



# The Water Report™

Water Rights, Water Quality & Water Solutions in the West

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## SEA LEVEL RISE & WASTEWATER INFRASTRUCTURE

CURRENT CALIFORNIA GUIDANCE AND STRATEGIES

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### Introduction

As with most climate change initiatives, California is uniquely positioned in the sea level rise adaptation experiment. With over 3,000 miles of diverse tidal coastline, California is one of the states expected to be most affected by sea level rise. According to the California Fourth Climate Change Assessment (Assessment), sea level rise could cause over \$17 billion in damage to residential and commercial buildings by 2100. *Assessment, Statewide Summary Report* (January 16, 2019). While sea-side homes and commercial attractions are the most obvious casualties, sea level rise's impact to coastal wastewater infrastructure stands to have an exponentially greater effect on Californians living both inland and on the coast. In 2015, municipal wastewater treatment plants in California discharged approximately 417 billion gallons of treated effluent at 57 discharge locations into the Pacific Ocean or a coastal bay (*Heal the Ocean, Inventory of Municipal Wastewater Discharges to California Coastal Waters* (September 2018)).

In the San Francisco Bay alone, wastewater treatment plants have a combined average discharge of approximately 600 million gallons per day and serve over 5.7 million residents. Hummel, M.A. et al., *Sea Level Rise Impacts on Wastewater Treatment Systems along the U.S. Coasts* (2018). Wastewater management is a critical component of maintaining clean water supplies and much of the infrastructure is located within low-lying areas exposed to coastal flooding. While the last five years of studies have nearly all confirmed that wastewater treatment infrastructure is positioned to absorb most of the impact of surging tides, California is only in the early stages of developing tangible water policies directed toward protecting this critical infrastructure.

### Wastewater Treatment Facilities At Risk of Compromise By Sea Level Rise

California's water infrastructure is notorious for its newsworthy failures largely due to old pipes in critical need of replacement and repair. The average age of wastewater collection systems in California is approximately 40 years old. Some areas with older populations have collection systems over 100 years old, including the City of San Francisco. The American Society of Civil Engineers' most recent scorecard gave California's wastewater system a C+ (ASCE, *Report Card for California's Infrastructure* (May 2019)). While the scorecard explains that in practice this means that California's system is in "fair to good condition," it also means that the system shows "general signs of deterioration," requires attention, and in some ways "exhibit significant deficiencies in conditions and functionality, with increasing vulnerability to risk." *Id.* at 6. When viewed in light of California's remaining water infrastructure (levees, inland waterways, stormwater, and drinking water) — which have been given a C or D rating — many elements are approaching the end of their service life. These conditions raise significant concern for the risk of failure when faced with the oncoming threat of sea level rise. This is of particular concern for coastal jurisdictions that have combined wastewater and stormwater systems.

## Sea Level Rise

### Treatment Plant Impacts

### Vulnerable Bay Area Plants

A recent study analyzed the impact of sea level rise on 36 wastewater treatment plants in California. According to the study, wastewater treatment plants in the southern part of the San Francisco Bay were found to be considerably more exposed to marine flooding at low levels of sea level rise than plants in the northern part of the bay. More than half of the Silicon Valley, Palo Alto, San Mateo and Alvarado plants' surface area would be flooded by 2.46 feet of sea level rise. Hummel, M.A. et al., *supra* note 3. The study also looked at which plants would be affected by groundwater-induced flooding at increasing increments of sea level rise, assuming the groundwater table would increase linearly with sea levels. Overall, the Mt. View and Silicon Valley plants could experience over 75% groundwater inundation with only 0.8 foot of sea level rise, with Silicon Valley experiencing 100% inundation from marine flooding with just 1.6 feet of sea level rise. The Central Marin, Novato, Ellis Creek, Sonoma Valley, Ryder Street, Benicia and San Pablo plants would all experience significant inundation by 6.6 feet of sea level rise. Overall, across the region, 25% of the wastewater treatment plants in the study were projected to experience marine flooding of at least a quarter of their surface areas, and 28% would experience groundwater-induced flooding, with at least 3.3 feet sea level rise.

These findings are largely aligned with the results of a draft study commissioned by the Bay Area Association of Clean Water Agencies. In analyzing the risk of sea level rise to 37 wastewater treatment plants around the bay, it found that 15 facilities were already vulnerable to sea level rise. Bay Area Clean Water Agencies, Executive Board Meeting February 16, 2018. Additionally, by 2047, four plants would be impacted by 1.1 feet of sea level rise (Treasure Island, San Francisco International Airport, City of Burlingame, City of Palo Alto; by 2067, one plant would be impacted by 2.2 feet of sea level rise (South San Francisco-San Bruno Water Quality Control Plant); and by 2117, seven plants would be impacted by 6.6 feet of sea level rise (Fairfield Suisun Sewer District, Las Gallinas Valley Sanitary District, City of Benicia, Mt. View Sanitary District, Delta Diablo, City of Hayward, East Bay Municipal Utilities District).

**Table 1: Sea Level Rise (SLR) at which wastewater treatment plants in the San Francisco Bay area are projected to begin experiencing flooding impacts.** Adapted from Hummel, M.A. et al, *supra* note 3.

Sea Level Rise Amount	Year 2018 Guidance projects the SLR level at the San Francisco gauge	Marine Flooding	Groundwater Flooding
0.82 foot	2040-2050	San Mateo, Palo Alto, Paradise Cove	Silicon Valley, Mt. View, Sunnyvale, Alvarado, Hayward, San Mateo, SFIA, Oro Loma-Castro Valley, San Leandro, So. San Francisco-San Bruno, Central Marin, Benicia, Ryder Street, Novato, Ellis Creek, Sonoma Valley
1.64 feet	2070-2080	Alvarado, Silicon Valley	East Bay MUD
2.46 feet	2090-2100	Novato, Millbrae, Benicia	Millbrae
3.28 feet	2110-2120	Central Marin, SFIA, Mt. View, Sunnyvale	Burlingame
4.10 feet	2120-2130	Southern Marin, Oro-Loma-Castro Valley	San Pablo, Southern Marin, Soslcol
4.92 feet	2140-2150	So. San Francisco-San Bruno, Treasure Island, San Leandro, San Jose-Santa Clara, Ryder Street, San Pablo	Southeast, Tiburon
5.74 feet	2150	Pinole-Hercules	Paradise Cove
6.56 feet	unprojected	Soslcol, Hayward, East-Bay MUD	

### The Water Report

(ISSN 1946-116X)  
is published monthly by  
Envirotech Publications, Inc.  
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Eugene, OR 97402

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

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

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### Guidance and Jurisdiction

While there have been multiple studies that have independently modeled sea level rise broadly across the state, local jurisdictions are primarily responsible for studying asset-level impacts. State agencies have in turn provided guidance regarding best science and decision-making frameworks, largely leaving specific adaptation strategies to local managers to tailor.

### Ocean Protection Council (OPC) Guidance

In recognition of overlapping jurisdiction and varying degrees of scientific accuracy, in 2004, the California Legislature passed the California Ocean Protection Act. The Act created the Ocean Protection Council (OPC), which is responsible for protecting and conserving ocean and coastal resources.



## Sea Level Rise

### 2018 Guidance

### Sea Rise Projections

### Projections Table

OPC has taken steps to provide a practical science-based framework for managers and agencies to use while adapting to rising seas. In 2018, OPC issued the *State of California: Sea-Level Rise Guidance 2018 Update (2018 Guidance)* in coordination with the California Natural Resources Agency, the Governor's Office of Planning and Research, and the California Energy Commission. The *2018 Guidance* represents the best available science to support planning for sea level rise in California. OPC anticipates updating the *2018 Guidance* at a minimum of every five years to reflect the latest scientific understanding of climate change sea level rise in California.

The *2018 Guidance* projects sea level rise for representative tide gauge locations along the Pacific coastline and projects the likelihood of occurrence of certain sea level rise heights from 2030 to 2150. Guidance projections are based on greenhouse gas emissions scenarios provided by the latest Intergovernmental Panel on Climate Change. The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change. The guidance also includes an extreme scenario ("H++ scenario") developed for the Fourth National Climate Assessment. The H++ scenario assumes the loss of the West Antarctic ice sheet under high emissions scenarios.

**Table 2**

Probabilistic projection (feet) for the height of **Sea-Level Rise at the San Francisco** gauge  
**High Emissions Scenario**

The H++ projection does not have an associated likelihood of occurrence\*\*\*

Year	Median*	Likely Range**	H++ scenario
2030	.4	0.3-0.5	1.0
2040	.6	0.5-0.8	1.8
2050	.9	0.6-1.1	2.7
2060	1.1	0.8-1.5	3.9
2070	1.4	1.0-1.9	5.2
2080	1.7	1.2-2.4	6.6
2090	2.1	1.4-2.9	8.3
2100	2.5	1.6-3.4	10.2
2110	2.6	1.9-3.5	11.9
2120	3.0	2.2-4.1	14.2
2130	3.3	2.4-4.6	16.6
2140	3.7	2.6-5.2	19.1
2150	4.1	2.8-5.8	21.9

\*50% probability sea level rise meets or exceeds the projection.

\*\*66% probability sea level rise will fall between the projected range.

\*\*\*Adapted from OPC 2018 Guidance, supra note 10.

### Re-Siting or Adapting

#### The Coastal Commission and State Water Board Guidance

California's State Water Resources Control Board (SWRCB) and Regional Water Boards have taken a variety of actions to respond to climate change. However, policies and efforts to address re-siting or adapting coastal wastewater treatment plants threatened by sea level rise are lacking.

SWRCB Resolution No. 2017-0012 required California's Division of Water Quality and the Regional Water Boards to evaluate and make recommendations on the need to modify permits and other regulatory requirements to reduce vulnerability of wastewater infrastructure to flooding, storm surge, and sea level rise by July 1, 2018 (SWRCB, Resolution No. 2017-0012, *Comprehensive Response to Climate Change*). Otherwise, the SWRCB refers all Regional Water Boards to the OPC *2018 Guidance* when making recommendations on permits and other decisions to protect coastal infrastructure.

Additionally, while the California Coastal Commission has the responsibility to review applications for wastewater treatment facilities, the Coastal Commission's review authority is limited to new or expanded facilities, with limited provision for subsequent review of the siting of aging or at-risk infrastructure in coordination with the water boards (California Coastal Act, Public Resources Code §§ 30610(d), 30412(c)). The Coastal Commission has on at least on one occasion denied a permit to rebuild an aging wastewater treatment plant in its same location due in part to the threats to the site posed by climate change. The Coastal Commission reasoned that the new Morro Bay facility failed to avoid coastal hazards because the site was located in an area that would also be inundated in a 100-year storm event and could be exacerbated by sea level rise over time. The Coastal Commission has since adopted a sea level rise policy guidance in 2015, which was revised in 2018 to adopt the science from the OPC *2018 Guidance*. California Coastal Commission, *Sea Level Rise Policy Guidance, Interpretative Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits* (2018). The Coastal Commission recommends local governments use its guidance and the OPC *2018 Guidance* in relevant planning and permitting decisions. The Coastal Commission has also provided guidance regarding what local jurisdictions should consider in revising their local coastal programs with respect to wastewater treatment networks and systems — summarized in Table 3 (next page).

### Aging Infrastructure

### Guidance Update

## Sea Level Rise

### Revisions Guidance

**Table 3**

<b>Require Special Considerations for critical infrastructure/facilities</b>	<b>Minimize Adverse Effects of wastewater discharges</b>
<ul style="list-style-type: none"> <li>• Establish measures that ensure continued function of critical infrastructure, or the basic facilities, service, networks, and systems needed for the functioning of a community.</li> <li>• Establish a plan for managed relocation of at-risk facilities, and/or other measures to ensure functional continuity of the critical services provided by infrastructure at risk from sea level rise and extreme storms.</li> <li>• Develop a long-term management plan to address the complexities of planning for sea level rise that incorporates any potential maintenance, relocation, or retrofits and structural changes to critical facilities to accommodate changes in sea level, and obtain Coastal Commission certification.</li> <li>• Apply high sea level rise projections for siting and design of critical facilities.</li> <li>• Ensure that critical facilities are designed to function even if the highest projected amounts of sea level rise occur.</li> <li>• Wastewater treatment and disposal systems are often located in areas that will be impacted by sea level rise. Ensure that these systems are not adversely affected by the impacts of sea level rise over the full life of the structure and ensure that damage to these facilities would not result in impacts to water quality or other coastal resources. Avoid locating new facilities in hazardous areas. If complete avoidance is not possible, minimize elements of the system that are in hazardous areas (e.g., locate the main facility on higher ground and only place pump stations in potentially hazardous areas), and design any facilities in hazardous areas to withstand worst-case scenario impacts.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider establishing a program to retrofit, relocate, or eliminate ocean outfalls and other wastewater infrastructure deemed at risk. Alternatives include modifications to outfall lines, the use of green infrastructure, and redesign of waste and stormwater systems.</li> <li>• Add policies to ensure that new ocean outfalls, wastewater treatment facilities, and other facilities that could negatively impact water quality if flooded or inundated, are sited and designed to minimize impacts from sea level rise. Avoid construction of new stormwater outfalls and direct stormwater to existing facilities with appropriate treatment and filtration where feasible.</li> <li>• Consolidate new and existing outfalls where appropriate.</li> <li>• Coastal development permits for new ocean outfalls should consider sea level rise in the design.</li> </ul>

\*Adapted from the California Coastal Commission's 2018 Sea Level Rise Guidance at chapter 7, *supra* note 14.

### CEQA Review Triggered

### Evaluation Discretion

### Environmental Hazards

#### California Environmental Quality Act (CEQA)

In the event sea level rise triggers adaptation measures that would modify or relocate a wastewater treatment facility, environmental review under the California Environmental Quality Act (CEQA) may be triggered.

CEQA is primarily concerned with analyzing the impacts of a project on the existing environment. However, addressing climate change involves analyzing the impacts of the existing environment on the proposed project (or "CEQA-in-reverse").

California courts have created some uncertainty about how and when agencies should evaluate the effect of climate-related hazards on a project. In *Ballona Wetlands Land Trust v. City of Los Angeles*, 201 Cal.App.4th 455 (2d. Dist. 2011), the court found that the City of Los Angeles' environmental impact report was not required to discuss impacts of future sea level rise on a proposed development project. In *California Building Industry Association v. Bay Area Air Quality Management District*, 62 Cal.4th 369 (2015), however, the California Supreme Court held that while CEQA does not generally require an evaluation of existing conditions upon future occupants or users of a proposed project, a public agency retains the discretion to make such an evaluation when conducting an analysis of its own project. The CEQA guidelines were amended to reflect these decisions and clarify that agencies must consider whether the project's effects risk exacerbating existing environmental hazards (e.g., floodplains, coastlines, wildfire risk), taking into account both short-term and long-term conditions in those areas.



As agency guidance evolves and the impacts of sea level rise become more palpable, CEQA may eventually become a tool through which sea level rise and acute storm weather pattern analyses are further scrutinized and thereby force and/or require adaptation strategies as mitigation.

### Current Management Efforts

Many studies have been commissioned to model sea level rise projections. Studies conducted to determine best adaptation practices and strategies are, in comparison, lacking. Most studies have only explored the initial planning phase and developed frameworks for vulnerability analyses. Few have identified and/or begun implementing specific adaptation measures to protect wastewater treatment networks in the future. For instance, Santa Clara County has largely confirmed that wastewater treatment facilities within their boundaries will be impacted with 1.6 feet to 3.2 feet of sea level rise. Santa Clara County also makes a number of recommendations for adaptation strategies.

Santa Clara County recommendations include:

- equipment specifications, such as use of one-way valves at discharge points
- elevation of the site or sensitive components of the plants
- retrofitting sensitive components
- use of submersible components
- expansion of wastewater and stormwater drainage capacity
- construction of flood barriers

County of Santa Clara Office of Sustainability and Climate Action, *Silicon Valley 2.0 Climate Adaptation Guidebook* (August 2015).

However, these recommendations are not site specific and require further site-specific assessment to justify implementation. The following sections discuss the specific management efforts and/or recommendations that are currently being explored.

## Management Strategies

### Natural Processes

### Adaptation Measures

### San Francisco Adaptation Atlas

#### NATURE-BASED MEASURES AND WAYS FOR WASTEWATER TREATMENT PLANT PARTICIPATION

In April 2019, the San Francisco Bay Area Planning and Urban Research Association released a framework for identifying effective adaptation strategies that takes advantage of natural processes to protect infrastructure against sea level rise. This effort was funded by the San Francisco Bay Regional Water Quality Control Board. See San Francisco Estuary Institute & The Aquatic Science Center, *San Francisco Bay Shoreline Adaptation Atlas*.

The *San Francisco Shoreline Adaptation Atlas (Shoreline Atlas)* divides the San Francisco Bay into Operational Landscape Units (OLUs) that “shar[e] certain physical characteristics that would benefit from being managed as a unit to provide...desired ecosystem functions and services.” *Id.* at 16. The *Shoreline Atlas* is valuable because it presents managers in other areas of the state dealing with similar ecological landscapes a baseline for consideration of specific adaptation measures. The *Shoreline Atlas* recommends that managers plan for sea level rise consistent with extreme risk aversion (using the H++ model from the OPC 2018 Guidance) when planning to protect critical infrastructure — such as wastewater treatment plants — that have a low tolerance for risk.

The *Shoreline Atlas* presents four categories of adaptation measures:

- 1) nature-based measures
- 2) grey infrastructure such as physical conventional infrastructure (levees and seawalls)
- 3) policy and regulatory measures
- 4) financial measures to incentivize and disincentivize implementation of other structural and policy measures



## Sea Level Rise

### Nature-Based Measures

Nature-based measures include: nearshore reefs; submerged aquatic vegetation; mudflat augmentation; beaches; tidal marshes; polder (low-lying land protected by dikes) management; ecotone (habitat-transitional) levees; migration space preparation; creek-to-baylands reconnection; and green stormwater infrastructure (see Table 4, this page). All were analyzed and assigned to OLU capable of implementing the measure.

<b>Table 4</b>	
<b>Nature-Based Measure</b>	<b>Description</b>
<b>Nearshore Reefs</b>	Nearshore reefs have the ability to reduce wave transmission both directly and indirectly by trapping sediment and stabilizing the substrate so that bed elevation increases, and subsequently, attenuates waves. Oyster reefs do not occur naturally in San Francisco Bay, and are created from bags of oyster shells or structures such as reef balls. These nearshore reefs are best suited to shallow water in areas of low wave action, near mudflats.
<b>Submerged Aquatic Vegetation</b>	Refers to all underwater flowering plants, and can contribute to trapping sediment and slowing shoreline erosion.
<b>Mudflat Augmentation</b>	Mudflat augmentation refers to the direct or indirect placement of fine sediment to increase mudflat elevation relative to the tides, which can help protect adjacent marshes or other shoreline types. Mudflats dissipate wave energy through shoaling processes in shallow water and limit the size of waves reaching the marsh edge, which can limit marsh erosion.
<b>Beaches</b>	Coarser gravel and cobble beaches can dissipate wave energy over shorter distances and are generally more suitable within the urbanized and constrained estuary. They can be placed in front of levees, roads or other infrastructure vulnerable to wave overtopping, or in front of marshes vulnerable to erosion.
<b>Tidal Marshes</b>	Tidal marshes, in conjunction with tidal flats, can mitigate flood risk due to storm surges, waves, and tidal currents through a combination of shoaling and friction effects. Marshes help reduce wave runup on and erosion of levees, enabling landward seawalls or levees to be lower and reducing maintenance costs.
<b>Polder Management</b>	Polders are low-lying areas of land that would normally be inundated by regular tides if they were not protected by dikes. Methods such as warping and levee lowering may allow the more gradual introduction of sediment into polders, by natural means, to reduce the impacts of catastrophic dike failures. Agricultural polders can perform a dual purpose as detention basins, employing low-lying areas for water storage during storms to reduce downstream river levels and flooding. They could possibly be used in coastal areas to delay storm surge peaks so they do not coincide with high tides, and to reduce backwater effects along fluvial channels.
<b>Ecotone Levees</b>	Ecotone levees are gentle slopes or ramps (with a length to height ratio of 20:1 or gentler) bayward of flood risk management levees and landward of a tidal marsh. Ecotone levees can attenuate waves, provide high-tide refuge for marsh wildlife, and allow room for marshes to migrate upslope with sea level rise. Ecotone levees could be included in the restoration of marshes in polders. The gentler ecotone slope may reduce wave runup and overtopping of the crest of the flood risk management levee.
<b>Migration Space Preparation</b>	Migration space refers to areas at appropriate topographic elevations that could support estuarine-upland transition zones now and in the future with sea level rise. These are often natural wetland-upland transition zone areas adjacent to present and potential marshes that could be protected, enhanced, or restored to allow marshes to migrate landward as sea level rises. Areas that provide migration space will be critical for long-term adaptation of tidal marshes and offer opportunities for creative strategies such as purchasing land and restoring freshwater wetlands that could transition to salt marsh.
<b>Creek-to-Baylands Reconnection</b>	Reconnecting creeks to their adjacent baylands through levee breaching or removal is one approach to improve sediment, nutrient, and freshwater delivery to the baylands while achieving flood risk management and habitat benefits.
<b>Green Stormwater Infrastructure</b>	Green infrastructure tools include rain gardens, bioswales, cisterns/rainwater harvesting, permeable pavement, creek daylighting, green roofs, urban forestry and more. These tools help retain stormwater upland in an urban watershed to slow it down, allow time for water to percolate into the ground, or for reuse for beneficial purposes like irrigation before it is collected in storm drains and shunted to receiving waters. This can reduce storm sewer, creek, and combined sewer-related flooding, which will become increasingly important with sea level rise and increased storminess.

\*Adapted from Shoreline Atlas, *supra* note 17.

**Sea Level  
Rise****Hybrid  
Strategies****Agency  
Approval**

The nature-based processes are meant to be less expensive and more effective, especially when combined into a hybrid protection strategy over time. If hybrid strategies are pursued, the *Shoreline Atlas* recommends iterative decision-making in order to prepare the landscape prior to sea levels actually rising. The Baylands Ecosystem Habitat Goals Project does just that. For instance, when sea levels rise to 0.5 foot, the project intends to acquire land and restore it for migration space so that at two feet of sea level rise, it is prepared to accommodate marshes. Similarly, at two feet of sea level rise, levees will be realigned so that they are effective at four feet of sea level rise when the levees would be needed. Note, most of these nature-based measures will require approvals from multiple agencies such as: US Army Corps of Engineers; San Francisco Bay Conservation and Development Commission; San Francisco Bay Regional Water Quality Control Board; California Department of Fish and Wildlife; State Lands Commission; US Coast Guard; US Fish and Wildlife Service; and National Marine Fisheries Service. Review under the National Environmental Policy Act and CEQA will also be required, thereby extending the time necessary for these projects to be completed.

*Shoreline Atlas*

As noted previously, the Silicon Valley, San Mateo, Palo Alto, and Alvarado wastewater treatment plants are projected to be significantly impacted with just 0.8 foot to 1.6 feet of sea level rise. The *Shoreline Atlas* indicates that OLUs where these plants are located are equipped to implement nature-based measures to adapt to rising sea levels that could contribute toward protecting these plants.

**Table 5**

<b>Wastewater Treatment Plant</b> identified in Hummel et al.	<b>Most Suitable Nature-Based Measures</b> adapted from Shoreline Atlas, <i>supra</i> note 17.
<b>San Mateo WWTP</b>	San Mateo OLU - Submerged aquatic vegetation, beaches
<b>Silicon Valley Clean Water WWTP</b>	Belmont-Redwood OLU - Beaches, tidal marshes, polder management, and ecotone levees.
<b>Palo Alto Water Quality Control Plant</b>	San Francisquito OLU - Nearshore reefs, tidal marshes, ecotone levees
<b>Alvarado WWTP</b>	Alameda Creek OLU - Beaches, tidal marshes, Polder management, Ecotone levees, Migration space

**Nature-Based  
Options**

The *Shoreline Atlas* also identified the following OLUs with wastewater treatment plants that could contribute toward the creation and management of suitable nature-based adaptation measures:

Identified OLUs with nature-based measures potential are:

- Novato OLU. It is expected to be 27% inundated with just 0.8 foot of sea level rise and 100-year storm surge, and 51% inundated with 1.6 feet of sea level rise. A horizontal levee could make use of treated wastewater from the Novato Sanitary District's water treatment plant to create brackish marshes to reduce wave action on the downwind edges of polders.
- Petaluma OLU. It is expected to be 28% inundated with just 0.8 foot of sea level rise and 100-year storm surge, and 42% inundated with 1.6 feet of sea level rise. There are opportunities for the wastewater treatment plant discharges into Ellis Creek to be used for peat accretion, and slope wetlands with transition zones, with or without horizontal levees.
- Santa Clara Valley OLU. It is expected to be 54% inundated with 4.9 feet of sea level rise and 100-year storm surge. There are limited opportunities for upland transgression, but these could be increased by strategic placement of ecotone and/or horizontal seepage levees utilizing treated freshwater from the San Jose-Santa Clara Regional Wastewater Facility.

**Oro Loma-Castro Valley Horizontal Levee Experiment**

The Oro Loma Sanitary District has taken steps to examine the effectiveness of a horizontal levee to protect the Oro Loma-Castro Valley wastewater treatment plant. In 2012, the Oro Loma Sanitary District offered its site to test the effectiveness of a horizontal levee (*Oro Loma and Castro Valley Sanitary Districts to Test Experimental Levee* (2015)). The project broke ground on the experiment in 2015 and converted a 10-acre field along the bay's edge into an 8 million gallon holding basin connected to the adjacent horizontal levee. Whereas traditional levees have a 1:1 slope, the experimental horizontal levee has a 30:1 slope. The project took approximately two years to complete and cost \$9.1 million. Water entering the treatment facility will first go through a conventional treatment process, continue through a wet weather treatment basin, and then seep into the adjacent horizontal levee for additional treatment. See *Save the Bay, Oro Loma Horizontal Levee Vegetation Report* (November 1, 2017). The project will be monitored to evaluate both the success of the climate change protection features, as well as the capacity of the cells and sediment within the levee to treat wastewater flowing through from the holding basin.

**Horizontal  
Levee****Wastewater  
Treatment**



## San Francisco's Comprehensive Approach

## NATURAL PROCESSES AND BUILT STRUCTURES PROTECT SHORELINE WASTEWATER ASSETS

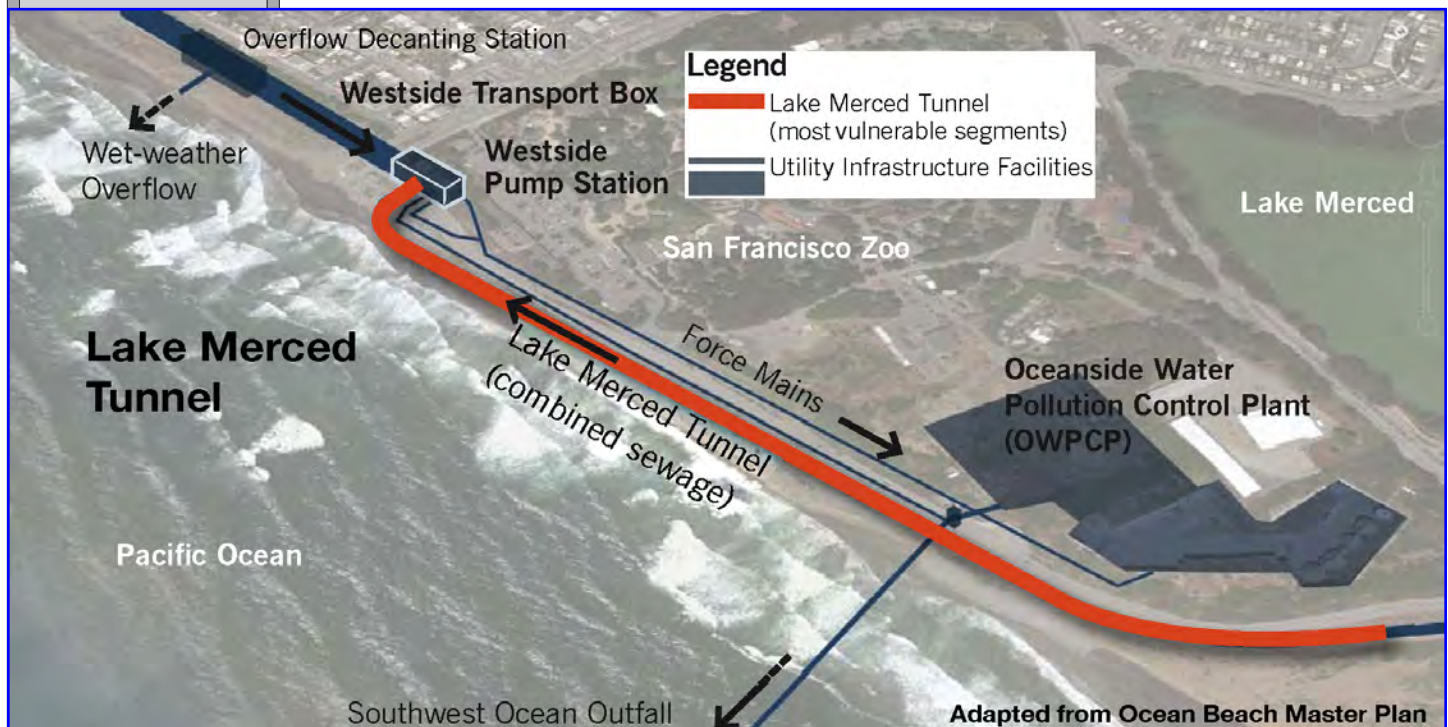
Erosion threatens the coastal combined wastewater and stormwater system on San Francisco's west side (ocean shore), where gravity brings combined sewage and stormwater flows to the Westside Pump Station. From the Westside Pump Station, the flow is pumped to the Oceanside Treatment Plant located along Ocean Beach. When the Treatment Plant is over-taxed during extreme weather events, the Lake Merced Wastewater Tunnel is used to retain the combined flow.

The San Francisco Public Utilities Commission (SFPUC) participated in the development of the Ocean Beach Master Plan (Master Plan) as a comprehensive strategy to address the threats sea level rise poses to San Francisco' west side — including area's wastewater management facilities (*see* References, below, for website).

The Master Plan (published 2012) contains six “Key Moves” designed to be implemented in stages. The Master Plan used the State of California’s 2010 Sea-Level Rise Interim Guidance Document that directs state agencies to plan for 14 inches of sea level rise by 2050 and 55 inches by 2100. Key Move 2 calls for a multipurpose coastal protection strategy that uses a combination of restoration and built structures to protect the existing Lake Merced Wastewater Tunnel in place with: (1) a low-profile hard structure; (2) a cobble berm or dynamic revetment, and placed sand; and (3) allowance for storm surges to wash over the tunnel and dissipate toward higher ground.

On May 10, 2018, San Francisco’s Local Coastal Plan (LCP) amendment was approved by the California Coastal Commission. The amendment addressed implementation of Key Moves 1 and 2 of the Master Plan related to sea level rise and coastal erosion, which were incorporated into the Western Shoreline Area Plan (San Francisco General Plan, Western Shoreline Area Plan). The LCP amendment commits the City to adopting managed retreat measures to protect existing wastewater and stormwater infrastructure from shoreline erosion and permit shoreline protection devices if necessary.

The SFPUC's Sewer System Improvement Program (SSIP) has also begun its comprehensive shoreline management and protection plan to protect the Lake Merced Tunnel, the Westside Pump Station, and the Oceanside Treatment Plant against bluff erosion and climate change-induced sea level rise. Short-term improvement analyses were completed in September 2018 with respect to erosion protection. The US Army Corps of Engineers is currently reviewing the design agreement, and the entire project, including long-term planning and implementation of short-term and long-term measures, is expected to cost \$126.8 million. *See* Wastewater Enterprise Programs 3rd Quarterly Report, Fiscal Year 2018-2019 (May 2019), CWWFAC01 - Ocean Beach Project. Overall, the SSIP is an integrated strategy that currently incorporates natural and built structures to protect San Francisco's aging wastewater infrastructure. The program is currently in Phase 1 — representing \$2.9 billion in investment. Quarterly reports discuss the progress made on specific projects across the city (*see* References, below, for website).





## Sea Level Rise

### Adaptation

#### CONCLUSION

While the OPC 2018 *Guidance* provides a conceptual framework to understand and address the threat of sea level rise, there remains a need for integrated management efforts across the many regulatory bodies responsible for siting, oversight, and management of wastewater treatment facilities. Additionally, many nature-based measures may not be presently allowable under existing permit conditions. Adaptation for wastewater treatment plants in particular requires proactive and thoughtful planning as many solutions — both nature-based and built — entail large-scale development, and may trigger protracted regulatory approval and environmental review. Managers also need to account for extreme storm events, which are typically associated with acute inundation that knocks infrastructure systems off-line, when developing its adaptation strategies.

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## Tribal Damage Claims

### “Right of Taking Fish”

### Stevens Treaties

### Culverts Case

### Supreme Court Decision

## TRIBAL RESOURCE DAMAGE CLAIMS

CULVERTS CASE IMPLICATIONS FOR TRIBAL TRUSTEESHIP AND NATURAL RESOURCE DAMAGE CLAIMS

by Connie Sue Martin, Schwabe Williamson & Wyatt (Seattle, WA)

*“The right of taking fish, at all usual and accustomed grounds and stations, is further secured to said Indians in common with all other citizens of the Territory, and of erecting temporary houses for the purpose of curing them, together with the privileges of hunting, gathering roots and berries, and pasturing their horses on open and unclaimed lands: Provided, however, That they shall not take shellfish from any beds staked or cultivated by citizens, and that they shall alter all stallions not intended for breeding-horses, and shall keep up and confine the latter.”*

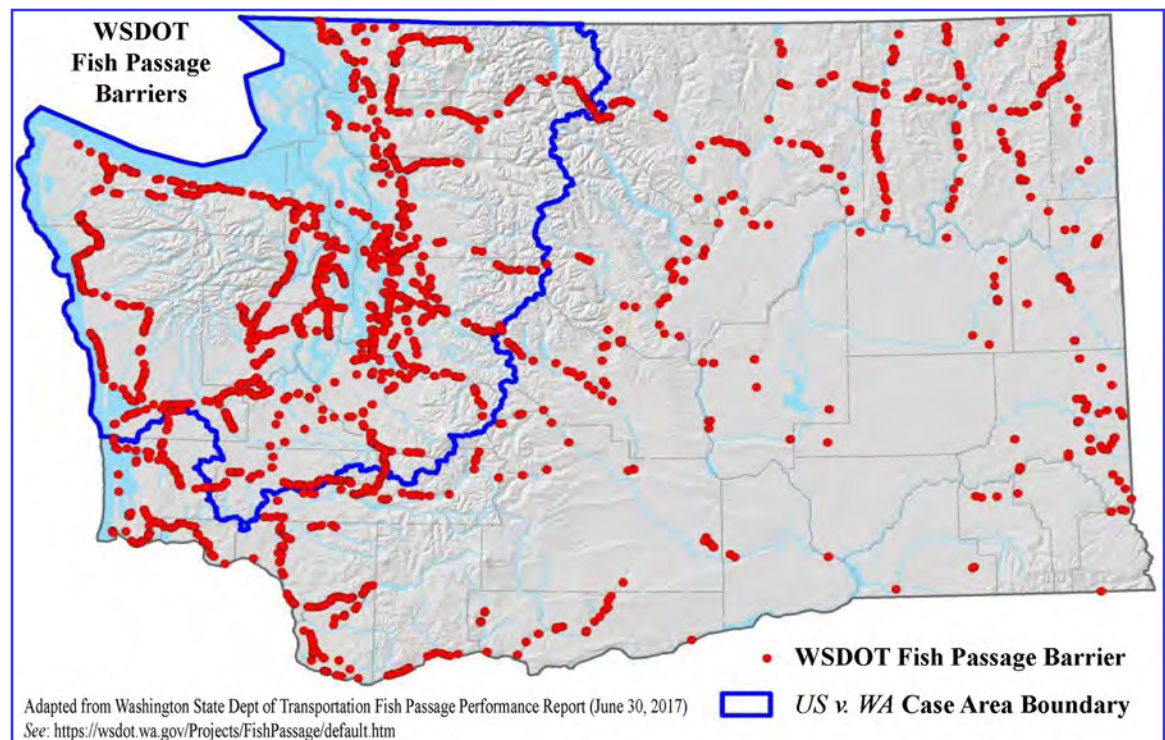
Art. 3, Treaty of Medicine Creek (1854).

### Introduction

On June 11, 2018 the United States Supreme Court issued its opinion in the “Culverts case.” This opinion was the latest installment in the long-running *U.S. v. Washington* treaty rights litigation that affirmed the rights of tribal signatories to the 1854-1855 Stevens Treaties to take 50% of the harvestable catch of salmon and steelhead in the case area in Washington State. (See the August 15, 2018 edition of *The Water Report* #174 for an excellent summary of the Culverts case, its potential implications, and a short history of tribal treaty fishing rights in Washington by Richard Du Bey, Andrew S. Fuller and Emily Miner).

The Culverts case was an appeal by the State of Washington of an injunction requiring the state to fix almost all of its remaining fish-blocking culverts by 2030, which the state asserted would cost more than \$2 billion. A core question posed by the case was whether the treaties guarantee some level of protection of salmon populations or merely promise the tribes an ever-diminishing share of diminishing fish runs — i.e., “the opportunity to ‘dip their nets’ into empty waters” (reference to a passage from Judge Orrick’s decision in *United States v. Washington*, 506 F. Supp. 187, 203 (W.D. Wash. 1980)).

The Supreme Court’s per curiam decision — a 4-4 tie after Justice Kennedy recused himself — meant that the Tribes’ and the United States’ victory in the court below was affirmed (per curiam decision is an opinion issued in the name of the court rather than specific judges). Consequently, the state must remove, replace, and repair fish passage-impairing culverts under state roads and highways.





<div data-bbox="159 176 305 302">Tribal Damage Claims</div> <div data-bbox="159 342 305 407">Habitat Protection</div> <div data-bbox="126 483 337 516">Damage Claims</div> <div data-bbox="126 657 337 722">CERCLA Cleanup Levels</div> <div data-bbox="151 867 313 932">Restoration Liability</div> <div data-bbox="151 1041 313 1106">Tribal Roles (Trustees)</div> <div data-bbox="159 1287 305 1388">Natural Resources Definition</div> <div data-bbox="134 1533 329 1598">Compensatory Damages</div> <div data-bbox="134 1740 329 1774">Residual Harm</div> <div data-bbox="126 1883 337 1917">Damages Extent</div>	<p>Opponents asserted that the decision will have broad implications. Eleven other states, Washington cities and counties, and private business, agricultural, and development interests filed amicus briefs in support of the state's position. They argued — among other potentially adverse outcomes — that the decision would confer a “seemingly limitless veto power over any and all activities that impact the salmon supply” in the case area (as the Washington State Association of Counties and Association of Washington Cities asserted in their brief).</p> <p>While it remains to be seen what, if any, impacts the Culverts case may have on state and local land use regulations, the environmental and natural resource implications of a treaty right to habitat protection are clear. This article discusses the intersection of tribal treaty rights under the Culverts case with tribal natural resource trusteeship and the assertion of tribal natural resource damage claims under the federal Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S. §9601 et. seq. (CERCLA). While natural resource damages may also be recovered under the Oil Pollution Act of 1990, 33 U.S.C. §2701 et. seq., this article focuses exclusively on claims under CERCLA.</p> <p style="text-align: center;"><b>Natural Resource Damage Claims: A Primer</b></p> <p>Most people have a passing familiarity with CERCLA's remedial side — the power of the US Environmental Protection Agency (EPA) to clean up uncontrolled or abandoned hazardous waste sites or respond to accidents, spills, or other releases of hazardous substances. EPA is empowered to seek out the parties responsible for those releases or hazardous waste sites and compel their cooperation in — and payment for — the cleanup. EPA decides what level of cleanup must be completed to be protective of human health and the environment. “Protective” does not mean “clean” in the sense that the environment is returned to its pre-release conditions.</p> <p>Restoring the environment to pre-release conditions happens on the restoration side of CERCLA. Section 107(f)(1) of CERCLA, 42 U.S.C. §9607(f)(1), provides that those persons responsible for the release of hazardous substances and liable for cleanup costs are also liable for “damages for injury to, destruction of, or loss of natural resources, including the reasonable cost /of assessing such injury, destruction or loss resulting from such a release.” Natural resource damage claims are brought by natural resource trustees. EPA is not a natural resource trustee.</p> <p>Congress expanded the role of Indian Tribes in both the remedial and the restoration sides of CERCLA in the 1986 Superfund Amendments and Reauthorization Act (SARA). Generally, the governing body of an Indian Tribe is to be “afforded substantially the same treatment as a State” with respect to many provisions of CERCLA (42 USC § 9626(a)). Section 107(f)(1) was amended to extend to specifically recognized Indian tribes as natural resource trustees with the authority to recover for injury to natural resources under their trusteeship.</p> <p>CERCLA broadly defines natural resources as including virtually any identifiable aspect of the natural environment, including:</p> <p style="padding-left: 40px;">[L]and, fish, wildlife biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States..., any State or local government, any foreign government, any Indian tribe, or, if such resources are subject to a trust restriction on alienation, any member of an Indian tribe.</p> <p>42 U.S.C. §9601(16).</p> <p>The damages available under CERCLA's Natural Resource Damage (NRD) provision are intended to be compensatory, not punitive. The public is to be made whole and the responsible party is required to pay only for the damages it caused. CERCLA provides that a tribe may recover damages for harm to natural resources belonging to, managed by, appertaining to, or held in trust for the benefit of the tribe. 42 U.S.C. §9607(f)(1). Indian tribes may recover for harm to natural resources both on- and off-reservation, on lands and waters where tribes have reserved treaty rights to hunt, fish, and gather.</p> <p>An NRD claim usually seeks to recover for residual harm to natural resources, assessed after any remedial action which EPA (or another authorized agency with cleanup authority) has selected and completed, or after the likely effects of the remedial action on natural resources has been taken into account.</p> <p style="padding-left: 40px;">[C]ustomarily, natural resource damages are viewed as the difference between the natural resource in its pristine condition and the natural resource after the cleanup, together with the lost use value and the costs of assessment. As a residue of the cleanup action, in effect, [damages] are thus not generally settled prior to the cleanup.</p> <p><i>In re Acushnet River &amp; New Bedford Harbor: Proceedings re Alleged PCB Pollution</i>, 712 F. Supp. 1019, 1035 (D. Mass. 1989).</p>
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## Tribal Damage Claims

### Measure of Damages

### Remedy Alternatives

### Original Case & Subproceedings

The measure of damages is the cost of restoration, rehabilitation, replacement and/or the acquisition of the equivalent of the injured natural resources and the services those resources provide. Damages may also include, at the discretion of the trustee, the compensable value of all or a portion of the services lost to the public for the time period from the discharge or release until the attainment of the restoration, rehabilitation, replacement and/or acquisition of the equivalent of the resources and the return of those services to baseline levels (pre-spill or pre-release).

Thus, to summarize, the measure of damages is the cost of restoration plus the value of lost services provided by the damaged resource, plus the costs of assessment. The goal of restoration is to return the resource to its pre-release or baseline level.

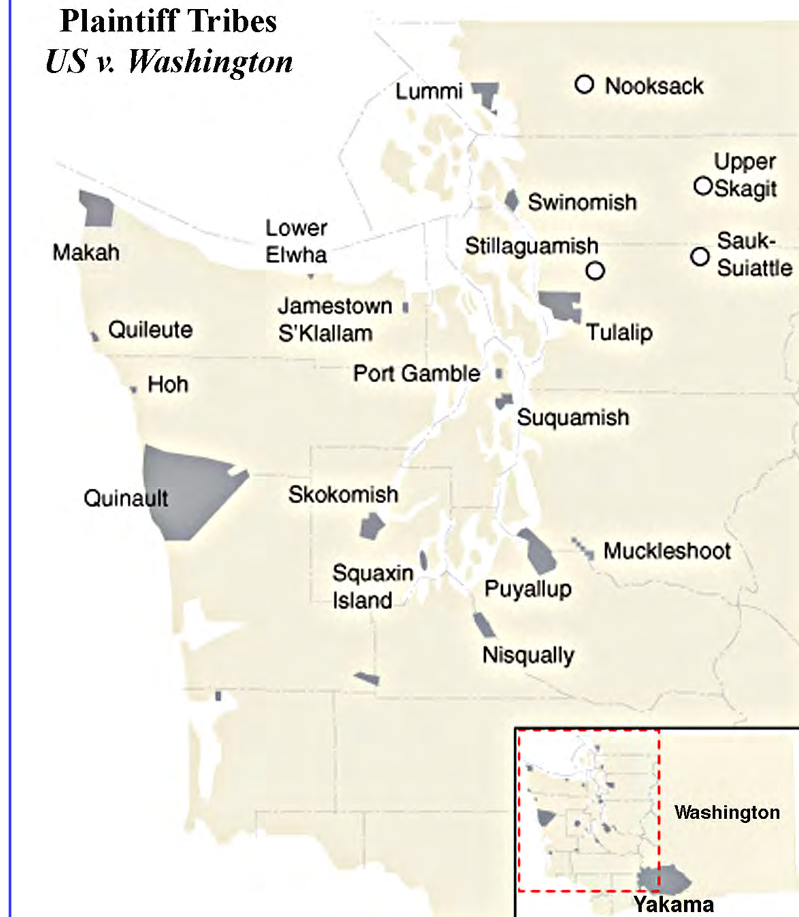
The trustee is required to develop a reasonable number of possible alternatives to remedy the damages. The trustee then chooses the alternative he or she determines is the most appropriate from among the possible alternatives. The alternatives are limited to those actions that restore, rehabilitate, replace, and/or acquire the equivalent of the injured resource and service to no more than their baseline (i.e., the way the resource would have been had the discharge or release never occurred).

One critical aspect of establishing a right to natural resource damages is proving trusteeship over the injured resource. As we approach the intersection between the Culverts case and tribal NRD claims, we must take a short detour to recount some relevant history.

#### The Culverts Case: Establishing A Treaty Right to Habitat

The original *U.S. v. Washington* case was filed in 1970. Interestingly (and sometimes maddeningly for the occasional newly-appearing attorney), the original case — U.S. District Court for the Western District of Washington Case No. 2:70-cv-09213 — is still active, with more than 21,900 docket entries. When new disputes arise among one or more tribes, between tribes and the state, or between tribes and individual shellfish companies with disputes over tidelands, the matter is filed under the original case number as a new subproceeding. Since the 1974 decision affirming the Tribes' treaty rights to fish, there have been 58 subproceedings. The Culverts case was subproceeding number 01-01, filed in 2001. However, a treaty right to habitat actually had its origin in what is commonly referred to as the "Phase II" litigation (with "Phase I" being the establishment of the treaty right to 50% of the harvestable catch in 506 F.Supp. 187 (W.D. Wash. 1974)).

#### Plaintiff Tribes *US v. Washington*





<div data-bbox="159 180 300 306"><b>Tribal Damage Claims</b></div> <div data-bbox="136 344 321 378"><b>Habitat Right</b></div> <div data-bbox="154 554 303 621"><b>Judgement Reversed</b></div> <div data-bbox="149 695 308 760"><b>Declaratory Relief</b></div> <div data-bbox="116 1008 339 1039"><b>“Concrete Facts”</b></div> <div data-bbox="144 1115 313 1148"><b>Fish Passage</b></div> <div data-bbox="144 1430 313 1497"><b>Degradation Impacts</b></div> <div data-bbox="139 1570 318 1638"><b>Treaty-Based Duty</b></div> <div data-bbox="110 1850 347 1881"><b>Tribes &amp; CERCLA</b></div>	<p>On September 26, 1980, Judge William Orrick decided the question of whether the treaty fishing right reserved to tribes a right to have the fishery resource protected from adverse environmental actions or inactions of the state in the affirmative, holding:</p> <p>[T]here can be no doubt that one of the paramount purposes of the treaties in question was to reserve to the tribes the right to continue fishing as an economic and cultural way of life. It is equally beyond doubt that the existence of an environmentally-acceptable habitat is essential to the survival of the fish, without which the expressly-reserved right to take fish would be meaningless and valueless. Thus, it is necessary to recognize an implied environmental right in order to fulfill the purposes of the fishing clause.</p> <p><i>United States v. Washington</i>, 506 F. Supp. 187, 205 (W.D. Wash. 1980).</p> <p>Judge Orrick concluded that the duty to refrain from degrading the fish habitat to an extent that would deprive tribes of their moderate living needs is imposed upon the state, the United States, and third parties. <i>Id.</i> at 208.</p> <p>On appeal, the 9th Circuit reversed the declaratory judgment regarding the implied environmental right, finding that it created a rule that was too imprecise to enforce:</p> <p>The legal standards that will govern the State’s precise obligations and duties under the treaty with respect to the myriad State actions that may affect the environment of the treaty area will depend for their definition and articulation upon concrete facts which underlie a dispute in a particular case. Legal rules of general applicability are announced when their consequences are known and understood in the case before the court, not when the subject parties and the court giving judgment are left to guess at their meaning. It serves neither the needs of the parties, nor the jurisprudence of the court, nor the interests of the public for the judiciary to employ the declaratory judgment procedure to announce legal rules imprecise in definition and uncertain in dimension. Precise resolution, not general admonition, is the function of declaratory relief. These necessary predicates for a declaratory judgment have not been met with respect to the environmental issue in this case.</p> <p><i>United States v. Washington</i>, 759 F.2d 1353, 1357 (9th Cir. 1985).</p> <p>In 2001, the treaty Tribes believed they had the “concrete facts” to underlie an environmental right implied in the treaties that the 9th Circuit had held were lacking in the Phase II litigation.</p> <p>Simply put, the central facts are these: anadromous fish, such as salmon, hatch and spend their early lives in fresh water, migrate to the ocean to mature, and return to their waters of origin to spawn. Roads often cross streams that salmon and other anadromous fish use for spawning. Road builders construct culverts to allow the streams to flow underneath roads, but many culverts do not allow fish to pass easily. Sometimes they do not allow fish passage at all.</p> <p>Four state agencies are responsible for building and managing Washington State’s roads and the culverts that pass under them: the Washington State Department of Transportation (WSDOT), the Washington State Department of Natural Resources (WSDNR), the Washington State Parks and Recreation Commission (State Parks), and the Washington Department of Fisheries and Wildlife (WDFW). Of these, WSDOT, the agency responsible for Washington’s highways, builds and maintains by far the most roads and culverts.</p> <p>The state has acknowledged that hundreds of culverts under state-owned roads and highways were impassible by fish. These culverts were either not designed or constructed with fish passage in mind or had become blocked over time.</p> <p>The involved culverts were degrading fish habitat so that adult fish production was reduced, which in turn reduced the number of fish available to be harvested by the Tribes — in violation of the treaties.</p> <p>Twenty-one Washington Tribes, joined by the United States, filed Subproceeding 01-01 and asked the court to find that the state has a treaty-based duty to preserve fish runs and habitat, and to compel the state to repair or replace state-constructed and state-operated culverts that impede salmon migration within five years of the date of judgment. The Culverts case was born.</p> <p style="text-align: center;"><b>The Scope of Natural Resource Trusteeship</b></p> <p>The statutory provisions in CERCLA recognizing a federally recognized tribe as a trustee with standing to assert NRD claims is just the starting point. It begs the questions of what a tribe is and what natural resources a tribe has trusteeship over.</p> <p>A tribe under CERCLA is “any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village but not including any Alaska Native regional or village corporation, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians” — that is, a federally recognized tribe. 42 U.S.C. § 9601(36). State-recognized tribes are not trustees under CERCLA.</p>
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<div data-bbox="159 180 302 306">Tribal Damage Claims</div> <div data-bbox="147 344 311 375">Co-Trustees</div> <div data-bbox="126 590 334 659">Perils of Co-Trusteeship</div> <div data-bbox="108 800 352 831">Claims Limitation</div> <div data-bbox="151 1010 311 1079">Trusteeship Scope</div> <div data-bbox="151 1255 311 1325">Segregating Damages</div> <div data-bbox="134 1501 326 1602">Differentiated Overlapping Interests</div> <div data-bbox="134 1850 326 1881">Trustee Scope</div>	<p>The question of what natural resources a tribe has trusteeship over — resources that belong to, are managed by, controlled by, or appertain to a tribe — is a more difficult question. CERCLA's statutory framework envisions the possibility of co-trusteeship among federal, state and tribal trustees:</p> <p style="padding-left: 40px;">Liability shall be to the United States...and to any State...and to any Indian Tribe for natural resources belonging to, managed by, controlled by, or appertaining to such tribe, or held in trust for the benefit of such tribe... .</p> <p>42 U.S.C. § 9607(f)(1) (emphasis added).</p> <p>Courts interpreting CERCLA have reached the same conclusion. For example, a District Court in Colorado held that the United States and Colorado were co-trustees for the natural resources affected by the Rocky Mountain Arsenal near Denver, Colorado. <i>U.S. v. Shell Oil Co.</i>, 605 F. Supp. 1064, 1080 (D. Colo. 1985). Similarly, in the NRD litigation surrounding the Bunker Hill superfund site, the Idaho District Court held that more than one trustee could manage, control, or hold in trust a given natural resource. <i>U.S. v. ASARCO, Inc.</i> 471 F. Supp. 2d. 1063, 1068 (D. Idaho 2005) (<i>Coeur D'Alene II</i>).</p> <p>The first Bunker Hill decision also demonstrated some of the perils of co-trusteeship. The trustees at the Bunker Hill site were federal agencies, the State of Idaho, and the Coeur d'Alene Indian Tribe. The state settled out its NRD claims against the responsible parties early. When the Tribe and the federal agencies sought to prosecute their NRD claims, the responsible parties argued that their NRD liability had been resolved by their settlement with the state and the other trustees' claims were barred.</p> <p>The court allowed the tribal and federal trustees to proceed to trial, but held that where two or more trustees claim an interest in a resource, their right to recovery would have to be proved by each at trial. <i>Coeur d'Alene Tribe v. ASARCO, Inc.</i>, 280 F. Supp. 1094 (D. Idaho 2003) (<i>Coeur D'Alene I</i>). Because the state had settled out, the federal and tribal trustees could not recover for injury to resources owned or controlled by the state, thereby limiting — potentially very significantly — the amount of the federal and tribal NRD claims. The court also defined the scope of natural resource trusteeship. In order to assert an NRD claim, each trustee had to demonstrate that it exercises hands-on, day-to-day management authority over a given resource. "Mere statutory authority" would be insufficient to establish a trustee relationship, because power that is not exercised is not management or control. <i>Coeur D'Alene I</i> at 1115-1116.</p> <p>Two years later, the Idaho District Court reversed itself sua sponte (on its own motion), holding that the language of the statute dictates that a co-trustee acting individually or collectively with the other co-trustees could proceed against the responsible party for the full amount of the damage, less any amount that has already been paid as a result of a settlement to another trustee by a responsible party. <i>U.S. v. ASARCO, Inc.</i> 471 F. Supp. 2d. 1063, 1068 (D. Idaho 2005) (<i>Coeur D'Alene II</i>). The Idaho District Court further held that if there is later disagreement between the co-trustees, that disagreement would have to be resolved by successive litigation between them. <i>Id.</i> at 1068.</p> <p>Another peril of co-trusteeship was demonstrated by the 10th Circuit Court of Appeals in the <i>State of Oklahoma v. Tyson Foods, Inc.</i>, 619 F.3d 1223 (10<sup>th</sup> Cir. 2010) (<i>Tyson Foods</i>). Oklahoma sued Tyson over its annual disposal of hundreds of thousands of tons of poultry waste in the Illinois River Watershed. The state sought damages for pollution to the watershed as a whole, even though both the state and the Cherokee Nation claim interests in natural resources in the watershed. The state made no effort to differentiate, segregate, or exclude damages for injury to tribal lands and water rights. The court held that the state lacked standing to assert an NRD claim for injury to resources it does not own or hold in trust — and dismissed the case.</p> <p>In another case from Oklahoma, the Quawpaw Tribe successfully asserted NRD claims for injury to terrestrial and aquatic resources at the Tar Creek superfund site. The defendants moved to dismiss, arguing that failure to join the State of Oklahoma required dismissal under the <i>Tyson Foods</i> precedent because of the state's overlapping interest in aquatic or land-based wildlife or waterways running through tribal land. In response, the Tribe amended its claim to seek relief only for NRD for injury to plant life on tribal lands. The Oklahoma District Court held that the Tribe had resolved the <i>Tyson Foods</i> problem because the state had no interest in plant life or habitat on tribal lands and thus was not a required party. <i>Quapaw Tribe v. Blue Tee Corp.</i>, 2010 U.S. Dist. LEXIS 86064 (N.D. Okla. Aug. 20, 2010).</p> <p style="text-align: center;"><b>CONCLUSION</b></p> <p style="text-align: center;"><b>IMPLICATIONS OF THE CULVERTS CASE ON NRD CLAIMS</b></p> <p>Demonstrating trusteeship over natural resources is a necessary element in a natural resource damage claim. As noted above, a trustee need not own the resource in order to assert its interests as a trustee. Rather, recovery may be had for injury to natural resources "belonging to, managed by, controlled by, or appertaining to" federal, state, and tribal trustees, or resources held in trust for the benefit of the tribal trustee.</p>
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**Tribal  
Damage  
Claims****Resource  
Ownership  
v.  
Trusteeship****Tribes as  
Co-Managers****Off-Reservation  
Rights****Tribal Rights****"Appertaining  
To"****Hunting Right  
Unsettled****Culvert Case  
Precedent**

Indeed, although natural resource trustees routinely seek to recover NRD for injuries to wild fish, birds, or animals within their borders, they do not own those resources. The United States Supreme Court (Supreme Court) has long recognized that "[n]either the State nor the Federal Government, any more than a hopeful fisherman or hunter, has title to these creatures until they are reduced to possession by skillful capture." *Douglas v. Seacoast Products, Inc.*, 431 U.S. 265, 284, 97 S. Ct. 1740, 1751, 52 L. Ed. 2d 304 (1977) (citations omitted).

Tribal trustees may claim trusteeship over a wide range of resources under the "appertaining to" language of CERCLA. According to Black's Law Dictionary, "appertaining" means "connected with in use or occupancy" and "to appertain" is "to belong to; have relation to; to be appurtenant to." Black's also tells us that a thing is "appurtenant" when it stands in relation to something and is necessarily connected with the use and enjoyment of that something. "A thing is...appurtenant to land when it is by right used with the land for its benefit, as in the case of a way, or water-course...across the land of another."

The Supreme Court recognizes tribes as co-managers of natural resources both with states and with the federal government in its treaty-making role. "[A]n Indian tribe's treaty rights to hunt, fish, and gather on state land are not irreconcilable with a State's sovereignty over the natural resources in the state...Indian treaty rights can coexist with state management of natural resources. Although States have important interests in regulating wildlife and natural resources within their borders, this authority is shared with the Federal Government when the Federal Government exercises one of its enumerated constitutional powers, such as treaty making." *Minnesota v. Mille Lacs Band of Chippewa Indians*, 526 U.S. 172, 204, 119 S. Ct. 1187, 1204, 143 L.Ed.2d 270, 296 (1999) (upholding off-reservation reserved rights of Milles Lac Band of Chippewa Indians); *Washington v. Washington State Commercial Passenger Fishing Vessel Assn.*, 443 U.S. 658, 61 L. Ed. 2d 823, 99 S. Ct. 3055 (1979) (affirming off-reservation reserved rights of fisheries of numerous tribes located in Washington state); *Kimball v. Callahan*, 590 F.2d 768 (9th Cir. 1979) (recognizing off-reservation reserved rights of the Klamath Tribes); *see also Antoine v. Washington*, 420 U.S. 194, 43 L. Ed. 2d 129, 95 S. Ct. 944 (1975).

Tribal trusteeship can arise from treaties or Executive Orders by the President. Tribal trusteeship applies to both *on-reservation* resources (including reserved water rights) and to *off-reservation* resources where tribes exercise hunting, fishing, and gathering rights. In the Culverts case, the 9th Circuit found that the state's barrier culverts within the case area block approximately 1,000 linear miles of streams suitable for salmon habitat (almost five million square meters). It further found that if those culverts were replaced or modified to allow free passage of fish, several hundred thousand additional mature salmon would be produced every year and would be available to the Tribes for harvest. *United States v. Washington*, 853 F.3d at 966.

One implication of the Culverts case is that, arguably, all of that approximately 1,000 linear miles of streams suitable for salmon habitat are natural resources appertaining to the Tribes' treaty-protected resource, over which a Tribe could assert trusteeship for purposes of a natural resource damage claim.

What's more, in addition to the well-established fishing right, the Stevens Treaties also reserved in the Tribes the right to hunt as well as to gather roots and berries on "open and unclaimed lands." The issue of the Stevens Treaties hunting right is generally considered to not yet be settled at the federal level, although the Washington State Supreme Court has held that the "open and unclaimed" land language of the treaties (in that case, the Treaty of Point Elliott) applied only to land within a Tribe's "ceded" areas under the treaties, or other "traditional" areas. *State v. Buchanan*, 138 Wash.2d 186, 978 P.2d 1070 (1999), *cert. denied*, 528 U.S. 1154 (2000).

The geographic scope of the Stevens Treaties hunting right is not clear. Most Tribes maintain that because the treaties contain no geographic limit, there is none. There is support for this assertion in *United States v. Michigan*, a case adjudicating the treaty rights of Michigan tribes to fish in waters of the Great Lakes. *See* 471 F. Supp. 192 (W.D. Mich. 1979); *see also, Choctaw Nation of Indians v. United States*, 318 U.S. 423, 431-32, 63 S. Ct. 672, 87 L. Ed. 877 (1943).

Even without a formal adjudication of the geographic scope of the treaty hunting right, the Culverts case still may provide a basis for demonstrating trusteeship over a resource for purposes of tribal NRD claims.

**FOR ADDITIONAL INFORMATION:**

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**Connie Sue Martin**, a member of Schwabe Williamson and Wyatt's Natural Resources Industry Group, is an environmental and natural resources lawyer and leads the firm's Indian law practice. She was counsel of record for the Nooksack Indian Tribe in the Culverts case, which was argued before the United States Supreme Court on April 18, 2018.

Permeable Pavement
Separated Sewer System
Green Savings
Climate Change Adjustments
Replacement Benefits
Decision Matrix
Treatment & Flow Benefits

PERMEABLE PAVEMENT BENEFITS

UTILIZING PERMEABLE PAVEMENT TO MEET TODAY’S NEEDS WHILE PLANNING FOR THE FUTURE

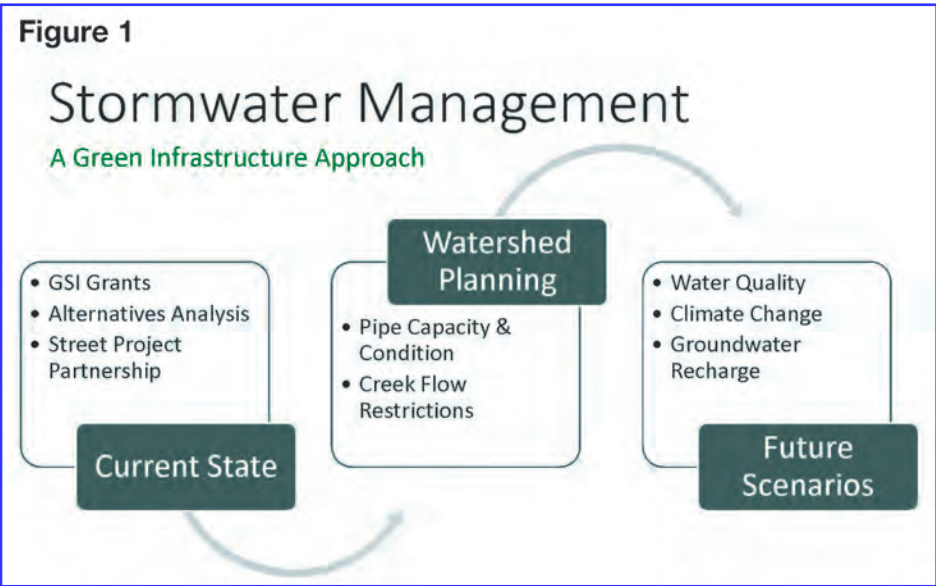
by Dana B. de Leon, PE, City of Tacoma Environmental Services (Tacoma, WA)

Introduction

CITY PLANNING – STORMWATER OPTIONS

The City of Tacoma, Washington (population 200,000) comprises 62 square miles of ultra-urban landscape. The City has a separated sewer system with 588 miles of storm pipes. As of today, less than 10% of Tacoma’s stormwater runoff from our 62 square miles is treated. As Tacoma plans for the future, we are considering stormwater scenarios that may put significant strain on the City’s resources.

Traditional stormwater treatment and flow control could cost the ratepayers of Tacoma \$12-\$18 billion using current technology. To reduce the burden on our citizens, Tacoma’s watershed planning efforts and Green Stormwater Infrastructure (GSI) approach are proving vital to the City becoming more resilient and sustainable. GSI analysis prioritizes efforts and identifies resources that have the most impact (see Figure 1: Stormwater Management, A Green Infrastructure Approach).



Tacoma has completed a condition assessment of our conveyance system and determined that less than 5% needs to be replaced. However, these pipes are not sized to current or future standards. Climate change may lead to more frequent and intense storms, overwhelming our stormwater system and further damaging receiving waters.

As roadways fail, the City can replace them with permeable pavement, allowing us to leave the existing undersized stormwater system in place. This provides cost savings today and reduces flows in the system. In the event that future regulations require end of pipe treatment, the City will need to treat far less flows.

Tacoma developed a decision matrix that prioritizes permeable pavement in residential roadways and bioretention on arterials and in business districts (see Figure 2: Watershed Planning GSI Decision Matrix). Where feasible, Tacoma prioritizes regional stormwater treatment facilities in areas that discharge into marine waters of Puget Sound (72% of the City discharges). The remaining 28% of City’s land contributes stormwater to creeks requiring flow control. In these watersheds, Tacoma is utilizing GSI to supplement the capacity of existing regional holding basins to protect our freshwater creeks.

Pervious Pavement Advances in Tacoma, Washington.

Over 10 years, the City of Tacoma has constructed more than eight acres of permeable parking lots and 50 residential blocks of permeable pavement. Fifty more permeable residential blocks are to be constructed this biennium. A combined total of 80 acres are currently infiltrating stormwater back into the ground.

Tacoma is continuing to improve cost analysis, design, construction, and maintenance of pervious pavement projects. The success of these projects has led to incorporating pervious pavement into our decision matrices and watershed planning efforts. These plans help us meet stormwater treatment/flow control requirements and address climate change issues.

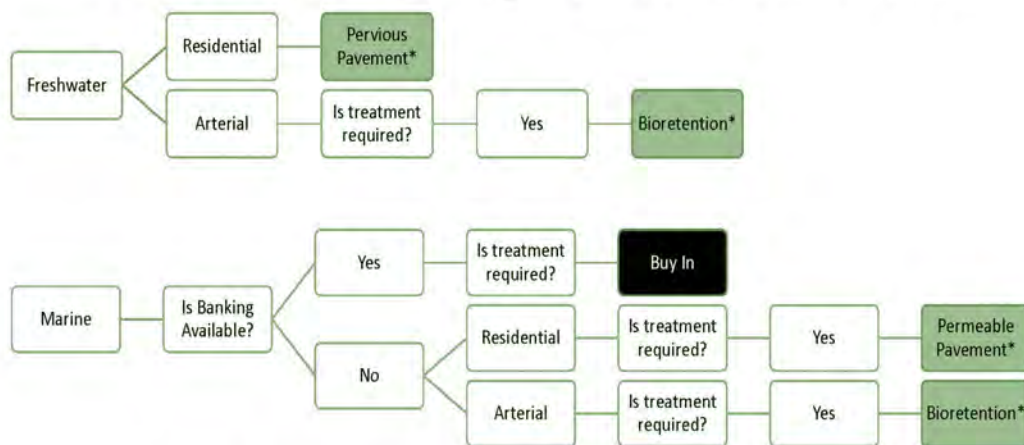


## Permeable Pavement

### GSI Matrix

**Figure 2**

### Watershed Planning GSI Decision Matrix



\* Preferred Infrastructure: A feasibility & lifecycle cost analysis still required

### Pervious Pavement Verses Alternatives

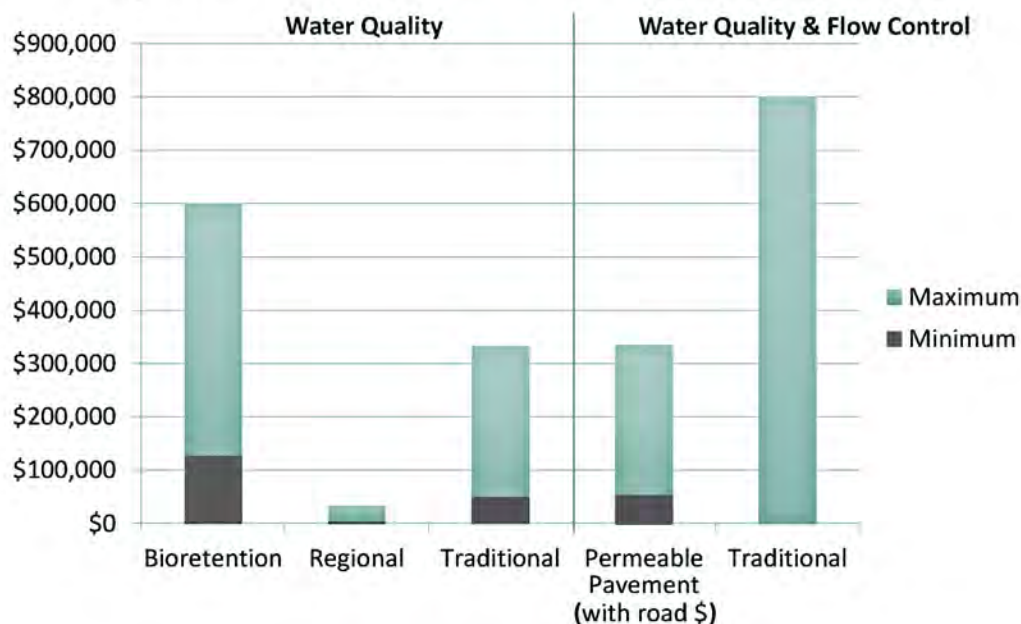
#### Pavement Savings / Funding Partnership

One significant barrier to permeable pavement projects is how to fund them. Roadway and stormwater funding typically come from two different funding sources. The City has developed a partnership between stormwater and roads funding, leveraging funds to improve Tacoma's neighborhoods, receiving waters, and aquifer. This partnership has revealed a whole project cost savings of 30-80% depending on project stormwater mitigation requirements. This provides a cost savings to both roadway and stormwater funds. The stormwater cost analysis at Tacoma's Cheney Stadium showed pervious pavement was half the cost of traditional pavement and stormwater facility design.

When compared to other water quality only and water quality/flow control facilities, the capital cost per contributing acre for Tacoma's permeable pavement projects has proven very competitive (see Figure 3: Capital Cost per Contributing Area).

**Figure 3**

### Capital Cost per Contributing Acre



### Cost Benefits

## Permeable Pavement

### Glacial Soils

### Maintenance Benefits

### Road Replacement

#### Bioretention v. Permeable Pavement

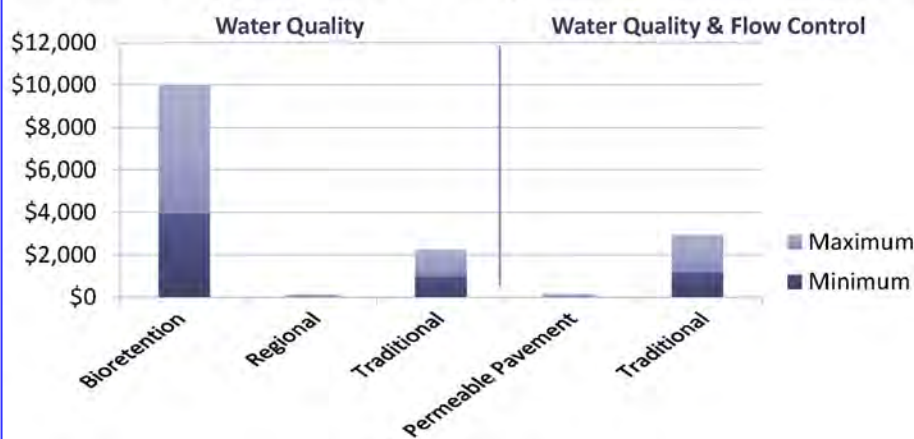
Many jurisdictions are turning to bioretention (*see sidebar below*) to reduce flows and improve water quality. There are two main drivers that have contributed to Tacoma focusing on permeable pavement.

First, our City's landscape was carved out by glaciers — over 80% of the land is mapped as glacially consolidated soils. For green infrastructure to be successful in these types of soil conditions a large surface area is required. This area requirement — which is very difficult to achieve with bioretention — can be achieved with permeable roadways. Most of our permeable pavement projects were constructed with native soils with an infiltration rate of less than 0.3 inches per hour, which is considered feasible. Bioretention has also proven to be very maintenance intensive, which results in significant whole life costs. Permeable pavement's annual maintenance costs per contributing acre is far less than bioretention and other types of stormwater facilities (*see Figure 4: Annual Maintenance Cost per Contributing Acre*).

Second, when the City first embarked on permeable pavement projects, over 50% of the roadways were in a failed condition and there was no funding for residential roadways. Permeable roadways have additional funding sources available for construction and this additional funding is ultimately what opened the door for permeable pavement in Tacoma. While replacing failed roadways with permeable pavement is cost effective, it would likely not be cost effective to replace a good roadway with permeable pavement just to achieve stormwater mitigation.

**Figure 4**

#### Annual Maintenance Cost per Contributing Acre



### Standards Lacking

#### Developing Standard Specifications

Another barrier to permeable pavement is the lack of industry standards and concerns over permeable pavement strength and durability. Standard Specification and details at the state or local level are imperative to the success of green infrastructure. In 2014, Tacoma was a key leader in the development of Pervious Pavement Specifications for Washington State. Specifications were developed with input from a cross-functional group of leading experts and input from all disciplines that have a hand in the process of pavement including:

- Design: Civil, Environmental, Geotechnical & Material Engineers; Public and Private
- Construction: Contractors, Suppliers, Installers, and Material Testing Labs
- Washington Asphalt Paving Association & local Concrete Associations

In 2016, the specifications were adopted into the Washington State Department of Transportation (WSDOT) Specifications through the Washington Chapter of American Public Works Association local programs. This group continues to meet annually and reviews recent advances in technology and makes recommendations to improve and update specifications.

### Adopted Specifications

#### Bioretention Facilities are:

- Shallow landscaped depressions with a designed soil mix and plants adapted to the local climate and soil moisture conditions that receive stormwater from small contributing areas.
- Designed to mimic natural forested conditions, where healthy soil structure and vegetation promote the infiltration, storage, filtration, and slow release of stormwater flows.
- Small-scale, dispersed, and integrated into the site as a landscape amenity.
- Can be used as a stand-alone practice on an individual lot; however, best performance is often achieved when integrated with other Low Impact Development (LID) practices.

Adapted from Washington Stormwater Center website — [www.wastormwatercenter.org/44-bioretention/](http://www.wastormwatercenter.org/44-bioretention/)

<div>Permeable Pavement</div> <div>Preparation</div> <div>Surfacing</div> <div>Porous Asphalt</div> <div>Pervious Concrete</div> <div>Improved Design</div> <div>Emergency Overflow</div> <div>Sweepers Strategy</div> <div>High Use Areas</div> <div>Sidewalk Uses</div>	<p><b>Specification Highlights include:</b></p> <p><b>Subgrade Preparation:</b></p> <ul style="list-style-type: none"> <li>• Requiring the compaction of the subgrade to at least 90%, but not exceeding 92%. This includes density testing during construction prior to placement of the pavement section.</li> <li>• Requiring the contractor to protect the subgrade from traffic and stormwater run-on (runoff from external areas).</li> </ul> <p><b>Ballast and Crushed Surfacing:</b></p> <ul style="list-style-type: none"> <li>• Exclusion of recycled concrete to reduce fines and high pH.</li> <li>• Increased the Los Angeles Wear, 500 Rev. to 30 % maximum and Degradation Factor to 30 minimum to prevent the rock from chemically and mechanically breaking down as it is exposed to water.</li> <li>• Requirement of two fractured faces applied to the No. 4 sieve. This allows the rock to bind up better and provides a better surface for vehicles to drive on.</li> <li>• Shaping and compaction shall be compacted until no visible movement is observed resulting in firm and unyielding condition.</li> <li>• It is recommended to the Engineer that the Choker Course not be allowed for pervious concrete projects. Tacoma is no longer using a Choker Course for PHMA either.</li> <li>• Many jurisdictions are starting to utilize a Permeable Asphalt Treated Base in their pavement section for both porous asphalt and pervious concrete. This allows for greater flexibility in construction, some cost savings, and generally a better final product.</li> </ul> <p><b>Porous Asphalt:</b></p> <ul style="list-style-type: none"> <li>• Increased asphalt binder to PG 70-22ER polymer modified with a binder content between 6 and 7% by total weight.</li> <li>• Compaction testing with a pavement density gauge during construction.</li> <li>• Minimum infiltration test results of 100 inches per hour.</li> <li>• Some jurisdictions are utilizing fibers and seeing great results in their material testing. Examples include kevlar, and carbon composite fibers. Recycled Asphalt Shingles with Recycled Asphalt Pavement has also been tested and passed the Hamburg Wheel Track and Cantabro Abrasion tests. This will be taken into considered in the next round of updates to the specifications.</li> </ul> <p><b>Pervious Concrete:</b></p> <ul style="list-style-type: none"> <li>• Additives have been incorporated to enhance the curing process, and reduce the need for plastic sheeting and improve constructability.</li> <li>• Jointing continues to be an area for improvement especially during the summer months. This includes things like sealing joints with asphalt and cutting joints full depth.</li> </ul> <p><b>See:</b> <a href="http://www.wsdot.wa.gov/partners/apwa/Division_5_Page.htm">www.wsdot.wa.gov/partners/apwa/Division_5_Page.htm</a></p> <p><b>Improvements to Pervious Pavement Roadway Designs</b></p> <p>Design of pervious pavement projects have continuously improved since design/construction of Tacoma's first projects.</p> <p><b>Tacoma pervious pavement project designs:</b></p> <ul style="list-style-type: none"> <li>• Always include emergency overflow to insure positive drainage is maintained. Pervious roads may not require a catch basin every 350 feet like traditional roadways, but they will drain in the event they get clogged or overwhelmed.</li> <li>• Overflow Infiltration Galleries can be utilized if you need to install a gutter with your curb. They are also suitable in areas with a small contributing area — such as a tough intersection with American Disabilities Act (ADA) ramps.</li> <li>• Parking area radii are typically designed to accommodate street sweepers. It is important to know the <i>radius of the vacuum part</i> of the sweeper — as opposed to the brushes' radius. If you just follow the typical manufacture recommendation it will be for the brushes and the parking lot's corners will never get vacuumed and this may result in a sediment plume that continues to grow.</li> <li>• Take special care in evaluating areas which require significantly sharp turning. This includes some turnarounds and parallel parking areas with high turnover rate frequencies — like in front of a coffee shop. Consider traditional pavement for such areas.</li> <li>• Ballasted Sidewalks can be utilized if you need additional infiltration area, or wish to reduce maintenance with standard sidewalks that look normal to residents who can maintain it as they always have.</li> </ul>
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## Permeable Pavement

### Cleaning Regimen

#### Moss

### Advancing Specifications

### Carbon Fiber Research

### Research Goals

### Practices Survey

### Water Quality Monitoring

**Dana de Leon** is a professional engineer at the City of Tacoma, Environmental Services/ Science & Engineering. She is a chemical engineer with 32 years of experience in stormwater studies related to quality/ quantity, source evaluations, NPDES regulatory issues, stormwater treatment technologies and Superfund evaluation and cleanup. Recent experience includes Project engineer of the Thea Foss Waterway Source Control Strategy Program and developing City of Tacoma's Regional Stormwater Facility Plan and In-Lieu-Of Construction Program.

### Pavement Maintenance

Tacoma residential streets are all swept twice a year with a regenerative air sweeper. This is consistent with the recommendations from the City of Chicago. Earlier designs with more stormwater run-on, tight turning radius, and no emergency overflow have shown to require more maintenance. Additional maintenance may include pressure washing or more advanced deep cleaning equipment. It should be the designers goal to design a permeable roadway that can still function if maintained by traditional means.

Pervious concrete has proven to grow moss more frequently than porous asphalt (even traditional pavements can grow moss in the Pacific Northwest). Shady areas without frequent vehicle use tend to grow it the fastest, such as sidewalks. For most of Tacoma's projects it has taken 4-5 years for the moss to grow — perhaps less if neighbors water and fertilize their lawns. Currently Tacoma is addressing moss with the advanced deep cleaning equipment. Other jurisdictions have tried alternative methods, such as weed burners with sweeping, or non-toxic chemical treatment.

### What's Next for Permeable Pavement

Tacoma continues to employ the team of experts to advance the specifications. Appropriate specifications are fundamental to successful implementation of permeable pavement.

A recently constructed project at the IDEAs (Industrial Design Engineering and Art) School field tested new mix designs and new material testing procedures. This project was funded by the Puget Sound Partnership with National Estuary Program through the Washington State Department of Ecology. Additional funding came from the Boeing Company. *See: [www.tacomaschools.org/idea/Pages/Permeable-Pavement.aspx](http://www.tacomaschools.org/idea/Pages/Permeable-Pavement.aspx).*

The Washington Stormwater Center in partnership with Washington State University is testing the water quality attributes of the standard permeable pavement mixes and mixes with composite carbon fibers. This research is also evaluating: long term wear and tear; ride and performance; cracking; and, of course, permeability.

#### Project Goals include:

- Furthering permeable pavement durability, enhancing design standards, and increasing confidence in permeable pavements.
- Elevating permeable material testing procedures to be reliable and consistent with traditional pavements.
- Receiving approval from Washington State Department of Ecology that permeable pavement meets basic water quality standards.

The first step was to complete a survey of professional practice as it relates to permeable pavements. This included respondents from three countries, 11 states, and 33 other jurisdictions. The survey noted respondents' use of permeable pavement for sidewalks and parking areas and that 44% were using porous asphalt for roadways and 33% were utilizing pervious concrete for roadways. Additionally, respondents were asked about: concrete jointing specifications; what's driving the basis of design; and what material testing procedures were being utilized. Washington, Oregon, and Virginia were identified as having state standards for permeable pavements.

#### The Next Steps are:

- Monitoring of pavements vis-a-vis water quality
- Completing and publishing the results of the survey
- Complete the Material Testing Report
- Completing a Recommendations Report, and ultimately amending the standard specifications

The reports are anticipated to be completed in July 2019, and the task force will be working on amendments to the specifications through the fall of 2019. [The City of Tacoma's Permeable Pavement website will be updated to include report findings as they become available — *see* website information below.]

### Conclusion

#### TACOMA'S PERMEABLE PAVEMENT SUCCESS

It is clear that permeable pavement is a valuable tool for replacing failed roadways and improving the water quality that enters Puget Sound. It is also evolving at a very rapid pace. Successful projects need a dedicated diverse team of civil, geotechnical, materials, engineers, inspection, and maintenance staff. Tacoma has and is continuing to improve cost analysis, design, construction, and maintenance of pervious pavement projects. Permeable pavement projects will continue to be incorporated into our decision matrices and watershed planning that aid with meeting stormwater treatment/flow control requirements and climate change issues.

#### FOR ADDITIONAL INFORMATION:

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CITY OF TACOMA'S PERMEABLE PAVEMENT WEBSITE: [www.CityofTacoma.org/PermeablePavement](http://www.CityofTacoma.org/PermeablePavement)

**WATER BRIEFS****LEAD ABATEMENT CO****DENVER WATER PROPOSES ALTERNATIVE PROGRAM**

Denver Water, Colorado's largest provider of drinking water, serves about 1.4 million people in Denver and surrounding suburbs. Lead getting into drinking water is an issue in Denver and surrounding suburbs due to the existence of customer-owned lead service lines and lead elements in customers' plumbing.

"There is no lead in the drinking water Denver Water delivers from its treatment plants, but lead can enter into water as it leaves our system and passes through customer-owned pipes and plumbing on their property and in their homes," said Jim Lochhead, Denver Water's CEO/Manager.

Over the past several years, Denver Water has taken steps to protect public health by removing lead service lines when its crews find them while performing other work. Denver Water has offered free water quality tests to customers worried about the existence of lead in their home's service line or plumbing. More than 5,400 requests have been made since May 2016.

The Colorado Department of Public Health and Environment (CDPHE) in March 2018 required Denver Water to begin preparations to use a food additive called orthophosphate to protect public health from the effects of lead leaching into drinking water from remaining old, customer-owned lead service lines.

Denver Water is currently preparing to formally propose an alternative. The proposal is a multipart program that would include rapidly accelerating existing efforts to remove all old lead lines in its service area.

Both orthophosphate and pH, when added to drinking water, coat the inside of pipes and over time reduces the likelihood of lead getting into the water as it passes through the customer's service line, indoor pipes and plumbing to the faucet.

Drawbacks to Denver Water using orthophosphate include the ripple effects of adding this nutrient into the larger water supply that can, under the right conditions, set off a chain of problematic events such as accelerating the growth of algae not only downstream of the city, but in Colorado's high-altitude lakes, reservoirs, and ponds.

Cost also is an issue. While Denver Water would invest millions in adding orthophosphate to its drinking water, other entities, including neighboring water providers and the region's Metro Wastewater Reclamation District, would have to spend millions trying to remove the nutrient from the water. It's also expected that the nutrient would runoff into the rivers and streams, such as the South Platte River, from customers' lawns and landscapes impacting downstream users.

Denver Water is preparing to formally propose an alternative program which has three main parts:

- Rapidly accelerating existing efforts to remove lead service lines, wherever they're found in Denver Water's service area, and replacing them with copper service lines. The goal is to replace an estimated 50,000 to 90,000 lead service lines in 15 years. Currently, about 1,200 lead service lines are replaced every year in Denver Water's service area.
- Distributing water filters, certified to remove lead from water, to customers who may have a lead service line to use until the line is replaced.
- Raising the pH of the water from 7.8 to 8.8 to protect customers who have a lead service line, as well as those who have lead solder joining pipes in their plumbing or lead pieces in their faucets.

Denver Water expects to formally propose the multipart program to the US Environmental Protection Agency (EPA) and CDPHE in August. EPA is expected to make its decision by the end of the year. If EPA makes the determination that the alternative is as efficient as orthophosphate at reducing lead at customer's faucets and then approves it, Denver Water must then request that CDPHE modify the designated optimal treatment. Whether or not CDPHE decides to change the designation, optimal corrosion control implementation will begin in March 2020.

"It's important to remember there is no health crisis around lead that Denver Water, state and federal regulators are responding to," said Nicole Poncelet-Johnson, director of water quality and treatment at Denver Water. "We continue to monitor our system and the quality of our water every day. Every year we collect and analyze tens of thousands of samples. Denver Water is in compliance with state and federal regulations regarding lead as well as other standards."

If EPA decides in favor of Denver Water's proposal to accelerate the removal of lead service lines from its service area over 15 years, it will be the third such program — and the largest — approved in the United States.

Denver Water estimates there are between 50,000 and 90,000 lead service lines buried throughout its service area in the city and surrounding suburbs. Denver Water currently has about 312,000 service lines in its system.

In Denver, homes built before 1951 are most likely to have lead service lines, based on Denver Water's experience over the years with lead lines in its service area. Until 1987, household copper pipes were connected with solder made with lead. And faucets and other plumbing pieces made before 2014 are likely to have some lead in them.

Denver Water knows those dates because in 1949, the utility changed its standards to allow builders to use galvanized steel and copper pipes instead of lead. Based on the lead service lines Denver Water crews have encountered, it appears most of the lead pipe inventory in Denver was gone by the early 1950s. In 1971, Denver Water banned the use of lead for service lines.

In 1994, Denver Water determined that it could reduce the corrosive power of its drinking water by adjusting the pH of the water, thereby reducing the likelihood of lead seeping into water.

The pH level of drinking water reflects how acidic it is. PH is measured on a scale of 0 to 14, with 7 considered neutral, meaning there's a balance between the water's acidity and alkalinity. Denver Water determined that raising the water's pH to 7.8, making it less acidic and allowing it to create a protective coating on the interior of lead service pipes, reduces the chances of lead leaching into water. State health officials approved the measure at that time.

**For info:** <https://denverwatertap.org/>

## WATER BRIEFS

**XL PIPELINE ACTIONS      US TRIBES' CASE CONTINUES**

On June 6, the 9th Circuit Court of Appeals dismissed a case that sought to revoke the permit for TC Energy's (TransCanada) Keystone XL (KXL) Pipeline. In that case, brought by a coalition of environmental organizations, the United States District Court had decided that the federal government did not follow the law when it issued its 2017 permit for the pipeline. The District Court blocked pipeline construction until the government and TC Energy met those legal requirements. All construction was stopped.

After the District Court's decision, President Trump took the extraordinary step of revoking the *original* KXL permit issued by the State Department and issuing a new permit himself on March 29. With the original permit revoked, the 9th Circuit decided to dismiss as moot the case based on that original permit. The injunction blocking KXL construction has now been lifted.

The litigation over the KXL Pipeline, however, is far from over. The Fort Belknap Indian Community and the Rosebud Sioux Tribe, represented by the Native American Rights Fund, have separately sued TC Energy and President Trump — *Rosebud Sioux Tribe v. Trump*. On May 16, 2019, the United States District Court for the District of Montana accepted an amended complaint in what will now be known as *Rosebud Sioux Tribe et al. v. Trump, et al.* (formerly *Rosebud Sioux Tribe v. US Dept of State*). The Rosebud Sioux Tribe (Sicangu Lakota Oyate) and the Fort Belknap Indian Community (Assiniboine (Nakoda) and Gros Ventre (Aaniiih) Tribes) in coordination with their counsel, the Native American Rights Fund (NARF), on September 10, 2018, initially sued the Trump Administration for numerous violations of the law in the Keystone XL pipeline permitting process. The Tribes are asking the court to rescind the illegal issuance of the Keystone XL pipeline presidential permit.

The Native American Rights Fund asserted in a press release on June 7th that, "[R]egardless of the new permit

and political maneuvering, the President is required to honor the treaties and the Constitution. And TC Energy still must abide by federal and tribal law. The case is now up to the Tribes, and they will not allow a foreign company to break American law, take land that does not belong to them, ignore the voices and laws of the tribal citizens, and destroy an aquifer that feeds millions of Americans." NARF Staff Attorney Natalie Landreth went on to highlight what is at stake: "People must understand that the Ogallala Aquifer covers 8 states and waters 30 percent of American crops. It is the largest underground water source in the United States. And the President and TC Energy would like to run a pipeline of highly toxic, cancer-causing sludge called 'tar sands' right through it. The Tribes are taking a stand for their people, their culture, their water, and their future, but they also are taking a stand for YOU."

The new complaint in *Rosebud Sioux Tribe et al. v. Trump, et al.*, Case No. 4:18-cv-00118-BMM, responds to President Trump's March 29 presidential permit. President Trump is now a defendant in the case. The Tribes filed this amended complaint: (1) to stop the President from trying to circumvent the court; and (2) to add claims against TC Energy Corp. (formerly TransCanada Corp.) because maps now show the pipeline corridor crossing tribal territory and water supplies.

**For info:** NARF website at: [www.narf.org/keystone-xl/](http://www.narf.org/keystone-xl/)

**SUPPRESSED TESTIMONY?      US CLIMATE CHANGE CONCERNS**

On June 11, Rep. Adam Schiff (D-CA), the Chairman of the House Permanent Select Committee on Intelligence (Committee), sent a letter to Bureau of Intelligence and Research (INR) Assistant Secretary Ellen McCarthy to request documents and interviews regarding prepared written testimony of Dr. Rod Schoonover, a senior analyst in the Office of the Geographer and Global Issues at the State Department's Bureau of Intelligence and Research, who appeared before the Committee last

week. Schoonover testified as part of an open hearing on the national security implications of climate change, alongside analysts from the Office of the Director of National Intelligence (ODNI) and the Office of Naval Intelligence (ONI). While the other two participants provided statements for the record (SFR) prior to the hearing, INR did not. It has since been publicly reported that the White House attempted to skew and demand politically-motivated changes of Dr. Schoonover's prepared testimony, and ultimately blocked that written testimony from being provided to the Committee.

In the letter, Schiff wrote: "The Committee sincerely appreciated Dr. Schoonover's appearance and his science-based, analytic findings about the manifold and interlocking assessed dangers that future climate change impacts pose to U.S. national security interests. However, the circumstances surrounding the absence of Dr. Schoonover's written statement for the record (SFR) — including troubling public reports describing those circumstances published in the days since the open hearing — have left the Committee with deep concern that officials within the Executive Office of the President sought to suppress for political reasons Dr. Schoonover's and State INR's objective analysis about this urgent national security issue."

Rep. Schiff also addressed reports of interference with Dr. Schoonover's written testimony in his letter. "After the hearing, both the Washington Post and the New York Times reported disturbing revelations about White House attempts to skew and demand politically-motivated changes of Dr. Schoonover's prepared testimony. An apparent draft version of Dr. Schoonover's testimony posted online by the New York Times is rife with politically-driven comments and deletions from personnel from the Executive Office of the President, including National Security Council staff. These reports raise profound concerns that White House officials abused the interagency process in an effort to manipulate, remove, and ultimately suppress the independent,



## WATER BRIEFS

objective analysis State INR planned to present before the Committee on a matter of national urgency.”

In the letter, Schiff requests testimony from the Assistant Secretary or appropriate senior representatives from INR, production of documents related to the written testimony (including edits and comments), and all communications between INR and personnel from the Executive Office of the President regarding the hearing, the written and oral INR testimony, whether the witness would appear and any other relevant communications.

**For info:** Full letter available at the Committee’s website at: <https://intelligence.house.gov/news/documentsingle.aspx?DocumentID=659>

## DRONE CAPABILITIES US

### CORPS PROJECTS

On May 24, the US Army Corps of Engineers (Corps) announced the recent addition to the Corps’ Sacramento District’s high-tech toolbox — a cutting-edge Unmanned Aerial System (UAS), or what the public would call a “drone.” The district’s UAS team, consisting of David Mello, James Oliver, Casey Young and Jerry Frost, gathered at New Hogan Lake, near Stockton, on May 10th to present a pre-flight brief and then a live demonstration of the new UAS to Sacramento District Commander Col. David Ray.

Mello explained that the UAS has many practical applications from providing video footage and photos for the Public Affairs Office to creating detailed mapping of sites such as Isabella Dam and is even capable of piecing together high-resolution 3-D images to share with team members and partner agencies. As Mello explain the many useful functions of the system, District Commander Ray voiced his appreciation for how the UAS will be a great asset for some of the district’s most complex projects. “This is powerful...it gives us the ability to better understand and synchronize our efforts,” said Ray. “This will be very helpful in not just explaining what we’re doing, but in allowing people to actually see specific details and visualize information that is difficult to explain.”

A week of training was provided by the manufacture company, Microdrone, and Sacramento District UAS team members Young and Mello are FAA (Federal Aviation Administration) Part 107-certified UAS pilots. The Sacramento District’s new UAS is a modern yet scalable system, meaning it can be updated with additional payloads at a later date, in order to keep it from becoming outdated and obsolete.

**For info:** Corps Sacramento District website at: [www.spk.usace.army.mil](http://www.spk.usace.army.mil)

## PUGET SOUND INFO WA

### ONLINE PLATFORM

The Puget Sound Partnership and its partners announced on June 28th the launching of “Puget Sound Info.” Puget Sound Info is an online platform for sharing information and stories about Puget Sound recovery priorities, activities, investments, near-term results and progress toward Puget Sound recovery goals. As of June 2019, Puget Sound Info includes these four tools:

- a revitalized, interactive Vital Sign website used to report on the status of over 50 indicators and progress toward Vital Sign targets and Puget Sound recovery goals;
- the brand new Action Agenda Tracker designed to house all tracking and reporting on Action Agenda Regional Priorities, Near Term Action (NTA) status and accomplishments, and investments in recovery activities;
- a revitalized National Estuary Program (NEP) Atlas built to house a summary of Puget Sound NEP investments; and
- a Data Center that provides access to detailed information about Activities, Progress Measures and Organizations that contribute data and reports.

In the coming months and years, Puget Sound Partnership will add financial information, progress measures, and continue to migrate information about previous Action Agendas, National Estuary Program investments, ongoing programs, and other Puget Sound recovery activities and accomplishments.

**For info:** Puget Sound Info website at: [www.pugetsoundstartshere.org/Facts.aspx](http://www.pugetsoundstartshere.org/Facts.aspx); Kari Stiles, [kari.stiles@psp.wa.gov](mailto:kari.stiles@psp.wa.gov)

## TRIBAL CONSENT WA

### CONSULTATION POLICY

On May 10, Washington State Attorney General (AG) Bob Ferguson announced a new, official policy that requires the Attorney General’s Office to obtain free, prior, and informed consent before initiating a program or project that directly and tangibly affects tribes, tribal rights, tribal lands, and sacred sites. Attorney General Ferguson also announced that his office will refrain from filing any litigation against a tribal government or tribal-owned business without first engaging in meaningful consultation to resolve the dispute, provided that doing so does not violate the rules of professional conduct. This policy is the first of its kind in Washington state. The Tribal Consent and Consultation policy is effective immediately.

The AG’s press release included praise from some tribal leaders. “Through his actions today, Attorney General Ferguson has listened to, learned from, and followed through on the advocacy of countless Native American leaders nationwide and Indigenous leaders globally who have defended the sovereignty and rights of their peoples,” said Quinault Indian Nation President Fawn Sharp. “By adopting ‘free, prior, and informed consent’ as the basis of his Administration’s interactions with Tribal Governments, Attorney General Ferguson has become a global standard bearer for recognizing the full sovereignty and political equality of Indigenous peoples.” Also weighing in was environmental attorney Jay Manning, former director of the Washington State Department of Ecology, stating that, “[T]his is a groundbreaking recognition of tribal sovereignty and the best way to ensure that treaty rights are honored. This commitment changes forever Washington state’s less than exemplary history on treaty rights.”

Consent will require a written resolution from the highest elected body from every federally recognized tribe that may be directly impacted. AG Ferguson will propose legislation in the 2020 legislative session to

memorialize and preserve this policy in statute. Due to other legal and practical restrictions, Ferguson’s consent policy does not include actions related to litigation, legal advice, or circumstances in which a failure to act may directly subject the Attorney General’s Office to sanction from the court. Consequently, Ferguson’s policy requires litigation consultation. Consistent with the Washington State Courts Rules of Professional Conduct, the Attorney General’s Office will consult with tribes before the office files any civil litigation against a sovereign tribal government or tribal-owned business. The policy calls for the Attorney General or his or her Chief Deputy to personally participate in the consultation whenever feasible.

Additionally, the policy requires meaningful notice to all 29 federally recognized tribal governments in Washington prior to proposing legislation or filing an amicus brief that may directly affect tribes or tribal lands, and after issuing a ballot statement on an initiative that may directly affect tribes and tribal lands.

**For info:** Complete Policy available on Washington AG’s website at: [www.atg.wa.gov/tribal-consent-consultation-policy](http://www.atg.wa.gov/tribal-consent-consultation-policy)

**TRIBAL SETTLEMENT** **AZ**  
**ADWR DIRECTOR SUPPORT**

On June 26, Arizona Department of Water Resources (ADWR) Director Tom Buschatzke appeared to express Arizona’s strong support for an important tribal settlement before a subcommittee of the federal House Natural Resources Committee. Director Buschatzke was scheduled to testify before the House Committee on Natural Resources’ Subcommittee on Water, Oceans, and Wildlife on H.R. 2459, the Hualapai Tribe Water Rights Settlement Act of 2019.

The federal legislation approves a settlement agreement involving the tribe and state parties that includes providing the tribe with 4,000 acre-feet per year of Central Arizona Project water from the Colorado River. The settlement also includes the planning, design, and construction of the “Hualapai Water Project,” which includes a pipeline

capable of delivering 3,414 acre-feet per year to the tribal reservation at Peach Springs and beyond to the tribe’s major tourist attractions at Grand Canyon West.

For the Hualapai Tribe, the settlement provides a renewable water supply and the infrastructure to convey that water supply from the Colorado River to critical areas on the Tribe’s reservation. Approval by Congress would authorize an appropriation of \$134.5 million for construction of the Project, \$32 million for operation, maintenance, and replacement costs by the Tribe, and \$7 million for use by the Secretary of the Interior in operating the water project before title is conveyed to the Tribe. The funding also provides technical assistance to prepare the Tribe for the operation of the Project.

Director Buschatzke pointed out that “[H]alf of the 22 federally recognized Indian tribes in Arizona still have unresolved water rights claims. Resolving these claims through settlement is a priority for the State.”

**For info:** <https://new.azwater.gov/>

**WATER PROTECTION** **AZ**  
**WATER PROTECTION FUND**

On July 8, the Arizona Department of Water Resources (ADWR) announced that the Arizona Water Protection Fund (AWPF) is accepting applications for the Fiscal Year 2020 Grant Cycle. The primary purpose of the AWPF is to provide monies through a competitive public grant process for implementation of measures to protect water of sufficient quality and quantity to maintain, enhance, and restore rivers and streams and associated riparian resources consistent with existing water law and water rights, and measures to increase water availability. A.R.S. § 45-2101(B).

The deadline to submit applications is at 3 p.m., September 6, 2019. The AWPF Commission awards grants under three categories: capital projects, research, and water conservation. The grant cycle schedule, grant application manual, and electronic forms are available on the AWPF website at: [www.azwpf.gov](http://www.azwpf.gov).

AWPF staff will be hosting one grant application workshop and a webinar for those who can’t attend the workshop. See the Calendar of Events for July 24. For the webinar, contact the Arizona Water Protection Fund (602-771-8528) for more information prior to July 24th.

The AWPF promotes the use of incentives emphasizing local implementation rather than regulation to address resource concerns. As such, the AWPF Commission’s philosophy has been to utilize a grassroots approach to improving river and riparian resources statewide. The Arizona Legislature established the AWPF in 1994 (A.R.S. § 45-2101, et seq.). The legislation establishing the AWPF provides that it is the declared policy of the Legislature to provide for a coordinated effort between state funding and locally led solutions for the restoration and conservation of the water resources of the state. A.R.S. § 45-2101(A).

**For info:** Reuben Teran at [rteran@azwater.gov](mailto:rteran@azwater.gov); ADWR website at: [www.azwpf](http://www.azwpf)

**FLOOD PLANNING** **TX**  
**NEW FUNDING/PLANNING**

The Texas Water Development Board (TWDB) was formed in 1957 in response to Texas’ record-breaking drought. As a result of the 2019 Texas legislative session, however, the TWDB’s flood programs have significantly expanded.

Discussions with stakeholders and the legislature regarding the need for a strategic document to identify solutions addressing statewide flood risks began in summer 2016. In 2017, the 85th Legislature subsequently provided funding for the TWDB to conduct a statewide survey to better understand flood planning and mitigation needs. This work culminated in the agency’s publication of a first-ever State Flood Assessment in January 2019, available at: [www.texasfloodassessment.com](http://www.texasfloodassessment.com).

Continuing this work, the 86th Legislature recently charged the TWDB with creating the state’s first state flood plan, to be adopted in 2024, and implementing two new funds, the Flood

## WATER BRIEFS

Infrastructure Fund (FIF) and the Texas Infrastructure Resiliency Fund (TIRF). Over the next year, the agency will also expand its existing flood-related programs, including floodplain mapping and development of an online dashboard of flood- and water-related information. As part of this effort, the TWDB will also establish a clearinghouse of information about state and federal flood planning, mitigation, and control programs that may serve as sources of funding for flood projects.

The plan will focus on evaluating existing flood infrastructure and will include a statewide, ranked list of ongoing and proposed flood control and mitigation projects and strategies. The plan will also include an analysis of development in the 100-year floodplain, which is defined by the Federal Emergency Management Agency (FEMA). In addition, the plan will recommend legislative policy changes needed to facilitate planning and project implementation. The first plan is due on September 1, 2024, with later plans due every five years thereafter.

Public meetings will be scheduled later this summer.

**For info:** TWDB at 512/ 463-8725 or [flood@twdb.texas.gov](mailto:flood@twdb.texas.gov) or [www.twdb.texas.gov](http://www.twdb.texas.gov)

**PUMPING IMPACTS****SW****NEW SURVEY – ONLINE TOOL**

A new web portal, created by affiliates from Stanford's Water in the West program, examines, compares and explains the permitting process of groundwater pumping across seven southwestern US states.

Overpumping groundwater poses a major threat to the availability of a critical resource, especially in the arid lands of the Southwest. States across the region have sought to deal with this issue through a wide variety of regulations and permitting processes. The new web-based dashboard tool compares groundwater withdrawal permitting — a common tool used by resource managers to limit groundwater pumping — to help plan for a more sustainable future.

“Western states have adopted a wide range of approaches towards

regulating groundwater pumping, but information about these approaches are not always shared across the region. Our goal is to help parties in different states learn from what is happening elsewhere. This is particularly important in California, where local agencies are working to implement the Sustainable Groundwater Management Act,” said Leon Szeptycki, executive director of Water in the West and a dashboard contributor.

Groundwater, a major source of drinking water, makes up roughly 25 percent of total available fresh water across the US. However, drier states with less surface-water supply use it more heavily than other regions. Water users in these areas often pump groundwater at a rate exceeding the recharge from rainfall, irrigation and streamflow, leading to a condition called overdraft. Overdraft can lead to negative consequences including seawater intrusion, water contamination, lowering of the water table and land subsidence.

Unlike surface water, groundwater has not been regulated in California historically. Traditionally, a right to withdraw groundwater was established by pumping the water and using it. California's 2014 Sustainable Groundwater Management Act requires sustainable management of groundwater basins, empowering local agencies with regulation of groundwater extraction if necessary. California was the last of the Southwestern states (including Arizona, Colorado, Nevada, New Mexico, Texas and Utah) to create a statewide framework for groundwater management.

“Our goal was to clearly lay out the varying policies and practices of these Southwestern states, highlight the geographic areas in which they held sway, and enable side-by-side comparisons across a number of different parameters. Some things are just best done visually, even in nuanced fields like the law,” said Geoff McGhee, dashboard co-creator and former creative director at the Bill Lane Center for the American West.

**For info:** <http://groundwater.stanford.edu/dashboard/>

**WATERSMART****WEST****\$29+ MILLION IN GRANTS**

The US Department of the Interior's Bureau of Reclamation (Reclamation) has announced that 13 western states will utilize \$29.1 million in grants from the WaterSMART Program to help communities conserve water.

Forty-five projects will be funded based on two categories. In the first category, 28 projects from 11 states were selected to share \$7.5 million with each project receiving up to \$300,000 in federal funding and having a completion timeframe of less than two years. The second category consists of 17 projects from seven states, sharing \$21.5 million. These projects are receiving up to \$1.5 million in federal funding and will be completed within three years.

Projects in Arizona, California, Colorado, Idaho, Montana, Nebraska, Nevada, New Mexico, Oklahoma, Texas, Utah, Washington, and Wyoming were selected to receive grants. Examples of projects that are receiving funding include: replacing unlined canals with pipe or a lining; installing flow measurement for real-time monitoring of water deliveries; advanced meters for residences that will help inform them about water use; and improving irrigation scheduling by installing moisture probes and irrigation system monitoring.

The Colorado River Indian Tribes in southwest Arizona will use \$250,000 of federal funding with \$250,000 of its own funding to modernize its Supervisory Control and Data Acquisition system to enable enhanced irrigation water control and management. The project is expected to result in annual water savings of 10,000 acre-feet that is currently lost to operational spills and evaporation.

The Grand Valley Water Users Association, near Grand Junction, Colorado, will combine \$178,884 in federal funding with \$220,000 of its own funding to implement several improvements at Roller Dam to collect more accurate and reliable diversion and measurement information. The project is expected to save 4,000 acre-feet of water every year and will result in reduced diversions from the Colorado



## WATER BRIEFS

River, benefitting a critical stretch of river known as the 15 Mile Reach, which is designated a critical habitat for many fish species.

The Mission Springs Water District, located in southern California, will combine \$300,000 in federal funding with \$3.4 million of its own funding to upgrade 12,967 residential water meters to advanced meters that help inform about leaks, breaks and other unusual use patterns. The project is expected to result in annual water savings of 549 acre-feet, which will reduce the amount of water pumped from the Coachella Valley Groundwater Basin.

Some projects complement on-farm improvements that can be carried out with the assistance of the US Department of Agriculture's Natural Resources Conservation Service (NRCS) to accomplish coordinated water conservation improvements. A number of the selected projects are expected to help make additional on-farm improvements possible in the future, including the West Cache Irrigation Company located in northern Utah. They will combine \$400,000 in federal funding with \$520,000 of their own funding to convert 2.25 miles of the earthen South Fields Canal to a pressurized pipeline. The project is expected to result in water savings of 1,222 acre-feet annually. Once completed, irrigators will be able to take advantage of the newly pressurized system to complete on-farm improvements, potentially funded by the NRCS through its Environmental Quality Incentives Program, such as converting from flood irrigation to more efficient sprinkler irrigation.

**For info:** [www.usbr.gov/watersmart/weeg](http://www.usbr.gov/watersmart/weeg).

**WATERSMART****DROUGHT RESILIENCE GRANTS****WEST**

Reclamation has announced that 18 projects will receive a total of \$9 million to prepare for drought. These projects will provide more flexibility and reliability for communities while reducing the need for emergency actions during a drought. The funding provided is part of the WaterSMART Program.

The selected projects are in California, Colorado, Idaho, Nebraska, New Mexico, Oregon and Texas. The grants will be leveraged with local cost-share to fund \$166.2 million in projects.

The A&B Irrigation District in Idaho will receive \$250,000 to implement, in coordination with the Twin Falls Canal Company, the Mid-Snake Recharge Injection Wells Project near the cities of Paul and Murtaugh, Idaho. They will construct six deep injection wells to recharge the Eastern Snake Plain Aquifer. The project will protect against drought for groundwater and surface water users and enhance the storage availability in Reclamation's Minidoka and Palisades projects.

The Pueblo of Zia located in Sandoval County, New Mexico, will receive \$750,000 to modernize the Zia Flume over the Jemez River and install associated buried PVC pipe. The Zia Flume brings irrigation water from Zia Lake to the Pueblo's agricultural lands. It is critical infrastructure for the Pueblo and has experienced damage in the past that was exacerbated by an extreme flood event in 2016. This project is also supported by the Pueblo's Drought Contingency Plan.

The Santa Margarita Water District in Orange County, California, will receive \$749,999 to install pipe in residential streets and easements, upgrade an existing pump station, repurpose an existing force main, and upgrade 35 existing water meters. This project will allow recycled water to be used instead of potable water for irrigation. It is supported in the district's 2015 Urban Water Management Plan and an adaptation strategy identified in Reclamation's Santa Ana Watershed Basin Study.

To learn more about the projects selected, visit Reclamation's drought website.

**For info:** [www.usbr.gov/drought](http://www.usbr.gov/drought).

**AQUIFER REBOUND****ALBUQUERQUE GROUNDWATER RISE****NM**

Groundwater levels in the Albuquerque area are on the rise according to newly published research from the US Geological Survey (USGS).

USGS maps produced since 2002 show that groundwater levels in and near Albuquerque, New Mexico, are rising compared to historical conditions despite recent below-normal annual precipitation. Relatively high groundwater levels in 2016 and reductions in the amount of groundwater-level decline, known as drawdown, are indicators of a rebounding groundwater level.

"These maps help the Water Authority ensure that our strategy of transitioning to surface water to supply the majority of our drinking water is having the desired effect on the aquifer and helping provide a resilient supply for the future of Albuquerque," said Katherine Yuhas, Water Resources Division Manager at the Albuquerque Bernalillo County Water Utilities Authority (ABCWUA).

The USGS has produced maps of drawdown (water-level decline) relative to pre-1961 conditions for the years 2002, 2008, 2012 and now for 2016. The 2016 map shows that areas of drawdown are decreasing in spatial extent and magnitude and that groundwater levels are recovering. The trend of rebounding groundwater levels since 2008 corresponds with decreases in groundwater withdrawals. In 2008, the ABCWUA incorporated the use of surface water from the San Juan-Chama Diversion Project rather than solely depending on groundwater for much of its drinking-water supply. Other water conservation efforts also account for rising groundwater levels.

"In many areas of the world, groundwater levels are dropping due to pumping, so what is happening in Albuquerque is notable," said John Bumgarner, Director of the USGS New Mexico Water Science Center. "Understanding how the aquifer responds to shifts in demand is important for the ABCWUA and for the residents of Albuquerque. The USGS is proud of its role in providing sound science to support Albuquerque's management decisions and future planning."

**For info:** Heidi Koontz, USGS, 303/202-4763 or [hkoontz@usgs.gov](mailto:hkoontz@usgs.gov) or [www.usgs.gov/news/news-releases](http://www.usgs.gov/news/news-releases)

# The Water Report

## CALENDAR

- July 16 OH**  
**Development of the Proposed Unregulated Contaminant Monitoring Rule for Public Drinking Water Systems: Public Meeting & Webinar, Cincinnati & WEB.** Environmental Protection Agency, 26 Martin Luther King Drive West; 9 a.m. - 5 p.m. Local Time. Presented by EPA - Register No Later than July 11th; Valid Photo ID Required to Gain Access; Seating & Webinar Connections Limited. For info: <https://attendee.gotowebinar.com/register/8457484520972125698>
- July 16 DC & WEB**  
**Hazardous Waste & Sites (ELI Summer School 2019), Washington.** Environmental Law Institute, 1730 M Street, NW, Ste. 700. Presented by Environmental Law Institute. For info: [www.eli.org](http://www.eli.org)
- July 16-18 WA**  
**Western States Water Council Summer (190th) Council Meeting, Leavenworth.** Icicle Village Resort. For info: <http://www.westernstateswater.org/upcoming-meetings/>
- July 17 NM**  
**Hydrology in Water Law Proceedings Seminar, Santa Fe.** La Fonda Santa Fe Hotel. For info: Law Seminars International, 206/ 567-4490 or [www.lawseminars.com/](http://www.lawseminars.com/)
- July 18-19 NM**  
**Natural Resource Damages Seminar, Santa Fe.** La Fonda Santa Fe Hotel. For info: Law Seminars International, 206/ 567-4490 or [www.lawseminars.com/](http://www.lawseminars.com/)
- July 18-20 CA**  
**65th Annual Rocky Mountain Mineral Law Institute, Monterey.** Monterey Conference Center. For info: [www.rmmlf.org/](http://www.rmmlf.org/)
- July 22-23 NM**  
**New Mexico Groundwater Conference, Albuquerque.** State Bar of New Mexico, 5121 Masthead NE. Presented by the American Ground Water Trust. For info: [www.agwt.org/events](http://www.agwt.org/events)
- July 23 TX**  
**Southern Region Water Conference 2019: "Improving Adoption of Sustainable Water Management Practices", College Station.** Texas A&M Hotel & Conference Center. AG-Extension Service Event. For info: <https://agrilife.org/southern-region-water-conference/>
- July 24 AZ**  
**Arizona Water Protection Fund: Applications for Fiscal Year 2020 Grant Cycle Workshop, Phoenix.** ADWR, 1110 W. Washington Street, Ste. 310, Middle Verde Conference Room, 4th Floor, 1:30 - 2:30 pm. For info: [www.azwpf.gov](http://www.azwpf.gov)
- July 24 TX**  
**Dam Safety Workshop, Decatur.** Decatur Civic Center, 2010 W. US 380. Presented by TCEQ. For info: [www.tceq.texas.gov/p2/events/dam-safety.html](http://www.tceq.texas.gov/p2/events/dam-safety.html)
- July 24 NM**  
**New Mexico PFAS Conference, Albuquerque.** State Bar of New Mexico, 5121 Masthead NE. Presented by the American Ground Water Trust. For info: [www.agwt.org/events](http://www.agwt.org/events)
- July 25 WA**  
**Pacific Northwest Environmental Industry Summit: Market Growth, Trends & Opportunities, Seattle.** Washington Athletic Club. Presented by Environmental Business Int'l. For info: [www.ebionline.org](http://www.ebionline.org)
- July 25-26 OR**  
**2nd Annual Agriculture Law Seminar, Bend.** McMenamins Old St. Francis School, 700 NW Bond Street. For info: The Seminar Group, 800/ 574-4852, [info@theseminalgrou.net](mailto:info@theseminalgrou.net) or [www.theseminalgrou.net](http://www.theseminalgrou.net)
- July 25-26 CA**  
**Sustainable Groundwater Planning in California Seminar, Sacramento.** Sutter Square Galleria. For info: Law Seminars International, 206/ 567-4490 or [www.lawseminars.com/](http://www.lawseminars.com/)
- July 28-August 1 TX**  
**"Responding to Change: Dynamic Stormwater Management in Economic, Political, & Climatic Transitions" - 2019 EPA Region 6 Stormwater Conference, Denton.** Denton Convention Center. For info: <https://tamuk-isee.com/conferences/epa2019conference/>
- July 29-31 PA**  
**Environmental Action Conference, Avondale.** Stroud Water Research Center, 970 Spencer Road, 9:00 am - 4:30 p.m. For info: <https://stroudcenter.org/event/>
- July 31 WEB**  
**Modeling Florida Lakes with BATHTUB Webinar, WEB.** 1 p.m. Eastern Time. Presented by EPA's Water Quality Modeling Workgroup. For info: Registration Required at: <https://epawebconferencing.acms.com/floridamodeling/event/registration.html>
- August 1-2 AZ**  
**Arizona Water Law Conference, Scottsdale.** Hilton Resort & Villas. For info: CLE Int'l, 800/ 873-7130, [live@cle.com](mailto:live@cle.com) or [www.cle.com](http://www.cle.com)
- August 5-6 OR**  
**Clean Water Initiative Workshop 2019, Corvallis.** Oregon State University. Presented by the College of Engineering: Chemical, Biological & Environmental Engineering. For info: <https://cbee.oregonstate.edu/water/workshop>
- August 7-9 OR**  
**Western Water Seminar, Portland.** Hilton Portland Downtown. Presented by National Water Resources Assoc. For info: [www.nwra.org/upcoming-conferences-workshops.html](http://www.nwra.org/upcoming-conferences-workshops.html)
- August 13-15 CA**  
**Indian Reserved Water Rights Claims Symposium, Fanner.** Harrah's Resort Southern California. Presented by the Native American Rights Fund & Western States Water Council. For info: [www.narf.org/cases/water-rights-symposium/](http://www.narf.org/cases/water-rights-symposium/)
- August 15-16 WA**  
**Water Law in Central Washington Seminar, Ellensburg.** Central Washington University, 400 E. University Way. For info: The Seminar Group, 800/ 574-4852, [info@theseminalgrou.net](mailto:info@theseminalgrou.net) or [www.theseminalgrou.net](http://www.theseminalgrou.net)
- August 19 CA & WEB**  
**Industrial Stormwater General Permit 2018 Amendments - Public Training Workshop, Sacramento.** CalEPA Headquarters Bldg., Byron Sher Auditorium, 1001 I Street. Presented by State Water Resources Water Boards, 9 a.m. - Noon. For info: Laurel Warddrip, 916/ 341-5531 or [Laurel.Warddrip@waterboards.ca.gov](mailto:Laurel.Warddrip@waterboards.ca.gov)
- August 19-22 OR**  
**Oregon Assoc. of Water Utilities Summer Classic Conference, Seaside.** Seaside Convention Center. For info: <https://oawu.net/training-events/annual-summer-classic-conference-seaside/>
- August 20 CA**  
**Central Valley Drinking Water - Solutions to Groundwater Contamination Workshop, Fresno.** Center for Irrigation Technology - Conference Room, 5370 N. Chestnut Avenue. Presented by the American Ground Water Trust & Fresno State California Water Institute. For info: [www.agwt.org/events](http://www.agwt.org/events)
- August 20-22 CO**  
**Colorado Water Congress Summer Conference & Membership Meeting, Steamboat Springs.** Steamboat Grand. For info: [www.cowatercongress.org/summer-conference.html](http://www.cowatercongress.org/summer-conference.html)
- August 20-22 TX**  
**8th Annual Texas Groundwater Summit, San Antonio.** Hyatt Regency Hill Country Resort. Presented by Texas Alliance of Groundwater Districts. For info: <https://texasgroundwater.org>
- August 21 CA**  
**Central Valley Drinking Water - Solutions to Groundwater Contamination Workshop, Bakersfield.** DoubleTree by Hilton Bakersfield, 3100 Camino Del Rio Court. Presented by the American Ground Water Trust & Fresno State California Water Institute. For info: [www.agwt.org/events](http://www.agwt.org/events)
- August 21-22 DC**  
**Water Finance Conference, Washington.** Washington Court Hotel. Hosted by Water Finance & Management. For info: <https://waterfm.com/call-speakers-2019-water-finance-conference/>
- August 22-23 FL**  
**Land Use Law Conference, Tampa.** Sheraton Riverwalk. For info: CLE Int'l, 800/ 873-7130, [live@cle.com](mailto:live@cle.com) or [www.cle.com](http://www.cle.com)
- August 28 CA**  
**Industrial Stormwater General Permit 2018 Amendments - Public Training Workshop, Playa Del Ray.** Environmental Learning Center at Hyperion Auditorium, 12000 Vista Del Mar. Presented by State Water Resources Water Boards, 9 a.m. - Noon. For info: Laurel Warddrip, 916/ 341-5531 or [Laurel.Warddrip@waterboards.ca.gov](mailto:Laurel.Warddrip@waterboards.ca.gov)
- September 8-11 CA**  
**34th Annual Water Reuse Symposium, San Diego.** Marriott Marquis. For info: <https://watereuse.org/news-events/>
- September 8-11 OR**  
**PNCWA 2019: Building Professional Excellence in Water Quality - Annual Conference & Exhibition, Portland.** Oregon Convention Center. Presented by the Pacific Northwest Clean Water Assoc. For info: <https://pcwm.memberclicks.net/>
- September 10 WA**  
**Water Quality Management in Washington Seminar, Seattle.** TBA. For info: Law Seminars International, 206/ 567-4490 or [www.lawseminars.com/](http://www.lawseminars.com/)



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## CALENDAR

(continued from previous page)

**September 11** **OR**  
EPA Portland Harbor Public Forum, Portland. TBA. Evening Forum with ODEQ & Community Advisory Group Support. For info: Laura Knudsen, 206/553-1838 or knudsen.laura@epa.gov

**September 12** **WA**  
Washington Environmental Cleanup Conference: CERCLA / MTCA / Sediments, Seattle. Washington Convention Center. For info: Holly Duncan, 503/ 282-5220, hduncan@elecenter.com or www.elecenter.com

**September 12-13** **CO**  
Advanced Metering Infrastructure (AMI) for Water Utilities Conference, Denver. EUCI Office Bldg. Conference Center, 4601 DTC Blvd., B-100. For info: www.euci.com/event

**September 12-14** **BC**  
Columbia Basin Transboundary Conference: One River, One Future - 6th International Conference, Kimberly. Kimberly Conference Center. RE: Renegotiation of the Columbia River Treaty, Reintroduction of Salmon above Grand Coulee Dam & More.. For info: Caitlin Hinton, Columbia Basin Trust, 250/ 344-2445 or chinton@cbt.org or https://transboundaryriverconference.org

**September 16-17** **Alberta**  
4th Annual Canadian Shale Water Management 2019: Reducing the Cost of Water Recycling & Reuse Summit, Calgary. TBD. Presented by IQ Hub. For info: www.canada.shale-water-management.com

**September 16-18** **China**  
American Water Resources Assoc. International Conference, Beijing. Joint AWRA-Chinese Academy of Sciences Event. RE: New Technologies, Strategies, Policies & Institutions. For info: www.awra.org

**September 16-19** **CO**  
Water Information Management Systems (WIMS) Workshop & USGS Water Use Collaboration, Fort Collins. Hilton Fort Collins. Presented by Western States Water Council & USGS. For info: <http://www.westernstateswater.org/upcoming-meetings/>

**September 17-18** **MT**  
Montana Water Law Seminar, Helena. Best Western Great Northern Hotel. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

**September 18** **CA**  
Industrial Stormwater General Permit 2018 Amendments - Public Training Workshop, Riverside. Santa Ana Regional Water Quality Control Board, 3737 Main Street, Ste. 500, Highgrove Room. Presented by State Water Resources Control Board, 9 a.m. - Noon. For info: Laurel Warddrip, 916/ 341-5531 or Laurel.Warddrip@waterboards.ca.gov

## 2019 AWRA Washington Annual State Conference

**October 1, 2019**  
**Seattle, WA**



**American Water Resources Association**  
Washington Section

**Water Resources Planning and Implementation: Challenges, Complexity, and Uncertainty**



Details and Registration at: [www.waawra.org](http://www.waawra.org)

Photos by Tom Ring