



The Water Report™

Water Rights, Water Quality & Water Solutions in the West

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& More!

SUSAN TATAYON INTERVIEW

CHAIR, SACRAMENTO-SAN JOAQUIN DELTA STEWARDSHIP COUNCIL

Conducted by Lisa Beutler (Stantec, Sacramento, CA)

Introduction

Susan Tatayon presides over the Delta Stewardship Council (Council), one of a trio of agencies responsible for stewardship of the Sacramento-San Joaquin Delta (Delta). The Delta and its stressed environs serve as the major hub for California's water management system (see map, page 4).

Chair Tatayon, appointed to the Council by Governor Jerry Brown in 2014, and reappointed in 2018, generously spared time on May 30, 2019 to talk with *The Water Report* about the Council, its roles and her goals for her term as Chair. She assumed the role of Chair beginning January 1, 2019 after serving three years as Vice-Chair. Her current term will expire February 2, 2022.

Upon being thanked for her time, Tatayon immediately (and characteristically) expressed appreciation for the opportunity to share up-to-date information about the Council and its current direction. She noted that in their recent planning session, the Council had expressly decided it would be important to conduct more outreach and build both the general public's and concerned decision-makers' understanding of the Council, its role, and the evolving Delta Plan (more on this below).

Tatayon's background and experience make her particularly well-suited for tackling the responsibilities of Council Chair. She has served in a number of increasingly responsible roles in the state and federal government as well as working in the private sector and at an environmental non-profit. To this we could add too many volunteer roles to succinctly recount. A common thread in all of her history is that she was often asked to tackle projects that required new approaches or to accomplish what had never even been done before. In each case she encountered the challenges as opportunities rather than burdens. She noted that one of these challenges was formative in developing her early views as a pragmatic environmentalist.

Those that know Tatayon will readily reference her moderated, gracious style and thoughtful attentiveness. They will simultaneously describe a firm resolve and clarity in which she is able to recast dilemmas to possibilities. The latter is evidenced in the Chair's own description of her work experiences.

Delta Agencies

Encompassing over half a million acres, the Delta's legislatively-defined boundaries extend over portions of five California Counties.

The bifurcated governance arrangement for the Delta was created by the Sacramento-San Joaquin Delta Reform Act of 2009 (Act) — the Legislature's response to what is considered one of California's thorniest areas of water management concerns. The primary focus of the Act is the requirement for creation of comprehensive, long-term management plan for the Delta (the "Delta Plan").

Tatayon Interview



Susan Tatayon



Lisa Beutler

The Water Report

(ISSN 1946-116X)

is published monthly by
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Eugene, OR 97402

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www.TheWaterReport.com

Subscription Rates:

\$299 per year

Multiple subscription rates
available.

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

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The Delta Plan advances the state's coequal goals for the Delta: 1) to improve statewide water supply reliability; and 2) to protect and restore a vibrant and healthy Delta ecosystem. These goals are to be accomplished in a manner that preserves, protects, and enhances the unique agricultural, cultural, and recreational characteristics of the Delta.

More agencies are involved in management of the Delta than can be easily listed here. However, three Sacramento-San Joaquin Delta agencies: 1) the Council; 2) the Delta Protection Commission (DPC); and 3) the Sacramento-San Joaquin Delta Conservancy (Conservancy) — are assigned very specific and pivotal responsibilities under the Act (see sidebar below).

We began by asking about the differences between these three Agencies and their roles. Tatayon broke into a smile, replying this is probably the most common question she gets, even from water and natural resources executives. She explained that the Council and its sister agencies, the DPC and the Conservancy all share the common role of implementing the Delta Plan. Beyond that, the Council has several distinctive roles, the most prominent being its responsibility to develop, adopt, and commence implementation of the Delta Plan. Related to this, the Council is responsible for appointment of an Independent Science Board (ISB). The ISB and the Council's science program work to support use of the best available science on Delta issues.

The Council also provides collaborative leadership in convening all the partners needed to implement the Delta Plan, and serves as a regulator. As a regulator they act as the final arbiter of whether-or-not any Delta-related projects advanced by state and local agencies are consistent with the Delta Plan.

Tatayon briefly detailed the legislatively-defined roles of the Delta Agencies. She noted the role of the Conservancy in ecosystem restoration and of the DPC as a land use planning body and service as a voice for the Delta's residents, visitors, and businesses.

Sacramento-San Joaquin Delta Agencies

Delta Stewardship Council: As an independent state agency the Council was required to, on or before January 1, 2012, develop, adopt, and commence implementation of a comprehensive management plan for the Delta (Delta Plan). State or local public agencies that propose to undertake certain proposed actions within the boundaries of the Delta or the Suisun Marsh must prepare and submit to the Council a specified written certification of consistency with the Delta Plan prior to taking those actions. As the consistency determination is a self-certification process, the Council oversees an appeal process whereby a person may claim that a proposed action is inconsistent with the Delta Plan, and request a determination of Consistency by the Council. The Council is also responsible for providing a charge to and appointing the members of the Delta Independent Science Board. See: <http://deltacouncil.ca.gov/>

Delta Independent Science Board (Delta ISB): The Delta ISB is a standing board of nationally or internationally prominent scientists with appropriate expertise to evaluate the broad range of scientific programs that support adaptive management of the Delta. The Delta ISB provides oversight of the scientific research, monitoring, and assessment programs that support adaptive management of the Delta through periodic reviews of each of those programs. The overall objective of Delta ISB oversight is to help make the science underlying Bay-Delta programs, the application of that science, and the technical aspects of those programs the best that they can be. See: <http://deltacouncil.ca.gov/> > "Delta Science Program"

Delta Conservancy: The Conservancy acts as the primary state agency to implement ecosystem restoration in the Delta and to support efforts that advance environmental protection and the economic well-being of Delta residents. As established within the Natural Resources Agency, it holds the authority to acquire real property interests from willing sellers or transferors and is required to use conservation easements to accomplish ecosystem restoration whenever feasible. A Sacramento-San Joaquin Delta Conservancy Fund in the State Treasury upon appropriation, finances projects, including ecosystem restoration and economic sustainability projects. See: <http://deltaconservancy.ca.gov/>

Delta Protection Commission: The oldest of the agencies, the Commission was created by the Delta Protection Act of 1992 and reconfigured by the Sacramento-San Joaquin Delta Reform Act of 2009. The Commission is responsible for the preparation and adoption of a comprehensive long-term resource management plan for about 500,000 acres of legally defined Delta lands (called the Primary Zone). The Act of 2009 also required that the Commission prepare and adopt an economic sustainability plan, which is reviewed, and as necessary, amended every 5 years. A significant role of the Commission is to provide a venue for the Delta's residents, visitors and businesses to provide input on matters related to the Delta. Like the Council, it serves as an appellate body for actions taken by a local government or other local agency for lands located within the Primary Zone viewed as inconsistent with the resource management plan, or other sections of the Protection Act for which the commission is responsible. It also informs the decision making of sister agencies on a variety of issues such as flood management and recreation investment as well activities related to the Commission's plans and jurisdiction. The Commission also comments on projects in the legally defined Secondary Zone (primarily the urban areas within the Delta) that have the potential to impact the Primary Zone. See: <http://delta.ca.gov/>

**Tatayon
Interview****Consultation****Implementation
Goals****“Covered
Action”
Consistency****“Covered
Actions”****“Project”
Definition****Appropriate
Skills****Less Understood and Misunderstood Roles**

Tatayon felt that some of the less known or understood Council functions included its ability to provide early consultation to project proponents. This consultation supports agencies in aligning their endeavors to be consistent with the Delta Plan. The Council is also able to convene expert panels and facilitate peer review.

Tatayon was particularly proud of its Delta Science and California Sea Grant fellowship programs. She felt support of fellows is a wise, long-term, generational investment in ensuring that required skills and knowledge will be available in the coming decades.

Another little-publicized role is the Council’s leadership of the Delta Plan Interagency Implementation Committee (DPIIC). The DPIIC strives to facilitate Delta Plan implementation with state and federal agencies that have a role in the Delta. The DPIIC focuses on progress in achieving the coequal goals. This progress is defined as “water supply reliability, Delta ecosystem health and restoration, Delta as a Place, and best available science in support of ‘One Delta, One Science.’”

As relates to misunderstood roles, an obvious one is a general perception that the Council approves projects. Tatayon affirmed that this is not the case. Instead, the Council oversees a certification process for demonstrating consistency with the Delta Plan. As outlined in the Delta Reform Act, this means that a state or local agency proposing to undertake a qualifying action, called a “covered action” (see sidebar below), must submit to the Council a written certification of consistency. This certification includes detailed findings as to whether the covered action is consistent with the Delta Plan. Any person may appeal a certification of consistency to the Council. At this point the Council would determine if the action is consistent, and if not, return it to the proponent.

“Covered Actions” & “Project”**Covered Actions**

Water Code Section 85057.5(a) describes a covered action as a plan, program, or project that meets all of the following conditions:

- Will occur, in whole or in part, within the boundaries of the Delta or Suisun Marsh;
- Will be carried out, approved, or funded by the state or a local public agency;
- Is covered by one or more provisions of the Delta Plan;
- Will have a significant impact on the achievement of one or both of the coequal goals or the implementation of government-sponsored flood control programs to reduce risks to people, property, and state interests in the Delta.

Definition of a Project Under the Delta Act

Public Resources Code Section 21065 describes a project as an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and which is any of the following:

- An activity directly undertaken by any public agency.
- An activity undertaken by a person which is supported, in whole or in part, through contracts, grants, subsidies, loans, or other forms of assistance from one or more public agencies.
- An activity that involves the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies.

Council Chairs Past & Present

Tatayon is the third Council Chair to serve in the relatively new agency. Council members select a chairperson from among their members who may serve for up to four years. Given the distinctive styles and approaches of the Chairs, we asked what she saw as the similarities and differences.

She began by complimenting the previous two leaders and noted how each was exactly the right person for the time in which they served. Chair Phil Issenberg brought the firm hand required for launching of an enterprise. She described how he was able to deftly navigate the intricacies of Delta issues, skillfully address tough issues, and ask the pointed and provocative questions needed to advance the thinking of everyone involved.

Her personal appreciation for the leadership of Chair Randy Fiorini was apparent as she described his gentlemanly and masterful diplomacy. She explained his careful, considerate and thoughtful approach as an interest based negotiator who brought people to the table and allowed the Council to confront well publicized and controversial issues.

Tatayon described her own style as one of facilitating collaboration. She enjoys bringing a full range of interests into the room, leveraging the strengths of each, and exploring multiple points of view. She described this approach as sometimes messy but finds that the confluence of ideas is generative and produces possibilities that would not otherwise have been considered. She also noted that when everyone is part of the decision crafting process they accept more ownership for implementation.

Tatayon Interview

Reducing Reliance

Goals as Chair

In terms of her own goals as Chair, Tatayon plans to focus on actual implementation of the Delta Plan, which includes reducing reliance on the Delta and building regional self-reliance.

Under California Water Code, reduction of reliance on the Delta means reducing “reliance on the Delta in meeting California’s future water supply needs through a statewide strategy of investing in improved regional supplies, conservation and water use efficiency.” Regions dependent on water from the Delta watershed are required to “improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects and improved regional coordination of local and regional water supply efforts.”

Adapted from
Delta Plan (2018) Chapter 3



Sacramento-San Joaquin Delta

Tatayon Interview

Groundwater Recharge

Science Focus

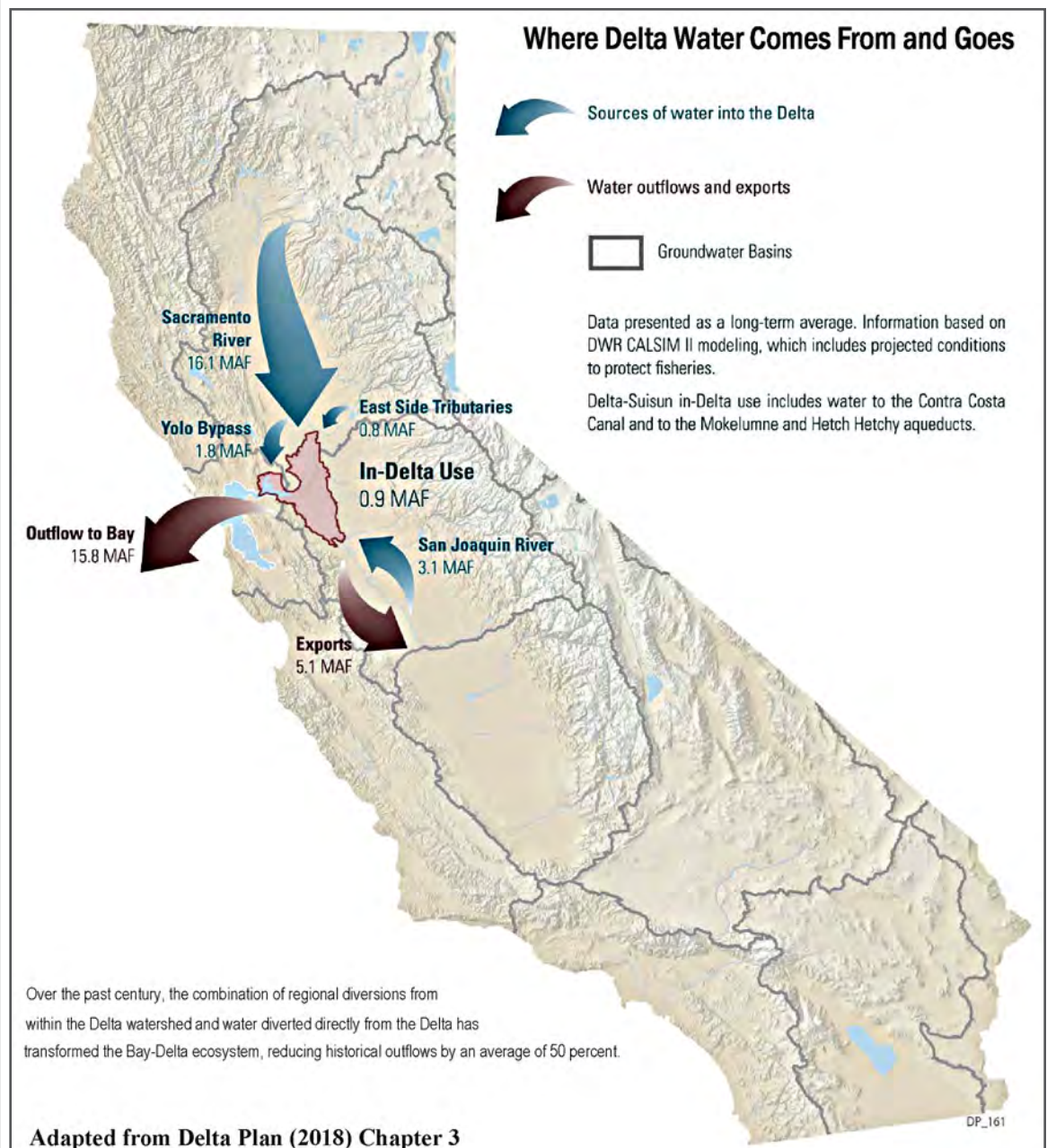
In Tatayon's view, this will require increasing awareness of the Plan and its statewide relevance. She is also providing support for implementation of the Governor's recent executive order to build a water resilience portfolio.

Another goal is to be engaged with advancing ecosystem restoration in the Delta. Tatayon believes she will be able to provide leadership to encourage approaches that ensure natural capital and assets are an integrated element of Delta initiatives rather than a "nice to have" or obligatory mitigation approach. She feels that this reframing of thinking will be critical in addressing the impacts of climate change. She is optimistic about recent efforts to integrate flood and floodplain management with groundwater recharge efforts and stressed how this helps recast opportunities for water storage and operations.

Tatayon also looks forward to supporting related integrated planning processes, like development of the California Water Plan Updates.

Delta Science

In surveys and other assessments, the Council's work in promoting the use of best available science is universally well regarded. We asked the Chair about how she planned to focus on and/or leverage this expertise and reputation. She was very enthusiastic about this aspect of the Council's work and particularly the 2017-2021 Science Action Agenda and the Council-led collaborative, multi-agency science funding initiative.



Tatayon Interview

Human Element

Tatayon again referenced the need for climate change adaptation strategies and how important Delta monitoring programs — along with the joint efforts with Interagency Ecological Program (IEP) — will be in that endeavor. The IEP, a consortium of State and federal agencies, has been conducting cooperative ecological investigations since the 1970s and provides ecological information for management of the Bay-Delta ecosystem and the water that flows through it.

A recent addition to the science agenda is more work on exploring Social Science. Tatayon finds that just focusing on the resource is not enough — better understanding the human element of the equation will be key to the Council's success.

Amendments to the Delta Plan

When adopted by the Council in May 2013, it was always anticipated the Plan would need periodic reviews and updates in response to changing circumstances and conditions in the Delta. The Plan was first amended in February 2016 to include an initial set of refined performance measures. In September 2016 the Plan was amended to exempt single-year water transfers from consideration as covered actions. A third series of amendments were adopted in April 2018 that: addressed conveyance, storage, and operations; updated a section regarding the Delta Levees Investment Strategy; and added a Mitigation Monitoring and Reporting Program as a Plan appendix — among other topics.

The Council is now working with partner agencies, stakeholders, and the public to build upon, further refine, and amend Chapter 4 of the Delta Plan. This chapter includes regulations covering: flow; introduction of nonnative invasive species; and criteria for priority restoration sites.

We asked how Plan amendments would help shape what happens moving forward. To this Tatayon robustly returned with the question, “Do you know how much work it is to complete an amendment?”

While presented with good humor, the retort emphasized the extraordinary amount of work it indeed involves. She outlined the need for environmental reviews and the associated requirements for approvals of regulatory actions by the State's Office of Administrative Law. Her final point being that no Chair would choose to undertake an amendments process without a clear case to do so.

In the case of the Chapter 4 amendment, Tatayon felt that it is critical for the Delta Plan to reflect the evolving understanding of climate change and its impacts. As described in Council documents, “The amendment is intended to consider the past and future effects of climate change and sea level rise, incorporate lessons learned about adaptive management of the Delta ecosystem, identify best practices, address needed institutional changes to improve implementation of restoration actions, and be informed by the best available interdisciplinary science.”

2018

Amendments

Flow

Regulation

Climate Change

Sea Level Rise

Short History of Lengthy Delta Conveyance Proposals

Planning documents dating back to 1917 suggested ways to move water from water rich Northern California to water scarce regions. The eventual engineered solutions to move water became reliant on dams and the natural infrastructure provided by river systems and the Sacramento-San Joaquin Delta. Today water is pumped from the Delta and moved further along through a canal system. Yet, from the time of construction forward, some questioned the use of the Delta water in this manner.

By 1957 the California Water Plan referenced an eventual need to develop an alternative to a Delta conveyance. Later Water Plans included in predictions of water supply the completion of a peripheral canal (a system that by-passes the Delta) for conveyance. In 1980 Governor Jerry Brown directed the California Department of Water Resources (CDWR) to initiate construction of the peripheral canal. The project was stopped in a 1982 by a referendum which had brought the issue before the voters in a hotly contested election.

Over the years, multiple proposals to address a growing set of problems created by use of the Delta for conveyance continued to be explored. In 2000, a 30-year plan for Delta management and restoration was drafted. Implementation of the plan was ultimately pledged by 25 state and federal agencies with expertise to manage the complex program. According to public records, this plan, set forth in a federal programmatic Record of Decision, “laid out a science-based planning process through which the participating agencies were able to make and implement better, more informed decisions and actions on future projects and programs.” Two years later, the California Bay-Delta Authority was created to oversee the program's implementation and Congress adopted the plan in 2004.

Efforts continued to seek resolution of Delta issues. In 2006, Governor Schwarzenegger convened a Delta Vision Task force that after extensive input released a Strategic Plan in 2008. Informed by this process, the 2009 Delta Reform Act (Act) states the Delta Plan (in legislation now required to be prepared by the Council) “shall promote options for new and improved infrastructure relating to the water conveyance in the Delta” — among other things.

After exploring their options, in 2015, the Brown administration proposed a California Water Fix that would have created two (twin) 30-mile tunnels to convey water around the Delta. CDWR proceeded with developing planning materials and, as required under the Act, self-certified that the project was consistent with this Delta Plan. CDWR's self-certification was appealed by nine parties. In October 2018, the Council staff issued a draft determination that not enough evidence existed in the record to support CDWR's determination and made a recommendation that the Council return the matter back to CDWR. On December 7, 2018, CDWR withdrew its Certification of Consistency. This action allowed the Delta Stewardship Council Executive Officer to dismiss the appeals because they no longer raised issues before the Council.

As noted in the interview, a more recent Executive Order from the Governor references further consideration of a single tunnel.

Tatayon Interview

Delta Tunnel

The Delta serves as the hub of the State's water transportation system and several proposals to find ways to move water around the hub through canals and twin-tunnels have been examined and dismissed (*see sidebar, previous page*). New proposals are being examined to consider an alternative to Delta conveyance that would only include one tunnel. An April 2019 Governor's Executive Order on Water Resiliency specifically references this concept. Given this history, no Delta interview would be complete without inquiring about the proposals to build a tunnel.

We asked what the Chair saw as the Council's role in determining a Delta conveyance project. Tatayon immediately referenced the 2018 Plan amendments and encouraged anyone wanting to know more about what the Council would examine should it respond to an appeal on a consistency determination, to read the Delta Plan Chapter 3 sections on conveyance, storage and operations (*see sidebar below*).

Delta Plan Chapter 3: Water Supply Principles

DELTA PLAN NOTES ON A MORE RELIABLE WATER SUPPLY FOR CALIFORNIA

(AS AMENDED APRIL 26, 2018)*

Delta Plan Chapter 3 provides an overview of California's water context including the special role of the Sacramento-San Joaquin Delta (Delta) in California's water.

Under the Delta Plan, four core water strategies must be implemented throughout the state to achieve the coequal goal of providing a more reliable water supply for California:

- Increase water conservation and expand local and regional supplies
- Improve groundwater management
- Improve conveyance and expand storage
- Improve water management information

In 2018, the Delta Stewardship Council amended the Delta Plan to promote options for water conveyance, storage systems, and the operation of both based on historical information and the best currently available science. The amendment recommendations are based upon the 19 Principles for Water Conveyance in the Delta, Storage Systems, and for the Operation of Both to Achieve the Coequal Goals.

19 Principles (abbreviated)*

- 1) New or improved Delta conveyance infrastructure should enhance the Delta ecosystem, including restoring more natural flows, protect or enhance water quality, and increase reliability.
- 2) Flexibility is key to new or improved Delta conveyance infrastructure.
- 3) Conveyance improvements should be able to adapt to changing conditions both near-term and in the future while continuing to provide benefits to the ecosystem and reliably convey available water supplies.
- 4) New or improved Delta conveyance infrastructure should increase resiliency of the state's water supply systems in the face of future threats related to climate change and levee failures.
- 5) To maximize benefits, new Delta conveyance infrastructure should be integrated with new and expanded storage projects, increased water-use efficiency and conservation improved groundwater management; and restoration of the structure and function of some key Delta ecosystems.
- 6) New or expanded water storage projects above and below the Delta are necessary.
- 7) New or expanded storage projects should be cost effective.
- 8) Groundwater storage opportunities should be protected.
- 9) New or expanded storage projects should provide both immediate and enduring ecosystem and water supply benefits.
- 10) New or expanded water storage projects are part of a system and should support a comprehensive approach to managing the water cycle.
- 11) Water exported from the Delta should more closely match water supplies available to be exported.
- 12) Storage and conveyance should be operated by storing water in wet periods and reducing diversions in dry periods to protect water quality in the Delta, provide more natural, functional flows, and enhance Delta inflows and outflows.
- 13) Operational decisions should be based upon more accurate, timely, and transparent water accounting and budgeting.
- 14) Additional water supplies can be derived from more efficient reoperation of existing infrastructure.
- 15) Water storage operational guidelines should adopt a multi-year planning horizon to ensure adequate carryover of stored water in surface and groundwater reservoirs at the end of each water year to buffer against multiple dry years.
- 16) Surface and groundwater storage, whenever feasible, should be operated conjunctively to reduce long term groundwater basin overdraft and improve groundwater basin recharge.
- 17) Conveyance, storage and operation of infrastructure should provide net benefits to the ecosystem, not just protecting the ecosystem from further degradation.
- 18) Operation of storage and Delta conveyance infrastructure should be informed by best available science, adequately monitored and evaluated, and adaptively managed to ensure progress towards well-defined performance measures.
- 19) Ecosystem benefits should be assured through contracts, operations and governance protocols, or other enforceable agreements.

*As Summarized from the State of California, Delta Stewardship Council Delta Plan Chapter 3 - A More Reliable Water Supply for California (as amended April 26, 2018) and supporting documents.

Tatayon Interview

Climate, Communication, & Planning Needs

Goal Awareness

Transformative Tedium

Delta Plan Five Year Review

A formal Five-Year Review process, including stakeholder input, was recently drafted. We asked the Chair what she found particularly interesting or noteworthy about the review preliminary findings.

Several issues stood out for her. First was the clear consensus among all the reviewers about the critical need to address climate change. She felt the overwhelming emphasis of this topic by stakeholders provided momentum to the State's goals and actions to respond and adapt.

A second highlight was the need for the Council to increase its communications across all sectors. She observed the heartfelt request of the Delta stakeholders to have a larger voice in the process. She equally noted that a lack of awareness and misunderstandings by those outside of the Delta undercut needed statewide support. She was also struck by the importance of increasing communications with those that have traditionally been less engaged in Delta discussions such as tribes and the underserved and disadvantaged communities. She believes that these groups, both inside and outside of the Delta, have relevant and important perspectives.

Tatayon also referenced some strategic planning the Council engaged in last March. The Council collectively, in addition to the topics she had already listed, wanted to increase the clarity of linkages between the Council's science endeavors and policy, and amplify the role of DPIIC.

A Water Pioneer

In closing, we sought to learn more about Tatayon's reflections on her own pioneering career trajectory and what lessons learned or advice she might offer to those starting out. Demonstrating her humility, she was genuinely perplexed by the question and replied that she never considered herself a pioneer. We spent a few minutes discussing what pioneers do, pointing out that her own series of accomplishments involved changing the way things were done or forging a path forward on things that had never been done before. We suggested that this probably qualified as pioneering. With this clarification and definition, she offered several pieces of advice.

First she encouraged those embarking on new endeavors to become fully aware of what they are trying to accomplish. She explained there will almost always be a need to adjust and change course as an effort evolves but keeping an eye on the overarching goal will help achieve results.

Tatayon advised that those wishing to build a career should not wait for the assignment. She shared that she was always asking what she might be able to do to help and it was through this process that some of her most extraordinary opportunities emerged.

Finally, she offered that there could be unknown benefits in embracing the mundane. She offered as an example an assignment she had been given that, in the view of others in the group, was tedious and mind numbing. It was this very experience, and the deep exposure to new perspectives it provided, that was among the most transformative of her early career.

In closing she again expressed appreciation for the opportunity to share the Council's story.

FOR ADDITIONAL INFORMATION:

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Lisa Beutler specializes in helping organizations and communities reach decisions and create effective public policy. After a decade as the Associate Director of the Sacramento State University Center for Collaborative Policy she moved to Stantec, a global design and engineering firm. At Stantec she helps clients with strategic thinking, collaborative policy, and water resources and other planning. Earlier in her career she was a state park ranger and served in special offices of two governors. As an elected leader for the American Water Resources Association, her water management expertise and passion for excellence is well known. In addition to being the California Water Plan Executive Facilitator, she is also a nationally recognized practitioner in large group processes and continues to explore the use of technology to improve collaboration, transparency and decision making. Her expertise has also led to key roles in California's implementation of the Sustainable Groundwater Management Act. Internationally, she helped lead the team that engaged 400 global leaders of religious and spiritual communities to address the obligations of the faith community in providing clean, safe water to the people of the world at the 2004 Parliament of World's Religions in Barcelona, Spain. A popular presenter at professional conferences, her work is and has been studied extensively and as far back as reviews in the *Public Productivity & Management Review* (1996). She has also been featured in a variety of publications and books including *Planning in the Face of Conflict* by John Forester. With a proven track record leading numerous complex, high profile projects ranging from water, land-use, and energy planning to off-highway vehicles, technology, substance abuse, and religious conflict resolution, she is a go-to resource for agencies with wicked problems.

Irrigation Innovation

Aging Infrastructure

Efficiency Regimen

Piping Laterals

Management Plan

SCADA & Telemetry

Federal Partnership

INNOVATIVE IRRIGATION MODERNIZATION

FOUR MICRO TURBINES SUPPLY NEW ADAPTABLE POWER SOURCE
RIBBON-CUTTING AT THE WATSON MICRO HYDRO DEMONSTRATION POWER PLANT

by Marc Thalacker, Three Sisters Irrigation District (Sisters, OR)

Introduction

Situated east of the Cascade foothills in a area running northeast from Whychus Creek (a tributary of the Deschutes River), through the Cloverdale area, and down McKenzie Canyon to Lower Bridge, the Three Sisters Irrigation District (TSID or District) provides irrigation water to 7,572 acres of land owned by farming and ranching interests located within its boundaries.

Prior to 1997, TSID had an aging irrigation infrastructure. The majority of TSID's 64 miles of canals and private laterals were open and losing over 50% of the water diverted from Whychus Creek to seepage and evaporation. Most of the District's water users had electric surface pumps that pumped from delivery ponds or directly from the canals to irrigate the 7,600 acres of irrigated farmland in the District. Over 1,000 acres, on a dozen properties in the District, were irrigated by flood application.

Since that time, though, things have improved dramatically. Thanks to the District's pursuit of enabling collaboration on a number of innovative projects — the latest of which recently receiving special recognition — a new regimen of irrigation efficiency is well underway.

On March 19th of this year, Senator Jeff Merkley, D-Oregon, US Department of Agriculture National Resources and Conservation Service Chief Matt Lohr, and other state and local dignitaries attended a ribbon-cutting celebrating the new Watson Net Meter Micro Hydro demonstration project at the Three Sisters Irrigation District. "I've worked with farmers across Oregon on water resource issues. I know how much rides on reliable water, and I understand their stress when its availability is in doubt," Merkley said. "That's why I've used my position as the top Democrat on the Senate Appropriations Agriculture Subcommittee to fight for solutions that can help farmers focus on growing their crops and growing their incomes with less uncertainty clouding their futures," Merkley added.

"This important project will not only get more water to Central Oregon farmers, it will also help ensure habitats are protected and water is conserved. This funding is a critical piece, and it's made possible because of the perseverance and collaboration among folks in Central Oregon," Merkley stressed.

Background

PIPING, PLANNING, & PROJECTS

TSID partnered with the US Department of Agriculture's (USDA's) Natural Resource Conservation Service (NRCS) in 1997 to prioritize piping of private irrigation laterals from its canals that served flood irrigated farmland. In 2000, TSID entered into cooperative grant agreements with the US Bureau of Reclamation (Reclamation) and the Deschutes River Conservancy to install gauging stations and measuring devices through the Water Conservation Field Services program. This laid the groundwork for developing a System Optimization Review that the District used to develop an Agricultural Water Management and Conservation plan. The plan included piping the entire district, installing a state of the art fish screen and channel restoration (including fish passage), and improving on farm efficiencies through the NRCS Environmental Quality Incentives Program (EQIP) and Agricultural Water Enhancement Program (AWEP) programs.

The plan also included developing Supervisory Control and Data Acquisition (SCADA) and telemetry to enable efficient oversight and management. SCADA is a control system architecture that uses computers, networked data communications, and graphical user interfaces for high-level process supervisory management. The remote management or monitoring function of a SCADA system is often referred to as telemetry. This allows for the reduction of staff time to monitor the system with "on the ground efforts" (which previously took days) by allowing for remote reading of the meters in "real time" in a couple of hours.

TSID partnered with NRCS and Reclamation under their *Bridging the Head Gates Memorandum of Agreement*. Through this partnership, NRCS provided the design and engineering to pipe the 30 miles of TSID Main Canals. Through NRCS's Agricultural Watershed Enhancement Program (AWEP) and Regional Conservation Partnership Program (RCPP) funding was made available to farmers for private laterals (i.e. pipes installed downstream from a control valve for irrigation purposes) and other farm projects. NRCS provided the design and engineering for these projects.

Irrigation Innovation

Habitat & Flow

Pressurized Delivery

Fish Passage & Hydropower

Pressurized Piping

Infrastructure Improvements

Carbon Neutrality

Micro Turbines Demonstration

Multiple Benefits

Environmental issues were also addressed. In 2006, the Deschutes River Conservancy, Deschutes Land Trust, and Upper Deschutes Watershed Council (combined as the “Deschutes Partnership”) developed a comprehensive restoration strategy to guide habitat restoration in support of steelhead reintroduction. This strategy set the broad goal of restoring the habitat conditions necessary to support self-sustaining populations of summer steelhead and spring Chinook in Whychus Creek. TSID worked with the Deschutes Partnership to restore flows to Whychus Creek.

In May of 2010, the McKenzie Pipeline project went live and TSID began delivering pressurized water to 2,000 acres in Lower Bridge eliminating 38 pumps and conserving almost 3,000,000 kWh per year.

TSID was shovel ready when the American Recover and Reinvestment Act (ARRA) was implemented under the Obama Administration. With ARRA and the help of Reclamation and Interior, as well as many other state, federal and NGO partners, TSID was able to pipe 3.77 miles of their Main Canal, starting at the diversion, with double 54” HDPE pipes, install a state of art fish screen, create fish passage, and assist with channel restoration. This set the stage for TSID to build a 700 kW Francis Turbine at Watson Reservoir. The Watson Hydroelectric plant was constructed during the summer of 2014 and went on line in August of the same year. The facility produces approximately 3 million kWh annually, which is enough green power to serve 275 homes each year. See Pamela Thalacker, *TWR* #101 for additional background information and details on the fish screening facility, other projects, and “Endangered Fish Reintroduction.”

Hydropower Opportunities

Authors Marc Thalacker has been the District Manager of TSID since 1997. During the 20+ intervening years TSID has replaced 60 of 64 miles of open canals with pressurized piped water for irrigation. When finished in 2020, the TSID will have eliminated 98 percent of all on farm pumping stations by delivering pressurized water. This equates to a savings of 9 million kilowatt hours (kWh) annually. This near-completion of the irrigation piping system gives TSID multiple hydroelectric power opportunities.

Hydroelectric power is important for modernization efforts as it provides a long-term revenue source that can be used to pay back \$4.5 million in Clean Water State Revolving Fund loans from the Oregon Department of Environmental Quality. The loans allowed TSID to install \$50 million of infrastructure improvements: High Density Polyethylene (HDPE) Pipelines; the Farmer’s Conservation Alliance Horizontal Fish Screen in 2010; and three hydroelectric plants. By installing the hydro plants, and providing pressurized water to its irrigation users, the District expects to be carbon neutral in 2020 — i.e., it will have no net release of carbon dioxide to the atmosphere.

As noted above, in 2014 TSID finished building a \$2.3 million 700 kW hydroelectric plant on the Watson Reservoir at the end of four miles of 54” HDPE pipe serving as its penstock. That plant converts excess gravity pressure from the piped irrigation water into a renewable energy source. The plant generates on average 3.1 million kWh annually.

Net Meter Micro Hydro Demonstration Power Plant

TSID has just completed a \$700,000 200 kW Net Meter Micro Hydro Demonstration plant that will begin generating 800,000 kWh annually, starting this year. It functions in the same manner as the hydroelectric plant on Watson Reservoir, but with four smaller scale (“micro”) turbines suitable for on-farm use. TSID plans to build the final 300 kW hydropower plant in 2019, which will generate 1.2 million kWh annually. TSID just completed the last phase of the District’s Main Canal system which will serve as a penstock to the third small conduit 300 kW hydro, with plans to go live in fall 2019. TSID will be fully piped and modernized in 2020 — including being carbon neutral.

At the ribbon-cutting ceremony for the new Micro Hydro Demonstration plant NRCS Chief Matthew Lohr pointed at the value of its addition for watershed solutions. “With voluntary support from farmers and ranchers, and through strategic partnerships with many other organizations, NRCS helps local communities develop watershed-scale solutions that sustain agriculture and the environment,” Lohr said. “Our collaborative work with irrigation partners in Central Oregon is a model for locally led watershed planning and implementation to modernize aging rural infrastructure. This type of work brings multiple benefits, including: conserving water; reducing energy consumption; producing green energy; increasing irrigation delivery efficiency; and improving in-stream habitat for threatened and endangered fish and wildlife.”



Irrigation Innovation

Technology Variety

Flow & Pressure Options

With the addition of these four micro turbines, the district will generate 26 percent more energy while showcasing turbine technology that can be used in on-farm hydropower generation projects on a small-scale. Due to the topography of the Three Sisters area, there are more than 60 sites at farms in the District with hydropower potential. The micro hydro demonstration project will generate enough energy to power over 75 homes. This new 200 kW, four-turbine net meter micro hydro facility — designed by Bill Cronin, PE, (NRCS State Irrigation Engineer) — allows the Natural Resources Conservation Service and TSID to demonstrate the variety of technologies available that can be used on farms or ranches that receive pressurized water. Three Sisters Irrigation District and NRCS designed this facility to help Oregon's irrigators consider this technology as a way to produce lasting economic and environmental benefits for rural communities.

Informational tours and educational workshops are being conducted to explain the four turbines included in the project, including:

- A Pump as Reverse Pump Turbine (Cornell, 15 kilowatt)
- Canyon Industries 11 kW Pelton Wheel Turbine (Canyon Hydro, Impulse, 11 kilowatt)
- Soar Hydropower 22.38 kW Adjustable Francis Turbine (Soar, Reactive Turbine, 22 kilowatt)
- Francis Turbine (HydroTek, Reactive Turbine, 150 kilowatts)

Each of these turbines has a technology that can be tailored to individual on-farm scenarios. Depending on the flow and pressure of water in an irrigation pipe entering the farm or ranch (available for flow through the penstock), one or more of these hydropower systems may be used to generate renewable electricity. The electricity may be sold to a utility or used to off-set electric loads (e.g. electricity used to power irrigation). A successful TSID installation will allow for technology transfer to many possible on-farm installations, where inline hydro turbines could replace energy wasting pressure reducing valves.



**Marc Thalacker, District Manager, TSID (left)
&
Robert Wallace, Executive Director, Wy'East RC&D
with the
Cornell 14 kW Reverse Pump**

**Irrigation
Innovation****Irrigation
Modernization****Renewable
Power****Positive Impacts****Flow
Augmentation****Aggressive
Conservation****1895 Priority**

Marc Thalacker has been the Manager of Three Sisters Irrigation District since 1997. He has farmed and ranched in Central Oregon since 1988. Marc serves on the boards of the Oregon Water Resources Congress and the Family Farm Alliance.

The tours and workshops are for: landowners; farmers and ranchers; the general public; small hydro groups; engineers — and generally for anyone interested in learning about: small hydro; renewable energy; sustainable farming; and irrigation modernization /efficiencies. At this time tours are held every few months. Recent tours were held for Sustainability Northwest, Cascades Academy private middle school, University of Southern Oregon Environmental Students, and the March ribbon cutting event for all those who were involved and supported the projects. The tours focus on the entire District irrigation modernization program and explains why four different turbines were chosen for the project. This highlights the various options that farmers and ranchers could utilize to develop their own micro hydro project.

The Micro Hydro Demonstration Project was funded by Bonneville Environmental Foundation, Energy Trust of Oregon, Oregon Department of Energy and Three Sisters Irrigation District. The clean green renewable power is sold to PacifiCorp, who will use the renewable power to comply with Oregon's Renewable Portfolio Standard and reduce their coal generation.

Accomplishments

The celebration of the latest accomplishment in the modernization process for Three Sisters Irrigation District highlights the Net Meter Micro Hydro Demonstration plant. This project, however, is part of a long-line of projects that has moved TSID forward.

Improvements include:

- Improved control of water in conveyance and delivery system. All 193 farms will be metered.
- Pressurization of delivery to irrigators.
- Electrical power conservation. Over 9 million kWh conserved annually.
- Increased economic inputs into the local community. Currently TSID's farmers are spending an additional \$2 million annually due to delivery of pressurized water on farm.
- Water Conservation — Elimination of existing canal seepage and evaporation. Improved water delivery of up to 25% during low flow periods and drought.
- Augmented instream flows in Whychus Creek that will benefit Redband and Bull Trout, Chinook and Fish Conservation. Installation of a state of the art Farmer's Conservation Fish Screen.
- Three Hydro facilities generating clean, green, renewable energy. When all three plants are completed TSID will be generating 4 million kWh annually.
- As of 2020 TSID will be carbon neutral with the energy generation, conservation, and crops grown.

TSID has pursued an aggressive conservation program. This program has consisted primarily of piping projects that eliminate canal seepage which previously averaged over 50 percent. Over 60 miles of the 64-mile system is now piped. As a result of these efforts by the district and its partners there is a permanent protected minimum flow in Whychus Creek of 20.26 cubic feet per second, which has a water right priority date of 1895 or prior. The on-farm deliveries have increased as much as 25% at the same time that we are increasing instream flow. This win-win scenario for fish and farms is creating consensus and avoiding conflict, proving that sustainable farming and a successful anadromous fish reintroduction can beneficially co-exist.

Conclusion

Modernization in the West is a collaborative effort to unlock the many benefits associated with upgrading large-scale agricultural water delivery infrastructure. By piping their canal systems, and installing small hydro facilities, TSID is improving the reliability of their water supplies, improving water quality, reducing risks to farmers during droughts, eliminating electric bills, creating green renewable energy, restoring Steelhead and Salmon runs, sustaining farming and health in economic rural communities, while enabling more water to be left in stream for fish and wildlife. These projects, over the last 20 years, have created jobs in rural central Oregon communities in Deschutes, Jefferson, and Crook Counties. As a result, TSID farmers are spending approximately an additional \$2 million a year in the local economy on irrigation equipment, tractors, buildings, specialty crops, and labor.

These and other projects in the West occur through widespread support and partnerships with government and conservation organizations, such as the Family Farm Alliance, Farmers Conservation Alliance, Energy Trust of Oregon, Bonneville Environmental Foundation, Oregon Department of Energy and funding from 15 organizations, including millions in USDA Natural Resource Conservation Service federal funds.

FOR ADDITIONAL INFORMATION:

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Indian Water Settlements

INDIAN WATER RIGHTS SETTLEMENTS

AN UPDATE FROM THE CONGRESSIONAL RESEARCH SERVICE

Editors' Introduction: What follows is comprised of lightly edited excerpts from a Congressional Research Service (CRS) update on Indian Water Rights Settlements dated April 16, 2019 (CRS reference: R44148, author Charles V. Stern). Sections detailing settlement negotiation procedures and funding sources have been largely omitted. Information regarding online access to the full report appears below.

Introduction

In the second half of the 19th century, the federal government pursued a policy of confining Indian tribes to reservations. These reservations were either a portion of a tribe's aboriginal land or an area of land taken out of the public domain and set aside for a tribe. The federal statutes and treaties reserving such land for Indian reservations typically did not address the water needs of these reservations, a fact that has given rise to questions and disputes regarding Indian reserved water rights. Dating to a 1908 Supreme Court ruling, courts generally have held that many tribes have a reserved right to water sufficient to fulfill the purpose of their reservations and that this right took effect on the date the reservations were established. This means that, in the context of a state water law system of prior appropriations, which is common in many US western states, many tribes have water rights senior to those of non-Indian users with water rights and access established subsequent to the Indian reservations' creation. Although many Indian tribes hold senior water rights through their reservations, the quantification of these rights is undetermined in many cases.

Tribes have pursued quantification of their water rights through both litigation and negotiated settlements. The settlements involve negotiation between tribes, the federal government, states, water districts, and private water users, among others. They aim to resolve conflict between rights holders and allow the parties to determine specific terms of water allocation and use with certainty. Over the last 50 years, negotiated settlements have been the preferred course for most tribes because they are often less lengthy and costly than litigation. Additionally, many stakeholders have noted that these negotiated agreements are more likely to allow tribes not only to quantify their water rights on paper but also to procure access to these resources in the form of infrastructure and other related expenses — at least in some cases.

This report provides background on Indian water rights, describes the settlement process, and summarizes enacted and potential settlements to date. It also analyzes issues related to Indian water rights, with a focus on the role of the federal government and challenges faced in negotiating and implementing Indian water rights settlements. Finally, it focuses on settlements in a legislative context, including enacted and proposed legislation.

Background

Indian water rights are vested property rights and resources for which the United States has a trust responsibility. The federal trust responsibility is a legal obligation of the United States dictating that the federal government must protect Indian resources and assets and manage them in the Indians' best interest. Historically, the United States has addressed its trust responsibility by acting as trustee in managing reserved lands, waters, resources, and assets for Indian tribes and by providing legal counsel and representation to Indians in the courts to protect such rights, resources, and assets. Specifically in regard to Indian water rights settlements, the United States has fulfilled its trust responsibility to Indian tribes by assisting tribes with their claims to reserved water rights through litigation, negotiations, and/or implementation of settlements.

The specifics of Indian water rights claims vary, but typically these claims arise out of the right of many tribes to water resources dating to the establishment of their reservations. Separately, some tribes also have time immemorial rights to water resources based on tribal water uses that preceded the establishment of reservations. Indian reserved water rights were first recognized by the Supreme Court in *Winters v. United States* in 1908. Under the *Winters* doctrine, when Congress reserves land (i.e., for an Indian reservation), Congress implicitly reserves water sufficient to fulfill the purpose of the reservation.

Reservations

Reserved Rights

Quantification

Settlement
Benefits

Federal Trust
Responsibility

Implicit
Reservation

Indian Water Settlements

Prior Appropriation

Winters Doctrine

In the years since the *Winters* decision, disputes have arisen between Indians asserting their water rights and non-Indian water users, particularly in the western United States. In that region, the establishment of Indian reservations (and, therefore, of Indian water rights) generally predated settlement by non-Indians and the related large-scale development by the federal government of water resources for non-Indian users. In most western states, water allocation takes place under a system of prior appropriation in which water is allocated to users based on the order in which water rights were acquired. Under the *Winters* doctrine and the western system of prior appropriation, the water rights of tribes often are senior to those of non-Indian water rights holders because Indian water rights generally date to the creation of the reservation. However, despite the priority of Indian reserved water rights, non-Indian populations frequently have greater access to and allocations of water through infrastructure. This discrepancy leads to disputes that typically have been litigated or, more recently, resolved by negotiated settlements.

Litigation of Indian water rights is a costly process that may take several decades to complete. Even then, Indian water rights holders may not see tangible water resources and may be awarded only “*paper water*” — that is, they may be awarded a legal claim to water but lack the financial capital to develop those water resources. This situation occurs because, unlike Congress, the courts cannot provide tangible “*wet water*” by authorizing new water projects and/or water-transfer infrastructure (including funding for project development) that would allow the tribes to exploit their rights. As a result, negotiated settlements recently have been the preferred means of resolving many Indian water rights disputes.

Settlement Structure and Process

Infrastructure = Access

The primary issue regarding settlement for Indian reserved water rights is quantification — identifying the amount of water to which users hold rights within the existing systems of water allocation in various areas in the West. However, quantification alone often is not sufficient to secure resources for tribes. Thus, the negotiation process frequently also involves provisions to construct water infrastructure that increases access to newly quantified resources. In addition to providing access to wet water, some negotiated settlements have provided other benefits and legal rights aligned with tribal values.

Environmental Restoration

Some tribal settlements have included provisions for environmental protection and restoration. For example, the Snake River Water Rights Act of 2004 (P.L. 108-447) included a salmon management and habitat restoration program. In another instance, the Truckee-Carson-Pyramid Lake Water Rights Act (P.L. 101-618) established a fish recovery program under the provisions of the federal Endangered Species Act, consistent with the tribe’s historic use and reliance on two fish, the cui-ui and the Lahontan trout. [For more information, see US Fish and Wildlife Service (FWS), *Digest of Federal Resource Laws of Interest to the US Fish and Wildlife Service: Pyramid Lake/Truckee-Carson Water Rights Settlement*, at www.fws.gov/laws/lawsdigest/PYRAMID.HTML.]

Federal Guidelines

Federal involvement in the Indian water rights settlement process is guided by a 1990 policy statement established during the George H. W. Bush Administration, “*Criteria and Procedures for the Participation of the Federal Government in Negotiations for the Settlement of Indian Water Rights Claims*” by the Working Group on Indian Water Settlements from the Department of the Interior (DOI). DOI adopted the *Criteria and Procedures* in 1990 to establish a framework to inform the Indian water rights settlement process and expressed the position that negotiated settlements, rather than litigation, are the preferred method of addressing Indian water rights. As discussed [in depth in the CRS Report] the primary federal entities tasked with pre-negotiation, negotiation, and implementation duties for Indian water rights settlements are DOI, the Department of Justice (DOJ), and the Office of Management and Budget (OMB).

Status of Individual Indian Water Rights Settlements

Negotiation Teams

The federal government has been involved with Indian water rights settlements through assessment, negotiation, and implementations teams (for enacted settlements) since 1990. As of 2018, there were 21 ongoing negotiation teams working on settlements projected to cost more than \$2 billion. Additionally, there are 23 implementation teams active for carrying out approved settlements. Overall, the federal government has entered into 36 settlements since 1978, with Congress enacting 32 of these settlements. The remaining settlements were approved administratively by the Secretary of the Interior or the U.S. Attorney General or by judicial decree.

Implementation Teams

Table 1, on the next page, lists enacted settlements as of the date of this report, while Table 2 (page 17) lists negotiation teams as of 2017 (the last time this information was made available).

Table I. Enacted Indian Water Rights Settlements

Year	Settlement and Legislation	State	Tribes	Total Acre-Feet Awarded per Year	Estimated Federal Cost (\$ millions)
1978 (1984, 1992, 2000)	Ak-Chin Indian Water Rights Settlement Act, P.L. 95-328 (P.L. 98-530, P.L. 102-497, P.L. 106-285)	AZ	Ak-Chin Indian Community of Papago Indians of the Maricopa	85,000	\$101.1
1982 (1992)	Southern Arizona Water Rights Settlement Act, P.L. 97-293 (P.L. 102-497)	AZ	San Xavier and Schuk Toak Districts, Tohono O'Odham Nation	66,000	\$39.8
1987	Seminole Indian Land Claims Settlement Act of 1987, P.L. 100-228	FL	Seminole Tribe of Florida	NA	NA
1988	Salt River Pima-Maricopa Indian Community Water Rights Settlement Act of 1988, P.L. 100-512	AZ	Salt River Pima-Maricopa Indian Community of the Salt River Reservation	122,400	\$47.5
1988 (2000)	Colorado Ute Water Rights Settlement of 1988, P.L. 100-585 (P.L. 106-554)	CO	Southern Ute, Ute Mountain Ute Tribes (and Navajo Nation)	70,000	\$49.5
1988	San Luis Rey Indian Water Rights Settlement Act of 1988, P.L. 100-675 (P.L. 114-322)	CA	La Jolla, San Pasquale, Pauma, Pala Bands of Mission Indians	NA	\$30.0
1990	Fort Hall Indian Water Rights Act of 1990, P.L. 101-602	ID	Fort Hall Shoshone-Bannock Tribes	581,331	\$22.0
1990	Fallon Paiute Shoshone Indian Water Rights Settlement Act of 1990, P.L. 101-618	NV	Paiute-Shoshone Tribe of the Fallon Reservation and Colony	10,588	\$43.0
1990	Truckee-Carson-Pyramid Lake Water Rights Act, P.L. 101-618	NV/CA	Pyramid Lake Paiute Tribe	NA	\$65.0
1990 (2006)	Fort McDowell Indian Community Water Rights Settlement Act of 1990, P.L. 101-628 (P.L. 109-373)	AZ	Fort McDowell Indian Community	36,350	\$23.0
1992	Northern Cheyenne Indian Reserved Water Rights Settlement Act of 1992, P.L. 102-374	MT	Northern Cheyenne Indian Tribe	83,830	\$73.0
1992 (1998)	Jicarilla Apache Tribe Water Settlement Act of 1992, P.L. 102-441 (P.L. 105-256)	NM	Jicarilla Apache Indian Tribe	40,000	\$6.0
1992 (1994, 1997, 2004)	San Carlos Apache Tribe Water Rights Settlement Act, P.L. 102-575 (P.L. 103-435, P.L. 105-18, P.L. 108-451)	AZ	San Carlos Apache Indian Tribe	67,965	\$41.4
1992	Ute Indian Rights Settlement Act of 1992, P.L. 102-575	UT	Northern Ute Indian Tribe; Ute Indian Tribe of the Uintah and Ouray Reservation	481,035	\$198.5
1994	Yavapai-Prescott Indian Tribe Water Rights Settlement Act of 1994, P.L. 103-434 (P.L. 104-91)	AZ	Yavapai-Prescott Indian Tribe	1,550	\$0.2
1999	Chippewa Cree Tribe of the Rocky Boy's Reservation Indian Reserved Water Rights Settlement Act of 1999, P.L. 106-163	MT	Chippewa Cree Indian Tribe	20,000	\$46.0
2000	Shivwits Band of the Paiute Indian Tribe of Utah Water Rights Settlement Act, P.L. 106-263	UT	Shivwits Band of Paiute Indians	4,000	\$24.0
2003	Zuni Indian Tribe Water Rights Settlement Act of 2003, P.L. 108-34	AZ	Zuni Indian Tribe	10,600	\$19.3
2004	Snake River Water Rights Act of 2004, P.L. 108-447	ID	Nez Perce Tribe	50,000	\$121.3
2004	Arizona Water Settlements Act of 2004, P.L. 108-451	AZ	Gila River Indian Community, Tohono O'odham Nation	653,500	\$2,328.3 ^a
2008	Soboba Band of Luiseño Indians Settlement Act, P.L. 110-297	CA	Soboba Band of Luiseño Indians	9,000	\$21.0
2009	Northwestern New Mexico Rural Water Projects Act (Navajo-Gallup Water Supply Project/Navajo Nation Water Rights), P.L. 111-11	NM	Navajo Nation	535,330	\$984.1
2009	Shoshone-Paiute Tribes of Duck Valley Water Rights Settlement Act, P.L. 111-11	ID/ NV	Shoshone and Paiute Tribe of Duck Valley	114,082	\$60.0
2010	White Mountain Apache Tribe Water Rights Quantification Act of 2010, P.L. 111-291	AZ	White Mountain Apache Tribe	99,000	\$327.2
2010	Crow Tribe Water Rights Settlement Act of 2010, P.L. 111-291	MT	Crow Tribe	697,000	\$461.0
2010	Aamodt Litigation Settlement Act, P.L. 111-291	NM	Nambé, Pojoaque, San Ildefonso, and Tesuque Pueblos	6,467	\$174.3
2010	Taos Pueblo Indian Water Rights Settlement Act, P.L. 111-291	NM	Taos Pueblo Tribe	9,628	\$124.0
2014	Pyramid Lake Paiute Tribe-Fish Springs Ranch Settlement Act, P.L. 113-169	NV	Pyramid Lake Paiute Tribe	NA	NA
2014	Bill Williams River Water Rights Settlement Act of 2014, P.L. 113-223	AZ	Hualapai Tribe	NA	NA
2016	Pechanga Band of Luiseño Mission Indians Water Rights Settlement Act, P.L. 114-322	CA	Pechanga Band of Luiseño Mission Indians	4,994	\$28.5
2016	Choctaw Nation of Oklahoma and the Chickasaw Nation Water Settlement, P.L. 114-322	OK	Choctaw Nation of Oklahoma and Chickasaw Nation	NA	NA
2016	Blackfeet Water Rights Settlement Act, P.L. 114-322	MT	Blackfeet Tribe	50,000	\$420

Indian Water Settlements

Table 2. Indian Water Rights Settlements with Negotiation Teams Appointed

Common Name of Negotiation	State	Tribe(s)
Abousleman	NM	Pueblos of Jemez, Pueblo of Santa Ana, Pueblo of Zia
Agua Caliente	CA	Agua Caliente Band of Cahuilla Indians
Coeur d'Alene	ID	Coeur d'Alene Tribe
CSKT	MT	Confederated Salish and Kootenai Tribes of the Flathead Reservation
Fallbrook	CA	Cahuilla Band of Mission Indians, Pechanga Band of Luiseno Mission Indians, Ramona Band
Fort Belknap	MT	Gros Ventre and Assiniboine Tribes
Kerr McGee	NM	Pueblos of Acoma and Laguna and Navajo Nation
Kickapoo	KS	Kickapoo Tribe
Hualapai	AZ	Hualapai Tribe
Havasupai	AZ	Havasupai Tribe
Lummi	WA	Lummi Tribe and Nooksack Tribe
Navajo-Little Colorado	AZ	Navajo Nation, Hopi Tribe, San Juan Southern Paiute Tribe
Navajo-Utah	UT	Navajo Nation
Tohono O'odham	AZ	Tohono O'odham Nation
Tonto Apache	AZ	Tonto Apache Tribe
Tule River	CA	Tule River Indian Tribe
Upper Gila River/San Carlos	AZ	San Carlos Apache Tribe and Gila River Indian Community
Umatilla	OR	Confederated Tribes of the Umatilla Indian
Walker River	NV	Walker River Paiute Indian Tribe, Bridgeport Indian Colony, Yerington Paiute Tribe
Yavapai-Apache	AZ	Yavapai-Apache Nation
Zuni/Ramah Navajo	NM	Pueblo of Zuni and Ramah Navajo Nation

Source: SIWRO, June 15, 2018.

Note: This list of teams is subject to frequent change and may contain inactive negotiations.

Note: NA = Not Applicable. Multiple public laws listed in Table 1 (previous page) signify amendments to laws, with amendments and corresponding years in parentheses. The federal cost of settlements is an estimate based on the amounts specifically authorized in enacted laws, though some settlements have unknown or unidentified sources of funding and these costs are not reflected in the chart. The column showing acre-feet awarded is based on amounts approved through congressionally enacted settlements and reflects total amounts as detailed in settlement agreements between stakeholders and interstate tribal compacts as well in federal legislation. These amounts generally are subject to specific conditions and allocations per use and tribe.

For more information, see NAWRS at <http://digitalrepository.unm.edu/nawrs/>.

Indian Water Settlements

Implementation Funding

Funding Source

New Water Projects

Environmental Concerns

Settlement Amendments

Water Reallocation

Considerations in Funding Indian Water Rights Settlements

The delivery of *wet water* to tribes that have enacted settlement agreements frequently requires significant financial resources and long-term investments by the federal government, often in the form of new projects and infrastructure. For federal policymakers, a widely recognized challenge is identifying and enacting federal funding to implement settlements while also resulting in cost-savings relative to litigation. In response to concerns related to implementation costs, some settlements have been renegotiated over time to decrease their estimated federal costs. For instance, legislation to authorize the Blackfeet Compact was first introduced in 2010 and was subsequently renegotiated and revised, resulting in a reduction to estimated federal costs by approximately \$230 million (nominal dollars) compared to the version of this legislation that was introduced in 2016. Partially in response to concerns related to justifying the costs of proposed settlements, OMB issued a memo to DOI and DOJ on June 23, 2016, outlining new steps that would provide for greater involvement by OMB earlier in the settlement negotiation process. OMB also stated that it would require, among other things, a description and quantification of the costs and benefits of proposed settlements by DOI and DOJ prior to a formal letter of Administration position.

After a preferred federal contribution is identified and agreed upon, other challenges include identifying the source and structure of federal funding proposed for authorization. Recent congressionally authorized Indian water rights settlements have been funded in various ways, including through discretionary funding authorizations (i.e., authorizations that require annual appropriations by Congress); direct or mandatory funding (i.e., spending authorizations that do not require further appropriations); and combinations of both. In regard to mandatory funding, some settlements have been funded individually and several others have been funded with mandatory spending from a single account, the Reclamation Water Settlements Fund. Additionally, some have tapped preexisting or related federal receipt accounts as the source for mandatory funding. The timing of the release of funds also has varied widely among settlements and may in some cases depend on expected future actions (e.g., contingent on completion of plans and/or certain nonfederal activities).

Compliance with Environmental Laws

The environmental impact of settlements has been an issue for federal agencies, environmental groups, and tribes, among others. In some cases, construction of settlement projects has been challenged under federal environmental laws, such as the National Environmental Policy Act of 1969 (NEPA; P.L. 91-190), the federal Clean Water Act (CWA; P.L. 92-500), the federal Endangered Species Act of 1973 (ESA; P.L. 93-205), and the federal Safe Drinking Water Act (P.L. 93-523).

Because some settlements involve construction of new water projects (such as reservoirs, dams, pipelines, and related facilities), some have argued that settlements pose negative consequences for water quality, endangered species, and sensitive habitats. For example, the Animas-La Plata project, located in southwestern Colorado and northwestern New Mexico, consists of a 270 foot dam, a lake with 123,000 acre-feet of storage, a pumping plant and pipeline to deliver water to the Navajo nation, among other things. This project, originally authorized in the Colorado River Basin Project Act of 1968 (P.L. 84-485) and later incorporated into the Colorado Ute Water Rights Settlement Act of 1988 (P.L. 100-585), faced opposition from several groups over the alleged violation of various environmental laws. In 1990, the FWS issued a draft biological opinion on the potential threat to the Colorado pikeminnow, an endangered fish species. Similarly, the Sierra Club Legal Defense Fund claimed that the Animas-La Plata project would harm the Colorado pikeminnow as well as the razorback sucker. Additionally, the U.S. Environmental Protection Agency (EPA) raised concerns that the project would negatively affect water quality and wetlands in New Mexico. These and other concerns stalled construction of the project for a decade. During this time, Reclamation completed several supplemental environmental impact statements and made changes to the project based on reasonable and prudent alternatives suggested by FWS. The Colorado Ute Settlement Act Amendments of 2000 (P.L. 106-554) amended the original settlement to address these concerns by significantly reducing the size and purposes of the project and codifying compliance to NEPA, CWA, and ESA. Other enacted settlements that initially encountered opposition stemming from environmental concerns include the Jicarilla Apache Tribe Water Settlement Act of 1992 (P.L. 102-441) and the Yavapai-PreScott Indian Tribe Water Rights Settlement Act of 1994 (P.L. 103-434).

Water Supply Issues

In addition to the need to quantify reserved water rights, a key difficulty during the negotiation process is identifying a water source to fulfill reserved water rights. Generally, this is done through reallocating water to tribes from existing sources, as was done for selected tribes in Arizona and the Central Arizona Project under the Arizona Water Settlements Act of 2004 (P.L. 108-451). In some cases, settlements have provided funds for tribes to acquire water from willing sellers. One such example of this is the Zuni Indian Tribe Water Rights Settlement Act (P.L. 108-34), in which the Zuni Indian Tribe Water Rights Development Fund was created for the tribe to purchase or acquire water rights rather than realize its federal reserved water rights as is common for other settlements.

Indian Water Settlements

Marketing & Transfers

Tribal Opposition

Permanent Quantification Issues

Trust Responsibility

Success?

In addition to identifying and quantifying a water source, settlements can address the type of water (i.e., groundwater, surface water, effluent water, stored water) and the types of uses that are held under reserved water rights (e.g., domestic, municipal, irrigation, instream flows, hunting and fish, etc.) as well as water quality issues.

Another common issue addressed within settlements is the question of whether to allow for the marketing, leasing, or transfer of tribal water. Twenty-one of the 32 congressionally enacted settlements permitted some form of marketing, leasing, or transferring, ranging from limited off-reservation leasing to less restrictive forms of marketing. This exchange of water can provide dual benefits of better water reliability in areas of scarce supplies and economic incentives to tribes. At the same time, some tribes and state users oppose any allowance for water marketing in settlements. Some members within tribes object to the exchange of water on religious and cultural grounds, due to the belief that water is fundamentally attached to tribal life and identity. Some non-Indians oppose allowances for water marketing in these agreements when marketing has the potential to increase the price of water that otherwise might be available for free to downstream water users and thus potentially could harm regional economies. As such, negotiating the right to market, lease, or transfer water can be a contentious issue that results in several restrictions to mitigate potential negative impacts.

The “Certainty” Debate

The certainty of Indian water rights settlements is commonly cited as a multilateral benefit for the stakeholders involved. Supporters regularly argue that mutual benefits accrue as a result of these agreements: tribes secure certainty in the form of water resources and legal protection; local users and water districts receive greater certainty and stability regarding their water supplies; and the federal and state governments are cleared from the burden of potential liability. Some tribal communities have objected to settlements based on these principles. They have argued that the specific, permanent quantification of their water rights through settlements may serve to limit the abilities of tribes to develop in the future. Similarly, some have argued against settlements as they may limit tribes to a particular set of uses (e.g., agriculture) and prevent potential opportunities for greater economic yields in the future. Some contend that to avoid use-based limitations, water rights settlements should focus on allowing water leasing and marketing (see discussion in “Water Supply Issues,” above) so tribes can control and use their water resources with greater flexibility. Still others have spoken out against the idea of negotiated settlements entirely, as they oppose negotiating their claims in exchange for lesser water rights and money. They view the process as akin to the “first treaty era” — when Indian tribes forfeited their lands. They note that in the future, the courts may be more favorable and allow for greater gains through litigation.

Non-tribal users also may raise their own concerns with the certainty of water rights settlements. Some water users have complained that provisions in certain settlements have the potential to maintain or even increase uncertainty associated with their water rights. For example, some water users in western Montana have raised concerns that the Confederated Salish and Kootenai Tribes (CSKT) Water Compact recognizes off-reservation water rights with the potential to significantly curtail non-tribal water rights beyond those quantified in the CSKT Compact.

Legislative Questions

Several common questions that are raised often in regard to Indian water rights settlements are discussed below.

Why Is the Federal Government Involved in Indian Water Rights Settlements?

Although settlements essentially act as a quid pro quo relationship among the many stakeholders involved, the federal government’s role in all stages of the settlement process serves as a way to fulfill its trust responsibility to the tribes to secure, protect, and manage the tribes’ water rights. Furthermore, many tribes have breach-of-trust claims against the federal government. Settlements (including those that provide for federal resources and funding for new water infrastructure) provide an opportunity for tribes to formally waive these claims and potentially resolve these disputes.

Has Negotiating Settlements Been Successful?

It is difficult to make broad characterizations of the impact of Indian water rights settlements. As of 2019, the federal government has been involved in the negotiation of more than 50 Indian water rights settlements. As previously noted, 36 of these negotiations have resulted in federal settlements with tribes and others. Whether these settlements have been successful depends in part on the metric used to define success. In most cases, the settlements have secured rights and access (or potential access) to tribal water resources. However, many of the projects to provide this access are ongoing, so it is not possible to characterize their end result for tribes and the federal government. Further, the extent to which settlements eventually achieve their anticipated benefits likely will vary among individual settlements. Some (including both Indian and non-Indian users) who support negotiating settlements in general may disagree with the contents or outcomes of specific settlements. Others may contend that other means (e.g., litigation) are more appropriate for solving these issues.

Indian Water Settlements

Tracking Funding

Tribal Development Funds

Fish Recovery

Purchasing Water Rights

Legislative Process Requirements

What Is the Funding Status of Current Enacted Settlements?

Due to the mix of discretionary and mandatory funds involved, it can be difficult to track the funding status of Indian water rights settlements. CRS estimates that as of FY2019, the federal government had appropriated more than \$2.9 billion in nominal discretionary funding to implement Indian water rights settlements, plus an additional \$4.3 billion in mandatory funds that have been made available or are expected to be made available in future years pursuant to authorizing legislation. These appropriations have been provided to multiple agencies, including Reclamation, BIA, the Bureau of Land Management, and the U.S. Fish and Wildlife Service. The total amount of authorized Indian water rights settlements is not formally tracked by the Administration. In early 2019, DOI estimated that Reclamation had a backlog of \$1.3 billion in “authorized but unfunded” Indian water rights settlements. Presumably, any future authorized settlements without associated mandatory funding commitments would add to this total.

What Types of Activities Typically Are Authorized in Indian Water Rights Settlements?

Settlements are negotiated on a case-by-case basis, so the details of each settlement vary and are related to specific issues between tribes and water users in a given area. Generally, most settlements ratify agreements and compacts that have been reached by stakeholders; authorize reallocation and delivery of water from existing sources; and authorize construction and funding for new water projects that are built by Reclamation (and in many cases, transferred to the tribes). In addition to providing access to water, most settlements have resulted in tribal development funds into which the Secretary of the Interior makes scheduled payments for the purpose of economic development and to cover various costs of managing water projects.

As previously stated, quantification and types of use are general issues within settlements, although additional benefits can be prominent factors as well. For example, numerous settlements have been negotiated to include provisions that would establish programs for fish and wildlife protection as well as ecosystem restoration. The Truckee-Carson-Pyramid Lake Water Rights Act (P.L. 101-618) established a fund to promote fish recovery efforts for the cui-ui, a threatened species and culturally significant fish to the Pyramid Lake Paiute tribe. The Snake River Water Rights Act of 2004 (P.L. 108-447) established two funds for restoring and improving fish habitats, with a particular focus on instream flow protection for salmon. In addition to these settlements, the Shivwits Band of the Paiute Indian Tribe of Utah Water Rights Settlement Act (P.L. 106-263) and the Zuni Indian Tribe Water Rights Settlement Act of 2003 (P.L. 108-34) included provisions and funding for habitat acquisition and wetland restoration, respectively.

In other cases, tribes and settlements have focused less on specific quantification and more on securing greater control of their rights or pursuing alternative forms of gaining water rights — for example, P.L. 100-228 approved an agreement that would allow the Seminole Tribe of Florida to administer its water rights and possess jurisdiction to manage its water resources with a water district at no cost to the federal government. In another case, the Zuni Indian Tribe waived certain claims to water to gain federal funds to purchase water rights from willing sellers. Also, in many cases, settlements have authorized conditions for water marketing and leasing for tribes — although the degree to which this is allowed varies by settlement.

Recent Indian Water Rights Settlement Legislation

Since 2009, Congress has enacted nine Indian water rights settlements involving 13 tribes, at an authorized federal cost of more than \$2 billion. These settlements were enacted in four bills: P.L. 111-291 (The Claims Resolution Act of 2010); P.L. 113-169 (the Pyramid Lake Paiute-Fish Springs Ranch Settlement Act); P.L. 113-223 (the Bill Williams River Water Rights Settlement Act of 2014); and P.L. 114-322 (the Water Infrastructure Improvements for the Nation Act, or WIIN). Several of these settlements, including those enacted by the 113th Congress and the Choctaw Nation and Chickasaw Nation Water Settlement Act included in WIIN, were not associated with any new federal funding authorizations or appropriations.

An issue related to Indian water rights settlements in recent Congresses has been the circumstances under which this type of legislation is to be transmitted and considered. During the 115th Congress, the chairman of the House Natural Resources Committee sent a letter to the Attorney General and the Secretary of the Interior outlining the committee’s process and expectations for considering Indian water rights settlement legislation (this process was similar to that used by the committee dating in the 114th Congress). These requirements included the following:

- A statement by the relevant departments (i.e., DOI and DOJ) affirming that each proposed settlement adheres to current executive branch criteria and procedures.
- Specific affirmation by the departments that the cost of a settlement to all parties does not exceed the value of the existing claims as calculated by the federal government and that federal contributions do not exceed the sum of calculable legal exposure and federal trust or programmatic responsibilities.
- Conveyance to a court by DOJ and agreement in writing by all settling parties to the settlement, pending a legislative resolution.
- Approval in writing by the departments of the legislative text needed to codify the settlement.
- Consent to being available to testify by DOJ.

Indian Water Settlements

Navajo Nation Claims

Colorado River Allocation

Subordination Clause

Fund-Based Approach

Mandatory Yearly Funds

Priority Tiers

Congressional Issues

- Listing of the legal claims being settled by both departments.

It is unclear to what extent any of these requirements will continue to apply in the 116th Congress.

Navajo Utah Settlement

In the 116th Congress, H.R. 644 and S. 1207 would both approve a settlement resolving water rights claims of the Navajo Nation on the San Juan River in the Upper Colorado River Basin in Utah. It would authorize the Secretary of the Interior to establish a Navajo Water Development Trust Fund and would authorize appropriations (plus any interest on these deposits) for two accounts to be established within the fund:

1. The Navajo Water Development Projects Account, which would be authorized to receive appropriations of \$198.3 million, adjusted for inflation, for municipal water supply projects.
2. The Navajo Operation, Maintenance, & Repair Account, which would be authorized to receive appropriations of \$11.1 million for water supply facility operations and maintenance activities.

In addition, \$1 million in nontrust fund appropriations would be authorized for the Department of the Interior to implement the settlements. The bill would reserve tribal access (through the project) to as much as 81,500 acre-feet per year from water sources adjacent to or within the Navajo Nation's reservation in Utah. This depletion would be subtracted from the State of Utah's Colorado River allocation. In return, parties (including the Navajo Nation, the United States, and the State of Utah) would waive and release most claims associated with this settlement. Additionally, the Navajo Nation has agreed to subordinate its water rights under the settlement to existing, non-Indian uses. According to the Navajo Nation, this could result in water shortages for the tribe 11% to 46% of the time when its full 81,500 acre-feet water right is put to use.

Earlier versions of the Navajo Utah Settlement legislation (e.g., introduced versions in the 115th Congress) adhered to the historically common practice of authorizing funds for Reclamation to construct new water resource facilities for the tribe. However, the fund-based approach evidenced in the current version of the legislation, in which the department would release funds from the Trust Fund to the Navajo Nation for expenditures as needed, represents a notable departure from this model. Advocates of the approach believe it may help to avoid cost overruns and would have the added benefit of supplementing available funds by accumulating interest. While the Navajo Nation supports this approach for this proposed settlement, it is unclear if other tribes with pending water-rights claims would support such a fund-based template for future settlements.

Reclamation Water Settlements Fund Extension

Congress is also considering the extension of mandatory funding for the Reclamation Water Settlement Fund, which was originally enacted in 2009. In the 116th Congress, H.R. 1904 and S. 886 would both extend the aforementioned \$120 million per year in mandatory funds for the Reclamation Water Rights Settlement Fund to make these amounts available in perpetuity. The annual transfer to this fund is currently set to begin in FY2020 and occur annually through FY2029. The bill would allow these transfers to continue, and would not alter the priority tiers currently laid out for the fund. In absence of specific prioritized settlements, funding would be available for other settlement agreements that require: the planning, design and construction of water supply infrastructure; a project to rehabilitate existing water delivery systems; or projects to restore fish and wildlife habitat affected by Reclamation projects.

Conclusion

Long-standing disputes over water rights and use involving Indian tribes continue to be negotiated and settled by the executive branch and are thus likely to be an ongoing issue for Congress. This matter includes: implementation of ongoing Indian water rights settlements; negotiation of new settlements; and consideration of these settlements for potential enactment and subsequent funding. As of the end of the 115th Congress, 32 settlements had been enacted since 1978, and 4 settlements had been approved administratively. Additional funding for ongoing settlements and authorization of and appropriations for new settlements are likely to be requested in the future.

In considering Indian water rights settlements, primary issues for Congress may include the cost, contents, and sufficiency of federally authorized efforts to settle tribal water rights claims, as well as the circumstances under which these settlements are considered and approved by authorizing committees and others (i.e., whether the settlements are accompanied by formal statements of Administration support, cost estimates, etc.).

In addition, the preferred extent of federal involvement in implementing settlements, including the question of whether the federal government or tribes should take the lead in developing and constructing projects, may be of interest to Congress.

FOR ADDITIONAL INFORMATION:

The full "Indian Water Rights Settlements" update from the Congressional Research Service is available from their website: <https://crsreports.congress.gov> (reference: R44148)

WATER BRIEFS

**SNOWMELT INCREASE WEST
FOREST FIRES IMPACT**

Forest fires are causing snow to melt earlier in the season, a trend occurring across the western US that may affect water supplies and trigger even more fires, according to a study by researchers at Portland State University (PSU), the Desert Research Institute (DRI), and the University of Nevada, Reno. It's a cycle that will only be exacerbated as the frequency, duration, and severity of forest fires increase with a warmer and drier climate.

The study, published May 2 in the journal *Nature Communications*, provides new insight into the magnitude and persistence of forest fire disturbance on critical snow-water resources. Researchers found that more than 11% of all forests in the West are currently experiencing earlier snowmelt and snow disappearance as a result of fires. The team used state-of-the-art laboratory measurements of snow samples, taken in DRI's Ultra-Trace Ice Core Analytical Laboratory in Reno, Nevada. They also employed radiative transfer and geospatial modeling to evaluate the impacts of forest fires on snow for more than a decade following a fire. They found that, all across the West, snow is melting an average of five days earlier after a fire than before. This accelerated timing of the snowmelt continues for as many as 15 years.

Kelly Gleason, the lead author and an assistant professor of environmental science and management in PSU's College of Liberal Arts and Sciences, conducted the research as a postdoctoral fellow at the Desert Research Institute. Her team cited two reasons for the earlier snowmelt. First, shade provided by the tree canopy gets removed by a fire, allowing more sunlight to hit the snow. Secondly and more importantly, the soot — also known as black carbon — and the charred wood, bark and debris left behind from a fire darkens the snow and lowers its reflectivity. The result is like the difference between wearing a black t-shirt on a sunny day instead of a white one. In the last 20 years, there's been a four-fold increase in the amount of energy absorbed by snowpack because of fires across the West.

For Western states that rely on snowpack and its runoff into local streams and reservoirs for water, early

snowmelt can be a major concern. "The volume of snowpack and the timing of snowmelt are the dominant drivers of how much water there is and when that water is available downstream," Gleason said. "The timing is important for forests, fish, and how we allocate reservoir operations; in the winter, we tend to control for flooding, whereas in the summer, we try and hold it back." Early snowmelt is also likely to fuel larger and more severe fires across the West, Gleason said. "Snow is already melting earlier because of climate change," she said. "When it melts earlier, it's causing larger and longer-lasting fires on the landscape. Those fires then have a feedback into the snow itself, driving an even earlier snowmelt, which then causes more fires. It's a vicious cycle."

Journal reference: Kelly E. Gleason, Joseph R. McConnell, Monica M. Arienzo, Nathan Chellman, Wendy M. Calvin. Four-fold increase in solar forcing on snow in western U.S. burned forests since 1999. *Nature Communications*, 2019; 10 (1) DOI: 10.1038/s41467-019-09935-y.

For info: Study available at PSU's website at: www.pdx.edu/news/node/51385

**TRIBAL SETTLEMENT WA
MITIGATION PROGRAM**

On April 15, 2019, after decades of conflict over use of water along Chamokane Creek, Washington State Department of Ecology (Ecology) Director Maia Bellon signed the tri-party settlement agreement in the *United States of America, Spokane Tribe of Indians, v. Barbara J. Anderson, et al.* case to address impacts of permit-exempt wells on flows in the creek. The Spokane Tribe, US Department of Justice, and the Ecology reached an innovative agreement to end the dispute. Ecology hailed the settlement as a significant achievement that protects stream flows and fish, while providing access to water for rural residents in the watershed.

Chamokane Creek flows along the eastern margin of the Spokane Indian Reservation in Stevens County. Water rights in portions of the 179-square-mile basin were adjudicated in 1979, and oversight of water rights in the basin are within the jurisdiction of the federal court. The US District Court

for Eastern Washington, in *United States and Spokane Tribe v. Anderson*, 736 F.2d 1358 (1984), established that the Spokane Tribe has a senior water right to Chamokane Creek to benefit culturally important fisheries. Litigation and conflict continued in the intervening years, until the federal court ordered the parties to conduct a study, which found a connection between surface and groundwater in the area. Historically, impacts of permit exempt domestic wells and stockwater uses along Chamokane Creek were considered so small that they did not need to be regulated and were allowed by the state. However, over the past 40 years, scientists have gained a better understanding of how groundwater pumping from wells can impact stream flows in the Chamokane basin.

Under terms of the agreement, Ecology will provide mitigation to offset the impacts of existing and future domestic groundwater use. A program will be established to improve stream flows and temperatures, allowing fish to migrate upstream. The program will be largely funded by Washington State through Ecology, with cooperation and support from the Spokane Tribe and Bureau of Indian Affairs

An innovative flow augmentation feature was noted at the beginning of the Settlement Agreement on page 1: "One element of the Mitigation Program (Program) is to construct, operate, and maintain a bank storage mitigation well using water from the Spokane River conveyed through a pipeline to augment flows in Chamokane Creek. The mitigation well will mitigate for the current and future new residential domestic permit-exempt well uses and the current stockwater uses and future permit-exempt stock water uses that meet the criteria" cited in the agreement.

The agreement also pointed out the temperature innovations included as part of the settlement. "The Program also includes commitments to provide the ability to improve water temperature conditions in the lower reach of Chamokane Creek, below Chamokane Falls, to alleviate high water temperatures in this reach that prevent fish from moving out of the Spokane River and up into Chamokane Creek during warm periods. The Program provides the Tribe the flexibility to import large quantities of cooler, bank

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storage groundwater associated with the Spokane River into the lowest reach of Chamokane Creek...during critical, high temperature periods. Pumping this imported groundwater will not impair flows in Chamokane Creek as it comes from out-of-basin.” *Id.*

For info: Settlement Agreement at Ecology Chamokane Creek webpage: <https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-availability/Chamokane-Creek>; Ty Keltner, Ecology, 360/ 255-4405 or ty.keltner@ecy.wa.gov

SUPPLY AGREEMENT WA DOMESTIC & INSTREAM WATER

On May 15, Seattle City Light and Ecology announced they have reached a landmark agreement that will provide water to more than 400 homes in Skagit and Snohomish counties and additional water for fish in the Skagit River. This new water supply will remove legal uncertainty for homes affected by a 2013 state Supreme Court ruling (*Swinomish Indian Tribal Community v. Department of Ecology*, 311 P.3d 6 (2013); see www.courts.wa.gov/opinions/pdf/876720.pdf). This water purchase upholds a commitment made by Ecology to find solutions for Skagit Basin landowners most affected by the ruling. This agreement also provides for water to a limited number of new homes along the Skagit River.

Through this agreement, Ecology will purchase water near Newhalem, in the upper Skagit River watershed. The water purchased is tied to a senior water right owned by Seattle City Light and used at their Skagit River Hydroelectric Project. The Memorandum of Agreement (MOA) provides for a continuous release of .5 cubic feet per second (cfs) of water from the Gorge Reservoir (approximately 362 acre-feet per year) for instream flow augmentation and mitigating the effects of permit-exempt groundwater withdrawals on the flows of the Skagit River. “I applaud Seattle City Light and area tribes for paving the way to make this innovative water agreement become a reality,” said Ecology Director Maia Bellon. “This approach provides needed relief to Skagit landowners and is part of our ongoing efforts to develop water solutions throughout the Skagit watershed. We look forward to continued collaboration with Skagit

County and other partners on this important project.”

Ecology has agreed to pay Seattle City Light a total of \$1,122,503 as fair compensation to City Light for the continuous release of .5 cfs of water on a permanent basis and for the operation and maintenance costs associated with the discharge of water into the Skagit River. The “permanent” water release is contingent on the continued operation and ownership of the Gorge Dam by City Light. Ecology has also agreed to pay (not to exceed) \$315,000 for reimbursement to City Light for the year-long development (planning, designing, and implementing) of the facility and operational modifications necessary at Gorge Dam for the discharge of water into the Skagit River. “Seattle City Light is pleased to work with the Department of Ecology and the tribes to help resolve a significant water issue in the Skagit Watershed,” said Debra Smith, Seattle City Light general manager and CEO. “This water release will benefit both local communities along the river as well as the fish in the river. We believe that this collaborative approach can serve as a model.”

This purchase agreement is the first step in developing a water mitigation program, which is anticipated to begin operating next year. In 2018, Ecology and Skagit County established the Big Lake Water Bank, which allowed new home development within the Nookachamps sub-basin. In 2017, Ecology announced a water availability zone in the Bayview area, where new water uses would not impact the Skagit River. As noted in the MOA at page 2, “[T]he project for City Light’s release of additional water being advance through this MOA will provide mitigation for all of the existing and many of the new permit-exempt groundwater uses in the Skagit River Basin.” Ecology has developed an “Exempt Well Mitigation Water Bank” as described in an attachment to the MOA.

For info: Keeley Belva, Ecology, 360/ 407-7139 or keeley.belva@ecy.wa.gov; MOA available upon request from *TWR* — TheWaterReport@yahoo.com

GROUNDWATER PERMITS US STATE APPROACHES

Groundwater is a critical resource in the western 17 states. Groundwater provides drinking water to nearly 10

million people and plays a vital role for food production and industries, especially during drought when surface waters are less available. Ensuring adequate groundwater supplies are available to meet growing water demands of the West is important and suggests that groundwater management must transcend the status quo.

Stanford’s Water in the West is developing a state-of-the-art toolbox (“Dashboard”) for understanding a sample of groundwater permitting approaches across the Southwest (one per state, selected to best inform California’s new Sustainable Groundwater Management Act). Groundwater withdrawal permitting applies to much of the West, and it has become an increasingly common tool for sustainable groundwater management at local, regional, and state levels. The legal terminology of groundwater permitting varies by state, but the concept used is similar: requiring a would-be pumper to gain permission before withdrawing groundwater. Sometimes even after permitting, there is a need to deal with water depletion or scarcity, for example by curtailing rights, but that “post-permitting scarcity management” is not addressed in this Dashboard; the Dashboard focuses only on permitting.

The Dashboard was created for agencies, water managers, and citizens interested in understanding groundwater withdrawal permitting. The focus of the toolbox is on specific characteristics of groundwater withdrawal permitting regimes: balance between state and local administration; criteria for issuing groundwater permits; the ways in which water rights are expressed in groundwater permits; metering in relation to groundwater withdrawals; and penalties for violating the terms of a permit. The Dashboard can provide baseline information for those considering introducing a permitting regime and those who want to find jurisdictions facing similar legal challenges. The Dashboard shows that there is a trend towards increased statutory management of groundwater.

The toolbox includes one legal approach considered in each of the seven southwestern states (Texas, New Mexico, Arizona, Nevada, California, Utah and Colorado). Even if a map does not show a special permitting area

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over a given part of a state, one might still need to gain permission to pump groundwater. Highlighting special permitting areas helps understand an important aspect of how a state has chosen to regulate groundwater differently in certain areas, compared to its “default” regulatory arrangements. The toolbox defines groundwater withdrawal permitting areas as geographically defined subareas of a state, which are designated due to concerns about the effects of intentional groundwater withdrawals (rather than, e.g., leaking due to a lack of maintenance). These designated areas have a “special” groundwater quantity management regime applies that is different from the regime that otherwise applies by default elsewhere in the state (e.g., permitting or other management techniques, but excluding adjudication). **For info:** Stanford’s Water in the West Dashboard website: <http://groundwater.stanford.edu/dashboard/index.html>

RECYCLED WATER CA WASTEWATER TO IRRIGATION

On May 30, the Pajaro Valley Water Management Agency (PV Water) celebrated 10 years of delivering recycled water to coastal growers. Owned and operated in collaboration with the City of Watsonville, the Watsonville Area Water Recycling Facility treats wastewater to tertiary standards, creating a safe and reliable supply of irrigation water for edible crops. The use of recycled water — in addition to PV Water’s other supplemental water supplies — reduces groundwater pumping and slows seawater intrusion in the Pajaro Valley.

PV Water has provided more than 14 billion gallons of supplemental irrigation water to coastal growers since water deliveries began in 2002. When recycled water deliveries were added in 2009, the delivered water service area had increased to approximately 5,000 acres of coastal farmland, the majority of which was experiencing seawater intrusion. Recently, PV Water expanded recycled water storage, improved distribution pumps and reconfigured Blend Well pipelines to increase deliveries of supplemental water to growers. These improvements add reliability, improve efficiency and increase quality while helping reduce groundwater pumping in coastal areas

most affected by seawater intrusion. To fund these projects, the City and PV Water have had great success in winning competitive grants and acquiring low-interest loans from State and Federal agencies.

Groundwater is the primary water source in the Pajaro Valley, accounting for approximately 95% of the total water supply. For many decades, groundwater pumping exceeded recharge, leading to an overdraft condition. Chronic overdraft has led to groundwater storage depletion and groundwater quality degradation, particularly because of seawater intrusion. These negative impacts threaten the long-term viability of the Pajaro Valley’s groundwater supply.

With the mandate to achieve a sustainable groundwater basin, PV Water is developing environmental impact reports that consider the potential benefits and costs to utilize local surface water supplies such as College Lake and the Watsonville Slough System. In addition to developing new water supplies, PV Water is funding a conservation program developed to help both agricultural and residential water users reduce water use.

PV Water is a state-chartered water management district formed to efficiently and economically manage existing and supplemental water supplies in order to prevent overdraft and to continue reduction of long-term overdraft. The agency also works to provide and ensure sufficient water supplies for present and future anticipated needs within its boundaries. **For info:** Mike Lockwood, PV Water, 831/ 772-9292 x15 or www.pvwater.org

PERCHLORATE REGS US PROPOSED RULEMAKING

On May 23, the US Environmental Protection Agency (EPA) released a pre-publication notice of proposed rulemaking that seeks public input on a range of options regarding the regulation of perchlorate in public drinking water systems. The agency is seeking comment on a proposed National Primary Drinking Water Regulation (NPDWR) for perchlorate to establish a Maximum Contaminant Level (MCL) and a health-based Maximum Contaminant Level Goal (MCLG) at 56 micrograms per liter. In addition, the agency is seeking comment

on three alternative regulatory options:

- An MCL and MCLG for perchlorate set at 18 micrograms per liter.
- An MCL and MCLG for perchlorate set at 90 micrograms per liter.
- Withdrawal of EPA’s 2011 determination to regulate perchlorate in drinking water.

Perchlorate is commonly used in solid rocket propellants, munitions, fireworks, airbag initiators for vehicles, matches, and signal flares. Perchlorate may occur naturally, particularly in arid regions such as the southwestern US and is found as an impurity in hypochlorite solutions used for drinking water treatment and nitrate salts used to produce nitrate fertilizers, explosives, and other products. For the general population, most perchlorate exposure is through the ingestion of contaminated food or drinking water. [See Aziz et al., *TWR* #26.]

In January 2009, EPA published an interim health advisory for perchlorate of 15 micrograms per liter (see Pre-Publication Notice, page 12). On February 11, 2011, EPA determined that perchlorate meets the Safe Drinking Water Act criteria for regulation as a contaminant. EPA found that perchlorate may have an adverse effect on the health of persons and is known to occur in public drinking water systems with a frequency and at levels that present a public health concern. Since that time, EPA has been reviewing the best available scientific data on a range of issues related to perchlorate in drinking water including its health effects, occurrence, treatment technologies, analytical methods, and the costs and benefits of potential standards.

EPA is requesting comment on all relevant aspects of the proposed rule but is especially interested in the perchlorate monitoring and reporting requirements for public water systems and a list of treatment technologies that would enable water systems to comply with the MCL, including affordable compliance technologies for small systems serving 10,000 persons or less. EPA is also requesting comment on its methodology for deriving the MCLG, the underlying assumptions and analysis of its cost and benefit estimates, and other specific items listed in the proposed rule.

EPA will accept public comment on the proposal for 60 days after

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publication in the Federal Register via <http://www.regulations.gov> [Docket ID No. EPA-HQ-OW-2018-0780].

For info: Samuel Hernandez, Office of Ground Water & Drinking Water, 202/ 564-1735 or hernandez.samuel@epa.gov; EPA Perchlorate website: www.epa.gov/dwstandardsregulations/perchlorate-drinking-water

PFAS RULE**US****DRINKING WATER SYSTEMS**

On July 16, EPA's Office of Ground Water and Drinking Water, Standards and Risk Management Division's Technical Support Center will hold a public meeting and webinar to discuss potential approaches to developing the proposal for the fifth Unregulated Contaminant Monitoring Rule (UCMR 5) for public drinking water systems. EPA will discuss issues related to UCMR 5, including: the impacts of the America's Water Infrastructure Act of 2018; analytical methods and analytes the Agency is considering, including per- and polyfluoroalkyl substances (PFAS); sampling design; minimum reporting levels; and other possible requirements. [See Kray & Wightman, *TWR* #182.]

EPA will hold the public meeting and webinar on July 16, 2019, from 9 a.m. to 5 p.m. (local time) in Cincinnati, Ohio. Persons wishing to attend the meeting in-person or online via the webinar must register in advance no later than July 11, 2019. For those wishing to attend online, register for the webinar at the website listed below.

The agenda for the public meeting and webinar will include time for public statements. To ensure adequate time for public statements, individuals, or organizations interested in providing input should mention their request when they register. All presentation materials should be emailed to UCMRWebinar@cadmusgroup.com no later than July 11, 2019, so that the information can be incorporated into the webinar. EPA asks that only one person present the statement on behalf of a group or organization and that the statement be limited to ten minutes. Additional statements from attendees will be taken if time permits or can be sent to UCMRWebinar@cadmusgroup.com after the public meeting and webinar. The number of seats and webinar connections available for the

meeting is limited and will be available on a first-come, first-served basis. Because this meeting is being held at a US Government facility, individuals planning to attend the meeting in-person should be prepared to show valid photo identification to the security staff in order to gain access to the meeting room.

For info: Register at: <https://attendee.gotowebinar.com/register/8457484520972125698>

BORDER AGREEMENT**TX****TEXAS & MEXICO COOPERATION**

State environmental officials from the Texas Commission on Environmental Quality (TCEQ), Texas Parks and Wildlife Department, and the Chihuahua Secretariat of the Environment signed an agreement May 23rd to work together for a healthier environment along the Texas-Mexico Border. Officials from those organizations signed the four-year Memorandum of Cooperation (MOC).

The Memorandum states that Texas and Chihuahua will work together on activities such as sharing best practices and maintaining productive communication on air quality, water quality, energy, transportation, and waste management issues. As the two states plan environmental programs and priorities, the memorandum details coordination and partnership in cross-border issues. The MOC focuses on "technical cooperation and collaboration between the Parties, the Government of the State of Texas and the Government of the State of Chihuahua" (MOC, page 1).

The MOC states the goal of the agreement on page 5 of the agreement: "The goal of this memorandum is to increase the cooperation and the exchange of knowledge, experience and technology related to the environment, natural resource management, sustainable development of available energy resources, and other actions to protect human health and the environment."

Chihuahua is one of four Mexican states bordering Texas. Sister cities along the Texas-Chihuahua border, including El Paso-Ciudad Juárez and Presidio-Ojinaga, coordinate with TCEQ's Office of Border Affairs and the Chihuahua Secretariat of Environment on environmental issues of mutual

interest. The two states previously had a memorandum of cooperation signed in 1999.

For info: Marty Otero, TCEQ, 512/ 239-0046; TCEQ website at: www.tceq.texas.gov; Memorandum of Cooperation (pdf) available upon request from *The Water Report* at 541/ 485-5350

OIL SPILL RULEMAKING**WA****RAILROAD RESPONSE EFFORTS**

Railroad lines stretch across thousands of miles in Washington, often along pristine rivers and shorelines of the state. An oil spill from a train could pose a significant threat not only to the environment but to people and local economies. That's why in 2015, Washington began requiring railroad companies to have oil spill contingency plans to ensure they are adequately prepared in case of a spill. After several years of implementing the initial regulation, the State's Department of Ecology (Ecology) is proposing updates, based on direction from the Washington Legislature, to streamline requirements and strengthen response to potential railroad spills.

Ecology proposes to:

- Enhance readiness requirements for oils that may weather and sink when spilled.
- Improve ability to rescue and rehabilitate wildlife that may be affected or oiled during a response.
- Ensure that the railroad response teams are trained and well qualified to manage a response in Washington.
- Update oil spill drill requirements.
- Streamline plans for small rail lines that don't move crude oil, with requirements that are in line with the size and scope of their operations.

Legislation driving the changes is included in 2017's ESHB 1136 and 2018's E2SSB 6269. Ecology invites the public to weigh in on these changes through July 22, 2019. Ecology is hosting a public hearings for this rule proposal in Seattle (7/9/19), another in Spokane (7/11/19), and an online webinar public hearing (7/10/19); see *TWR*'s Calendar of Events. For full information about dates and times, visit Ecology's Oil Spill Contingency Plan – Railroad website, noted below.

For info: Ecology website: <https://ecology.wa.gov/Regulations-Permits/Laws-rules-rulemaking/Rulemaking/WAC-173-186>

WATER BRIEFS

COLORADO RIVER ISSUES

CRS BASIN MANAGEMENT UPDATE

The Congressional Research Service's (CRS's) 29 page update "Management of the Colorado River: Water Allocations, Drought, and the Federal Role" (CRS reference R45546, May 17, 2019) provides a masterful overview of Colorado Basin water management history, legal structure, and current areas of concern. Chapter headings include: Law of the River; Water Shortage and Operations; Environmental Mitigation; Tribal Water Rights; Drought and Supply; Developments and agreements since 2000; 2019 Drought Contingency Plan; and Issues for Congress.

From the Summary (edited):

The Colorado River Basin covers more than 246,000 square miles in seven US states (Wyoming, Colorado, Utah, New Mexico, Arizona, Nevada, and California) and Mexico. Pursuant to federal law, the federal Bureau of Reclamation manages much of the basin's water supplies. Colorado River water is used primarily for agricultural irrigation and municipal and industrial (M&I) uses, but it also is important for power production, fish and wildlife, and recreational uses.

In recent years, consumptive uses of Colorado River water have exceeded natural flows. This causes an imbalance in the basin's available supplies and competing demands. Observers expect that increasing demand for supplies, coupled with the effects of climate change, will further increase the strain on the basin's limited water supplies.

The Law of the River is the commonly used shorthand for the multiple laws, court decisions, and other documents governing Colorado River operations. The foundational document of the Law of the River is the Colorado River Compact of 1922. Pursuant to the Compact, the basin states established a framework to apportion the water supplies between the Upper and Lower Basins of the Colorado River, with the dividing line between the two basins at Lee Ferry, AZ (near the Utah border). An additional 1.5 MAF in annual flows was made available to Mexico under a 1944 treaty. Future agreements and court decisions addressed numerous other issues (including intrastate allocations of flows), and subsequent federal legislation provided authority and funding for federal facilities that allowed users to develop their

allocations. A Supreme Court ruling also confirmed that Congress designated the Secretary of the Interior as the water master for the Lower Basin.

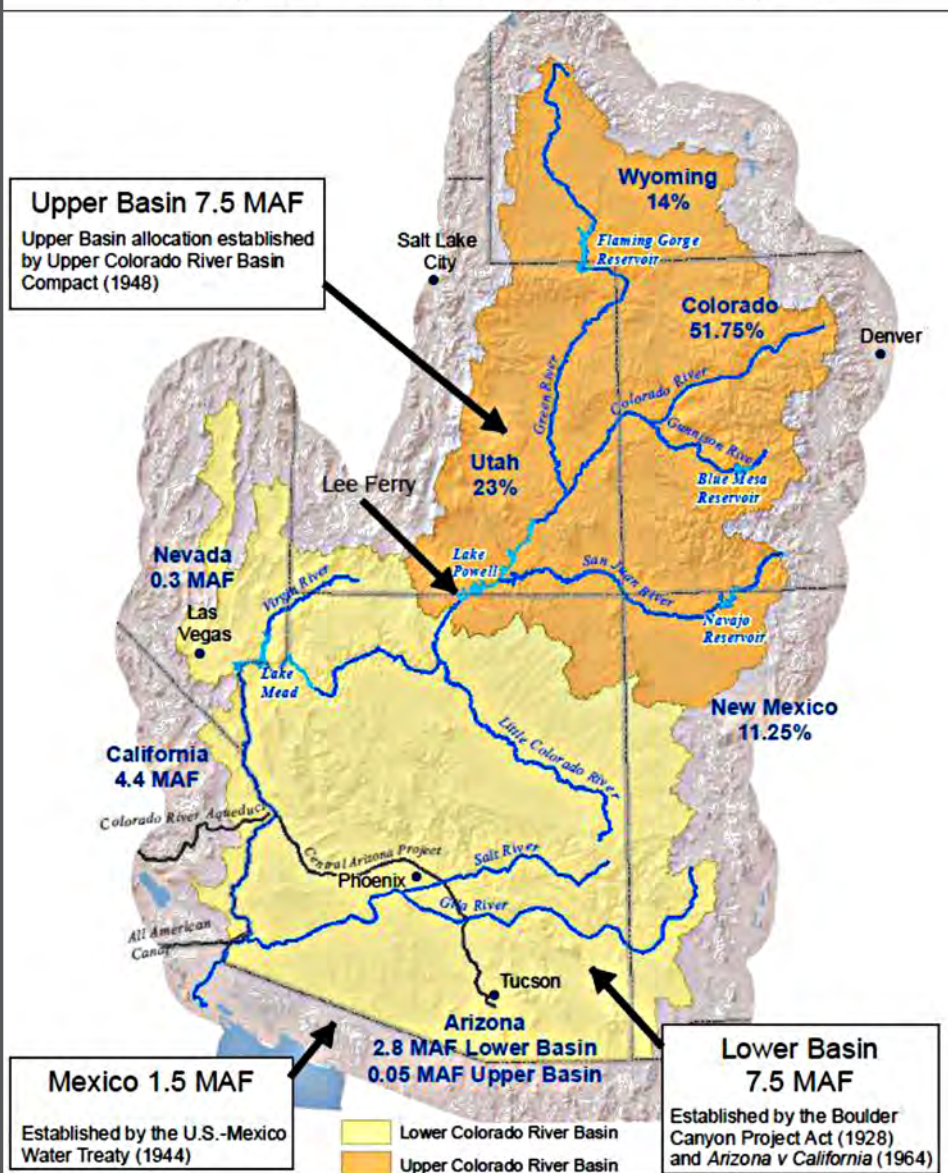
Reclamation and basin stakeholders closely track the status of two large reservoirs — Lake Powell in the Upper Basin and Lake Mead in the Lower Basin — as an indicator of basin storage conditions. Under recent guidelines, dam releases from these facilities are tied to specific water storage levels. As

of early 2019, Reclamation projected that there was a 69% chance of a shortage condition at Lake Mead in 2020; there was also a lesser chance of Lake Powell reaching critically low levels. Improved hydrology in early 2019 may decrease the chances of shortage in the immediate future.

For info: The full CRS update is available from their website: <https://crsreports.congress.gov> (reference: R45546)

Colorado River Basin Allocations

Percentages of overall allocation and million acre-feet (MAF)



Source: CRS, using data from USGS, ESRI Data & Maps, 2017, Central Arizona Project, and ESRI World Shaded Relief Map.

Notes: Although both the Upper and Lower Basins were allocated 7.5 MAF, there was uncertainty about how much water would remain in the Upper Basin after Colorado River Compact obligations to Lower Basin states were fulfilled. Therefore, outside of 50,000 AF provided annually to Arizona, the Upper Basin Compact provides its apportionments in terms of percentage of the overall Upper Basin allocation.

The Water Report

CALENDAR

June 16-19 NV
2019 AWRA Summer Specialty Conference - Improving Water Infrastructure Through Resilient Adaptation, Sparks. Nugget Casino Resort. Presented by American Water Resources Association. For info: www.awra.org

June 18 DC & WEB
Basics of the Clean Water Act (ELI Summer School 2019), Washington. Environmental Law Institute, 1730 M Street, NW, Ste. 700. Presented by Environmental Law Institute. For info: www.eli.org

June 19 WEB
Utility Examples to Mitigate Earthquake Impacts - EPA's Earthquake Resilience for Water Utilities Webinar, WEB. 1 p.m. EDT. For info: Register at: <https://register.gotowebinar.com/register/1388966157938085123>

June 19 OR
Managing Stormwater in Oregon Conference: The Business of Stormwater Regulation & Compliance, Salem. Salem Convention Center. Northwest Environmental Business Council (NEBC) Event. For info: <https://oregonstormwater.com/>

June 20 WA
Celebrate Water - Fundraiser & CLE: "Incentives for Voluntary Groundwater Mitigation in Arizona" by Amanda Cronin of AMP Insights, Seattle. Ivar's Salmon House. Presented by the Center for Environmental Law & Policy (CELP); CLE 4:00 - 5:00 pm; Fundraiser Dinner 5:30 - 8 pm. For info: <https://celebratewater2019.brownpapertickets.com/>

June 20 DC
The Leadership of Women in Developing U.S. Environmental Law & Policy: What They Did, What It Meant, and Where It Is Going - 50th Anniversary Seminar, Washington. Environmental Law Institute, 1730 M Street, NW, Ste. 700. Presented by Environmental Law Institute; Free & Open to Public - Register by 6/17/19. For info: www.eli.org

June 24 DC & WEB
Toxic Substances Control Act: Three Years Later - Workshop, Washington. George Washington University, Milken Institute School of Public Health, 1st Floor Auditorium, 950 New Hampshire Avenue, NW; 9 am - 4:30 pm. Presented by Environmental Law Institute;

Free & Open to Public - Register by 6/21/19. For info: www.eli.org/events/tsca-three-years-later

June 25 CO
Party on the Poudre, Fort Collins. H Lazy T Bar Ranch, 5:30 pm - 7:30 pm. Presented by the Colorado Water Trust. For info: www.ColoradoWaterTrust.org/

June 26 TX
Dam Safety Workshop, Conroe. Lone Star Convention & Expo Center, 9055 Airport Road. Presented by TCEQ. For info: www.tceq.texas.gov/p2/events/dam-safety.html

June 27-28 WA
Washington Water Law & Resource Management Conference, Seattle. Seattle Hilton. For info: Law Seminars International, 206/ 567-4490 or www.lawseminars.com/

July 1-2 CA
Open Water CA 2019: Innovating Through Integrating & Expanding the Water Data Community - 4th Annual Water Data Science Symposium, Sacramento & WEB. CalEPA Headquarters Bldg., Byron Sher Auditorium, 1001 I Street. Presented by the Surface Water Ambient Monitoring Program, the California Water Quality Monitoring Council & the San Francisco Estuary Institute. For info: Nick Martorano at: SB1070Coordinator@waterboards.ca.gov

July 9 WA
Oil Spill Contingency Plan - Railroad Rulemaking Public Hearing, Spokane. Ramada by Wyndham Spokane Airport Hotel; 1 pm. Presented by Dept. of Ecology. For info: <https://ecology.wa.gov/Regulations-Permits/Laws-rules-rulemaking/Rulemaking/WAC-173-186>

July 10 WEB
Oil Spill Contingency Plan - Railroad Rulemaking Public Hearing, WEB. 6:00 pm; Dial in by phone: +1 (646) 749-3122, Access Code: 123-020-765. Presented by Dept. of Ecology. For info: <https://ecology.wa.gov/Regulations-Permits/Laws-rules-rulemaking/Rulemaking/WAC-173-186>

July 10 TX
Dam Safety Workshop, Austin. J.J. Pickle Research Campus, The University of Texas at Austin, 10100 Burnet Road, Bldg. #137. Presented by TCEQ. For info: www.tceq.texas.gov/p2/events/dam-safety.html

July 10-11 CO
Endangered Species Act, Wetlands, Stormwater & Floodplain Regulatory Compliance for Energy & Utilities Seminar, Denver. EUCI Office Bldg. Conference Center, 4601 DTC Blvd., B-100. For info: www.euci.com

July 11 WA
Oil Spill Contingency Plan - Railroad Rulemaking Public Hearing, Seattle. Hilton Seattle Airport & Conference Center. Presented by Dept. of Ecology. For info: <https://ecology.wa.gov/Regulations-Permits/Laws-rules-rulemaking/Rulemaking/WAC-173-186>

July 11 ON
Introduction to FERC Hydropower Course, Toronto. Hilton Garden Inn - Toronto/Ajax. For info: www.euci.com

July 11 AZ
Solutions to Groundwater Contamination: PFAS & Other Emerging Contaminants - Conference, Chandler. Holiday Inn Hotel & Suites. Presented by the American Ground Water Trust. For info: www.agwt.org/events

July 12 ON
FERC Hydropower Licensing, Toronto. Hilton Garden Inn - Toronto/Ajax. For info: www.euci.com

July 15-19 GA
Water Quality Modeling Workshop - Water Quality Analysis Simulation Program (WASP 8.32), Atlanta. TBA. Sponsored by EPA Region 4 and the National Water Quality Modeling Work Group. For info: www.epawasp.com

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

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/

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/

July 18-20 CA
65th Annual Rocky Mountain Mineral Law Institute, Monterey. Monterey Conference Center. For info: 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

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

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

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@theseminargroup.net or www.theseminargroup.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/

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/>



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CALENDAR

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August 1-2 **AZ**

Arizona Water Law Conference, Scottsdale. Hilton Resort & Villas. For info: CLE Int'l, 800/ 873-7130, live@cle.com or 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

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/

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@theseminargroup.net or www.theseminargroup.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

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/>

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

Photos by Tom Ring