

The Water Report™

Water Rights, Water Quality & Water Solutions in the West

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GROUNDWATER & THE CLEAN WATER ACT

MURKY WATERS — ARE INDIRECT DISCHARGES TO GROUNDWATER REGULATED UNDER THE CWA?

Hawai'i Wildlife Fund, et al. v. County of Maui

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

Introduction

The bundle commonly referred to as the Clean Water Act (CWA or “the Act”) is made up of a statute first passed in 1972 and last amended in 1987, with antecedents as far back as the Rivers and Harbors Act of 1899. It is well to remember that in the beginning, US rivers were literally on fire. The Cuyahoga River had fires every decade between 1868 and 1972. Iconic photos from 1952 published on the cover of Life magazine at the time of a 1969 fire on the Cuyahoga River horrified the nation, galvanizing political support for passage of the Act three years later. Congress overrode a presidential veto to the initially-named “Federal Water Pollution Control Act Amendments of 1972” by 52 to 12 in the Senate and 247 to 23 in the House, with members of both parties casting votes on each side, in a bipartisan atmosphere at which we now can only marvel.

Congress set audacious goals in 1972: “To restore and maintain the chemical, physical, and biological integrity of the nation’s waters,” to make waters fishable and swimmable by 1983, and to eliminate the discharge of pollutants by 1985. Unsurprisingly, these target dates were not met. But by 1998, the United States had doubled the waters clean enough for fishing and swimming; more than doubled the number of people served by modern sewage treatment plants; and drastically reduced wetlands losses. In 1972, less than a third of the nation’s waters met the CWA’s goals; by 2016, it was estimated that over 65 percent did.



Cuyahoga River, Cleveland, June 1952

Groundwater Regulation

CWA Issues

CWA Provisions

Point Source

Groundwater Conduit Theory

Tensions inherent in the CWA from the beginning remain over 45 years later. Three jurisdictional aspects of the Act are still the subject of litigation and debate: 1) what are “navigable waters” (which defines the jurisdictional waters under the Act); 2) what does the “cooperative federalism” that is a hallmark of the Act mean for jurisdiction between the federal government and the states; and 3) what is the regulatory scope of the Act for groundwater?

While out of sight, groundwater is certainly no longer out of mind. More than 28 trillion gallons of water a year is pumped from underground in the US. About 78% is used for irrigation; 14% used for public supply systems; and 4% is applied to rural domestic/livestock uses. The recent increase in litigation involving groundwater mirrors a 2017 Gallup poll report that Americans are more concerned about water pollution than they have been since 2001.

Groundwater is not generally regulated under the CWA. The Act prohibits a discharge of a pollutant to “navigable waters,” from a point source without a National Pollution Discharge Elimination System (NPDES) permit. “Navigable waters” are defined under the Act as “the waters of the United States, including the territorial seas.” A “discharge” is defined as “any addition of any pollutant into navigable waters from a point source.” A “point source” is defined as “any discernable, confined and discrete conveyance including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.” CWA § 1362(7), (14). Specifically excluded from the definition of “point source” are agricultural stormwater discharges, irrigation return flows, and other “nonpoint” sources.

Indirect Discharges to Groundwater and the CWA in County of Maui

Groundwater has been the subject of a recent spate of cases before district and appellate courts, including most recently the Ninth Circuit, which has contributed to regulatory uncertainty about the Act. In *Hawai’i Wildlife Fund et al. v. County of Maui*, ___ F.3d ___, Case No. 15-17447 (9th Cir. Feb. 1, 2018), 2018 WL 650973 (*County of Maui*), the US Court of Appeals for the Ninth Circuit affirmed a federal district court ruling that the County’s discharge of treated effluent into its injection wells — through which pollutants then were carried by groundwater to the Pacific Ocean (part of the United States’ territorial seas and therefore a “navigable water”) — violated the CWA. The idea that indirect discharges of pollutants to navigable waters through groundwater are regulated under the CWA — sometimes known as the “groundwater conduit” theory — is not new. But the *County of Maui* decision has sparked renewed controversy about the regulatory reach of the CWA when groundwater is part of the equation.

The County of Maui (County) operates the Lahaina Wastewater Reclamation Facility. The County injects three-to-five million gallons of recycled, treated wastewater daily into four injection wells located a half-mile inland from the Pacific Ocean. The injection wells are long pipes that carry effluent about 200 feet underground into a shallow groundwater aquifer. The wastewater made its way through groundwater to the Pacific Ocean. A tracer dye study showed that 84 days after the dye was injected into two of the county’s four wells, the dye emerged from the seafloor through points known as “submarine springs.”

Hawai’i is among the 46 states authorized by the US Environmental Protection Agency (EPA) to administer the NPDES program. State regulators in Hawai’i knew of the County’s treated wastewater injections. The County did not hold an NPDES permit.

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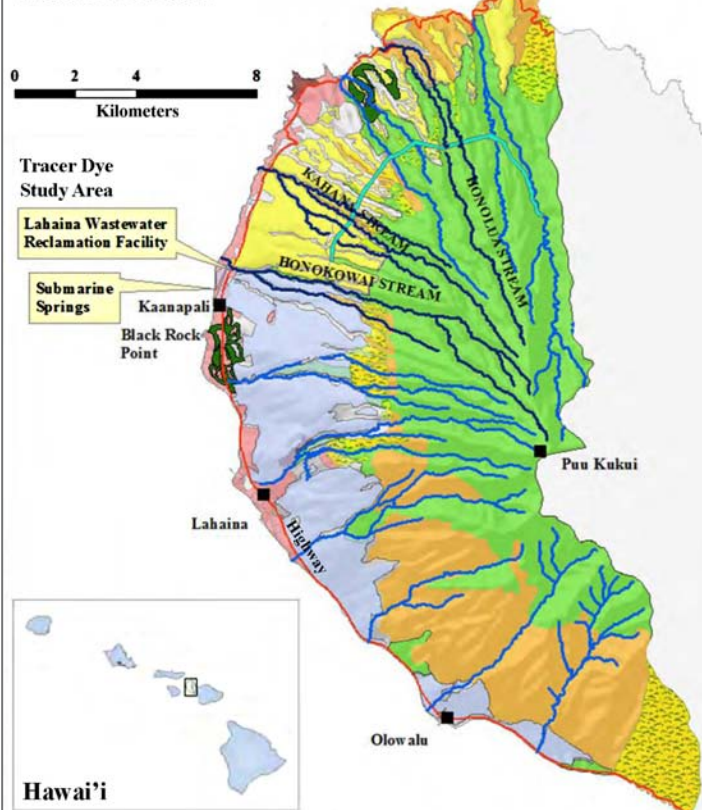
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Western Maui



Groundwater Regulation	<p>Plaintiffs argued that the County's effluent injections were discharges from a point source (the wells), carried through the groundwater to navigable water (the Pacific Ocean), causing damage to coral reefs and violating the CWA. The County argued that the discharge from a point source must be made directly to navigable waters to come under the jurisdiction of the CWA.</p>
Indirect Discharges	<p>The Ninth Circuit held that the indirect discharge through groundwater to the Pacific was subject to regulation under the CWA and required an NPDES permit. The Ninth Circuit rejected arguments that a point source must discharge directly into navigable water to trigger CWA regulation, holding instead that it is enough for the discharge to come <i>from</i> a point source (here, the wells). The court also stated, "[w]e assume without deciding the groundwater here is neither a point source nor a navigable water under the CWA" (<i>County of Maui</i>, Footnote 2). This statement is a departure from the district court opinion, which found that the groundwater was both. The Ninth Circuit emphasized that although there was no <i>direct</i> discharge to the Pacific, there was a "fairly traceable" connection established through the tracer dye studies, showing "the functional equivalent of a discharge into the navigable water" by the County. <i>County of Maui</i> at *7. The Ninth Circuit rejected arguments from the County that the indirect discharge was a "nonpoint source" regulated differently under the CWA. <i>Id.</i> at *8.</p>
9th Circuit Holding	<p>In doing so, the Ninth Circuit considered Justice Scalia's plurality opinion in <i>United States v. Rapanos</i>, 547 U.S. 715, 126 S.Ct. 2208, 165 L.Ed.2d (2006), "for its persuasive value," which states that the CWA does not prohibit the "'addition of any pollutant <i>directly</i> to navigable waters from any point source' but rather the 'addition of any pollutant <i>to</i> navigable waters'" based on hydrologic connection. <i>Rapanos</i> at 743 (emphasis in original); <i>County of Maui</i> at *6. In its briefs, the County had pointed out that groundwater was not at issue in <i>Rapanos</i>. The Supreme Court considered in <i>Rapanos</i> the question of whether surface wetlands adjacent to point source surface "ditches or man-made drains" intermittently flowing into navigable waters are regulated under the CWA and concluded that the wetlands are. See e.g., <i>Rapanos</i>, 547 U.S. 730, 755.</p>
Rapanos	<p>The Ninth Circuit stated the three key points of its holding as follows:</p> <p>We hold the County liable under the CWA because (1) the County discharged pollutants from a point source, (2) the pollutants are fairly traceable from the point source to a navigable water such that the discharge is the functional equivalent of a discharge into the navigable water, and (3) the pollutant levels reaching navigable water are more than <i>de minimis</i>.³ The second point in particular is an important one. We therefore disagree with the district court that "liability under the Clean Water Act is triggered when pollutants reach navigable water, <i>regardless of how they get there</i>." <i>Haw. Wildlife</i>, 24 F.Supp.3d at 1000 (emphasis added). Here, the Tracer Dye Study and the County's concessions clearly connect all four wells' discharges to the consistently-emerging pollutants in the ocean. We leave for another day the task of determining when, if ever, the connection between a point source and a navigable water is too tenuous to support liability under the CWA.</p>
Key Points	<p><i>County of Maui</i> at *6-7.</p> <p>The County has requested rehearing en banc of the Ninth Circuit decision.</p>
"Fairly Traceable"	<p>The Groundwater Conduit Theory in Other Cases</p> <p>In 1994, in <i>Village of Oconomowoc Lake v. Dayton Hudson Corporation</i>, 24 F.3d 962 (7th Cir. 1994), the Seventh Circuit held that an artificial stormwater retention pond that retained oil, grease, and other pollutants was not regulated under the CWA, even if a possible hydrological connection could not be denied. The Seventh Circuit noted that Congress rejected proposals to regulate groundwater under the CWA because, according to the Senate Committee on Public Works, "the jurisdiction regarding groundwaters is so complex and varied from State to State..." <i>Id.</i> at Footnote 13.</p>
Groundwater Jurisdiction	<p>More than half a dozen recent district court opinions have been handed down addressing regulation of indirect discharges to groundwater under the CWA, several involving coal ash landfills. District courts are split on whether the CWA governs releases of pollutants into groundwater that eventually carries the pollutants to navigable waters. Since 2014, district courts including the Eastern District of North Carolina, South Carolina, Maryland, and Eastern District of Pennsylvania have refused to apply the conduit theory to impose CWA liability. District courts, including the Middle District of North Carolina and Eastern District of Virginia, have concluded that indirect discharges to groundwater are regulated under the CWA. Four district court decisions are on appeal to the circuit courts, two in the Fourth Circuit and two in the Sixth Circuit.</p>
Rulings Split	<p>In each of the cases, as in <i>County of Maui</i>, both plaintiffs and defendants have relied on the language of the statute and regulations, legislative history, EPA's past statements in guidance and court filings, the potential impact of the groundwater conduit theory on a host of industries and activities, and the appropriate</p>

Groundwater Regulation

Pipe Leak

interaction of the CWA with other legal regimes — including state and local regulation of groundwater and wells, and federal regulation of coal ash disposal and underground waste injection — to support their positions. The cases have attracted amici (friend of the court) briefs from environmental groups, industry sectors, trade associations, and a number of states.

The Fourth Circuit Appeals

In *Upstate Forever v. Kinder Morgan Energy Partners, L.P.*, 252 F.Supp. 3d 488 (D.S.C. 2017), an underground pipe leaked about 370,000 gallons of petroleum into groundwater and soil. The leak was repaired and is still being remediated. Plaintiffs argued that the groundwater carried petroleum to navigable waters. The district court held that the migration of pollutants through soil and groundwater is “nonpoint source” pollution and therefore not regulated under the CWA and dismissed the action. The Fourth Circuit heard argument on appeal on December 7, 2017, and a decision is expected this spring.

Coal Ash Landfills

On March 21, 2018, the Fourth Circuit heard oral argument in *Sierra Club v. Virginia Electric Power Company*, 247 F.Supp.3d 753 (E.D. Va. 2017) (VEPCO), a case involving alleged indirect discharges of arsenic from closed coal ash landfills through groundwater to a nearby river and creek. In that case, the Virginia district court held that the indirect discharges through groundwater violated the CWA, finding the North Carolina middle district court ruling in *Yadkin Riverkeeper Inc. v. Duke Energy Carolinas*, 141 F.Supp.3d 428 (M.D.N.C. 2015), persuasive. In *Yadkin*, the district court held that the CWA governs where pollutants reach navigable waters through “hydraulically connected groundwater.” Just a year earlier, the North Carolina eastern district court held in *Cape Fear River Watch v. Duke Energy Progress, Inc.*, 25 F.Supp. 3d 798 (E.D.N.C. 2014), that the CWA does not cover discharges to hydrologically connected groundwater.

Hydraulic Connection

The Sixth Circuit Appeals

Two cases on appeal are pending in the Sixth Circuit, both involving coal ash landfills. In *Tennessee Clean Water Network v. Tennessee Valley Authority*, No. 3:15-cv-00424 (M.D. Tenn. Aug. 4, 2017) (TVA), the district court held that the coal ash landfill was a point source, and that unpermitted discharges of contaminated leachate migrating through groundwater hydrologically connected to nearby surface waters is a discharge from a point source regulated under the CWA. In *Kentucky Waterways Alliance et al. v. Kentucky Utilities Co.*, Civil Action No. 5:17-292-DCR (E.D. Kentucky, Dec. 28, 2017) (*Kentucky Utilities*), the district court held that movement of contaminants from groundwater to surface water is not subject to regulation under the CWA. (*Kentucky Utilities* opinion available at: www.leagle.com/decision/infdco20171229864).

Coal Ash Point Source

In *Kentucky Utilities*, the utility had a permit allowing regulated discharges from ash ponds through an external outfall. The plaintiffs argued that the ash ponds also discharged to a nearby surface water through naturally flowing groundwater that was infiltrating the settling ponds and flowing through springs to the surface water. The utility argued that the indirect discharges were not regulated under the CWA, and the district court agreed, granting the utility’s motion to dismiss.

Indirect Discharges

The district court in *Kentucky Utilities* considered whether groundwater could be subject to regulation under the CWA as navigable water, as a point source, or as a conduit, and rejected all three possibilities. As to groundwater as “navigable waters,” the *Kentucky Utilities* district court noted:

“Navigable Waters”

Courts have overwhelmingly found that groundwater, even if hydrologically connected to navigable waters, is not itself a navigable water under the CWA. *See, e.g., Rice v. Harken Expl. Co.*, 250 F.3d 264, 269 (5th Cir. 2001) (“[G]round waters are not protected waters under the CWA.”); *Vill. of Oconomowoc Lake v. Dayton Hudson Corp.*, 24 F.3d 962, 965 (7th Cir. 1994) (“Neither the Clean Water Act nor the EPA’s definition asserts authority over ground waters, just because these may be hydrologically connected with surface waters.”) (citations omitted); *Cape Fear River Watch, Inc. v. Duke Energy Progress, Inc.*, 25 F.Supp. 3d 798, 810 (E.D.N.C. 2014) (“Congress did not intend for the CWA to extend federal regulatory authority over groundwater, regardless of whether that ground water is eventually or somehow ‘hydrologically connected’ to navigable surface waters.”); *Copper Indus., Inc. v. Abbott Labs.*, No. 93-CV-193, 1995 WL 17079612, *4 (W.D. Mich. May 5, 1995) (“[T]he fact that these ground waters are hydrologically connected to some surface waters is insufficient to transform this case to a [CWA] cause of action.”).

The *Kentucky Utilities* district court concluded there were three reasons that groundwater is not navigable water under the CWA:

CWA Language

First, considering ground waters to be “navigable waters” would strain the language of the CWA [citing *Village of Oconomowoc Lake*, 24 F.3d at 965]...Second, the legislative

Groundwater Regulation

Definition Expansion

history of the CWA demonstrates that Congress extensively considered whether to extend the CWA to groundwater, and decided against it [citing legislative history in *Exxon Corp. v. Train*, 554 F.2d 1310, 1325-29 (5th Cir. 1977)]...Third, in *Rapanos v. United States*, 547 U.S. 715 (2006), the Supreme Court “eschewed a broad interpretation of ‘navigable waters’ and repeatedly cautioned against ‘attempting to expand the definition of navigable waters to encompass virtually all water, regardless of its actual navigability, location, or consistency of flow’” [citing *Upstate Forever v. Kinder Morgan Energy Partners, L.P.*, 252 F.Supp.3d 488, 497-98] [quotations from opinion omitted].

Point Source v. Non-Point

As to groundwater as a “point source” regulated by the CWA, the district court in *Kentucky Utilities* stated: Congress “drew a distinct line” between the discharge of pollutants from point sources and non-point sources in the CWA. *Or. Nat’l Res. Council v. United States Forest Serv.*, 834 F.2d 842, 849 (9th Cir. 1987). Discharges from point sources are subject to regulation under the NPDES, whereas the regulation of non-point sources is left to the states. *Id.* The Court must respect the line drawn by Congress, and cannot extend the CWA’s NPDES requirements to non-point source pollution...Non-point source pollution, by contrast [to point source pollution] “does not result from a discharge at a specific, single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition, or percolation.” *Cordiano v. Metacon Gun Club, Inc.*, 575 F.3d 199, 220 (2d Cir. 2009) (quoting EPA Office of Water, Nonpoint Source Guidance 3 (1987)). Groundwater is, by its nature, “a diffuse medium” and not the kind of discernible, confined and discrete conveyance contemplated by the CWA’s definition of “point source.” *See 26 Crown Assocs.*, 2017 WL 2960506, at *8 (“It is basic science that ground water is widely diffused by saturation within the crevices of underground rocks and soil.”)

Nature of Groundwater

Point Source Requirement

Finally, the court rejected the groundwater conduit theory:

Adopting [the conduit] theory would be inconsistent with the text and structure of the CWA. The primary problem with this rationale is that, if adopted, “any non-point-source pollution (such as ordinary surface run-off from the land into navigable waters) could invariably be reformulated as point-source pollution by going up the causal chain to identify the initial point sources of the pollutants that eventually ended up through non-point sources to come to rest in navigable waters” *26 Crown Assocs.*, 2017 WL 2960506, at *8.³ This would lead to the extensive regulation of non-point source pollution and would “effectively read the ‘point source’ requirement out of the Clean Water Act.” *Id.* at *9.

“Federalist Structure”

The court also noted that a groundwater conduit theory “would be inconsistent with [the CWA’s] federalist structure” which left groundwater pollution to be regulated by the states.

Evidence of Connection

While *County of Maui* involved a dye tracer test, the cases on appeal to the Fourth and Sixth Circuits rely on indirect evidence and extensive expert testimony to establish a hydraulic connection. The district courts in *VEPCO* and *TVA*, for example, considered comparisons of samples taken from groundwater and surface water, expert reports discussing hydrologic principles, and factual statements in the defendants’ reports to find a hydraulic connection between the landfills and surface waters. But even the more direct dye tracer in *County of Maui* raises issues of how long can it take for contaminants to reach surface waters through groundwater, and how far away can the point source be from the navigable water, for indirect discharges through groundwater to come within CWA regulation? In *County of Maui*, the dye showed in the Pacific Ocean after 84 days, and the injection well determined to be a point source by the Ninth Circuit was located half a mile inland.

The cases on appeal set up a potential split in the circuits with *County of Maui* that soon could bring the issues before the US Supreme Court.

EPA Position

EPA’s Position, and the February 28, 2018 Request for Comments

“Direct Hydrologic Connection”

EPA filed an amicus brief in the *County of Maui* appeal to the Ninth Circuit, arguing that discharge of pollutants through groundwater can violate the CWA if there is a “direct hydrologic connection” to a water of the United States. EPA stated that regulation of these indirect discharges is “consistent with the purpose of the CWA” and “is consistent with EPA’s long-standing position.” EPA also stated that while it agreed with the district court’s outcome, it disagreed with the district court’s conclusions reaching that outcome: “To be clear, the United States does not contend that groundwater is a point source, nor does the United States contend that groundwater is a water of the United States regulated by the Clean Water Act. Moreover, the United States does not agree with the district court’s application of the ‘significant nexus’ standard from *Rapanos v. United States*, 547 U.S. 715 (2006).”

Groundwater Regulation

Chevron Deference

"Fairly Traceable" Connection

Shifting EPA Position

Well Injection

Comments Requested

"Direct" Discharges

CWA Jurisdiction (WOTUS)

In its amicus brief, EPA took the position that the district court's judgment was "consistent with the language and purpose of the CWA." But EPA went on to say that "[e]ven if Congress's intent on this issue had been ambiguous, EPA has clearly stated for decades that pollutants that move through groundwater can constitute discharges subject to the CWA, and that interpretation is entitled to *Chevron* deference. *Chevron, U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837, 842-43 (1984)." [Editor's Note: *Chevron* deference is a doctrine that requires a court to defer to administrative agencies' interpretations of federal law]. According to EPA, relevant evidence to determine whether a point source discharge reaches navigable waters "without significant interruption"... "includes the time it takes for a pollutant to move to surface waters, the distance it travels, and its traceability to the point source." EPA. Br. at 26.

The Ninth Circuit rejected EPA's "direct hydrologic connection" standard, opting instead for a standard that a "fairly traceable connection" between indirect discharges to groundwater and navigable waters is "the functional equivalent of a discharge into navigable waters" under the CWA. *County of Maui* at *7. The court stated:

The EPA as *amicus curiae* proposes a liability rule requiring a "direct hydrological connection" between the point source and the navigable water. Regardless of whether that standard is entitled to any deference, it reads two words into the CWA ("direct" and "hydrological") that are not there. Our rule adopted here, by contrast, better aligns with the statutory text and requires only a "fairly traceable" connection, consistent with Article III standing principles. *See, e.g., Spokeo, Inc. v. Robins*, ___ U.S. ___, 136 S. Ct. 1540, 1547, 194 L.Ed.2d 635 (2016).

County of Maui, Footnote 3.

Some have argued that EPA's position over the years has been inconsistent. EPA states repeatedly in its amicus brief that "discharge of pollutants that move through groundwater to jurisdictional surface waters" are subject to the CWA. But early on, in EPA's 1979 Federal Register response to comments about the NPDES permit limit exclusion for well disposal (then § 122.41, now § 122.50), EPA stated that well disposal does not fall under the CWA:

The provision does not regulate well injection, directly or indirectly, nor does it place any limit on the amounts which may be injected, the rates of injection, or the design and operation of injected wells. Instead, § 122.41 focuses on the remaining wastes which are being discharged into waters of the United States. The purpose of the regulation is to ensure that the Act's treatment requirements are met for discharges into surface waters.

44 FR 32854, 32870 (June 7, 1979).

EPA stated this position again in 1984: "The regulation does not regulate, directly or indirectly, the wastewater that is diverted. No limits are placed on the amount of wastewater that may be diverted, nor upon how that waste is treated or disposed of. Generally, such activities are outside the scope of the NPDES program." 49 FR 37998, 38022 (Sept. 16, 1984).

On February 20, 2018, EPA requested comment on whether "EPA should review and potentially revise its previous statements" about "pollutant discharges from point sources that reach jurisdictional waters via groundwater or other subsurface flow that has a direct hydrological connection to a jurisdictional surface water" and specifically (i) whether "subjecting such releases to CWA permitting is consistent with the text, structure, and purposes of the CWA," (ii) would "those releases be better addressed through other federal authorities than the CWA NPDES permitting program," (iii) "whether some or all such releases are adequately addressed through existing state statutory or regulatory programs" or federal programs. EPA also seeks comment on whether it should clarify statements regarding the meaning and circumstances under which such discharges are "considered 'direct' in order to reduce regulatory uncertainties." 83 FR 7126 (Feb. 20, 2018). The comment period closes May 21, 2018.

The results of any formal rulemaking could be relied on by EPA to bolster a "*Chevron* deference" argument in future cases, in support of the position EPA ultimately takes on the issue. In the *County of Maui* case, the Ninth Circuit declined to extend *Chevron* deference to the EPA's views on indirect discharges. *See County of Maui*, Footnote 3 (quoted above).

Defining Jurisdictional Waters Under the CWA

The groundwater conduit cases come at a time of uncertainty about what constitutes "navigable water" under the CWA. The definition of navigable waters, or "waters of the United States," is *already the subject of lawsuits* across the country challenging the 2015 Waters of the United States (WOTUS) Rule and its regulatory aftermath. Defining the jurisdiction of waters regulated under the CWA is a struggle that has been going on for the life of the now-45 year old statute. *See Glick & Atencio, TWR #149 Moon, TWR #155; Taylor, TWR #157; and Kolanz, TWR #160.*

Groundwater Regulation

District Courts

"Suspension Rule"

Water Transfers Rule

Increased Permit Requirements?

On January 22, 2018, in *National Association of Manufacturers v. Department of Defense*, No. 16-299, 583 U.S. ___ (2018), the US Supreme Court ruled in a unanimous opinion that the federal district courts, rather than appellate courts, had original jurisdiction under the CWA to hear challenges to the 2015 WOTUS Rule, dubbed the "Clean Water Rule" by EPA, and clarify this jurisdictional question. The decision has sent numerous parties scurrying back to federal district courts to start anew litigation on a rule finalized in 2015 and litigated in the circuit court for the last two years.

On February 6, 2018, EPA and the Army Corps of Engineers published the "Suspension Rule," a new rule putting off the effective date of the 2015 WOTUS Rule to 2020 to allow the agencies time to review and revise the WOTUS Rule before it takes effect. The Suspension Rule has been challenged in a complaint filed the same day by New York and ten other states, plus the District of Columbia. Similar suits were filed by environmental groups in district courts in New York and in South Carolina. The Suspension Rule continues the application of the agencies' pre-2015 interpretation of the term "waters of the United States" in 2008 guidance documents, and follows the process set in motion by a February 2017 Executive Order directing the agencies to rescind or revise the WOTUS Rule.

The Supreme Court also decided on February 26, 2018 (no opinion), that it will not hear an appeal on the 2008 Water Transfers Rule, which was upheld by the Second Circuit. The Rule allows transfers of waters from one body to another without a permit under the CWA if there is no intervening pollutant added through the transfer or a treatment. The Supreme Court's decision puts an end, for now, to challenges to the rule that have been going on for almost ten years.

CONCLUSION

POTENTIAL IMPACTS OF THE INDIRECT DISCHARGES CASES

The recent district court decisions and pending appeals set up the possibility for increased federal permit requirements for those discharging wastewater that moves through groundwater that ultimately reaches navigable waters. Superfund site cleanups, municipalities, golf courses, recreation areas, agriculture, businesses that contain stormwater onsite in unlined ponds, cesspools, septic systems, underground storage tanks, surface impoundments, landfills, and pipelines — all potentially fall under the CWA if groundwater carries a discharge from them as a point source to navigable waters. The decisions may also result in a significant increase in the number of CWA citizen suits. The regulatory uncertainty associated with the groundwater conduit theory could also negatively impact infrastructure investments needed to address water infrastructure in the United States.

FOR ADDITIONAL INFORMATION:

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Kathy Robb, Principal at Sive Paget & Riesel, PC (New York, NY), has a practice focusing on environmental litigation before federal district and appellate courts across the country and in the US Supreme Court. She also counsels on environmental issues in complex transactions from the bid process through closing, advising clients on corporate structuring to best manage environmental risk. Kathy represents water districts, developers, investors, lenders, energy companies, industrial and paper companies, and chemical manufacturers on water-related disputes, endangered species issues, environmental impact reviews, river sites with contaminated sediments, solid and hazardous waste issues, and sites with contaminated groundwater. Kathy has represented companies in many of the large Superfund sites across the United States, in CERCLA investigations, cleanups, and litigation. She has represented water districts in litigation about the Colorado River in the All-American Canal lining and Glen Canyon Dam cases; about the Rio Grande in the silvery minnow case; and about the Guadalupe and San Antonio Rivers in the whooping crane case. Those cases involved claims under NEPA, the Clean Water Act, the ESA, the Migratory Bird Treaty Act, and the Grand Canyon Protection Act, among other statutes and common law claims. She also advised energy companies on the CWA's implications when permitting cooling water intake structures, and litigated the licensing of a nuclear power plant. Kathy serves as an adjunct professor at the Elizabeth Haub School of Law at Pace University and is the president of the Leadership Council of the Environmental Law Institute in Washington, DC. She is a member of the American College of Environmental Lawyers.

Christine Leas, Principal at Sive Paget & Riesel, PC (New York, NY), has over 25 years of experience practicing environmental law. She specializes in environmental regulatory compliance and transactional matters, counseling clients on the environmental aspects of mergers, acquisitions, and divestitures. Christine has worked on many aspects of brownfield redevelopment of properties under the New York State Brownfield Cleanup Program (and its predecessor Voluntary Cleanup Program) and Superfund sites (CERCLA and its state counterparts). She has represented private developers and public entities in connection with all phases of brownfield redevelopment — due diligence investigation, structuring and negotiating property acquisition/divestiture transactions, procurement and oversight of environmental consulting and remediation services, liability transfers, environmental insurance and regulatory permitting and compliance. Christine has also worked with corporate and financial institution clients on environmental aspects of mergers and acquisitions involving many domestic and international properties. Christine received her BA with a certificate in environmental studies from the University of Wisconsin-Madison (in the days before degree programs were offered in environmental studies), and her JD from the University of California, Hastings College of Law in San Francisco. She's admitted to practice in New York, Connecticut and California.

Klamath Settlement

Two Agreements

FERC Dams Agreement

Restoration Agreement

Deep Conflicts

Basin Attributes

THE KLAMATH SETTLEMENT — YEAR EIGHT

DAM REMOVAL PROGRESSING - WATER REFORMS STALLED BY CONGRESS

by Glen Spain

Pacific Coast Federation of Fishermen's Associations (PCFFA)
and the Institute for Fisheries Resources (IFR)

“Those who say ‘It cannot be done!’ should not interrupt those who are doing it.”
George Bernard Shaw

INTRODUCTION

On February 18, 2010 — with great fanfare and many speeches under the dome of the Oregon State Capital Building — the Governors of California and Oregon, multiple federal and state agency officials, representatives of more than 40 Klamath Basin stakeholder groups (including most of the federal Klamath Irrigation Project irrigation districts), and the Chiefs of the Klamath Tribes of Oregon, and Karuk and Yurok Tribes of California, all signed the two Agreements concerning water management in the Klamath Basin. The Klamath Basin straddles the border between California and Oregon. These two Agreements, taken together, are referred to in this article as the “Klamath Settlement.” [For additional background regarding the Klamath Settlement, *see* Simmons, *TWRs* #49 and #143.]

The first of these two Agreements was the Klamath Hydropower Settlement Agreement (KHS), intended to determine the ultimate fate of the four FERC-licensed Klamath Hydropower Project dams (J.C. Boyle, Copco 1 & 2, and Iron Gate Dam), owned by PacifiCorp Energy Corporation (also known as “Pacific Power”). These dams were built starting in 1916, with the current 50-year FERC license for the dams officially expiring in 2006. Operating under a series of one-year temporary extensions, the company was faced with the choice either to decommission and remove the dams, or to relicense them (with lots of expensive fixes and retrofits for salmon fish passage) for up to another 50 years.

The second part of the Klamath Settlement was the Klamath Basin Restoration Agreement (KBRA). The KBRA was a carefully crafted, science-driven, negotiated multi-stakeholder response to nearly a decade of constant water crisis for both fish and agriculture. The crisis started in 2001 with a partial federal Klamath Irrigation Project (Project) water shutdown deemed necessary to save lower river salmon. There followed an unprecedented major adult salmon fish kill in 2002 when water needed by the fish was diverted back to the Project prematurely by the George W. Bush Administration. Then, in 2006, a nearly coast-wide closure of ocean commercial salmon fisheries as well as Tribal in-river fisheries was implemented — triggered in large part by the prior 2002 lower Klamath River fish kill.

Together these two Agreements were the culmination of nearly ten years of intense negotiations over dams and water in the Klamath Basin — through droughts, water crises, fish kills, and nearly constant litigation. These two Agreements represented a landmark effort to: put an end to decades of water wars; recover seriously depressed but very valuable salmon runs to the Lower Basin; implement a much needed 50-year habitat restoration program for the Basin; and put the badly over-appropriated Basin water allocation system on a much more sustainable basis.

This article provides an update on the status of the Klamath Settlement as of Spring, 2018, eight years after its signing.

BACKGROUND

100 YEARS OF CONFLICT OVER DAMS, RIVERS AND FISH

The Klamath Basin (Basin) is a place where everything that can go wrong with Western water law has done so. For 100 years, the Basin has been embroiled in deep conflict over dams, water, and salmon. To understand these pervasive conflicts, a little background and history is necessary.

The Basin is larger than several states, containing about 15,688 square miles (40,623 km²), or slightly more than ten million acres (four million hectares) in area. The Basin lays roughly two-thirds in California, including parts of Siskiyou, Modoc, Del Norte, Humboldt, and Trinity Counties. The other one-third, comprising the headwaters of the Klamath River system and several large lakes, is in Oregon, including parts of Jackson, Lake, and Klamath Counties. Basin rainfall ranges from nearly 100 inches/year in its coastal rainforests to less than 12 inches/year in its arid high-desert Oregon headwaters above Klamath Falls, Oregon. The land base of the Basin is greatly fragmented between federal, state, Tribal, and privately-owned lands (see map).

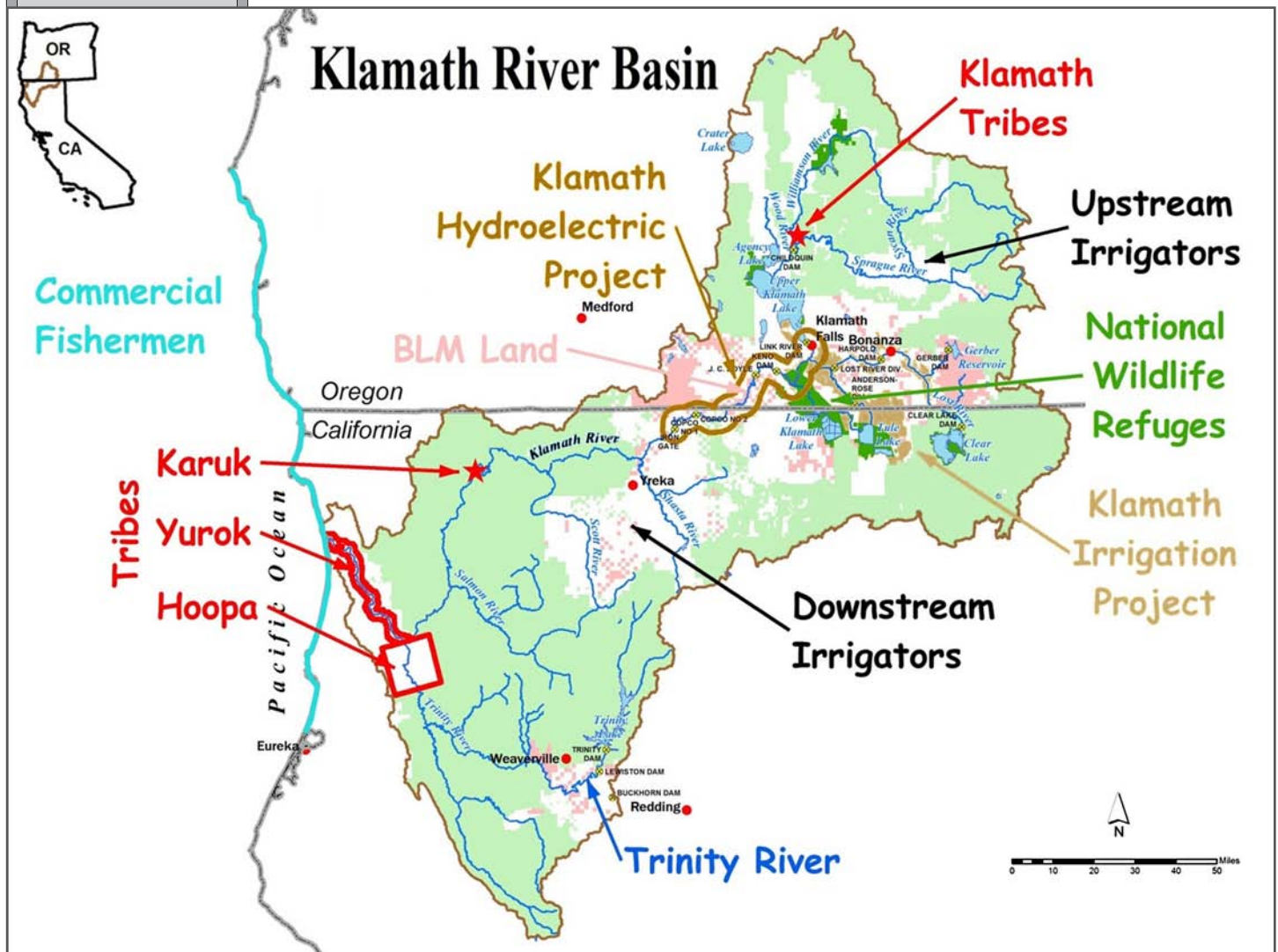
Klamath Settlement**Fragmented Management****Salmon Runs****Development Impacts**

The Basin also contains the Klamath National Wildlife Refuge system containing some of the most important waterfowl and wetlands habitat in North America. The Refuge supports millions of migrating birds traveling the “Pacific Flyway” — the route that many species of birds follow annually in western North America between the Arctic and South America.

Unfortunately, ecosystem management of the Basin is fragmented between two states, multiple counties and state agencies, and several federal agencies — each with its own (often conflicting) legal mandates. None of these entities have any management control over the whole Basin or any kind of comprehensive control over the many factors leading to the Basin’s ecological declines. Human population in the Basin is concentrated in a handful of small cities like Eureka, California and Klamath Falls, Oregon, but the rest of the population is widely scattered. Much of the land remains uninhabited and nearly pristine. Large portions of the Basin are Tribal homelands of the sovereign nations of: the Klamath Tribes of Oregon; the Yurok, Hoopa Valley, and Karuk Tribes of California; and several smaller Tribal Rancherias.

The Basin also was historically the third-largest salmon producing river system in the continental US, out-produced only by the Columbia-Snake and Sacramento-San Joaquin river systems. The indigenous peoples of the Basin have always had a salmon-dependent economy, as did the early European settlers. Before European development, the Klamath is estimated as having produced between 660,000 and 1.1 million returning adult salmon every year, with an average of 880,000.

Today, however, much of the salmon carrying capacity of the Basin has been destroyed in the pursuit of narrowly construed “development” goals (mostly for agriculture, mining, and logging) and the ensuing loss of salmon habitat. Adult salmon returns now average only about 9.7% of historic numbers, even including supplemental hatchery fish, and natural spawners survive at about 6.9% of past levels. Some stocks, such as coho salmon and spring-run Chinook, are down to less than 2% of their historic abundance. Some once-common salmonid stocks such as chum salmon and cutthroat are now effectively extinct.



Klamath Settlement

Fisheries Closures

Furthermore, under the fisheries management requirements of “weak stock management” for intermingling stocks in the ocean, whenever returning Klamath salmon spawner numbers drop below certain replacement thresholds, ocean commercial, recreational, and Tribal in-river fisheries have to be curtailed or completely suspended, causing the salmon-dependent economies enormous economic losses (40,700 fall-Chinook returning spawners is the lowest “maximum sustained yield” objective of the Magnuson-Stevens Sustainable Fisheries Act (16 U.S.C. Sec. 1801 et seq.)). This is exactly what happened in 2006 (*see below*) and was repeated in 2016. The situation was worse in 2017 when record low numbers of Klamath salmon returned to the river, and massive fisheries closures ensued up and down the coastline from Monterey, California to the Oregon-Washington border. A Secretary of Commerce “fisheries failure” disaster declaration is pending for these 2017 closures.

Species of Concern

There have been several efforts to bring special protections to the Basin to prevent more fish extinctions. One very important species of anadromous salmon (coho), once abundant in the Basin, is now listed as “threatened with extinction” under both the federal Endangered Species Act (ESA; 62 Fed. Reg. 24588 et seq. (May 6, 1997) as part of the Southern Oregon/Northern California Coho ESU), as well as under the equivalent California Endangered Species Act (CESA). Two other resident fish species dependent on Upper Basin aquatic habitats and culturally important to the Klamath Tribes of Oregon — the Lost River sucker (known to the Klamath Tribes as the “tschum”) and the short-nosed sucker (the “kuptu”) — have been on the federal ESA list since 1988 (53 Fed. Reg. 27130 et seq. (July 18, 1988)). Much of the Upper Basin is arid and the basic availability of water is always an issue given competing water uses.

Hydropower Dams

Salmon production in the Basin remains heavily impacted by a wide array of habitat damaging activities, both historic and ongoing. Today, the heaviest impact on salmon production by far comes from a series of aging hydropower dams built along the Klamath River near the California-Oregon border. In particular, Copco 1 (1918), Copco 2 (1925), J.C. Boyle (1958), Iron Gate (1962) and Keno Dam (1967). These dams are all owned by PacifiCorp (aka Pacific Power), a privately-owned but publicly regulated utility operating in six western states and providing power to about 575,000 Oregon and 45,000 California customers. Keno Dam is a very small flow regulation dam in the middle of this cluster and produces no power. The other four dams combined have generated only about 88 megawatts (MW) of electrical power on average over the terms of the last Federal Energy Regulatory Commission (FERC) 50-year license. 88 MW is less than 1% of PacifiCorp’s overall generation capacity of 10,894 MW. As noted above, that 50-year license officially expired in April 2006. While a relicensing or decommissioning application is pending, FERC extends PacifiCorp’s old license to operate the dams on a year-by-year temporary basis.

FERC License

Blocked Fish Passage

These four Klamath PacifiCorp-owned dams lack fish passage for salmon, and thus block access to more than 420 stream-miles of once fully occupied salmonid habitat above the dams. Habitat fishery biologists estimate that this blocked-off habitat could support as many as 110,000 additional salmon and steelhead yearly. Lack of fish passage in these dams is illegal under current law. It also violates the Treaty rights of the Klamath Tribes of Oregon to have salmon in their customary fishing grounds above the dams. These Tribes have not seen salmon in their territory since 1918.

Water Quality Issues

Reservoirs behind the dams also create or contribute to other serious water quality problems. These problems include: warming the water above tolerance levels for cold-water salmon; concentrating nutrients and encouraging the explosive growth of toxic blue-green algae; and encouraging the growth of fish pathogens downriver such as *Ceratonova shasta* and *Parvicapsula minibicornis*. These combined impacts threaten to drive wild salmon in the Basin to extinction. Other previously thriving fish species, such as spring-run Chinook and green sturgeon, struggle to survive at seriously depressed population levels.

Irrigation Project

A major constraining factor for lower river salmon production is sheer lack of water in the river. In the Upper Basin, about 220,000 acres is now irrigated as part of the federal Bureau of Reclamation Klamath Irrigation Project. In 1905, the then newly formed Bureau of Reclamation (Reclamation) was given Oregon state water right claims to “all the waters of the Klamath Basin, constituting the entire drainage basins of the Klamath river and Lost river...” for purposes of irrigation (approved by the Legislature pursuant to General Laws of Oregon 1905, Chapter 288, Sec. 2). This allows them to take essentially unlimited amounts of water from Upper Klamath Lake, so long as they can use it for irrigation. Typically, the Klamath Irrigation Project diverts up to 435,000 acre-feet of water from Upper Klamath Lake for this purpose, with higher diversions in the driest water years — thus exacerbating the impacts of all droughts on lower river salmon.

Tribal Water Rights

However, there are some water rights senior to Reclamation’s 1905 right. In particular, the federal Courts have ruled that Klamath Indian Tribal water rights are senior to all others and date “from time immemorial” (*see U.S. v. Adair*, 723 F.2d 1394 (9th Cir. 1983)), including the right to sufficient water to protect its Treaty fishery, which includes salmon.

After the original *Adair* Decision in 1975 the Oregon Water Resources Department undertook a

Klamath Settlement	lengthy water adjudication process that (after 43 years!) is still on-going in the Basin. However, the Adjudication Judge finally ruled in March, 2013, that under their Treaty the Klamath Tribes did indeed have the most senior water right in the Upper Basin. The Irrigation Project farmers' water priority derives primarily from Reclamation's 1905 junior right. Thus, the stage was set for the first great water conflict in the Upper Basin, between the Klamath Tribes of Oregon and Reclamation's contract irrigators and other junior water right holders situated hydrologically above the Project.
Adjudication	At least another 110,000 acres of irrigated lands also exist outside of and hydrologically above the federal irrigation Project in the Williamson and Sprague River Basins, the rivers that feed Upper Klamath Lake. These lands are irrigated with water directly diverted from the flows to Upper Klamath Lake or from groundwater pumping. Groundwater pumping could be reducing nearby stream flows by curtailing inflows from aquifer springs, but is separately regulated and not subject to the Adjudication Order. The Upper Basin irrigators are also concerned that the Klamath Tribe's senior water right might force curtailment of their own surface water irrigation diversions. This is precisely what happened in 2013 and several other recent dry years, causing many of these irrigators economic distress.
Upper Basin Irrigation	Another major source of water conflicts in the Upper Basin revolves around Endangered Species Act (ESA) protections both for resident fish in Upper Klamath Lake and for coho salmon below the dams. The courts have held that various other federal water obligations, including those deriving from the ESA and Tribal treaties, are senior to — and prevail over — all conflicting Project water contracts (<i>see Klamath Water Users Assn. vs. Patterson</i> , 204 F.3d 1206, 1213 (9th Cir. 1996) ("ESA and Tribal water obligations take precedence over the water rights of irrigators.")).
ESA Protections	ESA protections for fish led to a major confrontation during the near-record drought of 2001, during which many Project irrigators who were dependent upon Project water deliveries found themselves coming up short of water or losing their water deliveries altogether. Overall during 2001, Project irrigators lost more than one-third of their normal deliveries, with those most dependent on water from Upper Klamath Lake experiencing the most severe cuts. The economic impacts on these Project irrigators were devastating, creating a political backlash against the Bush Administration on ESA and water issues.
2001 Drought	In a widely-publicized (and clearly politically driven) move, in 2002 the Bush Administration ordered <i>full</i> irrigation deliveries to the Klamath Project irrigators <i>during the continuing drought</i> , thus seriously shorting water for salmon in the lower river. The result (as predicted by federal, Tribal, and state biologists whose objections were over-ridden) was the largest adult fish kill in US history. An estimated 70,000 adult spawning salmon died in the lower Klamath River before they could reach their spawning grounds. These devastating 2002 adult salmon losses, combined with dam-related water quality problems created by the dams, were both major factors contributing to the widespread fisheries collapse three years later. Adult returns were so low from the 2002 year-class that the Klamath salmon fisheries collapse of 2006 triggered widespread ocean salmon season closures over more than 700 miles of coastline, at an estimated cost of at least \$200 million in economic losses. In 2006, litigation led by PCFFA — originally filed in 2002 — resulted in an injunction requiring mandatory minimum flows for coho at Iron Gate Dam to prevent similar fish kills in the future (<i>Pacific Coast Federation of Fishermen's Associations, et al. vs. U.S. Bureau of Reclamation, et. al.</i> , No.C02-2006-SBA, 2006 WL 798920, *8 (N.D. Cal. Mar. 27, 2006)). Even today, the Klamath River is still being run by Court order.
2002 Irrigation Deliveries	Back-to-back water, agricultural, and fisheries crises in 2001, 2002, and 2006 and the resulting rotating economic disasters — with nearly constant litigation and political gridlock over these years — have amply demonstrated the desperate need for change in the Basin. The 2006 expiration of PacifiCorp's 50-year FERC license and the looming decision on what to do with its five mainstem dams created both the deadlines and the incentive for negotiating these changes. The February, 2010, Klamath Settlement Agreements were the carefully negotiated way forward — but only if they were ratified by Congress!
Fisheries Collapse & Litigation	KBRA ABANDONED BY CONGRESS
2010 Settlement	Because there are so many federal interests, and because the KBRA was essentially a settlement of many outstanding Indian federal Treaty water right claims since it directly affected multiple federal Bureau of Reclamation Irrigation Project water rights, and for several other legal reasons, it was clear from the start that the KBRA could not take full effect without the ultimate ratification of Congress. The Secretary of Interior signed it with that proviso. Indeed, the major push for these water conflict settlements had arisen from certain Members of Congress asking for a broadly supported, stakeholder-driven process. Due to the fact that several of its key elements were time sensitive, the 2010 KBRA also contained an automatic termination date of December 31, 2015, within which to obtain Congressional approval.
Congressional Approval Required	Unfortunately, the KBRA was closely linked to dam removal under the separate, but parallel, KHSA. This became a political lightning rod for the whole settlement package.
Dams Issue	

<div data-bbox="136 180 324 260">Klamath Settlement</div> <div data-bbox="152 302 308 369">"Least Cost Option"</div> <div data-bbox="162 407 298 474">Removal Surcharge</div> <div data-bbox="133 579 328 646">Dam Removal Impacts</div> <div data-bbox="120 963 341 997">Removal Report</div> <div data-bbox="136 1102 324 1136">Political Shift</div> <div data-bbox="126 1312 334 1346">Local Opinions</div> <div data-bbox="120 1803 341 1837">Property Values</div>	<p>The KHSA quickly got required approvals from the California and Oregon Public Utilities Commissions (September, 2010, in Oregon PUC Case No. UE-219, Order No. 10-364; and somewhat later in the California PUC Case No. A10-03-015). PacifiCorp has convincingly shown the PUCs that the "least cost option" for these dams was to decommission them and replace their meager amount of energy (~88 MW) with more modern, less costly facilities. In fact, PacifiCorp's PUC filings estimated that the cost of full FERC relicensing of the dams would likely be at least twice as much (\$400 to 500 million, and with no upward "cap,") as the total removal costs to its customers under the KHSA (capped at \$200 million). Both PUCs thus approved the collection of a very small (1.7%) monthly additional "Klamath Dam Removal Surcharge" from its Oregon and California customers until 2020, with these surcharges intended to build up over 10 years to the \$200 million fund for the "customer contribution" of removal costs to be provided by 2020.</p> <p>A joint NEPA/CEQA environmental assessment and robust peer-review process was also begun in 2010, which by 2012 led to a <i>Final Environmental Impact Statement/Environmental Impact Report</i> (Report) on dam removal impacts. The Report demonstrated that not only was dam removal a practical option in the Klamath, but (at \$292 million) would be nowhere near as costly to complete as had originally been feared.</p> <p>The Report also concluded that:</p> <ol style="list-style-type: none"> 1) Klamath dam removal would have no significant impact on the power grid, irrigation, flood control or downriver flooding risk; 2) there were no significant toxins in the sediments trapped behind the dams; 3) the sediment loads released by dam removal would flush through rapidly to the sea, mostly within a single year's rainy season, and sediment impacts on fish could be minimized and mitigated in various ways; 4) overall water quality of the river system would greatly improve; and 5) salmon runs of the Klamath, particularly when coupled with KBRA water reforms, would ultimately nearly double, with an expectation for major expansions of fall and spring run Chinook habitat and 10% more habitat for ESA-listed coho once those fish were able to recolonize above the dams. <p>All this information, with a triple set of peer-reviews, resulted in a document titled <i>Klamath Dam Removal Overview Report for the Secretary of Interior</i> that favored an affirmative KHSA-required "Secretarial Determination" regarding dam removal. All these documents and many supporting studies and reports are available at: www.klamathrestoration.gov.</p> <p>However, undeterred by Report findings, dam removal opponents were rallying. Starting in 2009 the political landscape in both Siskiyou and Klamath counties (and in much of the nation) dramatically changed, with "Tea Party" candidate takeovers, a sharp national slide to the political right, and ultimately a change of Congressional majority control from the Democrats to Republicans.</p> <p>In this new political atmosphere, "keeping our Klamath dams" became a cause célèbre of many self-proclaimed southeastern Oregon and northern California Tea Party politicians and conservative political talk show hosts. Motivated by this politically-charged campaign (which fabricated a great deal of misinformation), Siskiyou County dam removal opponents succeeded in 2010 in putting a citizen's initiative on the local ballot (Measure G) asking "Should the Klamath River Dams...and associated hydropower facilities be removed?" On November 10, 2010, Siskiyou County voters voted NO to the question by 79%. As a result, Siskiyou County ultimately never signed onto the Klamath Settlements, even though they were at the negotiating table throughout, and most of their legitimate concerns had already been addressed in the KHSA.</p> <p>Oregon's Klamath County did ultimately sign on in support of the Klamath Settlement Agreements in 2010. However, after a later Tea Party candidate take-over of the Klamath County Board of Commissions, Klamath County's position suddenly switched from support to opposition over the issue of dam removals, and then a similar citizen's referendum vote in Klamath County (Measure 18-107, Nov. 2016) produced a 72% vote in favor of keeping the Klamath dams. A number of the more conservative members of Congress in the new House of Representatives Republican majority (particularly Reps. McClintock and LaMalfa of northern California) joined the local pro-dam Tea Party-driven bandwagon, working to block Congressional approval of the KHSA in order to "keep our dams." In the process they also stood in the way of the KBRA, which was linked to dam removal.</p> <p>To be fair, there are some legitimate landowner concerns about the impacts of dam removal in Siskiyou and Klamath Counties where the dams now sit, particularly some landowners with homes around the reservoirs who fear their property values will go down once the lake is gone. But the NEPA process showed conclusively that negative impacts from dam removal could be fully mitigated and in large part eliminated, and that what few negative impacts remained would be only temporary. Those opposing dam removal have the facts and engineering studies strongly against them. The Klamath River Renewal Corporation (KRRC) is also tasked under the KHSA with taking all those concerns into account,</p>
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<div data-bbox="138 178 326 262">Klamath Settlement</div> <div data-bbox="170 367 293 436">Business Decision</div> <div data-bbox="134 510 329 577">Congressional Gridlock</div> <div data-bbox="157 825 308 892">Agreement Amended</div> <div data-bbox="134 1140 329 1207">Federal Funds Unneeded</div> <div data-bbox="134 1383 329 1451">Dam Removal Decision</div> <div data-bbox="138 1524 326 1554">FERC Process</div> <div data-bbox="157 1734 308 1875">Legislation Proposed & Opposed</div>	<p>and developing mitigation measures. Such measures include: constructing green-belts on emergent streamside lands; doing riparian restoration; stabilization and replanting of emerging lake-bottom lands; and development of recreational facilities on newly emergent lands that are intended to <i>increase</i> property values along the current reservoirs, offsetting any declines. Numerous other mitigation and risk-avoidance restoration efforts are part of the KHSA post-dam restoration package, all of which are now funded.</p> <p>Ultimately, the highly-politicized citizens' votes in Siskiyou and Klamath Counties in favor of "keeping our dams" have had little legal impact. Neither county owns or controls the privately-owned Klamath Hydroelectric Project. PacifiCorp's decision to remove them is nothing more than a business decision of the sort that public utilities make all the time, and which county governments do not have the legal authority to second guess. There is some irony in staunch private property rights advocates trying to use the governmental process to force a public utility to keep a failing asset.</p> <p>The bottom line is that from 2010 to 2015, the increasingly politicized and polarized struggle over the fate of these four dams in Congress resulted in gridlock. Several bills over several Congresses did well in the Senate (where Senators Wyden and Merkley from Oregon and California Senators Boxer/Harris and Feinstein championed them) but consistently failed to make progress in the ideologically divided House of Representatives. By December 31, 2015, time had run out and the water reforms of the KBRA portion of the comprehensive Klamath Settlement died in Congress. Many dam removal opponents rejoiced, mistakenly thinking that they had won the struggle over the fate of the four Klamath dams.</p> <p style="text-align: center;">KHSA RESURRECTION</p> <p>When I and others at the negotiating table wrote the KHSA into its final form in 2010, we had concerns about whether we could ever get it ratified by Congress — and so, unlike the KBRA, the KHSA had <i>no internal expiration date</i>. When Congress failed to ratify it on time, all the problems were still there, of course, but the simple solution of Secretary of Interior authorization for dam removal was now blocked. By late 2015 (and with an approaching Presidential election) the Klamath dam removal was tarred as an "Obama deal" in Congress by the new Republican Congressional majority and thus sabotaged. This occurred even though the Klamath Settlement was begun and largely negotiated under the Bush Administration with the support of many prominent GOP political figures — and even though it made good economic sense. In response, the Settlement Parties and PacifiCorp simply amended the deal to no longer require a special Interior Department "Secretarial Determination." Thus, KHSA no longer needed approval of a dysfunctional and hyper-partisan Congress.</p> <p>With what in retrospect was remarkable foresight, negotiators had also structured the KHSA deal so that dam removal itself needed no federal money. Hence, with the removal of the need for Congressional approval and with no federal funding needed, there were no longer any Congressional political levers to block the deal. Negotiators specifically intended to avoid the Congressional funding pitfalls previously experienced with the Elwha and Glines Dam removal project. That project was approved by Congress in 1992 (<i>Elwha River Ecosystem and Fisheries Restoration Act</i>) but for purely political reasons completely unrelated to the project itself remained unfunded by Congress for more than 15 years — with physical removal not beginning until September, 2011.</p> <p>With that new track in mind, the signatory Parties (including the Governors of both Oregon and California) and PacifiCorp all signed an <i>Amended Klamath Hydropower Settlement Agreement</i> in April, 2016. The Amended Agreement took the dam removal decision away from Congress and simply returned it back to the normal Federal Energy Regulatory Commission (FERC) process from which it had originally come.</p> <p>Several Members of Congress in the House who had most loudly defended the Klamath dams objected to the Amended Agreement. However, moving the relicensing/decommissioning decision-making process back to FERC was certainly nothing new. Relicensing and decommissioning has always been done that way, ever since FERC (or its predecessor) was created back in the 1930s and the Klamath Hydropower Project operates based on a FERC-issued license. It was the KHSA's initial exemption from the FERC process by way of Congress and the Secretary of Interior that was an actual innovation.</p> <p>Nevertheless, after the 2016 KHSA amendments there were still efforts by adamant dam removal opponents in Congress, through various riders and amendments, seeking to use the power of Congress to block this one FERC process. All were ultimately dropped. As special laws intended to reverse a single valid business decision and to block a single FERC hearing process, such Congressional interference with FERC was strongly opposed by pro-business interests. Opposition included the Trump Administration and many other private property rights advocates. Of course PacifiCorp and most of the rest of the nation's hydropower industry opposed such measures as setting a very dangerous precedent. A special Congressional action — prohibiting a particular utility company from disposing of a failing asset — would not only have been costly in terms of much higher electricity rates for constituents (and thus politically costly), but would likely have been an unconstitutional federal Fifth Amendment "taking" as well.</p>
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Klamath Settlement

“Dam Removal Entity”

New Non-Profit Model

Funding Sources

California Benefits

License Transfer & Surrender

There were also similar predictable political efforts to defund the whole KHSA funding mechanism made in the Oregon Legislature by eliminating the PUC-supervised Klamath Dam Surcharge Trust Fund (e.g., SB 1552, Secs. 8-10 in the 2018 Regular Session, written by former Klamath County Commissioner and current State Senator Dennis Linthicum, a long-time foe of dam removal). These efforts were opposed by the Oregon Governor and the broad coalition of KHSA signatory Parties, and so went nowhere.

Instead of looking to the federal government to be the “Dam Removal Entity” (DRE) to implement the KHSA as had originally been contemplated, by spring of 2016 a special California non-profit corporation was formed and established as the DRE. The Klamath River Renewal Corporation (KRRC) was organized for the sole function and purpose of taking title of the Klamath Hydropower Project’s four mainstem dams, and then removing them under FERC authorization (*see* www.klamathrenewal.org). Another (in retrospect) brilliant move by the original KHSA negotiators was that the precise character of the DRE — whether a federal, state, or local agency or a private engineering company — was left unstated. Of course, at the time the original KHSA was signed in 2016 we did not know how things would ultimately unfold.

Setting up a separate non-profit organization to take title to dams and then remove them is a new model for how to go about such a project. But there is precedent in the previously successful removal of three dams (Veazie, Great Works, and Howland Dams) on Maine’s Penobscot River — their purchase and demolition was accomplished through the non-profit, community-based, Penobscot River Restoration Trust. The Penobscot River Restoration Trust’s former Executive Director, Laura Rose Day, now sits as one member of the Board of Directors of the KRRC, lending her considerable experience in similar dam removal projects to this effort.

Since the formation of the KRRC, full funding of up to \$450 million has been made available to the corporation for dam removal.

Dam removal funding comes from the two KHSA-specified, non-federal funding mechanisms:

Customer Contributions: \$200 million is being collected by California and Oregon Public Utility Commissions through PacifiCorp monthly service charges to its customers in Oregon and California, as authorized by the 2010 Oregon Legislature (SB 76) and by the PUCs.

California Bond Funding: California voters approved Proposition 1 in 2014 for water and restoration projects statewide (*see* Brandt & Rendon, *TWR* #134); in 2015, the California legislature specifically allocated up to \$250 million of the Proposition 1 bond money to fund the difference between the Customer Contribution and the actual cost to complete the Klamath Hydropower Project facilities removal.

Some have challenged the rationale for using California bond money, instead of customer contributions as in Oregon, to fund California dam removal. However, there are only a relative handful of PacifiCorp customers in California (about 45,000), compared to 575,000 in Oregon, so there was no possibility of an equal distribution of dam removal costs embedded in the Customer Contribution funding mechanism. Moreover, the most important economic benefit that will come from Klamath dam removal is the restoration of the lower Klamath’s salmon fisheries. Most of this benefit will accrue to California’s coastal, salmon-dependent commercial fishing communities, raising the level of all of these currently depressed California economies. Other benefits will be greatly improved water quality throughout the Klamath River, most of which flows in California. Moreover, three of the four dams sit in northern California. Hence, there is a major California benefit from dam removal in northern California’s Klamath River and this was judged by the California Legislature to be more than enough to justify using up to \$250 million in California Prop. 1 Bond money for this major watershed restoration effort.

This \$450 million total pot of money should cover all dam removal and related watershed mitigation and restoration costs handily. As part of the 2012 NEPA process, Reclamation developed a detailed engineering “most likely” cost estimate of approximately \$292 million (in 2020 dollars) for complete four-dam removal. This estimate was derived through a rigorous analytical process and an independent peer review process, which is being further refined as part of the FERC submission to complete the FERC Application.

Meanwhile, the Klamath dam removal process is proceeding on parallel tracks through both FERC and the States of California and Oregon water quality agencies. Those state agencies feed mandatory water quality mitigation conditions into the FERC process under the Federal Power Act, 16 U.S.C. § 792 et seq., to obtain Clean Water Act (CWA) 401 Discharge Permits (*see* CWA § 401; 33 U.S.C. § 1341).

On September 23, 2016, PacifiCorp and the KRRC jointly filed an *Application for License Transfer* to the KRRC. PacifiCorp formally withdrew its old relicensing application to FERC when it filed its *Application for Transfer* under the Amended KHSA. Thus relicensing is no longer an option that PacifiCorp is pursuing. KRRC simultaneously filed an *Application for License Surrender*, formally petitioning FERC for permission to remove the dams. Also on September 23, 2016, the KRRC made a

<div>Klamath Settlement</div> <div>Water Quality Conditions</div> <div>Engineering Design Plan</div> <div>FERC Library</div> <div>FERC Approval</div> <div>Technical Committee</div> <div>Public Hearing</div> <div>Resistance Expected</div> <div>2021 Removal Target</div>	<p>formal <i>Application to California State Water Resources Control Board for 401 Certification</i> for Klamath dam removal, and a similar Application to the State of Oregon's Department of Environmental Quality. The state water quality agencies may approve these Section 401 discharge permits outright or deny such permits outright, but most likely will approve it with various mitigation conditions to protect interim water quality in the Klamath River while dam removals are proceeding. If acceptable to KRRC, those state agency conditions become part of the ultimate FERC permit.</p> <p>There are various other secondary permits, such as an Army Corps of Engineers 404 fill and removal permit, and then local Siskiyou and Klamath County construction project permits that will be applied for once the main FERC permits are secured.</p> <p>Since the preliminary <i>Applications</i> were filed with FERC on September 23, 2016, FERC has made additional information requests, which is a normal part of such a process. Answers to their additional questions have been either submitted or are in preparation and will be submitted with the final engineering design "Definite Plan" and refined cost estimates for dam removal by July 1, 2018.</p> <p>The various documents involved are available from the FERC electronic library at www.ferc.gov. The FERC Project Number file for the original PacifiCorp FERC license is No. P-2082, and for the new KRRC <i>Surrender Application</i> is No. P-14803. Copies of the major filings are also available from the KRRC web site at: www.klamathrenewal.org/regulatory. Copies of the previous "Detailed Plan" that was analyzed under NEPA/CEQA in 2012, and the <i>Draft EIS/EIR</i> of 2012 and the 2013 <i>Klamath Dam Removal Overview Report for the Secretary of Interior</i>, are also available at that KRRC website. Those documents and dozens of other key reports and technical studies that went into those analyses are also available at: www.klamathrestoration.gov.</p> <p>In a hopeful first sign of FERC's position on the project, on March 15, 2018, FERC formally approved administratively separating out the four dams in question into a separate FERC license ("Lower Klamath Project No. 14803"), leaving a few remaining minor components of the old FERC license that are not involved in the KHSA (such as Keno dam, and a few small power generation systems, most now decommissioned) to remain in PacifiCorp hands for a separate process as the company closes down its prior FERC license. This was a small — but good — first step at final approval.</p> <p style="text-align: center;">WHAT'S NEXT FOR THE KHSA</p> <p>As noted, after the FERC <i>Applications</i> and engineering studies that make up the "Definite Plan" for dam removal and the remaining answers to FERC requests for additional information are completed they will both be filed by July 1, 2018. The KRRC is also, at FERC's request, assembling a Technical Advisory Committee to peer-review and advise the corporation on details of its Definite Plan and other matters throughout the process of dam removal. This also is not an unusual FERC request.</p> <p>Upon completion of the FERC <i>Applications</i> July 1, 2018, FERC will then schedule public hearings on the <i>Applications</i> in various locations. The State water quality agencies will also schedule public hearings in their respective states as part of their decisional process on Section 401 water quality Certifications and Discharge Permits. Those hearings are expected to be scheduled in summer and fall of 2018, with agency decisions on these key permits expected to be issued sometime late in 2018 or early 2019.</p> <p>Will there be continued resistance to dam removal?</p> <p>Surely there will be, albeit that resistance has a dwindling factual basis to rely upon and must therefore stress ideological opinion. We proponents anticipate that more litigation to slow the dam removal process down or block it entirely is intended and we are preparing accordingly. Fortunately, the administrative record supporting dam removal, including multiple scientific, engineering, and economic studies subjected to three levels of independent peer-review, is overwhelming. Several litigation attacks on the process have already been made and all quickly failed. But there have been some delays, and the FERC process can be slow, so the KRRC has retargetted the physical dam removal process, originally scheduled for early 2020, to one year later in early 2021.</p> <p>Interestingly, no current resistance comes from the Trump Administration. In October 2017, the newly appointed Deputy Commissioner of the Bureau of Reclamation (Alan Mikkelsen) referred to the Klamath Dams FERC process in an interview with the Sacramento Bee. "We do not intend to intervene materially in any way in this process." (Sacramento Bee, 10/6/17: "<i>Trump Official Says Government Won't Stand in the Way of Removing Klamath Dams</i>" — see: www.sacbee.com/news/state/california/water-and-drought/article177691451.html). The Deputy Commissioner said the same thing to the Siskiyou County Board of Supervisors. Mikkelsen, who has extensive experience mediating western water disputes, is the Secretary of Interior's Special Envoy to the Basin. He has exhibited a readiness to help resolve the remaining unsolved water conflicts that are once again taking hold in absence of the KBRA.</p>
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Klamath Settlement

Revived Restoration Projects

Authorized Projects

Unauthorized Options

Conflicts Timeline

CAN SELECTED KBRA PROJECTS BE REVIVED?

With the demise of the KBRA, all the water conflicts that it was intended to address remained, but with none of the solutions. Congressional inaction was a great disservice to the men and women of the Upper Klamath Basin farming communities that worked hard with other Basin stakeholders to come to an agreement on how to reallocate the scarce water of the Basin more sustainably and fairly. They were ill-served by their Congressional representatives.

Can any portions of the old KBRA be revived as separate restoration or water conservation projects? The answer is YES. Many of the water reform measures of the old KBRA already have sufficient Congressional authorization — and even some federal budget money — and stand on their own merits.

Some of the examples of projects that can be “cherry picked” out of the old KBRA and have no need for any additional Congressional authorities, include:

- KBRA Section 18 listed a number of Upper Basin wetlands restoration projects that would both add to the Basin’s impoverished natural wetlands water storage system, but also benefit migrating waterfowl — some begun, some not, but all underfunded — which together would add almost 100,000 acre-feet of much needed additional water storage
- Controlling excessive groundwater withdrawals, which can be done more effectively under state water law
- Creating and implementing a Klamath Basin Drought Plan — which, remarkably, the Basin has never had
- Aggressively implementing various Clean Water Act Total Maximum Daily Load (TMDL) state water pollution controls already approved, but underfunded
- Better coordination, across the Basin, of all agency and private wetlands restoration efforts in a comprehensive 50-year restoration plan
- Responding to the major long-term threat of oncoming climate change

There are also a number of other not-yet-authorized measures that were part of the KBRA, which, on their own, could be approved by Congress simply because they make sense. Among them are:

- Creating a guaranteed water supply for the water-starved Klamath National Wildlife Refuges, which now have the most junior water right in the Reclamation’s system and so frequently go dry
- Making the National Wildlife Refuges and fish and wildlife needs legally a “Klamath Irrigation Project purpose,” so that Reclamation could legally provide water to the refuges, which it cannot now do under its organizing statute
- Various additional steps can be taken to reduce or minimize adverse ecological impacts on the Klamath National Wildlife Refuges from the approximately 23,000 acres of refuge lands that are annually leased out for high-intensity, commercial agriculture (the only national refuge in the country where commercial leasing on that scale exists)

There are a number of other good ideas in the old KBRA that should be reconsidered as stand-alone actions.

ON-GOING CONFLICTS

Unfortunately, the over-appropriation of the Klamath Basin’s scarce water supply has not ended, and without the KBRA the Basin is once again descending into perpetual “water wars” and conflicts. Some of the water conflicts that have already occurred in the absence of an approved, Congressionally ratified, KBRA include the following:

- 2010 — Additional drought-related water shutdowns, with associated fish and crop losses, requiring further Congressional disaster assistance to hard-hit Upper Basin farming communities
- 2013 — Major Upper Klamath Basin irrigation water shutoffs as a result of the 2013 completion of the water adjudication process, to meet newly enforceable Klamath Tribal senior water rights. Major bird die-offs also occurred on the dried-up Klamath National Wildlife Refuges, which survive mostly on irrigation runoff that is often highly polluted as well as being unavailable in dry years
- 2014-2015 — Severe drought continued. Massive *Ceratonova shasta* juvenile fish parasite outbreaks (usually fatal) occurred in the mid-Klamath river, infecting 81% of 2014 outmigrating juvenile salmon and 91% in 2015. An emergency lawsuit was brought in 2016 by the Yurok and Hoopa Tribes, PCFFA/IFR, and Klamath Riverkeeper to put more water back in the river to help prevent a similar devastating epidemic in 2017. A court injunction was issued March 3, 2017, requiring Reclamation to provide certain “flushing flows” and a reserve of 50,000 acre-feet of water earmarked for emergency “dilution flows” into the river in the event an outbreak occurs, in efforts to try to minimize mortalities (*see Yurok Tribe, et al. vs. BOR, et al.*, U.S. Dist. Ct. N. CA., Case No 3:16-cv-06863)
- 2016-2017 — Salmon adult spawner returns hit consecutive all-time record lows in both years, in large part because of high prior year juvenile *C. shasta* mortalities; most Klamath Management Zone (KMZ) coastal ocean commercial fisheries and all in-river Tribal fisheries are closed, with great

Klamath Settlement

economic losses. The US Department of Commerce declared a “fisheries failure” disaster for 2016, and a similar disaster declaration for 2017 for the area of the entire KMZ (several hundred miles of coastline from northern California to central Oregon) has been formally requested by the two state’s Governors and is now pending

2018 — Drought conditions resume. Conflicts over water are once again playing out in court, as Upper Basin irrigators try to overturn the 2017 court injunction obtained by Tribes and fishermen in the Lower Basin. Fights over water are playing an increasing role in the development of a new governing joint coho-suckers Biological Opinion (BiOp) to replace the current one set to expire in 2023.

CONCLUSION

CAN A NEW KLAMATH WATER SETTLEMENT ARISE?

There is no question that any comprehensive water settlement that could replace the KBRA would require Congressional approval. But the primary political lightning rod of KHSRA dam removal, the ostensible reason for Congressional inaction, is now thoroughly off the Congressional table (and proceeding on its own FERC track). The answer to the question whether another comprehensive water plan might be fashioned is therefore a cautious “maybe.”

There is simply no question that the Klamath Basin’s water supply is grossly over-allocated. There remains a great need to readjust the current broken water allocation system to be sustainable in line with actual rainfall, as the KBRA tried to do. Lack of the KBRA means that the Klamath Basin is once again wracked with water conflicts. Some of these are now built into the current state water rights system and particularly problematic in the Upper Basin which is arid and prone to droughts. Without major changes these conflicts will never end.

The State of Oregon never previously enforced the standard “first in time = first in right” water allocation system in the Basin. Instead, the State took the position that, without an Adjudication Order, the Prior Appropriation Doctrine was too legally shaky to be enforceable. That all changed in 2013 when, after 38 years of litigation, a Final Adjudication Order was finally issued in the Klamath Basin Adjudication. The Order confirmed the *Adair* decision giving the Klamath Tribes the most senior water right. This resulted, in 2013 and in several years thereafter, in the complete cutoff of water to many junior water right holders hydrologically above the Klamath Irrigation Project and some within the Project as well. These cutoffs now occur whenever Tribal senior water rights for the protection of fish and wildlife could not otherwise be met — as happens in most dry or drought years. There still is no real basin-wide Drought Plan. The Plan developed for the old KBRA died with it. The “Upper Basin Comprehensive Agreement,” that provided for more equitable sharing of water among Upper Basin water right holders above the Irrigation Project during droughts, was a creature of the KBRA and also formally died with it. Nothing replaced it. Nothing ever will unless there is another negotiated water deal that looks much like the KBRA.

The Klamath Settlement arose out of a bitter decade of back-to-back, rotating water and fisheries crises up and down the Basin that affected all of its communities. Finally, after years of struggle, both Upper and Lower Basin communities said, “Enough! Let’s try to negotiate a deal that works for everyone.” And they did. But then Congress abandoned them!

Most of those good people who brought about the Klamath Settlement the are still in the Basin. Most of the involved communities would still like to work something out that meets their community’s needs — particularly concerning more stability and certainty for the future. Farmers need more water certainty to plant, but so do fishermen whose resource depends on healthy rivers. The Tribes’ communities need to know they can pursue their cultures, customs, and livelihoods without facing mountains of dead fish and poisoned rivers.

Everyone in the Basin still wants to live in peace and watch their communities prosper. Thankfully, there still are efforts in all these Klamath stakeholder communities to keep channels of communication open, and to engage in such negotiations in the near future. There is hope that now that dam removal is off the table and on its own separate FERC track, that all the stakeholders who created the original KBRA can renegotiate from that framework as a starting point, and that the current Administration may help such negotiations coalesce in the near future.

FOR ADDITIONAL INFORMATION:

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Dam Removal Proceeding

Over-Allocation Remains

Adjudication Outcomes

Curtailment (Tribal Rights)

Negotiation Possibilities

Glen Spain is the NW Regional Director for the Pacific Coast Federation of Fishermen’s Associations (PCFFA) and its sister organization, the Institute for Fisheries Resources (IFR), both of whom are signatory Parties to the Klamath Settlement Agreements. He has been working toward Klamath dam removal and salmon restoration since 1985, and was PCFFA/IFR Lead Negotiator throughout the Klamath Settlement process, which started in 2000, as well as one of its principal drafters. He also serves as General Legal Counsel for both organizations and an Alternate Director for PCFFA/IFR on the Board of Directors of the Klamath River Renewal Corporation (KRRC). PCFFA is the largest trade association of commercial fishing families on the west coast, representing hundreds of largely family-owned commercial fishing businesses, many of whom make their living harvesting Pacific salmon for the nation’s tables and for export.

Groundwater Management

SGMA

Management Tools

Case Studies

Interdependent Tools & Actions

Groundwater Losses

SUSTAINABLE GROUNDWATER MANAGEMENT

EDITED EXCERPTS FROM:

The Future of Groundwater in California: Lessons in Sustainable Management from Across the West

by Christina Babbitt, Scott Sellers, Ann Hayden, & Maurice Hall (Environmental Defense Fund)
Kate Gibson & Nicholas Brozović, (Daugherty Water for Food Global Institute, University of Nebraska)
Sandra Zellmer (Daugherty Professor, University of Nebraska College of Law)
& Anthony Saracino (Water Resources Consultant)

TWR Editors' Introduction: *The Water Report* is very grateful to the authors of *The Future of Groundwater in California: Lessons in Sustainable Management from Across the West* for having generously granted us permission to publish the following minimally-edited excerpts from their excellent 124-page report. The graphics we have included have also been slightly modified to fit our format. The full report — including nine comprehensive case studies — is available online at: www.edf.org/6JQ.

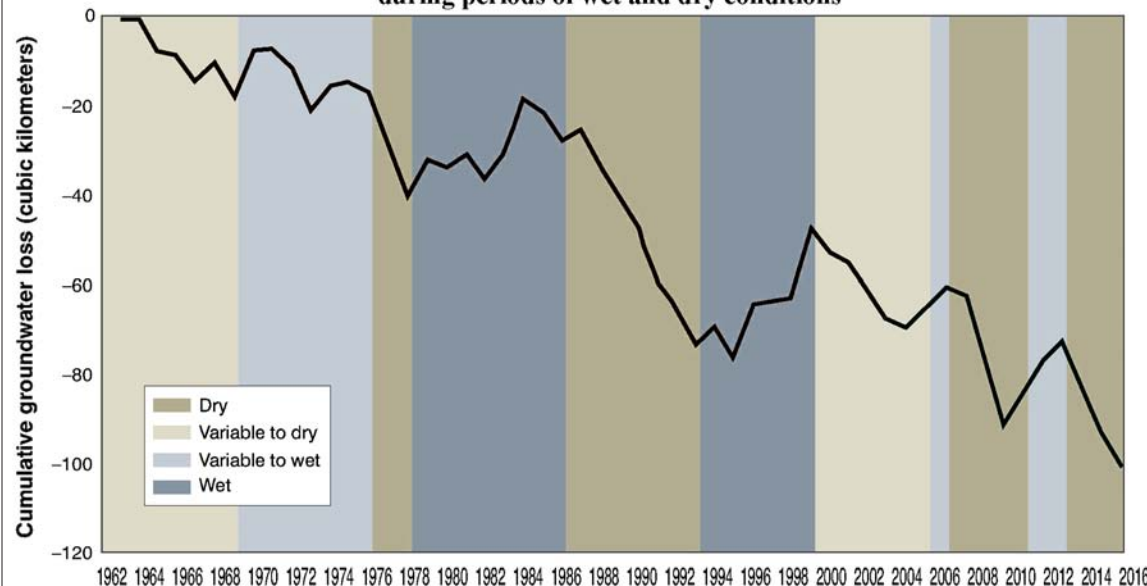
Executive Summary

The 2014 Sustainable Groundwater Management Act (SGMA) created, for the first time and on an unprecedented scale, a mandate to change how groundwater is managed statewide in California. While enacting SGMA was a tremendous step forward, communities and water districts now face the considerable challenge of creating successful groundwater management programs.

This report is aimed at helping California's water managers, public water agencies, county commissioners, city planners, and others better understand the suite of tools and approaches that can be used to enhance the sustainable management of groundwater. Specifically, we consider four categories of management tools — regulatory, incentive-based, agency supply augmentation and protection, and education and outreach — to evaluate how these tools are being used to address water quantity, water quality, and surface water and groundwater interaction challenges. We present nine comprehensive case studies of groundwater management across the Western United States to highlight how these tools have been used to address those challenges. The case studies represent basins that have a range of water uses — agricultural, municipal, or mixed water use, as well as basins with diverse hydrologic, political and social settings.

Effective groundwater management takes time and requires significant resources and commitment on the part of water managers and communities. Each groundwater management program presented in this report relies upon a variety of interdependent tools and actions to meet management goals. The case studies illustrate the importance of building trust, having sufficient data, using a portfolio of management approaches, assuring performance, and access to funding. Given the similarities between the goals of SGMA and those described in the case studies, these themes emerge as crucial to the successful implementation of California's landmark groundwater legislation.

Figure A.1 Cumulative groundwater loss in California's Central Valley during periods of wet and dry conditions



Background

Groundwater Management

Recharge Limitations

Depletion Impacts

“Undesirable Results”

Conjunctive Management

Groundwater provides about 40 percent of California’s total annual water supply and serves as a critical buffer against drought and climate change. But while groundwater is an effective buffer during dry periods, the resource needs time to recover after it has been pumped. At current rates of groundwater use, flooding events and wet periods will not be sufficient to recharge groundwater in key basins to support long-term sustained use, as shown in Figure A.1 that highlights cumulative groundwater loss in California’s Central Valley since the 1960s.

The trend of increasing groundwater use amid cycles of drought has exacerbated groundwater depletion, water quality degradation, land subsidence, and depletion of interconnected surface water throughout the state. California’s SGMA arose out of a recognition that the integrated management of the state’s water resources is essential to meeting its water management goals, and that when properly managed, groundwater resources will help mitigate the effects of drought and climate change to communities, farms, and the environment.

SGMA requires the formation of local Groundwater Sustainability Agencies (GSAs) and the development of groundwater sustainability plans to address the following “undesirable results” as defined in the Act:

- Chronic lowering of groundwater levels
- Degraded water quality, including the migration of contaminant plumes that impair water supplies
- Seawater intrusion
- Land subsidence that substantially interferes with surface land uses
- Reduction of groundwater storage
- Depletions of interconnected surface water that has significant and unreasonable adverse impacts on beneficial uses of the surface water

While California has a long history of managing a complex surface water storage and distribution system, managing surface water and groundwater as an integrated system presents some very distinct challenges. Surface water typically involves public agency control of storage and conveyance infrastructure, and groundwater often involves privately owned infrastructure and land, which can present a challenge for water managers as they attempt to fulfill SGMA’s requirements.

Fortunately, groundwater is being managed successfully in many places across the West, and much can be learned from case studies of groundwater management in these areas that include urban and agricultural settings. This report summarizes nine case studies of groundwater management in six states — Arizona, California, Colorado, Nebraska, Oregon, and Texas — and presents key lessons learned in an effort to inform and foster effective groundwater management in California.

Groundwater Management Strategies

The case studies presented in this report focus on the tools and actions water managers use to directly influence water use and availability and could be considered for inclusion in GSA sustainability plans.

Tools Used to Achieve Management Goals

Groundwater management districts featured in the case studies generally rely upon a suite of interdependent tools rather than a single policy or regulation to influence water user behavior. Groundwater management tools fall into four distinct categories: regulatory tools, incentive-based tools, agency supply augmentation and protection, and education and outreach. Specific tools are described in the case studies included in the appendix and, in every case, multiple tools are used simultaneously.

Regulatory Tools

Regulatory tools often form the backbone on which more sophisticated incentive-based tools are built. Regulatory tools require water users to take certain actions and are not intended to provide direct incentives, financial or otherwise, for water users. Examples include metering of wells (whether self-reported or monitored), best management practices (BMPs) without cost-share, and moratoria on new wells.

- Moratoria (or limits) on new wells or irrigated acreage
- Permitting system for wells
- Quantified and allocated irrigation or pumping rights
- Certification of irrigated acreage
- Metering of wells (self-reported or monitored)
- BMPs without cost-share (user pays)
- Continuing education requirements

Management Categories

Regulatory Options

Groundwater Management

Financial Incentives

Incentive-Based Tools

Some groundwater management tools are designed to provide incentives to influence change in water use behavior. Taxes, fees, or surcharges, as well as energy management practices (i.e., load control), are examples of tools that provide financial incentives for behavior change. Other tools, such as land retirement projects, credit-based systems to offset new groundwater development, water transfer systems that allow individuals to move water use to where and when it is most needed (for example by trading groundwater storage credits or use permits within a specific geographic area), and landowner-led recharge, also rely on economic valuations of water or underlying land assets for users who participate. In instances where groundwater managers seek to encourage users to adopt best management practices, cost-sharing programs can also provide financial incentives to participate while also fostering trust between users and managers.

- Taxes, fees, or surcharges
- Land retirement projects
- Managed aquifer recharge (land-owner is lead)
- Offset programs
- Transfer systems for credits, permits, or rights
- BMPs with cost-share
- Energy management practices (i.e. load control)

Agency Supply Augmentation and Protection Tools

Water managers often take additional actions at the district or regional level to achieve sustainable water use. Water supply augmentation and protection measures can support or supplement other management tools that more directly influence water user behavior. For example, water districts may pursue stream augmentation projects to enhance the effect of water user conservation on instream flows, or invest in water recycling systems that contribute to conjunctive use efforts by water users to recharge an aquifer. Conjunctive use efforts led by agencies — for example, construction and maintenance of dedicated recharge basins — also fall under this category.

- Stream augmentation projects
- Managed aquifer recharge
- Aquifer storage and recovery
- Infrastructure upgrades paid for by water supplier or rates
- Reservoir operations
- Seawater intrusion barriers
- Use of recycled water

Education and Outreach Tools

Water managers can help users better understand the consequences of their behavior and opportunities to improve groundwater sustainability via outreach and education initiatives. Efforts focused on highlighting current and future basin conditions and challenges, such as ongoing overdraft, can promote learning and enhance engagement within communities. Such tools can take many forms, including informational reports, guidance documents, and websites that aim to educate water users on best management practices or update community members on relevant management initiatives and activities. Targeted trainings, workshops, and conferences that engage participants around specific water-focused topics or the development of educational curriculum that advance water education in schools are additional examples.

- Educational programs and community engagement events
- Program reports and updates
- BMP guidance documents
- Data tools and informational websites

Overview of Case Studies

[The Full Report includes comprehensive] case studies [which] demonstrate groundwater management strategies formed in response to a variety of hydrologic challenges and social settings. The case studies bring together research and local insight on the management tools and actions various regions are using to address issues ranging from water quantity and quality to surface water depletion challenges. Tables B.1 through B.4 [pages 23 and 24] highlight prominent groundwater challenges faced across case studies, as well as key regulatory, incentive-based, and agency supply augmentation and protection tools used to address these challenges, respectively. All case studies also employ education and outreach tools to educate water users. While it is often difficult to pinpoint a single policy or tool responsible for the success of each program — and indeed, some of the cases have ongoing management challenges — the most prominent elements of each case study [are]:

Augmentation & Protection

Participant Engagement

Groundwater Challenges

Groundwater
Management

Safe-Yield Goal

Surface Water
Mitigation

Recharge

CASE STUDY 1 / ARIZONA: Phoenix Active Management Area

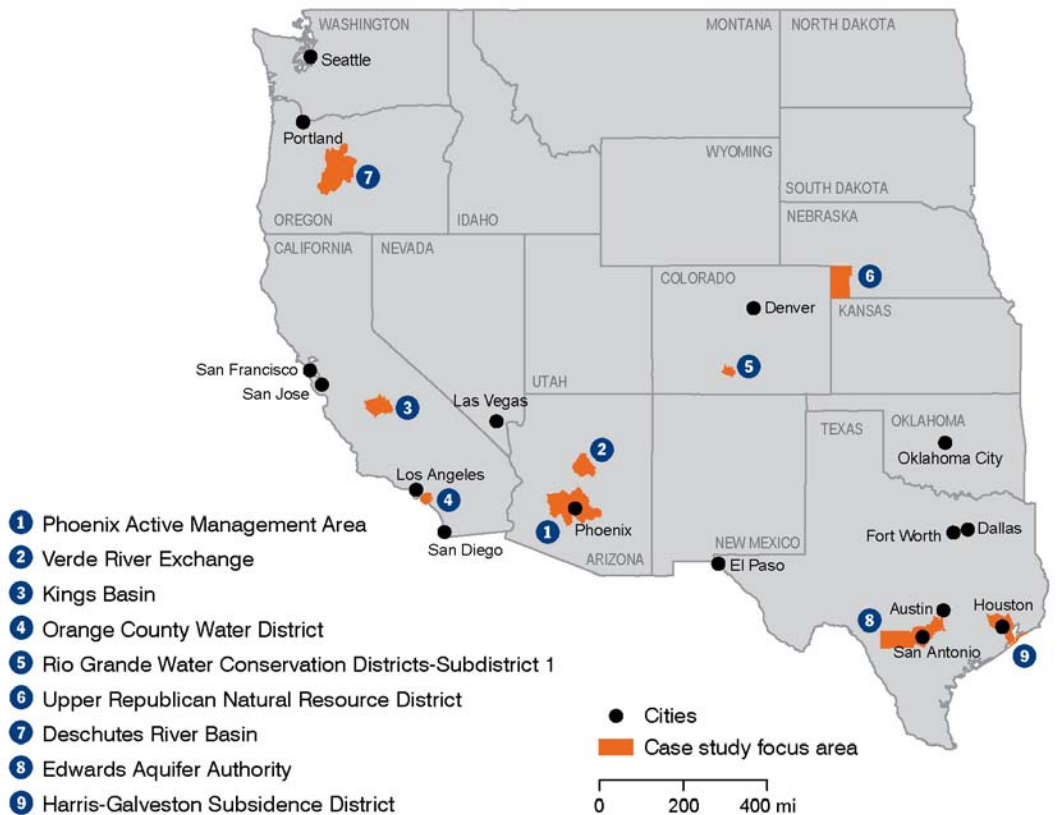
The Phoenix Active Management Area (AMA) encompasses a groundwater basin with agricultural and urban water uses. To address declining groundwater levels and land subsidence within the AMA, water managers established a goal to attain safe-yield, defined as the long-term balance between annual groundwater withdrawals and recharge, by 2025. To work toward this goal, AMA water managers developed a regulatory system to limit irrigated acres and established a system to enhance long-term storage through facilitated groundwater recharge, which takes advantage of conjunctive use mechanisms by using surplus surface water as recharge. While the AMA still struggles with localized areas of groundwater level declines, it has reached its overarching goal of safe yield for the basin. [See Buschatzke, *TWR* #32 and Megdal, *TWR* #104]

CASE STUDY 2 / ARIZONA: Verde River Exchange

Arizona's Verde River Valley supports historically dominant agricultural water uses and a rapidly growing, groundwater-dependent urban population. Significant increases in groundwater pumping have lowered groundwater levels in some areas and threaten Verde River surface flows. The Verde River Exchange, administered by local non-profit Friends of Verde River Greenway, is a community-driven, voluntary groundwater mitigation pilot-program designed to support continued development and growth, while protecting river flows and their cultural, economic, and ecological benefits in the region. To do this, the Exchange creates credits by incentivizing Verde Valley water users to voluntarily reduce their water usage. These credits can then be purchased by other Verde Valley water users seeking to reduce their water footprint and the impacts of their groundwater use. Launched in 2016, the Exchange could offer a scalable solution for mitigating the impacts of groundwater pumping on the Verde River and for stabilizing water supplies for future residents. [See Cronin, *TWR* #162]

CASE STUDY 3 / CALIFORNIA: Kings Basin

The Kings Basin is a predominantly agricultural region wherein water managers seek to mitigate groundwater quality degradation and groundwater level declines. To address these issues, the Kings River Conservation District has placed a strong emphasis on community engagement through data-driven educational outreach and other trust-building actions. The district assists growers in irrigation system reviews and water use efficiency and also uses dedicated recharge facilities and on-farm recharge to make use of floodwater. Recharge programs in the district have the capacity to recharge over 100,000 acre-feet annually and have helped reduce rates of groundwater level declines.

Overview map

Groundwater Management**Recharge & Recycling****Pumping Fee & Fallowing****Interstate Compact Requirements****Mitigation Bank****Pumping Caps & Water Trading****Usage Limits****CASE STUDY 4 / CALIFORNIA: Orange County Water District**

The Orange County Water District is situated in an almost entirely urban area, with 98% of water use going toward municipal and industrial sectors. The district goals are to protect and enhance groundwater quality and availability, which have been impacted by groundwater level declines and seawater intrusion. With no regulatory authority to control pumping, the district employs a pricing mechanism as an incentive for water retailers to purchase water imported from outside of the district rather than pumping groundwater. The District's innovative pricing scheme — in combination with basin recharge, seawater barriers, water recycling, and education and outreach initiatives — exemplify a portfolio of approaches that work together to promote cost efficiency, improved water quality and enhanced basin sustainability. [See Markus, *TWR* #59]

CASE STUDY 5 / COLORADO: Rio Grande Water Conservation District (Subdistrict No. 1)

Primarily an agricultural region, the San Luis Valley has experienced significant groundwater level declines. The Subdistrict manages water within its boundaries to mitigate stream depletion resulting from local groundwater pumping and thereby remain in compliance with an interstate water use agreement for the Rio Grande and Conejos Rivers. The Subdistrict places a fee on groundwater pumping to encourage irrigators to improve on-farm efficiency, switch to less water-intensive crops, and take advantage of the federal fallowing program Conservation Reserve Enhancement Program (CREP), which pays agricultural producers to take their land out of production permanently or for a certain period of time. The program has succeeded in recharging more water than required to offset surface water depletions.

CASE STUDY 6 / NEBRASKA: Upper Republican Natural Resources District

The Upper Republican Natural Resources District (NRD) manages groundwater level declines, surface water depletion, and groundwater quality degradation in an almost exclusively agricultural basin. Organized in 1972, the NRD uses multiple tools to mitigate groundwater declines and satisfy requirements of an interstate compact with Colorado and Kansas pertaining to surface water flows. Examples include a moratorium on drilling new wells, a well permitting system, "land occupation" taxes, a strict cap on groundwater pumping with both formal and informal water markets, and stream augmentation projects. The NRD also has strong community involvement and support for monitoring and enforcement in the District. [See Gilbert, *TWR* #107]

CASE STUDY 7 / OREGON: Deschutes River Basin

The Deschutes Basin aims to maintain instream water rights and scenic waterway flows while accommodating existing agricultural use and population growth through new groundwater development. To accomplish these goals and meet requirements of the state Scenic Waterways Act, the Deschutes Groundwater Mitigation Bank purchases existing surface water rights and sells corresponding mitigation credits to new groundwater pumpers. These mitigation credits have helped to preserve streamflow while allowing the approval of new groundwater permits in the basin. [See Griffiths, *TWR* #7 and Aylward & Newton, *TWR* #29]

CASE STUDY 8 / TEXAS: Edwards Aquifer Authority

The Edwards Aquifer program was established to manage and protect groundwater levels and groundwater-fed spring flows which are critical to the survival of several endangered species in the basin. The Edwards Aquifer Authority uses an aggregate cap on groundwater pumping for its mixed agricultural and urban user base, along with tradable permits to limit groundwater withdrawal. The Edwards Aquifer Authority encourages participation in a water trading market, which has resulted in the maintenance of minimum spring flows, despite a recent drought. Water trading has succeeded as an effective management tool by minimizing transaction costs, developing a functional online trading platform, limiting constraints as to how users divide their allocations, and establishing specific caps in state law. [See Frownfelter, *TWR* #1].

CASE STUDY 9 / TEXAS: Harris-Galveston Subsidence District

Water use in the Harris-Galveston Subsidence District is mostly industrial and municipal. The District is addressing land subsidence, groundwater level declines, and seawater intrusion by using fees and educational programs to encourage use of surface water in lieu of groundwater. Groundwater usage is limited to a percentage of an individual user's total water demand. If that percentage is exceeded, the user is subject to fees intended to discourage overuse of groundwater. While the district lacks a growth management strategy, rates of groundwater level declines have decreased.

[Editors' Note: The complete report contains the full Case Studies summarized above. The report is highly recommended reading for *TWR*'s subscribers for the details of the case studies, references, and links contained therein.]

TABLE B.1

Groundwater challenges across case studies

State	Management area	Dominant water use(s)	CHALLENGES ADDRESSED (SGMA UNDESIRABLE RESULTS)					
			Lowering of GW levels	Seawater intrusion	Land subsidence	Reduction of storage	Surface water depletion	Degraded GW quality
AZ	Phoenix AMA	Ag/Urban	•		•	•		•
	Verde River Exchange	Ag/Urban	•				•	
CA	Kings Basin	Ag	•			•		•
	Orange County Water District	Urban	•	•				
CO	Rio Grande Water Conservation District	Ag	•			•	•	
NE	Upper Republican NRD	Ag	•			•	•	•
OR	Deschutes River Basin	Ag/Urban					•	
TX	Edwards Aquifer Authority	Ag/Urban	•			•	•	•
	Harris-Galveston Subsidence District	Urban	•	•	•	•		

TABLE B.2

Regulatory tools used across case studies

Management area	REGULATORY TOOLS						
	Moratoria or limits on new wells/irrigated acreage	Permitting systems for wells	Quantified and allocated irrigation/pumping rights	Certification of irrigated acreage	Metering of wells (self-reported)	Metering of wells (monitored)	BMPs without cost share
Phoenix AMA	•	•	•	•	•		•
Verde River Exchange							
Kings Basin							
Orange County Water District					•		
Rio Grande Water Conservation District	•	•	•		•		
Upper Republican NRD	•	•	•	•		•	
Deschutes River Basin	•	•	•		•		
Edwards Aquifer Authority		•	•		•		•
Harris-Galveston Subsidence District		•	•		•	•	

The tables include information collected during development of this report and are not necessarily comprehensive of all challenges faced or management tools employed in each management area.

TABLE B.3

Incentive-based tools used across case studies

Management area	INCENTIVE-BASED TOOLS						
	Taxes, fees or surcharges	Land retirement projects	Managed aquifer recharge (landowner is lead beneficiary)	Offset program	Recharge, depletion or storage credits	Transfer of credits, permits or rights	BMPs with cost-share
Phoenix AMA					•	•	
Verde River Exchange				•	•		
Kings Basin			•			•	•
Orange County Water District	•						
Rio Grande Water Conservation District	•	•		•	•	•	
Upper Republican NRD	•	•				•	•
Deschutes River Basin	•			•	•	•	
Edwards Aquifer Authority				•		•	
Harris-Galveston Subsidence District	•						•

TABLE B.4

Agency supply augmentation and protection tools across case studies

Management area	AGENCY SUPPLY AUGMENTATION AND PROTECTION TOOLS						
	Stream augmentation projects	Managed aquifer recharge (agency lead)	Aquifer storage and recovery	Infrastructure upgrades (paid for by agency)	Reservoir operation	Seawater intrusion barriers	Recycled water
Phoenix AMA		•	•	•	•		
Verde River Exchange							
Kings Basin		•		•	•		
Orange County Water District		•		•	•	•	•
Rio Grande Water Conservation District	•	•		•			
Upper Republican NRD	•			•			
Deschutes River Basin	•			•			
Edwards Aquifer Authority	•		•	•			
Harris-Galveston Subsidence District				•	•		

Summary of Lessons Learned

IMPLICATIONS FOR SGMA IMPLEMENTATION

Groundwater Management

Recurring Themes

A review of the case studies reveals several lessons in effective groundwater management that coalesce around five recurring themes: the importance of building trust, the need for data to inform management decisions, using a portfolio of management approaches, assuring program performance, and having sufficient funding. These themes, as described below, can have significant implications for the successful implementation of California's Sustainable Groundwater Management Act (SGMA).

Building Trust

Groundwater management often requires asking people to change what they do in a way that has an actual or perceived financial impact. This requires establishing trust within that group of people — acceptance of a fair system that will allow them to use a sustainable amount of groundwater that supports their livelihood over the long-term.

Data Use

In addition to broad community involvement from the early stages of planning, there are specific things that water managers can do to build trust. Using data to illustrate current groundwater conditions and simulate future impacts can lend credibility to water managers, as well as create a sense of ownership in the future of the program. Water managers in the Kings Basin in California, for example, used data-driven groundwater models to convey how local areas and individuals' properties could be impacted by future groundwater declines. This educational approach enabled people to see and understand the connection between the goals of the program and their personal situation as landowners and agricultural producers who rely on groundwater to maintain their livelihood.

Sense of Ownership

A second method of trust building involves including key stakeholder groups within the community in the planning process so they can understand, support and vouch for the groundwater management program. In the case of Kings Basin, water managers included fisheries groups in the groundwater management process who used their positive past experiences with the community to build trust for the new groundwater policies.

Key Stakeholders

Cost-Sharing

Lastly, providing beneficial resources to the community can strengthen relationships with the same people affected by groundwater management programs. For example, the Upper Republican Natural Resources District manages recreational areas and provides the community with cost-sharing programs for planting trees intended for windbreaks. Such non-adversarial community programs have helped the District build trust and acceptance of challenging groundwater use restrictions in the face of interstate litigation.

Early Engagement

SGMA requires sustainability plans developed by a Groundwater Sustainability Agency (GSA) to include an explanation of GSA decision-making methodology and describe how the Agency encourages active involvement of stakeholders in that process. Arguably the most significant lesson learned from the case studies is that meaningful community and stakeholder engagement early in the process helps build trust and cooperation that leads to more effective groundwater management. And while the case studies demonstrate different ways to achieve trust between parties, they all involve building trust slowly and intentionally, which can be the difference between successful and unsuccessful groundwater management programs. [See DuPraw, et al. *TWR* #162]

The Need for Data

Transparency

As with the Kings Basin, the Edwards Aquifer Authority made water use data publicly available, which increased transparency and helped ensure buy-in from program participants.

Supporting Policies

In addition to using open data to build trust, data are also critical for effective decision-making. In the Upper Republic Natural Resources District, for example, irrigation wells in the District have been fully metered to measure water consumption since 1981 and the District has also maintained a groundwater well measurement database since 1972. Water level monitoring and water use tracking are used to detect trends and support groundwater policies.

Minimum Thresholds

One of the “undesirable results” that SGMA requires Agencies to address is the depletion of interconnected surface water. Minimum thresholds — the rate or volume of surface water depletions caused by groundwater use that has adverse impacts — need to be established and supported by sufficient data that inform computer models or equally effective methods of analysis. Regardless of the analytical method chosen, the case studies indicate that effective groundwater management largely depends on the gathering, management and analysis of sufficient water resources data.

Using a Portfolio of Approaches

Multiple Tools

Groundwater management cannot be achieved overnight, nor can it be accomplished by a single policy, regulation or project. It is important to recognize that multiple tools, added and built upon gradually, are necessary for successful groundwater management. In nearly every basin, including those featured in this report, advances in groundwater management begin with some form of permitting framework, tracking system, educational component, and revenue source for management. After these are in place, additional tools can be added based on local conditions.

Groundwater Management

Cap or Use

For example, prior to implementing a groundwater market in the Edwards Aquifer, groundwater managers had to first establish a system of groundwater pumping permits and then place a cap on overall groundwater use. Only after binding regulatory limits were placed on groundwater did the incentive arise to participate in rights transfers, which could be either permanent or temporary in nature. This example also illustrates that incentives can be a component of a groundwater management portfolio, but they require many other policies to support them. Furthermore, there are limits to what price mechanisms alone can do to reduce water demand, especially in California. While groundwater users may not be required to pay for water directly, they pay indirectly via energy costs and property taxes on irrigated land.

Wide Range of Actions

SGMA requires plans developed under the Act to include a description of the projects and management actions the Agency has determined will achieve groundwater basin sustainability. The lessons learned from the case studies clearly demonstrate the benefit of a portfolio approach to groundwater management. Agencies that include a wide-range of actions in their plans will greatly increase both their chances of success and the approval of their plans by the California Department of Water Resources (CDWR).

Monitoring & Enforcement

Assuring Performance

The case studies demonstrate the importance of sufficient monitoring networks and enforcement protocols. Any policy is only as good as the monitoring and enforcement behind it. Without adequate monitoring to detect noncompliance followed by subsequent enforcement measures, there will often be an inclination to ignore regulatory requirements. Monitoring and enforcement are an underappreciated aspect of groundwater management that incurs monetary, social, and political costs. This is especially true in areas where groundwater managers live and work alongside the very people whose actions they must manage. For this reason, it is critical to have political and community support, as well as sufficient financial and personnel resources, to carry out monitoring and enforcement. When routine meter inspection by the Upper Republican Natural Resources District revealed that a groundwater user was bypassing the flow meter to irrigate in excess of the allocated amount, the district revoked the violator's right to irrigate their land indefinitely, which resulted in a penalty of millions of dollars of potential crop revenue. The district received widespread support from the community for the decision because it trusted and supported the district's management of their valuable resource.

Plan Reviews

CDWR will periodically review approved SGMA Plans to ensure they remain consistent with the Act and are likely to achieve the sustainability goal for their respective groundwater basins. This review will include determining whether an Agency has 1) exceeded any established minimum thresholds, 2) implemented projects and management actions consistent with its Plan, and 3) addressed any data gaps to reduce levels of uncertainty.

Funding

Funding Sufficiency

It is difficult to imagine a scenario involving effective groundwater management without sufficient funding to carry out appropriate management actions. Virtually all of the case studies directly or indirectly demonstrate the need for sufficient funding to achieve groundwater management objectives. Whether it is the need for infrastructure to shift from groundwater use to surface water, as in the case of Harris-Galveston Subsidence District; the development and use of computer models employed by Kings Basin; the monitoring network established and maintained by the Edwards Aquifer Authority; or, the groundwater recharge facilities constructed and operated by Orange County Water District, they all required significant financial resources to achieve success.

Funding Mechanisms

When evaluating SGMA plans, DWR will determine whether the Groundwater Sustainability Agency has the financial resources necessary to implement the Plan. Even at their most basic level, GSAs, as envisioned under SGMA, require staff dedicated to engaging stakeholders and preparing groundwater sustainability plans to succeed. Beyond that, significant funding is necessary for implementing the projects and management actions contemplated in the SGMA plans. Securing sufficient funding will be one of the biggest challenges faced by many GSAs as they work to achieve sustainability, and the cases studies included in this report offer valuable insight on a variety of funding mechanisms being used across the west to support successful groundwater management.

FOR ADDITIONAL INFORMATION:

The Future of Groundwater in California: Lessons in Sustainable Management from Across the West
Full Report available at: www.edf.org/6JQ

CITATION: *The Future of Groundwater in California: Lessons in Sustainable Management from Across the West*. Prepared by the Environmental Defense Fund and the Daugherty Water for Food Global Institute, University of Nebraska. Babbitt, C., Gibson, K., Sellers, S., Brozović, N, Saracino, A., Hayden, A., Hall, M., & Zellmer, S. (Jan. 2018)

WATER BRIEFS

PFC POLLUTION: GM SETTLEMENT MN

On February 20, Minnesota Attorney General Lori Swanson announced that the State of Minnesota had reached a Settlement with 3M Company concerning water pollution arising from 3M's manufacturing of **perfluorochemicals (PFCs)**. The Settlement resolves an eight-year-old lawsuit (*Minnesota v. 3M*, Case No. 27-cv-10-28862, County of Hennepin, District Court) related to a 100 square mile underground "plume" of PFC chemicals in the East Metropolitan area of Minnesota's Twin Cities. For a number of years, 3M also dumped over 100,000 pounds of waste from its PFC manufacturing process per year directly into the Mississippi River.

Under the federal Toxic Substances Control Act, chemical companies are required to immediately notify the US Environmental Protection Agency (EPA) of information that reasonably supports the conclusion that their product presents a substantial risk of injury to health or the environment. In 2000, 3M admitted that it failed to report studies about PFCs' detrimental effects, sometimes for decades. In 2006, the EPA fined 3M \$1.5 million for withholding studies about PFC toxicity.

The State of Minnesota brought claims against 3M under the Minnesota Environmental Response and Liability Act (MERLA); the Minnesota Water Pollution Control Act (MWPCA); as well as various tort claims. The damages sought under MERLA were for injury to and destruction of natural resources. The damages sought under MWPCA were for loss or destruction of fish or other aquatic life. While many earlier PFC cases have emphasized health impacts, natural resource damages have not previously been a primary focus.

PFCs belong to a broad class of compounds known as **per- and polyfluoroalkyl substances (PFAS)** and are associated with immune, hormonal, and reproductive problems, including miscarriage and thyroid dysfunction. PFCs are widely used to make everyday products more resistant to stains, grease, and water. There remains widespread exposure to wildlife and humans. from several PFCs, including **perfluorooctanoic acid (PFOA)** and **perfluorooctane sulfonate (PFOS)**. PFOS is no longer manufactured in the United States, and PFOA production has been reduced.

3M made PFCs in its plant in Cottage Grove for use in nonstick cookware, fire extinguishers, and stain repellent. In 2004, traces of the chemicals were discovered in the drinking water of 67,000 people in Lake Elmo, Oakdale, Woodbury and Cottage Grove. Prior to the Settlement, 3M had already spent more than \$100 million removing the chemicals from groundwater, putting filters into city water systems and private homes, and paying other cleanup expenses.

Under the terms of the Settlement, 3M will provide an \$850 million grant to the State for a special "3M Grant for Water Quality and Sustainability Fund." This Fund will enable projects that support water sustainability in the Twin Cities East Metro region, such as continued delivery of water to residents and enhancing groundwater recharge to support sustainable growth. The projects will also result in habitat and recreation improvements, such as fishing piers, trails, and open space preservation. The company will pay up to another \$40 million to the Minnesota Pollution Control Agency (MPCA) to help affected communities with short-term drinking water solutions. If the \$890 million is exhausted at some point in the future and drinking water problems remain, the company will continue to pay to fix those problems under a 2007 consent order with the MPCA. Under the terms of the 2007 consent order, 3M agreed to pay for bottled water and in-home water filtration systems for private well owners whose groundwater had been contaminated by the PFCs that 3M manufactured. 3M will continue to pay for these expenses for at least the next five years. Long-term drinking water solutions will be paid for with funds from the grant. 3M will also continue to pay for remediation costs at the three sites in Washington County where they disposed of these chemicals and have taken responsibility for long-term monitoring and cleanup.

The February Settlement followed seven years of intense litigation involving 27,000,000 pages of documents, the taking of approximately 200 witness depositions, over \$10 million dollars in tests, fees and costs, over 100 judicial hearings and conferences, and over 1,600 court filings. The Settlement gives 3M protection from future claims related to the litigation, 3M admits no liability, and certain case documents were sealed by the court at 3M's request.

For info: 2018 Agreement and Order: www.ag.state.mn.us/Office/PressRelease/20180221_3M.pdf.

2010 Lawsuit at: www.ag.state.mn.us/Office/PressRelease/PDF/3M/PDF_01.pdf

Minnesota AG's Summary of 3M Settlement: www.ag.state.mn.us/Office/PressRelease/201803_3M_SettlementSummary.asp

PFAS: EPA LEADERSHIP SUMMIT IN MAY US

On March 19th EPA announced plans to host a National Leadership Summit in Washington, DC, on May 22-23, 2018. The Summit is being held to identify actions regarding **per- and polyfluoroalkyl substances (PFAS)**. National Leadership Summit participants will work together to: share information on ongoing efforts to characterize risks from PFAS and develop monitoring and treatment/cleanup techniques; identify specific near-term actions, beyond those already underway, that are needed to address challenges currently facing states and local communities; and develop risk communication strategies. Using information from the National Leadership Summit and community engagement, EPA plans to develop a PFAS Management Plan for release later this year.

EPA has also updated the PFAS website to highlight ongoing work by the agency, including the development of additional toxicity values, analytical methods, and treatment options for PFAS in drinking water. Details on the National Leadership Summit and community engagement events will be posted on the website as materials become available.

For info: www.epa.gov/pfas

WATER BRIEFS

ERRATA

Some text and a table in last month's article "*Mitigating for Development*" (page 17) overlooked the distinction between average annual withdrawal limits of "wells" versus "connections. While the conclusion that the new annual limits in recent Washington State legislation have minimal impact on protected streamflows remain valid, some specific numbers are incorrect. Readers wishing to have a corrected page 17 emailed to them can email their request to thewaterreport@yahoo.com.

NAVAJO SETTLEMENT NM CHALLENGE REJECTED

On April 3, the New Mexico Court of Appeals (Court) issued a decision upholding a major settlement that allocated water rights to the Navajo Nation from New Mexico's largest river, the San Juan. *State ex rel. State Engineer v. San Juan Agricultural Water Users Assoc., et al.*, Case No. A-1-CA-33535 (April 3, 2018). The Court concluded that the "...Settlement was fair, adequate, reasonable, and consistent with the public interest as well as all applicable New Mexico and federal laws." *Slip Op.* at 32.

"Appellants recite several iterations of the theme that the Settlement was unauthorized or in violation of New Mexico law...that the Settlement violates the New Mexico Constitution's separation of powers...further contend that through the Settlement, Governor Richardson attempted to infringe the plenary jurisdiction of the New Mexico Courts under Article VI of the New Mexico Constitution." The Court's view, however, was that Appellants' arguments were totally unpersuasive: "This contention, like Appellants' entire appeal, is based on a failure to understand the nature of the relationship between Indian nations and the United States government as well as the structure of federalism. It is compounded by a misconception of New Mexico water law procedure and the role of the New Mexico State Engineer." *Id.* at 7-8.

Of particular importance is the Court's discussion in a section entitled

"State Law Limitations Do Not Control Navajo Water" (*see id.* at 12-20). First, the Court holds that Tribes are not required to prove immediate beneficial use to quantify their water rights. "As noted earlier, New Mexico state law does not control Navajo water allocations. We reiterate that to the extent Appellants are attempting to apply New Mexico water limitations in this instance, federal law has expressly pre-empted such state limitations." *Id.* at 12. The section contains numerous other citations and authority on settled law regarding "beneficial use" when tribal reserved water rights are concerned, as opposed to other water rights under state law.

The second part of the section, beginning at page 16, explains the *Winters* Doctrine and the "practically irrigable acreage" (PIA) standard used to measure the water reserved to the Navajo Nation under the Settlement Agreement. Ultimately the Court held:

In line with current judicial analysis, the district court herein recognized the fundamental purpose of the Navajo Reservation was to create a sustainable homeland for the tribe. Other than frequently repeating the PIA mantra, Appellants have offered no evidence or supportive authority to contradict the district court's finding. Indeed the only evidence to which this Court was directed by Appellants is consistent with that finding. *See* Treaty of 1868 art. XIII, 15 Stat. 667, 671 (stating that the Navajo tribe agrees to make the reservation "their permanent home"). The district court's decision regarding the proper measure of reservation water is therefore not an abuse of discretion.

Id. at 20.

The opinion next contains an important section addressing the standard to be applied for quantification of the Navajo Nation's water rights, entitled "The District Court Properly Applied the Fair, Adequate, and Reasonable Standard to the Settlement of the Navajo Indian Irrigation Project

(NIIP)." *See id.* at 20-23. Incorporating relevant law and the specific history of the Project, the Judge pointed out that, "[A]ppellants' argument that Congress statutorily adopted the agreed amount of 508,000 acre-feet, but secretly expected a state judge to compute the Navajo Nation's share based on a PIA calculation, flies in the face of this history." *Id.* at 22.

The Court's opinion also explores in detail the role of settlements in water rights adjudications, with particular attention to the federal aspects of tribal water rights. The decision deals with procedural aspects of the Settlement, including holdings on due process and discovery limitations, as well as statutory procedure in the New Mexico adjudication process.

Near the end of the opinion, the Court discussed various allegations raised by the Appellants — which were vehemently rejected by the Court. Although sanctions were not imposed (as reported in some news accounts), the Court nonetheless gave a thorough warning to the attorneys that such conduct would result in sanctions in the future. "The allegation that the court fraudulently substituted a fake hydrographic survey alleges a felony in New Mexico and is appropriately subject to judicial sanctions. ...Appellants' claims alleging willful misconduct by the district court are rejected, and Appellants' counsel is strongly admonished not to advance any such frivolous and unfounded accusations in the future." *Id.* at 30. "Truth is not a matter of convenience. ...Making such allegations [alleging ex parte contact with the judge] without offering a shred of proof is unprofessional and unethical. [citation omitted] Appellant's (sic) counsel is cautioned that, in the future, such unsupported accusations and evidence-free speculation will not be so politely addressed by this Court, but will instead result in sanctions." *Id.* at 31.

The opinion is recommended for Judge Bruce Black's citation of authority and discussion of the numerous legal points involved.

For info: Opinion available at: www.nmcompcomm.us/nmcases/NMCASlip.aspx

WATER BRIEFS

**TEXAS V. NEW MEXICO TX/NM
US INTERVENES AS PARTY**

On March 5, US Supreme Court Justice Neil Gorsuch delivered an opinion in *Texas v. New Mexico*, 583 U.S. ____ (2018), ordering that the United States be allowed to intervene as a party in the case. Gorsuch began his opinion with one of Will Rogers' witticisms — the Rio Grande is “the only river I ever saw that needed irrigation.” He then noted that the Supreme Court “face[d] only a preliminary and narrow question: May the United States, as an intervenor, assert essentially the same claims Texas already has? We believe it may.” *Slip Op.* at 1.

Justice Gorsuch set out the basic history of the Rio Grande Compact and noted the current dispute: “According to Texas, New Mexico is effectively breaching its Compact duty to deliver water to the Reservoir by allowing downstream New Mexico users to siphon off water below the Reservoir in ways the Downstream Contracts do not anticipate.” *Id.* at 3.

Justice Gorsuch began his discussion by noting the unique jurisdiction of the Supreme Court in Compact disputes. “The Constitution endows this Court with original jurisdiction over disputes between the States. See Art. III, §2.” *Id.* at 4. “Using that special authority, we have sometimes permitted the federal government to participate in compact suits to defend ‘distinctively federal interests’ that a normal litigant might not be permitted to pursue in traditional litigation.” *Id.* at 5. While alluding to the possible participation by the federal government in Compact suits, Gorsuch also clarifies the limitations. “But just because Congress enjoys a special role in approving interstate agreements, it does not necessarily follow that the United States has blanket authority to intervene in cases concerning the construction of those agreements.” *Id.* at 5.

The Court then listed four reasons that it believes allows the US to intervene in this case. “First, the Compact [between the states] is inextricably intertwined with the Rio

Grande Project and the Downstream Contracts.” *Id.* at 5. “Second, New Mexico has conceded that the United States plays an integral role in the Compact’s operation” due to its responsibility to deliver water “as required by the Downstream Contracts and anticipated by the Compact.” *Id.* at 6. The Justice stated that New Mexico also contended that the federal government could be sued by a State for interfering with the Compact’s operation. “Third, a breach of the Compact could jeopardize the federal government’s ability to satisfy its treaty obligations” to Mexico to deliver 60,000 acre-feet of water annually from the Elephant Butte Reservoir. *Id.* at 6-7. “Fourth, the United States has asserted its Compact claims in an existing action brought by Texas, seeking substantially the same relief and without that State’s objection.” *Id.* at 7.

“Taken together, we are persuaded these factors favor allowing the United States to pursue the Compact claims it has pleaded in this original action.” *Id.*

Justice Gorsuch limited the precedential value of this holding. “This case does not present the question whether the United States could initiate litigation to force a State to perform its obligations under the Compact or expand the scope of an existing controversy between States.” *Id.*

The case was remanded to the Special Master for further proceedings consistent with the opinion.

For info: Opinion at: www.supremecourt.gov/opinions/17pdf/141orig_f204.pdf

**RECYCLED WATER CA
AUGMENTING RESERVOIRS**

On March 6, the California State Water Resources Control Board (SWRCB) announced it had adopted water quality and other requirements to ensure the safe use of treated recycled water to augment surface water supplies. The new regulations set requirements for the quality of treated recycled water that can be added to a surface water reservoir that is used as a source of drinking water. The regulations also specify the percentage of recycled water

that can be added and how long it must reside there before being treated again at a surface water treatment facility and provided as drinking water.

In addition to water quality requirements, the regulations also require local water systems to engage the public in developing “surface water augmentation” projects. The regulations recognize that public education and maintaining public confidence in their water supplies are essential parts of a project’s success.

The March 6th action is SWRCB’s latest effort to develop uniform statewide rules allowing for the expanded use of recycled water to indirectly supplement existing drinking water supplies. In 2014, SWRCB set requirements for using treated recycled water to recharge groundwater. The same year SWRCB adopted statewide rules for outdoor uses of recycled water and for irrigating crops.

SWRCB is also working on regulations for “direct potable reuse,” in which treated recycled water is added directly into a drinking water system or into a raw water supply immediately upstream of a drinking water treatment plant. These rules are expected by 2023 after further research, expert consultation, and public engagement to ensure the regulations protect public health while increasing drinking water supplies.

The approval of the regulations for surface water augmentation streamlines the process for drinking water providers to diversify their water sources, in order to provide a relatively reliable, drought-resilient, and sustainable option for supplementing the water in a surface water reservoir that is used as a source of domestic drinking water supply.

Last year, SWRCB funded more than \$748 million worth of water recycling projects using Proposition 1 grant and loan funds, and low-interest loans from the Clean Water State Revolving Fund. These projects are projected to add 44,980 acre-feet of recycled water per year to California’s overall water supply portfolio.

For info: Miryam Barajas, SWRCB, 916/ 341-5263 or miryam.Barajas@waterboards.ca.gov

WATER BRIEFS

INSTREAM TRANSFER

CA

STORAGE RELEASES FOR FLOW

On March 28, the Humboldt Bay Municipal Water District (HBMWD or District) announced that it had been awarded a \$693,408 Wildlife Conservation Board Grant, which will be used to investigate dedicating a portion of HBMWD's water rights to instream flow for beneficial use. This stream flow dedication is intended to benefit fish and wildlife by increasing habitat for salmonids and special status species in the Mad River.

Funds will be used for scientific and engineering studies and permits that support a "Petition for Change" to the California State Water Resources Control Board, Division of Water Rights. Under California's "use it or lose it" water laws, HBMWD could possibly lose water rights due to non-use in 2029. The project supports codifying HBMWD's permits and water rights so that up to 25 million gallons per day (MGD) can be released from the R.W. Matthews Dam at flows and times that benefit salmonids and other special status species in the Mad River. Releases would be from the District's Ruth Reservoir, which is located approximately 48 miles southeast of Eureka.

Releasing a maximum of 25 MGD is approximately 30% of HBMWD's current water rights. During the height of the 2016 drought, unlike most other Californians, HBMWD customers enjoyed a three-year storage "buffer" even without very stringent water conservation measures.

The Water Resource Planning process began after the District's two large industrial customers (pulp mills on the Samoa Peninsula) closed. The mills had provided 60% of the District's revenue and their closing decreased revenues to the District, decreased District water use, and thus potentially impacted the District's water rights through the "use it or lose it" standard. Three water use goals were identified: protection of HBMWD's water rights; fiscal sustainability; and environmental sustainability.

For info: HBMWD website: www.hbmwd.com

WATERSMART FUNDING

US

WATER SUPPLY RELIABILITY

On March 19, the US Bureau of Reclamation (Reclamation) announced three fiscal year 2018 WaterSMART Program funding opportunities for Water and Energy Efficiency Grants, Small-Scale Water Efficiency Projects, and Water Marketing Strategy Grants, all of which are part of the Department of the Interior's WaterSMART program initiative. Through WaterSMART, Reclamation leverages federal and non-federal funding to work cooperatively with states, tribes, and local entities to plan for and implement actions to increase water supply reliability through investments.

Reclamation provides three types of grants through WaterSMART. The Water and Energy Efficiency Grants will be awarded to projects that result in quantifiable water savings and those which support broader water reliability benefits. Small-Scale Water Efficiency Projects will be awarded to small-scale water management projects that have been identified through previous planning efforts. Water Marketing Strategy Grants will be awarded to entities exploring actions that can be taken to develop or facilitate water marketing.

States, Indian tribes, irrigation districts, water districts, and other organizations with water or power delivery authority located in the Western United States or United States Territories are eligible to apply for these funding opportunities. The project funding opportunities include financial assistance provided by Reclamation under its WaterSMART Grants program on a 50/50 cost-share basis.

Applicants for Water and Energy Efficiency Grants must submit their proposals by May 10th. Applicants for Water Marketing Strategy Grants must submit their proposals by July 18th. Applicants for Small-Scale Water Efficiency Projects must submit their proposals by July 31st.

For info: WaterSMART website at: www.usbr.gov/watersmart/

TREATMENT AS STATE

CO

SOUTHERN UTE TRIBE

EPA has approved the Southern Ute Indian Tribe's application to assume responsibilities associated with the Clean Water Act's Water Quality Standards and Certification programs. These programs will enable the Southern Ute Tribe to establish the regulatory and scientific foundation for protecting water quality, setting water quality goals and also serve as the regulatory basis for establishing water quality-based treatment controls and strategies for the Tribe's surface water bodies on tribal trust lands. The Southern Ute Tribe applied to EPA for Treatment in a Similar Manner as a State (TAS) for the Clean Water Act (CWA) Section 303(c) Water Quality Standards and 401 Certification programs for all currently held tribal trust lands. The CWA Section 401 Certification program requires the Tribe to certify that permitted discharges to its waters will comply with its water quality standards whenever entities apply for a discharge permit under the CWA.

Several federal environmental laws, including the CWA, authorize EPA to treat eligible federally recognized Indian tribes in a similar manner as a state for implementing and managing certain environmental programs. The basic requirements for applying for TAS are that the tribe must be Federally recognized; have a governing body carrying out substantial governmental duties and powers; have appropriate authority; and be capable of carrying out the functions of the program.

The Southern Ute Tribe has previously been granted TAS status for: CWA Section 106 (Water Pollution Protection); CWA Section 314 (Clean Lakes); CWA Section 319 (Nonpoint Source Program); and for Clean Air Act (CAA) Section 105. The Tribe also implements the 40 C.F.R. Part 70 Operating Permit Program under the CAA.

For info: Lisa McClain-Vanderpool, 303/ 312-6077, mcclain-vanderpool.lisa@epa.gov or <https://go.usa.gov/xQCMf>

April 16-18 FL 36th Annual ABA Water Law Conference, Orlando. Hilton Bonnet Creek. Presented by Section of Environment, Energy & Resources. For info: https://shop.americanbar.org/ebus/ABAEventsCalendar	April 24-25 WA Lake Roosevelt Forum Conference, Spokane. Davenport Hotel. RE: Columbia River Treaty, Upper Columbia Fish Reintroduction. For info: www.lrf.org	May 8-11 CA Association of California Water Agencies Spring Conference & Exhibition, Sacramento. Sacramento Convention Center. For info: www.acwa.com/events	May 23-24 NY 5th World Conference on Climate Change & Global Warming: "Abrupt Impacts of Climate Change", Queens. Hilton New York JFK Airport. For info: https://climate.conferenceseries.com
April 17 TX Climate, Ocean & National Security with Rear Admiral Jonathan White - 2018 People & Nature Speaker Series, Houston. Museum of Fine Arts, 6-8:30 pm. Presented by HARC - Houston Advanced Research Center. For info: nature.harcresearch.org	April 24-26 CO FLOW 2018: Managing Rivers, Reservoirs, and Lakes in the Face of Drought - Practical Tools & Strategies for Sustaining & Protecting Ecological Values of Water, Fort Collins. Hilton Hotel. Presented by the Instream Flow Council. For info: www.instreamflowcouncil.org	May 9 OR Stormwater Summit, Eugene. Lane Community College. Presented by Oregon Association of Clean Water Agencies. For info: www.oracwa.org	May 24 WEB Economics of Sustainable Reservoir Sediment Management Webinar - Dr. George Annandale & Dr. Rollin Hotchkiss, WEB. 11 am - Noon MT. Sponsored by CIRES Education & Outreach and CIRES Western Water Assessment. For info: http://cires.colorado.edu/news/announcing-reservoir-sedimentation-management-webinar-series
April 17-18 DC National Water Policy Fly-In, Washington. Washington Court Hotel. Presented by National Association of Clean Water Agencies. For info: www.nacwa.org/conferences-events	April 26 WEB Permitting for Reservoir Sediment Management Webinar - Dr. Rollin Hotchkiss, WEB. 11 am - Noon MT. Sponsored by CIRES Education & Outreach and CIRES Western Water Assessment. For info: http://cires.colorado.edu/news/announcing-reservoir-sedimentation-management-webinar-series	May 14-17 CA CDSR/WSWC Workshop on Improving S2S Precipitation Forecasting and Pilot Projects, San Diego. DoubleTree Hotel - San Diego Downtown. Presented by California Dept. of Water Resources & Western States Water Council. For info: www.westernstateswater.org/upcoming-meetings	May 31-June 2 China Aquatech China 2018, Shanghai. National Exhibition & Convention Center. For info: www.aquatechtrade.com/china/
April 18 WEB Introduction to the Lower Duwamish Waterway Roundtable, WEB. Two Times: 11 am - 12 pm; 6:30 pm - 7:30 pm. Presented by EPA. For info: julie.congdon@epa.gov	May 2 DC Green Infrastructure Leadership Exchange: Annual Meeting 2018, Washington. Renaissance Washington, DC Downtown Hotel. For info: http://giexchange.org/about-the-exchange/2018-exchange-annual-meeting/	May 15-16 TX Environmental Trade Fair & Conference, Austin. Austin Convention Ctr. Sponsored by Texas Commission on Environmental Quality. For info: www.tceq.texas.gov/p2/events/etfc/etf.html	June 3-7 MN World Environmental & Water Congress Conference, Minneapolis. Hyatt Regency Hotel. Presented by American Society of Civil Engineers. For info: www.ewricongress.org
April 20 OR Oregon Water Conference: Clean Water Act + Water Quality, Portland. World Trade Center Two. For info: Holly Duncan, Environmental Law Education Center, 503/ 282-5220, info@elecenter.com or www.elecenter.com	May 2-4 AZ Arizona Water Association's 91st Annual Water Conference & Exhibition, Phoenix. Phoenix Convention Center, South Building. For info: www.azwater.org (Events > Annual Conference)	May 15-16 CA Emerging Water Technology Symposium - 6th Biennial, Ontario. DoubleTree Hotel. Presented by Alliance for Water Efficiency. For info: www.iapmo.org	June 5-7 New Delhi (India) World Environment Expo - International Exhibition & Conference on Environment Protection Technology, Green Innovation, Clean & Green Energy, Eco-Friendly Products, Recycling & Waste Management, Pragati Maidan. Concurrent Events: World Environment Protection Congress (WEPC 18). For info: www.worldenvironmentexpo.com
April 22-25 FL GIS and Water Resources X Conference, Orlando. Rosen Centre Hotel. Presented by American Water Resources Association. For info: www.awra.org	May 2-4 AZ Arizona Water Association's 91st Annual Water Conference & Exhibition, Phoenix. Phoenix Convention Center, South Building. For info: www.azwater.org (Events > Annual Conference)	May 16-18 OR Pacific Northwest WaterReuse Conference, Portland. Sheraton Portland. Presented by WaterReuse. For info: https://waterreuse.org/news-events/conferences/waterreuse-pacific-northwest-annual-conference/	June 6 WA Northwest Climate Change Conference: Impacts + Adaptation, Sea Level Rise & Extreme Weather, Seattle. TBA. For info: Holly Duncan, Environmental Law Education Center, 503/ 282-5220, info@elecenter.com or www.elecenter.com
April 23-26 TX Texas Water 2018 Conference, San Antonio. San Antonio Convention Center. Presented by Texas Section AWWA - American Water Works Association. For info: www.txwater.org	May 8 WY Wyoming Water Forum: Ramesh Sivanpillai, WyGISC. "LANDSAT Missions and Water Data", Cheyenne. Wyoming Water Development Commission at 6920 Yellowtail Rd. Presented by Wyoming State Engineer's Office. For info: http://seo.wyo.gov/interstate-streams/water-forum	May 21-22 NY 17th International Conference on Industrial Chemistry & Water Treatment, Queens. Hilton New York JFK Airport. For info: www.NyEventsList.com	



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June 7-8 **CO**

39th Annual GWC Summer Water Conference: What Lies Beneath? Reasons to Care About Groundwater in the Southwest, Boulder. University of Colorado School of Law, Wolf Law Bldg., Wittemyer Courtroom. Presented by the Getches Wilkison Center. For info: www.colorado.edu/law/research/gwc/events

June 7-8 **WA**

Climate Change in the Pacific Northwest, Seattle. John Davis Conference Center, 1201 Third Avenue. For info: Law Seminars Int'l, 206/ 567-4490 or www.lawseminars.com

June 11-12 **ID**

Idaho Water Users Assoc. Summer Water Law & Resource Issues Seminar, Sun Valley. TBA. For info: IWUA, 208/ 344-6690 or www.iwua.org/

June 11-14 **NV**

Innovating the Future of Water: Annual Conference & Exposition '18, Las Vegas. Mandalay Bay Convention Center. Presented by the American Water Works Association. For info: www.awwa.org/conferences-education/conferences/annual-conference.aspx

June 14-15 **WA**

Critical Developments in Water Law in Washington Seminar - 27th Annual Conference, Seattle. TBA. For info: Law Seminars Int'l, 206/ 567-4490 or www.lawseminars.com

June 20-21 **NM**

Environmental Conditions of the Animas & San Juan Watersheds 3rd Annual Conference, Farmington. San Juan College. Presented by the New Mexico Environment Department. For info: <https://animas.nmwrri.nmsu.edu/2018/>

June 20-21 **CA**

2018 California Water Boards Science Symposium: Adapting in the Face of Disruptive Landscape Change, Sacramento. Cal EPA, 1001 I Street, 9am-3:00 pm. Presented by the State Water Resources Control Board; Free - Registration Required. For info: www.waterboards.ca.gov/resources/data_databases/wq_science_symposium.shtml

June 21 **OR**

Managing Stormwater in Oregon Conference, Salem. Salem Convention Center. Presented by Northwest Environmental Business Council. For info: www.oregonstormwater.com

July 9-11 **TX**

Managing Transboundary Groundwater Conference, Fort Worth. Worthington Renaissance Fort Worth Hotel. Presented by American Water Resources Association. For info: www.awra.org

July 19-21 **BC**

64th Annual Rocky Mountain Mineral Law Institute, Victoria. For info: www.rmmlf.org/

July 20 **OR**

Agriculture Law Seminar, Bend. The Oxford Hotel, 10 NW Minnesota Avenue. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net