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Water Rights, Water Quality & Water Solutions in the West

In This Issue:

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Author Sharon Megdal's Correct Phone Number is: 520/ 621-9591

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Federal Water Project Funding

Municipal Stormwater Regs

& More!

COLORADO MUNICIPAL WATER SUPPLY EVOLUTION

GROWING PAINS: THE EVOLUTION OF MUNICIPAL WATER SUPPLY DEVELOPMENT IN COLORADO

by Brett Bovee & Adam Jokerst, WestWater Research, LLC (Fort Collins, CO)

Introduction

Developing reliable water supplies to serve anticipated growth is a challenge that will only get more difficult with limited sources of new supply, rapid escalation of water prices in some locations, and challenges of regulatory approval by Federal agencies and state regulators. These conditions are eroding the paradigm long used by municipalities in Colorado, but also throughout the Western US, of simply purchasing more of the same water assets to meet projected future water needs. Some municipal water providers are turning to less established and more creative models to develop new water supplies.

This article examines emerging challenges in Colorado and the need for creativity as municipal providers look to provide reliable and affordable water service to a growing customer base. An example is presented for the City of Greeley within the fast-growing Front Range of Colorado, as a case study for challenges impacting many areas of the Western US.

Background

COLORADO'S FRONT RANGE: ADAPTING TO OVER 2 MILLION NEW RESIDENTS SINCE 1990

Municipal water providers strive to provide a safe and reliable water supply to every connection in their service area without interruption and at an affordable cost. Municipalities are also charged with securing new water supplies to meet growing populations and associated water demands. Successful water utilities are most often dedicated to long-range planning and are inherently risk averse. Redundancy, resiliency, and reliability are engrained in their working vocabulary. One of the tools that many municipal water providers use to ensure that they meet their mission is to craft policy that forces growth to pay its own way. This policy attempts to shield existing water customers from additional risk and/or cost that comes with the utility agreeing to serve new customers. The practical implementation of this policy varies for each municipal water utility, but the following are some common policy elements:

Water Rights Dedication: A land developer (or homebuilder) is often required to dedicate sufficient water rights to the water utility to match the expected average annual water demands of the planned project. The water utility often has a short-list of acceptable water rights that can be incorporated into the existing water supply system, and in Colorado these acceptable water rights are often some form of existing agricultural use right that can be converted to municipal use. In some cases, the water utility will allow the developer to pay a cash fee in lieu of dedicating water rights. The water utility will then use the cash to acquire water rights and/or increase water supplies through project investment.

Storage & Infrastructure Fee: In some cases, the water rights dedicated to the utility require additional reservoir storage or related infrastructure to "firm" the supply during drought periods. An additional fee may be charged by the water utility on a volumetric basis to provide the necessary funding to construct reservoir storage or to repay the costs of completed storage.

Municipal Supply

System Expansion

Population Growth

New Supply

Dwindling Pool

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Plant Investment Fee: The new development will also utilize capacity in the existing municipal water system, including capacity at the water treatment plant and in the distribution pipelines. Municipal water utilities typically charge a pro-rata fee to the developer based on the use of these existing facilities while also acknowledging that system expansion may be required as new demands are being served.

Collectively, these fees ensure that the water rights (supplies) and infrastructure needed to serve potable water to new customers are secured prior to any new water taps being added to the municipal water system. These fees are typically paid by the developer and incorporated into the purchase price of a home or the development cost of a business. Importantly, the monthly water bill paid by the new customers (as well as existing customers) reflects the operating costs of supplying potable water to their taps but typically does not reflect these upfront capital cost items.

These policy elements have resulted in an established paradigm that has worked well to support population growth. The Colorado Front Range — an urban corridor located along the eastern face of the Rocky Mountains stretching from Pueblo, Colorado to the Wyoming border — has grown by 2.6% annually since 1990, with 2,257,000 new residents being provided a high-quality municipal water supply. *See*: Colorado Water Conservation Board (2021). *Analysis and Technical Update to the Colorado Water Plan*. (https://cwcb.colorado.gov/colorado-water-plan/technical-update-to-the-plan).

The paradigm works because there have been and continue to be water rights that can be acquired to support development projects and the fees charged by municipal utilities can be accommodated in market home prices.

Looking Forward 30 Years

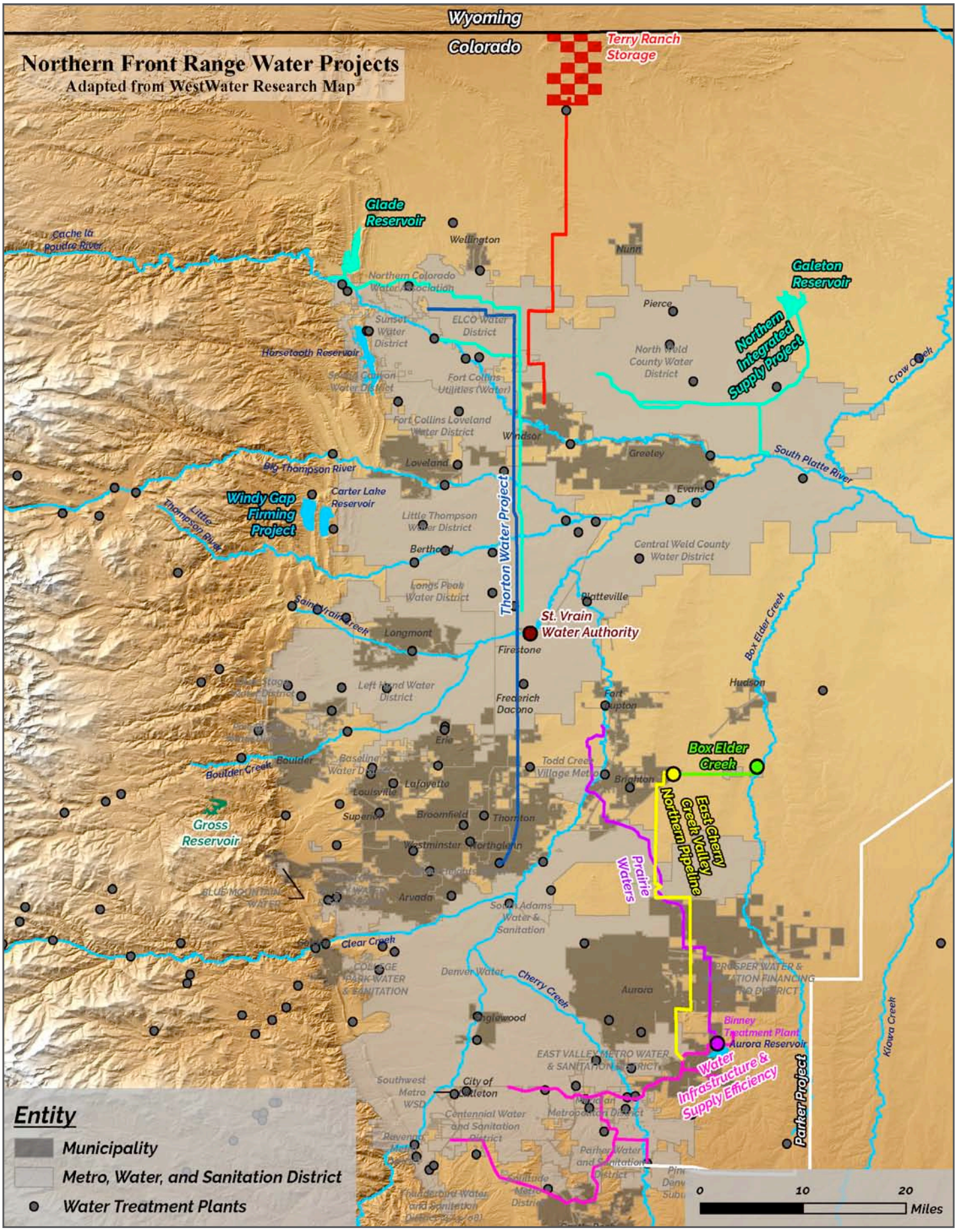
SERVING 1.5 MILLION NEW RESIDENTS BY 2050

Recent planning projections estimate that the Colorado Front Range will see 1,472,000 new residents by 2050 with new municipal water demand projected to increase between 313,000 and 621,000 acre-feet per year. *Ibid*. As described above, these new residents will not have new homes to occupy unless sufficient water supplies have been secured and fees have been paid to support a municipal utility's commitment to provide water service. The municipal utility is often challenged to accommodate growth while also maintaining its bedrock commitment to provide reliable water service and maintaining affordable water rates. The following paragraphs highlight some of the challenges that will likely be faced by the historical paradigm of securing new water supplies.

Limited New Water Supplies: Municipal water utilities along the Colorado Front Range are facing a dwindling pool of reliable water supplies to acquire and incorporate into their water portfolios. Most rivers east of the Continental Divide in Colorado have been fully appropriated since the late 19th century. In the 20th century, utilities turned to the Colorado River Basin for additional supply, constructing numerous trans-basin diversion projects to bring West Slope water to the eastern Front Range region (see Map). Into the 21st century, water utilities have increased their ownership of these previously established trans-basin water rights and projects. While there has been some recent activity to increase Front Range storage to facilitate increased trans-basin export, there has not been a major new trans-basin project constructed in Colorado since 1985. Climate change impacts on hydrology and uncertainty in interstate management of rivers have often decreased the feasibility of and interest in new projects. Therefore, there is a dwindling pool of water rights that a developer could acquire and dedicate and also rising uncertainty as to what municipal water utilities should do with the cash it is paid in lieu of dedicated water rights.

Rising Costs to Secure Available Water Sources: The reduction in available water supplies has resulted in price appreciation for water rights, particularly those water rights that have a proven track record of being dedicated to a municipal utility and/or acquired by a municipal utility. The most well-documented example in Colorado are shares (units) in the Colorado-Big Thompson (CBT) Project which have long been the water currency to allow new development projects in Northern Colorado. CBT units saw prices rise from $10,000 per unit in 2011 up to over $60,000 per unit currently. Irrigation ditch company shares accepted for raw water dedication have seen similar price appreciation in recent years. As an example, prices for shares in the Water Supply and Storage Company have risen 40% annually over the last five years.

Impractical Regulatory Timelines: New reservoir construction, or even enlargement of existing reservoirs, can be prohibitive because of an opaque and often burdensome regulatory process. New reservoir storage projects often require decades-long federal, state, and local environmental permitting processes. Even upon successful permitting, reservoir projects often face legal challenges that can add years to the projects' schedules and significantly change costs. Such permitting and legal challenges create a level of risk and uncertainty that some municipal water providers are unwilling to endure. Further, the length of permitting and legal challenges can add significantly to project costs. For example,



Municipal Supply

Permit Costs

permitting costs for the Northern Integrated Supply Project — a proposal to construct two new reservoirs and associated infrastructure benefiting 14 northern Colorado municipalities (*see*: www.northernwater.org/NISP/) — have exceeded $20 million. Delay to construction, arising from the permitting process, has added $100s of millions to overall project costs. Outside of water infrastructure projects, the regulatory timeline for completing a routine change of use for an existing water right through the state water court process is also a hurdle. Water court cases typically require at least three years and frequently cost the applicant over $100,000, with the most contested cases costing in excess of $500,000. *See*: Womble, P. and Hanemann, W. M. (2020). *Water Markets, Water Courts, and Transaction Costs in Colorado*. Water Resources Research, 56.

Pipeline Projects

Resistance to Long Distance Solutions: In some areas, municipal water utilities struggle to find proximate sources of water supply. This has led to several Front Range water pipeline projects, both planned and constructed, to convey water supplies over long distances. The cost of such pipelines can be prohibitive for small water utilities and a growing concern is the political risks of pursuing a long-distance pipeline. The communities located near the source of water supply do not like to see impacts to their local water sources while benefits are accruing to non-local communities. An example of such resistance is illustrated by the City of Thorton's Northern Project (*see*: https://thorntonwaterproject.com/), a pipeline proposed to deliver water from sources in northern Colorado south to the Denver Metro area. Communities in northern Colorado have strongly resisted the pipeline citing concerns over water export and environmental impacts. Litigation is ongoing and has resulted in delays, uncertainty, and increased costs to the project.

"Buy-and-Dry" Opposition

The agricultural community often opposes new municipal water projects as well, primarily in opposition to the common practice of "buy and dry" in which water is permanently removed from formerly irrigated land following a change to municipal use. Buy and dry practices have resulted in large areas taken out of irrigated agriculture and in some limited cases a collapse of small-town economies dependent on agriculture.

Given these challenges, some communities in Colorado are concerned water supply constraints will limit growth. Indeed, the cost and availability of water is often central to debates over affordable housing in the state.

Future Growth: Creativity is Key

New Approaches

Past practices for developing new water supply are becoming expensive and risky — even unavailable in some cases. As a result, municipalities are increasingly pivoting away from the water supply solutions that served them well over the past decades and pursuing more non-traditional water supply projects. Some of the creative solutions that Colorado municipal water providers have developed to support growth include:

Alluvial Groundwater

Use of the River Alluvium: There are several examples of municipal water utilities developing new water supply projects sourced from alluvial groundwater along river systems.

Examples include:

Aurora Prairie Waters Project
(*see*: www.auroragov.org/residents/water/water_system/water_sources/prairie_waters)

Firestone Alluvial Supply and Treatment Project
(*see*: www.firestoneco.gov/622/Firestone-Reservoirs-Wells)

Town of Castle Rock Box Elder Project
(*see*: http://crgov.com/1793/Import)

Short-Term Storage

These alluvial projects recognize that there is short-term storage in the river alluvium and a broader set of water rights can be used to mitigate (augment) the alluvial pumping. This use of alluvial groundwater represents one of the last remaining "buckets" of new water supply that can be developed on the Front Range. Augmentation sources have not historically been developed because of water quality concerns and advanced treatment is often required. However, as the cost of traditional water rights have increased, the long-term operational costs of advanced treatment are now often outweighed by the savings from lower priced alluvial sources.

Industrial Rights Transfer

Repurposed Industrial Water Rights: Another sector that may hold unique and useful water supplies to support municipal growth is industry, and particularly the mineral extraction and fossil fuel sectors. Gravel mining is a robust business along the Front Range rivers, and gravel mining companies often hold useful water rights and small storage reservoirs that can be used by local municipalities. Market activity for gravel pit water rights and storage along the Front Ranch has increased over time. Water providers have also looked to former mines for sources of water, an example of which is the City of Aurora's purchase of water rights associated with the London Mine, a former gold mine (*see*: www.

Municipal Supply

Municipal Partnerships

auroragov.org/residents/water/water_system/water_sources/london_mine_water_rights). Coal and gas power plants are large water users in the state, and as these facilities age or are decommissioned in favor of renewable energy supplies, their water rights holdings could be transferred to municipal water utilities. For example, the Platte River Power Authority, a regional electric utility, has in recent years sold some of its water rights to municipal water providers.

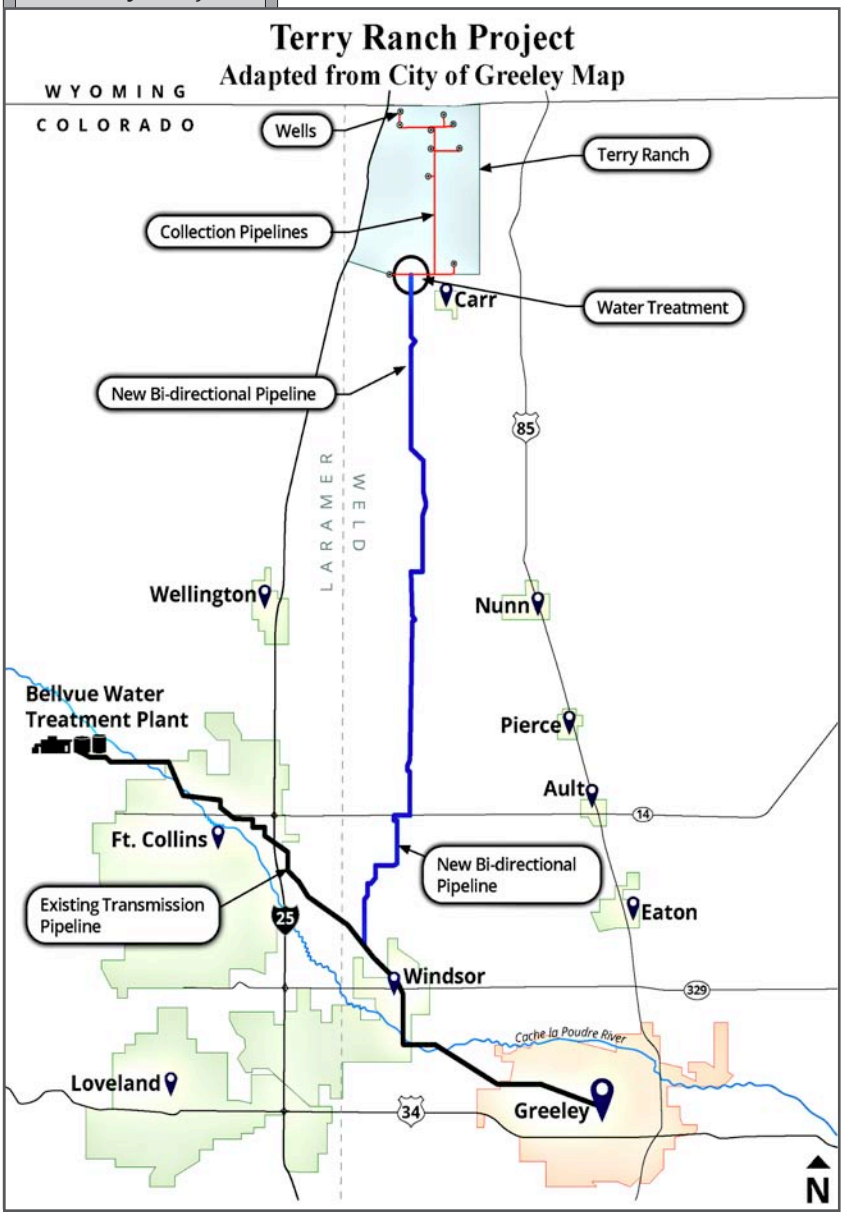
Shared Infrastructure & Supply: Historically, the Colorado Front Range municipal water supply has developed as a checkerboard of individual municipal water utilities including cities, towns, and water districts. For the most part, these utilities have developed independent water right portfolios and each have individually taken on the task of finding and securing new water supplies. There are roughly 50 independent municipal water providers on the Colorado Front Range. Partnerships and cooperative projects may hold promise for water providers due to economies of scale and diversifying water supplies. Examples of recent partnerships include:

The Water Infrastructure Supply Efficiency (WISE) project serving several municipal water utilities in the Denver Metro area (*see*: www.denverwater.org/your-water/water-supply-and-planning/wise)

The Arapahoe County Water & Wastewater Authority and East Cherry Creek Valley Water District partnership to develop a joint South Platte River water supply project (*see*: www.eccv.org/northernproject)

The Southern Delivery System benefiting Colorado Springs and other municipalities in the Arkansas River basin (*see*: www.water-technology.net/projects/southern-delivery-system-water-project)

Greeley Project



Case Study: Greeley's Terry Ranch Project

The City of Greeley is a rapidly growing community along the Northern Front Range. The City's current population of 115,000 is anticipated to more than double in the next thirty years. While Greeley enjoys an adequate water supply to meet its near-term needs, it must develop additional water supply to meet growing residential and industrial demands. Traditionally, Greeley planned to meet growing demands through the well-established approach of acquiring agricultural water rights and constructing new reservoir water storage to firm those rights.

For over two decades, Greeley pursued an enlargement of an existing on-channel dam on a tributary to the Cache La Poudre River in northern Colorado. The City proposed raising the dam to increase reservoir storage from 5,000 acre-feet to over 50,000 acre-feet. Enlarging the reservoir would impact several environmental resources including wetlands, stream channel, and critical habitat for species protected under the Endangered Species Act. Consequently, the project required numerous permits and authorizations from federal, state, and county agencies. The City spent 15 years and $19 million within the National Environmental Policy Act (NEPA) permitting process. During this time, mitigation requirements and construction cost estimates for the project steadily rose, as did the cost of water rights needed to fill the reservoir. What was once a $100 million project in the early 2000s became a $500 million project in 2018.

Starting in 2019, the City began evaluating less established alternatives to reservoir enlargement, focusing on less costly projects that did not have a federal nexus and could be built without federal permits. Well over 100 alternatives were screened, and through that evaluation process Greeley identified the Terry Ranch Project as a potentially viable alternative.

Municipal Supply

ASR Project

Conjunctive Management

Private Development

"Raw Water Credits"

Developer Purchases

City Purchase Structure

Repayment Risk

The Terry Ranch Project is an aquifer storage and recovery (ASR) project located along the Colorado-Wyoming border approximately 35 miles northwest of Greeley (*see*: https://greeleygov.com/services/ws/trp). The project provides Greeley with 1.2 million acre-feet of decreed non-tributary groundwater (groundwater that is not hydrologically connected to surface waters) and associated underground storage in the Upper Laramie Aquifer. The non-tributary groundwater provides the City with a new water source while underground storage offers the ability to firm the City's existing and future surface water supplies.

Greeley has historically relied entirely on surface water supplies. The addition of groundwater to the City's portfolio through the Terry Ranch Project allows Greeley to conjunctively manage surface and groundwater to extend its supplies during droughts. Greeley will continue to rely on surface water for its base demands but can turn to groundwater during droughts and surface water supply disruptions, such as the recent wildfires that have impacted the watersheds of its source water.

The Terry Ranch water rights were initially developed by a private party, Wingfoot Water Resources, LLC. Wingfoot perfected the water rights, drilled high-volume production wells, verified water quality, and obtained the surface easements and encumbrances necessary to construct the project before marketing the project to Greeley.

Wingfoot and Greeley negotiated a unique purchase structure to acquire the project. Rather than paying cash, Greeley agreed to pay Wingfoot "raw water credits" which are redeemable to meet the City's raw water dedication requirements. Greeley issued Wingfoot approximately 12,000 raw water credits, with each credit worth one acre-foot of raw water dedication. In issuing these credits, Greeley agreed it would accept the credits as a third option for developers to meet raw water dedication for a period of 80 years.

Wingfoot will sell the raw water credit to developers, home builders, or investors at a discount to Greeley's cash in lieu of water rights rate. Developers and homebuilders will then surrender the credits to the City to receive water service just as they would water rights or cash. Wingfoot's return for sale of the project is thus paid directly by the development community. Wingfoot has accepted an uncertain, but likely greater long-term payment from developers as compared to upfront payment from the city.

By issuing the raw water credits, Greeley expects to receive less cash in lieu payments for raw water dedication in the future. In essence, the transaction structure results in Greeley foregoing future revenue in exchange for the water project upfront. However, the purchase structure eliminated the near-term capital outlay and associated bonding that would have been required with a cash purchase. Because the pace of future development is unknown, issuing revenue bonds with the expectation that development fees (in this case cash in lieu payments), will fund bond debt creates repayment risk. With the Terry Ranch Project purchase, Greeley transferred this risk to Wingfoot. Greeley's risk was further reduced as Wingfoot agreed to provide $125 million towards the construction cost for the infrastructure needed to deliver the groundwater to the City. Purchase of the Terry Ranch Project closed in early 2021, and construction of the initial phases of the project is anticipated for early 2023.

Conclusion

MORE OPTIONS OUTSIDE OF THE BOX

Municipal water providers in Colorado face a myriad of constraints in developing new water supplies. Increased competition for water rights, inability to access traditional sources of supply, climate change impacts, and legal, regulatory, and political hurdles are among the factors impeding the more entrenched approaches to water supply development.

As population in the state continues to grow, municipal water utilities may benefit from considering more creative and less established sources of supply and deal structures, such as that presented for the Terry Ranch Project case study.

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Brett Bovee is the Operating Director for WestWater Research based in the Fort Collins office. Brett brings over 18 years of experience conducting a variety of engineering, economic, and water rights studies across the Western states. Many of these projects have been focused on water resources management and water development concepts in the pursuit, protection, and utilization of water rights. Since joining WestWater, Brett has performed dozens of focused water right valuation studies and broader economic and water market analyses. Brett brings a unique perspective to projects, combining a background in water resources engineering with a developed knowledge of water rights and economics.

Adam Jokerst is the Rocky Mountain Regional Director for WestWater Research and leads the Colorado office in Fort Collins. Adam brings over 15 years of experience in both the private and public sectors. He has overseen long-range water supply planning, water acquisition, water rights protection, and water conservation programs. Prior to joining WestWater, he served as Deputy Director for Water Resources at the City of Greeley, where he led a multi-disciplinary team that plans, develops, and operates water supplies serving 150,000 residents. Adam is passionate about finding innovative solutions to solve complex water problems.

Watershed Priorities

Better Investment

Addressing Barriers

Proposed Legislation

Public Good

Public "Paywalls"

Watershed Needs & Solutions

INNOVATIONS IN INTEGRATED WATERSHED MANAGEMENT

by Joe S. Whitworth, President & CEO, The Freshwater Trust (Portland, OR)

Introduction

We should demand better returns on our water investments. Since 1960, the US has spent $2 trillion trying to improve water quality, and another $2 trillion after natural disasters. Despite this tremendous investment, a large majority of waterways remain impaired, with accelerating drought, flood, and fire risks rapidly compounding the problem. While the US is poised to make a generational infrastructure investment in water through the Infrastructure Investment and Jobs Act of 2021 (IIJA), just adding cash will not yield different results. We must address the financial and practical barriers that currently make it so difficult to implement distributed watershed projects, and thus secure watershed-scale results. Moving forward, we need to be able to combine siloed public funds into an integrated solution, direct funding toward the highest return projects identified by precision technology, and eliminate complexity for participants.

America needs an upgrade to its conservation funding and implementation systems. An upgrade that leverages tools already in broad use, takes conservation from "retail" to "wholesale," and rewards results (not just effort).

Why We Need the Watershed Results Act & How It Works

The Watershed Results Act (WRA), introduced by Senator Ron Wyden in 2022 (S. 3539), provides a desperately needed demonstration of what such an upgrade could provide taxpayers, watersheds, and local communities. The WRA would help maximize every taxpayer dollar invested in water, while saving on future disaster spending. The WRA approach would also drive more benefits into underserved rural areas with health and income challenges, help generate durable and enriching rural jobs, alleviate municipal ratepayer pressure — including on vulnerable communities, and provide more financial options for farmers as they attempt to grow more food with less water. In a world short on winning bipartisan solutions, the WRA offers a unique pathway forward.

Unlike functioning marketplaces where private parties invest in and produce economic goods to sell, water is a public good. This means that many of the projects that need to be implemented lack a compelling business case for those who must choose to participate (e.g., agricultural producers, irrigation districts) and for private investment. This is especially true for the small but critical resiliency projects scattered across the landscape in each watershed. As a result, the government ends up being the primary actor responsible for overcoming these challenges and it has built an extensive project funding and regulatory apparatus to address this responsibility.

In practice, public funds either go toward large, centralized projects or trickle out through multiple, hard-to-access competitive grant programs with match funding requirements and procedural "paywalls" where only the most committed or best-resourced navigate the time, risk, and cashflow challenges to secure funds. Of $139.7 billion in CWSRF investments from 1988-2020, only $5 billion went to nonpoint projects. *See*: EPA, *Clean Water SRF Program Summary*, National Summary, at 24, 28 (2021), https://www.epa.gov/sites/default/files/2021-02/documents/us20.pdf; EPA, *Financing Options for Nontraditional Eligibilities in the Clean Water SRF Programs*, at 1 (2017), www.epa.gov/cwsrf/financing-options-nontraditional-eligibilities-cwsrf.

Further, because dollars are routed through project-specific funding silos and regulatory programs that focus on a sub-element of interrelated water problems, larger regional watershed needs are not often considered or managed via a coordinated funding and implementation strategy. This means that though there is a lot of public money in the system, and lots of projects get funded, they are often not well-coordinated toward watershed resiliency. Most potential leverage ends up diluted — effectively doing good deeds in locations that do not contribute at all to watershed health.

The solution to these challenges moving forward will require:

(1) a coordinated funding approach that integrates and leverages currently siloed but interrelated conservation funding sources;
(2) use of precision watershed analytics to quickly identify the best combination of projects to invest in;
(3) better use of financing to launch and accelerate progress; and
(4) a streamlined purchasing system that rapidly delivers funds to the ground with less friction.

The WRA connects all these components into a watershed solution framework.

Watershed Priorities

Clearinghouse

Guiding Analytics

Coordinated Funding

Defined Outcomes

Market Certainty

"Outcome Prices"

Legislation Benefits

Matching Requirement Drawbacks

The WRA aims to address these challenges head-on with the following elements:

- **"Outcomes Fund":** Establish an Outcomes Fund (or "Bank") within the Department of Interior (Interior). Instead of managing each funding source in its own silo, program funds can be pledged to the Fund. A Fund would serve as a clearinghouse for combining, concentrating, and quickly directing funds to the best projects, and tracking quantified project outcomes. A Fund could leverage multiple types of aligned, but currently fragmented, colors of money into a powerful, unified water outcomes purchasing machine. (*See* section below, "How a Watershed Outcomes Fund Works").
- **Complete and use "advance watershed analytics" to guide effort:** in each pilot, complete analytics and identify targets based on the results, with funds then directed to the best projects. (*See* section below, "How Precision Watershed Analytics Drive the WRA").
- **New outcomes dollars, coordinated with existing funds under a coordinated funding plan:** The WRA provides $15 million/year/watershed (over six years) to buy the best project "outcomes" identified by the analytics. The WRA defines "outcomes" as quantifiable increases in surface water or groundwater quantity, measurable increases in habitat, and other quantifiable benefits that can be modeled using publicly available tools and data, such as pounds of nitrogen or sediment removed, or avoided thermal loading. In addition to the seed money, the WRA requires a coordinated cross-agency funding plan for each pilot, which must demonstrate how investments will achieve targets. As part of these plans, agencies must modify, expand, and streamline eligibility and verification for existing federal funding sources, while also waiving non-federal match requirements, so that all sources can be leveraged together in pursuit of big, fast watershed results. (*See* sidebar, "The Hurdle of Match Requirements").
- **Simple and quick purchasing tools, plus clear market signals:** Currently there is no real economy for watershed projects. To create more market certainty, the WRA calls on Interior to set minimum "outcome prices" in each pilot. These signals are critical for private partners determining whether it makes good business sense to build a project. In addition to establishing price thresholds, the WRA calls on Interior to pay a project developer within 30 days of verifying outcomes via simple "pay for performance" contracts. With these signals from the federal government, a private market economy will sprout up, with actors proactively developing good conservation projects because it makes good business sense.
- **Pilots:** Direct the Interior to pilot this new approach in 2 - 5 watersheds.

In the face of intensifying drought, water quality issues, burning forests, and more frequent "once-in-a-millennia" flood and temperature events, the status quo approach to federal match funding must be reconsidered. The WRA — with its coordinated, prioritized, outcomes-driven approach — offers an opportunity to show how a match waiver in pilot watersheds can yield bigger, better, faster results.

The Hurdle of Match Requirements

Across dozens of federal grant programs, requirements for applicants to "match" the funding from the federal government with money from someone else are ubiquitous. The phrase "matching requirement" appears 15 times in the recent IIJA, requiring funding applicants to provide non-federal match at 15% - 50% of the government request. Matching funds are also referenced in more than 100 other pieces of legislation in this Congress. Common reasons for requiring matching funds include proof that an applicant is committed to the project (has "skin in the game"); proof of community buy-in, which could make the project more successful long-term when the funding has expired; and the belief that partially funding a diverse set of projects rather than fully funding fewer projects will satisfy political constituents.

Match requirements have become a default policy, often applied without considering unintended effects of slowing or chilling important actions. Match requirements actually make it difficult for the federal government to catalyze solutions to big, fast-moving environmental problems. Match requirements slow down "public good" projects, which prevents building watershed-level resiliency in the face of climate change. Under-resourced growers or groups that apply for funding must navigate multiple programs with uncertainty that the funding stream will be awarded. Even if awarded, the agencies can take months or years to negotiate contracts. Due to these long timelines, project partners often must move on to other projects, which can scuttle match commitments. Current match approaches lead to inequitable flow of funds to larger growers and organizations that can withstand the uncertainty. This traditional system has benefited those with the strength to wade through the process, but not necessarily those projects with the greatest environmental benefit. With new technology, using match as a screening tool is no longer needed. Instead, with precision analytics now widely available, agencies can define needed outcomes and fund projects that objectively deliver those public benefits. This quantified conservation approach means that agencies no longer need validation of a project's "worth" through its large financial match commitment.

Watershed Priorities

Outcomes Fund

"Pay for Performance"

Leveraged Investment

Current Programs Accessed

Upfront Financing

Implementation Accelerator

Best Projects

Streamlined Approach

How a Watershed Outcomes Fund Works

A Fund would be a one-stop "bank" for funders and farmers, with funding concentrated at the watershed level, investments prioritized by watershed analytics, simple engagement for farmers, and back-end tracking of projects, spending, and results. The following outline walks through how a Fund would work in practice.

Funding Source Aggregator and Clearinghouse

Instead of managing each funding source in its own silo, program funds could be pledged to an Outcomes Fund. A Fund would likely be housed within an agency. A Fund would serve as a clearinghouse for combining, concentrating, and quickly directing funds to the best projects, and tracking project outcomes. A Fund could leverage multiple types of aligned, but currently fragmented, colors of money into a powerful, unified water outcomes purchasing machine:

- **Congressional appropriations to purchase outcomes** via "pay for performance" contracts: Where a project has been completed, and has produced a verified "outcome," Fund dollars would purchase those benefits via a "pay for performance" contract with a negotiated per-unit price. This approach has been authorized by Congress in the Social Impact Partnerships to Pay for Results Act (SIPPRA) and is a streamlined version of a "fixed amount award." US Dep't of Treasury, SIPPRA – Pay for Results, https://home.treasury.gov/services/social-imact-partnerships/sippra-pay-for-results. *See* 42 U.S.C. § 1397n–1397n-13. In contrast to typical government programs, which reimburse expenses and effort without regard to results, this purchasing structure ensures that the government pays for results.
- **Leveraging with compliance investment:** US EPA can use its watershed permitting authorities to ensure point sources only invest in clean water treatment technology to the "point of diminishing returns," with remaining dollars reallocated to the Fund. This approach would protect urban ratepayers from high costs, while directing funds to watershed projects that more cost-effectively deliver results.
- **"Pile on" from other agencies and private sector:** The Bureau of Reclamation, the US Dept. of Agriculture, and other agencies can match these non-federal compliance fund pledges with commitments from current programs. Private companies/donors could also commit their funds, as can state agency corollaries.

Use Fund Pledges to Secure Accelerating Upfront Financing

In the face of so many conspiring challenges, time is at a premium. Instead of waiting on project dollars to flow out of agencies and utilities bit-by-bit via annual appropriations and rate collection cycles, these pledges — which would not need to be paid upfront, but rather awarded or contracted for — would be used to secure public and/or private debt, which would accelerate implementation. Public water lending and guarantee programs, including the State Revolving Funds and EPA's Water Infrastructure Finance and Innovation Act (WIFIA) lending program, could lead in underwriting this effort, which could provide the certainty necessary for private capital to engage. To date, uncertainty and scale factors have kept most "impact capital" focused on things where there is a simple payback plan, a repeatable and certain transaction model, and centralized project scale (e.g., windfarms, wastewater, industrial timber). A Watershed Outcomes Fund model would overcome many of these hurdles.

Use precision analytics to identify the best projects, then offer "easy button" incentive packages to farmers for producing "bushels of nature"

Far too few farmers utilize United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA) conservation programs (such as NRCS's Regional Conservation Partnership Program or FSA's Conservation Reserve Enhancement Program). This under utilization arises because of the complex and slow process, match funding hurdles, and uncertainty that their applications will be selected. Instead of placing the burden on farmers to access funds, analytics can be used to identify the best projects — i.e., those with the highest environmental benefits for the lowest costs. With those high-impact projects identified, simple upfront cash offers can be made to farmers to implement conservation projects, with the payment connected to outcomes produced. For example, once a conservation practice like a riparian buffer or a wetland has been installed, well-established publicly available models would be used to calculate the environmental "uplift" generated from the practice — with payment then provided based on the pertaining unit(s) of anticipated environmental benefit. This streamlined approach would remove barriers to entry, increase participation, reward better outcomes with more dollars, and reduce regulatory pressures through faster watershed improvement.

Watershed Priorities

How Precision Watershed Analytics Drive the WRA

Uniform Comparison

The WRA calls for "advance watershed analytics." The "advance" indicates the need for insight prior to action. The second part, "watershed analytics," can evaluate distributed project benefits and costs in uniform units, enabling comparison across multiple project types. Analytics also provide the common language to coordinate multi-funder investment across large geographies by allowing for a simple, objective unit for decision-making and tracking. Using analytics helps ensure that funds flow to the highest-impact combination of projects, that every taxpayer dollar is maximized, and that progress toward watershed resilience is tracked at a meaningful scale.

Analytics use existing technology and publicly available data sets and models to identify the highest impact projects, develop a specific roadmap for local stakeholders to use and improve, and then identify superior funding strategies.

Analytics Use

Developing and then using analytics follows three basic steps:

1) Integrate established government models and data with satellite imagery and other public data sets, as well as machine-learning technology, to remotely survey a watershed and identify specific conservation practices that could be implemented at the field level.
2) From the group of feasible practices, identify optimal combinations of practices that would produce the best ecological and economic options on the ground, and estimate costs and desired outcomes. This step also requires significant "implementability" analysis as the "best" projects may have significant social, physical, or legal obstacles.
3) Develop scenarios to identify the most efficient combination of investments to achieve watershed-level objectives (multiple objectives can be solved for).

Analytics Tool

The Freshwater Trust (TFT), a conservation nonprofit, developed its BasinScout® Analytics tool (BSA) precisely to identify, prioritize, and implement the most impactful and cost-effective blend of distributed projects in a watershed. First, BSA utilizes up-to-date satellite data to scan large geographies and evaluate field-level features (e.g., distance and slope relative to bodies of water, current irrigation practices, cropping).

Second, BSA:

- Determines which conservation practices are feasible to implement on each field
- Quantifies the projected ecological improvements generated by implementing that practice (e.g., nutrient or temperature reductions, water savings); and
- Estimates the life-cycle cost of implementing that practice on each field.

Prioritized Strategies

Third, with the ability to sort projects based on how cost-effectively they produce desired benefits, BSA generates targeted implementation recommendations to achieve watershed objectives. This analytical framework offers a specific roadmap for local stakeholders to use and improve and can identify superior funding strategies.

Case Studies: Analytics Driving Watershed-Scale Conservation Outcomes

Case Studies

As described in the below case studies, a number of entities are already using BSA to evaluate complex collections of data in conjunction with desired outcomes. The following case studies highlight the successes that are possible when enough time and focused attention is afforded to scaling up watershed solutions. Each of these examples only succeeded after overcoming multiple practical funding, financing, deployment, participation, and supply chain barriers.

The following examples prove that this kind of success is possible. They also serve to highlight why passing the WRA could do so much more to catalyze bigger, faster, better results.

Spending a Little to Get a Lot in Oregon's Deschutes River Basin

Nutrient Runoff

Central Oregon's Deschutes River watershed is facing multiple challenges. In 2021, many farmers had their water turned off due to drought, fish died from high water temperatures, and excess nutrient runoff choked the system with harmful algae blooms. TFT applied BSA to make sense of this problem. Scientists and local stakeholders agree that the Crooked River — an upstream tributary to the Deschutes River — is contributing the highest nutrient load to Lake Billy Chinook and is a primary driver of the water quality issues in the Lower Deschutes. In recent years, temperature and algal bloom issues in the Lower Deschutes have fueled concerns from recreational users, regulators, and community members. The excess nitrogen and phosphorus carried to the Lake from farms and livestock grazing in the Crooked are compounded by a hydroelectric dam and mixing tower in the Lower Deschutes. Moreover, agricultural communities in the basin remain highly exposed to drought. While multiple actors are engaged on pieces of the problem, there has not yet been a clear, consistent way to prioritize projects or create leverage.

Watershed Priorities

High Impact Identification

TFT's precision analysis determined that of 4,070 irrigated agricultural fields in the Crooked River basin, only 1,500 were feasible for implementing a productive conservation action (the majority of which involved converting from flood to center pivot irrigation). If all 1,500 potential fields had actions implemented, it would cost well over $100 million. However, by pursuing the highest impact fields, it is possible to spend just $25 million and still produce 60% of the overall potential sediment and nutrient loading reductions. Conversely, this means that if the right projects are not prioritized based on their relative reduction-per-dollar efficiency, stakeholders could inefficiently spend tens of millions of dollars without achieving additional meaningful pollutant reductions. The Crooked is a relatively small watershed; when extrapolated nationwide, this example highlights how analytics could direct hundreds of billions of dollars toward optimal outcomes.

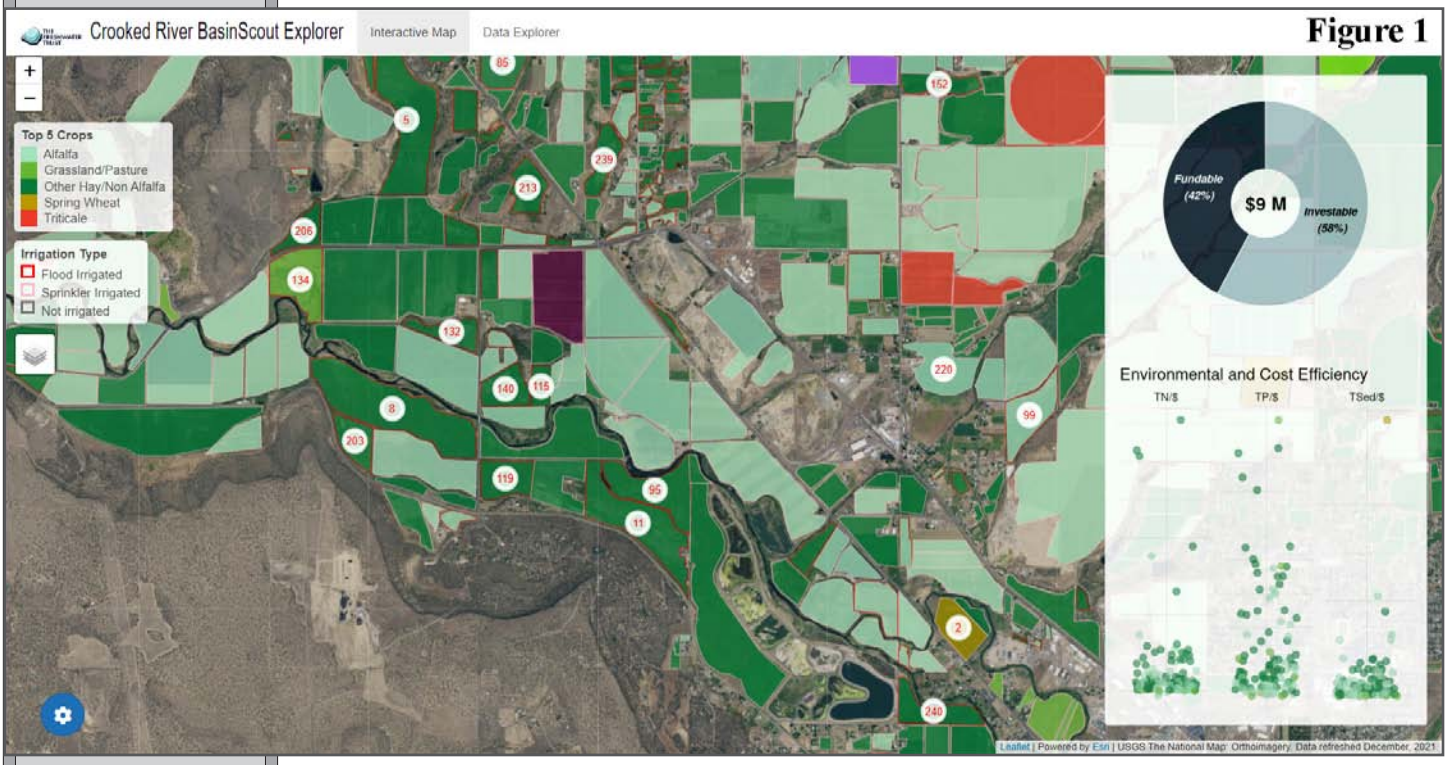

Figure 1: The Freshwater Trust's BasinScout Explorer showing a portion of the Crooked River basin. Circles highlight the irrigation upgrade projects that produce nutrient reductions comparatively efficiently per dollar (original in color).

Implementability Analysis

In converting this Crooked River analysis to an implementation plan, partners determined that the water delivery system components between district-owned infrastructure and fields would preclude many farmers from upgrading to precision irrigation even if they so desired. TFT has been working with the US Bureau of Reclamation, Central Oregon Irrigation District, and Deschutes River Conservancy to co-develop a model that identifies the resulting water savings, pollution reductions, hydraulic feasibility, and economics of various infrastructure modernization scenarios that would connect district-owned infrastructure efforts through to field-level upgrades. This "implementability" analysis helps ensure that mainline infrastructure upgrades also unlock high-impact, on-farm upgrades which, when implemented together, will provide more water savings and address a major water quality impact in the watershed.

Hydropower Certification

Snake River Restoration Program ($350 Million)

The same type of approach and toolkit helped the Idaho Power Company (IPC) finally achieve its Clean Water Act (CWA) certification. IPC went through 13 failed relicensing efforts for its hydropower dams in Hells Canyon (which produce 70% of the utility's hydropower). But with BasinScout analytics applied to the challenge, IPC was able to secure CWA approval from Idaho and Oregon to implement a $350 million watershed stewardship program that will reshape the mainstem Snake River to: better fit its current hydrograph; rehabilitate hundreds of miles of riparian vegetation on tributaries; and avoid significant sediment and nutrient loading due to upgraded irrigation infrastructure.

Watershed Priorities

Shading Credits

Instream Habitat

Temperature Compliance

Recycled Water for Irrigation

Groundwater Restoration

Rogue River Restoration Effort in Oregon ($25 Million): Temperance Compliance

A similar story unfolded in Oregon's Rogue River Basin. The City of Medford had a sizeable CWA water quality challenge. As highlighted by President Obama (*see* Project in Medford Video at: https://youtu.be/-DASgiCEaZQ), TFT helped Medford implement a solution that worked for ratepayers, farmers, and native fish. In 2011, rather than invest more than twice as much in chillers or a cooling pond to address a temperature compliance issue, Medford partnered with TFT to plant native trees and shrubs in strategic places along the Rogue River and its tributaries. The new vegetation blocks solar load. Using analytics, TFT quantifies the benefits of the vegetation in the same units as technology solutions, and then recruits the projects that produce the most benefits for the least cost. Under this $6.5 million contract, TFT recruited agricultural landowners willing to host shade trees for 20 years, with credits then available for permit compliance. TFT delivered the required 600 million credits two years early, resulting in ~5.5 river miles restored.

Building on the program for Medford, TFT then leveraged its know-how and supply chain into two complementary programs in the watershed. First, a $12 million instream habitat compliance restoration program in the Rogue River basin for the Bureau of Reclamation, which resulted in more than 250 new in-river fish habitat structures and ~2.5 river miles of riparian restoration. Second, TFT is also implementing a $4 million State Revolving Fund (SRF)-financed program for the City of Ashland for temperature compliance — the first SRF-funded water quality trading program of its kind.

Figure 2: Streamside revegetation projects block a quantified amount of solar energy to Oregon's Rogue River and its tributaries as part of a Clean Water Act compliance program

Groundwater Replenishment& Habitat Restoration Program in Sacramento Delta ($600-700 Million)

In 2016, TFT began working with the Sacramento Regional County Sanitation District to secure a massive state grant that would allow the utility to pump up to 50,000 acre-feet per year of recycled, tertiary treated wastewater to a stressed area directly south of Sacramento. Farmers there will use the recycled water to irrigate more than 16,000 acres of agricultural lands instead of pumping groundwater. To complement that work, TFT also designed a unique landscape-scale conservation approach that will secure, protect, and enhance more than 5,000 acres of important groundwater-dependent habitat in the southern Sacramento Valley over the next 80 years. This $600-700 million program is expected to restore depleted groundwater levels up to 35 feet within 15 years and increase the volume of groundwater in storage by approximately 225,000 acre-feet within 10 years, thus increasing drought resilience for the entire system, and benefiting irrigators, at-risk drinking water supplies, and fish and wildlife species.

Watershed Priorities

Conclusion

With drought and water quality issues intensifying, cities growing, and food insecurity deepening, the status quo approach to managing water resources cannot get us to where we need to be. We need to catalyze dramatically more solutions at scale and speed. Achieving watershed resilience will require an integrated approach that addresses water quality, scarcity, and community concerns together, and a prioritization and procurement system capable of quickly delivering coordinated public funds to the right combination of infrastructure and watershed improvement projects.

For Additional Information:
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Joe Whitworth has led The Freshwater Trust for more than two decades, growing the organization's budget tenfold during that time. He is focused on the next generation of conservation tools at the intersection of technology and finance to get results on the ground. In addition to formal advisory roles in B Corp, foundation and government settings, he is a patented inventor and author of the book "*Quantified: Redefining Conservation for the Next Economy*". He holds a B.A. from Dartmouth College and a J.D. from Lewis & Clark College with an emphasis in natural resources and water law.

About The Freshwater Trust

The Freshwater Trust is a systems change-focused nonprofit with 39 years of watershed-scale restoration expertise. TFT collaborates with landowners, agencies, governments, and businesses across the West to design and implement watershed-scale conservation programs using innovative technology, transaction and policy tools. For decades, TFT has navigated the gauntlet of agency funding programs, permits, and procedure to unlock more than $1 billion for optimized conservation solutions that deliver practical water solutions for farmers, cities, agencies, and rivers. We take pride in these wins but accomplishing critical work at scale shouldn't be so hard.

Dungeness Restoration

Unique Climate

Rain Shadow

WATERSHED RESTORATION

RESTORING THE DUNGENESS

FINDING BALANCE BETWEEN FISH, FARMS, AND COMMUNITY ON WASHINGTON'S OLYMPIC PENINSULA

by Chris Czarnecki, Washington Water Trust (Seattle, WA)

Introduction

The Dungeness Watershed, located in the northeast corner of Washington's Olympic Peninsula, is a unique watershed by western Washington standards. Local, regional, and statewide groups have been working together for years to restore the Dungeness River and other local streams. These efforts have entailed finding the right balance for the area's use of freshwater to support salmon, farms, and the local community. However, the watershed's unique climate and intensifying climate change impacts are making this effort more challenging and more urgent.

Can enough be done to build freshwater resiliency in the Dungeness watershed before it's too late?

The Dungeness Watershed

Flowing from its headwaters in the Olympic Mountains, the Dungeness River runs more than 28 miles to the Strait of Juan de Fuca and the Salish Sea. Together, the Dungeness River, along with its main tributary, the Gray Wolf River, drains a total area of 172,000 acres (Puget Sound Salmon Recovery Plan).

What makes the Dungeness watershed so unique in western Washington is its climate. Sitting in the rainshadow of the Olympic Mountains, it receives less rainfall and more sunshine than any place in the Puget Sound region with annual rainfall totals more akin to Southern California. While other regions of the Olympic Peninsula receive the largest amounts of rainfall in the state, annual rainfall in the City of Sequim, located along the Dungeness River, averages approximately 16 inches per year — an amount comparable to annual rainfall in Los Angeles, California. In contrast, the Hoh Rainforest, just 40 miles away from Sequim, receives on average 140 inches of rainfall per year; and Port Angeles, just 16 miles away, receives about 26 inches per year.

Dungeness Restoration

Tribal Values

Critical Salmon Habitat

Irrigation Extent

Riparian Development

Fishery Decline

The sunny climate of the Dungeness has always attracted people. The Jamestown S'Klallam Tribe has lived, fished, and hunted in the Dungeness Watershed since time immemorial. The Dungeness and the surrounding area hold significant cultural and spiritual value for the Tribe. At the time of European contact in the late 1700's, approximately 2,100 Tribal members lived across 13 permanent S'Klallam villages from the Hoko River to Hood Canal, plus established seasonal fishing, hunting, and gathering sites throughout the area.

One of the most culturally important species for the Jamestown S'Klallam Tribe was, and still is, salmon. The Dungeness River provides critical habitat for ten species of salmonids: Chinook salmon, Chum salmon, Coho salmon, Pink Salmon, Sockeye Salmon, Bull Trout, Dolly Varden, Steelhead, Rainbow Trout, and Cutthroat Trout. Other non-salmonids include Pacific lamprey and sculpin species. Salmon fishing was one of the primary means of sustenance for the S'Klallam people. However, after the arrival of settlers, an increased demand on the area's natural resources significantly impacted the once abundant salmon populations.

In the mid 1800's, European settlers began to use land in the watershed for logging and agriculture. Water from the Dungeness River and local streams became a central resource for development. Agricultural expansion was vast in the area, and due to the dry climate, water for irrigation had to be diverted from the Dungeness River and other streams within the watershed. A system of more than 100 miles of irrigation canals (an array largely unique in Western Washington) was developed and diverted a significant portion of the river's flow in the late summer – a critical time of year for Chinook and other fish species (Puget Sound Salmon Recovery Plan).

Over the years, the irrigation system in the Dungeness continued to expand and today totals approximately 170 miles. This irrigation covers nearly 7,000 acres of land which produce a wide diversity of crops including raspberries, blackberries, and a variety of other organic fruits and vegetables. The area is also noted for raising horses, goats, llamas, and dairy cattle, and for producing hay, grains, and lavender. To commemorate the importance of irrigation to the area, there is even an annual Irrigation Festival. Currently in its 127th year, the event is touted as Washington's oldest and longest running festival (Sequim Irrigation Festival).

Along with the expansion of agriculture, development in the watershed in the mid-20th century and its effects on the river mirrored that of many watersheds across the Pacific Northwest and beyond: riparian and floodplain areas were developed and levees were constructed. The river was channelized and the river's reduced complexity proved detrimental to fish habitat.

Over time, the combined impacts of these changes contributed to the significant decrease of Dungeness River Chinook and steelhead. Annual returns of thousands of fish to the Dungeness River were reduced to just hundreds (NOAA Fisheries 2007 and 2019). Four species that inhabit the Dungeness River are now listed as threatened under the Endangered Species Act: Puget Sound Chinook; Puget Sound Steelhead; Hood Canal/Eastern Strait of Juan de Fuca Summer Chum; and Bull Trout.

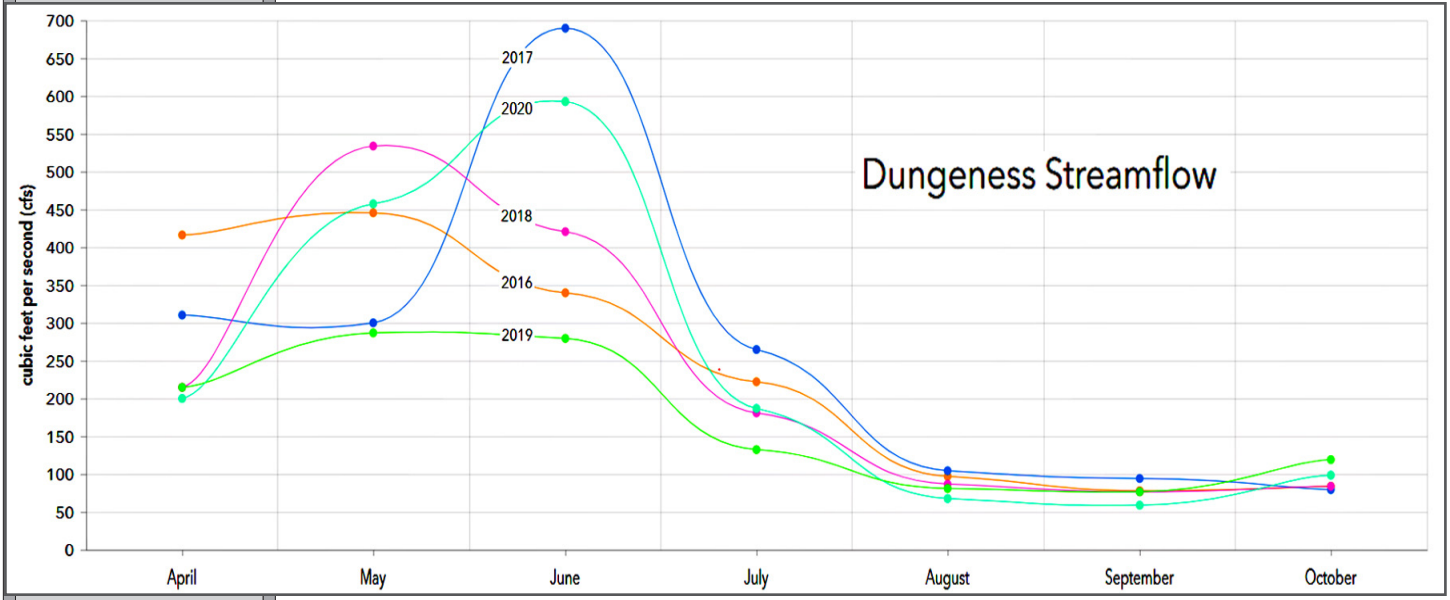
The decline of salmon is, naturally, having cascading effects throughout the greater ecosystem. Chinook salmon is the primary prey species for the endangered Southern Resident Killer Whale whose NOAA-Designated Critical Habitat includes the Dungeness near-shore area in the Strait of Juan de Fuca. NOAA cites "insufficient prey" as one of the three primary threats to the Southern Residents. NOAA, in partnership with the Washington Department of Fish and Wildlife, has determined the Northern Puget Sound Chinook salmon stock, which includes Dungeness River Chinook, to be the highest priority Chinook stock for recovery in the effort to help the Southern Resident Killer Whales.

Dungeness Restoration

Snowpack

Dungeness River Stream Flows

The Dungeness River relies heavily on a healthy snowpack in the Olympic Mountains that accumulates during the winter season then melts feeding the river throughout the dry season, when there is little to no rainfall. Flows in the Dungeness tend to be highest in the spring and decline steadily throughout the summer, reaching their lowest levels in August and September. Late fall and winter brings more variable flows due to increased rainfall and snow in the upper watershed.



Critical Months

The critical months of the water year are from April to October, when the need for water is at its highest for both fish and humans. From July to September, as the snowpack-derived flow begins to dwindle, up to 50% of the remaining flow in the Dungeness River can be withdrawn for out-of-stream uses including agriculture. The local agricultural economy is vital for the community and local livelihoods. However, at the same time, the water that agricultural requires impacts the amount and quality of water and habitat available to migrating, spawning, and rearing fish in the Dungeness River.

Water resource managers, agricultural producers, and other groups have been working together for years to try and strike the right balance between human and environmental water needs in the watershed. Climate change impacts are making this work evermore challenging and urgent.

Flows Regime

How Climate Change Will Impact the Dungeness

Climate change forecasts paint an alarming picture across Washington's Puget Sound region. A reduced snowpack and increased early season rainfall will likely result in higher winter flows and lower spring and summer flows. Peak flows will occur earlier in the spring. Overall, conditions will be more inhospitable to salmon.

2080s Projections

According to the University of Washington Climate Impacts Group's report *State of Knowledge, Climate Change in Puget Sound*, it is projected that by the 2080s (2070-2099, relative to 1970-1999):

- Stream temperatures in the Puget Sound region are projected to increase by 4.0°F to 4.5°F
- Total summer streamflow for the Puget Sound region is projected to decrease 32% - 40% on average
- Puget Sound rivers will more frequently exceed thermal tolerances for adult salmon (64°F) and charr (54°F), and the number of river miles with August stream temperatures in excess of these thermal tolerances is projected to increase by 1,016 and 2,826 miles, respectively
- Decreasing summertime streamflows are projected to reduce the habitat, health, and survival of Pacific salmon

Rain/Snow Mix

In the Dungeness watershed, these changes are projected to be even more pronounced. The Dungeness is what is called a transient watershed, meaning it is a "mixed-rain-and-snow" basin. According to the Climate Impacts Group, "streamflow is projected to change the most in watersheds that are strongly influenced by both rain and snow. These 'mixed-rain-and-snow' basins, currently found on the north Olympic Peninsula and at middle elevations in the Cascades are projected to experience large increases in winter flows and flooding, and more severe declines in summer low flows. Higher-elevation 'snow dominant' basins are projected to completely disappear from the Puget Sound region by the 2080s, while many mixed-rain-and-snow watersheds transition into rain-dominated basins… ." (UW Climate Impacts Group).

Severe Weather Increasing

Dungeness Restoration

Drastic Flow Shifts

Climate Change Impacts

Balancing Needs

Stakeholder Concerns

Management Team

Peak stream flows are projected to occur earlier in the 2080s in many snowmelt-influenced rivers in the Puget Sound region. In the Dungeness, they are projected to occur 25-40 days earlier. The only other Puget Sound watershed with a projected shift as drastic is the Elwha Watershed — the next watershed over to the west of the Dungeness. Further, summer minimum streamflow (the lowest 7-day average flow that occurs on average once every 10 years) in the Dungeness is projected to decline 52% to 74% on average by the 2080s. Again, the Elwha is the only other Puget Sound watershed with a more dramatic projected decrease in summer minimum streamflow (UW Climate Impacts Group).

The Jamestown S'Klallam Tribe, in its *Climate Vulnerability Assessment and Adaptation Plan*, sums up the water challenges that the Dungeness River, its fish, and the local community are facing:

> "Climate change impacts are complicated by competing uses for water from salmon spawning habitat, which is especially true for the Dungeness River watershed. Dungeness River water itself is used for salmon habitat, as irrigation for agriculture, and drinking water is taken from the associated shallow water table aquifer. As summer flows decrease, there will be less water available for both salmon returning to spawn and agriculture uses. Warmer temperatures will increase evapotranspiration (i.e. water use of crops and vegetation), dry out soils, and increase agricultural demand for water resources. Lower flow rates will mean that the water stays in the river longer and has higher water temperatures that will add stress to salmon returning to the river" (Jamestown S'Klallam Tribe).

Already the driest watershed in the Puget Sound region, the impacts from climate change will spell trouble for the Dungeness' freshwater and the communities and fish that depend on it.

Working Together to Restore the Dungeness

Local groups and interests have not just sat back and watched as the demands and cumulative impacts on the Dungeness River and other local streams have increased over time. They have recognized the need to collaborate to protect the river and find a balance between the needs of the community and the needs of the native fish and wildlife species.

In 1988, a diverse group of local interests came together to form the Dungeness River Management Team to foster communication on the topic of flood management for the Dungeness River. Eventually these discussions evolved to include other natural resource concerns such as: floodplain and riparian development; logging practices; agricultural production; water quality and quantity; and fish and wildlife habitat protection. These ongoing conversations led to the creation of: watershed management plans; river restoration initiatives; and strategies to address competing interests affecting water resources, stream habitat and salmon recovery (Dungeness River Management Team).

Dungeness Restoration

Irrigation Efficiency

Minimum Instream Flow

Closed Basin

Water Bank

Reallocation

Hydrologic Connection

New Use Mitigation

Aquifer Recharge

"Restoration" Recharge

In 1999, the Dungeness Water Users Association developed a Comprehensive Water Conservation Plan. The Plan identified irrigation efficiency projects that, when fully implemented, could reduce its river diversion by as much as two-thirds. Since then, Association members have converted more than two-thirds of their irrigation network from open ditches to pipes, thus improving the network's water-use efficiency and reducing the amount it withdraws from the river. In addition, the Water Users have agreed to divert no more than half of the flow in the Dungeness River during the irrigation season.

To date, Dungeness River Management Team members and other local partners have undertaken more than 50 projects to restore the Dungeness watershed.

The Dungeness Water Management Rule and Dungeness Water Exchange

While there have been significant efforts made towards restoring the Dungeness River, low stream flows remain a major issue. Flows regularly fall well below the desired minimum instream flow level of 105 **c**ubic **f**eet per **s**econd (cfs). Climate change and development in the watershed have presented an ongoing challenge.

In 2012, in response, the Washington State Department of Ecology adopted a new instream flow rule which closed the basin to new appropriations. This rule sought to protect flow levels in the Dungeness and independent streams for ESA-listed fish species by:

- Setting instream flow levels for the Dungeness River, tributaries, and independent streams
- Requiring mitigation for any new groundwater withdrawals
- Enabling the option to close streams year-round or seasonally
- Establishing reserves for in-house domestic uses

The establishment of the Dungeness Water Management Rule, particularly the mitigation requirement for new groundwater withdrawals, led a local advisory committee to initiate a water bank called the "Dungeness Water Exchange" in 2013.

The Dungeness Water Exchange is operated by Washington Water Trust — a statewide non-profit focused on flow restoration (*see* Cronin & Fowler, *TWR* #102). The Exchange allows for new water uses by re-allocating previously beneficially-used water rights. It is a water mitigation bank to allow for rural well development outside existing water systems, and ensures that new groundwater wells for new buildings and water uses in the Dungeness basin do not negatively affect flows in the river and streams.

Rivers, streams, and groundwater in the Dungeness are all hydrologically connected. This means the withdrawal of groundwater for new buildings or water uses can negatively impact the amount of water flowing in the Dungeness River and other local streams.

The Dungeness Water Exchange was seeded with a 175 AFY water purchase from the local irrigators by the Washington Department of Ecology (AFY = acre feet per year; one acre foot equals ~326,000 gallons or enough water to cover one acre of land one-foot deep). Those seeking to develop new wells within the defined Dungeness Water Rule Area, are required to purchase mitigation from the Dungeness Water Exchange, and meter their water use.

Underlying this water bank is an extensive groundwater model, which estimates the proportional impact of new wells to the Dungeness River and independent streams. In turn, the Dungeness Water Exchange manages the impact of this new use, by infiltrating water at seven aquifer recharge sites annually (May 15-July 15) located throughout the watershed. This aquifer recharge has been made possible with the agreement of Dungeness Water Users Association members to convey the water through their pipes/ditches to the aquifer recharge sites. The water is then infiltrated into the ground where it slowly moves over the course of weeks and months restoring groundwater and boosting flows in the Dungeness River and other local streams during the driest summer months when it is needed most. Since the Dungeness Water Exchange was created, it has mitigated the impacts of more than 400 new homes and small businesses, allowing the community to grow while protecting stream flows.

The Dungeness Water Exchange not only mitigates for new water uses in the Dungeness, but also goes above and beyond by putting additional "restoration" water back into the ground to benefit the groundwater, river, and streams. In 2019, the Dungeness Water Exchange expanded the aquifer recharge program with the Water Users Association, receiving a recharge permit from the Department of Ecology to utilize spring high flow water to contribute to flow restoration and not just mitigation at the recharge sites. This permit allows for withdrawals for restoration recharge January 1-July 14 if stream flow levels are above the instream flow requirements. In 2021, for example, the Dungeness Water Exchange had to mitigate 26.42 AFY of new water uses; however, it went far beyond this mitigation requirement by restoring an extra 482.80 AFY of water to the watershed (Washington Water Trust).

Dungeness Restoration

Dry Year Leasing

Responding to Drought: Dry Year Leasing

Recently, there have been a number of glimpses into potential future conditions in the Dungeness. Since the year 2000, there have already been six major droughts or dry-years in the watershed. Drought in the Dungeness is generally a result of one or more of the following: a low winter snowpack, high winter/spring temperatures, and/or very dry summers. 2015 was one of the worst droughts on record with the entire Dungeness under "Extreme Drought" conditions. In 2009 and 2016, flows were critically low, but drought was not officially declared by the State of Washington.

Year	Drought	Dry	Type of Drought
2001	X		Low Winter Precipitation
2003	X		Low Winter Precipitation
2005	X		Warm Winter Temperatures
2009		X	Low Winter Precipitation
2015	X		Warm Winter Temperatures
2016		X	Low Winter Precipitation
2019	X		Low Winter Precipitation
2021	X		High Spring/Summer Temperatures

When these drought and dry years occur, emergency actions can be taken to help the Dungeness River. An official declaration of drought by the Governor can activate emergency funding for Washington's Department of Ecology to support drought response efforts like dry year leasing. Under this scenario, water leases are developed with irrigators and they are essentially paid not to water their acreage for the last month of the irrigation season. That water then remains in the Dungeness River for fish where it can make a critical difference to help alleviate dangerous low flow conditions.

Forbearance Agreements

In 2001, 2003, and 2005, the Department of Ecology ran August-September leasing programs with irrigators in order to bolster late season flows. In 2009, 2015, 2016 and 2019, Washington Water Trust conducted a dry year leasing program for the last month of the irrigation season after the onset of a dry year or state-declared drought. In 2015, Washington Water Trust was able to secure forbearance-from-irrigation agreements with a number of irrigators which reduced diversions from August 15 - September 15 and left as much as 5.6 cfs instream. In 2016 with the onset of a dry spring, the snowpack quickly left the Olympics, and Washington Water Trust and irrigators mobilized to get irrigators signed-up for forbearance agreements to reduce diversions and protect instream 7.58 cfs, increasing late season flows by approximately 10%. In 2019, in response to drought, twenty farmers signed up for forbearance agreements resulting in water typically used to irrigate 1,350 acres being kept in the Dungeness River instead. This water increased the flow in the river by as much as 12% during this critical low-flow period (Washington Water Trust).

Dry year leasing in the Dungeness is an emergency action to help salmon during drought or dry years. With climate projections in mind, an expansion of the Dungeness Dry Year Leasing Program into a regular annual program has been explored as a potential way to significantly restore flows to the Dungeness annually and build climate resilience. Such a program would require the very challenging prospect of enrolling more than half of the currently irrigated acres in the basin into the forbearance program (nearly 4,000 acres) every year to have a flow restoration effect comparable to another proposed project — namely, the Dungeness Streamflow Restoration Off-Channel Reservoir, which represents the greatest remaining opportunity for Dungeness River flow restoration and freshwater climate resiliency.

Off-Channel Reservoir

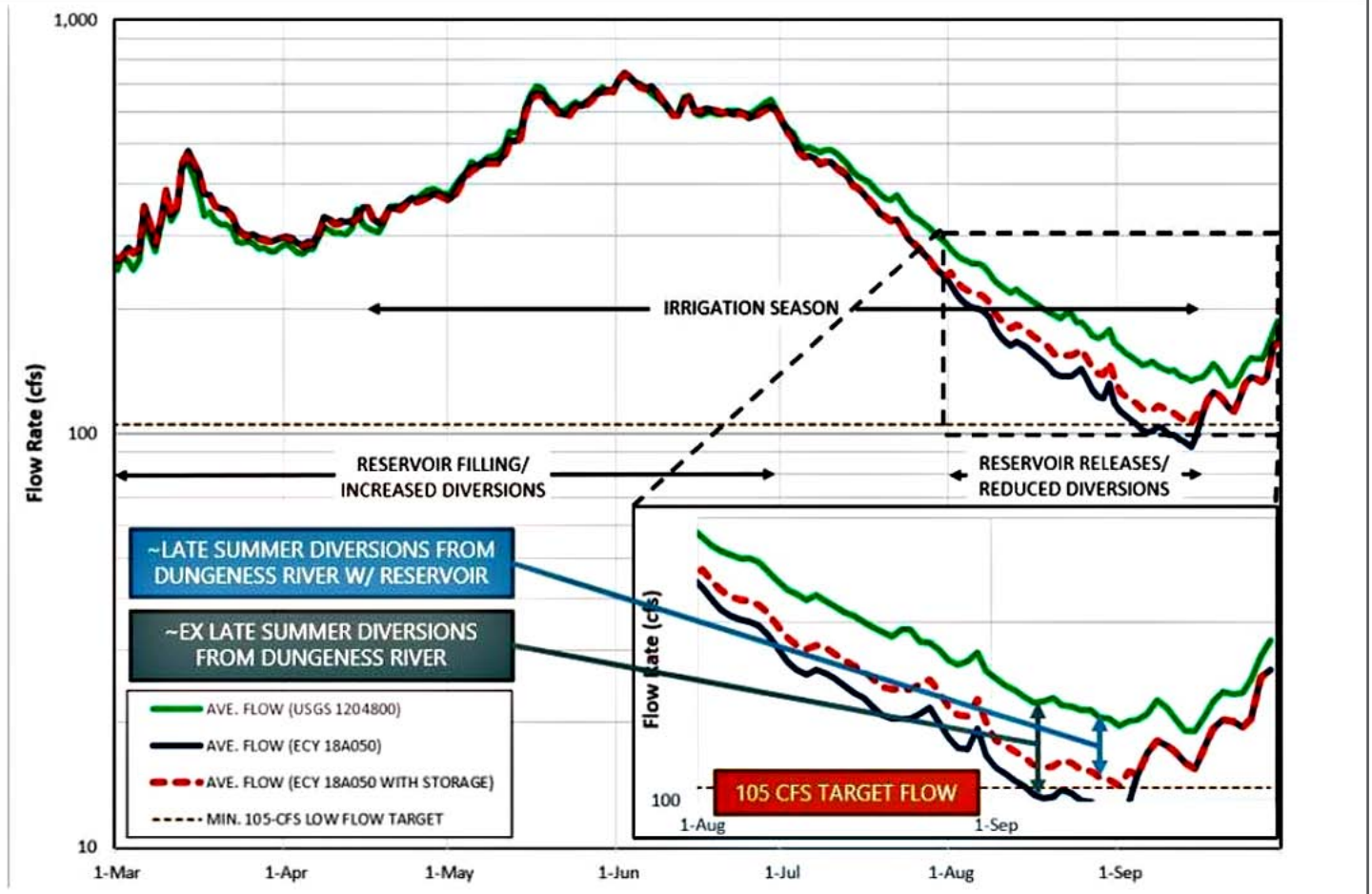
Looking Towards the Future: the Dungeness Streamflow Restoration Off-Channel Reservoir

The Dungeness Streamflow Restoration Off-Channel Reservoir represents the best opportunity to restore flow "in bulk" to the Dungeness River and provide freshwater climate resiliency for farmers on the eastside of the river. The Dungeness Reservoir has broad support from local and statewide entities. Clallam County has recognized the Dungeness Reservoir as its top water resources priority because of its benefits to community development, water resources, and salmon recovery. A working group focused on the reservoir has been convening regularly since 2014. This group includes: City of Sequim; Clallam Conservation District; Clallam County; Dungeness Water Users Association; Jamestown S'Klallam Tribe; Washington Department of Ecology; Washington Department of Fish and Wildlife; and Washington Water Trust.

Dungeness Restoration

Water Exchange

The proposed 1,600 acre-foot reservoir will be filled in the winter/spring when river flows are high with water diverted from the mainstem Dungeness via an irrigation diversion near mile 11 of the river. In August-September of each year, irrigators located on the east side of the Dungeness River will use the stored water for irrigation instead of diverting water from the river during its critical low flow period. This will allow up to 25 cfs of flow that would normally have been diverted to remain in the Dungeness River instead to support fish. This flow restoration represents as much as nearly 50% of flows in some low flow years when flows have dropped below 55 cfs, and should enable the river to meet its minimum 105 cfs low-flow target during an average year (Anchor QEA). It should be noted that water stored in the Reservoir will not be returned to the river.



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ANCHOR QEA

Anticipated Impact of Storage on Dungeness River Flows

Preliminary Basis of Design Report
Dungeness Off-Channel Reservoir Project

Streamflow Benefits

According to the US Fish and Wildlife Service's *Fish Habitat Analysis for the Dungeness River Using the Instream Flow Incremental Methodology*, the stream flow restored by the reservoir in the lower Dungeness River (when calculated for flow increases from 90 cfs to 120 cfs) could increase the **w**eighted **u**sable habitat **a**rea (WUA) by roughly 10%-35% for juvenile bull trout, juvenile steelhead, juvenile Chinook, adult Chinook, spawning Chinook, and spawning pink salmon. In addition to the habitat area increases, fish will experience benefits in the form of cooler water, improved water quality, and reduced threat of impassable barriers.

Climate Resiliency

The anticipated impacts of climate change were central to the development of the Dungeness Reservoir project as one of its primary objectives. In addition to providing climate resiliency to the Dungeness River and its ESA-listed fish, it will provide climate resiliency to the agricultural producers of the Dungeness Valley as it will serve as a reliable water source for irrigation, taking into account projected future climate change impacts and a shifting hydrograph. This need for climate resiliency in the Dungeness basin has been strongly emphasized and supported in local and regional climate change reports and adaptation

Dungeness Restoration

Agency Support

strategies. In addition to flow restoration and serving as a climate resilient water supply, the reservoir will provide additional benefits such as: reduction of local flood hazards from upland storm events; support for additional aquifer recharge; and a new, nearly 400-acre, community park.

Progress is being made towards the Dungeness Reservoir — and the major streamflow restoration and climate resiliency benefits it will provide — becoming a reality. The Washington Department of Ecology has provided valuable support to assist with the planning, design, land transfer, permitting, and outreach for the reservoir. However, additional federal and/or state support will be needed for the construction of the reservoir structure.

Conclusion

Many important collaborative approaches and strategies — from floodplain restoration to irrigation ditch piping to water banking to dry year leasing — are being used to restore and build resiliency in the Dungeness, the driest watershed in the Puget Sound region, for its fish, farms, and the local community. Intensifying climate change impacts will likely keep pace. Thus, forward-thinking local solutions will need to continue to be developed. The Dungeness Streamflow Restoration Off-Channel Reservoir is one of these solutions that will not only provide its own set of benefits but will integrate with and enhance the benefits of many of the restoration projects preceding and coming after it.

For Additional Information:

Chris Czarnecki, Washington Water Trust, 206/ 809-3208 or chris@washingtonwatertrust.org

Restoring the Dungeness website: This article is an extension of a recent ArcGIS Storymap on the Dungeness which contains more imagery, videos, and interactive elements. To view the Storymap, please visit: https://arcg.is/1WKO4e1.

Acknowledgements and Disclaimer

The author would like to acknowledge and give a special thanks to all of the wonderful groups that have worked hard together over the years to help the Dungeness River and watershed including but certainly not limited to: the Washington State Department of Ecology; the Washington State Department of Fish and Wildlife; Clallam County; Clallam Conservation District; Jamestown S'Klallam Tribe; City of Sequim; the Dungeness Water Users Association; and the Clallam Public Utility District. I would also like to thank my current and former Washington Water Trust colleagues who helped make the Storymap and, therefore, this article on the Dungeness possible: Aiman Shahpurwala; Jason Hatch; Nicole Gutierrez; Emily Dick; and Haley Brueckman. I am responsible for the information presented in this article, including any errors or omissions. Any questions can be directed to me at chris@washingtonwatertrust.org.

Chris Czarnecki is the Investments & Partnerships Officer at Washington Water Trust. Since graduating from Wake Forest University in 2007, he has worked in various capacities for conservation non-profits in Alaska, Nepal, Washington DC, and Seattle. He logged eight years of experience with organizations focused on community-based biodiversity and landscape conservation in the mountains of central and south Asia. In 2019, he joined the Washington Water Trust and is happy to be working as part of a dedicated team to restore and protect freshwater in Washington State for the fish that he passionately (and mostly unsuccessfully) loves to pursue with a fly rod during his free time.

WATER BRIEFS

The Water Report Up for Sale

From the Editors:

For over eighteen years, it has been our good fortune to be engaged in covering "Water Rights, Water Quality & Water Solutions in the West" — employment which has allowed us to interact with many of the most knowledgeable, thoughtful, motivated, and innovative practitioners active in the full range of water professions. However, the time has come for us to retire.

The Water Report is a well-established, resilient business whose subscription-based model has proven able to weather a Great Recession and the global pandemic, with a resubscription rate rarely dipping below 90%. There is ample opportunity for growth.

We operate with very low overhead costs with salaries supporting two full time positions (when younger, one of your editors managed a similar operation single-handed). While a monthly publishing schedule keeps us focused, we have enjoyed considerable flexibility in scheduling our working hours and time off. While we currently handle all aspects of the business excepting the printing and mailing, a number of activities (e.g., sales, graphics, layout, etc.) could easily be done by others.

To build upon our success, we consider it imperative that the new owner(s) remain appreciative of the importance pursuing the full range of opinion and expertise at work in water management and policy. We will be available to consult with during the transition, should that prove helpful.

If interested in discussing purchase of The Water Report, please call 541/ 517-5608 or email to: TheWaterReport@yahoo.com.

PFAS US

EPA's new lifetime health advisories

On June 15, the US Environmental Protection Agency (EPA) released four drinking water health advisories for per- and polyfluoroalkyl substances (PFAS). EPA also announced that it is inviting states and territories to apply for $1 billion to address PFAS and other emerging contaminants in drinking water. EPA is releasing PFAS health advisories in light of newly available science and in accordance with EPA's responsibility to protect public health.

EPA's also announced forthcoming National Primary Drinking Water Regulation for PFOA and PFOS, which EPA will release in the fall of 2022.

As part of a government-wide effort to confront PFAS pollution, EPA is making available $1 billion in grant funding through the Bipartisan Infrastructure Law to help communities that are on the frontlines of PFAS contamination. This funding is the first of $5 billion available through the Law to be used to reduce PFAS in drinking water in communities facing disproportionate impacts. These funds can be used in small or disadvantaged communities to address emerging contaminants like PFAS in drinking water through actions such as: technical assistance; water quality testing; contractor training; and installation of centralized treatment technologies and systems.

EPA will be reaching out to states and territories with information on how to submit their letter of intent to participate in this new grant program. EPA will also consult with Tribes and Alaskan Native Villages regarding the Tribal set-aside for this grant program. This funding complements $3.4 billion in funding that is going through federal Drinking Water State Revolving Funds (SRFs) and $3.2 billion through the Clean Water SRFs that can also be used to address PFAS in water this year.

The four drinking water health advisories indicate the level of drinking water contamination below which adverse health effects are not expected to occur. Health advisories provide technical information that federal, state, and local officials can use to inform the development of monitoring plans, investments in treatment solutions, and future policies to protect the public from PFAS exposure.

EPA's lifetime health advisories identify levels to protect all people, including sensitive populations and life stages, from adverse health effects resulting from a lifetime of exposure to these PFAS in drinking water. EPA's lifetime health advisories also take into account other potential sources of exposure to these PFAS beyond drinking water (for example, food, air, consumer products, etc.), which provides an additional layer of protection.

EPA is issuing interim, updated drinking water health advisories for **p**er**f**luoro**o**c**ta**noic acid (PFOA) and **p**er**f**luoro**o**ctane **s**ulfonic acid (PFOS) that replace those EPA issued in 2016. The updated advisory levels, which are based on new science and consider lifetime exposure, indicate that some negative health effects may occur with concentrations of PFOA or PFOS in water that are near zero and below EPA's ability to detect at this time.

The lower the level of PFOA and PFOS, the lower the risk to public health. EPA recommends states, Tribes, territories, and drinking water utilities that detect PFOA and PFOS take steps to reduce exposure. Most uses of PFOA and PFOS were voluntarily phased out by US manufacturers, although there are a limited number of ongoing uses. These chemicals remain in the environment due to their lack of degradation.

WATER BRIEFS

For the first time, EPA is issuing final health advisories for perfluorobutane sulfonic acid and its potassium salt (PFBS) and for **h**exa**f**luoro**p**ropylene **o**xide (HFPO) dimer acid and its ammonium salt ("GenX" chemicals). In chemical and product manufacturing, GenX chemicals are considered a replacement for PFOA, and PFBS is considered a replacement for PFOS. The GenX chemicals and PFBS health advisory levels are well above the level of detection, based on risk analyses in recent scientific studies.

EPA's new health advisories provide technical information that federal, state, and local agencies can use to inform actions to address PFAS in drinking water, including: water quality monitoring; optimization of existing technologies that reduce PFAS; and strategies to reduce exposure to these substances.

EPA encourages states, Tribes, territories, drinking water utilities, and community leaders that find PFAS in their drinking water to: take steps to inform residents and undertake additional monitoring to assess the level, scope, and source of contamination. Individuals concerned about levels of PFAS found in their drinking water should consider installing a home or point of use filter.

Next Steps

EPA will be moving forward with proposing a PFAS National Drinking Water Regulation in fall 2022. As EPA develops this proposed rule, the agency is also evaluating additional PFAS beyond PFOA and PFOS and considering actions to address groups of PFAS. The interim health advisories will provide guidance to states, Tribes, and water systems for the period prior to the regulation going into effect.

EPA's work to identify and confront the risks that PFAS pose to human health and the environment is a key component in the Biden-Harris Administration whole-of-government approach to confronting these emerging contaminants. This strategy includes steps by the Food and Drug Administration to increase testing for PFAS in food and packaging, by the US Department of Agriculture to help dairy farmers address contamination of livestock, and by the Department of Defense to clean-up contaminated military installations and the elimination of unnecessary PFAS uses.

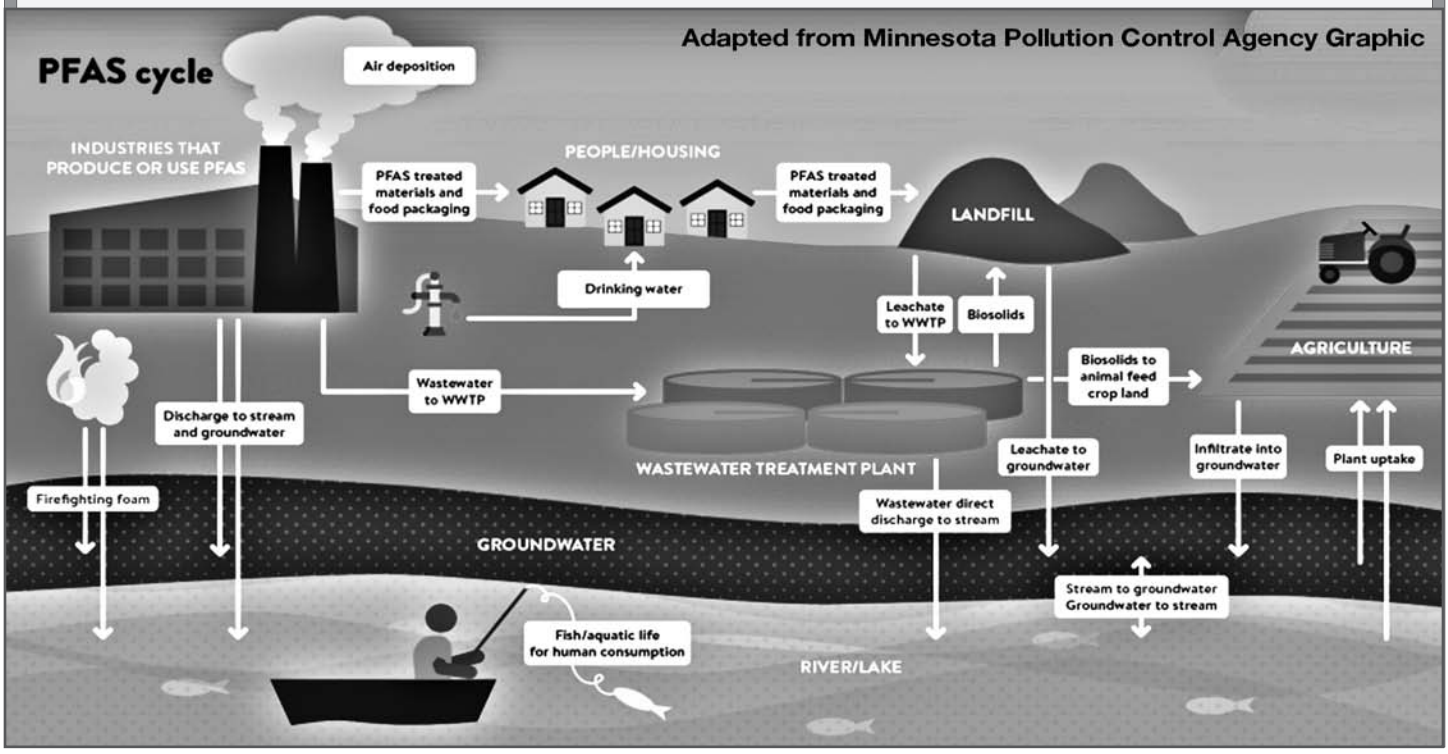
To receive grant funding announced today through the Bipartisan Infrastructure Law, states and territories should submit a letter of intent by August 15, 2022.

PFAS Strategic Roadmap

In accordance with EPA's "PFAS Strategic Roadmap" (see Water Brief, *TWR* #213 and Kray, et alia, *TWR* #216), the agency has undertaken a number of actions to deliver progress on PFAS including:

- Issuing the fifth Unregulated Contaminant Monitoring Rule to improve EPA's understanding of the frequency that 29 PFAS are found in the nation's drinking water systems and at what levels
- Issuing the first Toxic Substances Control Act PFAS test order under the National PFAS Testing Strategy
- Adding five PFAS to EPA's contaminated site cleanup tables
- Publishing draft aquatic life water quality criteria for PFOA and PFOS
- Issuing a memo to proactively address PFAS in Clean Water Act permitting
- Publishing a new draft total absorbable fluorine wastewater method

For info: EPA's PFAS website: www.epa.gov/pfas



WATER BRIEFS

WETLANDS FINES CA
MITIGATION SETTLEMENT

On June 2, the EPA announced a settlement with California's Imperial Irrigation District (IID) for violations of the Clean Water Act (CWA) related to polluting of local wetlands. Under the settlement, IID will pay a $299,857 penalty and provide mitigation to offset the harm to the environment.

"This enforcement action reflects EPA's continued commitment to ensuring public utilities like Imperial Irrigation District comply with federal laws and prevent pollution of wetlands," said EPA Pacific Southwest Regional Administrator Martha Guzman. "Actions like this are key to protecting our waterways and surrounding communities."

On November 5, 2020, inspectors from EPA's Pacific Southwest Region and the US Army Corps of Engineers inspected IID's construction of drain banks in the area and found that activities resulted in the discharge of sediment to approximately 1 acre of wetlands. This discharge also impacted approximately 20 acres of wetlands by severing the connection with Morton Bay, which drains to the Salton Sea.

In addition to paying the penalty, IID will develop a plan for the removal of the sediment in question and the restoration of the water connection to Morton Bay. If they are unable to restore the impacted site, IID would need to reestablish 63 acres of wetlands at an alternative location.

An overarching priority of the CWA is to restore and maintain the physical, chemical, and biological integrity of the nation's waters. A more specific CWA federal goal is "No Net Loss" of wetlands by first avoiding, then minimizing, and finally compensating for any impacts to aquatic resources caused by the discharge of dredge or fill material into waters of the United States.

EPA has proposed a Consent Agreement and Final Order and accepted public comment through July 5, 2022.

For info: Public Notice at: www.epa.gov/publicnotices/imperial-irrigation-district-imperial-ca-proposed-settlement-cwa-section-309g-class

COASTAL RESILIENCE US
NOOA FUNDING

On June 29th, US Commerce Secretary Gina M. Raimondo announced funding opportunities from the National Oceanic and Atmospheric Administration's (NOAA's) $2.96 billion in Bipartisan Infrastructure Law funds to address the climate crisis and strengthen coastal resilience and infrastructure. Over the next five years, NOAA's targeted investments in the areas of habitat restoration, coastal resilience, and climate data and services will advance ongoing federal efforts toward building climate resilience.

NOAA will select high-impact projects that will incentivize investments in communities, states, and regions that can drive additional funding to complementary projects. Funded projects will support three major initiatives:

Climate Ready Coasts will help coastal communities build the future they want to see, investing in natural infrastructure projects that build coastal resilience, create jobs, store carbon, remove marine debris, and restore habitat. ($1.467 billion over five years)

Climate Data and Services will support a whole-of-government effort to address the climate crisis by getting critical information and tools in the hands of decision-makers, particularly to address floods, wildfire, drought, and ocean health. ($904 million over five years)

Fisheries and Protected Resources will advance efforts to restore important fisheries habitat and promote community economic development. ($592 million over five years)

The investments will be scalable, leverage partnerships, and be responsive to the need for better climate information. NOAA will ensure the impact of this funding is equitable, coordinated, and results in projects that benefit Tribal Nations and underserved and underrepresented communities.

NOAA's Notice of Funding Opportunities for the coming year focused on habitat restoration, coastal resilience, and marine debris as part of the Climate Ready Coasts initiative including:

- Transformational Habitat Restoration and Coastal Resilience Grants ($85 million)
- Coastal Habitat Restoration and Resilience Grants for Underserved Communities ($10 million)
- Coastal Zone Management Habitat Protection and Restoration Grants ($35 million)
- National Estuarine Research Reserve System Habitat Protection and Restoration Grants ($12 million)
- Marine Debris Removal ($56 million)
- Marine Debris Challenge Competition ($16 million)
- Marine Debris Community Action Coalitions ($3 million)

These funding opportunities are designed to help coastal communities invest in and optimize green infrastructure and nature-based solutions to increase resilience to climate change and extreme weather events. The White House Coastal Resilience Interagency Working Group (IWG), co-led by NOAA and the Council on Environmental Equality (CEQ), developed a resource guide to build climate resilience in the coast, "*Compendium of Federal Nature-Based Resources for Coastal Communities, State, Tribes and Territories*" (*see*: www.noaa.gov/sites/default/files/2022-04/Nature-based-Solutions-Compendium.pdf).

These investments help advance the Biden-Harris administration's "America the Beautiful initiative" — which aims to conserve, connect and restore 30 percent of lands and waters in the US by 2030.

For info: www.noaa.gov/infrastructure-law

TRUST WATER RIGHTS WA
POLICY & GUIDANCE

On July 1, the Washington Department of Ecology (Ecology) announced the publication of the policy and guidance on the administration of the Trust Water Rights Program (TWRP). In addition, Ecology is sharing its new water banking form and updated water rights donation form.

These documents address the extensive comments Ecology received during two comment periods. Ecology made many changes to the drafts, and the final documents are now available on its Trust Water Rights Program and Water Banks websites.

POLICY 1010: Administration of the Trust Water Rights Program

GUIDANCE: Administering the Trust Water Rights Program

FORM: Request to Establish or Modify a Water Bank

FORM: Temporary Donation to the Trust Water Rights Program

This announcement comes after years of working toward our very first policy related to trust water and

a longstanding need to update our guidance. Thank you for your patience and for the comments you provided.
For info: Kelsey Collins, Ecology, 509/731-0976, Kelsey.Collins@ecy.wa.gov, or Ecology website: https://ecology.wa.gov/

ILLEGAL CANNABIS GROW CA
SEDIMENT RUNOFF FINE

On June 24, California's State Water Resources Control Board announced that three cannabis cultivators in Humboldt County are facing a $209,687 fine in connection with sediment discharged into tributaries of the Mad River that posed a risk to water quality and aquatic life, according to a formal complaint signed last week by staff of the North Coast Regional Water Quality Control Board.

Szagora LLC, Toshko Toshkoff and Rudy Chacon (the "cultivators") commercially cultivated cannabis on a 100-acre property along the Humboldt-Trinity County line between the towns of Dinsmore and Mad River. The complaint alleges the cultivators failed to obtain a permit to legally cultivate cannabis and did not respond to an enforcement order requiring them to maintain an access road on their property consistent with industry standards designed to protect water quality and beneficial uses. The road on the property has steep sections that are hydrologically connected to surface waters. North Coast Water Board staff determined the road is undersized, misaligned, and contains failed stream crossings that threaten to discharge sediment to the Mad River less than a quarter mile east of the property. "By failing to obtain a required permit, follow industry standards and adequately respond to an enforcement order, the unlicensed cultivators gained an unfair advantage over legal cultivators," said Claudia E. Villacorta, assistant executive officer. "But more importantly, they put a waterway at risk."

Sediment delivery to waterways negatively impacts the migration, spawning, reproduction and early development of cold-water fish. Excess sediment delivery to streams can smother aquatic animals and habitats; alter or obstruct flows resulting in flooding; and reduce water clarity, which makes it difficult for organisms to breathe, find food and refuge, and reproduce. The discharge of sediment in the Mad River watershed is especially problematic because it is listed as an impaired water body under Section 303(d) of the Clean Water Act due to elevated sedimentation/siltation and turbidity.

A public hearing to consider the complaint and vote on whether to approve the fine is scheduled for August 4-5 before the North Coast Water Board. A copy of the administrative complaint is available for review on the North Coast Water Board's website at: www.waterboards.ca.gov/northcoast/public_notices/public_hearings/enforcement_hearings/
For info: Blair Robertson, Waterboards at: blair.robertson@waterboards.ca.gov

CAFO GENERAL PERMIT WA
REISSUANCE REVIEW

The Washington Department of Ecology (Ecology) is proposing updates to the Concentrated Animal Feeding Operation (CAFO) water quality permit, which is how the agency oversees manure management at certain facilities. As part of the five-year permit review cycle, Ecology is asking for feedback on revisions to this permit, which mostly applies to large dairies. A number of the proposed updates are in response to a 2021 decision from the Washington State Court of Appeals, following appeals to an earlier version of the permit.

Currently, 24 CAFOs are regulated under Ecology's permit, out of more than 100 large CAFO facilities in the state. Ecology regulates these facilities because they have either released waste that entered surface or ground water, or they voluntarily chose to come under the permit. The Washington State Department of Agriculture is the principal inspector of dairies and partners with Ecology to implement this permit.

The proposed revisions are based on Ecology's experience implementing the current permit, including inspections and enforcement actions, updated science, permit appeal decisions, and stakeholder feedback. Ecology initially planned to propose updates to the permit in the summer of 2021, when a ruling from the Washington Court of Appeals on the permit was issued. The agency determined it made sense to incorporate the ruling in the draft permit and hold another round of listening sessions prior to releasing the draft permit for public review.

Based on the 2021 Court of Appeals decision, Ecology is proposing a number of updates, including: Monitoring; Manure Pollution Prevention; Managing Manure Lagoons; Restrictions for Applying Manure on Land; and Stream Protection Areas. Ecology is also proposing to start online reporting for this permit, so the information Ecology collects from permittees, such as annual reports, is available immediately. Previously, all permit documents were submitted to Ecology on paper.

Draft permit language and SEPA documents are available for public comment until August 3, 2022. Ecology has planned two public hearings on the permit, where attendees can hear a presentation from Ecology and provide verbal comments if they choose. Spanish language interpretation will be available at both events (*see* Calendar, this *TWR* for info on July 26 (morning) and July 28 (evening) workshops and public hearings.
For info: Chelsea Morris, Ecology, 360/764-0890, chelsea.morris@ecy.wa.gov or https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Concentrated-animal-feeding-operation#Reissue

WATER EFFICIENCY WEST
RECLAMATION PROJECTS

The Bureau of Reclamation selected 22 projects to share $17.3 million in WaterSMART Water and Energy Efficiency Grants. These competitive projects improve water use efficiency, increase renewable energy production, reduce the risk of water conflicts, and provide other benefits that will enhance water supply sustainability in the western United States.

The selected projects include: Lining and piping canals; Installing and upgrading water meters and timers; Installing solar to reduce power demand; and Adding automated gate controls. The projects will be completed in two or three years, depending on the funding received. To view all the selected projects, visit www.usbr.gov/watersmart/weeg/.

The Bard Water District, located in southern California near the Arizona border, will line a 1/2 mile section of the currently earthen upper Mohave Canal with concrete. The project is expected to result in annual water savings of 498 acre-feet, which is currently lost to seepage, evapotranspiration, and operational losses. Conserved water

will remain in the Lower Colorado River System and can be used by other water users during drought years and in times of shortage, including the Quechan Indian Reservation. The project will also allow farmers to continue to work with the Natural Resources Conservation Service's Environmental Quality Incentives Program to improve irrigation systems. The project will receive $484,340 with a total project cost of $968,680.

The Quincy-Columbia Basin Irrigation District in central Washington will line 2,500 feet of the earthen West Canal. The project will help address regional water reliability concerns, including drought, groundwater issues, and improved stream flows to assist salmon recovery. The project will receive $300,000 with a total project cost of $750,000.

The Lower Republican Natural Resources District in southern Nebraska will install near real-time telemetry equipment on 1,057 irrigation flow meters and other water management sensors for improved on-farm water management and reporting. In addition, the district will install eight solar-powered weather stations to collect evapotranspiration data to inform irrigation scheduling in the area. The project will receive $2,000,000 with a total project cost of $4,360,858.

This funding supplements the investments from the Bipartisan Infrastructure Law, which contains $400 million over five years for WaterSMART grants, including drought resiliency projects. In 2022, Reclamation is making $160 million available and will release other funding opportunities this spring.

For info: Reclamation's WaterSMART program webpage: www.usbr.gov/watersmart/; Bipartisan Infrastructure Law at: www.usbr.gov/bil

WASTEWATER TA MIDWEST

TRAINING/TECHNICAL ASSISTANCE

On June 27, the US Environmental Protection Agency (EPA) announced up to $18 million in available federal funding to build the pipeline of Technical Assistance (TA) providers that can serve rural, small, and Tribal municipalities through the Clean Water Act Prevention, Reduction, and Elimination of Pollution Grant Program. This investment delivers on President Biden's Justice40 initiative and will support TA providers to help utilities improve vital wastewater management that is essential to healthy communities. This funding will also elevate impact from Bipartisan Infrastructure Law funding available to small, rural, and Tribal communities.

This grant program highlights EPA's priorities to advance equity, address climate change, and to help bridge the gap between community needs and federal funding. EPA is seeking applications from organizations with experience delivering results-oriented technical assistance to rural, small, and Tribal publicly owned wastewater systems and decentralized wastewater treatment systems. Once selected, grantees will provide technical assistance in the following areas: Acquisition of financing and funding; Protection of water quality and compliance assistance; Tribal wastewater systems; Decentralized wastewater systems; and Lagoon wastewater systems.

President Biden's Justice40 initiative intends to ensure that federal agencies deliver at least 40% of benefits from certain investments, including water and wastewater infrastructure, to underserved communities.

For info: EPA program website at: www.epa.gov/small-and-rural-wastewater-systems/tools-training-and-technical-assistance-small-and-rural

COLORADO WATER PLAN CO 2023 UPDATE - COMMENT

The first Colorado Water Plan was released in 2015 at the direction of then-Governor John Hickenlooper to serve as the state's framework for solutions to the state's water challenges (*see* Water Briefs, *TWR* #132). The Water Plan is a grassroots effort, and relies on the Colorado water community to identify and implement basin-specific and/or statewide water projects that provide multiple benefits to the state's diverse water users. The Colorado Water Conservation Board (CWCB) creates and manages the Plan's framework, and supports the state's water community with funding and technical resources to implement programs and projects. In 2020, the Water Plan celebrated its 5th Anniversary, including 76% progress on identified actions and funding for more than 240 water projects across the state — all within just five years. *See* also Ecklund, *TWR* #206.

The next, updated version of the Colorado Water Plan is currently in the development process, set for final release in early 2023. The 2023 Water Plan vision is focused into four major action areas: Vibrant Communities, Robust Agriculture, Thriving Watersheds, and Resilient Planning. This process included a robust stakeholder engagement process in a scoping phase to consider feedback and concerns with the original plan, followed by an initial drafting phase. The 2022 draft version is currently out for a 90-day public comment period from June 30 — September 30, 2022. Public comments can be submitted through engagecwcb.org.

Collaborative Water Management is highlighted in the 2023 Fact Sheet. "The Colorado Water Plan is built on decades of evolving water policy and collaboration. Our water challenges demand united focus and innovation. The institutional system governing how much water Colorado can use and consume within its boundaries is based on nine interstate compacts, two equitable apportionment decrees, and Colorado water law (called prior appropriation). State and local governments also govern water use and management with regulations, ordinances, and codes. These governing systems working together have allowed Colorado's water users and stakeholders to develop strong relationships across regional divides."

The 2023 Fact Sheet goes on the emphasize Colorado Water Values. "The spirit of collaboration that underscores our four core values, will be more critical than ever to achieve the collective vision for Colorado's water future. These values include: 1) A productive economy that supports vibrant and sustainable cities, agriculture, recreation and tourism; 2) An efficient and effective water infrastructure system; 3) A strong environment with healthy watersheds, rivers, streams and wildlife; 4) An informed public with creative, forward-thinking solutions that are sustainable and resilient to changing conditions and result in strong, equitable communities that can adapt and thrive in the face of adversity."

For info: Colorado Water Plan webpage at: cwcb.colorado.gov >> Colorado Water Plan; Water Plan 2023 (2022 Draft) available along with Water Plan 2023 Fact Sheet on the webpage

CALENDAR

July 21 WEB
Hazardous Waste and Sites (ELI Summer School, 2022), 12:00pm-2:00pm Eastern Time. Presented by the Environmental Law Institute: Free - Registration Required by July 19. For info: www.eli.org

July 21-23 CO
68th Annual Natural Resources and Energy Law Institute, Vail. The Hythe. Presented by The Foundation for Natural Resources and Energy Law (formerly Rocky Mountain Mineral Law Foundation). For info: fnrel.org/programs/ai68

July 24-26 AZ
WateReuse Arizona Annual Symposium, Flagstaff. Little America Hotel. For info: www.azwater.org/events

July 24-27 WA
National Association of Clean Water Agencies (NACWA) 2022 Utility Leadership Conference, Seattle. Hyatt Regency. For info: www.nacwa.org/conferences-events/

July 26 WEB
Confined Animal Feeding Operation (CAFO) General Permit Reissuance - Workshop & Public Hearing Webinar, 10am Pacific Time. Workshop Immediately Followed by Public Hearing; Comments Accepted through August 3. For info: Chelsea Morris, Ecology 360/764-0890, chelsea.morris@ecy.wa.gov or https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Concentrated-animal-feeding-operation#Reissue

July 26-28 ID
Western Governors Association 2022 Annual Meeting, Coeur d'Alene. For info: www.westgov.org

July 28 WEB
Confined Animal Feeding Operation (CAFO) General Permit Reissuance - Workshop & Public Hearing Webinar, 6pm Pacific Time. Workshop Immediately Followed by Public Hearing; Comments Accepted through August 3. For info: Chelsea Morris, Ecology 360/764-0890, chelsea.morris@ecy.wa.gov or https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Concentrated-animal-feeding-operation#Reissue

July 28 OR
WateReuse Pacific Northwest Oregon Summer Summit, Eugene. Metropolitan Wastewater Management Commission Treatment Plant. RE: Recycled Water and its Many Benefits. Free Event. For info: https://watereuse.org/event/watereuse-pacific-northwest-oregon-summer-summit-and-social/

August 2-5 MT
Western States Water Council 2022 Summer Meeting, Polson. KwaTaqNuk Resort-Casino. For info: https://westernstateswater.org/upcoming meetings/

August 10 CA
California Association of Sanitation Agencies (CASA) Annual Conference, Olympic Valley. Resort at Squaw Creek. For info: https://casaevents.memberclicks.net/annual-conference

August 11 WEB
Trying Times: Conservation Easements and Federal Tax Law 2022, Virtual Event: 8am-Noon Pacific Time. Presented by the University of Utah College of Law: Sponsored by the Cultural Vision Fund & Utah Open Lands in cooperation with the Wallace Stegner Center. For info: www.utahopenlands.org > Events

August 11-12 AZ
30th Annual Arizona Water Law SuperConference: Challenges & Collaborative Solutions, Scottsdale. Hilton Hotel. For info: CLE International: 800/ 873-7130 or www.cle.com

August 16-18 UT
2022 National Water Use Data Workshop, Salt Lake City. Utah Dept. of Environmental Quality Bldg., 195 North 1950 West. Collaboration Between Western States Water Council Water Information Management Systems (WIMS) Group, USGS, Interstate Council on Water Policy & Internet of Water. For info: westernstateswater.org/events/2022-national-water-use-data-workshop/

August 17-18 CA
7th Annual California Water Data Summit, Irvine. UC Irvine. For info: www.cawaterdatasummit.org/

August 17-18 DC
2022 Water Finance Conference, Washington. Hilton Washington DC Capital Hill. RE: Water and Wastewater Utility Finance. For info: www.waterfinanceconference.com

August 18 WEB
Regulatory Compliance for Water & Wastewater - Virtual Event, For info: www.euci.com/events/all-conferences/

August 18-19 WEB
Wastewater Collection Systems Course, RE: Operations, Maintenance, Troubleshooting, and Technologies. For info: www.euci.com/events

August 30-Sept. 1 TX
Texas Groundwater Summit, San Antonio. Hyatt Regency Hill Country Resort. Expert Presentations on All Areas of Groundwater Management. For info: https://texasgroundwater.org/news-events/events/texas-groundwater-summit/

September 6-8 OR & WEB
Oregon Conservation Education and Assistance Network (OCEAN) CONNECT+ Hybrid Conference, Seaside. Seaside Convention Center; In-Person or Virtual Event. Training Focused on Technical & Administrative Aspects of Conservation Implementation. For info: connectoregon.net

September 8-9 WA
5th Annual Water Law in Central Washington Conference, Ellensburg. Central Washington University, 400 E. University Way. Update on Water Rights Law, Updates from Regulators, and Updates on Recent Trends and Practices. For info: The Seminar Group: 206/463-4400, info@theseminargroup.net or theseminargroup.net

September 11-13 CA
WateReuse California Annual Conference, San Francisco. Hyatt Regency Embarcadero. RE: Drought Response, Project Delivery Methods, and Inter-Agency Collaboration. For info: https://watereuse.org/sections/watereuse-california/meetings-events/

September 13 CO
Colorado Water Trust's Annual Riverbank Celebration, Denver. Denver Botanic Gardens. Includes Presentation of David Getches Flowing Water Award. For info: www.coloradowatertrust.org

September 19-20 AZ
Tribal Water Law 10th Annual Conference: Water Security on the Path to Resiliency, Scottsdale. We-Ko-Pa Casino Resort. For info: CLE International: 800/ 873-7130 or www.cle.com

September 19-21 MT
Western Collaborative Conservation Network's Confluence 2022 Conference, Pray. Chico Hot Springs Resort. RE: Collaboration and Regional Governance, Watersheds, and Cross-Cultural Collaboration. For info: https://collaborativeconservation.org/

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September 20 TX
Texas Rainmaker Award Dinner, Austin. Bullock Texas State History Museum. Hosted by the Texas Water Foundation. For info: www.texaswater.org

September 21-24 TN
SEER 30th Fall Conference, Nashville. Renaissance Nashville Hotel. Sponsored by the ABA Section on Environment, Energy, and Resources (SEER). For info: ambar.org/SEERevents

September 22 WEB
Pollution Prevention Waste Management Virtual Workshop, Hosted by Expert Staff from TCEQ, U.T. Arlington & US EPA. For info: www.tceq.texas.gov/p2/events/pollution-prevention-waste-management-workshop

September 24 OR
20th Annual Celebration of Rivers, Portland. Crystal Springs Rhododendron Garden, 5801 SE 28th Avenue. For info: htpps://bit.ly/20thgathering

September 28-29 CA
World Water-Tech North America Innovation Summit, Los Angeles. For info: worldwatertechnorthamerica.com

September 29-30 MT
Buying & Selling Ranches and Farmland Conference, Billings. Northern Hotel. For info: The Seminar Group: 206/ 463-4400, info@theseminargroup.net or theseminargroup.net

October 5-6 MT
22nd Annual Montana Water Law Conference, Helena. Great Northern Hotel. For info: The Seminar Group: 206/ 463-4400, info@theseminargroup.net or theseminargroup.net