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GROUNDWATER IN RURAL ARIZONA

A "DEEPENING" CHALLENGE

by Jocelyn Gibbon, J.D. (Freshwater Policy Consulting, LLC), Rachel O'Connor, M.E.S.M (Environmental Defense Fund), Haley Paul, M.S. (National Audubon Society), & Christopher Kuzdas, Ph.D. (Environmental Defense Fund)

Introduction

Groundwater is often considered a "hidden" resource. Although we typically hear less about it than we do about the storied and imperiled Colorado River or other western rivers, groundwater is especially critical in the intermountain West, including in Arizona and throughout the Colorado River Basin. Arizona, Nevada, and New Mexico are among the most groundwater-dependent states in the western United States, and their reliance on groundwater will increase as climate change impacts intensify and surface water resources become more scarce. Groundwater also supports more than half the annual streamflow in the Upper Colorado River Basin (Miller et al. 2021).

As the region enters deeper into an era defined by aridification (hotter temperatures and less precipitation), the importance of groundwater as a water supply will only grow. Yet in "rural" Arizona — making up about 80% of the land mass of the state and 40% of the Colorado River Basin — groundwater withdrawals and use remain essentially unregulated, despite increasingly evident consequences of overuse.

As residents, communities, tribes, and businesses from across the state raise questions and concerns about the future of their groundwater supplies, Arizona is in a position to craft and debate solutions that work for its diverse groundwater basins and subbasins to protect water supplies for the future. Moving forward, the steps that Arizona takes to address its open-access groundwater pumping will play a substantial role in determining the water security not only of its rural communities, but of the state, and potentially even the Colorado River Basin as a whole.

Background: Groundwater in Arizona

Across the Colorado River Basin, groundwater plays a larger role than is often acknowledged or understood. An analysis of U.S. Geological Survey (USGS) data reveals that each of the seven U.S. Colorado River Basin states relies on groundwater for from 13 to 50% of its water supply (EDF 2019). Many smaller and more rural communities are primarily or completely dependent on groundwater for drinking water. The Colorado River itself — including the Green River and other tributaries — is also highly dependent on groundwater. A 2016 USGS study found that 56% of total streamflow in the Colorado River Basin originates as groundwater (Miller et al. 2016).

In Arizona, groundwater makes up about 40% of the state's total water supply. This reliance will increase further in 2022 under a Tier 1 Colorado River shortage and in subsequent years under deeper shortages. Vast ancient aquifers underlie much of the state, fueling its growth even in areas without access to the Colorado River or other major rivers. Groundwater is a primary or sole supply of drinking water for many rural communities; more than half of Arizona's groundwater basins rely on groundwater for over 75% of their water supply (University of Arizona WRRC 2017). And groundwater is the source of the base flow, or year-round flow, in Arizona's rivers and streams that still flow year round, in addition to feeding the thousands of springs across the state (Stevens et al. 2020).

Arizona Groundwater

Groundwater's role in supporting Arizona's rivers, streams, and springs makes it even more important as a water supply for drinking and other cultural and economic uses — because most surface water supplies are at least partially dependent on groundwater. It also means that groundwater is central to supporting Arizona's remarkable landscapes and habitats. Arizona has been found by one study to be the third most biologically diverse state in the nation (NatureServe 2002); and all of that diversity and ecological function is dependent on water in the desert — much of which comes from the ground.

Given the interconnections among water supplies and demands across the state, strengthening water management in rural Arizona will be crucial not only to the future of rural Arizona communities, but to ensure that the state as a whole is able to meet its water needs and objectives into the future, and to most effectively partner with other states to meet Basin-wide challenges.

Arizona Groundwater Law & Management

Although groundwater is a critical water supply in rural Arizona, its use remains essentially unregulated and unmanaged in areas outside of the state's five Active Management Areas and three Irrigation Non-expansion Areas.

Figure 1:

Blue groundwater basins are Active Management Areas.

Purple groundwater basins are Irrigation Non-expansion Areas.

Tribal Lands are shown in gold.

Adapted from National Audubon Society material.

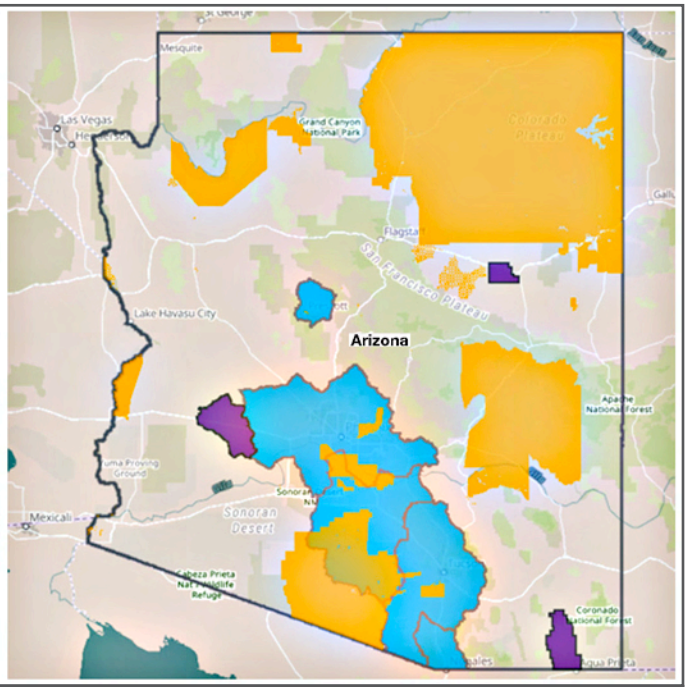
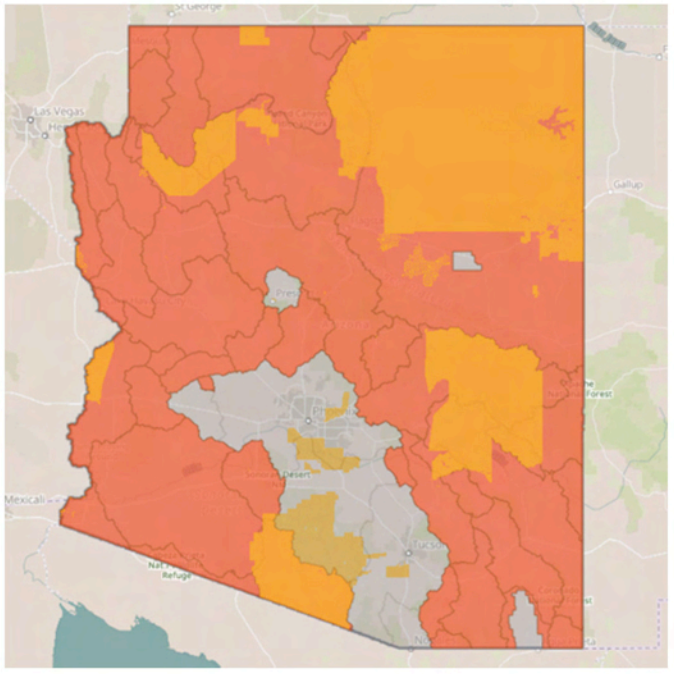


Figure 2:

Red indicates groundwater basins in "rural" Arizona, governed by the reasonable use doctrine.

Tribal lands are shown in gold.

Adapted from National Audubon Society material.



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Arizona Groundwater

Bifurcated Law

"Reasonable Use"

Accessible Groundwater

Land Subsidence

Groundwater Management Act

Active Management Areas "Safe Yields"

Rural Use

Reasonable Use

Unrestricted Use

Bifurcated Water Law & Reasonable Use

Surface water in Arizona has historically been governed by the Prior Appropriation doctrine, requiring a water right and priority date based on historic use in order to use water from rivers and streams. In contrast, since at least 1906, Arizona territorial and state courts have ruled that "percolating groundwater" is not subject to appropriation (*Howard v. Perrin*, 76 P. 460 (Ariz. 1904), aff'd, 200 U.S. 71 (1906)). What is often referred to as Arizona's "bifurcated" surface and groundwater law still persists today.

In 1953, the Arizona Supreme Court recognized "reasonable use" as the legal doctrine governing groundwater (*Bristor v. Cheatham*, 255 P.2d 173 (Ariz. 1953)). The reasonable use doctrine allows landowners to pump groundwater and put it to reasonable and beneficial use — and for the most part, this doctrine has not been interpreted as imposing constraints on groundwater use in Arizona. (In the 1950s through 1970s, the Arizona Supreme Court found that reasonable use of groundwater in Arizona did not allow for transporting groundwater off of the land where it was pumped, at least not without paying damages to injured neighbors — a holding whose unpopularity was one impetus for the 1980 Groundwater Management Act and its statutory revisions to the rules for groundwater transportation).

The 1980 Groundwater Management Act

Like other western states Arizona's growth accelerated tremendously after World War II, and by the mid-20th century, much of Arizona's rapidly increasing population was highly dependent on groundwater. The deep turbine pump and widespread, cheap electricity had made groundwater considerably more accessible. The Central Arizona Project, bringing Colorado River water into the growing interior of the state, was then still just a dream, and "in-state" surface water (from rivers like the Salt, the Verde, and the Gila) was only available in some parts of the state.

By the 1960s, groundwater level declines and land subsidence had become a concern both in the state's central urban areas (namely Phoenix, Tucson, and Prescott), and in its largest agricultural areas that did not directly border the Colorado River (notably the large expanse of agricultural lands in Pinal County between Phoenix and Tucson).

The 1980 Groundwater Management Act (GMA) was passed in response to these concerns — and to ensure continued federal funding for the construction of the Central Arizona Project canal. The federal government insisted that Arizona manage its groundwater declines as a condition of that continued funding — not wanting, presumably, to finance an expensive project to address groundwater dependence and overdraft if those conditions were going to simply persist (University of Arizona WRRC 2021).

The GMA was at the time of its passage hailed as an innovation in groundwater management. It created two types of "special management areas" for the state, areas where groundwater is governed according to locally specific requirements: Active Management Areas (AMAs) and Irrigation Non-expansion Areas (INAs). In an AMA, there are extensive statutory requirements and programs meant to help achieve the AMA's management goal (i.e., "safe yield" or a variation thereof for four of the five existing AMAs) (Ariz. Rev. Statutes § 45-562). The main feature of INAs is a requirement that no new land may be irrigated that was not irrigated prior to the establishment of the INA (Ariz. Rev. Statutes § 45-437).

There are currently five AMAs and three INAs in Arizona (*see* Figure 1, above). Although the Groundwater Management Act provided a process to create new AMAs and INAs in certain circumstances, these provisions remain largely unused. In 1994, the legislature divided off a piece of the Tucson AMA to create the Santa Cruz AMA, and in 1981 it created the Harquahala INA. No new AMA or INA has been created since then, nor has one ever been established by initiative of the Arizona Department of Water Resources or through the local petition process established by the GMA (*see* ADWR n.d.(a)).

Rural Groundwater

Arizona was often hailed as a success story in groundwater management because of the innovations of the 1980 GMA. But these provisions, now forty years old, for the most part apply only within those areas of the state designated as AMAs and INAs. Outside of these areas, and sovereign tribal lands, groundwater use in Arizona is still governed by the legal doctrine of "reasonable use."

Now enshrined in statute, the reasonable use doctrine allows a landowner outside of an AMA or INA to put any amount of water to any reasonable and beneficial use (Ariz. Rev. Statutes § 45-453). Although there are restrictions on transporting groundwater across basin or subbasin lines, and an "adequate water supply" program that provides some level of disclosure about water supplies to the first purchasers of new subdivisions, for the most part the reasonable use doctrine means that groundwater use is *unrestricted* throughout the bulk of "rural" Arizona (*see* Figure 2, above). And while "rural" is the term generally used in water circles to refer to Arizona outside of the AMAs, some of these areas include small cities and fast-growing regions that arguably are no longer especially rural in nature.

Arizona Groundwater

Rural Permitting

In non-AMA Arizona, unlike in most of the West, there is no general requirement for a state-issued permit, water right, or other authority in order to use groundwater. (Some western states don't require permits for smaller stockwater and domestic uses from what are often called "exempt" or "permit-exempt" wells). Before drilling a new well in Arizona, a landowner must file a "notice of intent to drill" in order to obtain a well-drilling permit; but the requirements only address well construction standards and do not relate to water use (Ariz. Rev. Statutes § 45-596). Arizona, as a result, does not comprehensively track, let alone manage, groundwater use in rural basins. [Editor's Note: Washington state has also found that large stockwater uses fall under the state's provisions for permit-exempt wells. *See* Osborn, *TWR* #71 and Water Briefs, *TWR* #95].

No Impact Analysis

In practice, what this typically means is that new and ongoing groundwater uses are allowed to proceed outside of the AMAs and INAs regardless of impacts, and indeed without any analysis of such impacts. In practice, a landowner may pump any amount of groundwater, and initiate a new use, even if:

- the total groundwater use in the basin exceeds recharge or what is sustainable in the long term
- the pumping causes the water table to lower or dries up existing wells
- the pumping impacts the flow of rivers, streams, or other surface water resources, potentially interfering with the water uses and rights of other established users

"Open Access" Use

Rural Arizona is one of the last remaining areas of true "open-access" groundwater pumping in the western United States, a place where the deepest well still wins. In the Colorado River Basin as a whole, rural Arizona remains the only region (with the arguable exception of a few very small areas of California) where a state-issued water right, permit, or other authority is not generally required in order to initiate a new groundwater use (EDF 2019).

In the past ten years, the consequences of unconstrained groundwater pumping are becoming more visible and acute across rural Arizona, pointing to a lack of water security that arises from the state's "free-for-all" approach.

Subflow Category

Subflow

Although it is not the focus of this discussion, it is worth noting another legal "wrinkle" that further complicates this picture. There is also a legal category of water in Arizona called "subflow," which is water that is pumped from underground, but that Arizona courts determine to be so closely connected to surface water that it is actually surface water under the law, and requires a water right and a priority date in order to use (*Maricopa County Munic. Water Cons. Dist. No. 1 v. Southwest Cotton Co.,* 4 P.2d 369 (Arizona 1931), modified and rehearing denied, 7 P.2d 254 (1932)). But so far in most parts of the state it has not been finally determined who is pumping "subflow" — or, what will happen to those pumpers who have a well, who are found to be pumping subflow, which is surface water — but did not go through the administrative process that is required to acquire a surface water right. This greatly complicates and intensifies the challenges in some parts of the state.

Surface Water Connection

Unregulated Consequences

Consequences of Unregulated Groundwater Pumping

Depletion of groundwater supplies can lead to a host of unwanted consequences. In parts of non-AMA Arizona, especially in the last decade, we are seeing increasingly visible evidence of some of these consequences, including:

- Declining groundwater levels
- Land subsidence
- Impacts to existing wells
- Diminishment of community water supplies
- Declining flows in rivers, streams, and springs

These first-order consequences also lead to increasing conflict among neighbors as they intensify.

"Index Wells"

Declining Groundwater Levels

Declining groundwater levels are evident in certain regions of rural Arizona.

The Arizona Department of Water Resources (ADWR) monitors water levels in about 1800 "index wells" across the state and publishes periodic reports showing groundwater level changes in these individual wells.

Groundwater Declines

ADWR acknowledges and emphasizes that data from individual index wells are not necessarily representative of conditions across a groundwater basin or subbasin. Nonetheless, this is often among the best information available indicating whether there are trends in groundwater level changes in a particular area. Looking at the data visually, one can discern groupings of wells where there have predominantly been declines in water levels over the last twenty years (ADWR 2020a). (*See* Figure 3, next page).

Arizona Groundwater

Groundwater Level Changes

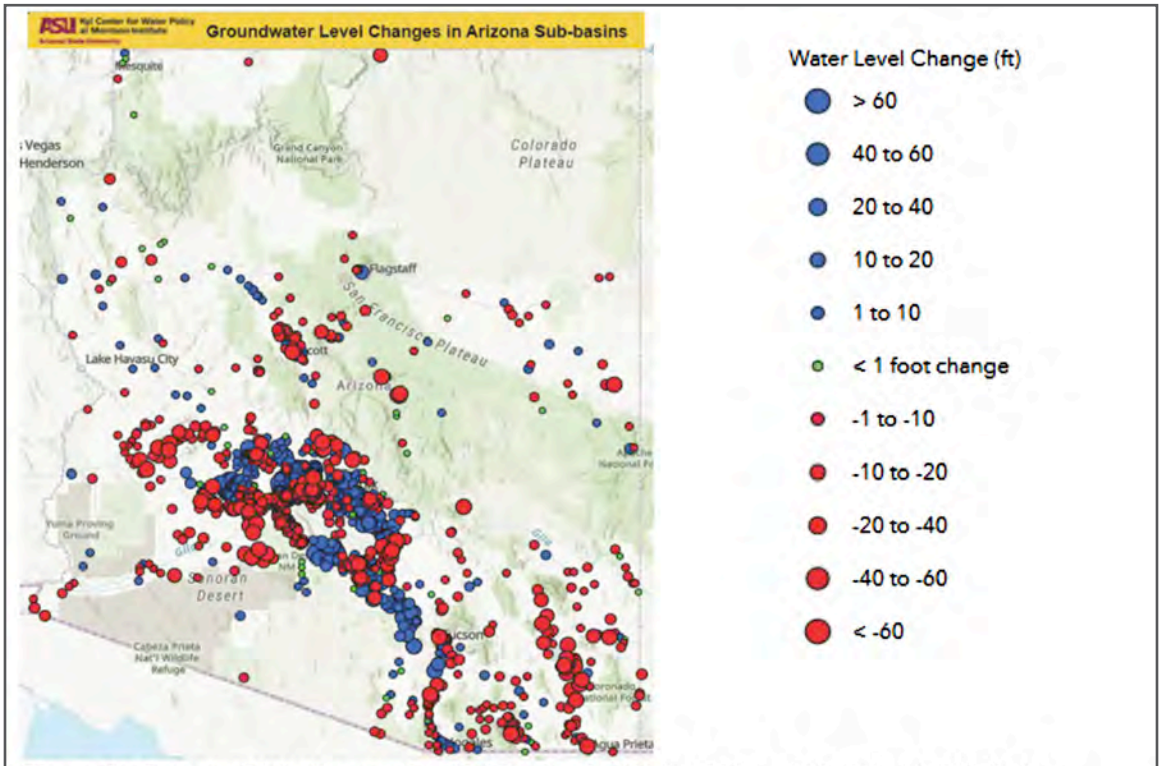

Figure 3: *Arizona State University's Kyl Center for Water Policy at Morrison Institute has recently created a web application that visually represents ADWR data showing changes in well water levels between 1998 and 2018. Data is from index and other wells in ADWR's Groundwater Site Inventory.* See https://azwaterblueprint.asu.edu/news/groundwater-level-change-app-launched

"Hot Spots"

Based on recent index well data, potential "hot spots" for groundwater level declines in non-AMA Arizona include the Willcox Groundwater Basin in southeastern Arizona, where groundwater levels in index wells declined an average of 28 feet from 2009-2019; the McMullen Valley Groundwater Basin west of Phoenix, where the average decline over the same period was ten feet; and the Hualapai Valley Groundwater Basin, with an average decline of six feet (ADWR 2020b). The Hualapai Valley Groundwater Basin, in northwestern Arizona, supplies the City of Kingman.

Declining Water Levels

In 2016, ADWR published a report that looks more closely at groundwater basins in southeastern Arizona, analyzing water use and water level changes in the Douglas and Willcox Groundwater Basins and San Simon Valley Sub-basin. ADWR's data shows that over the last several decades, water levels have declined between tens and hundreds of feet. Of the 392 wells measured in these three basins, 339 wells had declining water levels. The median water level change was a decline of 23.7 feet and the median rate of change was a loss of 2.6 feet per year. Simply put, in some places the water table appears to be dropping by 25 feet every decade (ADWR 2016a).

There are many places across the state where ADWR does not have index wells. For example, there is a notable paucity of such wells in the vast Coconino Plateau groundwater basin in north-central Arizona near Flagstaff, Tusayan, and Grand Canyon National Park (*see* Figure 3). Although the USGS does have some wells that it monitors in these areas, there are nonetheless large gaps in regularly tracked, publicly available data and in analyses of the data's significance.

Compaction Impacts

Land Subsidence

Land subsidence can occur in some aquifer systems when large amounts of groundwater are withdrawn. As groundwater levels decline, the small pores, cracks, and crevices where groundwater occurs begin to close in on themselves and collapse, causing the land to sink. This compaction can permanently reduce the total storage capacity of an aquifer.

Subsidence Rates

In the Willcox Groundwater Basin, found to be the most active subsidence area in the state, subsidence rates have nearly tripled between 1996 and 2015 (ADWR 2016a). Current subsidence rates are estimated at roughly 5.9 inches per year. At one site, there has been over five feet of land subsidence between 1992 and 2019, with 2.3 feet of subsidence occurring between 2011 and 2019. This has resulted in significant earth fissures, which have impacted roads, gas pipelines, and power lines (ADWR 2019).

Arizona Groundwater

AMAs: Subsidence Decease

Existing Wells Data

Well Depths

Water Supplies

Agricultural Use

USGS Modeling

Land Management

Tribal Impacts

Surface Water Impact

Subsidence has also occurred in McMullen Valley Basin. In some areas, the land surface has lowered by 16 inches, which has resulted in 2.1 miles of earth fissures (ADWR 2020c).

In total, land subsidence has occurred on over 3,400 square miles across the state, creating 357 miles of earth fissures. The most active subsidence is in rural Arizona outside of AMAs. In contrast, in the Phoenix and Tucson AMAs — where groundwater pumping is regulated and basins have safe yield goals — subsidence rates have decreased between 25 and 90 percent compared to the 1990s (ADWR 2019).

Impacts to Existing Wells

As groundwater levels decline, impacts to existing wells and water users are also being reported.

The extent of these impacts is hard to gauge, as no agency is charged with tracking water level declines or related impacts in individual private wells, nor documenting when a well runs dry. (ADWR has a web form on which landowners may voluntarily report a dry well to help "ADWR hydrologists to better understand aquifer conditions within a Basin or Sub-basin," but it is not widely used (*see* ADWR n.d. (b)).

Journalists have played an important role in documenting the challenges faced by rural Arizona well owners in recent years. The Arizona Republic published a five-part series — "*Arizona's Next Water Crisis*" — in December 2019 detailing how the proliferation of large wells drilled in rural communities across the state are drying up wells of long-time local residents, causing social and economic hardship. In Willcox, for example, residential wells are several hundred feet deep, while new corporate agricultural wells were drilled to over 2,000 feet deep. In La Paz County, long-time residents have expressed concern about declining water tables as multinational agribusiness drills deep wells to grow alfalfa that is shipped abroad. As domestic wells go dry, some must haul water until they can have their well deepened, while others consider moving because they cannot afford the costs (James and O'Dell 2019).

Other media outlets — e.g., the Daily Star, the High Country News, and the New York Times — have reported on similar challenges in rural Arizona, especially in areas of Mohave, La Paz, and Cochise Counties. In addition, some residents from rural communities have offered testimony at recent legislative groundwater study committee hearings, telling personal stories of neighbors' and friends' wells going dry.

Diminishment of Community Water Supplies

Unconstrained groundwater pumping also has implications for communities' water supplies as a whole. One example is in Kingman, where the Hualapai Basin — the primary source of Kingman's water — was projected by one study to have as few as 60 years of accessible groundwater remaining, at least without getting down into very deep water.

Groundwater pumping for agricultural use began very recently in the Hualapai basin — in 2014 for the irrigation of alfalfa, and then starting in 2016, for the irrigation of orchards for nuts, such as pistachios. A 2019 report commissioned by ADWR modeled groundwater depletions if land then owned by known farming operations were irrigated over time, based on different possible crop mixes of alfalfa and orchards. The report projected that in approximately 60 years, groundwater levels could reach 1200 feet below the ground, a depth beyond which groundwater is no longer considered "physically available" under the state's "adequate water supply" consumer protection regulations (Matrix 2019).

In the fall of this year, USGS published a new modeling report with projections based on different assumptions — including lower-water-use crops, on fewer acres of irrigated agricultural land. USGS concluded that if those assumptions play out, an extra 100 years of groundwater or more may remain above 1200 feet (Knight et al. 2021). The results of these studies show how much water and land management choices matter to the long-term viability of communities that rely on groundwater. It is clear that the future of water supplies in this area is precarious. Local communities have little authority to actually influence which assumptions play out in the future.

Ultimately the lack of tools and authorities to protect rural groundwater promises to be a problem not just for Kingman, but for many Arizona communities, since most communities in non-AMA Arizona are dependent on groundwater as a primary or even sole water supply. Some communities also rely on water from groundwater-fed rivers and streams, so those supplies are also at risk if unabated groundwater pumping continues.

Groundwater pumping can also impact springs, streams, and aquifers valued and relied on by sovereign tribal nations. As just one example, the Havasupai Tribe depends on the water in spring-fed Havasu Creek (in the Grand Canyon in northern Arizona). The Tribe has tried — as yet unsuccessfully — to use the court system to try to protect the waters on their reservation and their ancestral lands from depletion caused by nearby groundwater pumping (*Havasupai Tribe v. Anasazi Water Co*., 321 F.R.D. 351 (D. Ariz. 2017)).

Declining Water Levels in Rivers and Streams

In addition to impacts on groundwater levels, individual wells, and community water supplies, we have seen the impacts of unconstrained groundwater pumping on rivers, streams, and springs. Rivers and streams that flow year round in Arizona are generally sustained by groundwater; unrestricted groundwater pumping and climate change will continue to put these waterways at risk.

Arizona Groundwater

Verde River Headwaters

The flow regime of many of Arizona's rivers that once flowed perennially has changed over time. Groundwater level declines from well pumpage can cause loss of surface water flow as well as reduction in riparian vegetation.

One example is the Santa Cruz River near Tucson, where once-perennial stretches of river are now mostly dry, and large mesquite bosques supported by shallow groundwater have disappeared (Webb et al. 2007).

Another example is Del Rio Springs, which used to feed the Verde River's headwaters. Over time, as groundwater development increased in the Prescott area in northern Arizona, water levels in the Little Chino groundwater subbasin dropped, ultimately depleting Del Rio springs to an inconsistent trickle. When combined with agricultural diversions of surface water, this has left about five miles of what used to be the Verde's headwaters without water (Stevens et al. 2020; Haney et al. 2008). A 2013 USGS study found that water levels in the Verde River have declined by as much as 10,000 acre-feet a year — or eight percent of its annual flow — because of groundwater pumping over the last century (Garner et al. 2013).

Base Flows

Groundwater also supports base flows in the San Pedro River. As of 2007, wells were removing water at 240% of the natural recharge rate in certain San Pedro subwatersheds, causing a significant deficit in the amount of water that goes into the river and groundwater system versus what is withdrawn. Conservation and replenishment projects undertaken in recent years have caused hydrologic conditions in some locations near the Upper San Pedro River to improve — but overall, a deficit remains. Projections of future groundwater pumping and impacts to river flows suggest that, unless pumping can be further reduced or recharge substantially increased, base flow in the river will continue to decline — damaging riparian vegetation within the San Pedro Riparian National Conservation Area (Turner and Richter 2011; Gungle et al. 2016).

Riparian Damage

Grand Canyon Concerns

As a final example, groundwater feeds springs and streams in the Grand Canyon area. These valuable water sources are of great cultural significance to multiple Native American tribes; provide essential water to residents and visitors in and around Grand Canyon National Park; and support unique and sensitive ecosystems. Riparian habitats occur at springs, seeps, and short stream segments fed by springs, and support a species diversity 100-500 times greater than surrounding landscapes (NPS 2015). As growth and development and aridification increase stress on the shallower aquifers of the Coconino Plateau, it is becoming more common to drill wells into the deeper aquifer. This raises concerns about the health of spring and seep flows that discharge into the Grand Canyon. Decreasing flow was observed at two springs below the South Rim between 1994-2004: there was a 19% decrease in the flow of Cottonwood Springs and 25% decrease at Garden Creek (Kobor et al. 2004).

Groundwater Depletion

It is evident that unconstrained groundwater pumping negatively affects rural Arizona. These negative impacts will only intensify, and lead to increased conflict and more difficult challenges, unless action is taken to slow groundwater depletion.

Rural Management?

The Rural Groundwater Dialogue: Towards Solutions

Even in 1980 when the Groundwater Management Act was passed, there was acknowledgement by some of its creators that eventually groundwater in the then-more-rural areas of the state would need attention and ultimately a framework for management — but this was seen as an issue for another day. More than forty years later, rural Arizonans can increasingly be heard asking if that day has come.

Status Quo

Resistance and Inaction

Often the public dialogue about rural groundwater has been very binary: either create a new AMA for basins with severe challenges or do nothing. There is a widely expressed belief that AMAs are not appropriate for most rural basins, which is sometimes posited as the reason that the status quo is the best option. Thus, discussion of alternative solutions has generally been stymied.

In the last two decades there have been a handful of efforts in various parts of Arizona to ask the state to authorize new types of special management areas, or authorities for local communities — but for the most part these efforts have not been successful.

Local Initiation

One near exception was in 2006, when ADWR convened a "Statewide Water Advisory Group" (SWAG), focusing on rural water management challenges. The group discussed but did not advance a concept for a new type of water district for rural areas statewide. It did ultimately make recommendations for a water district in the Upper San Pedro River area, where conflicts and concerns were especially acute. In 2007, at the recommendation of the SWAG, the state legislature passed legislation authorizing the creation of the "Upper San Pedro Water District" upon approval of local voters (Ariz. Rev. Statutes § 48-6401) However, the proposal to create the district was narrowly defeated in an election by residents in 2010, and the legislative authorization allowed to sunset in 2012.

Legislative Proposal

In 2014 and 2015, residents of Cochise County worked with ADWR to develop a legislative proposal for a new type of water management area called a "groundwater conservation area" — but this idea became divisive in the local community and failed at the state level due to insufficient legislative support.

Arizona Groundwater INA Petition

In the meantime, on several occasions residents have petitioned ADWR for the creation of new INAs in specific basins or subbasins with declining groundwater levels. The ADWR's Director denied these petitions, finding that the statutory criteria (that there is not a reasonably safe groundwater supply for irrigation at current rates of withdrawals [Ariz. Rev. Statutes § 45-432]) had not been met (*see*, e.g., ADWR 2016b).

Changing Dialogue

A New Phase of Dialogue: Persistence

In the last few years, though, there are indications that the tenor, scope, and sophistication of the conversation are changing, and an increasing number of bills focused on rural groundwater management have been introduced — though not advanced — at the state legislature.

As accounts of failing residential wells and rapidly declining groundwater levels continue to percolate out of several regions of the state, an increasing number of rural leaders have come forward to ask the state and the legislature for help developing and implementing solutions — or for the authority to do so themselves at the local level (James and O'Dell 2020).

Basin Studies

In 2019, the legislature passed a bill (HB 2467), introduced by Representative Regina Cobb (R-Kingman), that established groundwater study committees for Mohave and La Paz Counties. These study committees were charged with gathering data about groundwater conditions in specific basins of concern and making recommendations to the legislature. The committees' recommendations are expected by the end of this year (Ariz. Laws 2019, Chapter 243).

"Rural Management Area"

In the 2020 legislative session — which ultimately was cut short due to COVID — there were the beginnings of conversations about extending groundwater protections to areas in Arizona that currently have none. One bill introduced by bipartisan sponsors (HB 2896) would have allowed a county board of supervisors to opt in to what has been named a "rural management area," or RMA — which would be a new management option for rural Arizona groundwater basins. An RMA would give local stakeholders the ability to select best management practices suited for their community. Ultimately, the bill was only heard for informational purposes and not given a full committee hearing or vote.

Again in 2021 there was a line-up of rural groundwater bills. The line-up included a bill about new INAs, the RMA bill, and others, including one to establish well-spacing or impact rules statewide (Paul 2021). In 2021, none of these bills received a committee hearing or opportunity for debate.

State-Wide Issue

That debate, however, has been bubbling up in other venues. In the La Paz and Mohave County study committees chaired by Representative Cobb, commenters have been coming forward to speak about groundwater issues not only in these two counties but in other areas of the state. In the meantime, in Cochise County, residents have begun gathering signatures for a petition that would put creation of new AMAs for the Willcox and Douglas groundwater basins on the local ballot in November of 2022.

Watershed groups, local elected officials, business voices, and other stakeholders from various parts of the state have started to weigh in at state-level forums, sharing the importance of groundwater to their community and asking that action be taken. The increasingly broad representation from different interests and geographies seems to signal a growing recognition that the impacts of unrestricted groundwater pumping are not isolated and that it is indeed a statewide issue requiring statewide action.

Potential Solution Sets: The RMA Dialogue

Solutions

Based on our observations working on these issues in Arizona, the policy dialogue has begun to move past the binary (AMA or not; is there a problem or not) to the generative: what are the potential solutions and solution sets to address rural groundwater challenges, and to meet the objectives and aspirations of rural communities.

Legislative Efforts

The rural management area concept introduced in HB 2896 in 2020 and HB 2679 in 2021 takes a step in this direction by proposing a new type of "special management area" for groundwater in Arizona.

RMA Creation

Under the RMA bills introduced in the last two years, state law would authorize the creation of an RMA for "groundwater basins at risk" in Arizona outside of AMAs. The county board of supervisors with jurisdiction over the majority of land in a basin would be authorized to create an RMA through resolution if the basin met the "at-risk" criteria in the bill.

Proposed RMA Structure

Upon creation of an RMA, a local council would be formed (through appointment by the Governor) and charged with creating a management plan for the RMA, as well as management goals if those had not already been prescribed by the board of supervisors. Plans would be approved by ADWR before taking effect. The available management tools and best management practices for potential inclusion in an RMA management plan are not described in detail in the bill but include voluntary and mandatory conservation programs, measuring and reporting requirements, and incentives for recharge. Responsibility for management plan implementation is also not made entirely clear in the introduced bills.

Arizona Groundwater

State& Local Roles

Tools & Authorities

Available Options

Resources

Water Security

Solutions: Policy Considerations

Based on our individual and collective work in and study of groundwater management in the western United States, we propose that there are a number of policy considerations to keep in mind in further debate and development of the RMA concept or other potential solutions. A few of the most important relate to: state and local governance; the nature of management "tools"; and funding and resources for groundwater management.

A host of considerations relate to appropriate governance for groundwater management, but one of the most significant is how authorities and responsibilities are shared between the state and local stakeholders and governments. In further developing the RMA concept — explicitly conceived of as an expansion of local control over groundwater resources — an important question will be the relative roles and relationships among: county boards of supervisors; local RMA "councils;" and the state ADWR. Ideally, the resulting blend of state and local control will allow the state to contribute support, expertise, and a statewide perspective to help make effective groundwater management decisions across the state. At the same time local stakeholders and governments can be enabled to take on responsibility in ensuring that groundwater management is well-tailored to meet specific local conditions, needs, and interests.

Another big set of considerations in developing and negotiating groundwater solutions will be the actual set of management "tools" or authorities that will be authorized for adoption in a rural management area or something like it. Arizona's AMAs come with a very specific regulatory framework and set of programs and requirements that apply "automatically" within an AMA — but while these are the programs most familiar to Arizona stakeholders and decision makers, they are not the only possible groundwater management tools. Through our work with the Water for Arizona Coalition (a public interest advocacy group with over 60,000 members) we have put together a document that catalogs and categorizes some of the different tools and approaches that are available to incorporate into local groundwater management (Water for Arizona Coalition n.d.). As the discussion proceeds, attention will need to be given to how broad a "menu" of tools should be made available for management of groundwater in rural areas.

Finally, in other states that have gone down a similar path, it has been found that the success of local water districts or management areas is often highly dependent on whether they have sufficient resources to function effectively — with resources including expertise, information, and funding for operations and programs. If Arizona counties and/or ADWR take on new responsibilities related to planning and management for rural groundwater, careful consideration should be given to the resource requirements associated with those responsibilities.

Conclusion

As stakeholders and decision makers in Arizona and the Colorado River Basin adapt water management to aridification and climate change, it is important to ensure that there are available tools and solutions to meet the needs and challenges of communities who rely on groundwater — but currently do not have a framework or set of authorities for its management. As challenges become more acute and more widely understood, Arizona appears to be finally poised for a meaningful debate about the water management needs and opportunities in rural Arizona. As a broader set of voices join the conversation, choices and solutions can be explored that keep those needs and opportunities front and center. Whether Arizona stakeholders and decision makers continue down this path to generate solutions will have important ramifications for water security in rural Arizona — but also, as pressures on other interconnected supplies increase, for the state and indeed the Colorado River Basin as a whole.

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Arizona Groundwater

References

Arizona Department of Water Resources (ADWR) n.d. (a). "*Active Management Areas*" last accessed November 15, 2021. https://new.azwater.gov/ama

ADWR n.d. (b). "*Report Dry Well Data*" last accessed November 15, 2021. www.azwater.gov/eforms/forms/drywell/drywellrpt.aspx

ADWR (2016a). "*Douglas and Willcox Basins and San Simon Valley Sub-basin, South Eastern Arizona*" Hydrologic Monitoring Report No.9. https://new.azwater.gov/hydrology/e-library/southeastern-arizona-hydrologic-monitoring-report-2016

ADWR (2016b). "*Hualapai Valley Groundwater Basin*" Letter from Director Thomas Buschatzke to Mohave County Board of Supervisors, October 28, 2016. https://new.azwater.gov/sites/default/files/ADWRresponsetoMohaveCountyINArequest.pdf.

ADWR (2019). *Land Subsidence Monitoring Report No. 4.* March 2019.

ADWR (2020a). "*Statewide Groundwater Level Changes in Arizona Water Years 2017 to 2018, 2008 to 2018, and 1998 to 2018*" Open-File Report No.18, December 2020.

ADWR (2020b). "*The Drought Contingency Plan*" presentation by Director Thomas Buschatzke to CLE International Arizona Water Law Conference, August 14, 2020.

ADWR (2020c). "*Butler Valley, Harquahala, McMullen Valley, Ranegras Plain, and Tiger Wash Basins, Western Arizona"* Hydrologic Monitoring Report No.10.

Environmental Defense Fund (EDF) (2019). "*Groundwater in the Colorado River Basin*" Story map. www.edf.org/colorivgw.

Garner, B.D., Pool, D.R., Tillman, F.D., and Forbes, B.T. (2013). "*Human Effects on the Hydrologic System of the Verde Valley, Central Arizona, 1910-2005 and 2005-2110, Using a Regional Groundwater Flow Model*" US Geological Survey Scientific Investigations Report 2013-5029.

Gungle, Bruce, Callegary, J.B., Paretti, N.V., Kennedy, J.R., Eastoe, C.J., Turner, D.S., Dickinson, J.E., Levick, L.R., and Sugg, Z.P. (2016). "*Hydrological Conditions and Evaluation of Sustainable Groundwater Use in the Sierra Vista Subwatershed, Upper San Pedro Basin, Southeastern Arizona"* (ver. 1.3, April 2019): US Geological Survey Scientific Investigations Report 2016–5114, 90 p., https://doi.org/10.3133/sir20165114.

Haney, J.A. et al. (2008). "*Ecological Implications of Verde River Flows"* The Nature Conservancy, Arizona Water Institute and the Verde River Basin Partnership.

James, Ian and Rob O'Dell (2019). "*Arizona's Next Water Crisis*" The Arizona Republic, December 5, 2019.

James, Ian and Rob O'Dell (2020). "*Legislature Plans to Address Groundwater Crisis in Rural Arizona*" The Arizona Republic, January 14, 2020.

Knight, J.E., Gungle, B., and Kennedy, J.R. (2021). "*Assessing Potential Groundwater-Level Declines from Future Withdrawals in the Hualapai Valley, Northwestern Arizona*" U.S. Geological Survey Scientific Investigations Report. https://doi.org/10.3133/sir20215077.

Kobor, J., Springer, A., Anderson, D., and Blakey, R. (2004). "*Simulating Water Availability in a Spring-Fed Aquifer with Surface Water/Groundwater Flow Models, Grand Canyon, AZ*" Northern Arizona University Masters Thesis.

Matrix New World Engineering (Matrix) (2019). "*Northwest Basins Groundwater Resource Assessment Mohave County, AZ*" Prepared for Arizona Department of Water Resources December 2019.

Miller, Matthew P. et al. (2016). "*The Importance of Baseflow in Sustaining Surface Water Flow in the Upper Colorado River Basin*" Water Resources Research. https://doi.org/10.1002/2015WR017963.

Miller, Olivia L. et al. (2021). "*How Will Baseflow Respond to Climate Change in the Upper Colorado River Basin*?" Geophysical Research Letters. doi: 10.1029/2021GL095085.

National Park Service (NPS) (2015). "*A Study of Seeps and Springs – Grand Canyon National Park*" www.nps.gov/grca/learn/nature/seepspringstudy.htm

NatureServe (2002). "*States of the Union: Ranking America's Biodiversity*" www.natureserve.org/sites/default/files/publications/files/stateofunions.pdf

Paul, Haley (2021). "*Advancing Arizona's Groundwater Management to Protect Our Water Supply: Several bills before the legislature would protect people and birds*" National Audubon Society Western Water News blog. www.audubon.org/news/advancing-arizonas-groundwater-management-protect-our-water-supply

Stevens, Lawrence E., Jeffrey Jenness and Jeri D. Ledbetter (2020). "*Springs and Springs-Dependent Taxa of the Colorado River Basin, Southwestern North America: geography, ecology and human impacts*" Water. doi:10.3390/w12051501.

Turner, D. S., & H. E. Richter (2011). "*Wet/Dry Mapping: using citizen scientists to monitor the extent of perennial surface flow in dryland regions*" Environmental Management, 47(3), 497–505. https://doi.org/10.1007/s00267-010-9607-y.

University of Arizona Water Resources Research Center (U of A WRRC) (2017). *Arizona Water Map.* https://wrrc.arizona.edu/sites/wrrc.arizona.edu/files/pdfs/Water-Map-Poster-2017.pdf.

U of A WRRC (2021). "*Arizona Groundwater Management - Past, Present and Future*" Arroyo 2021. https://wrrc.arizona.edu/sites/wrrc.arizona.edu/files/attachment/Arroyo-2021.pdf

Water for Arizona Coalition n.d. "*Arizona Rural Groundwater: Potential Tools for Local Management"* Available at https://www.waterforarizona.com/groundwater.

Webb, R.H., S.A. Leake, and R.M. Turner (2007). "*The Ribbon of Green: Change in Riparian Vegetation in the Southwestern United States*" The University of Arizona Press.

Instream Flow

FLOW RESTORATION IN COLORADO

POUDRE FLOWS: A NEW LEGAL PARADIGM

by Alyson Meyer Gould & Kate Ryan (Colorado Water Trust)
&
Casey Weaver, Colorado First Judicial District

Introduction

Prior Appropriation

Conflict, born of scarcity, has shaped Colorado's system of water allocation and administration through much of its history. A dispute between water users on the Cache la Poudre River during the summer of 1874, in particular, played a significant role in the state's formal adoption of the doctrine of Prior Appropriation. Since then, as Colorado's population has grown over the years, more and more water has been withdrawn from Colorado's rivers through a complex system of water laws developed out of the Prior Appropriation doctrine, causing them at times to flow extremely low or go completely dry. This threatens fish, riparian habitat, and local economies that rely upon a flowing river. Now, one hundred forty-seven years later, a diverse group of stakeholders on the Cache la Poudre River are using a new legal tool to write the next chapter — a chapter aimed not at taking water from the river but, rather, restoring flow to the river when needed.

This article is the first in a two-part series about the Poudre Flows Instream Flow Augmentation Plan (Poudre Flows Plan).

Poudre Flow Plan

The Poudre Flows Plan will be the first of its kind in Colorado and represents a new paradigm for flow restoration in Colorado. Part I of this article lays out the history of water use on the Cache la Poudre River and how such use helped shape Colorado water law. Part II discusses the flow restoration mechanisms that existed in Colorado prior to 2020 and explains how an instream flow augmentation plan differs from the other mechanisms. Finally, Part III provides an overview of the Poudre Flows Plan as it stands today.

I: The History of Colorado Water Law and the Role of Instream Flow Water Rights

To understand the role of instream flow water rights, it is important to understand where they fit in the history of Colorado water law. This history extends back over a century and can trace much of its development to competing interests in a river in north-central Colorado: the Cache La Poudre.

Conflict on the Cache La Poudre Gave Rise to New Water Laws

Competing Canals

Between 1870 and 1871, irrigators from the Union Colony completed the construction of two canals diverting from the Cache la Poudre in the present-day Greeley area. Two years later, in 1873, the Fort Collins Agricultural Colony, located twenty-five miles upstream, completed two canals with a combined capacity capable of sweeping the river dry during periods of low flow.

Late in the summer the following year, the Fort Collins irrigators did just that, depriving the Greeley-area farmers of flows sufficient to irrigate their crops. The Union Colony decided to file for a perpetual injunction to bar the Fort Collins farmers from diverting to the injury of their earlier rights, and, upon learning of their intention, Fort Collins suggested a settlement conference. The Union Colony agreed, and the two parties met at a schoolhouse midway between the two towns.

Settlement

At the conference, Fort Collins disagreed with the Union Colony's assertion that its earlier appropriation conferred a legal right to a reasonable portion of the river's water. Nonetheless, the parties agreed that Fort Collins would lower its headgates, allowing the foregone flow to reach the Greeley canals, in exchange for the Union Colony's suspension of the injunction. Though the Union Colony felt that Fort Collins breached the agreement, allowing less water to reach the Greeley canals than that upon which the parties had agreed, the controversy was temporarily quelled when, shortly thereafter, heavy rains soaked the area and broke the drought.

Prior Appropriation Adopted

Two years later, the constitutional convention created a nine-member committee on irrigation, agriculture, and manufacture, which included two representatives from Weld County, within which Greeley is located, but none from the Fort Collins area. The committee recommended formal recognition of the doctrine of Prior Appropriation within the new state's constitution and the full convention heeded the suggestion.

Instream Flow Seniority

Legal Framework

Diversion & Beneficial Use

Instream Use

SB 97

Change of Use

SB 156

Preserve & Improve

Acquisition Funding

2013 Expansion

In particular, the constitution declared that the unappropriated water of the state is public property, subject to the people's appropriation and use. Though the relevant sections did not set forth a legal framework, they precluded holders of junior water rights — those appropriated after a given, competing right — from diverting water if to do so would "injure" a senior water right holder (i.e., prevent senior right holders from fully accessing their water allocation).

The General Assembly began constructing that legal framework with the adoption of the Adjudication Acts of 1879 and 1881. The Acts allowed water users to confirm their rights through judicial decree and charged state water officials with the administration of such rights. To establish a right, a water user had to demonstrate that they had diverted, or would divert, water from the stream and had applied, or would apply, that water to a beneficial use. The early laws only allowed water users to confirm irrigation rights.

The Adjudication Act of 1903 extended the system of formal water rights adjudication to all other beneficial uses. Because the courts understood the constitution as requiring a water user to demonstrate both: 1) that they had diverted water; and 2) that they had applied that water to beneficial use to establish a water right — the Act did not permit a water user to appropriate a right to keep water in a river or stream for the benefit of the natural environment (i.e., an instream flow right).

The Rise of Instream Flow Water Rights

Though Colorado's system of water rights adjudication and administration continued to develop and evolve, the diversion requirement remained in effect. That changed in the early 1970s. Buoyed by the broader environmental movement, the General Assembly passed Senate Bill (SB) 97 in 1973. SB 97 recognized the use of water for instream flow purposes and maintenance of natural lake levels as beneficial uses and granted the Colorado Water Conservation Board (CWCB) — a state agency housed within the Colorado Department of Natural Resources — the exclusive authority to appropriate and acquire instream flow and natural lake level rights "as required to preserve the natural environment to a reasonable degree." Shortly thereafter, the Colorado Supreme Court upheld the codified bill, finding that, by recognizing an instream flow right and creating a legal mechanism through which the CWCB could appropriate or acquire such a right, SB 97 did not violate the Colorado Constitution's diversion requirement. One hundred forty-one years after water users appropriated Colorado's earliest water rights on the Rio Grande River, SB 97 permitted the use of water, on behalf of the people, to preserve the natural environment.

Though SB 97 permitted the CWCB to both appropriate new instream flow rights and acquire and change previously established rights to instream flow use, the General Assembly did not initially appropriate funds for acquisitions. Consequently, the CWCB established the vast majority of its early instream flow rights as new appropriations. Those new appropriations were subject to administration within the established prior appropriation system, were junior to all previously established rights, and, due to their late priorities, had a limited impact in many cases. Recognizing that limited effect, the General Assembly has modified and expanded the means by which the CWCB, often in partnership with water users and third-party intermediaries, can use water for instream flow purposes. A few such modifications and expansions are particularly relevant to the Poudre Flows Plan.

The General Assembly adopted SB 156 in 2002. As noted previously, SB 97 authorized the CWCB to appropriate or acquire instream flow rights to preserve the natural environment to a reasonable degree. SB 97 required the CWCB, in conjunction with Colorado Parks and Wildlife (CPW) (then, the Departments of Wildlife and of Parks and Outdoor Recreation), to determine the flow rate necessary to preserve the natural environment to a reasonable degree and capped the quantity that the CWCB could appropriate or acquire at that flow rate. SB 156 expanded the CWCB's authority, permitting it to acquire water rights and change them to instream flow purposes in quantities to preserve or improve the natural environment to a reasonable degree. SB 156, in those situations in which the CWCB had the opportunity to acquire water rights, allowed it to use an instream flow right to produce a more profound and lasting positive effect.

In 2008, the General Assembly bolstered the CWCB's ability to acquire water rights for subsequent change to instream flow use. As noted above, the General Assembly did not, in passing either SB 97 in 1973 or any subsequent legislation, allocate funds for the CWCB's acquisition of water rights. Thus, the CWCB had to rely on donations to acquire senior rights administered with early priorities. This limited the instream flow program's impact because, on many impacted rivers and streams, the CWCB was left to appropriate junior rights and could not exercise those rights against senior diversions.

In passing House Bill (HB) 08-1346, the General Assembly allocated funds to the CWCB for the acquisition of water rights. Specifically, the Bill allocated $1,000,000 per year from the CWCB's Construction Fund for such use. Notably, HB 1346 limited expenditures to acquisitions that would preserve the natural environment to a reasonable degree. Reversing course, however, the General Assembly amended the codified section in 2013 with the passage of Senate Bill 181, permitting the CWCB to use the allocated funds for acquisitions to improve the natural environment as well.

Instream Flow

Augmentation for Instream Flow

Finally, amidst the pandemic, in 2020, the General Assembly passed House Bill 1037. Relevantly here, HB 1037 confirmed that the CWCB could create augmentation plans for instream flow use. Acting pursuant to HB 1037, the CWCB now has the authority to operate permanent stream restoration plans in the form of Instream Flow Augmentation Plans. The passage of these bills will allow for an Instream Flow Augmentation Plan on rivers like the Cache La Poudre, helping to sustain fish and wildlife habitat, while also protecting other water users from injury to their water rights.

II: Distinguishing Instream Augmentation Plans from Other Legal Tools that Restore Streamflow

In order to illustrate how the various permanent streamflow restoration mechanisms work, consider a simplified example of a fictional stream. Assume a stream having a flow of 10 **c**ubic **f**eet per **s**econd (cfs) with two diversions. The first is a senior diversion with a priority date of 1900 for 2 cfs. The second is a diversion with a priority date of 1950 for 4 cfs. Finally, for the sake of simplicity, disregard return flow and transit losses in all of the following examples.

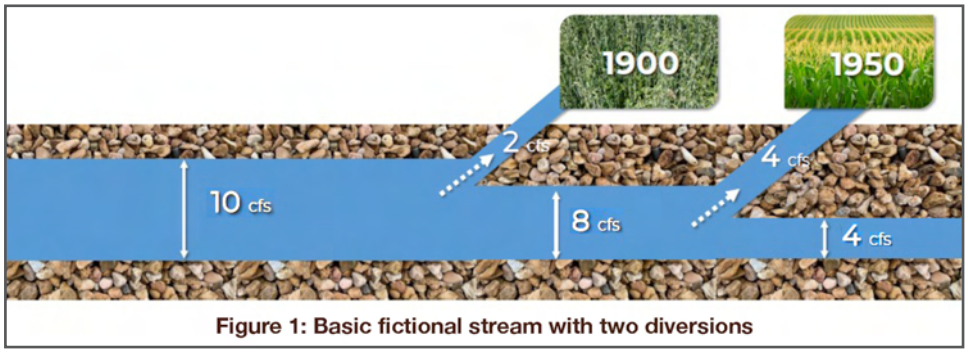

Figure 1: Basic fictional stream with two diversions

Instream Flow Impact

Now consider the impact of a new appropriation for instream flow use on this stream. As a new appropriation, this water right takes on a priority based on the date that the CWCB filed a water court application to have the water right adjudicated. As discussed in Part 1, Colorado law did not recognize instream flow as a beneficial use until 70 years after recognizing all the other beneficial uses. As such, an appropriated instream flow water right with a priority date of 1980 is relatively common. On the fictional stream described above, consider an appropriated instream flow of 4 cfs at the top of the reach with a priority date of 1980. That water right could protect some streamflow from future junior diversions, but, because it is junior to the other downstream diversions, 1.7 cfs of the 4 cfs decreed to it would be diverted along the reach.

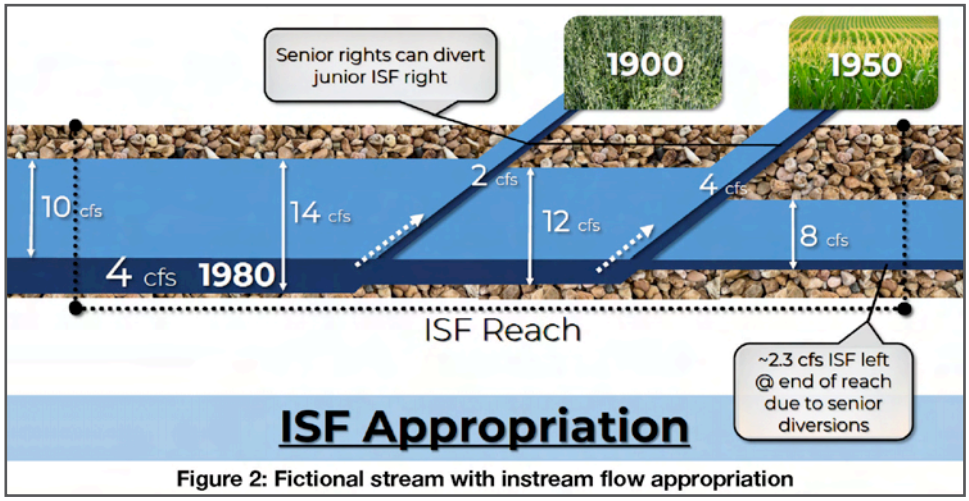

Figure 2: Fictional stream with instream flow appropriation

Changing Existing Right

Senior Protection

Next, consider the impact that would result if the CWCB were to acquire an existing water right and gain approval to change its use to instream flow. The water court process would impose terms and conditions on the CWCB's use of the water right, but the right would maintain its original priority date. Assume that a senior water right decreed in 1890 and upstream of the other two water rights on the fictional stream is changed to instream flow use. After the water court places terms and conditions on the CWCB's use of the acquired water right for instream flow, a rate of 4 cfs is allocated to the changed water right. Because it is senior to the other diversions, the entire 4 cfs is protected from diversion as it flows down the entire fictional stream.

Instream Flow

Protection from Diversion

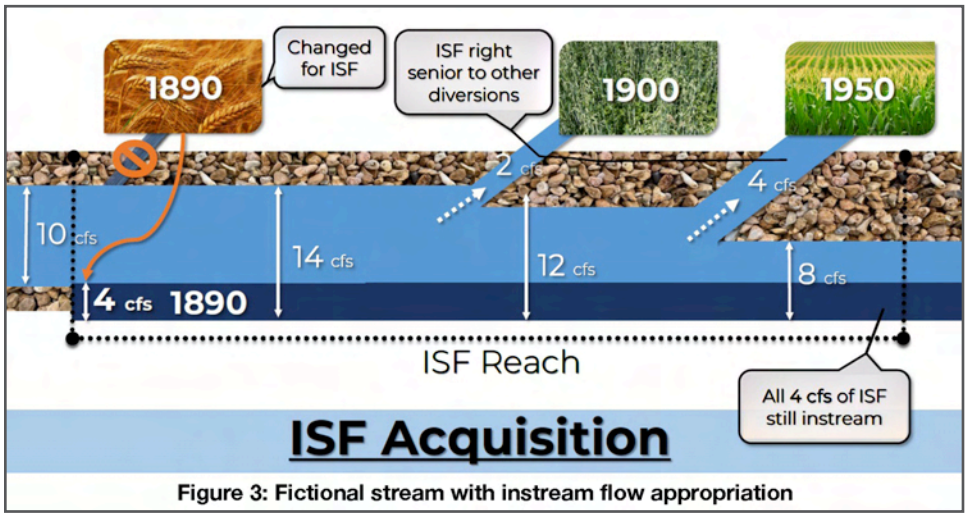

Figure 3: Fictional stream with instream flow appropriation

Acquired Instream Flows

Within Colorado, acquired instream flows are far less common than appropriated instream flows. According to the authors' estimate, they only make up about 3% of the instream flow rights in the state. While the CWCB can acquire senior rights on either a permanent basis (via purchase or donation), or on a temporary basis (via lease or loan), opportunities for protecting streamflow in this manner are sparse in certain areas. Neither acquired nor appropriated instream flow water rights are likely to achieve streamflow restoration goals on Colorado's larger and harder working rivers, many of which were overapprioriated early in the 1900s, as municipal, industrial, and agricultural diversions flooded the water courts. Recognizing this, Colorado water users have begun contemplating plans for appropriation to achieve streamflow restoration goals in recent years.

Traditional Augmentation Plan

Generally speaking, a traditional augmentation plan is a court-approved method for water users to replace out-of-priority diversions in time, location, and quantity, thereby preventing injury to other water rights. An augmentation plan is operated by strategically increasing the supply of water available for beneficial uses in a reach of stream within which other, more senior rights' full appropriation of the streamsflow precludes water users from appropriating new rights. On the fictional 10 cfs stream, for instance, imagine that a junior water user comes in and diverts 8 cfs upstream of the two more senior rights. If that diversion were not curtailed, the 1950 priority would not get water and the stream would dry up below the 1900 priority's 2 cfs diversion point. Alternately, the two senior diversions would curtail a 2022 water user seeking an 8 cfs diversion and would prevent it from adjudicating a water right in water court due to lack of water availability.

Instream Flow Augmentation Plan

An instream flow augmentation plan ("section 4.5" augmentation plan), as opposed to a traditional augmentation plan, is another type of augmentation plan in Colorado. The remainder of the section distinguishes a traditional augmentation plan from an instream flow augmentation plan. A "section 4.5" augmentation plan refers to C.R.S. § 37-92-102(4.5), which is the type of instream flow augmentation plan established by HB 1037 and used by Poudre Flows.

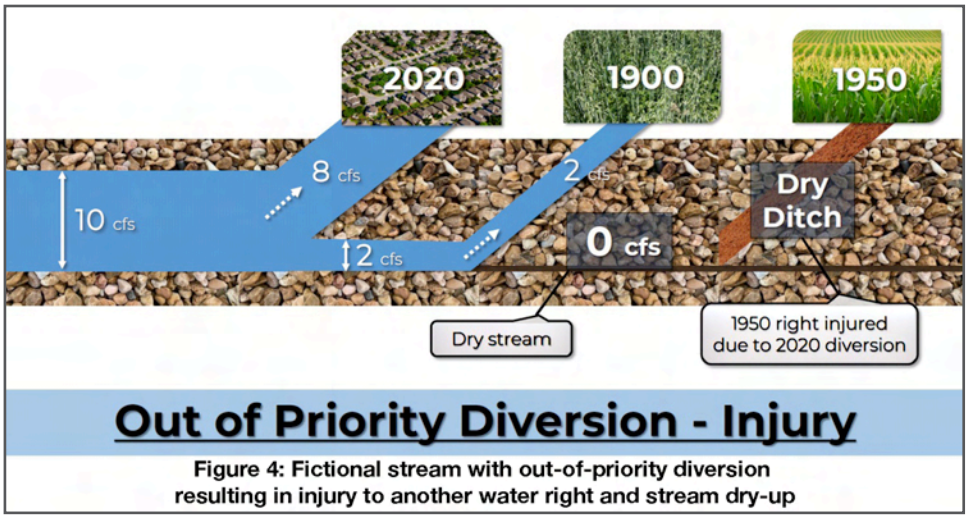

Figure 4: Fictional stream with out-of-priority diversion resulting in injury to another water right and stream dry-up

Instream Flow

New User

Stored Water

There is a path forward, however, for a new 2022 water user, i.e., a new junior appropriator. The new user can simply increase the supply of water available for its beneficial uses, thereby supporting the appropriation of a new water right. The 2022 water user could augment streamflow by introducing additional flow from a water right decreed for augmentation purposes. There are multiple potential sources of augmentation water, including senior rights acquired and changed for that purpose. In this case, consider augmentation water in the form of an upstream reservoir release. The 2022 water user secures a right to add an additional 4 cfs of stored water to the stream, which is enough flow to ensure that the 1950 priority can divert its full right. Note, however, that although the 1950 priority is no longer injured, the stream still dries up. This outcome is logical because the law neither requires, nor provides an incentive for, the 2022 water user to introduce more water to the stream than is necessary to prevent injury to other water rights. Even if it did, it could not prevent another water user from diverting the additional water out of the stream.

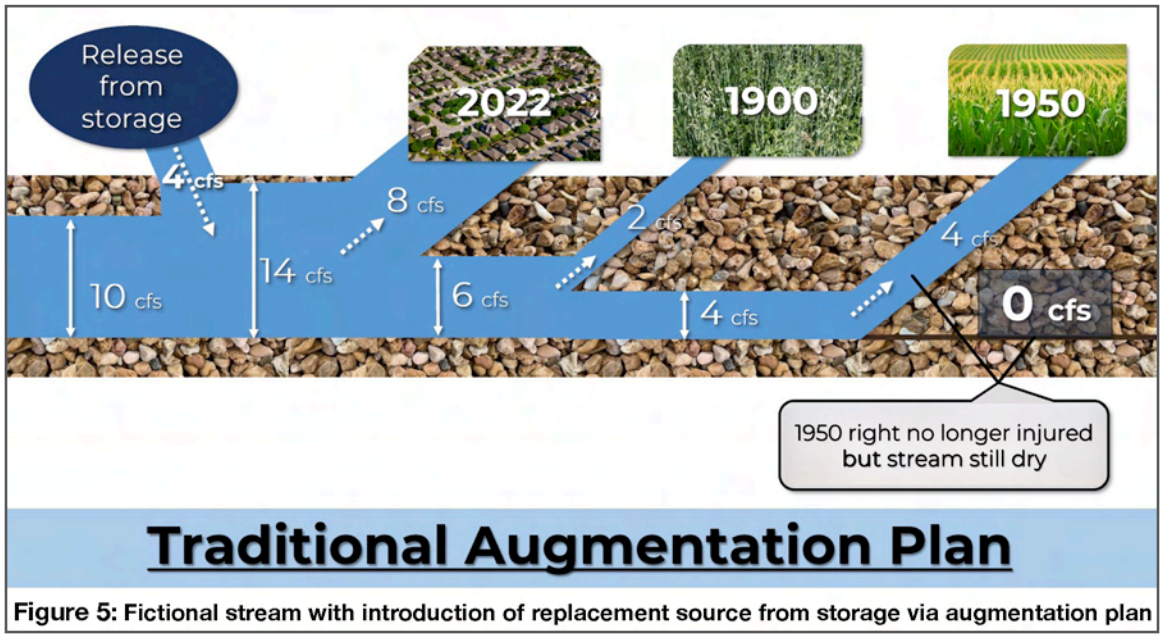

Figure 5: Fictional stream with introduction of replacement source from storage via augmentation plan

Instream Flow Augmentation Guideposts

From the 1980s through 2020, traditional augmentation plans proved to be a valuable tool for newer water users on over-appropriated stream systems. In 2020, a coalition of northern Colorado water users, together with the Colorado Water Trust and the CWCB, worked with then-State Representative Jennifer Arndt (D) and Senator Donald Coram (R) to secure passage of legislation that confirmed the use of augmentation water for instream flow purposes (HB 1037). The legislation established four guideposts for plans that provide for augmentation of instream flow:

First, the Bill permits the CWCB to create plans that produce rates of flow sufficient to both preserve and improve the natural environment to a reasonable degree. As noted above, the CWCB similarly has the authority to acquire and change water rights to instream flow use at quantities sufficient to both preserve and improve the natural environment to a reasonable degree but can appropriate new rights only in quantities sufficient to preserve such flows.

Second, for the CWCB to include a source of replacement water in a section 4.5 instream flow augmentation plan, a water court must have already quantified the replacement source and changed it to augmentation use. The owner of the replacement supply must consent to use of the water right in the plan. Once the plan is decreed, the CWCB can add additional sources of replacement water, as with a traditional augmentation plan.

Third, the instream flow augmentation plan cannot cause injury to other decreed water rights or administratively approved exchanges. The underlying decrees that changed and quantified the seed water remain in full force and effect, and the water court can add additional terms and conditions if those in place will not prevent injury.

Fourth, the augmentation plan proponent must pay for the modification of any existing diversion structure needed to operate the instream flow augmentation plan and the structure owner must agree to the modification.

Instream Flow

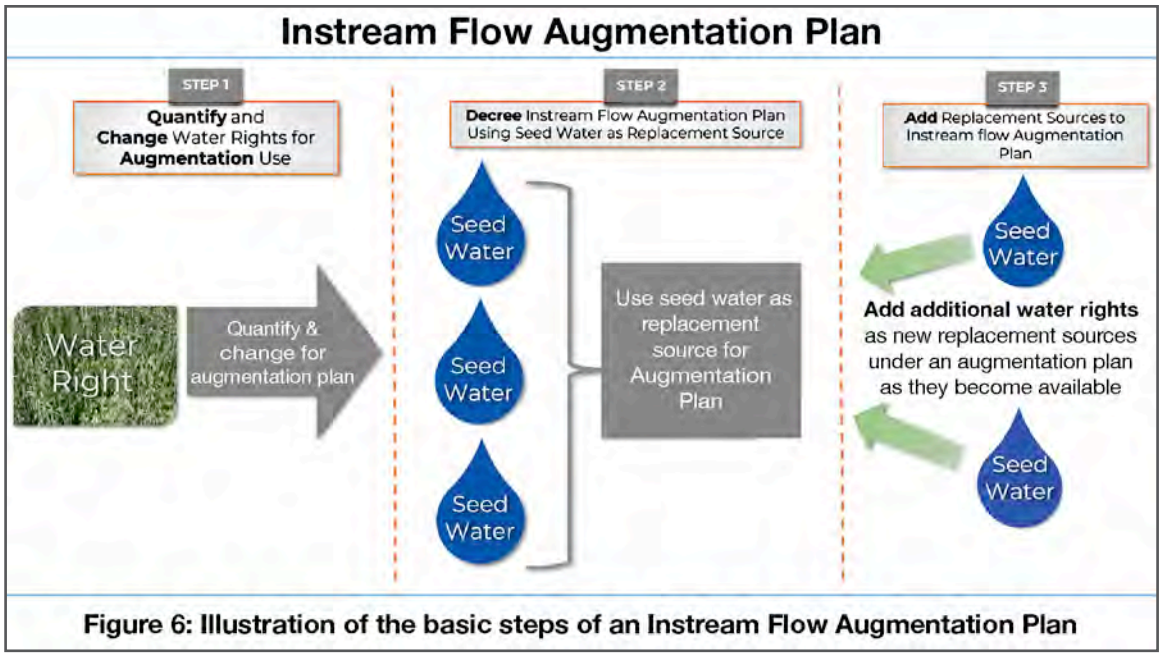

Figure 6: Illustration of the basic steps of an Instream Flow Augmentation Plan

Downstream Use

In light of the legislation, we can now consider how the addition of augmentation water for flow augmentation purposes would affect the fictional stream discussed above. Assume replacement water of 4 cfs added to the fictional stream at the top of a geographic reach is identified for instream flow augmentation. That water flows through the reach without being diverted by the senior water rights. Though similar to the acquired instream flow example above, the water added at the top of the reach is decreed for augmentation, rather than for instream flow use. This example is also similar to a traditional augmentation plan. However, the water added to the stream *remains instream* boosting flows through the entire reach. As in the example of a traditional augmentation plan, if the replacement water is appropriately decreed, it can be reused for different purposes downstream of the reach in which it augments streamflow.

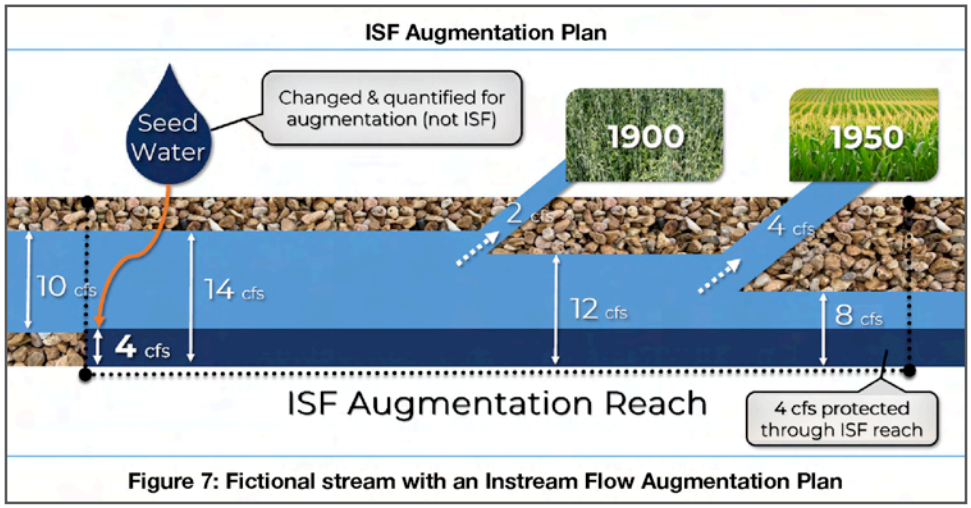

Figure 7: Fictional stream with an Instream Flow Augmentation Plan

III: Instream Flow Augmentation Plans in Practice

First Plan

Poudre River

As alluded to above, the first-ever plan for augmentation of instream flow is currently being developed in northern Colorado on the Cache la Poudre River. The Poudre River runs west from its headwaters in Rocky Mountain National Park through the Roosevelt National Forest toward Colorado's eastern plains within Water Division 1. This is a well-populated and fast-growing area, home to centennial agricultural production and the cities of Fort Collins and Greeley. Water Division 1 is also the jurisdiction of one of the state's busiest water courts and complex water rights administration crisscrossed by ultra-senior diversions, transbasin water deliveries, and a web of exchanges and traditional plans for augmentation. The Poudre River falls steeply through the Cache la Poudre Canyon where flows include CWCB instream flow appropriations and federal Wild and Scenic River administration protected flows. At the mouth of the Poudre Canyon, the river slows as it hits the plains, before continuing another 57-miles east to its confluence with the South Platte River.

Instream Flow

"Dry-Up" Locations

Study/Action Group

Local Support

Poudre Flows Cooperation

MOA for Group Structure

Streamflow Analysis

Seed Water

"Float on the Bottom"

Development Phase

This 57-mile stretch of the Poudre River epitomizes the concepts of a "hard working river" and "the lifeblood" of several Colorado communities. Much of the flow of the Poudre River is used outside of the channel resulting in reduced flow and even dewatering within the channel. There are six "dry-up" locations where the entirety of the streambed is regularly exposed due to historic diversions for storage, agricultural, municipal, and industrial uses. Downstream of such uses, river flows rebuild across the seasons, as return flows reach the channel.

As noted above, conflicts on the Poudre River gave rise to some of Colorado's first water laws. So, perhaps it is fitting that the first instream flow augmentation plan is also planned for the Poudre River. However, instead of arising out of conflict, this time the innovation resulted from cooperation. The hard working 57-mile stretch of the Poudre River has had neither sufficient water availability nor benefited from the political will to support an instream flow appropriation by the CWCB. Nevertheless, local water users and stakeholders have persisted in searching for a solution to support both healthy flows and the consumptive uses that the Poudre River provides. Over the past decade, the Poudre Runs Through It Study/Action Group (Group), convened by Colorado State University on behalf of local water users, has worked toward that goal. Around 2016, the Group began consulting with the Colorado Water Trust, a statewide nonprofit that aims to restore flows to Colorado's rivers in need. These entities began strategizing to develop a plan for augmentation of instream flow and gathered support from local water users to pursue the plan.

A diverse group of entities with varied interests has cooperated to form the Poudre Flows partnership. That diversity has been important to the concept as the partnership has, from the start, sought to represent a cross-section of interests on the hard-working Poudre River. The cities of Greeley, Fort Collins, and Thornton are fiscal contributors and will supply the seed water rights to the plan for augmentation. Cache la Poudre Water Users Association is a group that represents local ditch and irrigation companies, providing valuable logistical support. Northern Water Conservancy District, which supplies native and transbasin water via the Colorado-Big Thompson Project to northern Colorado water users, provides both logistical and financial support. Two state entities are involved: Colorado Parks and Wildlife (the environmental need experts); and the CWCB, which will hold the instream flow water right. Finally, the Colorado Water Trust serves as the fiscal agent, fundraiser, and project facilitator, and engaged Spronk Water Engineering for technical services on behalf of the group. The parties have all contributed and agreed to a Memorandum of Agreement (MOA) to govern how the Poudre Flows group will function now and in the future. (The MOA is at page 126, etc. of the CWCB's Board packet dated November 18–19, 2020, available at: https://dnrweblink.state.co.us/cwcb/0/edoc/213402/23%20PF%20AugPlan1stMtg%20Memo%20w%20Exhs.pdf).

Planning for the Poudre Flows Plan for augmentation began with an analysis of streamflow in the river and how it could be optimized. The analysis required the parties to answer four basic questions:

First, what is the flow now? The Poudre Flows project has examined flows along the entire 57-mile reach, including variability across different locations and throughout the year. Gage data helped to address this question.

Second, what flow do the fish need to survive and thrive? This analysis is the purview of Colorado Parks and Wildlife scientists who calculate the "preserve" and "improve" flow rates for river segments that the CWCB can use for water acquisitions in an instream flow augmentation plan.

Third, what is the difference between today's flows and ideal fish flows?

Fourth, can the seed water make up at least some of this difference?

Addressing each of these questions together, the plan for augmentation aims to add the seed water to the stream when it is available and needed to boost flow to preserve or improve the environment. Seed water consists of augmentation supplies that are new to contemporary river flows, having derived from sources that historically have been diverted and from which water courts have approved fully consumable replacement rates and volumes. The seed water will augment flows that would have otherwise been in the Poudre River, without interfering with the senior diversions, exchanges, and operations that have historically supported water users. In effect, the augmentation supplies will "float on the bottom" of the river — protected from diversion, reconnecting dry-up locations, and boosting flows without interfering with the hard-working nature of the river that people depend on.

There has been and will continue to be a lengthy and robust project development and judicial process to achieve the Poudre Flows plan for augmentation of instream flow.

First, there was the development phase, which included:

- some serious out-of-the-box thinking
- significant fundraising
- two years' worth of legislative lobbying and statutory approval
- the parties' drafting of and agreement to the formulative memorandum of agreement
- preliminary engineering
- the outreach essential to community support

Instream Flow

Adminstrative Approval

Implementation

Following the development phase, the Poudre Flows partners sought administrative approval from the CWCB. State law required the partners to gain the agency's approval to acquire a right to use the seed water rights in the plan and for the partners to file an application with the water court. After gaining the CWCB's approval, the plan will proceed before the Division 1 Water Judge just like a traditional augmentation plan. After approval on paper, the partners will coordinate annual operations and long-term planning, including ongoing investments to facilitate the passage of augmentation water downstream. Finally, the partners will be able to add additional sources of replacement water to the augmentation plan, commensurate with approval form the CWCB and Colorado's State Engineer.

With that, you may be asking where is the Poudre Flows project at now? It received CWCB approval in January 2021 and the partners filed the water court application in April 2021. Part II of this series on the Poudre Flows Plan is forthcoming, pending the Division 1 Water Court's approval.

Conclusion

History

Let's review. Colorado's system of prior appropriation arose largely out of necessity to address competing interests. Since 1874, more and more water has been diverted for beneficial use causing some rivers to have low flows and in some cases, go completely dry. Instream flow water rights were recognized as a beneficial use fairly late, resulting in a relatively junior status as compared to other types of water uses. Colorado's instream flow program has evolved over the course of its 40-year history, with the latest development coming amid the pandemic in the form of instream flow augmentation plans.

Plans' Benefits

Instream flow augmentation plans are distinct from the other types of permanent flow restoration mechanisms. These include instream flow appropriations, which tend to be relatively junior; instream flow acquisitions, which are fairly rare; and traditional augmentation plans, which are not designed to benefit instream flow. Instream flow augmentation plans, on the other hand, are specifically designed to benefit instream flow, taking advantage of the benefits of acquired instream flows, but with more flexibility and capability for adaptation.

The first-ever instream flow augmentation plan, the Poudre Flows Plan, is now pending before the Division 1 Water Court. It is a plan borne of innovation and collaboration of a diverse group of partners and designed for a hard-working river vital for the health of the environment and the livelihood of many water users who rely upon its flows. Part II of this series on the Poudre Flows Plan will follow the Water Court's issuance of a decree for the plan.

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Casey Weaver, Esq. Originally from Carbondale, Colorado, Casey attended, and recently graduated from law school at the University of Denver. While in law school, he interned with the Water Court for Water Division No. 5, Denver Water, the Colorado Water Trust, and the Colorado Office of the Attorney General's Natural Resources and Environment section, and served on the editorial staff of the University of Denver Water Law Review and the Denver Law Review. Casey is currently serving as law clerk for the Honorable Jason D. Carrithers of Colorado's First Judicial District.

Public Trust & Transfers

Water Transfers

Third-Party Impacts

Out-of-Basin Transfers

"Continuing" Public Trust Obligation

"Return Flow" & Recharge

Out-of-Basin Impacts

Place of Use Change

PUBLIC TRUST / WATER TRANSFERS

PUBLIC TRUST RESOURCE IMPACTS RESULTING FROM WATER TRANSFERS OUTSIDE THE ORIGINAL BASIN

by Paul Stanton Kibel, Golden Gate University School of Law (San Francisco, CA)

Introduction

When it comes to the parties to long-term water transfers, there can certainly be benefits to the parties themselves. Many of these transfers involve water that was previously used for irrigation in rural areas being conveyed to more urban areas for municipal use. With such water transfers, the urban purchaser (often an urban water agency) receives the benefit of the water supply while the rural farming interests (often an irrigation district) receive the benefit of financial payments for the water.

However, with such long-term water transfers, the water is often transported from one watershed/basin (the "original basin") to another watershed/basin (the "transfer basin"). When such out-of-basin transfers occur, the parties to the water transfer deal are not the only parties and interests impacted by the transfer. This is because, as explained below, water that is transferred out of the original basin is permanently lost to the original basin.

In this article, we will consider the ways natural resources and uses protected by California public trust law can be impacted by out-of-basin water transfers. The article focuses on two examples of situations where public trust concerns are involved, one from southern California and the other from northern California. The first example (from southern California) is the long-term transfer of water from the Imperial Irrigation District (IID) to the San Diego County Water Authority (SDCWA). The second example (from northern California) is the inter-basin transfer component of the Trinity River Division of the federal Central Valley Project (CVP).

Protection of Fisheries Under California Public Trust Law

Pursuant to the California Supreme Court's 1983 *National Audubon* decision, the California State Water Resources Control Board (State Water Board) and other state and local agencies have a "continuing" obligation to provide full protection to public trust resources and uses "whenever feasible." *National Audubon Society v. Superior Court,* 33 Cal.3d 419, 446, 189 Cal.Rptr. 346; 658 P.2d 709 (1983) (*National Audubon)*. The *National Audubon* decision, and other California Court of Appeal decisions, have affirmed that fisheries and other wildlife (including wild birds) are public trust resources and that non-commercial fishing is a public trust use. *See Center for Biological Diversity v. FPL Group*, 166 Cal.4th 1349 (2008).

It is important to emphasize at the outset that the State Water Board's public trust obligations are "continuing" obligations — i.e., they continue beyond the point in time of initial approval and require the State Water Board to give ongoing consideration to new post-approval information related to impacts on fisheries. With California public trust obligations, there is no "one and done." 33 Cal.3d at 446.

Return Flow and Groundwater Percolation

HYDROLOGICAL WAYS A BASIN RECLAIMS IRRIGATION WATER

When water is applied as irrigation to agricultural fields, some of that irrigation water makes its way back to adjacent surface waters in the basin as "return flow." Some of the water applied for irrigation also percolates down through the soil to replenish and recharge groundwater aquifers in the basin. In this sense, when water is applied for irrigation in a basin a significant portion of that irrigation is later returned to that basin as surface water or groundwater.

However, when water is transferred out of the original basin where it was formerly used for irrigation, the return flow and groundwater percolation do not occur in the original basin. In terms of the lost return flow to surface waters, this means there is reduced instream flow downstream, and such reduced instream flow can have adverse impacts on fisheries — through impacts on instream temperature, salinity, and algae blooms resulting from low-flow conditions. To the extent such return flows support wild bird habitat there can also be adverse impacts on wild birds associated with out-of-basin transfers.

Example No. 1:
The State Water Board's Approval of IID's Long-Term Transfer of Water to SDCWA

In 2002, the State Water Board approved the long-term lease of 200,000 annual **a**cre-**f**eet (AF) of water use rights held by IID to SDCWA. The original source of water for IID's 200,000 AF of water rights is the Colorado River. The State Water Board's 2002 approval of the transfer authorized a change in the designated "place of use" from Imperial County to San Diego County.

Public Trust & Transfers

Salton Sea Reduction

Public Trust Resources

Sources to Replenish Flows

Toxic Dust

Diversion Out-of-Basin

Public Trust Unraised

Flow Reduction Impacts

Instream Flow

The Salton Sea is located in Southeast California and serves as critical habitat for the endangered brown pelican and also supports saline-tolerant fisheries such as tilapia. The Salton Sea — as a result of man-made engineering alterations — is now cut off from direct flows from the Colorado River and instead relies on irrigation runoff to replenish its waters. This irrigation runoff can evaporate rapidly in the intense heat of the region. IID's long-term water transfer to SDCWA meant a significant reduction in the amount of irrigation water applied in Imperial County and a corresponding significant reduction in water to replenish the Salton Sea.

During the State Water Board hearings on the IID-SDCWA transfer, conservation groups (such as the National Audubon Society) filed administrative briefs alleging that the brown pelican and tilapia fisheries are public trust resources and that the State Water Board had public trust obligations to prevent harm to these public trust resources.

In response to this briefing, the State Water Board imposed conditions on the IID-SDCWA transfer that required the parties to find supplemental sources of water to help replenish flows into the Salton Sea for 15 years. That 15-year period expired in 2017, so now the State of California (through the State Water Board and the California Department of Fish and Wildlife), the federal government (through the United States Fish and Wildlife Service), IID, SDCWA and conservation groups (such as National Audubon Society and Defenders of Wildlife) are working to secure other sources of water to maintain flows into the Salton Sea to prevent the Salton Sea from receding.

Beyond brown pelicans and the tilapia fishery, there are now also problems with toxic dust from the areas where the Salton Sea lakebed is now exposed. In particular, there is an area called Red Hill Bay on the Salton Sea that is prone to toxic dust storms. Submerged tidelands are generally entitled to protection under California public trust law, so the situation with the dust rising off Red Hill Bay may impose additional public trust obligations on the State Water Board to maintain flows into the Salton Sea. *California Fish Company*, 138 P.2d 79 (Cal. 1913).

The situation with the IID-SDCWA out-of-basin transfer and the transfer's impacts on the Salton Sea provides one illustration of the ways that public trust concerns can factor into out-of-basin water transfers.

Example No. 2:
State Water Board Approval of the CVP Trinity River Division's Transfer of Water From Trinity River Basin to the Sacramento River Basin

Construction of the Trinity River Division of the CVP was completed in 1964. The main structural components of the CVP Trinity River Division are: (1) two instream dams on the Trinity River — Lewiston Dam and Trinity Dam (the Trinity River is tributary to the Klamath River); (2) Whiskeytown Dam on Clear Creek, which is tributary to the Sacramento River; and (3) Clear Creek Tunnel which transports water from the reservoir behind Lewiston Dam (in the Klamath River basin) to the reservoir behind Whiskeytown Dam (in the Sacramento River basin).

The net effect of the Trinity River Division of the CVP is that significant amounts of water that would otherwise naturally flow in the Klamath River basin are transferred out-of-basin to the Sacramento River basin. The reason for this transfer was the CVP's view that there was a greater need for irrigation water in the Central Valley than there was in the Klamath River basin.

Importantly, the diversion and storage rights for the Trinity River Division of the CVP were approved in appropriative water licenses issued by the State Water Board to the Bureau of Reclamation in the late 1950s. At the time the State Water Board issued licenses for the CVP Trinity River Division, no explicit analysis of public trust concerns or impacts was done. Remember, this was 25 years before the *National Audubon* decision by the California Supreme Court.

As a result of the reduced instream flows of water in the Trinity River and downstream in the Klamath River, there have been outbreaks of the Ich parasite on the Klamath River which has killed large numbers of salmon. The reduced instream flows in the Klamath River (due in part to the CVP diversion of water from the Klamath River basin to the Sacramento River basin) has also led to higher instream temperatures that have killed salmon in the Klamath River.

For the past decade, the Bureau of Reclamation, the National Marine Fisheries Service, and counties in the Klamath River basin (as well as Native American tribes and state agencies such as the State Water Board and the California Department of Fish and Wildlife) have been involved in plans to increase instream flow in the Klamath River to provide better protection for salmon. Such plans involve curtailing the amount of water diverted via Clear Creek Tunnel from the reservoir behind Lewiston Dam to the reservoir behind Whiskeytown Dam.

The proposals to restore additional instream flows to the Trinity River and Klamath River, and reduce diversions from the Klamath River basin to the Sacramento River basin, involve many legal components,

including those under the federal Endangered Species Act and those relating to Native American fishery rights. These legal components also include the State Water Board's continuing obligation under California public trust law to evaluate the feasibility of providing protection for public trust resources such as salmon.

The State Water Board may not have given due consideration to California public trust law when it initially approved the appropriative water licenses for the CVP Trinity River Division in the late 1950s. But following the 1983 *National Audubon* decision by the California Supreme Court, the State Water Board now has an ongoing obligation to conduct this public trust assessment in light of new information about the impacts on salmon from the CVP Trinity River Division out-of-basin transfers.

Conclusion: California Public Trust Law Requires the State Water Board's Ongoing Supervision of Out-of-Basin Transfers to Prevent Harm to Fisheries and Other Wildlife

California public trust law requires the State Water Board to continually supervise out-of-basin transfers of water to evaluate whether such transfers are harming fisheries and other wildlife in the original basin by reducing instream flow. This State Water Board obligation is ongoing and extends beyond the initial transfer approval.

The State Water Board approved the IID-SDCWA transfer back in 2002, and the State Water Board approved the appropriative water rights issued to the Bureau of Reclamation for the CVP Trinity River Division back in the late 1950s.

Under California public trust law, the State Water Board therefore has a continuing obligation to evaluate current information about adverse impacts on fisheries and wild birds to determine whether modification of the initial terms of approval for these inter-basin transfers is now needed to provide additional instream flows in the original basin to restore and maintain these natural resources at risk.

For Additional Information:
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WATER BRIEFS

TOXICS REDUCTION NW

WEBINAR DECEMBER 14

APPLICATIONS DUE: FEB 8

The US Environmental Protection Agency (EPA) is issuing two Request for Applications (RFAs) from eligible entities for federal grants to improve water quality in the Lower Columbia River Estuary and/or the Middle and Upper Columbia River Basin through specific actions to: reduce toxics; increase toxics monitoring; and/or increase public education and outreach on pollution prevention to reduce toxics. The Columbia River Basin Restoration Program will assist tribal, state, and local governments; nongovernmental entities; and others as they implement the Columbia River Basin Toxics Reduction Action Plan (*see* Soscia, *TWR* #201) and the Lower Columbia Estuary Partnership Comprehensive Conservation and Management Plan and conduct activities to support EPA national goals for the Columbia River Basin.

Eligible projects must address at least one of the following project categories: eliminating or reducing pollution; cleaning up contaminated sites; improving water quality; monitoring to evaluate trends; reducing runoff; protecting habitat; or promoting citizen engagement or knowledge. Priority for funding will be given to projects which are consistent with federal fiscal years 2021 and 2022 (FY21/22) funding priorities as described in the RFA.

EPA is offering an informational webinar on Decenber 14, 2021. EPA encourages potential applicants to attend. During the webinar, EPA will review: eligibility criteria; funding limits; and mandatory cost-share requirements. Participants will have the opportunity to ask questions. Pre-registration is not required.

Webinar: Tuesday, December 14, 9:30am-11am (PST).

More information about this funding opportunity and the informational webinars can be found at: EPA's Columbia River Basin Website.

Applications must be submitted electronically by February 8, 2022 11:59 pm (EST) through www.grants.gov by following the instructions in the RFA.

For info: EPA Columbia River Basin Website: www.epa.gov/columbiariver/columbia-river-basin-restoration-funding-assistance-program

INTERSTATE COUNCIL ON WATER POLICY US

EXECUTIVE DIRECTOR SEARCH

The Interstate Council on Water Policy (ICWP) seeks a dynamic, experienced and engaged leader to manage daily activities of ICWP and who will be dedicated to increasing the value of the organization for ICWP members. The Executive Director will have experience and skills to manage the workings of a professional organization, effectively communicate ICWP's priorities, and the ability to build relationships with members, key federal administrators, Congressional staff, and other stakeholders. The Executive Director will implement the strategic plan with an emphasis on innovation and member engagement. Location is flexible, however, travel to Washington, DC and meetings in various locations is integral.

ICWP promotes integrated water resources management to address water quantity and quality concerns, enhance water planning and science, and ensure economic and environmental sustainability. Founded in 1959, ICWP is the national water policy organization of state, interstate, regional, and other water resource management agencies. As a 503(c)(3) organization, ICWP develops and promotes member-supported positions on national policy issues and provides guidance to Congressional policy makers and key federal agencies.

Minimum Qualifications:

- Bachelor's degree in water resources, public policy, natural resources, environmental science/management, or related field; advanced degree preferred
- Progressively responsible experience in water resources, public policy, or related area
- Excellent judgment, interpersonal skills and ability to work independently and as part of a team
- Excellent verbal and written communication skills, as well as marketing and public relations experience including representing an organization in public forums
- Senior management experience in a nonprofit or other organization, with skill in organizational management, fiscal and strategic planning, and meeting planning
- Knowledge and experience with state and federal water resource, legislative and budget processes; contacts and within federal water resource agencies are strongly preferred

Applications accepted through January 14, 2022. The Board of Directors is seeking full-time or part-time independent contractor proposals; the position is not an employee of ICWP. To apply, please submit a cover letter, resume/CV, three references and compensation requirements to: ICWP Executive Director Search, infoicwp@gmail.com. Applications will be kept confidential.

For info: ICWP website: https://icwp.org/opportunities/icwp-seeks-new-executive-director-apply-by-january-14-2022/

WOTUS US

EPA/DOA RULEMAKING

On November 18, EPA and the Department of the Army (agencies) announced a proposed rule to re-establish the pre-2015 definition of "**w**aters **o**f **t**he **U**nited **S**tates" (WOTUS). This action is intended to advance the agencies' goal of establishing a durable definition of WOTUS The proposal aims to protect public health, the environment, and downstream communities while supporting economic opportunity, agriculture, and other industries that depend on clean water. This proposed rule would support a stable implementation of "waters of the United States" while the agencies continue to consult with states, Tribes, local governments, and a broad array of stakeholders in both the implementation of WOTUS and future actions.

Congress enacted the federal Clean Water Act (CWA) in 1972 with the statutory objective "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." One of the CWA's principal

WATER BRIEFS

tools in achieving that objective is a prohibition on the discharge of pollutants from a point source to "navigable waters" unless otherwise authorized under the Act. "Navigable waters" are defined in the Act as "the waters of the United States, including the territorial seas." Thus, "waters of the United States" is a threshold term establishing the geographic scope of federal jurisdiction under the CWA. The term "waters of the United States" is not defined by the Act but has been defined by EPA and the Army in regulations since the 1970s and jointly implemented in the agencies' respective programmatic activities.

"In recent years, the only constant with WOTUS has been change, creating a whiplash in how to best protect our waters in communities across America," said EPA Administrator Michael Regan. "Through our engagement with stakeholders across the country, we've heard overwhelming calls for a durable definition of WOTUS that protects the environment and that is grounded in the experience of those who steward our waters. Today's action advances our process toward a stronger rule that achieves our shared priorities."

Recent court decisions have reinforced the need for a stable and certain definition of WOTUS (*see* article, *TWR* #213). The US District Courts for both Arizona and New Mexico have vacated the Navigable Waters Protection Rule. In light of the court actions, the agencies have been implementing the pre-2015 regulatory regime nationwide since early September 2021.

The proposed rule would maintain the longstanding exclusions of the pre-2015 regulations as well as the exemptions and exclusions in the CWA on which the agricultural community has come to rely.

The agencies conducted extensive pre-proposal engagement, including Federal and Tribal consultation, to help inform the content of the proposed rule. The agencies are taking comment on this proposed rule for 60 days beginning on the date it is published in the Federal Register.

For info: EPA WOTUS website: www.epa.gov/wotus.

BASIN STUDIES WEST

RECLAMATION SEEKS PARTNERS

The Bureau of Reclamation (Reclamation) is requesting letters of interest from eligible non-federal entities for Basin Studies and Water Management Options Pilots. Letters of interest are due by February 11, 2022, to the nearest regional office.

Through basin studies, Reclamation works with state and local partners to develop projections of future water supply and demand, including the impacts of climate change, and to identify collaborative strategies to ensure sustainable future water supplies in river basins across the Western United States. Since establishing the program in 2009, Reclamation has funded 27 basin studies.

Reclamation is also requesting letters of interest for Water Management Options Pilots. These pilots allow Reclamation to work with state and local partners to evaluate solutions to water management challenges by building on completed basin studies. Pilots may include both additional analysis that further develop strategies identified in a basin study and/or efforts to update or expand analysis.

The Basin Study Program is part of WaterSMART — the Department of the Interior's water initiative that uses the best available science to improve water conservation and help water resource managers identify strategies to narrow the gap between supply and demand.

For info: WaterSMART website: www.usbr.gov/watersmart/index.html.

SNOWPACK FORECASTS WEST

RECLAMATION COMPETITION

Reclamation is launching a new prize competition for improved snowpack water forecast techniques throughout the West. Developing better techniques to determine the amount of water stored as snowpack provides water managers more accurate information to make better water management decisions. The total prize purse for this competition is $500,000.

The competition is divided into two tracks. In track one, participants develop a model and calibrate it using historical information. The effectiveness and accuracy of the test model will be evaluated during the winter and spring using real-time snowpack measurements. For track two, models in the first track are eligible to submit a report that discusses their solution and approaches to solving the problem in track one.

Reclamation conducts prize competitions to spur innovation by engaging a non-traditional, problem-solver community. In the past six years, it has awarded more than $4 million in prizes through 29 competitions.

For info: Reclamation website: www.usbr.gov/research/challenges/swe.html.

Mississippi v. Tennessee US

EQUITABLE APPORTIONMENT

Mississippi brought an original action before the US Supreme Court against Tennessee for damages and other relief related to the pumping of groundwater by the City of Memphis from the Middle Claiborne Aquifer, a water resource that lies beneath eight States. Mississippi argued that Tennessee's pumping — using wells Mississippi conceded are located entirely in Tennessee — siphoned water away from Mississippi and amounted to a tortious taking of groundwater owned by Mississippi.

Mississippi expressly disclaimed any equitable apportionment remedy, arguing that the "fundamental premise of this Court's equitable apportionment jurisprudence — that each of the opposing States has an equality of right to use the waters at issue — does not apply to this dispute." Complaint ¶49. The Special Master appointed by the Court to assess Mississippi's claims determined that the aquifer is an interstate water resource and that equitable apportionment is the exclusive judicial remedy. The doctrine of equitable apportionment aims to produce a fair allocation of a shared water resource between two or more States, *see Colorado v. New Mexico*, 459 U. S. 176, 183, based on the principle that States have an equal right to reasonable use of shared water resources.

On November 22, the US Supreme Court (the Court) issued a unanimous decision authored by Chief Justice Roberts on Exceptions to Report

WATER BRIEFS

of Special Master, in *Mississippi v. Tennessee*, No. 143, Orig. (Nov. 22, 2021), rejecting Mississippi's claim that Tennessee and the City of Memphis were taking its groundwater. The Court dismissed Mississippi's case and held that the waters of the Middle Claiborne Aquifer are subject to the judicial remedy of equitable apportionment; Mississippi's complaint was dismissed without leave to amend. This holding finds, for the first time, that the doctrine of equitable apportionment applies to interstate aquifers.

The Court rejected Mississippi's assertion that it has a sovereign ownership right to all water beneath its surface that precludes application of the doctrine of equitable apportionment. "Mississippi's ownership approach would allow an upstream State to completely cut off flow to a downstream one, a result contrary to our equitable apportionment jurisprudence." *Slip Op*. at 10.

The Water Report will be publishing a major article on the decision in its January 15, 2022 issue.

For info: Order available at: www.supremecourt.gov/opinions/21pdf/143orig_1qm1.pdf

WATER BANK GRANTS WA

PILOT PROGRAM

The Washington State Department of Ecology (Ecology) on November 17th announced the opening of its pilot Water Banking Grants and that Ecology is now accepting applications. This funding opportunity will remain open until all funds are awarded or until funding expires on June 30, 2023. Ecology plans to award up to $14 million during this funding opportunity.

This pilot program funds the purchase of existing water rights to create local water banks using Ecology's trust water right program. The pilot grants are intended to furnish rural communities in headwater basins throughout the state with funds to compete with deep-pocketed water investors. The goal is to preserve water supplies for local use. To help protect aquatic resources, one-third of each water right bought with this funding must be dedicated to instream use.

As demand for water increases statewide, supplies available for new water uses are increasingly scarce. As a result, market interest in existing water rights — buying, selling and banking — has increased dramatically in recent years, leading to a number of high-profile water right purchases and transfers. Due to the nature of Washington water law, it is much easier to transfer a water right downstream than upstream — even if an upstream transfer simply seeks to return that water right to its original place of use. For this reason, some communities in headwater basins are concerned about the sale of large water rights downstream. In response, the state legislature set aside $14 million this year for this water banking grants pilot program, as well as additional funding to support ongoing policy development to support the program.

This program funding is available for public entities (and their private partners) who have demonstrated interest in an existing water right, validity of that right for water banking purposes, and sufficient expertise to manage the water bank on an ongoing basis. Additionally, eligibility for grant funding is restricted to rural headwater counties as shown in Ecology's map on their website.

Ecology previously published the "Water Banking Grants Funding Guidelines" to assist applicants with developing and submitting their applications (https://apps.ecology.wa.gov/publications/SummaryPages/2111023.html). A new focus sheet and blog post have also been recently published highlighting this pilot grant program. (*See* https://apps.ecology.wa.gov/publications/SummaryPages/2111026.html and https://ecology.wa.gov/Blog/Posts/November-2021/Pilot-program-to-fund-local-water-banks, respectively).

Ecology is offering consultation meetings for potential applicants to discuss the details of their water banking project with agency staff before submitting an application. To request a consultation meeting or ask questions about the funding program, email WaterBankingGrants@ecy.wa.gov. If requesting a meeting, include "meeting request" in the subject line.

For info: Chris Anderson, Ecology, 360/ 890-5471 or https://ecology.wa.gov/Water-Shorelines/Water-supply

PUMPED STORAGE TOOL US

PLATFORM FOR HYDROPOWER

The Department of Energy's Water Power Technologies Office (WPTO) announced November 16 that is recently launched the Pumped Storage Hydropower (PSH) Valuation Tool. The PSH Valuation Tool is a web-based platform that takes users through the valuation process presented in the Pumped Storage Hydropower Valuation Guidebook.

One significant hurdle standing between the US and its goal of 100% carbon-free electricity by 2035 and a net-zero energy economy by 2050 is a lack of clean energy storage. The good news is solutions are already available — chief among them PSH, which currently accounts for 95% of all utility-scale energy storage in the United States. However, the development and deployment of new PSH projects is a large undertaking with high capital costs and can seem daunting without the ability to calculate the value of PSH plants and their associated services. To help more developers accurately calculate the full value potential of a PSH project, a team from Pacific Northwest National Laboratory and Argonne National Laboratory created the PSH Valuation Tool to guide users through the 15-step valuation process.

The platform features a back-end benefit-cost analysis tool, a price-taker valuation tool for small-scale PSH, and a multi-criteria decision analysis tool. It is available free to the public and will, when used in concert with the guidebook, help stakeholders make decisions about funding, approving, and/or pursuing new or existing PSH project upgrades.

For info: Department of Energy website at: www.energy.gov/eere/water/articles/department-energy-releases-new-tool-aid-pumped-storage-hydropower-project

WATER BRIEFS

NONPOINT GRANTS CA

TARGETED WATERSHEDS

On November 19, the California Water Boards sent out notice of a grant opportunity to protect and improve waters from nonpoint source pollution. Nonpoint source pollution is a by-product of land use practices. Farming, timber harvesting, construction, marina activity, roads, mining, and urbanized areas deliver pollutants to surface and groundwater via runoff and leaching. Nonpoint source pollution includes fertilizers, sediment, pesticides, and other pollutants picked up by water traveling over land. Nonpoint source pollution is water pollution that does not originate from a single, discrete point, such as a sewage treatment plant outlet, but rather from many points spread across the landscape.

The State Water Resources Control Board (SWRCB) has $4 million dollars in grant funding to be awarded late summer 2022 to the following types of projects located in targeted watersheds across the state:

- Stream restoration to reduce erosion, such as streambank stabilization and revegetation
- Ranch and rangeland improvements to reduce impacts from grazing, such as fencing and off-stream watering troughs
- Improvements to rural, dirt roads to reduce erosion and sedimentation
- Farm improvements to reduce agricultural chemicals such as fertilizer and pesticides from entering waters through irrigation improvements, cover crops, vegetated filter strips, and bioreactors
- Revegetation or restoration of areas burned by wildfire to prevent runoff of sediment and toxic materials
- Harbor and marina improvements to reduce leaching of toxic metals from anti-fouling paint on boat hulls
- Planning activities to develop watershed-based plans

All projects must be within and designed to improve one of the watersheds or waterbodies listed in the "Program Preferences" section of the 2022 Nonpoint Source Grant Program Guidelines. Requests for funding must be for a minimum of $250,000 or a maximum of $800,000, except for planning proposals which can be for a minimum of $50,000 and a maximum of $200,000. Projects must be completed in three years or less, starting in spring 2023. Funding match is required in most cases. Waivers of match are available for projects benefiting disadvantaged communities. Federally Recognized Tribes must provide a limited waiver of sovereign immunity to be eligible for funding.

To apply or for more information, please see the 2022 Nonpoint Source Grant Program Guidelines online.
For info: NPA Control Program at: www.waterboards.ca.gov/water_issues/programs/nps/

WATER INFRASTRUCTURE US

WIFIA LOAN INVITATIONS

On December 3, EPA announced that 39 new projects are being invited to apply for Water Infrastructure Finance and Innovation Act (WIFIA) loans and four projects are being added to a waitlist. The agency anticipates that, as funds become available, $6.7 billion in WIFIA loans will help finance over $15 billion in water infrastructure projects to protect public health and water quality across 24 states.

EPA's WIFIA program will provide selected borrowers with innovative financing tools to address pressing public health and environmental challenges in their communities. Consistent with its announced priorities, the WIFIA program is making $1.2 billion in loans available to support infrastructure needs in historically underserved communities. Additionally, 14 projects will help protect infrastructure from the impacts of extreme weather events and the climate crisis. New and innovative approaches, including cybersecurity, green infrastructure, and water reuse, are included in 24 projects.

EPA is also inviting state agencies in Indiana and New Jersey to apply for a total of $472 million in WIFIA loans through EPA's state infrastructure financing authority WIFIA (SWIFIA) program. EPA's SWIFIA loans are available exclusively to state infrastructure financing authority borrowers, commonly known as State Revolving Fund (SRF) programs, and will allow these programs to finance more infrastructure projects in their states. These programs will combine state resources, annual capitalization grants, and the low-cost, flexible SWIFIA loans to accelerate investment in drinking water and wastewater infrastructure to modernize aging systems and tackle new contaminants.
For info: WIFIA program at: www.epa.gov/wifia

WATER STORAGE CA

FUNDING PROGRAM

The California Water Commission (CWC) announced progress in its Water Storage Investment Program (WSIP), with a third project moving forward to meet continuing eligibility requirements. The Chino Basin Conjunctive Use Environmental Water Storage/Exchange Program (Chino Basin Program) met the statutory deadline to ensure progress and remain eligible for Water Storage Investment Program (WSIP) funding. Proposition 1 — the Water Quality, Supply, and Infrastructure Improvement Act of 2014 — requires all WSIP applicants to complete their feasibility studies, release a draft version of their environmental documents for public review, provide the DWR director documentation of commitments for at least 75 percent of the non-program funding, and have the California Water Commission find their project feasible no later than January 1, 2022. At the November 17 meeting, the Commission found that the Chino Basin Program was feasible.

The Chino Basin Program would construct an advanced water treatment facility and distribution facilities that would store up to 15,000 acre-feet per year of treated wastewater in the existing Chino Basin Water Bank. Public benefits of the project include enhanced instream flows in the Feather River to aid Chinook smolt emigration, stored water to be used in the event of an emergency that disables water import infrastructure, and a reduction in the total dissolved solids in the Chino

Groundwater Sub-basin to protect groundwater quality. Construction is expected to begin in 2025.

In October, the Los Vaqueros Reservoir Expansion Project and the Harvest Water Program met the statutory deadline and remained eligible for WSIP funding. The remaining four WSIP projects — the Kern Fan Groundwater Storage Project, Pacheco Reservoir Expansion Project, Sites Project, and Willow Springs Water Bank Conjunctive Use Project — are expected to come before the Commission for feasibility determinations in December.

Beyond January 1, 2022, Proposition 1 requires each of the seven projects to meet four requirements before they can appear before the Commission for a final funding decision: final environmental documents, non-public benefit cost share contracts, contracts for the administration of public benefits, and all permits required to begin construction. Combined, the projects, if completed, would add 2.77 million acre-feet to California's water storage capacity.

For info: CWC website: https://cwc.ca.gov/Water-Storage

TRIBE DROUGHT AID WEST RECLAMATION PROGRAM

Reclamation has announced that 31 tribes in 12 states will receive $9.9 million through the Native American Affairs Technical Assistance to Tribes Program.

"Water 2021 was one of the most hydrologically-challenging years to date. As the year unfolded, Reclamation recognized the need to reprogram $100 million dollars to directly deal with the drought and to build resiliency into the future. This funding is a part of that reprogramming and will help facilitate partnerships with Tribes and Tribal organizations as they address severe and continued drought conditions affecting their critical water resources," said Reclamation Deputy Commissioner Camille Calimlim Touton.

Reclamation's Native American Affairs Technical Assistance Program provides technical assistance to Indian Tribes to develop, manage, and protect their water and related resources. The program has supported a broad range of activities in each year since its inception in the early 1990s.

Given the historic drought conditions this year, the Department of the Interior made several investments to help mitigate effects of the west-wide drought on the ground, including reprograming significant funding into drought-related programs and projects. This included a significant increase in funding for the Native American Affairs Technical Assistance Program.

The projects selected are:

- Big Valley Treatment Plant Improvements, $350,000 (California)
- Chemehuevi Wastewater Extension, $400,000 (California)
- Cherokee Mankiller-Soap Water Study, $400,000 (Oklahoma)
- Choctaw Arbuckle-Simpson Aquifer Study, $199,844 (Oklahoma)
- Choctaw Blue River Water Supply Analysis, $56,020 (Oklahoma)
- Cow Creek Water Resource Assessment, $399,748 (Oregon)
- Fallon Paiute-Liner Appraisal Study, $379,000 (Nevada)
- Fort Belknap Spring & Well Improvements, $300,000 (Montana)
- Havasupai Bar Four Treatment System Improvements, $406,000 (Arizona)
- Hopi Power Extension, $368,733 (Arizona)
- Isleta Pueblo Mound Rio Erosion Control, $150,000 (New Mexico)
- Jemez Pueblo Pecos Diversion Dam Improvements, $250,000 (New Mexico)
- Klamath Stock Watering Wells, $375,000 (Oregon)
- Lower Brule Sioux Water Meters Installation, $398,265 (South Dakota)
- Navajo Nation Many Farms Feeder Improvements, $300,000 (Arizona/Utah)
- Nez Perce Bedrock Creek Restoration, $95,613 (Idaho)
- Nez Perce Little Salmon River Restoration, $87,589 (Idaho)
- Nez Perce LOP Exchange Well Design, $140,000 (Idaho)
- NW Shoshone OGOI Laterals, $142,340 (Utah)
- NW Shoshone OGOI Pipe Improvements, $135,945 (Utah)
- NW Shoshone SCADA System, $40,000 (Utah)
- Oglala Sioux Kyle Pumphouse Electrical Improvements, $162,508 (South Dakota)
- Oglala Sioux No.9 Pumphouse Improvements, $15,109 (South Dakota)
- Oglala Sioux Brotherhood Booster Pump Improvements, $33,005 (South Dakota)
- Oglala Sioux Slim Buttes Booster RTU Upgrades, $62,884 (South Dakota)
- Quechan Indian Flow Measurement Improvements, $100,995 (Arizona)
- San Filipe Pueblo Phase II, $399,998 (New Mexico)
- Santa Clara Pueblo Phase II-Main Ditch Liner, $400,000 (New Mexico)
- Shoalwater Bay Water System Improvements, $175,000 (Washington)
- Shoshone-Bannock Tribes Drought Plan Update, $249,300 (Idaho)
- Shoshone-Bannock Tribes Tank Rehabilitation, $250,000 (Idaho)
- Skokomish Meter Replacement, $225,055 (Washington)
- Standing Rock Sioux WTP Control Extension, $370,015 (North/South Dakota)
- Table Mountain Treatment Plant Solar, $408,400 (California)
- Taos Nose Pipeline Phase II Improvements, $400,000 (New Mexico)
- Tule River Water Transmission Improvements, $397,560 (California)
- Twenty-Nine Palms Contingency Plan, $220,000 (California)
- Umatilla Drought Planning, $372,008 (Oregon)
- Ute Tribe Water Monitoring Improvements, $10,000 (Utah)
- Zuni Supply Options Assessment, $266,000 (New Mexico)

The Native American and International Affairs Office in the Commissioner's Office serves as the central coordination point for the Native American Affairs Program and lead for policy guidance for Native American issues in Reclamation.

For info: Reclamation website: www.usbr.gov/native.

CALENDAR

December 14 WEB
Grant Applications to Reduce Toxics in the Columbia River Basin - EPA Webinar, Virtual Event, 9:30am-11:00am PST. RE: CWA § 123 Columbia River Basin Restoration Program Request for Applications. Applications Due by February 8th. See Brief, This TWR. For info: www.epa.gov/columbiariver/columbia-river-basin-restoration-funding-assistance-program

December 15 WEB
Multi-State Panel on Water Policies, Water Law, & Planning Efforts: AWRA-WA December 2021 Virtual Dinner Meeting, Virtual Event. Presented by American Water Resources Assoc. - Washington Section, 7pm Pacific Time. For info: Washington Section: www.waawra.org/

January 19-21 CA
California Association of Sanitation Agencies (CASA) Winter Conference, Palm Springs. Hilton Palm Springs. Speakers, Panel Presentations & Networking. For info: https://casaevents.memberclicks.net/winter-conference

January 20 OR
Superfund Conference: Environmental Contamination & Cleanup, Portland. World Forestry Center - Miller Hall. In-Person Gathering Limited to 100 Participants. For info: Environmental Law Education Center, Holly Duncan, www.elecenter.com

January 20-21 WEB
Cybersecurity Fundamentals for Water & Wastewater Utilities - Virtual Event, For info: www.euci.com/events/

January 20-21 WA
29th Annual Endangered Species Act Conference, Seattle. On-site Location TBD; Available In Person, Live Webcast or On Demand. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

January 20-21 TX
Texas Wetlands-LIVE! Conference, Houston. JW Marriott by the Galleria. For info: CLE International, 800/ 873-7130 or www.cle.com

January 27-28 CO
MBTA & BGEPA-LIVE! Conference, Denver. Embassy Suites. For info: CLE International, 800/ 873-7130 or www.cle.com

January 30-Feb. 2 MN
2022 Minnesota Water Well Association Convention & Trade Show, Minneapolis. Minneapolis Marriott Northwest. For info: https://mwwa.org/

January 31-Feb. 3 AZ
National Association of Clean Water Agencies (NACWA) Winter Conference, Scottsdale. Scottsdale Plaza. RE: Challenging Issues That Lie Ahead. For info: www.nacwa.org/conferences-events

February 1-2 WEB
Leadership Development for Water Sector Utilities - Virtual Event, Key Characteristics of an Effective Utility Leader. For info: www.euci.com/events/

February 1 WEB
Hydropower 101 - Virtual Event, Basic Overview of Hydropower Operations. For info: www.euci.com/events/

February 10-11 AZ
Water Security on the Path to Resiliency: 10th Annual Tribal Water Law Conference, Scottsdale. We-Ko-Pa Casino Resort. For info: CLE International, 800/ 873-7130 or www.cle.com

March 1-3 AZ
Growing Water Smart Workshop, Phoenix. TBA / Virtual Backup. Presented by Arizona Growing Water Smart Communities. For info: http://resilientwest.org/growing-water-smart/arizona/

March 5-9 TX
37th Annual WateReuse Symposium, San Antonio. Marriott San Antonio Rivercenter. For info: https://watereuse.org/news-events/conferences/

March 7-8 WEB
Asset Management for Water Utilities - Virtual Event, Intro Course. For info: www.euci.com

March 7-9 DC
Association of Municipal Water Agencies (AMWA) 2022 Water Policy Conference, Washington. Hyatt Regency Capitol Hill. RE: Biden Administration Priorities; Legislative Plans from Congressional Members; and Implementation Timetables. For info: www.amwa.net/conference/2022-water-policy-conference

March 9 WEB
Establishing an Asset Management System (AMS) for Water and Wastewater Utilities with ISO 55000 - Virtual Event, For info: www.euci.com

March 14-16 TBD
P3C's Public-Private Partnership Conference & Expo - 10th Annual Conference, TBA. For info: https://thep3conference.com/

March 18-19 OR
Pacific Northwest Ground Water Exposition, Portland. Red Lion Hotel. Pacific Northwest Ground Water Association Event. For info: https://pnwgwa.org

March 21-23 TX
Geospatial Water Technology Conference, Austin. DoubleTree by Hilton. For info: www.awra.org

March 22 TX
Texas Environmental Excellence Awards (TEEA), Austin. TBA. Awards by the Office of the Governor & TCEQ Commissioners. For info: www.tceq.texas.gov/p2/events/teea/about-teea

April 5-7 VA
2022 Western States Water Council Spring (198th) Meetings & Washington Roundtable, Crystal City. DoubleTree Hotel in Washington, DC. For info: https://westernstateswater.org/events/

April 5-7 DC
Interstate Council on Water Policy 2022 Washington DC Roundtable, Washington. TBA; In-Person Meeting. Co-Sponsoring with Western States Water Council & the National Water Supply Alliance. For info: Sue Lowry, ICWP, 307/ 630-5804 or www.icwp.org

April 11-15 CA
11th International Symposium on Managed Aquifer Recharge, Long Beach. Hilton Long Beach. Technical Sessions, Plenary Sessions, Field Trips & Networking. For info: https://ismar11.net

April 22 CA
Berkeley Law's Annual Environmental Awards Banquet & Ecology Law Quarterly's 50th Anniversary Celebration, Berkeley. TBA. With Environmental Leadership Award Winner Dr. Robert Bullard. For info: Center for Law, Energy, & the Environment, 510/ 642-7235, clee@law.berkeley.edu or www.law.berkeley.edu/research/clee/events/annual-energy-environmental-awards-banquet/

April 25-27 AL
American Water Resources Association 2022 Spring Specialty Conference - "Water Risk Under a Rapidly Changing World: Evaluation and Adaptation", Tuscaloosa. Bryant Conference Center at the University of Alabama. Co-Hosted by the AWRA Future Risk Committee & the Alabama Water Institute. For info: www.awra.org

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CALENDAR

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April 25-28 LA
Gulf of Mexico Conference (GoMCon) , Baton Rouge. Raising Canes River Center. Conference Combines: the Annual Gulf of Mexico Alliance All Hands Meeting; the Annual Gulf of Mexico Oil Spill & Ecosystems Science Conference; and the Triannual State of the Gulf Summit; Integrating Science & Management for Decision-Making. For info: www.gulfbase.org/event/gulf-mexico-conference-gomcon-2022

April 26-27 DC
National Association of Clean Water Agencies (NACWA) 2022 National Water Policy Fly-In, Washington. Hilton National Mall. For info: www.nacwa.org/conferences-events