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Water Rights, Water Quality & Water Solutions in the West

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"USE IT OR LOSE IT" IN COLORADO WATER LAW

UNDERSTANDING CONSERVATION CONCERNS

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BACKGROUND

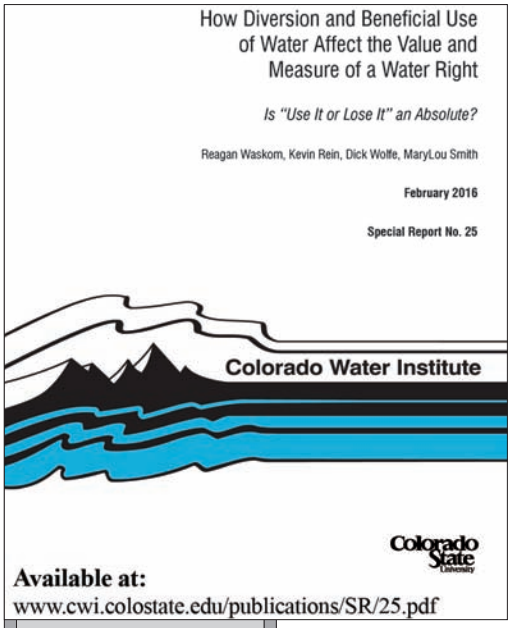
Throughout the American West, water use is predominately administered under western water law through a system of water rights which grants the right to use a specified amount of water for a recognized beneficial use or uses. Under this system, the phrase "use it or lose it" has come to refer generally to the possible forfeiture or abandonment of one's water right due to a period of non-use.

The Colorado Water Institute (CWI), while engaged in research and outreach activities related to agricultural water conservation, soon realized that concern about "use it or lose it" is often a substantial stumbling block to adoption of water conservation practices and technologies. Many water rights holders are concerned that not fully using their water right for its specified purpose(s) could adversely affect the amount of water covered under their water right.

In an effort to better understand how the term "use it or lose it" is being understood — i.e., under what circumstances the phrase is being used accurately and where it is being used erroneously — CWI convened, with the cooperation of the Colorado Division of Water Resources and the State Engineer, a twenty member stakeholder group composed of experts currently engaged with this issue throughout the State of Colorado. The group was made up of water attorneys, engineers, agricultural producers, and conservation group representatives. Over the course of three meetings, the group analyzed Colorado statutes and administration concerning this topic. Major points of agreement were reached as to what statements could be made in educational materials to clarify what the law actually has to say about "use it or lose it."

Various Colorado statutes address the topic, some specific to abandonment of a water right if it is not used, and others having to do with quantification of a water right in "change" or transfer cases, which involve a change of a water right. Since many water users are concerned that the value of their water right may be diminished by reduced use over time — for instance if they choose to divert less than their full decree for conservation purposes — the stakeholder group focused on all pertinent aspects of possible water right diminishment. The stakeholder group concurred that a better understanding of the law would allay some fear in the agricultural community, though they also pointed out that in some cases additional clarification (through new statutes, administrative practices or rulings) might be needed for greater assurance.

A CWI Special Report, *How Diversion and Beneficial Use of Water Affect the Value and Measure of a Water Right*: *Is "Use It or Lose It" an Absolute* (Special Report) was derived from the work of these stakeholder meetings. It is the hope of the Colorado Water Institute and Colorado's Department of Water Resources that the Special Report will provide a basis for further education and dialogue among water commissioners, water attorneys and engineers, water policy makers, agricultural water rights owners, and the general public. The Special Report is available for download online at: www.cwi.colostate.edu/publications/SR/25.pdf.



This article describes some aspects of the stakeholder group process and highlights major findings of the Special Report.

THE "USE IT OR LOSE IT" PRINCIPLE

Water rights in Colorado are based upon the principle that a water right is a legal right to beneficially use a portion of the public's water without waste or speculation (termed a usufructuary right). The term "use it or lose it" is commonly associated with the incorrect belief that by maximizing the amount of water diverted, regardless of the need, one can enhance or preserve the magnitude of a water right in a future transfer or protect it from some other reduction. Efforts to reduce diversions for conservation or efficiency purposes raise a similar concern for some people: that in reducing the amount of water diverted, some portion of the water right may be lost. Because of this, "use it or lose it" is commonly seen as a barrier to implementing water conservation measures and efficiency improvements.

STAKEHOLDER QUESTIONNAIRE & SOME RESPONCES

The stakeholder members were chosen for their experience and expertise, some legal, some agricultural, and some from conservation groups working with the agricultural sector to create options for mutual benefit from agricultural water as Colorado faces a looming gap between supply and demand.

Prior to the meetings, stakeholder-members received a questionnaire, which asked:

- In your experience, what are the contexts where the term "use it or lose it" is most in play and most likely to be misunderstood? Can you shed any light on the basis of the misunderstanding?
- In your opinion is the misunderstanding due to confusion in the law, the courts, or the administration of water rights?
- What do you think is needed to sort out the misunderstandings and to educate water users about our current law, policy and administration regarding "use it or lose it?"
- What would you like to accomplish at our meetings as we scope out these issues?

Responses to these questions reiterated the need for clarification and formed the basis for dialogue.

Some of the responses included:

- A quick review of Colorado case law reveals nowhere the actual phrase "use it or lose it" is used. The term is non-technical, imprecise, and perhaps uninformed.
- The concept is really a gross simplification of the legal theories of waste, abandonment, and maximum utilization. Colorado's law and jurisprudence encourage the beneficial use of Colorado's compact apportioned waters.
- I believe that the term "use it or lose it" is most misunderstood in the context of a water right owner trying to preserve the value of his/her water for a potential future sale of the right or future change of use adjudication. There seems to be an ingrained concept that a temporary reduction in headgate diversions automatically will result in a reduction of the amount a water right owner can divert and a corresponding reduction in the amount that can be sold or changed to other uses in the future.
- With regard to abandonment, clients often ask if their water right will be abandoned if they fail to divert and apply it every year. This is a misunderstanding, though I do advise them that failure to use the right could result in reductions in CU [**c**onsumptive **u**se] in a future change in use case.
- There is some confusion in the law, or at least inconsistent policies. While non-use for a period of less than 10 years does not raise a presumption of abandonment, you are penalized in the change in use context for it.
- There is often a feeling among irrigators that they would not want to increase efficiency and decrease diversions, because it would lead to a "reduction" of the water right in change in use cases. While theoretically, CU awarded in change in use should not decrease based upon changes in efficiency, this is sometimes not the case in application, depending upon how the engineering is done.
- The term is frequently used to refer to lack of flexibility in western water law as it relates to conservation, efficiency, and water transfers. Abandonment and forfeiture statutes are important, in part, to avoid speculation. They also may act as disincentives to conservation and/or efficiency practices that reduce consumption or diversion of water. Conservation, efficiency, and alternative transfers are at the forefront of discussions about drought and climate change, but misunderstandings about abandonment or a lack of exceptions to promote conservation goals limit participation. Some believe that temporary reductions in consumptive use for conservation program or transfer purposes may reduce the transferable quantity in a future change case. Others believe reductions in diversion rates while maintaining consumptive use may cause a water right to be placed on the abandonment list.

Incorrect Belief

Clarification Needed

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Use It or Lose It?

Abandonment Risk

- The misunderstanding seems to be due, primarily, to inconsistencies in water rights administration across the state. In turn, water lawyers reasonably urge their clients to avoid taking any action that might put them at risk of abandonment in the eyes of their local water administrators. Even if they are able to challenge placement on the abandonment list and are likely to eventually prevail, water court and administrative appeals can be expensive and time consuming.
- Consistency in administration is important, but local and regional conditions must also be taken into account. Education and outreach at the basin level should be the first step to determine how "use it or lose it" is applied and understood by water users on the ground. So long as the rules are clear, the water court and state engineer should retain enough authority to administer water rights flexibly to address changing needs and impacts of climate change.
- Conservation organizations constantly are looking for partners who irrigate land to determine if making voluntary modifications to irrigation practices might create opportunities to benefit flow-related ecological conditions in our State's rivers and streams. In the course of these exploratory conversations, we frequently encounter either questions or outright apprehension regarding "use it or lose it." Sometimes these reactions parrot things an irrigator may have heard from legal counsel. Sometimes these reactions reflect the folklore around water. Sometimes these reactions are directly attributable to conversations the irrigator has had recently or in the distant past with his/her water commissioner/ditch rider.

Concerns

- We've come to find that these misunderstandings seem grounded in several concerns, including: (1) a distrust of the government; (2) a concern that any existing protections will be revoked; (3) feeling that holding and saving water for later is the least risky/most prudent thing to do; and (4) that there are multiple sources of law, rather than one clear articulation.
- Education is always good, but the problem is that there is not a coherent story to tell, particularly about the interaction between our "use it or lose it" approach and increased efficiency.

BENEFICIAL USE

Western water law is rooted in the concept of beneficial use and Colorado is no exception. Colorado's constitution sets forth two key principles:

Public Property

ARTICLE 16 § 5. Water of streams public property

> The water of every natural stream, not heretofore appropriated, within the state of Colorado, is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided.

ARTICLE 16 § 6. Diverting unappropriated water — priority preferred uses

> The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied. …

Beneficial Use Defined

Colorado's 1969 Water Rights Determination and Administration Act Defines "Beneficial Use" as follows (C.R.S. § 37-92-103(4)):

> "Beneficial use" means the use of that amount of water that is reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made. Without limiting the generality of the previous sentence, "beneficial use" includes:
>
> (a) The impoundment of water for firefighting or storage for any purpose for which an appropriation is lawfully made, including recreational, fishery, or wildlife purposes;
>
> (b) The diversion of water by a county, municipality, city and county, water district, water and sanitation district, water conservation district, or water conservancy district for recreational in-channel diversion purposes; and
>
> (c) For the benefit and enjoyment of present and future generations, the appropriation by the state of Colorado in the manner prescribed by law of such minimum flows between specific points or levels for and on natural streams and lakes as are required to preserve the natural environment to a reasonable degree.

Actual Needs

Speculation

The policy rationale underpinning the beneficial use concept is straightforward. *See* Colorado Revised Statutes Section (C.R.S. § 37-92-602(4)). Individuals are permitted to make use of the state's waters, but only to the extent of actual need, as demonstrated by beneficial use. Without a beneficial use, the contingent right granted by the public to the appropriator ceases to exist. As a result, the water is left in the stream and available for others who are able to put it to good use. Multiple beneficial uses create economic opportunity and increase the standard of living for the community at large. Individuals who seek to "speculate" using the public's resource are exposed by their lack of beneficial use and promptly dismissed from the water rights market, leaving the water to bona fide users with the potential to make a meaningful contribution to the economy.

Use It or Lose It?

If the concept is straightforward, application of the doctrine of beneficial use in Colorado water law is complicated and many faceted. The manner in which beneficial use concepts are applied varies depending both upon the subject matter and the unique facts presented by each situation. Unfortunately, the phrase "use it or lose it" — perhaps a well-intentioned attempt to summarize these complexities into digestible form — has become an impediment to understanding rather than an aide. The phrase lends itself well to coffee shop conversations or interest pieces in western periodicals, but it is far too broad to provide meaningful insight into the doctrine of beneficial use as applied in Colorado. This lack of clarity generates conflict. Conversely, greater understanding of this issue increases the potential for resolution of water rights conflicts.

BENEFICIAL USE DOCTRINE APPLIED TO USE IT OR LOSE IT

Areas of Concern

The CWI led stakeholder group identified five major areas of concern within Colorado water law in which the doctrine of beneficial use is encountered: 1) Administration of Absolute Rights; 2) Administration of Conditional Rights; 3) Abandonment; 4) Change of Use; and 5) Implementation of Intentional Conservation or Efficiency Measures.

Concern 1. Administration of Absolute Rights

Absolute Rights

A water user must show diversion and application to beneficial use to achieve recognition of an absolute water right. In general, once a water right has been made absolute, the State and Division Engineers will not seek to limit the actions of the owner of the water right if they conform to the terms of the absolute decree. Absolute decrees and change of water right decrees state the place of diversion, type of use, and amount of diversion that can be made in the exercise of the water right. The place of the water right's use is either stated in the decree or derived from evidence of the appropriator's original intent in making the appropriation.

New Practices

New irrigation practices must not conflict with the provisions of the water right decree, provisions of an interstate compact, or any promulgated rules. In part, this concept was affirmed through Colorado Senate Bill (SB) 13-074, codified in C.R.S. § 37-92-305(4)(a)(I)(B) and C.R.S. § 37-92-503(9). However, while the State or Division Engineer will not limit the use of a water right based on an established maximum as long as the use does not exceed the limits specified in the decree, there may be situations where a water right's decree is unclear regarding the use and the water court may place limits on the use of the water right. This concept was also affirmed for wells in the Designated Ground Water Basins through SB 13-075, which protects wells from a reduction in the amount allowed through the final permit due to consideration of a reduction in the amount of water pumped if the reduction was for conservation purposes.

Well Permits

As to well permits for tributary or designated groundwater, absent abandonment or a change of water right, the Colorado Division of Water Resources (CDWR) does not seek to revoke or modify well permits based on non-use. Therefore, in general, a water user may use their full entitlement to water consistent with the terms and conditions of the decree or well permit even though there may have been previous and perhaps prolonged periods of non-use or diminished use. The Division Engineer and his or her staff are required to maintain records of the diversion and beneficial use of water. Any permanent change in the physical point of diversion, place of use, or a change in the type of beneficial use (such as agricultural to industrial) must be approved by the Division Water Court.

Increased Use within Decree Terms

Decree Terms

Absent abandonment, a change of water right, or wasteful practices, the water user may use the full entitlement to water consistent with the terms and conditions of the water right decree or well permit even though there may have been previous and perhaps prolonged periods of nonuse or diminished use. The State Engineer will not limit the actions of the owner of the water right altering past irrigation practices by diverting a larger amount of water, irrigating more land, irrigating a different crop, initiating a new application method, consuming a larger portion of the water right, or any combination of these (but not necessarily limited to these), as long as the new irrigation practice does not conflict with the provisions of the water right decree, provisions of an interstate compact, or any promulgated rules. However, the water right cannot be enlarged to include acreage not contemplated and the protective conditions contained in the decree to prevent injury to other water rights must be honored. In part, this concept was affirmed through SB 13-074, codified in C.R.S. § 37-92-305(4)(a)(I)(B) and C.R.S. § 37-92-503(9). If a decree is ambiguous on these issues, and it is asked, the water court will impose limitations based upon the intent of the original appropriator.

No Injury

Waste is Not Permitted

No Waste

The concept of waste is critical in water rights administration. Water commissioners evaluate this issue

Use It or Lose It?

"Duty of Water"

on a case-by-case basis at the time of diversion. C.R.S. § 37-92-502(2)(a) requires that "[e]ach division engineer shall order the total or partial discontinuance of any diversion in his division to the extent that the water being diverted is not necessary for application to a beneficial use… ." Proper application of this authority requires that the Division Engineer and the Division Engineer's staff understand the amount of diversion that is needed to accomplish a beneficial use without waste (generally referred to as the "duty of water"). For example, for an irrigation water right that means understanding the geographic-specific irrigation requirements since the duty of water may vary from one location to another. Water that is diverted above the amount necessary for application to a beneficial use (including necessary transit loss) is considered waste. Increased diversions for the sole purpose of maintaining a record of a larger diversion are considered waste. Wasteful diversions will either be curtailed, or will not be considered as a part of the water right's beneficial use. Water diverted to carry the consumptively used portion of a water right to the location where it is used is part of "the duty of water" and is not considered waste.

Concern 2. Administration of Conditional Rights

"Reasonable Diligence"

Colorado water law provides for the issuance of a decree for a conditional water right for a specific, non-speculative beneficial use. After the decree is issued, the water must be applied to the decreed beneficial use or the water right will be subject to consideration of "Abandonment of a conditional water right" and subsequent "termination" (C.R.S. § 37-92-301(1)). However, if that application to beneficial use has not occurred but the applicant has shown "reasonable diligence" in pursuing the perfection of the water right, the holder of the water right can make the showing of reasonable diligence to the court every six years to retain the conditional water right.

Change of Use

Colorado water law allows a non-speculative conditional water right to undergo a change of use proceeding even though there is not a record of historical consumptive use. According to C.R.S. § 37-92-103(5), "[t]he term 'change of water right' includes changes of conditional water rights… ." The standard for quantifying the amount of a conditional water right that may be changed is the "contemplated draft" of the water right. This standard includes consideration of what use was contemplated for the water right at the time of the conditional water right appropriation, further limited by the conditions that would have allowed greater or lesser use of the water.

Concern 3. Abandonment

Owner's Intent

Colorado water law provides that an absolute water right is subject to consideration of "abandonment" and subsequent "termination." This would occur as the result of the *intent* of the owner to discontinue the use of the water right in part or in whole for an extended period of time.

Abandonment List

A water right is subject to listing on the decennial abandonment list (issued in 2000, 2010, 2020, etc.) if the water has not been put to use for an extended period of time, typically ten years or more. Non-use does not necessarily constitute abandonment if there is no intent to abandon and/or the non-use is due to circumstances such as the destruction of the headgate in a flood. C.R.S. § 37-92-401(1)(c) states that the Division Engineer will use the guidance given in C.R.S. § 37-92-402(11), which states, "[f]or the purpose of procedures under this section, failure for a period of ten years or more to apply to a beneficial use the water available under a water right when needed by the person entitled to use same shall create a rebuttable presumption of abandonment of a water right with respect to the amount of such available water which has not been so used; except that such presumption may be waived by the division engineer or the state engineer if special circumstances negate an intent to abandon." The statute is clear that a water right can be considered abandoned in part. The Division Engineer would make this judgment based upon historical diversion records but this determination can be countered by evidence provided by the water right owner that there was no intent to abandon the right.

Partial Abandonment

"Special Circumstances"

In application, a periodic reduction or reductions that result from an effort to apply water more efficiently or to conserve the resource may be considered "special circumstances" that "negate the intent to abandon." Therefore, such efficiency improvements do not typically contribute to an abandonment determination by the Division Engineer. The owner of the water right should keep records of such efficiency or conservation actions to be used in the event any claim of abandonment is made.

Municipal Deference

Municipal and quasi-municipal water providers are charged with the *responsibility* to serve customers and the obligation to plan for future growth through the acquisition of water rights. Colorado law gives special deference to these water providers. This deference, known as the *Great and Growing Cities Doctrine*, allows water providers to acquire water rights for future use, within reasonable time and amount limits and, subject to reasonable diligence review proceedings, in a manner that does not conflict with Colorado's anti-speculation law. Thus, while municipal water supplies can in theory abandon water rights, in practice it is very rare because of the deference given to municipal water planning.

Use It or Lose It?

Consumptive Use

Return Flow

No Injury Rule

Representative Period

Diversion Analysis

Concern 4. Change of Use

Generally, in a water right transfer (change of water right) case, the true measure of the water right is its actual historical, beneficial **c**onsumptive **u**se (CU); in the case of an irrigation right, this is the documented annual crop evapotranspiration that can be shown to have been met by the water right, for a representative period of years. Thus, there is likely no real legal incentive to divert more irrigation water than is needed to satisfy what the crop will eventually consume plus necessary carriage water. Additional water diverted, over that amount needed to transport the water to its place of use, becomes ditch seepage and return flow from the farm — neither of which is part of the CU — and generally of no value in a change case. [EDITOR'S NOTE: "Return Flow" is water that returns to streams and rivers after it has been applied to beneficial use, either as a surface flow or as inflow from groundwater.] However, there remains a disincentive to practices that temporarily or permanently reduce consumptive use if the water right may be diminished in a future water right change case. Colorado SB 13-019 and other provisions now provide exemptions for participation in certain conservation programs but concerns, both real and imagined, persist in some circumstances.

Representative Study Period

The standard applied by the water court in a "change of water right" case is that the change cannot cause injury to other water rights and, more recently, the standard has included consideration that the change not cause an expansion of historical consumptive use. The measure of the historical consumptive use is typically the average consumptive use over a representative period of record. Using a representative study period for the determination of historical consumptive use helps ensure that the quantified water right is reflective of the amount averaged over a range of conditions.

What constitutes a "representative study period" may vary from case to case. Recently, water users did get some guidance as to what constitutes a representative study period through Senate Bill 15-183. SB 15-183 clarified what a representative study period is in three important ways. *See* C.R.S. § 37-92-305(3)(d). First, the representative study period should include wet years, dry years, and average years; second, the representative study period must not include undecreed use of the water right; and third, the study period need not include every year of the entire history of the water right.

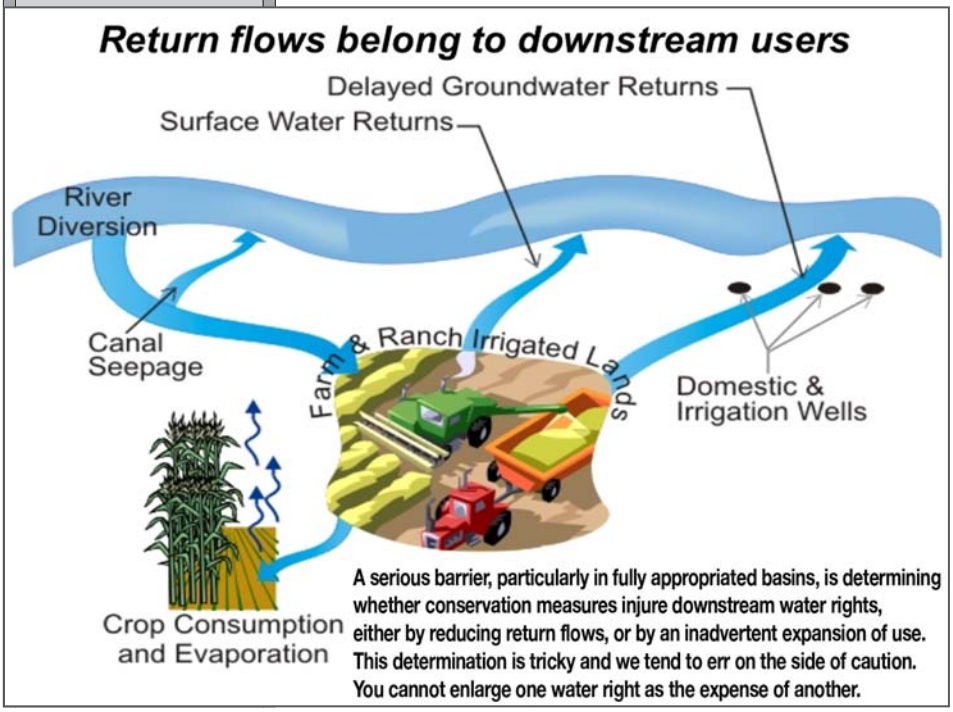
Statutory recognition of the representative study period concept provides assurance that parties intentionally diverting less as a part of a conservation program or making administratively approved uses other than the decreed use will not be penalized for these arguably "non-representative" uses. In addition to this general defense, many of these temporary uses benefit from specific statutory protections against unintended consequences in a change in use proceeding.

Diversion, Consumption, and Waste

While the measure of a water right can be clearly described as the amount of historical consumptive use, an analysis to determine that amount must include an analysis of the amount of diversion over the representative study period. The amount of diversion in and of itself does not necessarily result in a greater consumption. However, diversion records influence the analysis in at least two ways.

First, the amount of the diversion for the period of analysis is used to calculate an estimate of the amount of consumptive use, after consideration of transit losses and efficiency. In general, the amount of consumptive use allowed in a water right change is determined by reconciling the amount of water diverted, reduced for losses and efficiency considerations, with the amount of water that could have actually been consumed, for example, by irrigated crops for an agricultural water right. This practice leads to a determination of consumptive use that is theoretically not reliant on the amount of diversion, so long as sufficient supply was available to meet crop demand. However, in water short situations, higher diversions in the representative study period will translate to an increase in calculated CU.

Second, the amount of diversion represents the initial impact to the stream that results from the exercise of the water right. The owner of the water right may continue to impact the stream after a change of water right in the time, location, and amount of impact previous to the change case in the full amount of non-wasteful diversion, even if the entire



Use It or Lose It?

"Re-Appropriating" Return Flows

Actual Need

Efficiency Measures

Records

Conservation Programs

Fallowing

Instream Flow

Rotational Management

Conservation Reserve

amount diverted is not ultimately consumed. In practice, this allowance is implemented by allowing diversion and use of the diverted amount, while ensuring the maintenance of return flows in time, location, and amount.

Return flows may be "re-appropriated" by the change in use applicant, meaning, in practical terms, that the applicant seeks to keep the return flows whenever the priority call is junior to the date of the application for change in use. So, although consumptive use defines the senior right, the diversion amounts define the return flow appropriation. All things considered, an applicant re-appropriating return flows would prefer to have greater rather than lesser diversions, since this enables them to divert water they may be able to retain, depending upon the call. [Editor's Note: A "call" is made by a senior water user who is not receiving the full amount of his/her water right, requesting administration of the water available in the stream, resulting in curtailment of junior water users on a priority basis until the senior right is satisfied.]

This does not mean that a water user should divert decreed amounts, regardless of need. Some water users are advised by well-meaning individuals, including their legal counsel, that they should divert the entire decreed amount of their water right, whether it is needed for the particular use or needed at all, in order to preserve their water right. Taking such action is purported to protect a water right from abandonment and/or lead to the maximum value of the water right in a water right change proceeding. This conclusion is based on a misapplication of the law. First, if resources allow for proper administration, such diversions should be curtailed as wasteful in keeping with the language of the C.R.S. § 37-92-502(2)(a), above. Second, consumptive use is based on an analysis of the crop demand, not diversions, so diverting excess water will not yield additional consumptive use. Excess diversions will either be discounted as wasteful in the historical consumptive use analysis, or made a part of the return flow obligations of the applicant. Meeting return flow obligations is difficult for applicants. Increasing this obligation is not positive from an applicant's perspective. In sum, an increased diversion rate beyond what is necessary for the specific beneficial use is not helpful from a perspective historical consumptive use analysis. Therefore, while recognizing that the diversion amount is an important component in a water right change case, excess diversions beyond the duty of water may be curtailed and do not add to a water right's value in a change of water right case. These excess diversions do not lead to a calculation of a greater consumptive use amount, nor protect the excess portion of the water right for change in use purposes.

Concern 5. Implementation of Intentional Conservation or Efficiency Measures

Efficiency improvements do not typically contribute to an abandonment determination by the Division Engineer. However, as noted above — while the Division Engineer has authority to consider "special circumstances" that "negate the intent to abandon" — a long-term record of reduced diversions that result from efficiency efforts or other actions may ultimately be considered the permanent character of the water right and the reduction could be considered an "intent to abandon." In such a case, the reduction may be considered for abandonment. The owner of the water right should keep records of this type of efficiency action.

Recent changes in statutes provide protection for water rights if non-use is attributed to a formal conservation program or administratively approved change in use. SB 13-019 provides such protection to water rights in Divisions 4, 5, and 6. *See* C.R.S. § 37-92-305(3)(c) ("In determining the amount of historical consumptive use for a water right in division 4, 5, or 6, the water judge shall not consider any decrease in use" when the land on which the water from the water right has been historically applied is enrolled under a federal land conservation program or there is "nonuse or decrease in use of the water from the water right by its owner for a maximum of five years in any consecutive ten-year period as a result of participation in" certain water conservation, land fallowing, or water banking programs.)

Such programs include:

- Fallowing and Leasing Pilot Projects. *See* C.R.S. § 37-60-115(8).
- Temporary Instream Flow Loans. *See* C.R.S. § 37-83-105. In addition, the abandonment statute makes exceptions for no decreed use when water is loaned or contracted to the Colorado Water Conservation Board (CWCB) for instream flow use or there is nonuse due to water conservation, land fallowing, and water banking programs. *See* C.R.S. § 37-92-103(2)(a) and (b).
- Rotational Crop Management Contracts. *See* C.R.S. § 37-92-103(10.6) (definition); C.R.S. § 37-92-305(4)(a)(IV). ("A failure of a party to a rotational crop management contract who is not the owner of the irrigation water rights that are subject to the contract to put to beneficial use the full amount of water that was decreed pursuant to the application for approval of the contract shall not be deemed to reduce the amount of historical consumptive use that the owner of the water rights has made of the rights.")
- Substitute Water Supply Plans. *See* C.R.S. § 37-92-308
- Interruptible Water Supply Agreements. *See* C.R.S. § 37-92-309, C.R.S.
- Ground Water Commission's Designated Ground Water rules exclude from the computation of average historical use years of "limited or no irrigation" due to lands being placed into a federal set aside or conservation reserve program. *See* Ground Water Commission Rule 7.10.4, 3 Code Colo. Regs. 410-1.

Use It or Lose It?

Owner's Intent

Ambiguity Remains

Educational Process

DOCUMENTING INTENT

Diversion records in Colorado are maintained by the Division of Water Resources on a tool known as HydroBase. HydroBase is a central database that houses real-time, historic, and geographic data related to water resources in Colorado. HydroBase Online is the web-based access tool used to query water data (stored in HydroBase), such as streamflow, diversions, water rights, and much more. It can be accessed at http://cdss.state.co.us/onlineTools/Pages/OnlineToolsHome.aspx. One significant outcome of the "use it or lose it" dialog was the clarification by the Office of the State Engineer that HydroBase allows water rights holders to document their intent when diversions are reduced for any reason, but particularly when diversions were reduced for conservation or other measures covered under statute. Given that intent forms a primary basis for the determination of abandonment, the public education effort includes the recommendation that if there are reasons for reduced diversion, these should be documented and provided to the Division Engineer.

CONCLUSION: WHAT'S NEXT?

A key goal of the stakeholder group was to clarify what parts of the law are clear and where ambiguity exists. The group was asked to decide if they wished to work further on the task of determining the steps to provide clarity for ambiguous matters or if they wished to simply report on what they found is clear and what is ambiguous. They determined the latter, with the idea that another group, another time, might have the political will to tackle the challenge of clarifying any remaining items that are ambiguous. Indeed, a few members of the stakeholder group promoted the idea that it is good for these matters to remain ambiguous, because that ambiguity provides flexibility for engineers, attorneys, and the courts to take into consideration individual differences in circumstances.

An article in ProPublica published around the time the stakeholder group did its work was titled *Use It or Lose It: Across the West, Exercising One's Right to Waste Water*. Like the whole topic of "use it or lose it," most of the article hit the nail on the head (though a few inaccuracies did occur). Most importantly, the author, Abrahm Lustgarten, stated "[T]he effects of 'use it or lose it' laws are so significant that policy experts warn that western states won't be able to begin untangling larger issues of drought and conservation without dealing with it first."

Believing that statement to be at least partially true, the Colorado Water Institute (www.cwi.colostate.edu/), the Colorado's State Engineer's Office (http://water.state.co.us/Home/Pages/default.aspx) and stakeholders involved in this process are undertaking a statewide educational process. The intent is not to give definitive answers to every question, but rather to stimulate dialogue that could lead to some additional clarification down the road. Discussion panels have been staged for the Colorado Ag Water Alliance (http://coagwater.colostate.edu/index.aspx) and the Colorado Water Congress (www.cowatercongress.org/). The State Engineer is using the material in training sessions with staff. Future plans include presentations and dialogue with state water attorneys. One result of the stakeholder process was the Special Report mentioned above. Published by the Colorado Water Institute, the Special Report can be retrieved at www.cwi.colostate.edu/publications/SR/25.pdf.

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AG/MUNI WATER: ROTATIONAL LEASING-FALLOWING

COLORADO'S CATLIN PILOT PROJECT DEMONSTRATES LEASING-FALLOWING EFFECTIVENESS

by Leah Martinsson & Megan Gutwein, Berg Hill Greenleaf Ruscitti LLP (Boulder, CO)

Fallowing

"But-and-Dry"

Leasing & Fallowing

No Injury Rule

"Historical Consumptive Use"

Pilot Projects

Streamlined Approach

Catlin Pilot Project

Criteria & Guidelines

INTRODUCTION

Due to population growth and finite water resources, Colorado has been struggling with the adverse effects of agricultural dry-up ("buy-and-dry") as cities purchase agricultural water rights and permanently transfer that water to meet growing municipal demand. For some time, lawmakers and other stakeholders have been searching for alternative solutions to traditional transfers and changes of water rights in order to prevent buy-and-dry. Leasing-fallowing — in which irrigators forego watering parcels of land and lease the water temporarily to cities for municipal uses — is one of these alternatives. Leasing-fallowing is currently being tested in a pilot program operated by the Colorado Water Conservation Board (CWCB).

Certain concepts of Colorado water law that govern permanent changes of water rights in the Colorado water court system are also generally applicable to temporary changes of water rights through leasing-fallowing. Under Colorado law, changes of water rights are only permitted to the extent that they will not cause injury to junior appropriators. Injury is avoided by ensuring that the use of the changed water right is not expanded from the historical use and that the historic stream conditions are maintained. Thus, to avoid injury to other water rights, a water rights holder that seeks to change the use of their water right may only change the portion that was actually consumptively used — i.e., the "historical consumptive use." In the context of irrigation water rights, this is limited to that amount of water actually consumed by the irrigated crop. The remaining amount of any water that was diverted by that water right holder returned to the stream for use by downstream water rights as "return flows." In order to prevent injury and maintain stream conditions for junior appropriators, these return flows must be maintained in time, place and amount.

The Colorado legislature authorized the current leasing-fallowing program in passing House Bill 13-1248 (H.B. 1248) to encourage leasing-fallowing agreements in 2013. Colo. Rev. Stat. § 37-60-115(c)(III)-(IV)); Colo. Rev. Stat. § 37-60-115(8). H.B. 1248 built on the ashes of H.B. 11-1068, a similar idea that ignited a firestorm of opposition. This program was expanded in 2015 by Senate Bill 15-198 to allow for water made available from fallowing to be used for environmental, industrial, recreational, and other agricultural uses. Through the "Agricultural to Municipal Leasing-Fallowing Pilot Program," the CWCB may approve up to ten pilot projects, each lasting up to ten years, with no more than three projects in any major river basin. Colo. Rev. Stat. § 37-60-115(8). Projects must be approved by the end of 2018 and H.B. 1248 specifically prohibits transfers across the Continental Divide or out of the Rio Grande River Basin. *Id*. The purpose of H.B. 1248 is to develop and implement leasing-fallowing, hoping to stem permanent agricultural dry-up. *Id*. Furthermore, the pilot program is designed to demonstrate cooperation among water owners such as irrigators, ditch companies, and cities. A key aspect of the pilot program is to evaluate the feasibility of delivering temporary water to municipalities, using a streamlined approach for determining historical consumptive use and injury. CWCB, *Criteria and Guidelines for Fallowing-Leasing Pilot Projects (2016)* (hereinafter *Criteria and Guidelines*).

Pursuant to H.B. 1248, the Lower Arkansas Valley Super Ditch Company, Inc. (Super Ditch) and the Lower Arkansas Valley Water Conservancy District (Lower Ark) submitted an application for a leasing-fallowing pilot project called the Catlin Pilot Project in July of 2014, which the CWCB approved in January 2015. *See Criteria and Guidelines* at*:* http://cwcb.state.co.us/water-management/water-projects-programs/Pages/Fallowing-LeasingPilotProjects.aspx. The Catlin Pilot Project was created to make senior water rights available for the use of three municipal water providers, by rotating the fallowing of irrigated lands in the Lower Arkansas River Basin. This project is discussed in additional depth later in this article.

Criteria and Guidelines Governing Pilot Projects

H.B.1248 requires that the CWCB develop and adopt criteria and guidelines pursuant to which the pilot program is operated. The criteria and guidelines set forth the process and requirements for leasing-fallowing pilot project selection, application, and approval. *Criteria and Guidelines* at 2. In general, the application process consists of four steps: (1) submittal of a pilot project proposal to the CWCB; (2) submittal of a pilot project application to the CWCB; (3) written determination by the State Engineer; and (4) CWCB action. *Id*. at 5.

The initial proposal must contain: a description of the project; the proposed municipal, agricultural, environmental, industrial, or recreational use; and evidence showing that the project meets eligibility

Fallowing

Proposal Information

requirements, that all necessary agreements have been obtained or may reasonably be obtained, and that requirements of water conservancy or conservation districts have been considered. *Id*. at 5, 9. Project proposals should be narrative and should not include technical information.

Proposals must also contain sufficient information for the CWCB to evaluate:

- the specific water rights involved
- the land ownership and parcels to be fallowed
- the water source used to meet return flow obligations
- the process for delivering replacement and transferred water
- all necessary infrastructure

Id. at 9.

CWCB Consideration

After a thirty-day public comment period, the CWCB will consider the proposal for selection at its next scheduled meeting occurring at least sixty days after receiving the proposal. *Id*. at 5. The CWCB may then select the project (making it eligible to apply for approval), request more information, or deny the proposal. *Id*. In selecting pilot projects, the CWCB must give preference to projects that would use existing infrastructure. *Id*. at 8.

Application Submission

Once a proposal is selected, the project sponsor must submit a full application with supporting technical information to the CWCB. *Id*. at 6. The application must provide evidence regarding historical irrigation of the lands included in the proposed pilot project, include a historical consumptive use analysis, and demonstrate how historical return flows will be replaced to prevent injury. *Id*. at 11. The historical consumptive use analysis and calculation of return flows must be done using the Lease-Fallow Tool (discussed below). *Id*. at 11.

CWCB Approval (Terms)

Upon submittal of a complete application, the CWCB must accept comments on the application for sixty days. During that time the applicant or State Engineer may hold two informal meetings between interested parties to discuss concerns. *Id*. 6. Within thirty days after the comment period, the applicant, State Engineer, and water rights owners who filed comments on an application must hold a conference and file a joint report describing agreed-upon terms and conditions and reasons for not agreeing to any other term or condition. *Id*. Taking into consideration the agreed-upon terms and conditions in the joint conference report, the State Engineer must determine in writing whether the project can operate without causing injury within thirty days, or within fifteen days of the close of the comment period if no comments are received. *Id*. Additionally, projects must meet local land use regulations, prevent erosion, and comply with noxious weed requirements, which help mitigate the potential negative effects of fallowing land. *Id*. at 16. Subject to adoption of all terms and conditions in the State Engineer's determination, the CWCB may approve the pilot project at its discretion. The CWCB may also adopt any additional terms and conditions at its discretion. *Id*. at 6.

THE LEASE FALLOW TOOL: SPREADSHEET MODEL

Consumptive Use v. Return Flow

Conservation Assumptions

An important aspect of the H.B. 1248 pilot program is use of the Lease Fallow Tool (LFT) to calculate historical consumptive use and return flow obligations. This streamlines and simplifies the technical analysis needed to support a leasing-fallowing project. H.B. 1248 and the criteria and guidelines require that applicants use the LFT. *Id*. As discussed further below, the trade-off for providing a more simplified approach to these calculations through use of the LFT is that the LFT uses conservative assumptions for factors such as irrigation efficiency that underestimate historical consumptive use and correspondingly overestimate historical return flows. This virtually eliminates the risk that leasing-fallowing projects will injure other water users or violate Colorado's interstate obligations. (*See* Britt Banks and Peter Nichols, *A Roundtable Discussion on the No-Injury Rule of Colorado Water Law*, The Colorado Lawyer 44(7) p. 91 n.10 (2015)).

Regional Model (LFT)

The LFT is a spreadsheet-based model developed from the Irrigation Systems Analysis Model (ISAM) by the Colorado Division of Water Resources (CDWR) in collaboration with a technical committee consisting of private water engineers representing a broad range of water rights owners through an open public process. *See*, *In the Matter of the Proposed Compact Rules Governing Improvements to Surface Water Irrigation Systems in the Arkansas River Basin in Colorado*, Case No. 09CW110 (Water Div. No. 2, Oct. 25, 2009). The ISAM is a peer-reviewed computer program developed by CDWR to compare monthly water budgets of surface water irrigation systems — with and without an improvement — in order to evaluate the impacts of an improvement to a surface water irrigation system located in the Lower Arkansas Basin. DWR developed ISAM over a number of years with input from the advisory committee of water engineers. It is considered a conservative model and has been in use for five years to analyze irrigation changes for over 100 farms annually. Its distinct advantage is that it has eliminated the need for individual modeling of each farm. *Id*.

Fallowing

Simulation & Evaluation

The LFT operates in two basic steps. First, the user inputs data for every parcel of land that might be fallowed using a Microsoft Excel interface. Second, the LFT runs this data through the ISAM model to simulate historical water balance and calculate return flows using background code (as opposed to the analysis being completed within the Excel spreadsheet), subject to the conservative assumptions set forth in the criteria and guidelines. *User Manual* at 4. This analysis generates a results page and summary tables. *Id*. In order to simplify evaluations, the LFT supplies input databases, but the user may also use a blank sheet to enter and personalize the data. *Id*. The LFT does not calculate the location where return flow obligations must be made or evaluate the sufficiency of supplies available to meet return flow obligations. Rather, that must be part of the application and determined in conformance with the requirements of the criteria and guidelines. *See* References below for details on accessing the LFT and the LFT *User Manual*.

The Catlin Canal Company Pilot Project

Temporary Municipal Water

After its proposal was selected, Lower Ark and the Super Ditch submitted an application to the CWCB in September 2014 for a leasing-fallowing pilot project. This pilot project was approved by the CWCB in January 2015. The Catlin Canal Company Pilot Project (Project or Catlin Pilot Project) uses shares in the Catlin Canal Company to supply up to 500 acre-feet annually of temporary municipal water to the Town of Fowler, the City of Fountain, and the Security Water District during the ten-year approval period. (*See* Martin and Wood Water Consultants, Inc., *Letter Report Re: HB 13-1248 Catlin (Fallowing-Leasing) Pilot Project 1* (September 25, 2014); (hereinafter *Application*)).

Water Rights

The thirty-five mile long Catlin Canal diverts water from the Arkansas River approximately 44 miles downstream of Pueblo Reservoir. *Application* at 1. The Catlin Canal Company owns three water rights with appropriation dates of 1875, 1884, and 1887 that were all adjudicated in 1905. *Id*. at 2. The company has a total of 18,660 outstanding shares that irrigate between 17,000 and 18,660 acres, so one share has historically irrigated between 0.85 and one acre of land. *Id*. The Catlin Pilot Project uses shares that historically irrigated six "Participating Farms" that collectively have committed 1046.83 shares historically used to irrigate 902.2 acres, or approximately 0.86 acres per share to the Project. Lower Arkansas Valley Water Conservancy District, *2015 Annual Report* (hereinafter *Annual Report*). As required by the criteria and guidelines, each of the Participating Farms will fallow no more than 30% of its acreage per year to allow for continuous operation during the ten-year term of the pilot project. *Application* at 6. The Colorado Decision Support System (CDSS) mapping was used to develop historically irrigated acreage for the Participating Farms. *Id.* at 4.

Fallowing Limitation

Calculations

In order to calculate historical consumptive use and return flow obligations, Lower Ark and the Super Ditch used the LFT. In accordance with the criteria and guidelines, the presumptive factors used in the LFT run for the Participating Farms were:

- Farm Efficiency - 55%
- Soil Moisture – six inches (root depth of four feet, AWC 12.5%)

Other factors used in the LFT run are as follows:

- Ditch Loss – 10.4309% per Arkansas River Hydrologic Institute ("HI") Model (see References).
- Off-Farm Lateral Losses – 3.5% per HI Model. *Id.* at 4.

System Losses

While the Farm Efficiency and Soil Moisture factors are conservative, the remaining listed factors are generally considered representative for this ditch (Personal Communication: Craig Lis, Senior Water Rights Engineer, Martin & Wood Water Consultants, Inc. (March 21, 2016). In compliance with the criteria and guidelines, the applicants also used: the Modified Blaney-Criddle and TR-21 crop coefficients (also considered conservative); the weather station nearest to the headgate; thirty years of diversion records; cropping patterns based on county cropping records; and the US Bureau of Reclamation effective precipitation method — all of which were input into the LFT. *Application* at 4. The study period for the Participating Farms consisted of 1984 through 2013, the most recent period from which diversion records are available. The LFT results indicated that the shares proposed for fallow in 2015 would yield on average 477.5 acre-feet of consumptive use. *Id.* at 6.

Study Period

Return Flow Obligations

The criteria and guidelines provide that return flow obligations for all pilot projects will be calculated based on an assumed percentage split of 20% surface (tailwater) return flows and 80% groundwater (deep percolation) return flows. The required return flows are calculated using the LFT and must be met by the Project in time, place, and amount. The Project maintains these return flows through the diversion of water at the Catlin Canal headgate followed by release to the stream and through use of two recharge facilities. *Id.* at 13. In addition, releases from upstream storage (Pueblo Reservoir) may be made to replace return flows if needed. *Id.* at 15. Maintenance of these return flows is necessary to ensure that historical stream conditions are maintained and that water historically returning to the stream is available for junior

Historical Conditions

Fallowing

Injury Issues

appropriators. This requirement is designed to ensure that other water users are not injured by operation of the Project. Because the LFT uses conservative assumptions that underestimate historical consumptive use and overestimate return flows, its use reduced injury disputes during the application process and also reduced the engineering costs associated with preparing information needed to obtain the approval. *See* Banks and Nichols, *A Roundtable Discussion on the No-Injury Rule of Colorado Water Law,* infra.

Municipal Pumping

Under the Catlin Pilot Project, the Town of Fowler uses water made available through the Project to replace stream depletions owed for increased pumping of its wells. Fowler uses the additional water to allow for outdoor lawn watering during the irrigation season. *Application* at 17. These wells are already covered by a Rule 14 plan (Rule 14 plans are a means of ensuring compliance with the Arkansas River Compact by replacing certain well depletions with various sources of dedicated water). Therefore, Catlin Pilot Project water is dedicated to that Rule 14 Plan to augment Fowler's additional well depletions. *Id*.

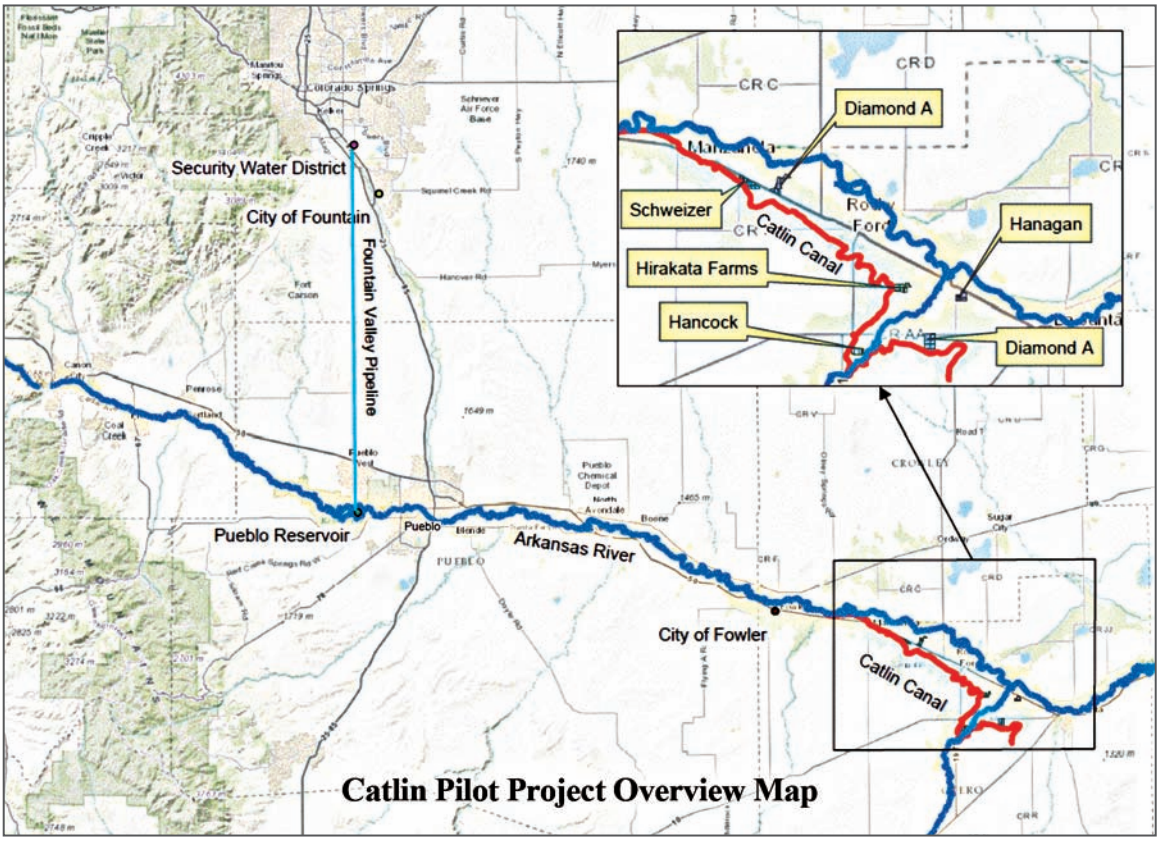
"Exchange" to Storage

Catlin Pilot Project water that is made available to the City of Fountain (Fountain) and the Security Water District (Security) to bolster municipal supplies is delivered via an "exchange" of water into Pueblo Reservoir. Both Fountain and Security take delivery of their water in Pueblo Reservoir, from which they transport it to their municipal systems through the Fountain Valley Conduit. *Id.* at 20. Operation of an exchange to make these deliveries is necessary at the Catlin Canal headgate — where water available to the Catlin Pilot Project is diverted — which is located far downstream of Pueblo Reservoir. Through an "exchange," an upstream user can divert water that belongs to a downstream user as long as substitute water supplies are provided at the appropriate time, place, quantity, and quality to fulfill the water rights of a downstream user. *See* Justice Gregory J. Hobbs, Jr., *Citizen's Guide to Colorado Water Law* 15 (2004). Therefore, the Catlin Pilot Project's use of an exchange allows for water to be stored upstream in Pueblo Reservoir in exchange for the substitution of water that is delivered through the Catlin Canal headgate and then returned to the Arkansas River for use by downstream water rights holders.

Storage Upstream

Compact Compliance

A useful component of the Catlin Pilot Project approval is that it allows for certain "trades" of consumptive use water generated by the Project with water committed to administrative plans that ensure Colorado's compliance with the Arkansas River Compact to deliver water downstream to Kansas. Trades may be made between water stored in Pueblo Reservoir intended for release to meet obligations owed by these plans (on the lower reaches of the Arkansas River) for the water that the Project generates and which accrues to the Arkansas River upstream of these obligations. These trades are important to operation of the Project because they may be used even at times when there is insufficient flow in the Arkansas River to allow for operation of an exchange. These trades are also beneficial to water users in Colorado that are covered by these administrative plans, because otherwise these plans would be required to release excess water to make up for transit losses occurring between Pueblo Reservoir and the downstream location where the obligations are owed.



Fallowing

Accomplishments

Fallowed Acreage

Consumptive Use Water

Exchanged Water

Multiple Participants Benefit

Return Flow (Recharge)

Fallow Methods

LFT Efficacy

Alternative Transfers

THE CATLIN PILOT PROJECT 2015 OPERATIONS

The Project successfully completed its first year of operations in 2015 and demonstrated the first "proof of concept" in Colorado for fallowing-leasing as an alternative to buy-and-dry. *Annual Report* at 1. The Project supplied over 400 acre-feet of water to the three municipal participants, consistently met all return flow obligations to avoid injury, and generated significant income (over $1000 per acre) from the fallowed acreage for the Participating Farms. *Id*. Moreover, the success of the Project helped increase irrigators' interest in rotational fallowing-leasing and decreased users' concerns about temporary transfers. *Id*.

The Catlin Pilot Project began water deliveries on March 16, 2015 and ended operations on November 14, 2015, corresponding with water deliveries to the Catlin Canal. *Id*. at 7. Due to heavy spring rains, above-average river flows were maintained throughout much of the 2015 irrigation season, which may have affected water deliveries. *Id*. at 8. For instance, extreme precipitation in May affected the project because runoff threatened to overtop the Catlin Canal and also clogged it with tumbleweeds, resulting in either no water or reduced water deliveries during that month. *Id*. at 16.

Throughout the season, the Participating Farms successfully fallowed 234.8 acres comprising 13 separate parcels and 252.14 associated shares. *Id*. at 8. In 2015, fallowed land consisted of 26% of the Catlin Pilot Project acreage and was less than 30% of each farm. *Id*. The Catlin Pilot Project delivered a total of 1211.75 acre-feet of water in 2015, which was only slightly less than the Participating Farms' entire pro-rata share due to typical monitoring difficulties. *Id*. at 10. That amount included deliveries for municipal consumptive use, tailwater (surface) return flow obligations, and deep percolation return flow (groundwater) obligations. Accordingly, the Catlin Pilot Project generated 438.45 acre-feet in consumptive use water, which was slightly higher than estimated due to wetter conditions than average. *Id*. The project successfully delivered 408.48 acre-feet to the three municipal participants, while the consumptive use water not delivered was allocated to deep percolation, evaporation from recharge ponds, transit losses, or to compensate for recharge pond deliveries due to weeds. *Id*. at 11.

Fountain and Security each received 154.3 acre-feet of water at Pueblo Reservoir and moved it to their systems through the Fountain Valley Conduit. *Id*. at 11-12. In order to accomplish these deliveries, the Project exchanged water which was generated from the Participating Farms' fallowing of irrigated acres from the confluence of Timpas Creek and the Arkansas River, moving the water upstream to Pueblo Reservoir. During 2015, there was sufficient exchange potential along the Arkansas River at all times to meet all requested exchanges. *Id*. at 17.

The Catlin Pilot Project then delivered water that was not exchanged to Pueblo Reservoir to Fowler, highlighting the utility of having multiple municipal participants in different locations to use all of the available consumptive use water. *Id*. at 19. Lower Ark held exchanged consumptive use water in Pueblo Reservoir in its storage account until Fountain and Security requested transfers into their own accounts. *Id*. at 12. The municipalities used all of their water between July and November 2015. *Id*. at 13. In addition, Project water replaced just shy of 100 acre-feet, or 20% of Fowler's well depletions in 2015. *Id*. at 14.

The Catlin Pilot Project successfully met its surface (tailwater) and groundwater (deep percolation) return flow obligations in 2015. This amount totaled to 770.22 acre-feet replaced. *Id*. at 20. Furthermore, the two recharge ponds operated successfully and replaced deep percolation return flows for all farms by sufficiently replicating return flow timing and preventing injury to other water rights in compliance with approval conditions. *Id*. at 21.

Lower Ark and the Division Engineer of the State of Colorado conducted inspections of the fallowed fields' compliance with dry-up conditions, and the Participating Farms met expectations. *Id*. at 41. Inspections revealed two minor deviations that were subsequently fixed to prevent injury. *Id*. at 41-42. Moreover, Participating Farms successfully prevented erosion, blowing soils, and noxious weed invasions on dried-up parcels. *Id*. at 42. Fallow methods used in 2015 included the planting of dry-land crops (winter wheat), maintaining corn stalks/stubble, and plowing under fields.

CONCLUSION

The Catlin Pilot Project helped demonstrate that leasing-fallowing agreements in Colorado can be an effective tool to minimize permanent agricultural dry-up and aid municipalities in stabilizing their water supplies. The Project has also established the efficacy of the LFT as a relatively simple and straightforward method of calculating historical consumptive use and return flow obligations. Because LFT uses conservative assumptions, it also helps alleviate concerns about injury to other water rights by leaving more water in the river. Moreover, the project established that cooperation among irrigators and urban water users is possible and even desirable, and that various parties are interested in such arrangements. More groups should take advantage of H.B. 1248 and create similar pilot projects to encourage participation and cooperation in other river basins.

Historically, Colorado has lacked effective legal and market mechanisms to help facilitate leasing-fallowing agreements and instead has relied on the water court process for *permanent* changes of water rights and on individual transactions that often favored cities over irrigators due to power imbalances. In contrast, projects like the Catlin Pilot Project are fostering the formation of an efficient market that will provide opportunities for alternative transfer mechanisms.

Fallowing

Water Market

Alternative Approval Process

Through implementing the Leasing-Fallowing Pilot Program, the CWCB has established the expertise and credibility to operate a permanent statewide program. Accordingly, lawmakers should consider creating a permanent leasing-fallowing program that facilitates creation of a functioning water market, which would be governed by formally promulgated rules. Such a program should be administered by the CWCB, should rely on the State Engineer to review and approve technical and non-injury aspects of leasing-fallowing projects, and should include use of streamlined approaches similar to the LFT. Such a program would address the primary barriers to the widespread use of alternative transfers mechanisms by creating a meaningful water market mechanism and an alternative approval process that avoids the costly and time-consuming water court process.

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Tribal Groundwater

Groundwater Importance

Planning Considerations

Winters Rights

Reserved Water Right

Non-Use Inapplicable

Colorado River Allocations

Non-Indian Reserved Rights

Primacy Purpose

TRIBAL GROUNDWATER RESOURCES

MANAGEMENT CONSIDERATIONS UNDER CURRENT LAW

by Christopher Payne, Snell & Wilmer LLP (Phoenix, AZ)

Introduction

In the arid southwest, water is the most important and precious natural resource. In some communities, groundwater is the primary source, and often sole source, of water for domestic, agricultural irrigation, industrial, and cultural uses. Consequently, management of groundwater resources is critical to sustain a clean and reliable groundwater supply for current and future generations. This article examines the options available for tribal groundwater management under the current legal framework.

Efforts to create and implement effective water resource management plans for tribal communities generally require the quantification of water rights, an understanding of the mechanisms available under federal and state law to protect water rights, and the development of groundwater management codes. In developing water resource management plans, tribes should consider: the interaction between federal and state water law impacting tribal rights to surface water and groundwater; tribal authority to manage and protect groundwater resources; the relationship between tribes and neighboring water users; and federal and state laws, regulations, and programs addressing groundwater utilization, recharge, and conservation. Thus, the development of an effective tribal water resource management plan requires not only an understanding of Tribal claims and rights, but also an understanding of the state and federal legal framework surrounding surface water and groundwater rights as well as the scope of protection available for groundwater rights under tribal, federal, and state laws.

The *Winters* Doctrine Provides Federal Reserved Water Rights to Tribes

Under the *Winters* doctrine, when Congress creates a federal reservation of land, it impliedly reserves sufficient water to fulfill the purposes of the reservations. *See Winters v. United States*, 207 U.S. 564 (1908). Prior to addressing the ability of tribes to manage groundwater resources within their lands, *Winters* rights (also referred to as "federal reserved water rights") must first be addressed. In *Winters*, the United States Supreme Court held that when Congress authorized land to be set aside for the Fort Belknap Indian Reservation in Montana, it impliedly reserved sufficient water to fulfill its purpose for creating the reservation, namely to provide a permanent tribal homeland with an agricultural economy. Specifically, in *Winters*, the United States brought suit against water users located on lands near the Fort Belknap Reservation for damming and diverting the waters of the Milk River, which abutted the reservation. In defense, the water users argued that: (i) their water right rights had been perfected under state law; (ii) the Tribe's water right was extinguished upon Montana statehood; and (iii) not allowing the water users to continue to divert water would prevent them from irrigating their own lands. The Court rejected the water users' arguments, holding that a reserved water right attached to the land when the United States created the Fort Belknap Reservation. Notably, the Court indicated that the priority date of the reserved water right coincided with the creation date of the Fort Belknap Reservation, and consequently, the reserved water right was superior to any water rights later perfected under state law. In addition, the Court held that under the reserved right doctrine, Indian water rights do not depend on putting water to beneficial use (a legal concept critical to state-based prior appropriation legal regimes) and as a result, cannot be lost due to non-use.

The *Winters* case was the first to establish the existence of federal reserved water rights, and many subsequent cases have refined the scope of those rights. For example, *Arizona v. California* addressed the allocation of the waters of the Colorado River among several states, the federal government, and various tribes. 373 U.S. 546 (1963). In deciding *Arizona v. California*, the US Supreme Court extended the *Winters* Doctrine to non-tribal federally reserved lands. The Court held that the creation of reservations was "not limited to land, but included waters, as well." *Id*. at 598. The Court found that inherent in the definition of reserved water rights is a reservation of water for future use. Finally, the Court confirmed that the creation date of a reservation is the priority date for a reserved water right. It is important to note, however, that unlike Indian reserved water rights, non-Indian federal reserved water rights are limited to the minimal amount required to meet the original primary purpose of the reservation. *See Cappaert v. United States*, 426 U.S. 128 (1976); *see also United States v. New Mexico*, 438 U.S. 696 (1978).

Thus, under the *Winters* Doctrine, as modified by subsequent case law, when Congress creates a reservation it impliedly reserves sufficient water, from the then unappropriated water available, to fulfill the primary purpose for which the reservation was created. Because there were very few non-Indian water uses in existence at the time most Indian reservations were created, Indian reserved water rights generally pre-date and are superior to the majority of water rights held under state law. In fact, most Indian reserved water rights are junior only to pre-existing vested state rights.

Tribal Groundwater

Adjudications

State Courts

Although *Winters* reserved rights are federal-law rights, they are often adjudicated in state courts as part of state-law based comprehensive general stream adjudications under the McCarran Amendment. The McCarran Amendment of 1952 authorizes joinder of the United States in comprehensive general stream adjudications, including the adjudication of Indian reserved water rights. 43 U.S.C. § 666. Although tribes themselves may not be joined in state general stream adjudication proceedings without their consent, tribes are required to either waive their sovereign immunity and intervene or permit the federal government to litigate on their behalf. *See Colo. River Water Cons Dist. v. United States*, 424 U.S. 800 (1976). Further, even though the McCarran Amendment did not divest federal courts of jurisdiction to hear reserved water rights cases, the Supreme Court has instituted an abstention doctrine in favor of state general stream proceedings. As a result, the litigation of tribal *Winters* right claims will often occur in state court.

Groundwater Issue

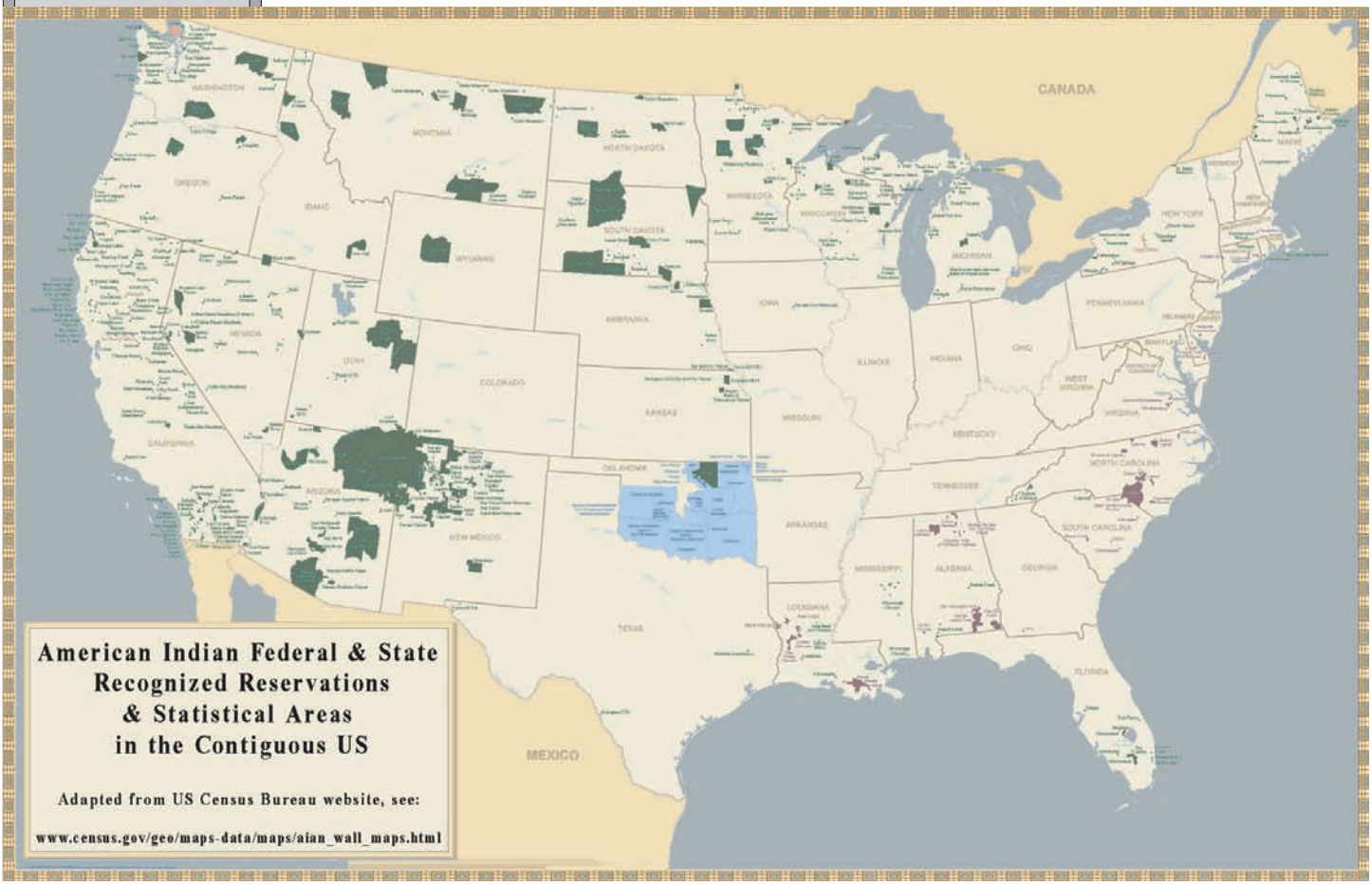
Winters Rights & Groundwater

WINTERS RIGHTS HAVE NOT BEEN UNIVERSALLY RECOGNIZED AS INCLUDING GROUNDWATER

The *Winters* case and its progeny involve federal reserved right claims to surface water but do not expressly address whether *Winters* rights also include groundwater. Moreover, there has been no uniform approach created by federal or state laws or court systems to address tribal claims to reserved groundwater rights. As discussed below, the few courts that have addressed whether tribes have a reserved right to groundwater have ranged from finding no reserved water right to groundwater, to finding only a conditional reserved right to groundwater, to finding a fully unconditional reserved right to groundwater. This variance in the application of the reserved right doctrine to tribal groundwater claims has impacted the ability of some tribes to plan for and manage their water resources.

Litigation Results

The application of the *Winters* doctrine to groundwater has been litigated in a few federal courts, as well as a limited number of state courts under the McCarran Amendment. Several lower federal court decisions in the 1980s suggested that groundwater might, or should, be an available source to satisfy Indian reserved water rights. *See e.g., Gila River Pima-Maricopa Indian Community v. United States*, 695 F.2d 559, 561 (Fed. Cir. 1982) ("Gila River water and groundwater constituted the intended sources for irrigation of the Gila River Reservation."); *New Mexico ex rel Reynolds v Aamodt*, 618 F. Supp. 993, 1010 (D.N.M. 1985) (holding that Pueblo water rights include groundwater that is "physically interrelated to" surface water sources). However, the question of whether *Winters* rights apply to groundwater was not directly addressed by any court until 1988.



Tribal Groundwater

Wyoming Decision

In 1988, the Wyoming Supreme Court held that although the Shoshone and Arapaho Tribes of the Wind River Reservation were entitled to a *Winters* right to surface water, they had no *Winters* right to groundwater. *In re Gen. Adjudication of All Rights to Use Water in the Big Horn River System*, 753 P.2d 76, 100 (Wyo. 1988) (*Big Horn River System*). The Wyoming Supreme Court found that the "logic which supports a reservation of surface water to fulfill the purpose of the reservation also supports reservation of groundwater." However, the Court ultimately determined there exists no reserved right to groundwater, in part because no prior case law had applied the reserved water doctrine to groundwater. *Id.* at 99. As a result, the Court held that because there is no reserved right to groundwater, the use and allocation of all groundwater is presumptively a matter of state law.

Arizona Holdings

Even though the Wyoming Supreme Court was the first state Supreme Court to directly address the issue of a tribal reserved right to groundwater, the *Big Horn River System* no-reserved water right approach to groundwater has not been adopted by any other court (though *Pyramid Lake Paiute Tribe of Indians v. Ricci*, 245 P.3d 1145 (Nev. 2010) did construe a federal water decree as excluding groundwater rights for the Pyramid Lake Paiute Tribe). In fact, the Arizona Supreme Court rejected *Big Horn River System* in 1999, ruling instead that the federal reserved right doctrine provided a conditional right to groundwater. *In re the General Adjudication of All Rights to Use Water in the Gila River System and Source*, 989 P.2d 739 (Ariz. 1999). Specifically, the Arizona Supreme Court held that a "reserved right to groundwater may only be found where other waters are inadequate to accomplish the purpose of a reservation." *Id.* at 748. The Court, however, did not describe when or how surface water would be considered "inadequate." Rather, the Court ruled that the determination of whether groundwater is necessary to accomplish the purpose of a reservation is a "fact-intensive inquir[y] that must be made on a reservation-by-reservation basis." *Id.*

Federal Law Protection

Importantly, the Court also determined that a federal reserved groundwater right may be subject to protection beyond what state law can provide, holding that once a reserved right to groundwater is established, federal law may be invoked to protect groundwater from subsequent diversion under state law rights to the extent such protection is necessary to protect the reserved right. *Id.* at 750.

Montana & Washington

In contrast, at least two courts have found that an unconditional right to groundwater is implicit in the *Winters* doctrine. In 2002, the Montana Supreme Court held that groundwater quantification "is simply another component" of the determination of Indian water rights. *Confederated Salish & Kootenai Tribes of the Flathead Reservation v. Stults*, 59 P.3d 1093 (Mont. 2002). Similarly, in 2005 a federal district court in Washington State ruled that groundwater — whether or not hydrologically connected to surface water — was part of a tribe's reserved water right. *United States v. Wash. Dep't of Ecology*, 375 F. Supp.2d 1050 (W.D. Wash. 2005). This case, however, was subsequently vacated after the parties reached a settlement. *See United States ex rel. Lummi Indian Nation v. Wash. Dep't of Ecology*, 2007 WL 4190400 (W.D. Wash. Nov. 20, 2007), *aff'd*, *U.S. ex rel. Lummi v. Dawson*, 328 Fed. App'x. 462 (2009). *See also* Water Briefs, *TWR* #46: December 15, 2007.

Water Settlements

Despite the inconsistent treatment by the courts, many tribes have been able to secure a reserved right to groundwater through water settlements. In fact, of the nearly 30 Indian water settlements that were enacted by Congress between 1978 and 2010, approximately half contain some provision addressing the right to groundwater; though there has been little uniformity in the groundwater provisions of these water rights settlements. For example, some settlements specified a quantity of groundwater for tribal use or set a limit on tribal pumping of groundwater, while other settlements provided tribal communities with the express right to use groundwater beneath their lands. *See, e.g., The Water Right Claims-Ak-Chin Indian Community Act of 1978*, Pub. L. No. 95-328, §2(b), 92 Stat. 409 (1978); *Shivwits Band of the Paiute Indian Tribe of Utah Water Rights Settlement Act of 2000*, Pub. L. No. 106-263, §7(a)(3), 114 Stat. 737 (2000); *Zuni Indian Tribe Water Rights Settlement Act of 2003*, Pub. L. No. 108-34, § 8(e), 117 Stat. 782 (2003)); *Salt River Pima-Maricopa Indian Community Water Rights Settlement Act of 1988*, Pub. L. No. 100-512, 102 Stat. 2549 (1988)); *Southern Arizona Water Rights Settlement Act of 1982*, Pub. L. No. 97-293, §§ 303(c) & 306(a), 96 Stat. 1261 (1982) (Papago Tribe, now the Tohono O'Odham Nation); *Southern Arizona Water Rights Settlement Act of 2004*, Pub. L. No. 108-451, §307(a)(1), 118 Stat. 3478 (2004) (Tohono O'Odham Nation).

Uniformity Lacking

Restrictions

Restrictions on groundwater use have also been incorporated into settlements. *See, e.g., Jicarilla Apache Tribe Water Rights Settlement Act*, Pub. L. No. 102-441, 106 Stat. 2237 (1994).

Reserved Rights Litigation (California)

In addition, at least one tribe has sought recently to establish a reserved water right to groundwater through litigation. *See Agua Caliente Band of Cahuilla Indians v. Coachella Valley Water Dist.,* No. EDCV 13-883-JGB, 2015 WL 1600065 (C.D. Cal.). In this compliant — filed by the Agua Caliente Band of Cahuilla Indians in the US District Court for the Central District of California on May 14, 2013 — the Band alleges that excessive groundwater pumping has caused overdraft of the Coachella Valley Groundwater Basin and asserting a reserved right to the groundwater resources with a priority date of "time immemorial" for the purpose of providing and sustaining a tribal homeland on the lands of the Agua Caliente Reservation. The Band seeks related declaratory and injunctive relief, including declarations that it possesses a groundwater right in the sub-basins "in sufficient quantities to foster, promote, and fulfill the homeland purposes for which the lands of the tribe's reservation were set aside for the tribe and its members, both for all present and future purposes." *See* Moon, *TWR* #134: April 15, 2015 for more details.

Tribal Groundwater

Uncertainty

Regulation of Private Users

Water Code Moratorium

DOI Oversight

DOI Position

Moratorium Limit & Exception

Non-Regulatory Option

The absence of a clearly defined tribal reserved water right to groundwater may make it difficult for some tribal communities to effectively develop and implement water resource management plans. In these situations, tribal communities may not be able to determine whether they have a reserved groundwater right or quantify their right. Further, tribal communities which only have a reserved right to surface water, and in some circumstance those with a conditional right to groundwater, may not have any right to use groundwater on their lands unless that right is acquired under state law.

Water Code Hurdles

SOME TRIBES UNABLE TO ENACT TRIBAL WATER CODES DUE TO A "MORATORIUM" ENACTED IN 1975

Indian tribes have the right to regulate the conduct of their members (*see United States v. Wheeler*, 435 U.S. 313, 322 (1978)) — a right which ostensibly extends to the regulation of tribal members' use of water. Utilizing their inherent sovereign powers over tribal land and natural resources, some tribes have enacted water codes in an attempt to regulate all users of reservation water, sometimes including nonmembers. However, the law governing tribal authority to enact water codes to regulate nonmembers is not well-established, and over the years, there has been confusion among tribes and private water appropriators. *See generally* Thomas W. Clayton, *The Policy Choices Tribes Face When Deciding Whether to Enact a Water Code*, 17 Am. Indian L. Rev. 523 (1992). In fact, the US Department of the Interior (DOI) was sufficiently concerned about the potential for conflict inherent in tribal water codes that in 1975, the US Secretary of the Interior imposed what some have called a "moratorium" on the approval of tribal water codes submitted by tribes subject to the Indian Reorganization Act. Thus, even though developing and implementing water codes is typically a matter of political priority and legislative compromise, in contrast to non-tribal governments, the development and implementation of water codes for some tribes will also require the approval of the DOI, not only for the specific code provisions, but also for the authorization simply to enact a water code.

In 1975, the Secretary of the Interior "imposed a moratorium on the approval of water codes in order to permit the DOI to promulgate guidelines for approval." *See American Indian Law Deskbook A* § 8:22 at n. 1 (2015). The Secretary's order provides in part as follows:

> Our authority to regulate the use of water on Indian reservations is presently in litigation. I am informed, however, that some tribes may be considering the enactment of water use codes of their own. This could lead to confusion and a series of separate legal challenges that might lead to undesirable results. I ask, therefore, that you instruct all agency superintendents and area directors to disapprove any tribal ordinance, resolution, code, or other enactment which purports to regulate the use of water on Indian reservations and which by the terms of the tribal governing document is subject to such approval or review in order to become or to remain effective, pending ultimate determination of this matter.

See Memorandum from the Secretary of the Interior, *Rogers C.B. Morton, to the Commissioner of Indian Affairs* (Jan. 15, 1975); *see also Memorandum from the Solicitor of the Interior, John D. Leshy to Deputy Secretary David Hayes regarding Tribal Water Rights Settlements and Allottees* (Jan. 19, 2001) (describing the "January 15, 1975, memorandum from Secretary Morton directing the Bureau of Indian Affairs to disapprove any tribal ordinance, resolution code or other enactment purporting to regulate the use of water on Indian reservations"). Under this moratorium — absent approval by the Secretary of the Interior — any tribal law that purports to regulate the use of water must be disapproved by the DOI, pending the creation of DOI rules for tribal water codes pursuant to 25 U.S.C. § 381. *American Indian Law Deskbook A* § 8:22 at n. 1; *Holly v. Totus*, 655 F. Supp. 548, 552 (E.D. Wash. 1983), *aff'd in part, rev'd in part sub nom. Holly v. Watson Totus*, 749 F.2d 37 (9th Cir. 1984). The moratorium only applies to tribes that are subject to the Indian Reorganization Act. *Id*. Although DOI rules have been proposed in the decades succeeding the Secretary's order, no rules have ever been consummated by the DOI. *Id.* To date, the moratorium is still in effect, although DOI made one exception in 1985 when it approved the tribal water code included in the water rights compact between the State of Montana and the Assiniboine and Sioux Tribes of the Fort Peck Reservation.

The current state of the law regarding the moratorium on the approval of tribal water codes may frustrate the ability of some tribes to exercise self-determination by enacting their own water codes. In support of the DOI's position on tribal water codes, some have argued that there have been few tribes that have requested approval of water codes over the past several decades. While that may be the case, it does not account for the possibility that some tribes may not have attempted to develop water codes due to the existence of the moratorium.

For those tribes who are not able to enact comprehensive water codes due to the moratorium, non-regulatory approaches to encourage groundwater conservation and employ best management practices

Tribal Groundwater

Management Options

Sovereignty Issues

Off-Reservation Impacts

Settlements & Cooperation

Water Quality Protection

Partnering Options

may be established. Such approaches could include establishing groundwater monitoring plans to record pumping information, water depth, and water quality, and establishing voluntary water conservation and public education programs. Tribes could also consider the creation of tribal ordinances that set forth general tribal interests and direct the development of water management plans. In addition, for tribes that operate water systems, tribes may also consider implementing conservation measures, such as encouraging water conservation through rate structures and the use of water meters. Finally, tribes could consider partnering with state and local entities to encourage water management and regulation.

Conclusion: Intergovernmental Cooperation

Tribes have long been recognized as sovereign entities, "possessing attributes of sovereignty over both their members and their territory." *United States v. Wheeler*, 435 U.S. 313, 323 (1978). As a result, the authority of states and local governments to assert their own regulatory authority on tribal land is limited. Just as tribes cannot regulate off-reservation activities, states cannot regulate activities of a tribe or its tribal members within its lands unless expressly permitted by Congress. Because watersheds and groundwater basins — as a matter of nature — extend beyond the boundaries of tribal lands, states must consider existing reserved water rights as they develop management plans for water near tribal lands and they must work with tribal governments in developing and managing shared groundwater resources.

Groundwater pumping and water use occurring off-reservation may impact groundwater and surface water uses on-reservation and vice-versa, and as a result, state and local governments should work with tribes to ensure tribal rights, priorities, and needs are incorporated into state-wide and regional watershed plans. These types of intergovernmental efforts can serve to supplement, or at times be in lieu of, the direct exercise of tribal regulatory authority over water. In addition, some tribes regulate groundwater through intergovernmental agreements as part of comprehensive water rights settlements. Because states generally have no regulatory jurisdiction over tribal water rights, states and local jurisdictions should recognize the benefit that can come from cooperating with tribes regarding the regulation of water and implementation of effective basin-wide water policies.

Finally, in addition to protecting tribal water resources through the exercise of their sovereign powers, tribes may — with the approval of the US Environmental Protection Agency (EPA) — consider protecting their water resources through federal laws and regulations, such as the Clean Water Act and the Safe Drinking Water Act. Both of these acts provide tribes with authority to protect their water resources, including provisions that authorize EPA to treat a tribe as a state by approving tribal administrative and regulatory programs. (*See* Moon & Light, *TWR* #52: June 15, 2008; Water Briefs, *TWR* #139: Sept. 15, 2015). In fact, over 50 tribes are currently recognized by EPA as having inherent jurisdiction over their waters — including jurisdiction over non-members and water use on non-member fee lands. EPA's regulations have been upheld by the courts as "reflecting appropriate delineation and application of inherent Tribal regulatory authority over non-consenting nonmembers." *Montana v. EPA*, 137 F.3d 1135, 1141 (9th Cir. 1998). Tribes that exercise authority under these Acts to regulate water use on a reservation-wide basis should consider partnering with state and local entities to efficiently manage and regulate water use and water quality.

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Chris Payne, an Associate at Snell & Wilmer LLP in Phoenix, AZ, has a practice concentrated on both transactional and litigation matters in the areas of natural resources and real estate, including water, mining, environmental, and real estate law. His practice includes: assisting clients with water rights; mineral title and permitting; environmental permitting and compliance; retail and commercial leasing; and real property purchase and sale transactions. Chris has represented clients in both administrative and judicial actions involving water, mining, and environmental law. He has assisted clients with issues involving groundwater and surface water rights and supplies, including representation in the Arizona State stream adjudications; litigated claims involving state-based and federal reserved water rights; assisted clients with mineral title, mineral development and mineral permitting issues; and advised clients about compliance with local, state and federal environmental permits and regulations. Previously, Chris worked as a civil engineer for one of the largest architectural and civil engineering firms in the nation. His background and experience as an engineer included: preparing environmental assessments; environmental impact statements and construction drawings; conducting water supply and water development studies; floodplain delineation; solid waste planning; and grading and drainage design.

WATER BRIEFS

Fracking Report Clarification

In a phone interview with TWR, Dr. Dominic DiGiulio, lead author of the Stanford fracking study reported on last month (see Jordan, TWR#146), expressed concern that some reporting on his work in the popular press had misconstrued his findings. He supplied TWR with this clarification:

"Our research demonstrated impact to Underground Sources of Drinking Water or USDWs as a result of hydraulic fracturing. A USDW is a regulatory term with a regulatory definition, but it basically means a ground-water resource for present or future use. A distinction must be made regarding impact to a ground-water resource versus impact to domestic water wells. A ground-water resource can become contaminated without impact to domestic water wells if these domestic water wells are not drawing water from areas of ground-water contamination. We stopped short of stating that domestic water wells in the Pavillion Field were directly contaminated from hydraulic fracturing because we believe that current evidence is insufficient to make that claim. However, we believe that data suggests that impact occurred to domestic wells as a result of ground-water contamination near unlined pits in the Field. Up until the mid-1990s, up to 44 unlined pits received drilling and production fluids from hydraulic fracturing. Thus, there appears to be indirect impact rather than direct impact to domestic wells as a result of hydraulic fracturing. All this may be somewhat confusing but words have to be carefully chosen when describing impact to ground-water as a result of hydraulic fracturing."

FRACKING SPILLS ND

NEW DUKE U STUDY

In a study released in April, researchers from Duke University's Nicholas School of the Environment report that accidental wastewater spills from unconventional oil production in North Dakota have caused widespread water and soil contamination. Researchers found high levels of ammonium, selenium, lead, and other toxic contaminants as well as high salts in the brine-laden wastewater, which primarily comes from hydraulically fractured oil wells in the Bakken region of western North Dakota. Streams polluted by the wastewater contained levels of contaminants that often exceeded federal guidelines for safe drinking water or aquatic health. Soil at the spill sites was contaminated with radium, a naturally occurring radioactive element found in brines, which chemically attached to the soil after the spill water was released. At one site, the researchers were still able to detect high levels of contaminants in spill water four years after the spill occurred. The Duke team published its peer-reviewed study in the journal Environmental Science & Technology.

"Until now, research in many regions of the nation has shown that contamination from fracking has been fairly sporadic and inconsistent," said Avner Vengosh, professor of geochemistry and water quality at Duke's Nicholas School of the Environment. "In North Dakota, however, we find it is widespread and persistent, with clear evidence of direct water contamination from fracking."

"The magnitude of oil drilling in North Dakota is overwhelming," Vengosh said. "More than 9,700 wells have been drilled there in the past decade. This massive development has led to more than 3,900 brine spills, mostly coming from faulty pipes built to transport fracked wells' flowback water from on-site holding containers to nearby injection wells where it will be disposed underground."

As part of the study, the team mapped the distribution of the 3,900 spill sites to show how they were associated with the intensity of the oil drilling.

North Dakota's unconventional oil production grew from about 100,000 barrels a day in 2007 to more than 1 million barrels a day in 2014. Much of the increased production has been made possible by advances in hydraulic fracturing and horizontal drilling. The industry's expansion in North Dakota has fueled economic growth, especially on tribal lands and in rural areas, but also has sparked concern about drinking water contamination.

"Unlike spilled oil, which starts to break down in soil, these spilled brines consist of inorganic chemicals, metals and salts that are resistant to biodegradation," said Nancy Lauer, a PhD student of Vengosh's who was lead author of the study. "They don't go away; they stay. This has created a legacy of radioactivity at spill sites."

Soil samples collected downstream from spill sites contained higher levels of radioactivity than soil at the spill sites themselves, Lauer noted. This suggests that radium builds up in the soil as the spilled brine flows through the environment.

As part of their study, the researchers collected samples of brine-laden spill waters from four sites — two large spills and two smaller ones. They measured and analyzed the samples for inorganic contaminants and to identify the unique isotopic signature, or fingerprint, of Bakken region brines. By comparing this fingerprint to the geochemical and isotopic profiles of 29 background surface water samples collected across the region, the team was able to determine where and to what extent contamination associated with brine spills had occurred, and rule out the possibility that it had been caused by other sources.

"These isotopic tracers give scientists powerful forensic tools for tracking the presence of spill waters in the environment," Vengosh said. "Given that spills can occur upstream from drinking water sources, long-term monitoring of downstream waters is necessary to assess impacts on water quality."

One of the state's largest spills to date occurred in 2014, when an underground pipeline leak caused approximately one million gallons of brine to flow down a ravine and into Bear Den Bay, about a quarter mile upstream from a drinking water intake on Lake Sakakawea. "Many smaller spills have also occurred on tribal lands, and as far as we know, no one is monitoring them," Vengosh noted.

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https://nicholas.duke.edu/about/news/ContaminationinNDLinkedtoFrackingSpills#sthash.Kj7BG26w.dpuf;
Environmental Science and Technology Article: http://pubs.acs.org/doi/abs/10.1021/acs.est.5b06349

WATER BRIEFS

OIL & GAS LAWSUIT US

DRILLING & FRACKING WASTE

On May 4, a coalition of community and environmental organizations filed a federal lawsuit against EPA calling for regulations to stop oil and gas companies from disposing and handling drilling and fracking wastes in ways that threaten public health and the environment. The organizations are pushing EPA to issue rules that address problems including the disposal of fracking wastewater in underground injection wells, which accept hundreds of millions of gallons of oil and gas wastewater. The groups filing the suit include the Environmental Integrity Project, Natural Resources Defense Council (NRDC), Earthworks, Responsible Drilling Alliance, San Juan Citizens Alliance, West Virginia Surface Owners' Rights Organization, and the Center for Health, Environment and Justice.

The lawsuit, filed in the US District Court for the District of Columbia, calls on the court to set strict deadlines for EPA to comply with its long-overdue obligations to update waste disposal rules. The lawsuit also urges EPA to ban the practice of spreading fracking wastewater onto roads or fields, which allows toxic pollutants to run off and contaminate streams. EPA should also require landfills and ponds that receive drilling and fracking waste to be built with adequate liners and structural integrity to prevent spills and leaks into groundwater and streams. *Environmental Integrity Project, et al. v. Gina McCarthy, EPA*, Case No. 1:16-cv-00842 (D.D.C.) (May 4, 2016). The plaintiffs "seek to compel" EPA "to fulfill long-delayed nondiscretionary duties and promulgate revised regulations and guidelines for the disposal, storage, transportation, and handling of oil and gas wastes." *Complaint* at 2.

A notice of intent to sue EPA was filed last August, warning the agency a lawsuit would follow unless it complied with its duty under the Resource Conservation and Recovery Act (RCRA) to review and revise the federal regulations and guidelines governing how oil and gas waste must be handled and disposed. RCRA requires that EPA review the regulations and state plan guidelines at least every three years and, if necessary, revise them. The agency determined in 1988 that such revisions of the regulations were necessary to address specific concerns with oil and gas wastes, yet has failed to meet its legal responsibility to act for nearly three decades, according to the lawsuit. The organizations allege that EPA's current regulations do not take into account the dangerous contents of oil and gas wastes or their unique handling and disposal practices and that the current RCRA rules governing oil and gas wastes are too weak because they are the same rules that apply to all "non-hazardous" wastes (including household trash).

For info: Kate Kiely, NRDC, 212/ 727-4592 or kkiely@nrdc.org; *Complaint* available upon request from *TWR*

GRAYWATER RECYCLING US

STORMWATER REUSE

Chronic and episodic water shortages are becoming common in many regions of the US, and population growth in water-scarce regions further compounds the challenges. Alternative water sources include graywater and stormwater. Graywater is untreated wastewater that does not include water from the toilet but generally includes water from bathroom sinks, showers, bathtubs, clothes washers, and laundry sinks. Both these alternatives are increasingly being viewed as resources to supplement scarce water supplies rather than as waste to be discharged. Graywater and stormwater can serve a range of non-potable uses, including: irrigation; toilet flushing; washing; and cooling — although treatment may be needed. Stormwater may also be used to recharge groundwater, which may ultimately be tapped for potable use. In addition to providing additional sources of local water supply, harvesting stormwater has many additional potential benefits, including: energy savings; pollution prevention; and reducing the impacts of urban development on urban streams. Similarly, the reuse of graywater can enhance water supply reliability and extend the capacity of existing wastewater systems in growing cities.

Despite the benefits of using local alternative water sources to address water demands, many questions remain that have limited the broader application of graywater and stormwater capture and use.

To address these issues, the National Academies of Sciences, Engineering, and Medicine recently published *Using Graywater and Stormwater to Enhance Local Water Supplies: An Assessment of Risks, Costs, and Benefits* (2016). This report examines technical, economic, regulatory, and social issues associated with graywater and stormwater capture for a range of uses, including non-potable urban uses, irrigation, and groundwater recharge. The report considers the quality and suitability of water for reuse, treatment and storage technologies, and human health and environmental risks of water reuse. These findings and recommendations should prove useful for water managers, states undergoing drought, and local and state health and environmental agencies.

The report is available for free online or a paperback can be pre-ordered from The National Academies Press.

For info: The National Academies Press, 800/ 6246242 or http://www.nap.edu/download.php?record_id=21866

HYDROPEAKING FLOWS WEST

AQUATIC INSECT IMPACTS

Researchers concluded in a study published in the journal BioScience that "hydropeaking" of water flows on many rivers in the West has a devastating impact on aquatic insect abundance. The study, released on May 2nd, raises serious questions about the current practice of raising river volumes up and down every day — known as hydropeaking — to meet hour-by-hour electricity demand, which has nearly wiped out local populations of some insects that feed local river ecosystems. The research was based in part on a huge citizen science project with more than 2,500 samples taken on the Colorado River in the Grand Canyon, and collaboration of researchers from the US Geological Survey, Oregon State University, Utah State University, and Idaho State University.

Hydropeaking is used around the world and is particularly common with hydropower dams in the American West. Rivers are some of the most extensively altered ecosystems on Earth, the researchers wrote, and more than 800,000 dams exist globally. Hydropower provides 19 percent of the world's electricity supply and far

WATER BRIEFS

exceeds the generation of all other renewable sources combined.

Researchers found a clear correlation between hydropeaking and the number of insect species present. An almost complete absence of certain insects occurs in some parts of rivers where they should have been present — including the Colorado River downstream of Glen Canyon and Hoover Dams. A majority of aquatic insects are vulnerable to this phenomenon and can be "subject to acute mortality." Some of these insects are food for fish, birds, bats, and other wildlife. Loss of these insects can have a major impact on fisheries and ecosystem health.

The Study points out that one way to address the problem is to leave river levels stable for several days at a time — possibly on weekends when electricity demands do not vary as much — so that insects could lay their eggs with success. This might help address but will not totally solve the problem.

"For the first time, this study determines the ecological impacts of hydropeaking separated from other dam-imposed stressors, and identifies the specific cause-and-effect relationships responsible for biodiversity loss below hydroelectric dams," said Ted Kennedy, a USGS scientist and lead author of the study. "These results may help resource managers improve river health while still meeting societal needs for renewable hydroelectricity."

For info: David Lytle, 541/ 737-1068 or lytleda@oregonstate.edu; Full Study available upon request from TWR or at: http://bioscience.oxfordjournals.org/content/early/2016/04/30/biosci.biw059

LAND & WATER FUND US

CONSERVATION FUND ANNOUNCED

On April 18, Secretary of the Interior Sally Jewell announced nearly $95 million would be distributed from the Land and Water Conservation Fund (LWCF) to all 50 states, US territories, and the District of Columbia to support conservation and recreation projects in local communities. A state-by-state list of the fiscal year 2016 stateside funding allocation is available at: www.doi.gov/sites/doi.gov/files/uploads/2016%20LWCF-GOMESA%20Apportionment.pdf.

Congress established the LWCF in 1965 to ensure access to outdoor recreation resources for present and future generations, and to provide money to federal agencies and state and local governments to purchase land, water, and wetlands. Funds are awarded through federal matching grants that leverage public and private investment and enable state and local governments to create, develop, or enhance everything from urban parks to state wildlife management areas to soccer fields. The funds also provide the public with access to rivers, lakes, and other water resources, and permanently conserve these areas for outdoor recreational use and enjoyment. A recent analysis of the Land and Water Conservation Fund found that every $1 invested in land acquisition generated a $4 return on investment for communities.

Only once in the past 50 years has Congress appropriated LWCF funding at the fully authorized level of $900 million. President Obama's 2017 budget request includes a legislative proposal to establish mandatory funding for LWCF programs, with full funding at $900 million. On September 30, 2015, the date Congress allowed the Fund to expire temporarily for several months, Jewell urged Congress to reauthorize the LWCF and to pass President Obama's proposal to guarantee permanent full funding of $900 million a year that Congress authorized under the original law. Congress provided a short-term renewal of three years for LWCF in the fiscal year 2016 Omnibus Appropriations Act. Chronic uncertainty and under funding have made it increasingly challenging for local, state and federal partners to use this important conservation tool.

For info: www.nps.gov/lwcf

GROUNDWATER PLANS CA

WATER AVAILABILITY FOR GW

The Sustainable Groundwater Management Act (SGMA) directed the California Department of Water Resources (CDWR) to prepare a report on water available for replenishment of groundwater by December 31, 2016. DWR was charged with presenting its best estimate, based on available information, of water availability for groundwater replenishment in the state. SGMA stakeholder and advisory groups have provided input to CDWR that will help guide the content and scope of this December 2016 *Water Available For Replenishment* (WAFR) Report.

On April 1, CDWR released an interim White Paper that describes the technical and policy foundations as well as the proposed WAFR report content. The White Paper is available for public review and comments are being solicited by CDWR to help inform the WAFR Report.

The availability to replenish groundwater is important for Groundwater Sustainability Agencies (GSAs) under the SGMA, since GSAs in high and medium-priority basins are required to prepare Groundwater Sustainability Plans (GSPs), which include "[a] description of surface water supply used or available for use for groundwater recharge or in-lieu use." (Wat. Code, § 10727.2(d)(5).)

In the White Paper, DWR defines "water available for replenishment" by separating the concept into two parts: (1) "water available"; and (2) "for replenishment of groundwater." Implementing entities (such as GSAs) "would likely need to develop a project in two parts — first, to identify the timing and amount of water available, and second, to determine the location and logistics for groundwater replenishment." White Paper at 1.

The White Paper also discusses potential sources for water to include: "surface water (including stormwater), water conservation, recycled water, desalination, water transfers, and others." *Id*. at 2. The WAFR will address two specific methods to replenish groundwater: "active recharge" and "in-lieu recharge." Active recharge is defined to include "direct spreading" — i.e., "ponding water in percolation basins where it infiltrates downward into unconfined aquifers" — and "aquifer injection" — i.e., "water is injected into confined aquifers using aquifer storage and recovery wells." In-lieu recharge may be accomplished "by providing an alternative source to users who would normally use the groundwater, thereby leaving groundwater in place" to improve groundwater levels or provide for later use. *Id*. at 6-7.

For info: DWR website: www.water.ca.gov/groundwater/sgm/wafr.cfm

WATER BRIEFS

GROUNDWATER PLANNING CA

EVALUATION OF OPTIONS

The Wheeler Institute at UC Berkeley recently released a report entitled "*Designing Effective Groundwater Sustainability Agencies: Criteria for Evaluation of Local Governance Options*." The report is designed to help local water management agencies comply with California's new law, the Sustainable Groundwater Management Act (SGMA) of 2014. The Wheeler Institute has developed a framework to help these agencies prepare to manage this critical resource for the first time. The esteemed authors of the report are Michael Kiparsky, Dave Owen, Nell Green Nylen, Juliet Christian-Smith, Barbara Cosens, Holly Doremus, Andrew Fisher, and Anita Milman.

With the passage of the SGMA in 2014, California adopted a historic policy of managing groundwater resources sustainably. This ambitious goal is critical to California's water security, but major questions remain about how to achieve it. The report argues that designing institutions for sustainable groundwater management is one of the most pressing near-term challenges for SGMA implementation. The new local Groundwater Sustainability Agencies (GSAs) required under SGMA will play a critical role in meeting groundwater sustainability goals. However, SGMA does not specify the details for institutional design of GSAs, nor what specific governance actions must be taken to achieve sustainability.

The primary purpose of this document is to assist stakeholders and decision makers in evaluating the design of GSAs. It aims to empower them to think critically about whether proposed GSAs will meet their needs now and in the future, and — if not — which tools may help to achieve these goals. The framework presented here draws on experience in other natural resource management contexts and on research on governance and institutional design to provide lessons learned and illustrative examples.

Local stakeholders and state agencies can use the nine criteria defined in this report to evaluate the institutional design of newly forming GSAs. These criteria support efficacy and fairness, two foundational elements of good governance. The criteria — scale, human capacity, funding, authority, independence, representation, participation, accountability, and transparency — form the basis for conceptual guidelines from which arise key questions that stakeholders and agencies can use to test the potential for a GSA to govern for groundwater sustainability. This report details the existing legal context for each of these criteria, and distills the criteria into a set of simple questions designed to help decision-makers and stakeholders evaluate the newly forming GSAs.
For info: Michael Kiparsky, kiparsky@berkeley.edu; Report available at: www.law.berkeley.edu/research/clee/research/wheeler/groundwater-governance-criteria/

NEVADA IMPAIRMENTS NV

PROGRESS IN NEWEST LIST

EPA has approved the State of Nevada's list of waterways in need of protection, and proposed adding portions of two rivers in northeastern Nevada. The federal Clean Water Act requires states to assess their rivers, lakes and coastal waters, and submit a list of impaired waterways to EPA. The Nevada Division of Environmental Protection previously developed cleanup plans, known as Total Maximum Daily Loads (TMDLs), to address pollutants in over 100 perennial river miles and over 80,000 lake acres. State and federal water quality standards have since been attained for approximately half of those impairments.

Nevada monitored 6,500 miles of perennial streams and 228,000 acres of lakes and reservoirs, and the data shows that over 2,500 miles of streams and 80,000 lake acres do not achieve water quality standards, primarily because of an excess of nutrients, toxic metals, or high temperatures. EPA is proposing to add a section of the South Fork Humboldt River and a revised section of the North Fork Little Humboldt River to the impaired waters list based on elevated levels of mercury in fish that may pose health concerns to people consuming fish caught in those waters.
For info: Margot Perez-Sullivan, EPA, 415/ 947-4149 or perez-sullivan.margot@epa.gov

WATER EFFICIENCY US

RESIDENTIAL WATER USE

On April 25, the Water Research Foundation (WRF) published a new water efficiency study entitled, "*Residential End Uses of Water, Version 2*" (REU 2016). This project serves as a comprehensive update to WRF's 1999 *Residential End Uses of Water* study (REU 1999). The new study provides an updated and expanded assessment of water use, including more varied site locations, hot water end use data, more detailed landscape analysis, and additional water rates analysis. The project is focused solely on single-family residences.

The new study identifies variations in water use by each fixture or appliance, providing detailed information and data on changes since the REU 1999 study. Looking to the future, the study's research evaluates conservation potential, and includes predictive models to forecast residential demand.

Single-family homes typically use the most water of any utility customer sector. "The 23 utilities studied show a decline of 22 percent in average annual indoor household water use since WRF's landmark 1999 study. Water providers should consider lower household water use when making future plans." Executive Report at 3. "The decline in water use across the residential sector, even as populations increase, poses new challenges for water utilities. Information on single family home water consumption is significant for utility rate and revenue projections, capital planning (water supply and infrastructure needs), daily operations to provide water, water efficiency programs, and more." *Id*.

The study addresses conservation potential for the future with optimism for the single-family sector. "With 100 percent occurrence of higher efficiency devices, indoor household water use could drop 35 percent or more, to below 40 gallons per capita per day. Aggressive outdoor water conservation could reduce outdoor use even further." *Id*. at 10.

The significance of the study was noted for utilities: "These data are essential for understanding demand patterns and establishing end-use benchmarks. Indoor water use will continue to decline in the future, which

WATER BRIEFS

will impact utility water sales. REU 2016 provides current data, evaluates conservation potential, and develops predictive models to assess and forecast residential demand." *Id*. at 14. (*See* Hardberger, *TWR* #145 regarding utility rates/pricing.)

The electronic version of the Executive Report is available to the public, while the full report is available only for WRF subscribers. Research partners and co-funding organizations were: City of Fort Collins, City of Scottsdale Water Department, Clayton County Water Authority, Denver Water, Region of Waterloo, Tacoma Public Utilities, Toho Water Authority, and the Alliance for Water Efficiency on behalf of Portland Water Bureau, Region of Peel, San Antonio Water System, and Tampa Bay Water.

For info: Report available at: www.waterrf.org/PublicReportLibrary/4309A.pdf

CLIMATE CHANGE US RESPONSES & PROGRESS

The National Water Program has released the "*2015 Highlights of Progress: Responses to Climate Change*." Part I of this report presents key "highlight" projects and products implemented by the National Water Program and Office of Research and Development in 2015 in each of six vision areas: water infrastructure; watersheds and wetlands; coastal and ocean waters; water quality; working with Tribes; and cross-cutting program support. Part II of this report includes descriptions of key 2015 "highlights" of climate change and water work in each of the 10 EPA regional offices.

For info: www.epa.gov/sites/production/files/2016-04/documents/final_2015_nwp_climate_highlights_reportv2_0.pdf

RIVER WATER QUALITY US INFORMATION GAP

On April 12, the Izaak Walton League of America (IWLA) released a report on water quality monitoring asserting that Americans are in the dark about the health of local waters, potentially leaving pollution undetected. The report shows that state water quality monitoring in streams across the country is haphazard and limited resulting in "an alarming lack of timely information about water quality in this country," said IWLA Executive Board Chair Jodi Arndt Labs.

IWLA conducted an extensive investigation into stream monitoring practices and water pollution problems in all 50 states and uncovered startling results: states are effectively monitoring water quality in only 2% of rivers and streams nationwide; more than half (55%) of the streams and rivers states tested were not safe for designated uses such as swimming, fishing, and as sources of drinking water; pollutants in these waters include a laundry list of bacteria, carcinogens, and nutrients; testing sites are often randomly located and limited in number; most information about water quality in streams is 5 to 10 years old; and more than half of all states (26) received D or F grades for the overall effectiveness of the state's stream monitoring efforts.

The Clean Water Act of 1972 requires states to monitor the safety of all waterways, report water quality information publicly every two years, and address pollution problems. IWLA noted that states vary widely in virtually every aspect of water quality monitoring, including standards used to assess water quality; where, when, and which waters are tested; the types of tests performed; and how states provide information to the public. IWLA found that many states have weak water quality standards that can inflate the number of waters rated clean and healthy — and most states don't monitor water quality often enough to make accurate statewide safety claims.

IWLA is proposing a solution to this problem: empowering citizens to collect scientifically valid water quality data (and ensuring states use this data more effectively). IWLA has been training and supporting citizen volunteers for decades through its Save Our Streams (SOS) program. Variations of the SOS program have been adopted by states and volunteer groups across the country. IWLA provides free tools — including training videos, data forms, equipment lists, and a new biological monitoring mobile app — to help any volunteer get started with water quality monitoring. Program materials are available online at www.iwla.org/sos.

For info: Full Report at: www.iwla.org/righttoknow

COLUMBIA BIOP REJECTED NW FED PLAN INVALIDATED (AGAIN)

The US District Court for the District of Oregon (Court) on May 4th invalidated the federal government's 2014 Columbia Basin salmon biological opinion (salmon plan or BiOp). Judge Michael Simon ruled that this latest plan — like each of its four predecessors — violates the federal Endangered Species Act and additionally the National Environmental Policy Act. The Court sided with plaintiff fishing businesses, conservation groups, clean energy advocates, the State of Oregon, and the Nez Perce Tribe in finding the latest federal plan for protecting endangered Snake and Columbia river salmon and steelhead is fatally flawed. *National Wildlife Federation, et al. v. National Marine Fisheries Service, et al*., Case No. 3:01-cv-00640-SI (D. Or. May 4, 2016).

The long and tortured nature of the case was noted by the Court: "The 2014 BiOp is the latest in a series of biological opinions issued by NOAA Fisheries since 1992 relating to operations of the FCRPs. NOAA Fisheries previously issued biological opinions that were challenged in this lawsuit in 2000, 2004, and 2008, and a supplemental biological opinion in 2010. Each time, the Court, acting through US District Judge James A. Redden, found certain conclusions by NOAA Fisheries in the biological opinions to be arbitrary and capricious." *Opinion* and *Order*, footnote 4 at 5.

The Court rejected the BiOp as inadequate and illegal on several grounds in the 149-page *Opinion and Order*:

- It rejected the plan's foundational "trending towards recovery" legal framework that allowed the agencies to conclude that the plan was working "with very little actual improvement in fish abundance;"
- It rejected the plan's heavy reliance on uncertain and speculative habitat mitigation measures to make up for the harm caused by the dams;
- It found the government failed to adequately assess the "potentially catastrophic impact" of climate change on the basin's salmon and steelhead populations; and
- It found that the agencies violated the National Environmental Policy Act by failing to consider alternatives to the

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current narrow approaches that have "already costs billions of dollars, yet they are failing."

In its Conclusion the Court set forth the following orders: "[N]ot later than March 1, 2018, NOAA Fisheries is directed to file with the Court its new biological opinion. The Court retains jurisdiction over this matter to ensure that the Federal Defendants: (1) develop appropriate mitigation measures to avoid jeopardy; (2) produce and file a biological opinion that complies with the ESA and APA; and (3) prepare an EIS that complies with NEPA." *Id*. at 149.

"Hundreds of thousands of adult salmon died last summer because of warm water in the Columbia and Snake reservoirs," said Todd True of Earthjustice, one of the attorneys representing the fishing and conservation plaintiffs. "The Court's sharp rejection of yet another illegal federal plan for operating the dams on these rivers amplifies the clear warning that management of these dams must change dramatically — and very quickly — if wild salmon are to inhabit these rivers in the future. It's time to finally get this right. We need to seriously consider a plan that retires and removes the four lower Snake River dams. Only action on this scale has the potential to allow wild salmon to survive and recover in light of the vivid threat they face from a warming climate."

Plaintiffs in this case include: American Rivers, Columbia Riverkeeper, Federation of Fly Fishers, Idaho Rivers United, Idaho Wildlife Federation, Institute for Fisheries Resources, National Wildlife Federation, Northwest Sportfishing Industry Association, NW Energy Coalition, Pacific Coast Federation of Fishermen's Associations, Salmon For All, Sierra Club and Washington Wildlife Federation.

For info: Court Order available at: http://earthjustice.org/

WQ STANDARDS US

EPA RECOMMENDATIONS

EPA has put together a list of recommended actions for developing water quality standards. It includes tools, approaches, and resources being developed by the EPA to help meet the standards. The recommendations are intended for states and tribes, but are not legally binding requirements. The purpose of this document is to outline EPA's recommended priority actions and approaches for states and tribes to consider carrying out in their **w**ater **q**uality **s**tandards (WQS) and **w**ater **q**uality **c**riteria (WQC) programs for the next two years. The document also describes tools, approaches and resources that EPA is developing to assist states and tribes in meeting these priorities.

EPA states that "[F]ulfilling these priorities will be a cooperative effort requiring effective working relationships between states and tribes and EPA to improve and modernize WQS and WQC programs."

Priorities were selected based on a number of considerations including: subject areas in which EPA believes the greatest environmental and human health benefits can be achieved; legal obligations and litigation vulnerabilities; resources available to both EPA and the states and tribes; the public's interests and expectations; opportunities for national advancement; advances in science and technology; and recent updates to EPA's water quality standards regulations (which included goals of greater transparency and building a stronger regulatory foundation for state and tribal WQS actions).

For info: EPA's Recommended Priorities for State and Tribal WQS and WQC Programs is available at: www.epa.gov/sites/production/files/2016-02/documents/wqs_priorities_draft_022616_508.pdf

GREEN INFRASTRUCTURE US

NEW WRF PROJECTS

The Water Research Foundation (WRF), a leading sponsor of research supporting the water community, has announced two new projects that will provide guidance on: 1) **c**apital **i**mprovement **p**roject (CIP) project delivery methods for drinking water and wastewater utilities; and 2) incentives for green infrastructure on private property for combined sewer and stormwater utilities, stormwater program managers, and city planners.

The project, *Project Delivery Performance Evaluation and Decision Support Tool for Water and Wastewater Capital Projects*, will provide the first ever quantitative comparison of **d**esign **b**uild (DB), **c**onstruction **m**anager **a**t **r**isk (CMAR), and **d**esign-**b**id-**b**uild (DBB) project delivery methods for the water and wastewater sector and develop an electronic decision support tool based on the performance data. Results of this research will provide the water sector with statistically significant comparative results for delivery options for common project metrics (cost, schedule, and quality). The analytical evaluation of these results and development of the decision support tool will increase the water sector's ability to confidently select the project delivery method that best suits the project specific construction needs.

The project, *Incentives for Green Infrastructure Implementation on Private Property*, will identify how green infrastructure and low-impact development can be incentivized on private property, beyond the minimum required by development and redevelopment ordinances. The outcome of this project will be a resource guide to help combined sewer and stormwater utilities develop or refine incentive programs to become more effective as an offset to CIP implementation.

For info: WRF website: www.waterrf.org/Pages/Projects.aspx?PID=4309

CLIMATE ADAPTATION WEST

WATER SUSTAINABILITY REPORT & TOOL

The *SECURE Water Act Report*, produced by the US Bureau of Reclamation and its state and local partners, was released following the White House Summit on Water in March.

The report identifies climate change as a growing risk to Western water management and cites due to: warmer temperatures; changes to precipitation; and snowpack changes effecting the timing and quality of streamflow runoff across major river basins. Western states face risks to: water supply, quality, and operations; hydropower; groundwater resources; flood control; recreation; and fish, wildlife and other ecological resources.

The report shows several increased risks to western United States water resources during the 21st century.

WATER BRIEFS

Specific projections include:

- Temperature increase of 5-7 degrees Fahrenheit by the end of the century;
- Precipitation increase over the northwestern and north-central portions of the western US and a decrease over the southwestern and south-central areas;
- Decrease for almost all of the April 1st snowpack, a standard benchmark used to project river basin runoff; and
- A 7 to 27 percent decrease in April to July stream flow in several river basins, including the Colorado, the Rio Grande, and the San Joaquin.

Specific basin-level impacts include:

Southern California: In Southern California, warming and population growth are projected to increase water demand, reliance on imported water and the use of groundwater in the area, leading to development of alternative water supplies, such as recycled water.

Colorado River Basin: Reductions in spring and early summer runoff could translate into a drop in water supply for meeting irrigation demands and adversely impact hydropower operations at reservoirs.

Klamath and Truckee River Basins: Warmer conditions may result in increased stress on fisheries, reduced salmon habitat, increased electricity demand, increased water demands for in-stream ecosystems, and increased likelihood of invasive species' infestations.

Columbia and Missouri River Basins: Moisture falling as rain instead of snow at lower elevations will increase the runoff during the wintertime rather than the summer, translating to reductions for meeting irrigation demands, adversely impacting hydropower operations, and increasing wintertime flood-control challenges.

Sacramento and San Joaquin River Basins: Earlier season runoff combined with a potential for increasing upper watershed evapotranspiration may reduce the capacity to store runoff in Reclamation's Central Valley Project and state reservoirs.

Rio Grande Basin: Reduced snowpack and decreased runoff likely will result in less natural groundwater recharge. Additional decreases in groundwater levels are projected due to increased reliance on groundwater pumping.

While climate change poses significant risks to Western water resources management, Reclamation is already addressing vulnerabilities through adaptation strategies being developed with water managers across the West. For example, under the WaterSMART Program, collaborative basin studies evaluate the impacts of climate change and identify a broad range of potential options to resolve current and future water supply and demand imbalances.

Reclamation has forged collaborative relationships in 15 of the 17 Western states with a diverse group of non-Federal partners, including state water resource agencies, tribal governments, regional water authorities, local planning agencies, water districts, agricultural associations, environmental interests, cities, and counties. These partnerships focus on identifying and developing adaptation strategies to address the vulnerabilities related to drought and climate change.

In addition to the new Report, the Interior Department launched an online tool enabling the public to visualize the regional impacts and potential adaptation options. The tool allows users to check, by basin, how temperature, precipitation, and snowpack are projected to be affected by climate change and how climate change may affect runoff and water supplies. The viewer can also check the projected flow of a river at specific points and times of the year and display adaptation options.

The Report and visualization tool provides a five-year update on the river basins listed in the SECURE Water Act — the Colorado, Columbia, Klamath, Missouri, Rio Grande, Sacramento-San Joaquin and Truckee river basins — as well as other Western river basins.
For info: The SECURE Water Act Report, fact sheets on projected climate change impacts on the eight western river basins, and the visualization tool are available at www.usbr.gov/climate/secure.

WATER FINANCE CO BASIN INVESTMENT BLUEPRINT

The report "*Liquid Assets: Investing for Impact in the Colorado Basin*" reflects the results of an investigation undertaken by Encourage Capital and Squire Patton Boggs, in collaboration with the Walton Family Foundation, to identify potential impact investments that could be successfully deployed to finance water resource solutions, generate related environmental benefits, and create a financial return. This report outlines eleven promising impact investment strategies that have been grouped into nine separate "investment blueprints." These strategies are intended for use as generic models in the development and investigation of specific investment opportunities on the ground. Some of these concepts represent a proposed re-tasking of existing investment tools and approaches that have been successfully deployed in other natural resource contexts. Others represent unique approaches that combine or build on investment structures that have not previously been used in the context of natural resource management.

While these blueprints could potentially be deployed in many parts of the West, this investigation is focused on the Colorado River Basin, one of the most water-stressed watersheds in the Western US, and one of the most heavily regulated and developed river systems in the world.

The 399 page report details targeted opportunities for: Forest Health Environmental Impact Bonds; Riparian Restoration Environmental Impact Bonds; Sustainable Ranching; Crop Conversion & Infrastructure Upgrades; Commodity-Indexed Dry-Year Options; System Loss Pay for Performance; Green Bonds with Sustainability Conditions; Next Generation Water Trusts; and Water Storage Trading.
For info: The report "*Liquid Assets"* is available online at: http://encouragecapital.com/solutions-strategies/water/

CALENDAR

May 16 WA
Environmental Due Diligence Seminar, Seattle. WSCC Conference Center. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

May 16 TX
Endangered Species Act Conference, Austin. Omni Hotel at Southparrk. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

May 16 TX
Rainmaker Award Dinner Honoring Carlos Rubinstein, Austin. Bullock Texas State History Museum. Hosted by Texas Water Foundation. For info: Carole Baker, 512/994-7260 or cbaker@texaswater.org

May 16-17 OR
11th Annual Oregon Brownfields Conference, Sunriver. Sunriver Resort Conference Center. For info: www.oregon4biz.com/Brownfields-Conference-2016/

May 17 WA
Spring Networking Event - Students & Water Professionals, Seattle. Vista Café, Foege Bldg. At University of Washington. Hosted by AWRA-WA Section. For info: http://goo.gl/forms/5ILVg8Vr4d

May 17-19 MD
National Essential Fish Habitat Summit Public Meeting, Annapolis. Westin Annapolis, 100 Westgate Circle. Presented by National Marine Fisheries Service. For info: www.fisheriesforum.org/our-work/special-projects/efh-summit

May 18-19 WA
2016 WateReuse Pacific Northwest Conference, Spokane. Red Lion Hotel at the Park. For info: https://watereuse.org/news-events/conferences/

May 18-20 CA
California Water Ass'n 2016 Spring Conference, Sacramento. The Citizen Hotel. For info: www.calwaterassn.com/upcoming-conferences/

May 19 WA & WEB
Floodplain Development: Regulation Under FEMA & ESA Seminar, Seattle. Hilton Seattle. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

May 19 MT
Spring 2016 Northwest Clean & Affordable Energy Conference, Missoula. Holiday Inn Missoula Downtown. Presented by Northwest Energy Coalition. For info: nwec@nwenergy.org

May 19 CA
Regulatory Capture at the Water-Energy Nexus: US Hydraulic Fracturing Regulation, Palo Alto. Stanford Woods Institute Presentation - Program on Water Governance. For info: https://earth.stanford.edu/events

May 19-20 CA
San Diego Tour 2016, San Diego. Desalinization Plant. For info: www.watereducation.org/general-tours

May 19-23 TX
Lower Rio Grande Valley Water Quality Management & Planning Annual Conference, South Padre Island. La Isla Grand Resort. Presented by Texas A&M University - Kingsville. For info: https://moneyconnect.tamuk.edu/C20209_ustores/web/store_main.jsp?STOREID=122

May 20 OR
Annual "Round-Up" CLE Program - Agricultural Law Section, The Dalles. Columbia Gorge Discovery Center. Presented by Agricultural Law Section - Oregon State BAR; Deadline to Register May 9 - Space Limited. For info: Janine Hume, 503/ 227-1111 or jhume@sussmanshank.com

May 22-24 CO
20th Annual WateReuse Research Conference, Denver. Westin Denver Downtown. For info: https://watereuse.org/news-events/conferences/

May 23-24 RI
Hydropower Relicensing Conference, Providence. Omni Providence. For info: www.euci.com/events/0516-hydro-power-relicensing/

May 23-26 LA
AWEA Wind Power 2016 Conference & Exhibition, New Orleans. Ernest N. Morial Convention Ctr. Presented by American Wind Energy Ass'n. For info: www.windpowerexpo.org/index.aspx?&RDtoken=22301&userID=

May 24 TX
Thirst for Power: Energy, Water, and Human Survival: People & Nature 2016 Speaker Series, The Woodlands. Lone Star Community Bldg., 5000 Research Forest Drive, 6p.m. Speaker: Dr. Michael Webber Presented by HARC (Houston Advanced Research Center). For info: www.harcresearch.org/

June 1 CA
Blue Tech Forum 2016: 20:20 Vision - Insights to Future-Proof Your Water Strategy, San Francisco. Airport Marriott Hotel. For info: www.bluetechforum.com/

June 1 ID
National Climate Boot Camp: Tribal Needs & Concerns Related to Climate Change, Moscow. University of Idaho. Presented by USGS & University of Idaho. For info: www.usgs.gov/newsroom/article.asp?ID=4320#.VhQe5ygqY-Y

June 1 CA
Third Annual California Water Summit: "Investing in Water Assests & Infrastructure as California's Water Revolution Takes Off", Sacramento. The Westin Sacramento. For info: www.ca.watersummit.com

June 2-3 CA
Endangered Species in California (ESA & CESA) Seminar, Long Beach. Courtyard Long Beach Downtown. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

June 6 WA
Natural Resources Damages: Assessment & Restoration Conference, Seattle. WA State Convention Ctr. For info: Environmental Law Education Center, 503/ 282-5220 or www.elecenter.com

June 6-7 CA
Sustainable Groundwater in California, Sacramento. Courtyard Marriott Sacramento Midtown. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

June 8 WA
Celebrate Water - CELP's Annual Meeting, Seattle. Ivar's Salmon House. Presented by Center for Environmental Law & Policy. For info: www.celp.org/

June 8-10 GA
One Water Summit 2016, Atlanta. Atlanta Marriott Marquis. Presented by US Water Alliance. For info: http://uswateralliance.org/one-water/one-water-summit-2016

June 9-10 CO
Coping with Water Scarcity in River Basins Worldwide: Lessons Learned from Shared Experiences - 2016 Martz Summer Conference, Boulder. University of Colorado School of Law. Presented by the Getches Wilkinson Center for Natural Resources, Energy & the Environment. For info: www.colorado.edu/law/research/gwc/events

June 12-14 WY
Governor's Annual Meeting, Jackson Hole. For info: http://www.westgov.org/

June 13 ID
Summer Water Law & Resource Issues Seminar, Sun Valley. Sun Valley Resort. Presented by Idaho Water Users Ass'n. For info: www.idahowaterengineering.com

June 15-17 CA
Bay-Delta Tour 2016, Bay Delta. Sacramento-San Joaquin Delta. For info: www.watereducation.org/general-tours

June 16 WA
Water Rights in Central Washington: Self-Assessment & Acquisition, Wenatchee. Coast Wenatchee Center Hotel. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

June 19-22 IL
ACE16 - American Water Works Association Annual Conference and Exposition, Chicago. McCormick Place. For info: www.awwa.org/conferences-education/conferences/annual-conference.aspx

June 20 CA
Tribes and CEQA Seminar: New Rules for Tribal Consultation Under AB 52, Cabazon. Morongo Casino Resort. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

The Water Report
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CALENDAR

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June 28-30 CA
Toward Sustainable Groundwater in Agriculture: 2nd International Conference Linking Science and Policy, Burlingame. Hyatt Regency S.F. Airport. Presented by Water Education Foundation & UC Davis Robert M. Hagan Endowed Chair. For info: http://www.watereducation.org/internationalgroundwater2016

July 10-13 CO
Water Environment Federation (WEF) & International Water Association (IWA) Nutrient Removal and Recovery Conference, Denver. The Hyatt. Presented by Water Education Foundation. For info: http://www.awwa.org/conferences-education/conferences/sustainable-water-management.aspx

July 11-13 CA
2016 AWRA Summer Specialty Conference: GIS & Water Resources IX, Sacramento. Hilton Sacramento Arden West. Presented by American Water Resources Ass'n. For info: www.awra.org/meetings/Sacramento2016/

July 13-14 CO
Water Quality in the Distribution System, Denver. EUCI Offices. Presented by EUCI. For info: events@eucievents.com

July 13-15 ND
Western States Water Council Summer (181st) Council Meeting, Bismarck. Radisson Hotel. For info: http://www.westernstateswater.org/upcoming-meetings/

July 13 NM
Hydrology & the Law Seminar, Santa Fe. TBA. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

July 14-15 NM
Natural Resources Damages Seminar, Santa Fe. La Fonda Santa Fe Hotel. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

July 18-19 WA
Washington Water Law Seminar, Seattle. TBA. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

July 18-19 CO
Endangered Species Act, Wetlands, Stormwater & Floodplain Regulatory Compliance for Utilities, Denver. Hyatt Regency Denver Tech Center. Presented by EUCI. For info: events@eucievents.com

July 21-23 CA
Rocky Mt. Mineral Law Foundation 62nd Annual Institute, Squaw Valley. The Resort at Squaw Creek. For info: www.rmmlf.org

July 22 HI
Hawaii Water Law, Honolulu. Hilton Waikiki Beach. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

August 3-5 ID
Western Water Seminar, Sun Valley. Sun Valley Resort. Presented by National Water Resources Ass'n. For info: www.nwra.org/upcoming-conferences-workshops.html