700 acre-feet and transfers up to 3,000 acre-feet
	Southern Nevada Water Bank	1991	Groundwater storage for future use and drought resiliency	As of 2015, 337,000 acre-feet of water stored in Southern Nevada Water Bank
States' Banks Comparison	Texas	1993	Water right transfer based program from sales or leases managed by Texas Water Development Board	Deposits: 545 acre-feet through 2015. Requests: 14,320 acre-feet through 2015
	<p align="center"><b>Constraints on Washington State Water Banking</b></p> <p>There are a several issues that constrain Washington's water banking system relative to other Western States. These include: geologic differences; historical focus on rural uses; the complex legal framework of Washington water law; water quality standards for ASR projects; and administrative barriers such as lack of regulatory funding.</p> <p><b>Geologic Issues</b></p> <p>Other Western States have been able to bank hundreds of thousands of acre-feet of water primarily through groundwater storage projects via shallow aquifer recharge (SAR) or aquifer storage and recovery (ASR). The structural and stratigraphic geologic environment of ASR and SAR sites is key to their success and the volumes that can be banked. ASR projects fundamentally depend on achieving suitable retention of the water injected for storage for an appropriate period. SAR projects rely on having relatively high permeability materials from the surface to the water table to allow adequate infiltration.</p> <p>In the typical situation for applications of ASR and SAR, water collected during times of winter and spring abundance should remain in storage and be recoverable at least until it can be withdrawn and used in the dry summer and fall months or in drought years. In the case of streamflow augmentation, water would be retained with appropriate lag times to later discharge to surface water during low flow periods. Containment for ASR relies on having geologic conditions that isolate, at least in part, the aquifer used for storage, such as by faulting or by stratigraphic changes.</p>			
	<p><b>Constraints</b></p> <p><b>Water Retention</b></p> <p><b>Adequate Infiltration</b></p>			



<b>Water Banks</b>	<p>The geology of Washington State poses challenges for identifying suitable geologic environments for ASR relative to other Western States. This is particularly true in the Quaternary glacial deposits of the Puget Sound area, where structural isolation due to faulting is limited and aquifers tend to have significant hydraulic connection with surface water. In Eastern Washington, the Columbia River Basalt Group does have examples of suitable structural isolation or stratigraphic conditions, such as in the White Salmon and Walla Walla areas, where ASR is being implemented or pursued. However, this has not typically been suitable for large-scale SAR, given that the aquifers are focused in flowtop zones between successive lava flows, with substantial thicknesses of low permeability material in between. Water percolating from ground surface will not readily supply the target aquifers. Of the ASR and SAR facilities existing in Washington, stored volumes are on the order of only hundreds to thousands of acre-feet compared to many times that amount in other Western States.</p>
<b>Hydraulic Connection</b>	
<b>Stored Volumes</b>	<p><b>Washington's Historical Focus on Rural Uses</b></p> <p>Demand for water from a water bank influences the development of supply. In Washington, the focus over the last decade has been very small exempt uses for domestic supply. While collectively, they can have an impact on the water budget, the consumptive use of a stand-alone exempt well (e.g., under 5,000 gpd) is very small. For example, the Kittitas County water bank sells two packages: 275 gpd for indoor use and 300 gpd for indoor use plus 500 square feet of landscaping. When return flow credits for septic tank recharge are applied, this ranges from 0.092 to 0.126 acre-feet per residence. With this kind of demand per transaction, retirements of a small senior irrigation right can serve a large number of residences. In contrast, water bank customers in other Western States are municipal and agricultural in nature, necessitating much larger volumes of water to serve.</p>
<b>Demand Influences Supply</b>	<p><b>Washington's Historical Legal Framework</b></p> <p>Until the passage of ESSB 6091 in 2018, a series of Washington State Supreme Court cases clarified that impairment of existing uses had to be evaluated in-time, in-place, and in-kind. <i>See e.g., Postema v. Pollution Control Hearings Board</i>, 11 P.3d 726 (2000); <i>Swinomish v. Ecology</i>, 178 Wn.2d 571, 311 P.3d 6 (2013); <i>Foster v. Dept. of Ecology, City of Yelm and WA PCHB</i>, Case No. 90386-7 (2015); <i>Foster v. Yelm</i>, 362 P.3d 959 (2015); and <i>Whatcom County v. Hirst, Futurewise et al.</i>, Case No. 91475-3, 381 P.3d 1 (2016).</p> <p>An impairment determination — especially with respect to adopted minimum instream flows to protect aquatic habitat — could be made based on modeled or predicted impacts to stream flows regardless of whether the impacts would be measurable in the system. The so-called “one-molecule” impact standard for impairment of instream flows made it very challenging for water banks to serve demand because the mitigation bar was set very high, as illuminated in the <i>Foster</i> Supreme Court decision in Washington in 2015. For example, while there is general acceptance in Washington that mitigation should focus on times that correspond to limiting factors for fish (e.g., summer/early fall), there are times in the spring and winter when adopted instream flows are not met in certain water years. Therefore, an irrigation water right with a season of use from April to October that is retired may not be suitable to mitigate for a year-round domestic use, <i>even if</i>:</p> <ul style="list-style-type: none"> <li>• The use or impacts from the use is small (no such thing as de minimis impairment);</li> <li>• The impacted time period is outside the fish-critical time period (in-kind, in-place standard); or</li> <li>• The total and consumptive use retired is equal to the mitigated amounts (annual time-step is not sufficient).</li> </ul>
<b>Domestic Supply</b>	
<b>Impairment Standard</b>	
<b>“One-Molecule” Impact</b>	
<b>Quality Issues</b>	<p><b>Regulatory Barriers – Water Quality Standards for ASR in Washington State</b></p> <p>Some states have had greater success in utilizing ASR to seed water banks because of regulation differences in each state. Permitting of ASR projects for water storage and banking in Washington require compliance with the state groundwater quality standards under Chapter 173-200 WAC. These standards include numerical criteria for chemical constituents that the source water must meet before it can be stored in a groundwater aquifer, and further includes an antidegradation policy (WAC 173-200-030) that states in part:</p>
<b>Antidegradation Policy</b>	<p>(c) Whenever groundwaters are of a higher quality than the criteria assigned for said waters, the existing water quality shall be protected, and contaminants that will reduce the existing quality thereof shall not be allowed to enter such waters, except in those instances where it can be demonstrated to the department's satisfaction that:</p> <ul style="list-style-type: none"> <li>(i) An overriding consideration of the public interest will be served; and</li> <li>(ii) All contaminants proposed for entry into said groundwaters shall be provided with all known, available, and reasonable methods of prevention, control, and treatment prior to entry.</li> </ul>

<b>Water Banks</b>	<p>Compliance with Washington’s antidegradation policy can increase the cost and time required to permit an ASR project — with less certainty over the ultimate outcome — which has acted as a barrier to some utilities fully embracing ASR. As an example, municipal drinking waters routinely contain <b>disinfection byproducts (DBPs)</b> resulting from treatment (chlorination) necessary to meet US Environmental Protection Agency (EPA) and state Department of Health treatment requirements. Since native groundwater does not typically contain DBPs, the antidegradation standard is frequently triggered for ASR projects using municipal source waters. Under Washington regulations, the mere presence of detectable DBPs in the source water requires additional engineering analysis, regardless of whether the concentrations of DBPs meet numerical drinking water or groundwater quality standards.</p>
<b>Municipal Source</b>	<p>This approach contrasts with states like Oregon, where water quality requirements for ASR are based on protecting the highest beneficial use of the aquifer, typically as a drinking water source. The rule for permitting ASR projects is contained in Chapter 690-350 Oregon Administrative Rule (OAR). In Chapter 690-350-0010(6)(b), Oregon requires that the permittee “minimize, to the extent technically feasible, practical and cost-effective, the concentration of constituents in the injection source water that are not naturally present in the aquifer.” However, under 690-350-0010(6)(e), water containing DBPs associated with treatment of source water may be injected at concentrations up to the federal <b>maximum contaminant levels (MCLs)</b> for drinking water.</p>
<b>Oregon Requirement Contrast</b>	<p><b>Administrative Barriers</b></p>
<b>Agency Responsibilities</b>	<p>The cost of forming, permitting, and managing a water bank can be very large. For example, under the traditional water bank framework in Washington, Ecology’s responsibilities for a new water bank could include:</p> <ul style="list-style-type: none"> <li>• Transferring an existing water right to the Trust Program or issuing a new water right for a waters supply project</li> <li>• Negotiating a Trust Water Agreement describing how the bank will operate</li> <li>• Permitting or assisting in bank transactions out of the bank</li> <li>• Tracking and reporting bank performance to the public and Legislature and ensuring the bank is following the Trust Water Agreement</li> <li>• Using State Water Masters to track trust quantities and ensure the mitigation supply is left instream and not diverted by others</li> <li>• Potentially acting as a funder in certain water banks where a public interest is served (e.g. instream flow)</li> </ul>
<b>Ecology Budget</b>	<p>Ecology’s annual budget from the Legislature directs its staff resources. In the last ten years, demands from water banking have outpaced Ecology’s ability to meet all these obligations. As such, Ecology has had to make decisions around prioritization of work that at times is a constraint on water bank transactions and the ability of new water banks to fulfill emerging demand. A future fee structure for water bank activities could help Ecology keep pace with increasing demand for water bank support (Ecology et al, 2016).</p>
<b>Hirst Fix</b>	<p><b>Recent Washington State Water Banking Developments</b></p> <p>A number of recent developments in legislation, new water supply projects, and improved public transparency for water transactions have improved the outlook for Washington State’s water banking future.</p> <p><b>The 2018 “Hirst Fix”</b></p> <p>In January 2018, the Washington State House and Senate passed ESSB 6091 to address legal water availability issues for exempt well users stemming from the landmark <i>Whatcom County v. Hirst</i> case. As Chris Pitre wrote in the March 2018 issue of <i>The Water Report</i> #169, the main takeaways of ESSB 6091 were:</p>
<b>Out-of-Kind Mitigation</b>	<p>“Part 1: Building Applications &amp; Exempt Wells (“Hirst Fix”) — Building applications utilizing wells filed prior to passage of ESSB 6091 may be approved. Newer applications may be approved with some additional requirements (e.g., fees and more stringent water use caps) until modified instream flow rules are in place as developed under Part 2.</p> <p>Part 2: Instream Flow Rule Updates — Processes are established to amend existing instream flow.</p> <p>Part 3: Stream Flow Enhancement (“Foster Fix”) — A Task Force is convened to recommend options for out-of-kind mitigation of instream flow impacts from new water right allocations.”</p>
<b>Mitigation Fee Program</b>	<p>The two most important elements of this new law in Washington relative to water banking are first, a mitigation fee program will allow aggregation of funds to solve larger problems that affect limiting factors for fish instead of each party attempting to mitigate for often immeasurable impacts. Second, the pilot strategy to evaluate changes to the in-kind, in-time, in-place, one-molecule standard is underway.</p> <p>There are examples in Washington where this has already been in place for several years, and seeing the Legislature begin to embrace these principles statewide is a strong move forward. For example, recall</p>



<div data-bbox="120 176 339 216"><b>Water Banks</b></div> <div data-bbox="115 256 347 323"><b>Conservation Fee Projects</b></div> <div data-bbox="128 533 332 636"><b>Net Environmental Benefits</b></div> <div data-bbox="157 779 303 846"><b>Mitigation Solutions</b></div> <div data-bbox="173 989 287 1056"><b>Alluvial Storage</b></div> <div data-bbox="146 1409 315 1440"><b>Data Details</b></div> <div data-bbox="120 1724 341 1791"><b>Supply Program Success</b></div>	<p>that in the Yakima Basin water banking is governed by total water supply available (TWSA) as measured at Parker Dam and by impairment to senior water rights. While retiring senior irrigation water rights to offset new domestic uses satisfies regional TWSA requirements, it alone cannot offset impairment during the non-irrigation season in tributaries to the Yakima River. To address this mitigation timing issue, basin stakeholders developed a conservation fee approach. In the Teanaway Basin (a tributary to the Yakima River near Ellensburg), water banking for domestic or other year-round uses requires paying into a conservation fund. This is required by Ecology and Kittitas County for issuing building permits in that area. The conservation fund is then used to develop projects throughout the Teanaway Basin that: improve the quality and quantity of anadromous fish habitat; improve the riparian gallery forest; retime water through improved bank storage; and improve the ecological function of the watershed.</p> <p><b>New Pilot Water Supply/Banking Projects</b></p> <p>Additionally, Pitre pointed to the potential of pilot projects to help overcome the <i>Foster</i> decisions standard of one molecule, in time, in kind, in place barrier at the City of Port Orchard, City of Sumner, City of Yelm, Spanaway Water Company, and Bertrand Watershed Improvement District. Some of these candidates already have well-developed alternative mitigation plans. The City of Yelm was the subject of the <i>Foster</i> case, and processing of their application under this new law (“<i>Hirst Fix</i>” - ESSB 6091) is expected to consist of resubmitting their application supported by the original report of examination that was overturned by the Court. Ecology is empowered by this act to make allocation decisions for these five projects on the minimum basis of providing net environmental benefits.</p> <p>In addition to these official “<i>Foster</i> pilots,” Counties are exploring other means of creating and reporting on mitigation solutions that can ultimately lead to new legislation clarifying mitigation standards in Washington that do not have the historic chilling effect on water banks that current law does. For example, Kittitas County has a conservation fee program countywide for those that seek water from their bank which is being used to continue to expand bank service in areas where mitigation is likely to be required to address local impairment instead of regional TWSA impairment. Kittitas County is also exploring mitigation projects that could parallel the program in the Teanaway Basin (see above).</p> <p>Chelan County and Natural Systems Design also recently constructed an experimental alluvial water storage project on Poison Creek near Cashmere, Washington. This included construction and permitting of an engineered wood structure across the creek to: slow streamflow; raise in-channel and subsurface water elevations; and promote sediment deposition. The resulting retention of water is expected to increase instream flows into the dry season through a natural release of water from the subsurface sediments. This retiming of water supply in a rural setting could also be used as mitigation for localized impacts. Armed with new information from the <i>Foster</i> Pilots and county-led mitigation pilots, the Washington State Legislature should be in a better position to undertake further changes to State law to incentivize water banking.</p> <p><b>Improving Transparency in Public Forums</b></p> <p>The Legislature was concerned that details on booming water bank transactions were not being tracked and that costs were not transparent to the marketplace or to policy-makers trying to shape future water legislation. In 2016, the Legislature passed SSB 6179, which included transparency measures such as directing Ecology to track the following information on their website:</p> <ul style="list-style-type: none"> <li>• The amount charged for mitigation, including any fees</li> <li>• Priority date of the water rights made available for mitigation</li> <li>• Geographic areas in the state where mitigated permits may be issued</li> <li>• The processes utilized by a water bank to obtain approval to use the water rights as mitigation for new water uses</li> <li>• The nature of the ownership interest in the mitigation being sold to landowners</li> <li>• Mitigation recording on the title</li> </ul> <p>The passing of SB 6179 has resulted in the enactment of RCW 90.42.130.</p> <p><b>OCR Mission</b></p> <p>The most successful supply program in Washington to influence water markets is the Office of Columbia River (OCR). In 2006, Ecology OCR was directed to: “aggressively pursue the development of water supplies to benefit both instream and out-of-stream uses” (RCW 90.90.005). In addition to directly creating water supplies (over 410,000 acre-feet) and creating multiple state water banks (e.g. Lake Roosevelt, Sullivan Lake), OCR has helped partner with, fund, and co-develop regional watershed restoration activities that have water markets as part of an integrated water solution (e.g. Yakima Integrated Plan at: <a href="https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-supply-projects-EW/Yakima-River-Basin-projects/Yakima-integrated-plan">https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-supply-projects-EW/Yakima-River-Basin-projects/Yakima-integrated-plan</a> (see also Malloch &amp; Garrity, <i>TWR</i> #135); and Icicle Strategy at: <a href="http://www.co.chelan.wa.us/natural-resources/pages/icicle-work-group?parent=Planning">www.co.chelan.wa.us/natural-resources/pages/icicle-work-group?parent=Planning</a> (see also Kaputa, <i>TWR</i> #162)).</p>
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**Water Banks****Funding**

Although in 2016 OCR reached the end of its initial \$200M bond authorization, it continues to be supported annually in the Washington State Legislature with additional water supply funding, including options to support existing and new storage, conservation and pump exchanges, and water markets. Having a supply-side champion has helped Washington meet the regulatory, administrative, and physical demand-side influence of the last decade (e.g. climate change, population growth).

**Conclusion****WATER BANKING IS STILL DEVELOPING IN WASHINGTON STATE**

Water banking in Washington State is relatively new and its adoption has been challenged by geologic barriers as well as administrative and funding barriers. Geologic conditions in other states allow orders of magnitude more water to be stored compared to Washington. The regulatory environment for ASR-based water bank models is also friendlier in other states compared to Washington, which increases the likelihood that this type of physical bank seeding will be used.

Funding barriers at the agency level are not unique to Washington. However, because the focus of Washington water banks has and continues to be lots of transactions on small rural uses of water, the staff requirements to track, manage, evaluate, and report such transactions are disproportionately greater than other states where a different focus exists.

Progress is being made in Washington on water banking. An agency with a water supply development focus including water banking does exist (OCR). Uncertainty in the market has been removed through transparency standards making market transactions, costs, and availability clearer to the public and affected stakeholders. And in 2018, pent up demand for water supply solutions has increased legislative focus via ESSB 6091 to find global aggregate solutions over single small mitigation solutions, which helps position water banking as a critical mitigation tool in Washington State's future.

**Challenges****Mitigation Tool****Acknowledgments**

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Ecology's water banks website:

<https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-rights/Trust-water-rights/Water-banks>

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- 2016 Columbia River Basin Long-Term Water Supply and Demand Forecast (Ecology, OCR, WSU, UU, Aspect), <https://fortress.wa.gov/ecy/publications/SummaryPages/1612001.html>
- 2017 Columbia River Basin Annual Water Supply Inventory Report: <https://fortress.wa.gov/ecy/publications/documents/1812001.pdf>
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- Postema v. Pollution Control Hearings Board (2000), Swinomish v. Ecology (2013), Foster v. Ecology (2015), Whatcom v. Hirst (2016).

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## Nonpoint Sources Program

# NONPOINT SOURCES MANAGEMENT

NEW MEXICO'S NONPOINT SOURCE MANAGEMENT PROGRAM

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&

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### Introduction

The majority of water quality impairments identified in New Mexico's streams and rivers continues to be due to nonpoint sources of water pollution. Nonpoint source (NPS) pollution can be directly related to land use practices on a broad geographic scale. It is generally caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up natural and human-caused pollutants, which are deposited into rivers, lakes, wetlands and ground water. In New Mexico, nonpoint sources of pollution include, but are not limited to: agriculture; construction activities; grazing; malfunctioning septic systems; recreational activities; resource extraction; riparian habitat modification; roads; silviculture/forest management; streamflow modification; and stormwater runoff from developed areas.

### NPS Management Program

The New Mexico Environment Department's (NMED's) NPS Management Program is designed as a cooperative effort among federal and state agencies, watershed stakeholders, and NMED's Surface Water Quality Bureau (SWQB) Watershed Protection Section (WPS). The current plan for the NPS Management Program was developed in 2014 and approved by the US Environmental Protection Agency (EPA) in early 2015 (NMED/SWQB 2014a). A draft revised plan is now under development. The current plan states an overall goal of meeting and maintaining water quality standards and designated uses of surface water and ground water resources in New Mexico. The plan's objectives are directed toward meeting this goal, and entail: watershed-based planning; restoring and protecting surface and ground water quality; education; and interagency cooperation.

The NPS Management Program is supported with federal Clean Water Act (CWA) Section 319(h) funds. Recent years' funding awarded by EPA for New Mexico's NPS Management Program has been stable, with annual funds averaging \$1.9 million in fiscal years 2013-2017, and increasing an average of 2.2% each year.

The NPS Management Program includes activities carried out by NMED staff to meet the objectives of the program. One such activity — with the objective of water quality protection — is NMED's coordination with the US Army Corps of Engineers to implement the State's CWA Section 401 certification responsibilities for Section 404 permits. These federal permits are required for persons conducting "dredge or fill" activities in a water of the United States, and are designed to protect the waters from degradation due to NPS pollution associated with such activities. In 2017, NMED certified a new set of Nationwide Section 404 Permits. Sixty-six CWA Section 401 water quality confirmations, certifications, or other actions were completed in 2017. NMED staff also coordinate with the New Mexico Energy, Minerals, and Natural Resources Department to implement portions of the New Mexico Mining Act pertaining to water quality. The NPS Management Program supports or implements several outreach activities throughout the year, including: publication of the quarterly newsletter *Clearing the Waters*; other small publication projects; development and maintenance of SWQB web pages; several workshops per year through individual CWA Section 319 projects; and presentations for school and community groups.

The NPS Management Program also relies on established resource protection programs, national and state NPS pollution prevention programs, and activities of other land management and resource protection agencies to address NPS pollution. New Mexico identifies programs and activities that will facilitate the achievement of surface water quality criteria, using a voluntary approach to implement water quality improvements. For example, coordination between the US Forest Service and NMED's Watershed Protection Section (WPS) continues to be an integral part of the NPS Management Program and has facilitated cooperation on many successful NPS pollution reduction projects.

## Land Use Impacts

## Typical Sources

## Plan Objectives

## Stable Funding

## "Dredge or Fill"

## Outreach

## Voluntary Approach

## Nonpoint Sources Program

### Reporting & Tracking

NMED reports how CWA Section 319(h) funds and state matching funds are used, in EPA's Grants Reporting and Tracking System (GRTS). The four tables below include the funding breakdown for: Section 319 funded watershed-based planning projects; Section 319 funded implementation projects; and state-funded projects. Detailed information for each project is available from EPA's GRTS website: [www.epa.gov/nps/grants-reporting-and-tracking-system-grts](http://www.epa.gov/nps/grants-reporting-and-tracking-system-grts). The available information includes project work plans and, for completed projects, final project reports.

Activities carried out by NMED's SWQB and NMED's Ground Water Quality Bureau (GWQB) implementing the NPS Management Program are represented as projects in the following table.

**Table 1**

Grant Number	Project Number	Project Title	Project End Date	Total 319h Funds	State Funds
99610116	14-A	SWQB NPS Program Activities, FY 2014	06/30/2014	\$1,111,905	\$442,000
99610116	15-A	SWQB NPS Program Activities, FY 2015	06/30/2015	\$1,090,554	\$0
99610117	16-A	SWQB NPS Program Activities, FY 2016	06/30/2016	\$961,974	\$100,000
99610117	17-A	SWQB NPS Program Activities, FY 2017	06/30/2017	\$1,072,061	\$100,000
99610118	18-A	SWQB NPS Program Activities, FY 2018	06/30/2018	\$1,154,920	\$60,000
99610116	14-B	GWQB NPS Program Activities, FY 2014	06/30/2014	\$150,000	\$150,000
99610116	15-B	GWQB NPS Program Activities, FY 2015-2016	06/30/2016	\$138,623	\$124,738
99610117	17-B	GWQB NPS Program Activities, FY 2017	06/30/2017	\$116,054	\$94,074
99610118	18-B	GWQB NPS Program Activities, FY 2018	06/30/2018	\$150,000	\$150,000

## Watershed-Based Plan

### TMDL Tie-In

The NPS Management Program emphasizes watershed-based planning, as described in EPA's Nonpoint Source Program and Grants Guidelines for States and Territories (EPA, 2013). A **watershed-based plan** (WBP) includes nine elements to encourage effective implementation and adaptive evaluation. NMED encourages use of a WBP by any watershed restoration program to benefit water quality. WBPs are used by local watershed groups and other interested stakeholders to build on the CWA Total Maximum Daily Load (TMDL) process. TMDLs assess the pollution load a water body may accept while retaining the ability to support its designated beneficial uses. WBPs provide more detailed characterization of: Pollutant Sources; Management Measures; Information and Education Programs; and Monitoring.

The WBP approach facilitates: coordinated watershed restoration efforts; the development of effective watershed associations; stakeholder engagement; and the implementation of effective **best management practices** (BMPs) to reduce NPS pollution. NMED underscored its encouragement by making watershed-based planning a requirement for significant restoration activities to be funded with CWA Section 319(h) funds. New Mexico's current and recently completed watershed-based planning projects are summarized in the following table.

**Table 2**

Grant Number	Project Number	Project Title	Project End Date	Total 319h Funds	State Funds	Local Funds
99610116	14-F	Lower Animas WBP	06/15/2016	\$0	\$287,540	\$0
99610116	14-I	Ute Reservoir WBP for Water Quality Restoration	01/31/2018	\$66,604	\$0	\$60,660
99610116	15-S	Rio Fernando de Taos WBP (Part 1)	06/30/2018	\$84,000	\$0	\$56,000
99610117	16-F	Rio Fernando de Taos WBP (Part 2)	04/01/2019	\$29,747	\$0	\$19,831
99610117	16-G	Watershed-Based Planning within the Upper Agua Chiquita Drainage Basin	06/30/2019	\$63,165	\$0	\$42,136
99610117	16-H	Upper Pecos WBP Update and Revision	12/31/2018	\$22,360	\$0	\$14,980
99610117	16-I	WBP for the Upper Rio Grande Watershed, Comanche Creek Subwatershed	06/30/2019	\$24,555	\$0	\$16,483
99610117	16-J	Rio de las Vacas WBP	05/31/2020	\$49,239	\$0	\$33,295

## WBP Planning Projects



## Nonpoint Sources Program

### Planning Focus

### BMPs Implementation

The focus of planning and implementation is on impaired waters with approved TMDLs. Also included is a limited group of impaired waters for which a TMDL is *not* required because the impairment is thought to be caused by insufficient flow (i.e., Category 4C streams) and an even more limited category of streams where existing plans are thought to be sufficient such that a TMDL is not required (Category 4B streams). Through a combination of funding programs, partnerships, education and outreach activities, New Mexico encourages interested parties to implement BMPs to control or reduce the degree of water quality impairments.

The following table lists New Mexico's current and recently completed Section 319 implementation projects.

**Table 3**

Grant Number	Project Number	Project Title	Project End Date	Total 319h Funds	Local Funds
99610116	14-C	Middle Rio de las Vacas Water Quality Improvement Project	12/31/2016	\$278,648	\$211,397
99610116	14-D	Ponil Creek Restoration Project, Phase II	10/31/2017	\$118,517	\$104,150
99610116	14-J	On-The-Ground Improvement Projects for the Upper Gallinas River and Porvenir Creek Phase II	06/30/2018	\$230,700	\$100,000
99610116	15-C	Upper Jaramillo Creek Water Quality Improvement Project (Part 3)	12/31/2017	\$21,411	\$0
99610116	15-D	Riparian Restoration along the Rio Cebolla, NM with Emphasis on Sediment Reduction	01/14/2017	\$12,988	\$12,988
99610116	15-E	Upper Gallinas River Monitoring	06/01/2018	\$42,455	\$0
99610116	15-R	Rio Nutrias Watershed Based Plan Implementation Phase I (Part 1)	06/30/2018	\$124,852	\$83,235
99610116	15-T	Jemez National Recreation Area Riparian Protection Project	06/30/2018	\$221,000	\$3,290
99610117	16-C	Temperature Reduction and Riparian Habitat Restoration in Upper Cow Creek	06/30/2020	\$236,166	\$168,550
99610117	16-D	Rio Nutrias Watershed Based Plan Implementation Phase I (Part 2)	12/31/2019	\$145,210	\$0
99610117	16-E	Las Cruces Workshop on Low Impact Development, Green Infrastructure, and Water Harvesting Techniques	12/30/2015	\$15,872	\$0
99610117	17-Q	Rio San Antonio Water Quality Improvement Project	06/30/2020	\$322,633	\$228,098
99610117	17-R	On-The-Ground Improvement Projects for the Mora River – Upper Canadian Plateau Phase 1A	06/30/2020	\$262,310	\$184,050
99610117	17-S	Upper Rio San Antonio Watershed On-The-Ground Restoration to Improve Water Quality	06/30/2020	\$205,575	\$0
99610117	17-T	Lower Animas Watershed Based Plan Implementation Projects	12/31/2020	\$229,644	\$156,400
99610118	18-C	Temperature Reduction and Erosion Reduction in Lower Cow Creek	12/31/2021	\$156,017	\$104,200

### River Stewardship Program

A key part of the NPS Management Program is the state-funded River Stewardship Program. The goal of the River Stewardship Program (RSP) is to fund projects that enhance the health of rivers by addressing the root causes of poor water quality and stream habitat. In 2014, the New Mexico Legislature appropriated \$2.3 million in capital outlays funds. In 2015, the Legislature appropriated \$1 million, and in 2016 the Legislature appropriated \$1.5 million. In 2017, the Legislature did not appropriate funding for RSP for state fiscal year 2018, but the Legislature did include \$500,000 in the 2019 budget. Pending signature by Governor Martinez, these funds will support RSP in state fiscal year 2019.

RSP OBJECTIVES INCLUDE:

- Restoring or maintaining hydrology of streams and rivers to better handle overbank flows and thus reduce flooding downstream
- Enhancing economic benefits of healthy river systems such as improved opportunities to hunt, fish, float, or view wildlife
- Providing state matching funds required for federal CWA grants

RSP projects, like Section 319 projects described above, are selected through a competitive, statewide application or Request for Proposals process. Although RSP projects are not required to implement watershed-based plans, each RSP project proposal is evaluated relative to its alignment with local, state, tribal, or federal planning documents, and watershed-based plans often provide the strong basis in planning for proposals to be competitive.

The following table (next page) lists New Mexico's current and recently completed RSP projects.

### Root Causes

### Objectives

### Competitive Process

## Nonpoint Sources Program

## River Stewardship Projects

**Table 4**

Grant Number	Project Number	Project Title	Project End Date	State Funds
99610116	14-G	Bank Stabilization and Habitat Enhancement, a Red River Restoration Project	06/30/2016	\$274,911
99610116	14-H	Selden Drain Restoration Program Phase II	06/30/2016	\$149,195
99610116	15-F	Gallinas Village River and Floodplain Restoration	06/30/2018	\$292,746
99610116	15-G	Pecos River Dalton Day Use Area River Restoration Project	06/30/2018	\$216,366
99610116	15-H	San Juan River Restoration Project (Part 2)	06/30/2018	\$98,966
99610116	15-I	Track Fire Burn Area Perennial Stream Restoration Project	06/30/2018	\$149,990
99610116	15-J	Middle Percha Creek Silver Fire Rehabilitation Project	06/30/2018	\$50,023
99610116	15-K	Red River Town Park Restoration Project	06/30/2018	\$338,767
99610116	15-L	Restoring Hydrologic Functioning to the Rito de los Indios, Valles Caldera National Preserve	06/30/2018	\$172,000
99610116	15-M	San Vicente Creek Urban Watershed Restoration Project	06/30/2018	\$138,221
99610116	15-N	Post-Fire Restoration of the Rito de los Frijoles at Bandelier National Monument Visitors' Center	05/07/2016	\$27,934
99610116	15-O	Rio Grande Corridor at Buckman Phase II	06/30/2018	\$149,019
99610116	15-P	Middle Jaramillo Creek Water Quality Improvement and Riparian Restoration Project	06/30/2018	\$139,750
99610116	15-Q	El Rito Creek Habitat Enhancement and Bank Stabilization Project	06/30/2018	\$173,835
99610117	17-C	Upper Rio San Antonio Watershed Restoration to Improve Water Quality	06/30/2020	\$246,606
99610117	17-D	Animas River Restoration Project	06/30/2019	\$237,000
99610117	17-E	Enhancing Aquatic Habitat Conditions in the Galisteo Creek in Galisteo, New Mexico	06/30/2020	\$169,942
99610117	17-F	Gila River Floodplain Restoration	06/30/2019	\$149,000
99610117	17-G	Rewinding the Gallinas River in the City of Las Vegas	06/30/2020	\$315,166
99610117	17-H	Restoring La Jara Creek from Damage from the Thompson Ridge Fire, Valles Caldera National Preserve	06/30/2019	\$132,000
99610117	17-I	Constructing Diverse Native Bosque Habitat on Two River Bars at the Pueblo of Santa Ana	06/30/2020	\$133,873
99610117	17-J	Restoration of Sawmill and Foreman Creeks, Comanche Creek Watershed	06/30/2019	\$195,535
99610117	17-K	Valle de Oro National Urban Wildlife Refuge Riparian, Wetland, and Water Quality Improvement	06/30/2019	\$114,000
99610117	17-L	Two Rivers Park Restoration Project	06/30/2020	\$235,621
99610117	17-M	Bosque del Bernalillo Storm Water Quality and Habitat Enhancement to the Rio Grande Project	06/30/2020	\$139,867
99610117	17-N	Post-Tres Lagunas Fire and Flooding Restoration Project for Holy Ghost Canyon, Creek, and Tributaries	06/30/2019	\$144,465
99610117	17-O	Village of Questa Fishing Park (Reach A) Stream Restoration Project	06/30/2020	\$157,550
99610117	17-P	Upper San Antonio Canyon Water Quality Improvement Project	06/30/2020	\$137,100

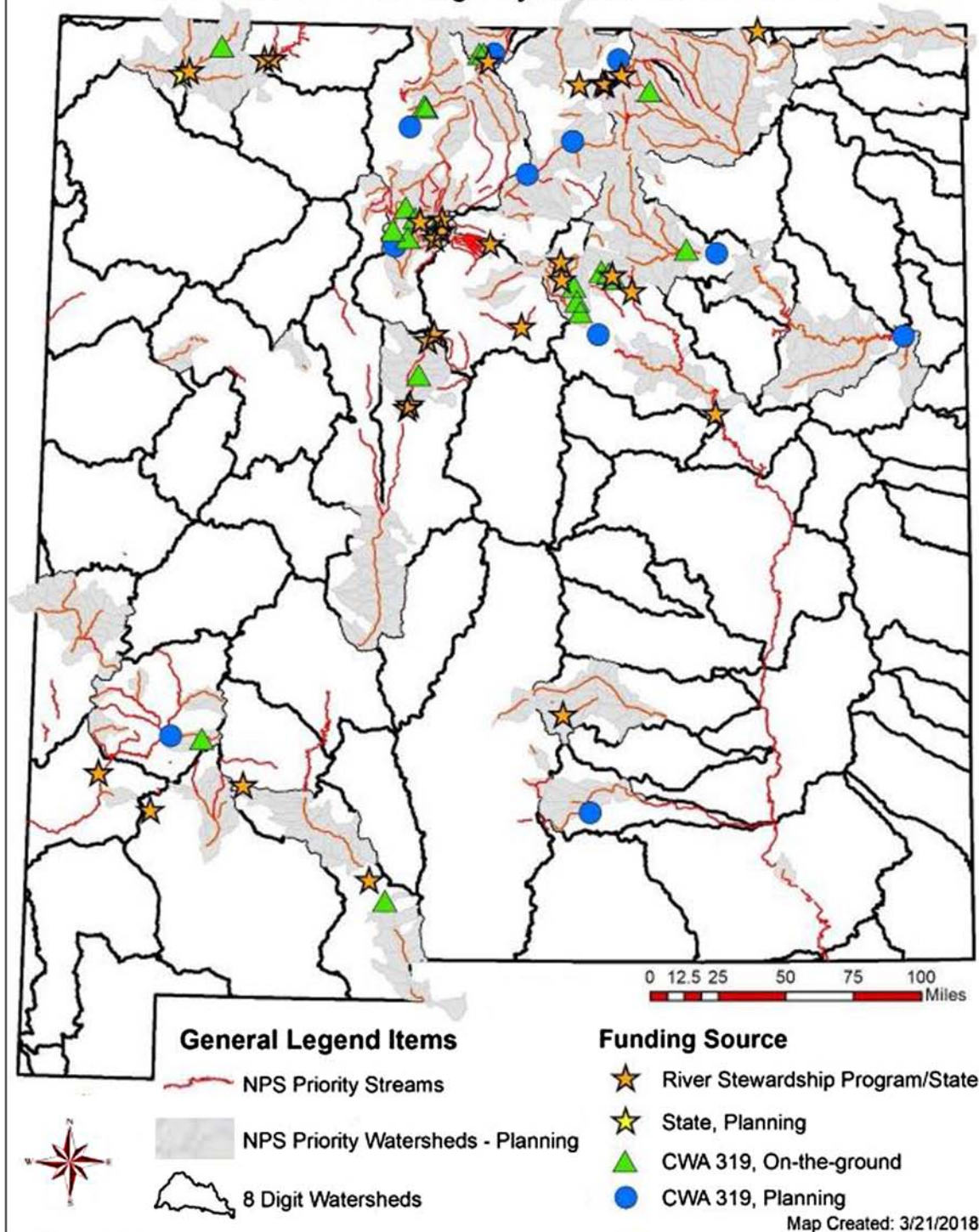


## Nonpoint Sources Program

### Priority Planning

## NPS Reductions Report

### New Mexico Environment Department SWQB - WATERSHED PROTECTION SECTION Restoration and Planning Projects 2012 to March 2018



### Pollutant Load Reduction Reporting

CWA Section 319(h)(11) requires each state to report to EPA on an annual basis “reductions in nonpoint source pollutant loading,” as a component of the Nonpoint Source Management Program Annual Report. EPA and NMED use EPA’s Grants Reporting and Tracking System (GRTS) to implement this reporting requirement. Information reported by NMED for calendar year 2017 is available online at: <https://tinyurl.com/NM-2017-Load-Reductions>.



## Nonpoint Sources Program

### Temperature Focus

### Peak Summer Improvements

### Riparian Cover

### Quality Attainment

### NPS Success Stories

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### Effectiveness Monitoring

An important goal of the NPS Management Program is to monitor the effects of NPS pollution control projects on water quality. These projects are primarily stream restoration measures funded under CWA Section 319, but also include projects funded through RSP and the Wetlands Program.

Effectiveness monitoring has focused primarily on projects addressing stream temperature impairments in mountain streams in northern and central New Mexico. Temperature monitoring is ongoing on the following streams: Bluewater Creek (*see* next article, this *TWR*); Rio de Los Pinos; Ponil Creek; Rito Peñas Negras; Rio de las Vacas; Redondo Creek; Jaramillo Creek; San Antonio Creek; and Cow Creek.

The stream temperature monitoring provides data for statistical analysis using the before/after upstream/downstream study design, in which the relationship between the upstream and downstream stations is tested for a significant difference before and after restoration. Initial results from the data analysis indicate that peak summer temperatures in many streams have improved, but still exceed the associated water quality criteria for coldwater aquatic life. However, the projects are expected to have beneficial effects which will continue to increase as vegetation continues to grow.

A common restoration technique is to exclude cattle and elk grazing by building fence enclosures and planting native vegetation to bring back the riparian cover. Although this technique is expected to be effective, there is a significant lag time between planting and sufficient vegetation growth to effectively shade the stream. Data collection and analysis will be continued to account for this lag time.

### Conclusion

Change within a watershed to bring about water quality standards attainment is usually a long-term proposition. Economic changes, societal values, climate cycles, and climate change each may exert as much influence on water quality as isolated projects or small shifts in land management practices. NMED's Effectiveness Monitoring Program seeks to recognize water quality standards attainment attributable to projects or intentional management improvements.

A key NPS Management Program milestone is for NMED to submit one or more nominations per year to EPA for recognition as a NPS Success Story under EPA's performance measure WQ-10a ("number of NPS impairments that have been eliminated from 303(d) – listed waterbodies/waterbody segments through restoration actions," EPA 2017). New Mexico's EPA-recognized NPS Success Stories include: Bluewater Creek (perennial portions Bluewater Reservoir to headwaters); Polvadera creek (Cañones Creek to headwaters); Willow Creek (Pecos River to headwaters); Sitting Bull Creek (Last Chance Canyon to Sitting Bull Springs); Comanche Creek (Castilla Creek to headwaters); Santa Fe River (Paseo del Cañon to Santa Fe WWTP); and Rio Cebolla (Rio de las Vacas to Fenton Lake). For details on these and other states' EPA-recognized NPS Success Stories *see*: [www.epa.gov/nps/nonpoint-source-success-stories](http://www.epa.gov/nps/nonpoint-source-success-stories).

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### New Mexico's Nonpoint Source Management Program

Additional information describing the Nonpoint Source Management Program can be found in the *New Mexico Nonpoint Source Management Program* (2014a)

*See*: [www.env.nm.gov/surface-water-quality/nps-plan/](http://www.env.nm.gov/surface-water-quality/nps-plan/)

### Watershed-Based Planning in New Mexico

Information on watershed-based planning in New Mexico, including WBPs that have been reviewed and accepted by EPA, is available at: [www.env.nm.gov/surface-water-quality/wbp/](http://www.env.nm.gov/surface-water-quality/wbp/)

### Annual Reports

Information on work completed in specific years can be found in *State of New Mexico Nonpoint Source Management Program Annual Reports*.

*See*: [www.env.nm.gov/surface-water-quality/nps-annual-reports/](http://www.env.nm.gov/surface-water-quality/nps-annual-reports/)

### Funding

Information on projects funded through CWA Section 319 and the state-funded River Stewardship Program is available at: [https://www.env.nm.gov/nmed\\_319\\_and\\_rsp\\_project\\_list/](https://www.env.nm.gov/nmed_319_and_rsp_project_list/)

This list is periodically updated and includes links to the GRTS database.

NM Environment Department - Surface Water Quality Bureau  
[www.env.nm.gov/surface-water-quality](http://www.env.nm.gov/surface-water-quality)

## Riparian Restoration

### BMPs



### Riparian

### Canopy Cover & Temperature

## RIPARIAN RESTORATION

IMPROVING WATER QUALITY ON NEW MEXICO'S BLUEWATER CREEK

by Daniel Guevara, Environmental Scientist - Watershed Protection Section  
New Mexico Environment Department Surface Water Quality Bureau (Santa Fe, NM)

### Introduction

Riparian restoration and improved best management practices (BMPs) have improved water quality on Bluewater Creek in Cibola County, New Mexico.

### Background

Prior to the improvements, Bluewater Creek was heavily impacted by various land uses. The New Mexico Environment Department Surface Water Quality Bureau (NMED/SWQB) documented water quality problems such as high nutrients, turbidity, and temperature. As a result, Bluewater Creek was added to the state's list of impaired waters in 2006.

Bluewater Creek's designated use of Coldwater Aquatic Life was not supported due to the documented impairments. Probable sources included: off-road vehicle use; loss of riparian habitat; forest road construction and use; wild horse grazing; rangeland grazing; silviculture harvesting; and streambank modifications/destabilization.

### Project Highlights

Starting in 2009, WildEarth Guardians conducted a federal Clean Water Act (CWA) Section 319 project on the portion of the creek managed by the New Mexico State Land Office. They built exclosures to restrict access to the riparian area by herbivores and off-road vehicles, and replanted native cottonwoods and willows. Additionally, the Cibola National Forest improved grazing management in the upper watershed by rounding up wild horses that were impacting the area. The results were impressive as the area was transformed from a denuded channel to a lush riparian forest in just a few years (see Figures 1 and 2). Subsequent water quality surveys indicated that nutrient and turbidity levels had improved, and these impairment listings were removed from the CWA Section 303(d) List of Impaired Waters.

A primary factor in improving water quality was the CWA Section 319(h) Project entitled "*Bluewater Creek Temperature Reduction and Riparian Restoration Project*" — which was conducted by the WildEarth Guardians from January 2009 to December 2010. This project dramatically increased the riparian canopy cover and reduced temperature loading by planting 2,500 cottonwood trees, 35,000 willow trees, and 500 native riparian shrubs. To protect these plantings from domestic livestock grazing, elk-browsing, and off-road vehicles, the Guardians also constructed elk-proof fenced exclosures along 1.3 miles of the creek. Additionally, the Cibola National Forest rounded up feral horses on their portion of the watershed, which has also improved the condition of the riparian areas.



**Figure 1: 2009**



**Figure 2: 2016**

**Bluewater Creek above Bluewater Reservoir before (2009) and after (2016) restoration**  
**Note: Same photo point location**

## Riparian Restoration

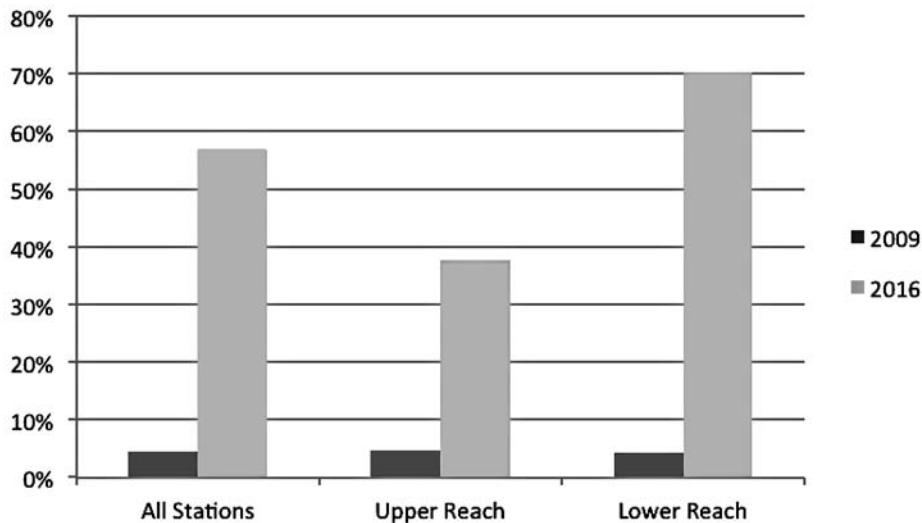
### CWA Grant

### Partners and Funding

The restoration project on Bluewater Creek was funded by a CWA Section 319(h) grant for \$186,516. The funds were awarded through a competitive Request for Proposals from the NMED/SWQB, who also provided project oversight, development, and effectiveness monitoring. The environmental non-profit group WildEarth Guardians submitted the successful proposal and carried out the on-the-ground work. The New Mexico State Land Office is the managing agency for the project area. These cooperators provided \$223,481 in non-federal matching funds. Additionally, the Cibola National Forest manages the land upstream, which encompasses the majority of the watershed.

### Results

The CWA Section 319(h) projects in Bluewater Creek have resulted in removal of the turbidity and nutrient impairments from the 303(d) List of Impaired Waters as well as a significant decrease in temperature. In 2010, there were only one of seven exceedances of the interim turbidity numeric translator of 25 NTU (Nephelometric Turbidity Unit, a measure of the cloudiness in liquid), and this assessment unit was declared as unimpaired for turbidity. The nutrient impairment was also removed in 2011 after a Level One nutrient assessment indicated that the nutrient levels had fallen below impairment levels. Effectiveness monitoring data collected by the SWQB Watershed Protection Section upstream and downstream of the restoration reach before and after the project showed a canopy cover increase from 4% in 2009 to 57% in 2016 (see Figure 3). Additionally,



**Figure 3:** Measurements of canopy cover show a dramatic increase following restoration project.

### Temperature Decrease

an Analysis of Covariance (ANCOVA) performed on temperature data showed that the project resulted in a mean temperature decrease of 1.6 °C (see Figure 4). Although stream temperature still occasionally exceeds the standard, this trend in decreasing temperature is positive and should lead to a future delisting of the temperature impairment as well.

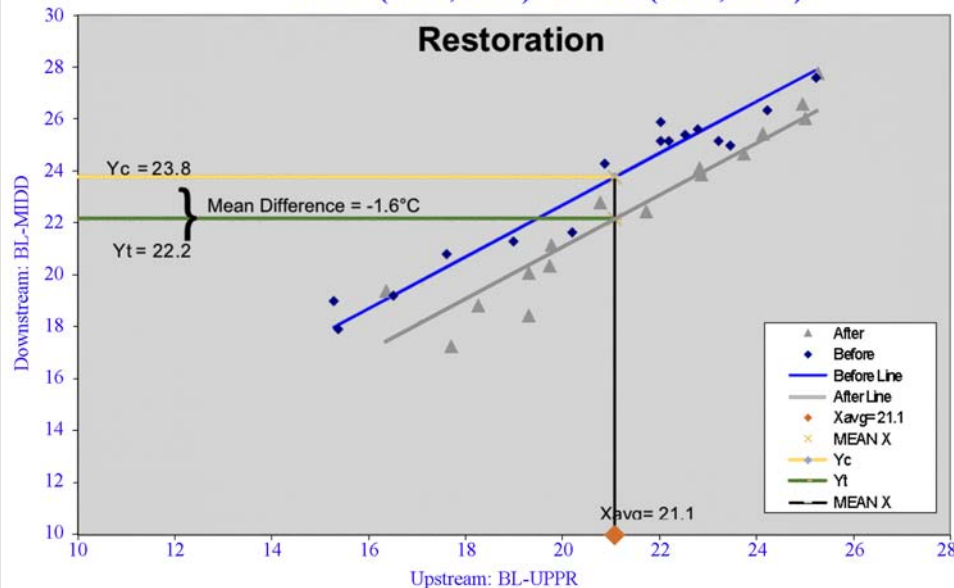
### Conclusion

The success of this work indicates that these proven methods could be applied in other similar locations to improve stream habitat and water quality.

### FOR ADDITIONAL INFORMATION:

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**Figure 4** Bluewater Creek ANCOVA: 10 Day Max Temp (°C) Before (2009, 2011) vs After (2015, 2016)



**Daniel Guevara** is an environmental scientist working at the Watershed Protection Section of the New Mexico Environment Department Surface Water Quality Bureau in Santa Fe, NM.



## GROUNDWATER and the CLEAN WATER ACT: An Update

by Kathy Robb, Sive, Paget & Riesel (New York, NY)

### Groundwater Regulation

**Editors' Introduction:** Since the article "*Groundwater and the Clean Water Act*" went to press for publication in *The Water Report* #170 (April 15, 2018), significant developments in two groundwater cases under the Clean Water Act (CWA) have occurred, for which author Kathy Robb has kindly provided this update.

### Footnotes Additions

#### County of Maui Seeking Review by the US Supreme Court

In *Hawai'i Wildlife Fund, et al. v. County of Maui*, \_\_\_ F.3d \_\_\_, Case No. 15-17447 (9th Cir. Feb. 1, 2018), 2018 WL 650973, defendant County of Maui's petition for rehearing en banc was denied by the Ninth Circuit. In its March 30, 2018 Order denying rehearing, the Ninth Circuit amended its February 1, 2018 opinion by adding language to three footnotes, apparently to further bolster and explain its holding:

1. *Slip Opinion* at page 12, footnote 2, the following text was added to the end of the footnote:

"Hence, it does not affect our analysis that some of our sister circuits have concluded that groundwater is not a navigable water. See *Rice v. Harken Expl.*, 250 F.3d 264, 270 (5th Cir. 2001); *Vill. of Oconomowoc Lake v. Dayton Hudson Corp.*, 24 F.3d 962, 965 (7th Cir. 1994). We are not suggesting that the CWA regulates all groundwater. Rather, in fidelity to the statute, we are reinforcing that the Act regulates point source discharges to a navigable water, and that liability may attach when a point source discharge is conveyed to a navigable water through groundwater. Our holding is therefore consistent with *Rice*, where the Fifth Circuit required some evidence of a link between discharges and contamination of navigable waters, 250 F.3d at 272, and with *Dayton Hudson*, where the Seventh Circuit only considered allegations of a 'potential [rather than an actual] connection between ground waters and surface waters,' 24 F.3d at 965."

2. *Slip Opinion* at page 19, footnote 3, the following text was added to the end of the footnote:

"Those principles are especially relevant in the CWA context because the law authorizes citizen suits to enforce its provisions. See § 1365. Our approach is firmly grounded in our case law, which distinguishes between point source and nonpoint source pollution based on whether pollutants can be 'traced' or are 'traceable' back to a point source. See *Alaska*, 749 F.2d at 558; *Ecological Rights*, 713 F.3d at 508; *supra*, at 12–15."

3. *Slip Opinion* at page 19, the following text replaces the sentence after the citation to *Haw. Wildlife*, 24 F. Supp. 3d at 1000:

"Here, the Tracer Dye Study and the County's concessions conclusively establish that pollutants discharged from all four wells emerged at discrete points in the Pacific Ocean, with 64 percent of the wells' pollutants reaching the ocean. The Study also traced a southwesterly path from the wells' point source discharges to the ocean."

The February 1, 2018 decision and March 30, 2018 amended Order are available at the Ninth Circuit's website: <https://www.ca9.uscourts.gov/opinions/> >> Search on Case No. 15-17447.

The County has announced its intention to petition for a writ of certiorari to the US Supreme Court to review the Ninth Circuit's decision, and had asked the Ninth Circuit on April 3, 2018, to stay the mandate in the case while a petition goes forward. The Ninth Circuit denied the request in a one-sentence order on April 12, 2018. The petition to the US Supreme Court is due 90 days from March 30, 2018.

#### Kinder Morgan District Court Reversed by Fourth Circuit

In *Upstate Forever v. Kinder Morgan Energy Partners, L.P. (Kinder Morgan)*, Case No. 17-1640 (April 12, 2018), the Fourth Circuit ruled — on the same day that the Ninth Circuit refused to stay its mandate in *Maui* — that a petroleum pipeline spill resulting in a discharge of pollutants reaching navigable waters through groundwater is regulated under the CWA. A divided Fourth Circuit panel vacated the district court decision, which had held that migration of pollutants through soil and groundwater is "nonpoint source" pollution not regulated under the CWA, and had dismissed the citizens' suit for lack of subject matter jurisdiction and failure to state a claim. The Fourth Circuit held that a claim could go forward under the CWA and remanded the case to the district court for further proceedings.

The case was filed in 2016 and arose from a 2014 underground pipeline spill of an estimated 370,000 gallons of gasoline into soil and groundwater in South Carolina. The pipeline, six to eight feet underground, was repaired within days, and remediation was begun under the oversight of the state agency authorized to issue NPDES permits and oversee water quality in South Carolina. Kinder Morgan has recovered about 210,000 gallons of gasoline. Remediation continues. The plaintiffs allege that Kinder Morgan did not fully comply with the remediation measures required, and that the gasoline traveled after the spill through groundwater up to 1000 feet into two nearby creeks and adjacent wetlands. Kinder Morgan argued that the violation ceased when the pipeline was repaired, and that if pollutants are seeping into navigable waters it is from a nonpoint source — groundwater — which is not regulated under the CWA.

### Conveyed to Navigable Water

### Point Source Distinction

### Tracer Dye Study

### Pipeline Spill

### Nonpoint Source

## Groundwater Regulation

### Point Source

### Continuing Violation

### “Direct Hydrological Connection”

### Scalia Interpretation

### Distinction Threatened

### Dissent Focus

### Indirect Discharges

#### Kathy Robb,

Principal at Sive Paget & Riesel, PC (New York, NY), has a practice focusing on environmental litigation before federal district and appellate courts across the country and in the US Supreme Court.

The district court held that the plaintiffs had not stated a claim under the CWA because the pipeline was not continuing to release gasoline and therefore the violation was not ongoing. The district court also held that indirect discharges through groundwater to navigable waters were nonpoint sources that were not regulated under the CWA.

The Fourth Circuit reversed, holding that the point source (here, the pipeline) need not continue to release a pollutant in order to constitute a violation — it was enough that the spilled gasoline continued to migrate through soil and groundwater and enter surface waters. The court stated that any “delay between the time at which pollution leaves the point source and the time at which it is added to navigable waters” does not prohibit a citizens’ suit claim under the CWA. *Kinder Morgan* at 17. While the court noted that citizens’ suits provision under the CWA is intended primarily to allow citizens “to abate pollution when the government cannot or will not command compliance,” the court reasoned that a violation could be continuing even if the conduct that caused the violation had ceased. *Id.* at 14.

The court also held that “a plaintiff must allege a direct hydrological connection between ground water and navigable waters in order to state a claim under the CWA for a discharge that passes through ground water,” reflecting the position taken by EPA in its amicus brief in *Maui*. *Id.* at 23-24. This standard is a different articulation from the “fairly traceable” standard set by the Ninth Circuit in *Maui*, although the Fourth Circuit noted that in its view there was “no functional difference” between its standard and the Ninth Circuit’s “fairly traceable” standard. *Id.* at 24, fn. 12.

Like the Ninth Circuit in *Maui*, the Fourth Circuit looked to Justice Scalia’s opinion in *Rapanos v. United States*, 542 U.S. 715 (2006), for guidance. The Fourth Circuit quoted the same sentence from *Rapanos* that the Ninth Circuit included in the *Maui* opinion: “However, when analyzing the kinds of connected waters that might fall under the CWA, Justice Scalia observed that ‘[t]he Act does not forbid the “addition of any pollutant *directly* to navigable waters from any point source,” but rather the “addition of any pollutant *to* navigable waters.”’ *Id.* at 743 (quoting 33 U.S.C. § 1362(12)(A)).” *Kinder Morgan* at p. 20 (emphasis in original).

The dissent stated that the majority’s reading threatened to undermine the CWA distinction between “point source” and “nonpoint source” discharges, stating that:

[C]lose examination of the text, history, and structure of the CWA reveals that not every addition of pollution amounts to a CWA violation — much less an ongoing CWA violation. Congress precisely defined a CWA violation as the addition of pollutants from a point source, and for there to be an ongoing CWA violation, there must be an ongoing addition of pollutants from a point source into navigable waters. *See* 33 U.S.C. § 1362(12).

*Id.* at 27.

Focusing on “three central features” of the CWA — “point source” pollution, the NPDES program, and primary enforcement through state and federal regulators supplemented by citizens’ suits — the dissent emphasized legislative history and statutory language highlighting Congress’s intent to limit federal jurisdiction under the CWA to point source pollution, and stated that the CWA National Pollutant Discharge Elimination System (NPDES) permitting program is “not only ill-equipped to address, but also inapplicable to, nonpoint source pollution.” *Id.* at 36.

The Fourth Circuit decision in *Kinder Morgan* has raised further concerns that applying the NPDES program to indirect discharges through groundwater from a pipeline spill carrying pollutants to waters of the United States would expand the regulatory scope of the CWA and the number and scope of citizens’ suits significantly, create regulatory uncertainty, and require case-by-case analysis that is impractical at best. Both the *Maui* and *Kinder Morgan* court decisions have drawn the attention of the regulated community. Regulated entities could face increased permitting costs and related liabilities if they fail to obtain CWA permits for indirect discharges of pollution to waters of the United States through groundwater. Cities, states, and companies point out that they cannot know in advance if a spill or leak will occur, and so cannot identify what kind of permit they might need.

Four additional cases addressing indirect discharges through groundwater to navigable waters are pending in the Second, Fourth, and Sixth Circuits: *26 Crown Street Assocs. v. Greater New Haven Water Pollution Control Authority*, 2017 U.S. Dist. Lexis 106989 (D. Conn. 2017)(No. 17-2426, 2d Cir.); *Sierra Club v. Virginia Electric and Power Co.*, 145 F. Supp. 3d 601 (E.D. Va. 2015) (No. 17-1895, 4th Cir.); *Kentucky Waterways Alliance v. Kentucky Utilities Co.*, No. 5:17-292-DCR, 2017 WL 6628917 (E.D. Ky. Dec. 28, 2017) (No. 18-5115, 6th Cir.); and *Tennessee Clean Waters Network v. TVA*, 273 F. Supp. 3d 775 (M.D. Tenn. 2017) (No. 17-6155, 6th Cir.).

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*Maui* decision available at: [cdn.ca9.uscourts.gov/datastore/opinions/2018/02/01/15-17447.pdf](http://cdn.ca9.uscourts.gov/datastore/opinions/2018/02/01/15-17447.pdf)

*Kinder Morgan* decision available at: [www.ca4.uscourts.gov/opinions/171640.P.pdf](http://www.ca4.uscourts.gov/opinions/171640.P.pdf)

## WATER BRIEFS

## COLORADO RIVER RIFT: MANIPULATING SUPPLY WEST

A public rift has developed between Arizona and four other states, plus Denver Water, over the alleged manipulation by Arizona's largest water user of water flows from the upper basin of the Colorado River. Colorado, New Mexico, Utah and Wyoming communicated their disapproval of the approach being taken by the Central Arizona Water Conservancy District (CAWCD), in a letter from the Upper Colorado River Commission (UCRC) dated April 13th to Tom Buschatzke, Director of the Arizona Department of Water Resources. Denver Water joined those four states, supporting the concerns raised by the UCRC — “over the manipulation of water demands by the Central Arizona Project” — in a letter (email) by James Lochhead, CEO/Manager to CAWCD on April 16th. CAWCD is the organization that manages and operates the Central Arizona Project (CAP).

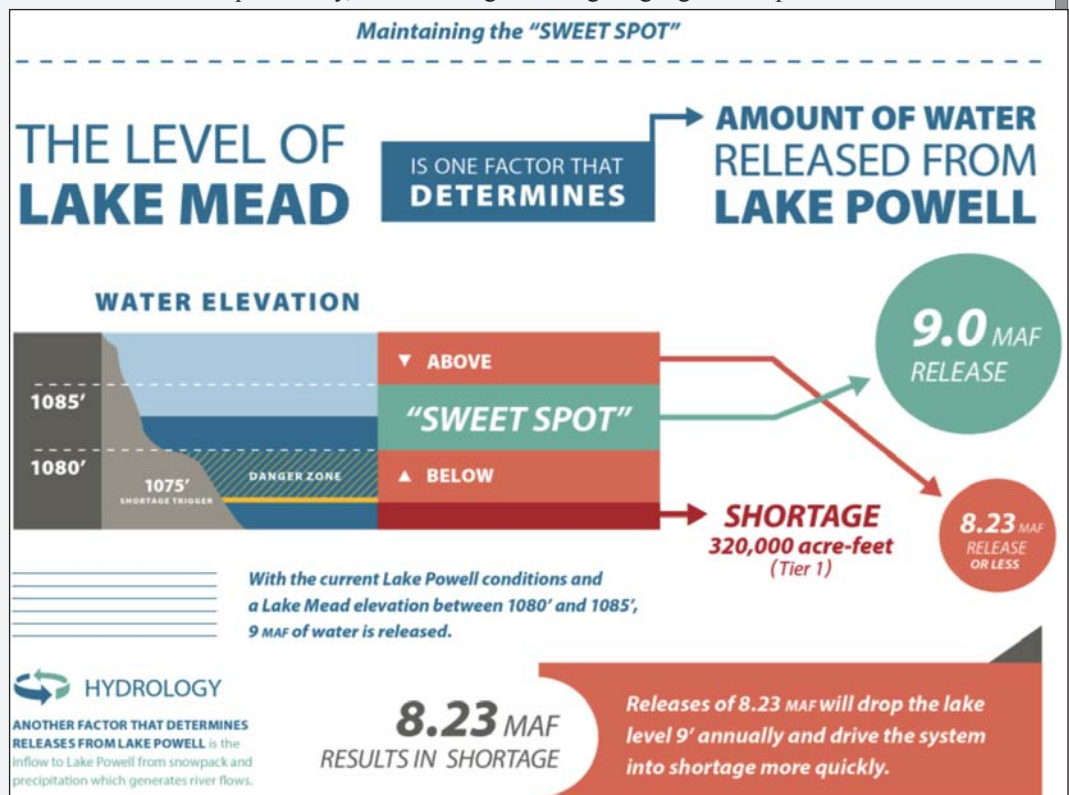
The four Upper Basin states and Denver Water assert that CAP is taking advantage of agreements in the Colorado River Basin that allow water to be released from Lake Powell to fill Lake Mead. “Specifically, these efforts lay out CAWCD's strategy to intentionally maximize demands within the Central Arizona Project to induce larger than normal releases from Lake Powell. CAWCD's goal appears to be to delay agreement on drought plans in order to take advantage of what it terms the ‘sweet spot’ by drawing on ‘bonus water’ from Lake Powell. Both characterizations indicate that CAWCD intends to disregard the basin's dire situation at the expense of Lake Powell and all the other basin states.” UCRC Letter. That approach is designed to keep Lake Mead elevation levels low enough that the Upper Basin is required to release water from Lake Powell, while maintaining Lake Mead's elevation at a level that avoids a “shortage trigger” (1075 feet) which would result in mandatory cutbacks in consumption. (See the “Sweet Spot” graphic below; originally posted — then removed — from the CAP website).

The recent history of cooperation amongst Colorado River water users is being tested by the alleged manipulation. Denver Water pointed out the actions by CAWCD “severely compromise the trust and cooperation that has allowed us to develop the System Conservation Pilot Program. In the upper basin, this program was designed to temporarily and voluntarily compensate water users to forego their use of water to support critical water level elevations in Lake Powell. CAWCD's manipulation of demands in order to take advantage of the supposed ‘sweet spot’ in Lake Powell water releases undermines this purpose, and is unacceptable.” Denver Water Letter. The letter goes on to state that “Denver Water is prepared to terminate our funding of the program after we meet our obligations in 2018, unless significant progress is made in the finalization of the lower basin drought contingency plan, and unless CAWCD is able to verifiably establish it has ceased all actions to manipulate demand and is fully participating in aggressive conservation measures along with other entities in Arizona.”

CAWCD, meanwhile, issued a press release on May 1st following an April 30th meeting with the Upper Colorado River Commission representing Colorado, New Mexico, Utah, Wyoming, and the United States. The Arizona Department of Water Resources (ADWR) and Denver Water also participated in the meeting on the phone. “Concerns from the Upper Basin Commissioners were heard and respected, and there was a productive discussion. All parties recognize there is still much work to do. The Commissioners and CAWCD are resolved to returning to the collaborative processes, and important relationships, that have defined the successes for which the Colorado River Basin has been famous for two decades. The meeting was an opportunity to express intent, and going forward we must focus on results. CAWCD regrets that intra-Arizona issues have impacted other parties in the Colorado River basin. Specifically, CAWCD regrets using language and representations that

were insensitive to Upper Basin concerns, and resolves to have a more respectful and transparent dialogue in the future. As a result of the meeting, CAWCD has committed to beginning a fresh conversation within Arizona, including with ADWR and other stakeholders, to chart a path forward for an effective Drought Contingency Plan. We believe that a renewed collaborative process will ultimately support development of broad-based solutions with our Colorado River Basin colleagues to benefit the entire Colorado River system.” CAWCD Press Release.

**For info:** Upper Colorado River Commission at: [www.ucrccommission.com/](http://www.ucrccommission.com/); CAP website at: [www.cap-az.com/](http://www.cap-az.com/)





## WATER BRIEFS

**SNOWMELT & DUST WEST  
RADIATIVE IMPACT**

An important new study has concluded that dust — not spring warmth — controls the pace of spring snowmelt that feeds the headwaters of the Colorado River. Contrary to conventional wisdom, the amount of dust on the mountain snowpack controls how fast the Colorado Basin's rivers rise in the spring regardless of air temperature, with more dust correlated with faster spring runoff and higher peak flows. The study, titled "*Variation in Rising Limb of Colorado River Snowmelt Runoff Hydrograph Controlled by Dust Radiative Forcing in Snow*" by Thomas H. Painter, S. McKenzie Skiles, Jeffrey S. Deems, W. Tyler Brandt, and Jeff Dozier, was published January 23rd in the journal *Geophysical Research Letters* (first published 12/11/17).

The finding is valuable for western water managers and advances the understanding of how freshwater resources, in the form of snow and ice, will respond to warming temperatures in the future. By improving knowledge of what controls the melting of snow, it improves understanding of the controls on how much solar heat Earth reflects back into space and how much it absorbs — an important factor in studies of weather and climate.

When snow gets covered by a layer of windblown dust or soot, the dark topcoat increases the amount of heat the snow absorbs from sunlight. Tom Painter of NASA's Jet Propulsion Laboratory in Pasadena, California, has been researching the consequences of dust on snowmelt worldwide. This is the first study to focus on which has a stronger influence on spring runoff: warmer air temperatures or a coating of dust on the snow.

Windblown dust has increased in the US Southwest as a result of changing climate patterns and human land-use decisions. With rainfall decreasing and more disturbances of the land, protective crusts on soil are removed and more bare soil is exposed. Winter and spring winds pick up the dusty soil and drop it on the Colorado Rockies to the northeast. Historical lake sediment analyses show there is currently an annual average of five to seven times more dust falling on the Rocky Mountain snowpack than there was before the mid-1800s.

Painter and colleagues looked at data on air temperature and dust in a mountain basin in southwestern Colorado from 2005 to 2014, and streamflow from three major tributary rivers that carry snowmelt from these mountains to the Colorado River. The Colorado River's basin spans about 246,000 square miles (637,000 square kilometers) in parts of seven western states. The researchers found that the effects of dust dominated the pace of the spring runoff even in years with unusually warm spring air temperatures. Conversely, there was almost no statistical correlation between air temperature and the pace of runoff. "We found that when it's clean, the rise to the peak streamflow is slower, and generally you get a smaller peak," Painter said. "When the snowpack is really dusty, water just blasts out of the mountains." The finding runs contrary to the widely held assumption that spring air temperature determines the likelihood of flooding.

Coauthor McKenzie Skiles, an assistant professor in the University of Utah Department of Geography, said that while the impacts of dust in the air, such as reduced air quality, are well known, the impacts of the dust once it's been deposited on the land surface are not as well understood. "Given the reliance of the western US on the natural snow reservoir, and the Colorado River in particular, it is critical to evaluate the impact of increasing dust deposition on the mountain snowpack," she said.

Painter pointed out that the new finding doesn't mean air temperatures in the region can be ignored in considering streamflows and flooding, especially in the future. "As air temperature continues to climb, it's going to have more influence," he said. Temperature controls whether precipitation falls as snow or as rain, for example, so ultimately it controls how much snow there is to melt. But, he said, "temperature is unlikely to control the variability in snowmelt rates. That will still be controlled by how dirty or clean the snowpack is."

Skiles noted, "Dust on snow does not only impact the mountains that make up the headwaters of Colorado River. Surface darkening has been observed in mountain ranges all over the world, including the Alps and the Himalaya. What we learn about the role of dust deposition for snowmelt timing and intensity here in the western U.S.

has global implications for improved snowmelt forecasting and management of snow water resources."

The study coauthors are from the University of Utah, Salt Lake City; University of Colorado, Boulder; and University of California, Santa Barbara. **For info:** Study available at: <https://doi.org/10.1002/2017GL075826>

**SECRET SCIENCE US  
EPA PROPOSED RULE**

On April 24, EPA Administrator Scott Pruitt announced that he has signed a proposed rule to "strengthen the science" used in regulations issued by EPA. The rule "will ensure that the regulatory science underlying Agency actions is fully transparent, and that underlying scientific information is publicly available in a manner sufficient for independent validation," according to EPA's press release (the EPA event with Administrator Pruitt announcing the proposed rule was closed to the press).

Meanwhile, widespread criticism of the proposed rule focused on the point that the proposal would prevent EPA from utilizing health studies based on medical records that — due to patient privacy laws — must be kept confidential.

Comments to the proposed rule must be received on or before May 30, 2018.

**For info:** Proposed Rule Federal Register link at: [www.epa.gov/newsreleases/epa-administrator-pruitt-proposes-rule-strengthen-science-used-epa-regulations](http://www.epa.gov/newsreleases/epa-administrator-pruitt-proposes-rule-strengthen-science-used-epa-regulations)

**SUPERFUND AGREEMENT TX  
DIOXIN CONTAMINATION**

On April 9, EPA announced that an agreement has been reached with International Paper Company and McGinnes Industrial Maintenance Corporation (the "companies") to perform a remedial design for the San Jacinto River Waste Pits Superfund Site selected remedy. The selected cleanup action addresses the potential dangers posed by dioxin contamination at the site in Harris County, Texas.

The final cleanup plan considers the ever-changing San Jacinto River, which encroaches on the site, while protecting important downstream resources including the Galveston Bay estuary. EPA added the San Jacinto River Waste Pits Superfund Site to the National Priorities List of Superfund sites in 2008

## WATER BRIEFS

after testing revealed contamination from dioxins and furans near the waste pits. The site consists of two sets of impoundments, or pits, built in the mid-1960s for disposing solid and liquid pulp and paper mill wastes that are contaminated with dioxins and furans.

EPA's cleanup plan, with support from state partners and the US Army Corps of Engineers, includes installing engineering controls before excavating approximately 212,000 cubic yards of dioxin contaminated material for disposal. The estimated cost is \$115 million, representing a reasonable value for the cost incurred according to EPA. The remedial design is estimated to take about 29 months to complete to ensure waste is safely and properly contained during construction and removal. The design work will be performed by the companies under the oversight of EPA and Texas Commission on Environmental Quality. The current quarterly cap inspection and maintenance program will continue while the remedial design is being completed.

While the remedial design is ongoing, the US Department of Justice and EPA will begin negotiations with the potential responsible parties to enter into a consent decree regarding construction of the remedy.

**For info:** Jennah Durant, EPA, 214/665-2200 or R6Press@epa.gov

#### WASTEWATER RULING OR PRETREATMENT REGULATIONS

On April 23, US District Court Judge Michael H. Simon ordered Carl Zeiss Vision, Inc. (Zeiss) to pay \$750,000 in criminal fines for repeatedly discharging untreated wastewater from its lens-manufacturing facility in Clackamas, Oregon to the Kellogg Creek Wastewater Treatment Plant. "The Justice Department will not tolerate any business, corporation, or individual that bypasses federal environmental laws to seek a competitive advantage or to maximize profits," said Billy J. Williams, US Attorney for the District of Oregon.

According to court documents, over a multi-year period Zeiss knowingly discharged a variety of hazardous substances to the Clackamas County sewer system. In May 2012, Clackamas Water Environmental Services sent Zeiss a "Non-Residential Questionnaire" or industrial user survey as required by the federal Clean Water Act. In

response, the company falsely described its wastewater as being 200 gallons per day of "green lens cleaner" that required no pretreatment. In reality, Zeiss regularly discharged cadmium-and-lead alloys, acidic lens polish, and potassium hydroxide the company attempted to neutralize with hydrochloric and muriatic acids.

In March and June 2015, EPA's Criminal Investigation Division installed pH probes in the sewer line coming from the Zeiss manufacturing facility. These probes detected regular unlawful discharges. Investigators recorded unlawful waste discharges (with excessively high or low pH levels) on two-thirds of the days monitored. The government estimates Zeiss avoided \$382,000 in proper disposal costs over the period of the offense. By failing to disclose its discharges to Clackamas County, the company operated completely outside pretreatment regulations for years.

Carl Zeiss Vision, Inc. is a subsidiary of Zeiss International based in Oberkochen, Germany. The company previously pleaded guilty on January 4, 2018 to one count of violating the wastewater pretreatment requirements outlined in Section 1319(c)(1)(A) of the Clean Water Act.

**For info:** US Attorney's Office, District of Oregon's website: [www.justice.gov/usao-or](http://www.justice.gov/usao-or)

#### NO DISCHARGE ZONE WA VESSEL SEWAGE BANNED

Washington State Department of Ecology (Ecology) Director Maia Bellon signed into law the Puget Sound No Discharge Zone (NDZ) on April 9, stopping the release of vessel sewage into the waters of Puget Sound. The new rule took effect May 10 and bans the discharge of any type of sewage (blackwater), treated or untreated, within Puget Sound. There is no change to graywater requirements. Vessels looking to empty their loads will need to use a pump-out station or wait until they are out of the NDZ.

In establishing its first no discharge zone, Washington joins 26 other states and more than 90 no discharge zones in the US. The new rule also establishes geographic boundaries, how to close marine sanitation devices, effective dates for certain commercial vessels, and enforcement authority. NDZ boundaries include all marine waters of Washington State inward from the

line between the New Dungeness and Discovery Island lighthouses, to the Canadian border, the fresh waters of Lake Washington, and all the water bodies that connect Lake Washington to Puget Sound. The Washington Department of Health expects to upgrade or open approximately 1,000 acres of commercial shellfish beds for harvesting near marinas with the establishment of the NDZ.

The rule comes after a robust five-year public outreach and evaluation effort, including multiple public comment periods. To put the no discharge zone in place, Ecology had to submit a proposal to EPA, which approved Ecology's proposal in February 2017.

Ecology's website contains information on pumpout options, including locations, for boaters and vessel operators. For more on the Puget Sound No Discharge Zone, visit Ecology's website and for additional information, visit [pumpout.washington.org](http://pumpout.washington.org).

**For info:** Ty Keltner, Ecology, 360/510-0682 or [ty.keltner@ecy.wa.gov](mailto:ty.keltner@ecy.wa.gov); Ecology website: <https://ecology.wa.gov/Water-Shorelines/Puget-Sound/No-discharge-zone>

#### KLAMATH FLOWS CA/OR FISHERIES FLOWS UPHeld

On April 30, US District Court Judge William Orrick of the Northern District of California denied a motion brought by Defendant-Intervenors Klamath Water Users Association (KWUA) and member districts for relief from injunctions issued last year in two related cases. *See Hoopa Valley Tribe v. National Marine Fisheries Service, et al.*, Case No. 16-cv-04294-WHO (April 30, 2018). "The injunctions ordered the United States Bureau of Reclamation...to require certain types of water flows as part of their operation of the Klamath River Project in order to prevent irreparable harm to the SONCC Coho salmon, an endangered species." *Slip Op.* at 1. That injunction, a group of pulse and dilution flow requirements ordered in March 2017, can require over 100,000 acre-feet of water to be released to augment flows in the Klamath River that are aimed to help with C. shasta, a disease that impacts listed species under the Endangered Species Act. Presently, the injunction is also resulting in delay in the ability to divert any water for irrigation for KWUA districts.



## WATER BRIEFS

## RESERVOIR EIS

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## WATER SUPPLY NEEDS

The US Army Corps of Engineers is preparing an Environmental Impact Statement (EIS) to analyze the direct, indirect, and cumulative effects of a proposed water supply project, the Cedar Ridge Reservoir (Project), proposed by the City of Abilene, Texas. A Clean Water Act Section 404 permit would be required for the construction and operation of the proposed Project since it would result in permanent and temporary impacts to waters of the US. The Project is intended to provide approximately 34,400 acre-feet of new reliable water supply to address additional water supply needs. The Cedar Ridge Project would be constructed, owned, and operated by the City of Abilene.

Abilene is proposing to construct and operate a new 227,127 acre-foot reservoir, with a surface area of 6,635 acres at conservation pool and an additional 2,151 acres at flood pool formed by an approximately 5,200-foot long earthen dam. Impacts to waters of the US at the project site include fill and inundation of 29-miles of the Clear Fork of the Brazos River and inundation of 43 miles of intermittent and ephemeral tributaries to the Clear Fork. In addition, the proposed project would result in downstream impacts associated with hydrologic alterations. As part of the proposed project, other facilities to be constructed include two spillways, a multi-level outlet works, a pump station and 34-mile pipeline, roadways, and construction areas. The pump station and pipeline would affect areas that may be waters of the United States. Construction of the dam and associated facilities would require the placement of approximately 16,000 cubic yards of fill material below the ordinary high water mark of the river and a small amount of fill in an ephemeral tributary. The construction of the dam and spillways would require 117 acres of land. Temporary and permanent construction of the pump station, pipeline, access roadways, laydown areas, and borrow areas could impact an estimated 1,100 acres of land area.

**For info:** Federal Register, 4/13/18: Document No. 2018-07303 - available at: [www.federalregister.gov/documents/2018/04/13/2018-07303/intent-to-prepare-an-environmental-impact-statement-for-the-city-of-abilene-texas-cedar-ridge](http://www.federalregister.gov/documents/2018/04/13/2018-07303/intent-to-prepare-an-environmental-impact-statement-for-the-city-of-abilene-texas-cedar-ridge)

These pulse and dilution flows were ordered until consultation on a new biological opinion is complete. The current schedule for completion of a new biological opinion is 2020. For additional information on the March 2017 injunctions, *see* Water Briefs, *TWR* #158.

The order denying the motion states that the court considered the merits of KWUA's motion but denied it because the Defendant-Intervenor "do not show newly discovered evidence sufficient to justify suspending or modifying the injunctions pursuant to Rule 60(b)(2), nor that prospective application of the injunctions would be inequitable pursuant to Rule 60(b)(5). Staying enforcement would not preserve the status quo, and I do not have jurisdiction to grant their requested stay while the appeal is pending. Nor would I in light of the evidence of record." *Id.* at 2.

Later in the order, Judge Orrick noted an important limitation on his authority in regard to endangered species. "Intervenor's argument mainly rests on the effects of the Klamath River Project on the family farms and ranches in the Project's irrigation districts. [citation omitted] I am sympathetic to those concerns, but as I have already discussed at length in the Injunction Orders and as is very plainly the law, I am not free to favor economic or other interests over potential harm to endangered species." *Id.* at 9.

The US Bureau of Reclamation (Reclamation) filed a response to KWUA's motion on March 23rd with the court, outlining Reclamation's proposed 2018 Klamath Project operations, including how Reclamation planned to provide water to irrigators in the Klamath Basin by mid-April and provide water for endangered species. According to Reclamation, the injunction called for a 72-hour surface flushing flow between November 1 and April 30, and emergency dilution flows later this spring or summer if necessary. The injunction also states that in no event should the prescribed flows interfere with conditions necessary to protect ESA-listed suckers in Upper Klamath Lake. Reclamation's press release noted just how dire the 2018 situation is: "[S]ince the start of the 2018 water year, cumulative inflows to Upper Klamath Lake have been some of the lowest observed on record. Reclamation has determined that there is not enough water in the system to

produce a surface flushing flow with Klamath Project water and still meet lake threshold elevation requirements for suckers."

**For info:** Order available at: [www.scribd.com/document/377936845/Judge-William-Orrick-s-ruling-on-Klamath-River-dam-water-releases-challenge](http://www.scribd.com/document/377936845/Judge-William-Orrick-s-ruling-on-Klamath-River-dam-water-releases-challenge); Scott White, KWUA, 541/ 883-6100 or [scott@kwua.org](mailto:scott@kwua.org); Reclamation webpage: [www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=61848](http://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=61848)

## DRINKING WATER NEEDS US INFRASTRUCTURE ASSESSMENT

On March 30, EPA delivered the Report to Congress of the 2015 *Drinking Water Infrastructure Needs Survey and Assessment* (DWINSAs) to the offices of the President of the US Senate and the Speaker of the US House of Representatives. The 2015 DWINSAs is the sixth since 1995 and estimates investment need of \$472.6 billion in the Nation's drinking water infrastructure over the next 20 years, a 10.3% increase, in constant dollars, over the estimated need of the 2011 DWINSAs. The 2015 DWINSAs provides an estimate of the Nation's existing total drinking water transmission and distribution pipe as being over 2.2 million miles or enough to circle the globe at the equator nearly 90 times. The Assessment's determination of the relative needs of each state will be used as the basis for the allotment of the Drinking Water State Revolving Fund (DWSRF) for the four fiscal years of 2018 through 2021.

EPA's assessment shows that improvements are primarily needed in:

- Distribution and transmission: \$312.6 billion to replace or refurbish aging or deteriorating pipelines
- Treatment: \$83 billion to construct, expand or rehabilitate infrastructure to reduce contamination
- Storage: \$47.6 billion to construct, rehabilitate or cover water storage reservoirs
- Source: \$21.8 billion to construct or rehabilitate intake structures, wells, and spring collectors

**For info:** DWINSAs available at: [www.epa.gov/drinkingwatersrf/epas-6th-drinking-water-infrastructure-needs-survey-and-assessment](http://www.epa.gov/drinkingwatersrf/epas-6th-drinking-water-infrastructure-needs-survey-and-assessment)



<b>May 17</b> <b>WEB</b> <b>One Water in Action: Exploring Benefits &amp; Lessons Learned Webinar, WEB.</b> 11 am CST. Presented by Texas Living Waters Project - One Water for Texas: Integrated Water Solutions. For info: Jennifer Walker, walkej@nwf.org; Registrar at: www.bit.ly/onewatertx	<b>May 24</b> <b>WEB</b> <b>Economics of Sustainable Reservoir Sediment Management Webinar - Dr. George Annandale &amp; Dr. Rollin Hotchkiss, WEB.</b> 11 am - Noon MT. Sponsored by CIRES Education & Outreach and CIRES Western Water Assessment. For info: <a href="http://cires.colorado.edu/news/announcing-reservoir-sedimentation-management-webinar-series">http://cires.colorado.edu/news/announcing-reservoir-sedimentation-management-webinar-series</a>	<b>June 6</b> <b>WA</b> <b>Northwest Climate Change Conference: Impacts + Adaptation, Sea Level Rise &amp; Extreme Weather, Seattle.</b> John Davis Conference Center, 1201 Third Avenue. For info: Holly Duncan, Environmental Law Education Center, 503/ 282-5220, <a href="mailto:info@elecenter.com">info@elecenter.com</a> or <a href="http://www.elecenter.com">www.elecenter.com</a>	<b>June 11-12</b> <b>ID</b> <b>Idaho Water Users Assoc. Summer Water Law &amp; Resource Issues Seminar, Sun Valley.</b> TBA. For info: IWUA, 208/ 344-6690 or <a href="http://www.iwua.org/">www.iwua.org/</a>
<b>May 18</b> <b>CA</b> <b>Climate Change Programs Conference, San Francisco.</b> BASF Conference Center. For info: CLE Int'l, 800/ 873-7130, <a href="mailto:live@cle.com">live@cle.com</a> or <a href="http://www.cle.com">www.cle.com</a>	<b>May 24</b> <b>WA</b> <b>2018 Washington State Legislative Update - Focus on Water Resources Issues Dinner Meeting, Seattle.</b> Naked City Brewery, 8564 Greenwood Avenue N, 5:30-8 pm. Presented by AWRA - Washington Section. For info: <a href="http://waawra.org">waawra.org</a>	<b>June 7</b> <b>WA</b> <b>Celebrate Water 2018 - CELP CLE and Celebration, Seattle.</b> Ivar's Salmon House. Presented by Center for Environmental Law & Policy, CLE from 4-5 pm; Celebration 5:30-8:00 pm. For info: <a href="http://www.celp.org">www.celp.org</a>	<b>June 11-14</b> <b>NV</b> <b>Innovating the Future of Water: Annual Conference &amp; Exposition '18, Las Vegas.</b> Mandalay Bay Convention Center. Presented by the American Water Works Association. For info: <a href="http://www.awwa.org/conferences-education/conferences/annual-conference.aspx">www.awwa.org/conferences-education/conferences/annual-conference.aspx</a>
<b>May 18</b> <b>OR</b> <b>Oregon State Bar Agricultural Law Section Annual "Round-Up" CLE Program, The Dalles.</b> The Columbia Gorge Discovery Center, 10 am - 3:30 pm. Deadline to Register is May 10 (space limited). For info: Janine Hume, 503/ 227-1111, <a href="mailto:jhume@sussmanshank.com">jhume@sussmanshank.com</a> or <a href="https://agsection.wordpress.com/">https://agsection.wordpress.com/</a>	<b>May 31</b> <b>WEB</b> <b>One Water Deep Dive: Q&amp;A with the Experts &amp; Case Studies Webinar, WEB.</b> 11 am CST. Presented by Texas Living Waters Project - One Water for Texas: Integrated Water Solutions. For info: Jennifer Walker, walkej@nwf.org; Registrar at: <a href="http://www.bit.ly/onewatertx">www.bit.ly/onewatertx</a>	<b>June 7</b> <b>OH</b> <b>EPA Region 5 Water Finance Forum, Finlay.</b> Finlay Inn & Conference Center. Hosted by Great Lakes Environmental Infrastructure Center, EPA Region 5 Finance Center. For info: <a href="http://ctt.nonprofitsoapbox.com/2018epa-ohio">http://ctt.nonprofitsoapbox.com/2018epa-ohio</a>	<b>June 14-15</b> <b>WA</b> <b>Critical Developments in Water Law in Washington Seminar - 27th Annual Conference, Seattle.</b> Crowne Plaza Hotel. For info: Law Seminars Int'l, 206/ 567-4490 or <a href="http://www.lawseminars.com">www.lawseminars.com</a>
<b>May 18</b> <b>SD</b> <b>Water Rights &amp; Mineral Rights Seminar - Speaker David Ganje, J.D., Pierre.</b> Ramkota Inn, 1-4 pm Local Time. Sponsored by the Capital Journal. For info: Capital Journal, 605/ 224-7301	<b>May 31-June 2</b> <b>China</b> <b>Aquatech China 2018, Shanghai.</b> National Exhibition & Convention Center. For info: <a href="http://www.aquatechtrade.com/china/">www.aquatechtrade.com/china/</a>	<b>June 7-8</b> <b>CO</b> <b>39th Annual GWC Summer Water Conference: What Lies Beneath? Reasons to Care About Groundwater in the Southwest, Boulder.</b> University of Colorado School of Law, Wolf Law Bldg., Wittmyer Courtroom. Presented by the Getches Wilkison Center. For info: <a href="http://www.colorado.edu/law/research/gwc/events">www.colorado.edu/law/research/gwc/events</a>	<b>June 20-21</b> <b>NM</b> <b>Environmental Conditions of the Animas &amp; San Juan Watersheds 3rd Annual Conference, Farmington.</b> San Juan College. Presented by the New Mexico Environment Department. For info: <a href="https://animas.nmwrri.nmsu.edu/2018/">https://animas.nmwrri.nmsu.edu/2018/</a>
<b>May 21</b> <b>WA</b> <b>Wetlands in Wshington Seminar, Seattle.</b> Silver Cloud Hotel Seattle - Broadway. For info: Law Seminars Int'l, 206/ 567-4490 or <a href="http://www.lawseminars.com">www.lawseminars.com</a>	<b>June 3-7</b> <b>MN</b> <b>World Environmental &amp; Water Congress Conference, Minneapolis.</b> Hyatt Regency Hotel. Presented by American Society of Civil Engineers. For info: <a href="http://www.ewricongress.org">www.ewricongress.org</a>	<b>June 7-8</b> <b>WA</b> <b>Combating Climate Change in the Pacific Northwest, Seattle.</b> John Davis Conference Center, 1201 Third Avenue. For info: Law Seminars Int'l, 206/ 567-4490 or <a href="http://www.lawseminars.com">www.lawseminars.com</a>	<b>June 20-21</b> <b>CA</b> <b>2018 California Water Boards Science Symposium: Adapting in the Face of Disruptive Landscape Change, Sacramento.</b> Cal EPA, 1001 I Street, 9am-3:00 pm. Presented by the State Water Resources Control Board; Free - Registration Required. For info: <a href="http://www.waterboards.ca.gov/resources/data_databases/wq_science_symposium.shtml">www.waterboards.ca.gov/resources/data_databases/wq_science_symposium.shtml</a>
<b>May 21-22</b> <b>NY</b> <b>17th International Conference on Industrial Chemistry &amp; Water Treatment, Queens.</b> Hilton New York JFK Airport. For info: <a href="http://www.NyEventsList.com">www.NyEventsList.com</a>	<b>June 5-7 New Delhi (India)</b> <b>World Environment Expo - International Exhibition &amp; Conference on Environment Protection Technology, Green Innovation, Clean &amp; Green Energy, Eco-Friendly Products, Recycling &amp; Waste Management, Pragati Maidan.</b> Concurrent Events: World Environment Protection Congress (WEPC 18). For info: <a href="http://worldenvironmentexpo.com">worldenvironmentexpo.com</a>	<b>June 8</b> <b>CO</b> <b>Colorado Water Law 16th Annual Conference: New Drought Challenges, Legislation &amp; Solutions, Snowmass Village.</b> The Westin Resort. For info: CLE Int'l, 800/ 873-7130, <a href="mailto:live@cle.com">live@cle.com</a> or <a href="http://www.cle.com">www.cle.com</a>	<b>June 21</b> <b>OR</b> <b>Managing Stormwater in Oregon Conference, Salem.</b> Salem Convention Center. Presented by Northwest Environmental Business Council. For info: <a href="http://www.oregonstormwater.com">www.oregonstormwater.com</a>
<b>May 23-24</b> <b>NY</b> <b>5th World Conference on Climate Change &amp; Global Warming: "Abrupt Impacts of Climate Change", Queens.</b> Hilton New York JFK Airport. For info: <a href="https://climate.conferenceseries.com">https://climate.conferenceseries.com</a>			



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## CALENDAR

(continued from previous page)

### **June 25-26** **Argentina**

**Argentina Shale Water Management & Frac Sand Logistics Exhibition & Conference, Buenos Aires.** Emperador Hotel. For info: [www.argentina.shale-water-sand.com/?join=VR](http://www.argentina.shale-water-sand.com/?join=VR)

### **July 9-11** **TX**

**Managing Transboundary Groundwater Conference, Fort Worth.** Worthington Renaissance Fort Worth Hotel. Presented by American Water Resources Association. For info: [www.awra.org](http://www.awra.org)

### **July 16-20** **MT**

**Water Law in Indian Country - Summer Program, Missoula.** University of Montana School of Law; 9 am - 12 pm each day. Blewett School of Law 11th Annual Summer American Indian & Indigenous Law Program. For info: [umt.edu/indianlaw](http://umt.edu/indianlaw)

### **July 19-20** **WA**

**Tribal Water in the Pacific Northwest, Seattle.** Crowne Plaza Hotel. For info: Law Seminars Int'l, 206/ 567-4490 or [www.lawseminars.com](http://www.lawseminars.com)

### **July 19-21** **BC**

**64th Annual Rocky Mountain Mineral Law Institute, Victoria.** Victoria Conference Centre. For info: [www.rmmlf.org/](http://www.rmmlf.org/)

### **July 20** **OR**

**Agriculture Law Seminar, Bend.** The Oxford Hotel, 10 NW Minnesota Avenue. For info: The Seminar Group, 800/ 574-4852, [info@theseminargroup.net](mailto:info@theseminargroup.net) or [www.theseminargroup.net](http://www.theseminargroup.net)

### **July 22-24** **AZ**

**Arizona WaterReuse Symposium, Flagstaff.** Little America Hotel. Presented by WaterReuse. For info: [https://waterreuse.org/event/az-water-reuse-symposium/?instance\\_id=323](https://waterreuse.org/event/az-water-reuse-symposium/?instance_id=323)

### **July 31-August 3** **OR**

**2018 Western States Water Council Summer (187th) Meeting, Newport.** Best Western Agate Beach Inn. For info: [www.westernstateswater.org/upcoming-meetings](http://www.westernstateswater.org/upcoming-meetings)

### **August 1-3** **UT**

**Western Water Seminar, Park City.** Park City Resort. Presented by National Water Resources Assoc. For info: NWRA, [www.nwra.org/upcoming-conferences-workshops.html](http://www.nwra.org/upcoming-conferences-workshops.html)

### **August 2-3** **AZ**

**Arizona Water Law 26th Annual Conference: Reforms, Initiatives & In-Depth Legal Analysis, Scottsdale.** Hilton Scottsdale Resort. For info: CLE Int'l, 800/ 873-7130, [live@cle.com](mailto:live@cle.com) or [www.cle.com](http://www.cle.com)

### **August 13-15** **CO**

**StormCon Denver (2018): The Surface Water Quality Conference & Expo, Denver.** Hyatt Regency Denver at Colorado Convention Center. For info: <https://www.stormcon.com/>



## Managing Stormwater in Oregon

The Business of Stormwater Regulation and Compliance  
June 21, 2018 - Salem Convention Center

For Information: [www.oregonstormwater.com](http://www.oregonstormwater.com)