



The Water Report™

Water Rights, Water Quality & Water Solutions in the West

In This Issue:

**Adjudication:
Tribal Perspective 1**

**Agricultural Water
Conservation 9**

**Florida v. Georgia:
Recommendations ... 18**

**WOTUS Proposal
v. Science 24**

Water Briefs 24

Calendar 27

Upcoming Stories:

**Managing for
Uncertainty**

**Phoenix Water
Management**

& More!

~~~~~ SNAKE RIVER BASIN ADJUDICATION ~~~~~

CHALLENGES AND OPPORTUNITIES: A TRIBAL PERSPECTIVE

by Jeanette Wolfley, University of New Mexico (Albuquerque, NM)

Introduction

Securing, protecting and managing water rights are critical goals for Indian tribes because they provide needed water to: conduct cultural practices; provide drinking water to communities; support irrigation of crops; and maintain instream flows for wildlife. The lack of quantification of senior tribal water rights has led to a major uncertainty as to the availability of the resource for *all* water users in the western United States. Beginning in the 1980's, states commenced general stream adjudications to quantify the amount of water that tribes are entitled to under the reserved water rights doctrine established in *Winters v. United States*, 207 U.S. 564 (1908), along with the water rights of other users. These complex water rights cases are costly and may take decades to complete. As a result, tribal, federal, and state governments have negotiated over 36 water rights settlements to resolve water uncertainty. The settlements have proven to be effective to resolve intractable litigation of tribal water rights and have: addressed environmental concerns; hastened the delivery of water through the construction of water delivery infrastructure projects to meet reservation and off-reservation community needs; promoted economic development; and enhanced tribal self-sufficiency.

In 1987, the Director of the Idaho Department of Water Resources filed a petition for the general adjudication of all rights arising under state or federal law to the use of surface and ground waters from the Snake River Basin water system and for the administration of such rights. *In re Snake River Basin Water Sys.*, 764 P.2d 78, 81 (1988) (SRBA). Twenty-seven years later, the SRBA was concluded with the entry of a Final Unified Decree on August 25, 2014. *Final Unified Order; In re SRBA*, Case No. 39576 (Aug. 25, 2014) — which decreed water rights within the basin.

The water rights of three tribes (Shoshone-Bannock Tribes of the Fort Hall Reservation, Shoshone-Paiute Tribes of the Duck Valley Reservation, and the Nez Perce Tribe) were quantified in the general stream adjudication of the SRBA. Each tribe negotiated, crafted solutions, and reached a settlement agreement to fulfill the century-old promises captured in the treaties and agreements with the United States. The settlements were tailored to secure a supply of water to provide a viable permanent homeland for present and future generations to live. Currently, the three Tribes are in the process of implementing their water settlements.

This article presents some of the many challenges and opportunities which arose in the SRBA during the negotiation and implementation process of the 1990 Fort Hall Water Rights Agreement. It offers some recommendations from a tribal perspective, and describes the continuing work to fully implement the Shoshone-Bannock Tribes water rights settlement.

Adjudication & Tribes

Tribal Goals

Agreement Specifics

Groundwater Rights

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260 North Polk Street,
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Editors: David Light
David Moon

Phone: 541/ 343-8504
Cellular: 541/ 517-5608
Fax: 541/ 683-8279
email:
thewaterreport@yahoo.com
website:
www.TheWaterReport.com

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Setting Priorities and Goals

In any water settlement negotiations tribes should clearly articulate their core principles and priorities in approaching and reaching a settlement. Once there is clarity in these core principles, the tribe must determine the potential issues, and the best route and solutions to reach those goals.

The Shoshone-Bannock Tribes (Tribes) set four primary goals in the negotiations:

First, Wet Water — securing “wet water” — not just a “paper water right” — was paramount to the Tribes. A stable, continuing water supply was critical to ensure the survival and future existence of the tribal community, and ensure a viable economy on the reservation.

Second, Natural Flows and Storage — the Tribes sought to secure the majority of water through natural flows and storage water. This goal enabled the Tribes to avoid the construction of any large infrastructure and water delivery projects.

Third, Flexibility — it was crucial to have the flexibility to use various sources of water for a wide variety of uses. For example, water stored in the reservoirs is partially leased to provide funding to sustain the Tribal Water Resources Department.

Fourth, Reality-Based — the Tribes sought to create a settlement document that was based on actual conditions and reality-based opportunities.

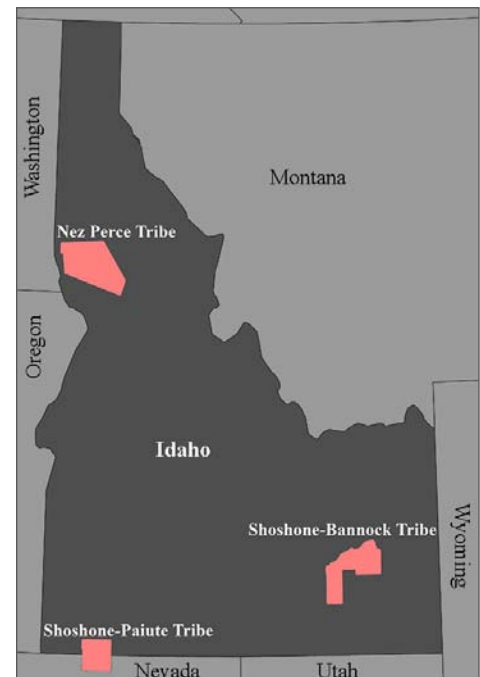
With these four primary goals articulated the Tribes moved forward to negotiate its water rights settlement, and to seek to reach the goals established by the Tribal leadership.

The Fort Hall Water Rights Agreement

The primary legal basis for the Shoshone-Bannock Tribes' water rights was the *Winters* doctrine, relying on an Executive Order of 1867 and the Fort Bridger Treaty of July 3, 1868, 15 Stat. 673. The Reservation is comprised of about 545,000 acres, with 98% of the land held in trust, and 2% fee land owned by Tribal members and non-Indians. The Shoshone-Bannock Tribes, State of Idaho, United States, and Committee of Nine of Water District 01 reached agreement on July 10, 1990. Under the Fort Hall Water Rights Agreement (Agreement), the Tribes and its members may divert up to 581,031 acre-feet per year (AFY) of water from the Upper Snake River basin, comprised of a combination of natural flow, groundwater, and federal contract storage water from two Upper Snake River reservoirs. The water rights are for present and future irrigation, DCMI (domestic, commercial, municipal, and industrial), instream flow, hydropower, and stock water uses. The parties did not have to negotiate construction of future federal water projects to transfer water to the Fort Hall Reservation because a federal irrigation project exists. Also, there are major rivers, creeks and tributaries flowing through the Reservation. The Agreement guarantees groundwater use rights up to 125,000 AFY from any ground water source within the Reservation, and 23,500 AFY from the Bannock Creek Basin. The Tribes created a Tribal Water Bank to rent water stored in two reservoirs for use off-Reservation by private or governmental entities. Storage rights amounting to 130,831 AFY may be used for leasing. The Agreement provides that water rights can be used to enhance instream flows throughout the Reservation.

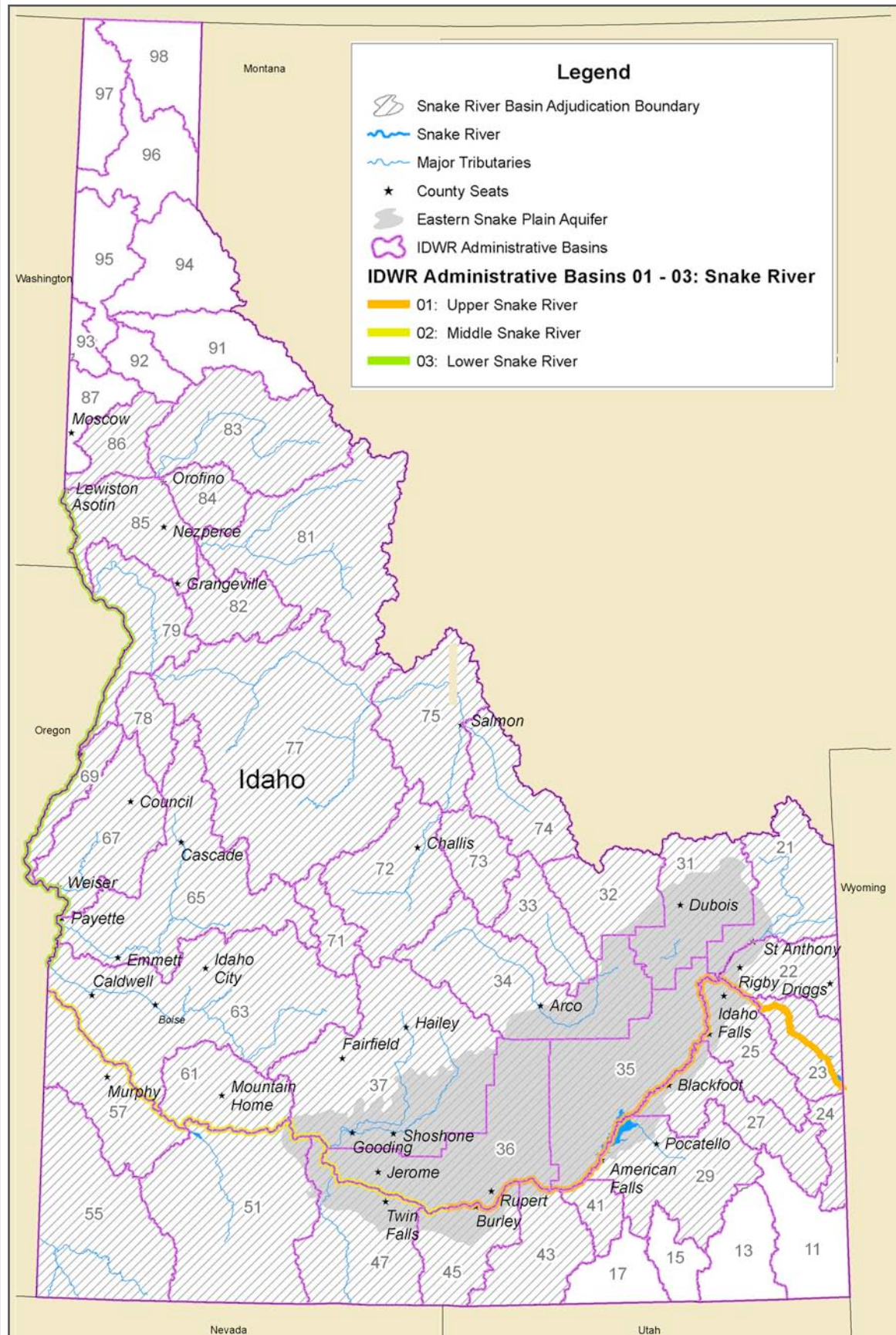
The instream flow rights include any water accrued under federal contract storage rights, any natural flows for waters located within the Reservation, and up to 15,000 AFY of water accrued in the Blackfoot Reservoir and Grays Lake (both located off-Reservation). The Agreement addresses administration of the Tribal water rights because many of the Tribes' water rights divert from sources that originate outside the Reservation and are shared with non-Indian water users as part of the federal Fort Hall irrigation project. The Tribes administer tribal water rights within the Reservation. The Tribes, United States and Idaho share administration of the Snake River Tribal water right. The State administers all diversions from the Snake River, but the United States is responsible for the physical operation of its Snake River diversion to the federal irrigation project, which serves lands on and off-Reservation. The State, Tribes, and United States share water management data and reports for diversions to the Reservation.

(Agreement available at: <https://idwr.idaho.gov/files/adjudication/1990-Fort-Hall-Indian-Water-Rights-Agreement.pdf>).



Adjudication & Tribes

Snake River Basin Water System



Adjudication & Tribes

Tribal Governance

Public Participation

Assimilation & Allotments

Cultural Integrity

Local Stakeholders

Exercising Good Governance

An Indian water settlement will impact a tribal community's future and overall quality of life. It will affect reservation citizens, individual landowners, the use of natural resources, economic development, and future planning. In each settlement, tribal decision-making and governance seeks to reflect the history, experience, culture, and wishes of the unique people and community it serves. Tribal government officials should exercise good governance including transparency and accountability in their decision-making, and be responsive to the needs of their people throughout the water negotiation and settlement process. Good tribal governance seeks strategic vision for the future, informs the community, educates its citizens, and builds trust in the decision-making. A responsive government also includes the capacity to comprehend and respond to the individual community member's needs, questions, and suggestions.

Providing opportunities for public participation can strengthen tribal government and sovereignty, and improves the tribe's relations with the community and off-reservation communities. Participation by the local community and the public is a cornerstone of good governance. Citizen participation must be meaningful, informed and organized. Education and information sharing with tribal members at meetings, open houses, and in an easily understandable format can alleviate conflicts with Indian landowners and balance the competing interests of the greater community. Tribes may also consider establishing a steering committee comprised of tribal members who will be responsible for giving input to the water negotiation team and keeping their constituency informed of the settlement process. Tribal governments and their legal counsel should seek to attain good governance goals so that their actions are viewed as fair and just. Finally, education of the tribal membership is useful because during the implementation process members may wish to serve on a water resources commission, or be employed as water technicians or water resource department staff.

Respecting the Interests of Community Members

Tribal water settlement decisions affect the entire political and social fabric of the community, likewise impacting its cultural and spiritual well-being. Such decisions impact the communal rights to live on lands and the daily use of water.

The federal policies of assimilation and allotment of Indian reservation lands have been abandoned, but their legacy remains. One feature of this legacy on many reservations is a large population of individual tribal members owning allotments. Under the various allotment statutes, an individual Indian (allottee) received a certain number of acres, generally between 40 to 160, to be held in trust by the United States for the allottee for a period of twenty-five years. At the expiration of the trust period, when the allottee was supposed to have sufficiently assimilated, the individual would receive fee title to the land. Individual Indian landowners do not simply want to be reassured that everything regarding their water rights is being taken care of; they want and expect opportunities to participate in the governmental decisions that affect them and to have a voice, and in some instances vote on proposed water settlements. The Shoshone-Bannock Tribal members voted on and approved the Fort Hall Water Rights Agreement.

Additionally, communal ownership and kinship places certain duties and responsibilities on some tribal members with respect to land and all the living beings of the environment. Often, certain individuals — elders, traditional, and spiritual leaders — advocate the critical importance of cultural integrity. They seek to preserve the beauty and stability of the community, protect the health and welfare of the residents, and to plan for future generations. These voices, comments, and opinions serve an important role in the water settlement and institutional setting. As part of the deliberative process, tribal officials should seek out comments and opinions to hear diverse thoughts on major water plans, adoption of laws and regulations, and other water related actions.

Tribal members do not always expect to get everything they want, but they do expect to be heard, taken seriously, and informed of tribal council decisions and processes. Certainly, tribal elected officials are the ultimate decision makers on these critical water settlement issues, and a flexible and informed approach is needed and made by the tribal leadership and community.

Building Relations with the Public

Proactive engagement of local stakeholders in efforts to resolve Indian water rights claims is an important component of any settlement. Tribes have a vital stake in water settlements and water management to preserve their homelands, treaty rights, and their sovereignty — and local support can play a constructive role to resolve disputes. It is very difficult to wrest water away from non-Indian communities that have been relying on it and using it for many years. Therefore, understanding local politics, building relationships, and educating all stakeholders are key elements of successful negotiation.

To many non-Indians, the reservation remains a foreign place and the tribal governmental structure is a mystery. Tribes must be ready and willing to understand the challenge this presents. It is vital to address misconceptions and criticisms during the water settlement process by guaranteeing public participation, and increasing dialogue among the tribes, private landowners, and businesses. A mutual understanding

Adjudication & Tribes

Protecting Tribal Rights

of the public's needs should be fostered and participants should be encouraged to define their concerns. A structured, open process can instill confidence in the deliberative process, and ensure that the tribal government carefully weighs the public's issues and concerns.

Being Vigilant

Tribes must be ever vigilant to protect their senior water rights from junior users. The Snake River Basin Adjudication involved ongoing litigation and finalization of all water uses in the river basin. Thus, even though the Shoshone-Bannock Tribes were first to have their water rights quantified and adjudicated, and a partial final decree entered in the SRBA, this did not halt non-Indian users from claiming Tribal water in their water application filings. The Tribes filed over 700 objections against the non-Indians claiming tribal water, tribal priority dates, tribal lands as places of use, and other types of uses. The City of Pocatello also claimed Tribal water under an 1888 Act that ratified the cession of certain lands of the Shoshone-Bannock Tribes for a railroad right-of-way and to set aside 1840 acres for a townsite which became the City of Pocatello. The SRBA Special Master and Idaho Supreme Court found that Section 10 of the Act of September 1, 1888, ch. 936, 25 Stat. 252, did not grant the City of Pocatello a federal water right, nor was the City granted a portion of the federally protected water reserved to the Tribes by the Treaty of Fort Bridger of 1868, 15 Stat. 763. The Tribes had to invest substantial financial and human resources to litigate the junior water rights and resolve conflicting interpretations of the water rights agreement provisions. The judicial approval of additional agreement provisions was also necessary. A water system management plan was also negotiated and approved by the parties.

Keeping the United States Engaged

The United States expressly acknowledged that "Indian water rights are vested property rights for which the United States has trust responsibility, with the United States holding legal title to such water in trust for the benefit of the Indians." *1990 Criteria and Procedures for the Participation of the Federal Government in Negotiations for the Settlement of Indian Water Rights Claims*, 55 Fed. Reg. 9223 (March 12, 1990). The US has a legal obligation to protect and develop Indian water rights, and facilitate and fund the resolution of water rights conflicts. The future of tribes and water they hold depend on a consistent commitment from the federal government to protect water rights, and develop water supplies and infrastructure in Indian communities. It is vital to evaluate and determine who should be at the table for the federal government from negotiation to implementation. For instance, should the United States Fish and Wildlife Service or the federal Bureau of Reclamation be at the table? It is also critical that those same federal agencies remain engaged, committed to completing and effectuating the water rights agreement. While the involvement of the federal government in Indian water settlements is required as part of their trust responsibility to tribes, federal and tribal interests are not always aligned, and separate legal counsel for tribes is often necessary.

Trust Responsibility

Agency Involvement

Implementation

The US Department of Interior's attorneys and US Department of Justice are intimately involved in the negotiation and settlement process, and then a federal implementation team is assigned. It is critical that the federal team continues to advocate for the tribal interests to ensure full implementation. Tribes may be required to urge and nudge the federal government to fulfill its obligations to protect and preserve the tribe's water and consistently adhere to the settlement provisions.

The local US Bureau of Indian Affairs office may play a primary role in the day-to-day implementation of a Settlement. The Bureau may prove an obstacle, particularly if they interpret the settlement agreement in a manner that is inconsistent or contrary to the tribal administration of tribal water rights.

Federal Antagonism

Local federal offices may have a vested interest in maintaining the status quo and not assisting the tribe in providing data, information, monitoring, and general agreement. Such local/federal antagonism burdens tribal efforts to fully implement their water settlements. For example, prior to approving the Shoshone-Bannock Tribes' Water Code, the Department of Interior required that a provision cover allottee water rights. Although the Tribes did not agree that a provision was necessary, the Tribes established a water permit process that recognizes allottee's lands and allocation of water. However, the local Bureau of Indian Affairs Fort Hall Irrigation Project operations refuses to recognize the Tribal water allocation to the allottee as determined under the Tribal Water Code and permitting system and will not distribute irrigation water to allottee's land. This conflict exists because the Bureau of Indian Affairs irrigation project administers water delivery on the Reservation in accordance with antiquated federal irrigation handbooks that do not recognize allottee water rights and newly adjudicated tribal water rights. In short, the United States agency declines to follow the terms of the Agreement and relies instead on its handbooks that do not consider tribal water rights decreed under State adjudications. The United States cites to 25 CFR § 171 to support its position that the irrigation operations administers its facilities by enforcing applicable federal statutes, regulations, Executive Orders, directives, Indian Affairs Manual, the Irrigation Handbook and other policies — all of which do not include state court decrees. The Tribes are also working to resolve other ongoing issues with the United States relating to Tribal water secured in the Agreement.

Allottee Allocation Conflict

**Adjudication
& Tribes****Institutional
Knowledge****Resolving
Sticking Points****Historical
Practices****Implementation
Factors****Integrated
Management****Management
Needs****Closing Loose Ends and Ensuring Clarity**

The negotiation of water settlements is a huge, complex process that lasts for many years. Although engineers and attorneys often see the settlement to completion, there may be a change in representation or individuals who retire during the process. It is imperative that the parties' original representatives keep detailed summaries and records of the negotiations, and the history of terms and provisions reached. Such records will enable future representatives to fully understand the meaning of the agreement. Any words, phrases, or paragraphs that are left to interpretation may result in more negotiations or litigation of the issue. Agreements should be clearly and concisely drafted to enable a tribal lay person, such as a water commissioner, water technician, or paralegal, to understand the document. During the implementation stage it is imperative that water department staff be able to apply and carry out the provisions of a water agreement for monitoring, administration, and delivery of water to the tribal community.

There may be a desire by the parties to the negotiation to set aside a difficult issue for later, save clauses, or to base the implementation of the water used based on historical practices. Although the sticking point may be a so-called "deal breaker," the parties should persevere and tackle the issues. Unresolved issues and provisions saved for a later day delay full implementation of the agreement, create animosity between the parties, and may lead to a misinterpretation by new negotiators or inconsistent interpretations by the court. Any historical water practices must be documented and agreed to, and any agreement language must be consistent with the actual operations of a water system. For example, as part of the Blackfoot River water right, the Tribes and United States agreed to an "equitable adjustment" in the event it was later determined that water use by the non-Indian Blackfoot natural flow water exceeded 45,000 AFY. The term "equitable adjustment" was not defined or explained in the Agreement. This issue was very contentious and the United States and Tribes interpreted the water rights provision dramatically different than the State. The United States and Tribes files a Motion for Enforcement of the equitable adjustment provision, and in turn, the State filed a Motion for Accounting. The SRBA Court ordered the parties to participate in settlement negotiations to resolve the differing interpretations. Following two years of negotiations, the parties reached a Blackfoot River Equitable Adjustment Settlement Agreement, including a Blackfoot River Management Plan. These two documents were incorporated into the original partial final SRBA Consent Decree.

Implementation of the Settlement

Once the dust has settled from the negotiations, the ink dried on the settlement agreements signed by the parties and enacted by Congress, the real work begins: tribal government departments and agencies have to implement the water settlement provisions. Certainly, this is a daunting challenge that will involve many tribal players addressing a myriad of tasks and issues. Implementation is dependent on the specific terms of the settlement and can be broad and far-reaching. Some agreements provide for major funding and construction of water delivery systems off-reservation and infrastructure development on-reservation, which requires millions of dollars of congressional funding, annual appropriations, and ongoing federal support. Some reservations may have existing infrastructure from federal irrigation projects. There may be rivers, streams, and tributaries flowing through or contiguous to the reservation such that major federal support and construction to deliver wet water will not be required. However, many of the federal irrigation projects are over 100 years old, in dilapidated condition, and in need of major improvements.

Building Capacity for Tribal Water Resources Management

Capacity building is fundamental to implementing a tribal water settlement and to fulfill the obligations agreed to and water gained in the settlement. This endeavor is a vitally important step in the process of planning, developing, and managing water resources — in terms of both water quantity and quality — across all water uses. It includes the institution development, policy and legal frameworks, infrastructure and human resources development, and information systems that support and guide water management.

Tribal water resources management seeks to harness the benefits of water by ensuring there is sufficient water of adequate quality for drinking water and sanitation services, energy generation, as well as sustaining healthy water-dependent ecosystems and protecting the spiritual values of lakes, rivers, and estuaries. Water resource management also entails managing water-related risks, including floods, drought, and contamination. The complexity of relationships between water and tribal households, economies, and ecosystems, requires integrated management that accounts for a great number of uses and tribal values.

Tribes will need to invest in institutional strengthening, information management, and (natural and human-made) infrastructure development. Institutional tools such as legal and regulatory frameworks, water pricing, and incentives are needed to better allocate, regulate, and conserve water resources. Information systems are needed for resource monitoring, decision-making under uncertainty, systems

**Adjudication
& Tribes****Adaptation****Natural
Resources
Department****Legal
Framework****Water Code
Elements****Federal
Approval
Moratorium****Planning
Elements**

analyses, and hydro-meteorological forecast and warning. Investments in innovative technologies for enhancing productivity, conserving and protecting resources, recycling stormwater and wastewater, and developing non-conventional water sources should be explored. Opportunities for enhanced water storage (including aquifer recharge and recovery) should be sought. Ensuring the rapid dissemination and appropriate adaptation or application of these advances will be a key to strengthening water in tribal communities. Capacity building also requires a diverse array of disciplines and areas to address short and long term needs in a coherent way.

Institutional Development

Tribes may have a natural resources department that regulates land and water matters. If they do not, a water resources department may need to be developed to address the water rights settlement agreement implementation. This department is responsible for: establishing laws and regulations; undertaking planning and financing; developing and managing water resources; and monitoring, investigating, and regulating activities relating to water uses. There are many tribal players who undertake various responsibilities to provide services and administer the program. The players may include: a water engineer; water quality specialist; water technicians; administrative staff; data programmer; attorney; paralegals; and water commissioners.

Codes and Regulations

A primary component of the implementation process is the development of tribal water laws and regulations to manage water resources. This component is necessary to identify the functions and structure of the water resources department to: issue water permits; hold hearings; regulate activities impacting water sources; and establish water priority standards.

As part of the water code development, tribes need to consider:

- the system for determining priorities of use
- monitoring water uses
- addressing violations
- how should allottees be covered in the code
- who will administer the code
- who will issue permits and license
- will there be appeals to the tribal court
- what kind of due process will be applied
- what kind of cultural values will be incorporated into the code and how will they be incorporated.

The draft water code should go through the tribal review and comment period, and seek comments from tribal members and the public if it seeks to regulate non-member's water rights.

Tribes organized under the Indian Reorganization Act of 1934 must submit their laws — including water codes — to the US Secretary of Interior for approval. Since 1975, there has been a moratorium on tribal water code approvals. The policy is outdated and hinders the ability of tribal governments to effectively regulate and control the water resources on their lands. More recently, the Water Resources Director of the US Bureau of Indian Affairs has stated that tribal water codes are approved on an “ad hoc” basis. However, there is no criteria for approval other than the discretion of the Department of Interior. In order to obtain Secretarial approval, a tribe must present its water code for Interior Solicitor review and convince Interior authorities that the water code should be approved. The process is slow and arduous. It takes a great amount of effort to travel to Washington, DC to meet with the Solicitor and Secretary of Interior to gain approval. The Secretary of Interior should prioritize the approval of tribal water codes that are required in settlements and have judicially decreed water rights.

Additionally, planning documents are important.

Some of the planning documents needed may include:

- general water planning
- drought contingency plan
- river management plan
- water conservation plan
- water marketing
- integrated resource management with other tribal departments
- groundwater modeling
- groundwater management plan

[Editor's Note: In 2007, the US Department of Interior approved the Shoshone-Bannock Tribes' Water Code. It established the Tribal Water Resources Commission's powers, duties and responsibilities, as well as codifying the Tribal Water Resources Department's authority to manage water resources on the Fort Hall Indian Reservation. *See website below for additional information*].

Adjudication & Tribes

Basin Resources

Information Reliability

Water Development Funding

Information Systems: Inventory & Assessments

As part of the negotiation process, tribes generally define their water basin(s) and tributaries. However, during the implementation process, tribes need to take steps to inventory all the water resources and ecosystems, conduct an assessment of community needs and priorities, and collect data regarding water availability, water demand, and water quality. This collection should include physical, biological, and economic data and information on the basin. Establishing basin monitoring and geographic information systems that coordinate water information from local, state, and regional systems is essential to understanding the present status of basin resources and to monitor changes. It is also important that tribes have an understanding of how state authorities account for and administer water rights. Effective coordination with the state and federal agencies to share data and information is also vital to successfully manage water on reservation.

To effectively manage and make decisions regarding tribal water resources, a tribal water resources department needs reliable information on: the quantity of both surface and groundwater resources (and their seasonal and yearly fluctuations); water uses (particularly for irrigation, drinking water and municipal use, and pollution sources); and, the risks of floods, droughts, and accidental pollution. Basin information systems will deliver real time information to tribal decision-makers to enable day-to-day planning for water allocation and distribution within the tribal community, and to plan for future uses.

Water Marketing

An effective tribal water management system requires adequate, reliable, and sustained funding. Many tribal governments have limited financial resources and the funding for the water resources department may depend heavily on allocations from central government budgets. The Shoshone-Bannock Tribal government committed to using the water settlement funding to establish a water resources department separate from the Tribal natural resource departments. The Tribes have authorized the use of revenue generated from water marketing to support the ongoing operations of the department. A water marketing feasibility study was completed. The study identified possible lessors, uses, and price of water in the local and regional area near the Reservation. The Tribes continue to monitor the local market for storage water to ensure that it is adequately compensated from its rental storage water. [For detailed information on "Tribal Water Marketing" by the Shoshone-Bannock Tribes, *see* Bovee, Wolfley, Teton & Martin, *TWR* #149.]

FOR ADDITIONAL INFORMATION:

JEANETTE WOLFLEY, University of New Mexico 505/277-3010 or wolfley@law.unm.edu
Shoshone-Bannock Water Resources Department website: www2.sbtribes.com/water-resources-department/
Snake River Basin Adjudication website: www.srba.state.id.us/finaldecree.htm

Jeanette Wolfley is an enrolled member of the Shoshone-Bannock Tribes and is legal counsel for her Tribes on various matters, including implementation of the Fort Hall Water Rights Agreement with the Tribal Water Resources Department. She is also a Professor at the University of New Mexico School of Law where she teaches Indian Water Rights, Federal Indian Law, and other tribal natural resource courses. Jeanette has practiced law for over 37 years primarily representing Indian tribes in natural resources, water and environmental, and other governmental matters. She served as General Counsel for her Tribes prior to entering private practice.

Agricultural Conservation
Water Stress
Conserved Water
Conservation Disincentive
Return Flows
Efficiency Upgrades
Multiple Benefits
Other Options

INSTREAM BENEFITS FROM AGRICULTURAL CONSERVATION

SECURING INSTREAM BENEFITS FROM AGRICULTURAL WATER CONSERVATION
WESTERN STATES AND OREGON’S ALLOCATION OF CONSERVED WATER PROGRAM

by Ted Howard, Center for Environmental Law & Policy (Seattle, WA)

Introduction

In the Western United States, as in many other parts of the world, water resources are coming under increasing pressure. Urban growth is creating new demand — even as the efficiency of domestic and commercial use increases. Climate change is decreasing the reliability of supply and increasing the frequency and intensity of shortages. Meanwhile, biotic communities that depend on adequate streamflow for survival, such as anadromous fish and their predators, are under stress — salmonids and Orcas are two particularly salient examples in the Pacific Northwest. Under these increasingly problematic conditions, water users and policymakers have strong incentives to find ways to do more with less water.

Given that agriculture is by far the largest water-use sector in the Western states, many efforts to find water savings will focus on agricultural conservation. This article discusses the water savings potential of several conservation methods — particularly irrigation efficiency technology — and legal frameworks in the Western states that encourage, subsidize, and formalize such savings. Particular focus will be put on the use of conserved water to augment instream flows and the environmental functions they support.

The State of Oregon’s Allocation of Conserved Water Program (ACWP), Or. Rev. Stat. § 537.455-500, is discussed as an example that integrates agricultural water conservation and instream flow augmentation into a single statutory scheme, looking at its advantages and limitations, with an eye toward whether it is a model to be emulated by other states.

The traditional requirement in prior appropriation-based water law that a right be continuously put to beneficial use tends to disincentivize irrigators from taking active steps towards water conservation. Decreased diversions due to more efficient technology make users potentially vulnerable to partial forfeiture of an economically valuable water right — as they may be no longer using the full amount of the water that was previously diverted to satisfy the beneficial use. Without specific provisions that allow the conserved portion of a water right to be protected, the “use it or lose it” legal regime for water rights discourages irrigators from investing in agricultural efficiency improvements.

Agricultural Efficiency

Agricultural efficiency is defined as the percentage of water applied to a field (whether diverted from rivers or streams or pumped from aquifers) that is consumed by crops (referred to as “consumptive use”). Traditional, “low-tech” irrigation methods, such as furrow irrigation, are very inefficient in this sense. Before technology upgrades, irrigation districts in Oregon’s Deschutes basin operated under the assumption that only 20% of an irrigator’s diversion would be consumptively used — i.e. taken up by crops. Water that is not consumed may infiltrate into a local aquifer or migrate back to a neighboring stream — in which case it becomes part of the “return flow” that is available for downstream users to divert. These return flows have traditionally been quite important. One study estimated that in the 1980s, 47% of all water diverted for agriculture originated as return flows from upstream diversions.

Upgrades in irrigation efficiency may take place at the level of the irrigation district. For example, when open ditches used to transport water are replaced with lined canals or pipes, this reduces the amount of water lost to seepage, vegetation, and evaporation. Efficiency may also be undertaken by individual irrigators, as when farmers switch from furrow irrigation to center-pivot irrigation, or from conventional center-pivot irrigation to higher-efficiency dropped-nozzle or drip irrigation. Such upgrades can be quite expensive, with the cost of installing drip irrigation estimated around \$800–1,200 per acre.

Irrigation upgrades such as these provide multiple benefits for both farmers and the environment. The ability to more carefully target irrigation results in more evenly watered soil (furrow irrigation requires the use of excess water on the higher side of a field to ensure that the lower side will receive enough), reduces weed growth, and produces an increase in output (measured in dollar value) per unit of water applied and per acre of irrigated land. The environmental benefits of upgraded irrigation technology include reducing soil erosion and the runoff of minerals, fertilizers, and pesticides — thereby helping to preserve soil health and instream water quality.

Improvements to water transmission and irrigation technologies are not the only way to produce conserved water that can be used elsewhere. Third-parties seeking benefits from agricultural water conservation, such as environmental non-profits or municipalities looking to buy water rights, may also

Agricultural Conservation
Net Water Savings?
Consumptive Use Increase
Legal Framework
Upgrade& Net Loss
US Irrigation

pursue strategies such as forbearance agreements with irrigators to fallow certain fields, to grow crops with lower water requirements, or to engage in deficit irrigation, by providing less than the crop’s full water requirement.

Does Water Conservation Actually Make Water Available for Other Uses?

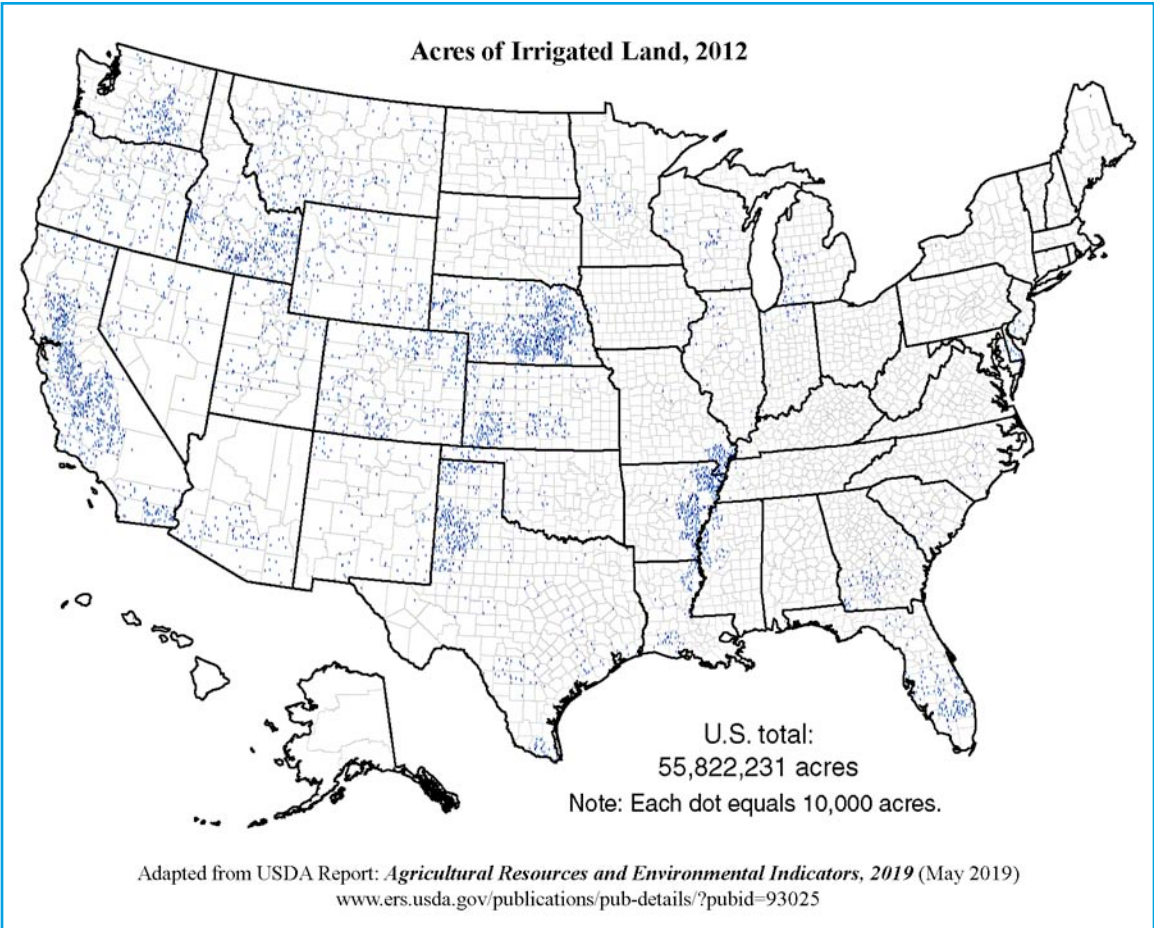
In addition to direct environmental and economic benefits, a major goal of policies to encourage agriculture conservation is to produce net water savings that will allow a portion of the water previously diverted for irrigation to be transferred to other uses, including instream uses that provide environmental benefits such as supporting fish habitat.

Producing actual net water savings through agricultural conservation may not be as simple as simply promoting efficiency upgrades. Policy-makers have often presumed that there is a direct relationship between efficiency upgrades and water savings. However, a body of research in the past several decades on the real-world effects of increased irrigation water efficiency, in various parts of the United States and around the world, has found many cases in which total consumptive use has *increased* as a consequence of increased efficiency.

Legal frameworks designed to produce water savings through agricultural conservation therefore need to be carefully designed to ensure that any transferrable water rights assumed to result from decreased diversions actually correspond to real instream water. To understand why, we must look at the relationship between irrigation technology and consumptive use.

Efficiency Upgrades and Consumptive Use

Theoretical models of irrigation efficiency’s effect on consumptive use have predicted that subsidizing upgrades do not produce total water savings in a majority of scenarios. For example, modeling of irrigation improvements’ effects in the Rio Grande Basin has predicted significant increases in the economic value of farm production, but also a net loss of water due to changes in planting patterns and other variables (see below). This net loss increases with subsidies. The predictions of these models have been supported by a number of empirical studies of water use in areas where irrigation efficiency has been upgraded.



Agricultural Conservation

Consumption Increases

Savings Offsets

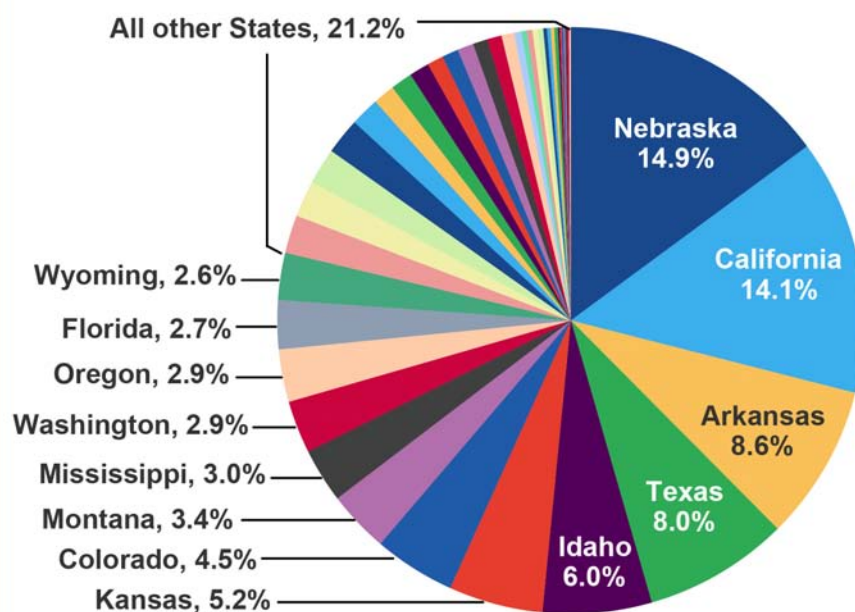
Drip Irrigation & Evaporation

The Environmental Quality Incentives Program, 16 U.S.C. § 3839aa (2018), an ongoing Federal program created by the 1996 Farm Bill, and the Agricultural Water Enhancement Program, a subsidiary program that ran from 2008 to 2014, have provided well over a billion dollars in funding for irrigation upgrades. Multiple studies have found that in areas receiving subsidies through the program, overall water use increased due to cultivation of more water-intensive crops and expansion of irrigated acreage. Casado-Perez, Pfeiffer, *supra*. In a study conducted for the New Mexico Interstate Stream Commission, conversion from flood irrigation (with an approximate efficiency of 60%) to drip irrigation (with an approximate efficiency of 90%) was accompanied by an 8-16 percent increase in overall water consumption. A study of upgrades to sub-surface drip irrigation and micro-sprinklers in Oregon's Grasslands Drainage area saw an increase in consumptive use, through both expanded irrigation and cultivation of more water-intensive crops.

In Australia's Murray-Darling Basin, which is a closed basin with comprehensive metering of water use, the Australian government has spent \$2.5 billion dollars subsidizing irrigation upgrades. Water use in the basin has expanded. Studies of the program's efficacy found no reduction in water use per acre basis, or release of water to other users. Agricultural modernization initiatives in Morocco that included funding for improved irrigation technology led to an expansion of water use and an accelerated rate of groundwater extraction. In Spain, where the national share of agriculture using drip irrigation increased from 2% to 46% between 1980 and 2009, a 40% decrease in diversions was accompanied by an overall increase in consumptive use. This increase was largely driven by a shift to more water-intensive crops, particularly away from cotton and toward citrus trees, which caused a 20% increase in irrigation requirements.

In contrast, a study of California's San Joaquin Valley, which saw the use of drip irrigation increase by 31% between 1972 and 2001, did not find a corresponding increase in consumptive use, largely due to decreased evaporation in drip-irrigated fields. The study area was predominantly planted with vineyards, orchards, and other high-value crops.

State shares of total U.S. irrigated acres, 2012



Note: The 13 leading States (10 Western, and Arkansas, Mississippi, and Florida) accounted for 78.8 percent of U.S. irrigated acres, including harvested cropland, pasture, and other lands (but excluding horticulture under protection).

Source: USDA, Economic Research Service using USDA, National Agricultural Statistics Service, 2012 Census of Agriculture, State data.

Agricultural Conservation

Consumption Factors

Fallowing & Forbearance "Slippage"

Verifiable Reduction

Instream Transfer

States' Distinctions

Drivers of Increased Consumptive Use

One major factor in increased consumptive use is also a reason why upgrades in irrigation methods economically benefit irrigators: because water can be applied more precisely to the root zones of crops, more of the water is absorbed, crops grow larger, and thereby lose more water to the atmosphere through evapotranspiration. Water use may also increase because upgrades are often followed or accompanied by changes in planting patterns — for example by shifting over to more valuable crops, such as vine and orchard crops. Many of these crops — which may themselves be another significant investment — cannot be fallowed. If grown exclusively with drip irrigation, crops' root systems do not develop to the same extent, and become less able to absorb precipitation, meaning that irrigated land will depend on consistent stream diversions that cannot be interrupted from year- to-year. District-level conservation projects, like canalization or piping, may not drive a similar increase in consumptive use, as savings from decreased evaporation and seepage is not necessarily accompanied by increased evapotranspiration from crops.

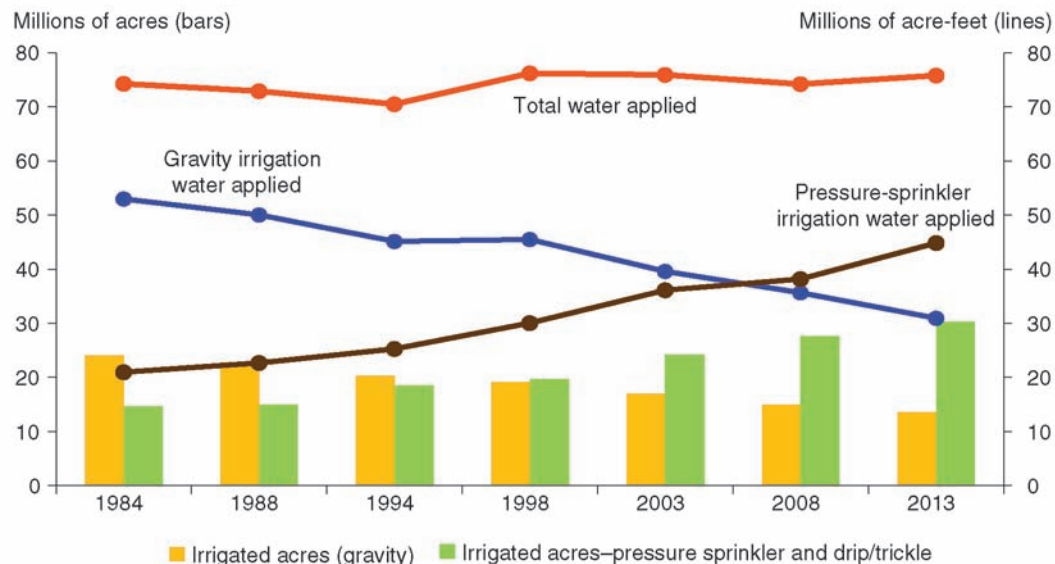
Even conservation methods that do not involve any technological improvements may not provide as much conserved water as might be expected. Some fallowed fields have been found to consume nearly as much water as an irrigated field, due to migration from adjacent irrigated sections. Forbearance agreements and other land idling programs may also suffer from "slippage" — in which previously fallowed land — not included in the agreement — is brought back into active irrigation. Some deep-rooted crops may draw down groundwater even when left unirrigated.

Given the available data, policymakers should not assume that encouraging agriculture conservation will by itself easily produce saved water that can be applied to other uses. Any program or legal framework with the goal of making water newly available for other uses should be specifically designed to release water rights for transfer only to the extent that conservation measures result in a verifiable reduction in consumptive use. We turn now to some existing structures in the western states that enable or promote agricultural water conservation and allow conserved water rights to be transferred to other uses.

The Law of Instream Flow Transfers

All western states recognize instream flows that support fish, wildlife, and recreation as beneficial uses to which a water right may be dedicated. Thus, they all potentially allow for a portion of a water right made newly available by water conservation to be transferred to instream use. However, factors in many of these states make such environmental transfers — of conserved water or otherwise — difficult and infrequent. Some states do not allow for temporary transfers to instream flow. Idaho does not allow for permanent transfers to instream flow. Arizona only allows water rights transferred to instream flow to retain their original priority dates if they are held by the state, and any transfer occurring within an irrigation district must be approved by the district. Ariz. Rev. Stat. Ann. § 45-172.

Trends in irrigated acres and applied water use, 17 Western States 1984-2013



Note: Water-use information from USDA's FRIS reports onfarm water applied, not withdrawals. Also, the area tracked includes only acres irrigated in the open. It excludes area (square-feet) under protection on horticulture operations.
Source: USDA, Economic Research Service using USDA, National Agricultural Statistics Service 1984, 1988, 1994, 1998, 2003, 2008, and 2013, Farm and Ranch Irrigation Survey (FRIS) data.

Adapted from USDA Report: *Agricultural Resources and Environmental Indicators, 2019* (May 2019)
www.ers.usda.gov/publications/pub-details/?pubid=93025

Agricultural Conservation

Legal Incentives

Limits on Transfers

Instream Transfers: OR & WA

Washington's Program

Some of the states, while not having detailed programs, do have legal provisions which encourage transfer of conserved water. Texas, for example, bestows a “right to expedited consideration” to change applications that involve a reduction in diversions. Tex. Water Code § 11.122(b-1)(3). Montana allows for the full portion of “salvaged” water — an amount resulting from a decrease in diversions — to be retained by a rights holder for beneficial use (Mont. Code § 85-2-419 (2019)), and a separate provision allows water to be held in trust by the Montana Department of Natural Resources and Conservation for instream use. However, this mechanism has been very rarely used. *See Cassidy Woodard, A Look At Laws Authorizing Uses of Conserved and Saved Water in California, Montana, Oregon, and Washington (2016).*

California law explicitly limits the amount of conserved water that can be transferred to the amount by which consumptive use has decreased. Cal. Water Code § 1011(a). Sellers must demonstrate how actions such as fallowing or crop shifting will reduce consumptive use, and the Water Resources Control Board prohibits use of some crop changes as the basis for conserved water transfers due to uncertainty around the crops’ water use. *See Jones and Colby, supra.* Several Western states, such as Arizona, New Mexico, and Wyoming, have had a negligible amount of water rights converted to instream use. California, Colorado and Montana have seen between 34 and 50 transfers each. Leon F. Szeptycki et al., *Environmental Water Rights Transfers: A Review of State Laws* (2015).

The Northwest

Washington and Oregon far surpass other states in the number of formal water right transfers to instream flow, with hundreds of permanent transfers and over a thousand temporary transfers each. No other state has reached even a hundred formal environmental water transfers (this does not include water moved within an irrigation district with a large unitary water right, or within state or federally run water projects such as the California State Water Project or the Colorado-Big Thompson Project; both may involve water being dedicated to instream flow, but not the formal change of a water right.)

Washington State’s Trust Water Rights Program (TWRP), Wash. Rev. Code § 90.42, allows the Department of Ecology to temporarily or permanently hold water rights in trust. Applications are granted expedited processing for rights holders who have received funding from the state-run Irrigation Efficiencies Grant Program, or other state conservation financing under Wash. Rev. Code § 90.42.030. Working in combination, these programs together allow for agricultural conservation measures — funded in part or whole by the state — that produce water rights which can then be transferred to the TWRP to be held in trust for the benefit of the instream flow.

Trends in the shares of acres irrigated with more efficient irrigation systems, by system type, for the 17 Western States, 1994-2013



Note: **Efficient gravity irrigation** includes furrow irrigated acres using above- or below-ground pipe, or a lined open-ditch field water-delivery system, plus acres in flood irrigation (between borders or within basins) on farms using laser-leveling and pipe or lined open-ditch field water-delivery systems. **Efficient pressure-sprinkler irrigation** includes acres using either drip/trickle and low-flow micro systems or lower pressure-sprinkler systems [pressure per square-inch (PSI) < 30]. **Traditional irrigation** includes all remaining irrigated acres associated with traditional irrigation systems, including less water-use efficient gravity and sprinkler systems.

Source: USDA, Economic Research Service, using data from USDA’s National Agricultural Statistics Service Farm and Ranch Irrigation Surveys (FRIS) for 1994, 1998, 2003, 2008, and 2013.

Adapted from USDA Report: *Agricultural Resources and Environmental Indicators, 2019* (May 2019)
www.ers.usda.gov/publications/pub-details/?pubid=93025

Allocation of Conserved Water – the Oregon Experience

**Agricultural
Conservation****Oregon
Approach****“Conserved
Water”****Priority Date
Protected****Percentage
Allocation****Downstream
“Harm”
Mitigation****Permanent
Transfers to
Instream****Diminishing
Trend****Stream Reach
Protection****Statutory Scheme**

Oregon is unique among the Western states in comprehensively treating water conservation and its transfer in a single statute, the Allocation of Conserved Water Program. This allows a water right to be split into two portions: the water conserved by reducing diversions through efficiency upgrades; and the water that will still be used after the upgrades. The ACWP defines conservation as “the reduction of the amount of water diverted to satisfy an existing beneficial use achieved either by improving the technology or method for diverting, transporting, applying or recovering the water or by implementing other approved conservation measures.” ACWP measures conserved water as follows:

“Conserved Water” means that amount of water that results from conservation measures, measured as the difference between: (a) The smaller of the amount stated on the water right or the maximum amount of water that can be diverted using the existing facilities; and (b) The amount of water needed after implementation of conservation measures to meet the beneficial use under the water right certificate.

Or. Rev. Stat. § 537.455.

This conserved amount becomes a new water right with the same priority date as the existing right. Twenty-five percent of the conserved portion of the water right goes to the state, to be held in trust by the Oregon Water Resources Department (OWRD.) This amount can be higher if the efficiency upgrades were funded in part or in whole by the state or federal government, or if the right-holder chooses to donate a larger portion. (Where the upgrades were financed by third-party environment non-profits, the conserved portion has generally been entirely donated to the state). The state’s portion is only converted to an instream flow right if the OWRD finds it is needed to support instream flow — otherwise it becomes available for downstream water users. In practice, the state’s portion almost always becomes an instream flow right, as most basins in Oregon are over-appropriated, and outside funding for ACWP applications is targeted to basins where instream flows need the most support. The remaining 75% can be spread to uses on other land irrigated by the right holder or sold or leased to other users.

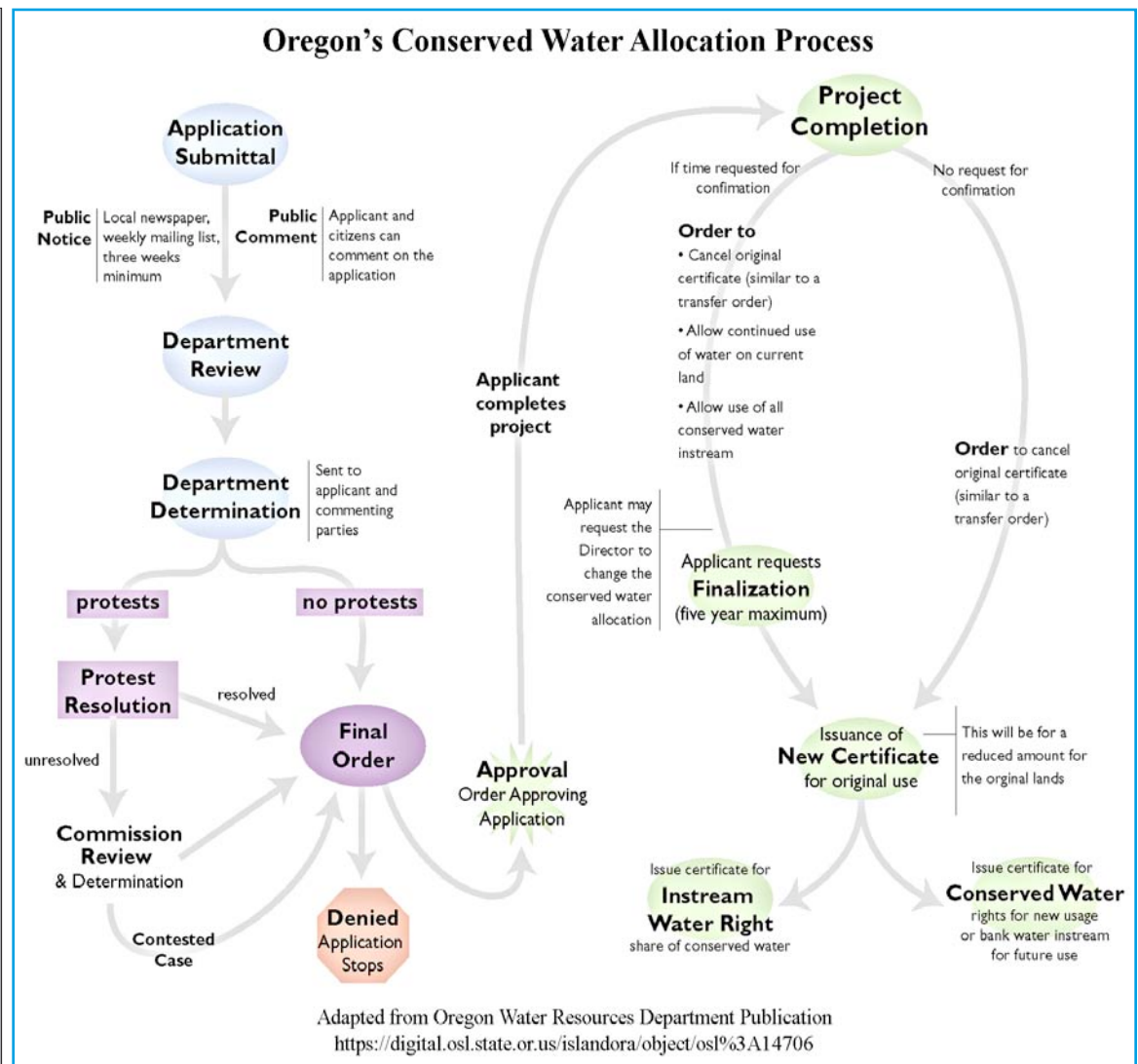
Because the ACWP defines conservation as a reduction in diversion rather than in consumption, downstream users must look for protection to two provisions in the law. First, in reviewing an application to allocate conserved water, the OWRD must determine the amount of water needed to mitigate for harm to existing (downstream) water rights. “Harm” is potentially broader than simply a reduction in the water available to avert downstream, and could include impact on water quality, or increased costs of diversion. If OWRD makes such a determination, then part of the water right would be left available for downstream appropriators, and not become part of the instream flow or the portion of the saved water available for spreading or sale. If there is no demonstration that downstream water users will be harmed, then potentially an applicant can increase consumptive use after installing efficiency improvements. Although the amount initially diverted from the river will be less, the amount of water available to the basin overall will decrease due to reduced return flows caused by increased consumptive use. If a resulting decrease in return flows injures a downstream user, they can challenge the change to the water right, and the OWRD can modify its approval to account for the injury.

Results

With around 100 successful applications to the ACWP, the program accounts for a sizeable majority of the permanent transfers of water rights to instream flow in Oregon — which stood at a total of 113 as of 2015. This compares to about 267 permanent acquisitions overall for Washington’s Trust Water Rights Program. The largest portion of the water dedicated to instream flow through the ACWP has come from a few large projects in a limited number of basins, a leading example being the Deschutes Irrigation District’s conversion of irrigation channels to pipes. In the first 20 years of the program, canal piping at the irrigation district level amounted to 93% (72 cubic feet per second: “cfs”) of all the conserved water allocated to instream flow.

After a swell of both applications and water conserved starting in 2003, there appears to have been an effect of diminishing returns, with a smaller but steady number of new applications in recent years. Apparently, this is due to the fact that projects capable of readily producing large reductions in water diversions have already been completed. See Garrick & Aylward, *supra*.

It should be noted that even if agricultural water conservation fails to reduce total consumptive use in a basin, it may still provide environmental benefits. Aside from the aforementioned reductions in agricultural runoff, reducing initial diversions — even if they fail to decrease consumptive use — may be desirable to protect particular stream reaches important to fish species at particular times. It takes time for water diverted from the stream to return to it via “return flows.” If more efficient technology allows an irrigator to take less from a stream during periods when stream flows are lower, or are particularly important in the lifecycle of anadromous fish species, a policy of encouraging or subsidizing decreased diversions may be a sensible method of accomplishing certain environmental policy goals even in the absence of overall water savings. See Neuman, *supra*.

Agricultural
ConservationOregon
Process

Marginal Value

Transfers and Transaction Costs

While agriculture remains the largest sectoral water user in the West, it is often one of the lowest value uses per unit of water. The marginal value of municipal and industrial water use can be as much as three to four times higher than agricultural water use. The purchase of existing water rights is typically a less expensive method for cities to acquire water, compared to the expense of creating “new” water by means of costly infrastructure projects such as storage and desalination. Small decreases in agricultural water can significantly augment urban supply. For example, a five percent decrease in overall agricultural use in the western states would increase urban water availability by a third. See Bretsen & Hill, *supra*. The benefits of instream flow, in the form of healthier fish populations and other ecosystem services, also carry an economic value that may exceed the value of lower-productivity agriculture use.

Thus, economists tend to see the transfer of water rights as an important mechanism for achieving an economically optimal distribution of water, and wish to reduce the transaction costs involved as much as possible. A number of economists have highlighted the “no injury” rule as a leading contributor to these transaction costs, particularly for its potential to expose each change application to challenge by a range of impacted parties. The “no injury” rule requires that any modification of a water right must not interfere with other water users’ exercise of their rights. The state agencies tasked with reviewing applications for water right modifications must affirmatively establish that no such injury will occur before approving a change.

The transaction costs of transferring water to instream use can indeed be quite high, with substantial variation between different basins and projects. The cost of simply preparing an application for modification of a water right under the Allocation of Conserved Water Program in Oregon can range from \$5,000–\$15,000. Water conservation projects in the Northwestern states have had transaction costs ranging from \$416 to \$13,388 per cfs of water recovered. This amount is in addition to the \$1,202–\$9,416/cfs paid to the water rights holders. See Garrick & Aylward, *supra*.

Transaction
Costs“No Injury”
Rule

**Agricultural
Conservation****Approval Time****Perception****Environmental
Non-Profits'
Role****State
Variability****Protection
Paradox****Room to
Experiment**

The time involved in seeing through a successful application functions as an additional transaction cost. ACWP applications have taken from 1.3–2.76 years on average, with some pending for over five years. *See Szeptycki, supra.* The application process for permanent transfers to the TRWP can take between six months and six years. In California, the average approval time for a transfer to instream flow has been 480 days for permanent transfers. *See Woodard, supra.*

The friction applied to transfers by the costs of the application process go beyond the direct expense of completing changes to a water right. It may also contribute to a perception among irrigators that the administrative hurdles to transfers, especially permanent transfers, are too complex and uncertain to be worth pursuing. This perception may be influenced by, and further reinforce, a general distrust of water regulations and the agencies that enforce them.

Because of the hesitance of irrigators, the costs involved in acquiring economically valuable water rights and the administrative process of applying to change the water rights, third parties, especially streamflow-focused environmental non-profits such as the Freshwater Trust, Washington Water Trust, and the Deschutes River Conservancy, often take a leading role in transferring water to instream use. The non-profits act as both a funding source and in taking on the administrative burden of completing applications.

Conclusions

Despite sharing a common legal foundation in the Prior Appropriation Doctrine, differences in climate, population, infrastructure, and agricultural patterns make easy comparisons between the western states elusive. Given the many variables involved, and the lack of comprehensive data, it is difficult to determine to what degree differing legal approaches between states account for differences in the frequency and volume of environmental water transfers.

The paradox of agricultural water conservation is that the mechanisms designed to protect other water users, which are the source of many of the transaction costs in transferring water, also provide many of the safeguards that may prevent agricultural efficiency improvements from resulting in higher consumptive use overall. It may be tempting to compare the relatively small number of formal instream transfers in California (with its policy of limiting transfer to the amount of consumptive use) to the large number of transfers in Oregon (where transfer of the full volume of a water right previously diverted is assumed to be valid unless it is shown to cause injury to other users), and conclude that the Oregon approach is more conducive to encouraging environmental transfers. Not only would this *not* take into account other important differences between the two states, but Washington has achieved a similar number of environmental transfers as Oregon, with a legal approach that is somewhat closer to California's. The absence of a unified conserved water statute does not seem to have made a substantial difference in amount of water ultimately dedicated to instream flow.

There is still much room for experimentation in how best to shape the law to face our present and future water challenges. In crafting new approaches, legislators, practitioners, and advocates should keep in mind that the effects of agricultural conservation are complex, and it will not serve as a magic wand that simply provides new water.

FOR ADDITIONAL INFORMATION:

TED HOWARD, Center for Environmental Law and Policy, 206/ 829-8299 or Thoward@Celp.org

Ted Howard is currently a legal fellow at the Center for Environmental Law and Policy in Seattle, Washington. He has previously worked in the legal department of the Oglala Lakota Tribe in South Dakota, and the Environmental Law Clinic at Washington University in St. Louis. He is a co-founder and former editor of the interdisciplinary environmental journal *Tvergastein*.

Agricultural Conservation

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**Florida
v.
Georgia
ACF Basin**

Trial & Remand

Factual Findings

**Factual
Questions**

**Benefits/Harm
Standard**

FLORIDA-GEORGIA WATER DISPUTE

SPECIAL MASTER'S RECOMMENDATIONS

by David Moon, Editor

Introduction

The ACF Basin is comprised of the Apalachicola River, Chattahoochee River and the Flint River. The long-running dispute between Florida and Georgia concerns the proper apportionment of the water of this interstate river basin (ACF Basin) spanning the Florida/Georgia border. Florida, the downstream State, brought this original jurisdiction proceeding before the US Supreme Court against Georgia, the upstream State. It claimed that Georgia's actions denied Florida an equitable share of ACF Basin waters and sought an equitable apportionment of those waters. The Supreme Court ruled that the dispute lies within the Supreme Court's original jurisdiction, and appointed a Special Master to take evidence and make recommendations. The second Special Master appointed in the case is Judge Paul J. Kelly of New Mexico, Senior US Circuit Court of Appeals Judge.

Before Judge Kelly was appointed Special Master, the previous Special Master Ralph Lancaster, Jr. conducted pre-trial proceedings, oversaw a multi-week trial, and ultimately recommended that the Supreme Court deny Florida's request for relief. The Supreme Court, however, concluded that Special Master Lancaster applied the incorrect legal standard and remanded with instructions to make further factual findings. *See Florida v. Georgia*, No. 142, Orig., 138 S. Ct. 2502, 2508 (2018)(*Florida*). The US Supreme Court ruled in that June 27, 2018 decision that Florida had made a legally sufficient showing as to the possibility of fashioning an effective remedial decree.

On December 11, 2019, Special Master Kelly issued his "Report of the Special Master" (*Report*). Special Master Kelly provides the "history of the dispute" and case in the *Report* at 1-7. Ultimately, the *Report* recommends denying Florida's request for a decree that would equitably apportion the waters of the ACF Basin.

The 81-page *Report*, true to its charge on remand from the Supreme Court, relies heavily on the factual findings of Special Master Kelly, which he explains in detail in the *Report*. One obvious takeaway from the *Report* is that experts, evidence, and facts do matter — particularly in interstate battles where the factual situation is extremely complex. As noted by Kelly early in the *Report*, "Based on the record developed at trial, the parties' remand briefing, and the oral arguments held on November 7, 2019, I have strived to make 'extensive,' 'specific,' and 'detailed' factual findings to reach a conclusion on the issues identified by the Supreme Court in this Report." *Report* at 6-7 (footnote and citations omitted).

Issues on Remand from the Supreme Court

The Supreme Court decided in its June 27, 2018 holding in *Florida* that Special Master Lancaster had applied "too strict a redressability standard" in his recommendations and gave Special Master Kelly guidance on how to proceed on remand. *Florida*, 138 S. Ct. at 2516.

In light of that holding, the Court remanded with instructions to make findings concerning the following questions on remand: (1) whether Florida suffered harm caused by decreased water flow into the Apalachicola River; (2) whether Florida showed that Georgia's use of the Flint River is inequitable; (3) whether that potentially inequitable use harmed Florida; (4) whether an equity based cap on Georgia's use of Flint River waters would materially increase streamflow in the Apalachicola River given the Corps' operational rules or reasonable modifications that could be made to those rules; and (5) whether such additional streamflow in the Apalachicola River may significantly redress the economic and ecological harm that Florida has suffered. *Id.* at 2518, 2525–27. The Court also made clear that Florida must show that "the benefits of the [apportionment] substantially outweigh the harm that might result." *Id.* at 2527 (alteration in original) (quoting *Colorado v. New Mexico* (*Colorado I*), 459 U.S. 176, 187 (1982)).

Report at 3.

Florida's Alleged Injuries & Harm Caused by Georgia: Clear & Convincing Evidence?

In a critical factual finding, the Special Master concluded that Florida failed to provide sufficient evidence that Georgia's actions were the cause of the harm alleged by Florida:

Florida alleges that lower flows in the Apalachicola River (the "River") have harmed the ecosystems in both the River and the Apalachicola Bay (the "Bay"). Florida highlights the

Florida v. Georgia



Florida v. Georgia Drought Harm Only Georgia's Consumption Cause of Decline Weight of Evidence Drought Factors Evidence Standard Causal Evidence Lacking	collapse of the Bay's oyster fishery, but Florida has not proved that the harm to the oysters resulted from "the action of [Georgia]." <i>Florida</i>, 138 S. Ct. at 2514. The harms Florida points to in the River only have an attenuated connection to Georgia's consumptive use or they are not concrete, and Florida has thus failed to show a "threatened invasion of rights...of serious magnitude" in the river by clear and convincing evidence. <i>Id.</i> (quoting <i>Washington</i>, 297 U.S. at 524). <i>Report at 8.</i> The Special Master also highlighted a limitation on Florida's alleged injuries. "Before I analyze the evidence of harm to the Bay and the River, I note that Florida has not provided any evidence of harm during years with normal or more than normal rainfall. Georgia highlighted this fact on remand. Ga. Supp. Br. at 4 (Ga. Br.); Ga. FoF ¶¶ 1–2. Florida has not argued otherwise, and from my own review of the record, I do not find clear and convincing evidence of harm during periods of average rainfall." <i>Report at 8.</i> Oyster Fishery: Harms to the Bay Georgia does not contest that the oyster fishery suffered significant harm; rather, it argues that the collapse resulted from Florida's mismanagement, and insofar as low flows caused the collapse, those low flows were predominantly caused by drought, not Georgia's consumptive use. Ga. Br. at 4–9. I agree and conclude that Florida has not shown by clear and convincing evidence that the harms in the Bay resulted from Georgia's consumption. <i>Report at 9.</i> Low Flows, Drought & Mismanagement Given the aforementioned evidence, I conclude that low flows played some role in the oyster population decline of 2012. Nevertheless, for the reasons below, I conclude that Florida's management was a more significant cause of the decline. Further, to the extent that low flows caused the decline, drought was a more significant cause of the low flows than Georgia's consumption. Georgia highlights evidence that Florida's oystermen overharvested the oyster resource in the period leading up to and after the oyster collapse. <i>Report at 14.</i> The Special Master's discussion of the parties' respective evidence explained his conclusion on the cause of the oyster collapse based on the comparison of the evidence introduced by each party. "Next, even if low flows and associated increased salinity caused the oyster crash, Georgia argues that the low flows were the result of drought, not its consumption. Ga. Br. at 8–9. I find this argument persuasive." <i>Report at 19.</i> The Special Master found that Florida's position was compromised by its own evidence: Importantly, Florida's own modeling shows that cutting 50% of Georgia's agricultural consumption would only have decreased salinities by one to two parts per thousand (ppt) in only very limited areas of the Bay in 2012. This shows that drought was a much bigger factor in causing salinity increases than Georgia's consumption. More importantly, Dr. White found that the impacts on oyster biomass of such salinity decreases would also be small (just over 1%)...In the face of persuasive evidence that Florida's mismanagement led to the collapse, these very modest modeling results fall short of showing by clear and convincing evidence that Georgia caused the oyster decline. <i>Report at 20 (citation omitted).</i> Clear and Convincing Evidence: Harms to the Bay The Special Master concluded his discussion on "Harms to the Bay During Dry Years" by concluding that "Florida has not shown by clear and convincing evidence that the oyster collapse was caused by Georgia rather than another cause (like mismanagement of the resource or drought), and Florida has not shown any other harms to the Bay." <i>Report at 21–22.</i> Harms to the River During Dry Years The Apalachicola River (River) and its associated floodplain "provide habitat that supports the highest species density of amphibians and reptiles in North America." <i>Report at 22.</i> Florida maintained that those species and habitats were harmed by low flows in the River caused by Georgia's consumption. The Special Master discussed the evidence briefly before sounding rejecting Florida's assertions. "Georgia responds in two main ways, arguing that Florida has not shown evidence of real harm resulting from low flows and that any of the concrete harms that Florida identified were not caused by Georgia's actions. (citations omitted). I agree with Georgia and find a complete lack of evidence of any harm caused by Georgia to the ecosystems of the River and floodplain." <i>Report at 22.</i>
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Florida v. Georgia Georgia's Consumptive Use Equitable Apportionment Reasonable Use Agricultural Consumption Sharing Drought Burden Corps' Dams	Whether Georgia's Use of ACF Waters Is Inequitable (<i>Report</i> at 25-53) Despite noting that his finding “that Florida has not suffered any harm from Georgia’s consumption would typically end my analysis” the Special Master — based on the remand from the Supreme Court — provided a lengthy discussion of “whether Georgia’s use of water from the ACF Basin is inequitable.” <i>Report</i> at 25. The Supreme Court has asked me to determine “[t]o what extent does Georgia take too much water from the Flint River.” <i>Florida</i>, 138 S. Ct. at 2527. I conclude that Georgia does not take too much water from its portion of the ACF Basin including from the Flint River. I reach this conclusion after considering Georgia’s consumptive use as compared with the flows passing to Florida, Georgia’s conservation efforts, and Georgia’s uses of the water. <i>Report</i> at 25 (footnote omitted). The Special Master addressed Georgia’s consumptive use in detail, in order to “determine whether Georgia uses an inequitable amount of ACF waters...” <i>Report</i> at 26. To make his determination of whether Georgia’s use was equitable, Kelly considered “total state-line flows and relative shares of population and output in the Basin, Georgia’s uses for the water, and Georgia’s conservation practices.” <i>Report</i> at 45. The <i>Report</i> also discusses the equitable apportionment analysis he applied: Although the comparison between the populations, economic output, and consumption may be helpful, I recognize that “wasteful or inefficient uses will not be protected.” <i>Colorado I</i>, 459 U.S. at 184. Moreover, if such comparisons were dispositive, then equitable apportionment analysis would be reduced to a rigid rule whereby the larger state always wins. This would clearly run counter to the flexibility and attention to all relevant factors that equitable apportionment demands. <i>See Florida</i>, 138 S. Ct. at 2515. <i>Report</i> at 46. Another area addressed in the <i>Report</i> concerns the reasonableness of Georgia’s consumption. “Beginning with M&I consumption [municipal & industrial], I conclude that Georgia’s consumption has been reasonable. Georgia has taken concrete steps to increase efficiency and conserve in this area, and the effectiveness of those steps has been borne out by reductions in per-capita use. ... Finally, Florida has not pointed to any compelling evidence of waste or inefficiency in Georgia’s M&I consumption. I therefore conclude that Georgia ACF consumptive water use in the M&I sector is reasonable.” <i>Report</i> at 52-53 (footnote omitted). The Special Master also delved into whether Georgia’s agricultural consumption during droughts was equitable. Kelly found that Georgia’s use provides significant value, especially during drought, and also that Georgia implemented a number of agricultural efficiency measures. “On the other hand, when severe droughts hit the region, Georgia’s agricultural consumption only increases, and Georgia has not effectively curbed this use.” <i>Report</i> at 53. Special Master Kelly then turned to the guiding legal doctrine and equitable apportionment principles, again looking to the facts regarding the oyster collapse as the indicia of Florida’s harm for his conclusion: The question, then, is to what extent the two States should share the burdens of drought. Enter the doctrine of reasonable use and the Supreme Court’s equitable apportionment precedents. Both Florida and Georgia possess “an equal right to make a reasonable use of the waters of the stream,” and “[w]asteful or inefficient uses will not be protected.” <i>Florida</i>, 138 S. Ct. at 2513 (emphasis in original) (quoting <i>Lancaster Rep.</i>, 2017 WL 656655, at *26; <i>Colorado I</i>, 459 U.S. at 184). In <i>Tyler v. Wilkinson</i>, a case <i>Florida</i> cites as setting forth the principle of reasonable use, <i>see Florida</i>, 138 S. Ct. at 2513, Justice Story explained that “the true test” of reasonable use is whether it injures other users. 24 F. Cas. 472, 474 (C.C.D.R.I. 1827) (No. 14,312). Given that test, I conclude that Georgia’s use is not unreasonable because Florida has not shown that the oyster collapse was caused by Georgia’s consumptive use. <i>Report</i> at 53-54. Army Corps Operations Another area of complexity dealt with by the <i>Report</i> (at 54-61) involves the operations of the US Army Corps of Engineers (Corps) of its “system of five Chattahoochee reservoirs and dams to maintain storage and the rules it follows to do so.” <i>Report</i> at 55. The Supreme Court wanted to know — “would additional water resulting from a cap on Georgia’s water consumption result in additional streamflow in the Apalachicola River?” <i>Report</i> at 55. This question had two parts: (1) the result “under the Corps’ revised Master Manual” (existing rules) or (2) the result “under reasonable modifications that could be made to that Manual.” <i>Report</i> at 54-55.
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Florida v. Georgia

Limited Benefits

Benefits > Harm

Conservation Proposals

No Significant Benefits

Weighing Benefits

The Special Master concluded that “very little streamflow generated by a potential decree would pass through to Florida at the times it claims to need additional streamflow under existing operational rules.” *Report* at 55. “Because Florida has proved neither that Georgia’s consumption is inequitable nor that the benefits of a decree would substantially outweigh the potential harms, *infra* Section V, I do not decide whether reasonable modifications could be made to the Corps’ Manual.” *Report* at 61 (footnote omitted).

Whether the Benefits of a Decree Would Substantially Outweigh the Harm that Might Result

The Special Master eliminated whatever suspense of his recommendation remained by stating his conclusion at the beginning of this section of the *Report*. Kelly also set forth the standard governing whether Florida was entitled to equitable apportionment.

Because very little of the additional streamflow generated by a decree would result in increased Apalachicola flows at the times when Florida needs them, I find that Florida would receive no appreciable benefit from a decree. For Florida to be entitled to an equitable apportionment, it must be “shown that ‘the benefits of the [apportionment] substantially outweigh the harm that might result.’” *Florida*, 138 S. Ct. at 2527 (alteration in original) (quoting *Colorado I*, 459 U.S. at 187). Consequently, I conclude that Florida is not entitled to a decree equitably apportioning the waters of the Flint and Chattahoochee Rivers.

Report at 62.

Florida’s Proposals and Their Costs

At pages 67-75 of the *Report*, the Special Master also deliberated on Florida’s proposals that Georgia could employ to reduce its consumptive use in the ACF Basin. “If the suggested measure is both adequately supported and feasible, then I estimate the likely streamflow increases and costs associated with the measure. I then provide a summary of the likely costs and streamflow benefits associated with those suggestions in Table 2, *infra*.” *Report* at 67; Table 2 located at 75.

Florida’s ten suggestions are:

- Municipal Leak Abatement
- Eliminate Inter-Basin Transfers
- Reduce Outdoor M&I Watering During Drought
- Stop Irrigating Unpermitted Acreage
- Stop Irrigating When Marginal Yield Approaches Zero
- Irrigation Efficiency Improvements
- Permanent Buyback of Irrigation Permits
- Reduce Irrigation Depths During Drought
- Attendant Reductions in Farm Pond Evaporation
- Switching High-Value Crop Irrigation to Deep Aquifers

Benefits of a Decree

While the amount of flow involved is significant, the Special Master again found Florida’s evidence in support of its assertions to be underwhelming. “I find that an extra 1,000 cfs of Apalachicola flows during low flow periods would not significantly benefit Florida. (footnote omitted). Florida argues that a remedy would increase freshwater inflow, which would reduce salinity and thereby reduce predation by predators that prefer more saline environments. Fla. Br. at 32. Florida’s evidence does not support that conclusion.” *Report* at 75-76.

Balancing Costs and Benefits of Apportionment

The Special Master set forth a standard that governs the equitable apportionment decision and his subsequent recommendation. “Weighing the benefits of a potential decree against its costs to determine whether ‘the benefits...substantially outweigh the harm that might result,’ *Florida*, 138 S. Ct. at 2527 (quoting *Colorado I*, 459 U.S. at 187), I conclude that the benefits of a decree would not substantially outweigh the harms or costs that might result.” *Report* at 78.

Special Master Kelly explained that he reached that conclusion based on two reasons:

First, Florida’s own evidence on benefits does not convince me that the benefits would be substantial. As noted above, Florida’s modeling only showed small benefits to the amount of oyster biomass that would result from a decree, and Florida has not shown that the oysters would benefit substantially more than its modeling indicates. And the evidence on benefits to the River shows similarly small, if any, incremental increases.

Report at 78.

Florida v. Georgia

Cost of Decree

Fishery's "Distinctive Culture"

Rejection Basis

Second, I have concluded from Dr. Stavins' and Dr. Sunding's testimony that the cost of a decree to reach nearly 801 cfs during summers of dry years would be over \$100 million per dry year. I am able to compare the fishing industry's revenues with these costs. The Apalachicola fishing industry generates only \$11.7 million in revenue per year..., and the oyster fishery only generated about \$6.6 million per year before the oyster collapse. Notably, these are total revenues, and do not represent the incremental benefit from increased streamflow. Dr. Stavins calculated that the incremental revenues would be only \$760,000 for the fisheries in the Apalachicola Bay, generating only \$190,000 in profits (which Dr. Stavins maintains is the proper measure of economic benefit).

Report at 78-79 (citations and footnote omitted).

Special Master Kelly further discussed the "distinctive culture" of the oyster industry as part of the cost/benefit analysis, before again finding in favor of Georgia due to the costs that would be incurred:

Setting such economic considerations aside, Florida has also noted that the Apalachicola oyster fishery has a "distinctive culture" that may be lost if the fishery does not recover... However sympathetic I may be to such concerns, Florida must still show that the benefits of a decree would substantially outweigh the harms, but Florida has not shown that there would be any benefit to that cultural resource given Dr. White's quite modest results on oyster biomass. And because the benefits to oysters would be so modest, the value of preserving the oyster resource for its own sake would also be very minor in comparison to the significant costs imposed on Georgia.

Even considering the claimed incremental benefits to ecosystems in the River resulting from a decree in addition to the benefits in the Bay, I cannot conclude that the total benefits would substantially outweigh the costs because Dr. Allan's harm metrics demonstrate small positive changes.

Report at 79-80 (citations omitted).

Special Master's Recommendation to the Supreme Court

Given my factual findings, I recommend denying Florida's request for a decree because it has not proved the elements necessary to obtain relief. Florida has pointed to harm in the oyster fishery collapse, but I do not find that Georgia caused that harm by clear and convincing evidence. Next, although Georgia's use of the Flint and Chattahoochee Rivers has increased since the 1970s, Georgia's use is not unreasonable or inequitable. Last, I have determined that the benefits of an apportionment would not substantially outweigh the harm that might result. This is especially true given that the Army Corps' reservoir operations on the Chattahoochee River would prevent most streamflow increases from reaching Florida during the times when more streamflow is needed to alleviate Florida's alleged harms.

Report at 7.

Conclusion

Special Master Kelly's *Report* was presented to the Supreme Court. The Supreme Court will make the final decision in this "original proceeding" case.

Although it is always difficult to predict, the Supreme Court seems unlikely to overturn the factual conclusions of the *Report* and grant Florida an equitable apportionment decree.

FOR ADDITIONAL INFORMATION:

Special Master's *Report* and Complete Docket Sheet available at the Tenth Circuit Court of Appeals website: www.ca10.uscourts.gov/special-master-142/

WOTUS PROPOSED RULE DEFINING THE SCOPE OF WATERS REGULATED

EPA SCIENCE ADVISORY BOARD'S SCATHING REVIEW

EPA's Science Advisory Board (SAB), the public advisory group providing extramural scientific information and advice to the EPA, has taken serious exception to the Trump Administration's proposal to rewrite the definition of "waters of the United States" (WOTUS). The US Environmental Protection Agency and the Department of the Army proposed a new WOTUS definition in December, 2018 (*see Sensiba & Gerard, TWR #179*). In September, 2019, the agencies repealed 2015 revisions to the definition (*see Water Briefs, TWR #188*). SAB has submitted its draft "*Commentary on the Proposed Rule Defining the Scope of Waters Federally Regulated Under the Clean Water Act*" (*Commentary*) for public comment.

SAB begins its *Commentary* by clearly setting out the issue involved. "Establishing a sound, consistent, scientifically supported and clear definition of 'waters of the United States' (WOTUS) is a critical component of implementing the United States Federal Water Pollution Control Act (1972), more commonly known as the Clean Water Act (CWA). The Act itself does not provide such a definition. Achievement of the Act's overall objective 'to restore and maintain the chemical, physical and biological integrity of the Nation's waters' requires a clear definition of the geographic and hydrologic scope of these waters.'" *Commentary* at 1.

"At the EPA Science Advisory Board (SAB) meeting on June 5-6, 2019, the SAB discussed the scientific and technical underpinnings of the proposed WOTUS rule and concluded that aspects of the proposed rule are in conflict with established science, the existing WOTUS rule developed based on the established science, and the objectives of the Clean Water Act." *Id.*

The *Commentary* then further explains SAB's conclusion: "The SAB finds that the proposed revised definition of WOTUS (84 FR 4154) (hereafter, the proposed Rule) decreases protection for our Nation's waters and does not support the objective of restoring and maintaining 'the chemical, physical and biological integrity' of these waters." *Id.* at 2. The *Commentary* notes that SAB is under "no...constraint to give deference to shifting legal opinions in its advisory capacity and is in fact obligated by statute to communicate the best scientific consensus on this topic." *Id.* SAB then set out the key elements that amplify its findings (footnotes and citations omitted), concisely addressing the issues in the WOTUS debate.

SAB findings (footnotes and citations omitted) include:

The proposed Rule does not fully incorporate EPA's 2015 Connectivity Report (U.S. EPA 2015), Rains (2011), and Rains et al. (2016) and is a substantial departure from the earlier WOTUS rule definition. The EPA's 2015 Connectivity Report emphasizes that functional connectivity is more than a matter of surface geography. The report illustrates that a systems approach is imperative when defining the connectivity of waters, and that functional relationships must be the basis of determining adjacency. The proposed Rule offers no comparable body of peer reviewed evidence to support such a departure, and no scientific justification for abandoning the more expansive view of connectivity of waters accepted by current hydrological science, which has advanced substantially since the CWA was enacted decades ago, as reflected in the Connectivity report.

The proposed Rule neglects established science pertaining specifically to the connectivity of ground water to wetlands and adjacent major bodies of water by failing to acknowledge watershed systems and processes discussed in EPA's 2015 Connectivity Report. In particular, there is no scientific justification for excluding ground water from WOTUS if spring-fed creeks are considered to be jurisdictional. The chemical or biological contamination of ground water may lead to contamination of functionally connected surface water. Ground water may also contribute to intermittent flow of jurisdictional tributaries. Shallow ground water may directly connect wetlands to adjacent major bodies of water. Therefore, the scientific importance of ground water protection and ground water connections should require that these waters be protected from unacceptably high contamination. The same threats apply to those bodies of water that only occasionally flow, such as the arroyos of the Southwest United States.

The proposed Rule excludes irrigation canals from the definition of WOTUS. The biological and chemical contamination of large-scale irrigation canals is an established and serious threat to public health and safety. The presence of *E. coli* in leafy vegetables is often traceable to irrigation water contaminated by animals in feed lots or pastures adjacent to the canals. Water associated with confined animal feeding operations has also been shown to contain chemical contaminants, such as steroids, that are associated with public health concerns.

The definition of jurisdictional waters in the proposed Rule also departs from established science cited by EPA in support of the 2015 WOTUS Rule, in the exclusion of adjacent wetlands that do not abut or have a direct hydrologic surface connection to otherwise jurisdictional waters. SAB review of the 2015 WOTUS rule found a sound scientific basis for the inclusion of these wetlands (U.S. EPA Science Advisory Board 2014). No body of peer reviewed evidence has been presented to support an alternative conclusion.

The proposed Rule portrays three Supreme Court decisions as establishing a coherent basis for drawing simple "bright lines" to determine jurisdictional waters for the purpose of the CWA; however, by abandoning a scientific basis to adopt a simplistic, if clear surface water-based definition, this approach neither rests upon science, nor provides long term clarity, as is evidenced by the continuing interpretation and re-interpretation of these decisions over time.

Id. at 2-3.

WATER BRIEFS

SAB concludes its draft *Commentary* by reiterating the drawbacks of the proposal:

The proposed definition of WOTUS is not fully consistent with established EPA recognized science, may not fully meet the key objectives of the CWA — ‘to restore and maintain the chemical, physical and biological integrity of the Nation’s waters,’ and is subject to a lack of clarity for implementation. The departure of the proposed Rule from EPA recognized science threatens to weaken protection of the nation’s waters by disregarding the established connectivity of ground waters and by failing to protect ephemeral streams and wetlands which connect to navigable waters below the surface. These changes are proposed without a fully supportable scientific basis, while potentially introducing substantial new risks to human and environmental health.

The *Commentary* then proposes a simple option. “It is readily apparent that a conflict exists between current, recognized hydrological science versus the CWA and its subsequent case law. This suggests that new legislation is needed to update the CWA to reflect scientific discoveries since 1972.”

Public Comments Teleconference January 17

SAB will discuss its findings and take public comments during a teleconference January 17. To comment during the teleconference, email Thomas Armitage (armitage.thomas@epa.gov). A copy of SAB’s Draft Commentary is available at: [https://yosemite.epa.gov/sab/sabproduct.nsf/WebBOARD/5939AF1252DDADFB852584E10053D472/\\$File/WOTUS+SAB+Draft+Commentary_10_16_19_.pdf](https://yosemite.epa.gov/sab/sabproduct.nsf/WebBOARD/5939AF1252DDADFB852584E10053D472/$File/WOTUS+SAB+Draft+Commentary_10_16_19_.pdf)

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

MILITARY BASE SCARCITY US AT-RISK INSTALLATIONS

A recently released GAO report entitled “*Water Scarcity - DOD Has Not Always Followed Leading Practices to Identify At-Risk Installations*” (GAO-20-98) found that the Department of Defense (DOD) does not have assurance that it is using reliable information regarding which installations are at risk for water scarcity. When comparing the results of six Office of the Secretary of Defense (OSD) and military department assessments on installations vulnerable to water scarcity, GAO found that they varied markedly, raising questions about which source of information DOD is using to determine which installations are vulnerable to water scarcity. Part of the report noted that there were 102 individual installations identified in the six assessments as vulnerable to water scarcity. GAO-20-98 at 11.

An OSD official stated that the three OSD-produced assessments provided the best information available on which installations are at risk of water scarcity. However, GAO found that these assessments did not reflect four of five leading practices for identifying and analyzing water scarcity — practices that contribute to a reliable assessment of water availability. Specifically, OSD did not always: (1) identify current water availability; (2) identify future water availability; (3) take into account all sources of water; or (4) precisely identify locations. Further, although GAO found that the three military department assessments aligned with all leading practices, OSD

officials disagreed as to whether these assessments can and should be used to identify installations at risk of water scarcity across the defense enterprise. Until OSD resolves the question as to whether it should conduct a department-wide assessment of installations that aligns with leading practices or whether it should rely on the military department assessments, the department will not have assurance that it is using reliable information to assess water scarcity.

DOD reported in January 2019 that critical installations are at risk of water scarcity — that is, of not having sufficient water available to meet their mission needs. According to military department officials, installations depend on water for activities such as training, weapons testing, fire suppression, and sanitation. In its 2018 Fourth National Climate Assessment, the U.S. Global Change Research Program reported that warming temperatures will continue to cause worsening droughts and the decline of surface water quality.

GAO recommends that the Office of the Secretary of Defense assess whether it should conduct a coordinated, department-wide assessment aligned with leading practices or rely on military department assessments to determine which DOD installations are at risk of water scarcity. DOD concurred with GAO’s recommendation.

For Info: Elizabeth Field at 202/ 512-2775 or fielde1@gao.gov; GAO Report at: www.gao.gov/assets/710/702928.pdf?utm_source=outreach&utm_medium=email_DCM2098

WATER BANK WEBSITE AZ NEW ARIZONA SITE

On December 13, the Arizona Water Resources Department announced a recent redesign of the Arizona Water Banking Authority’s (AWBA’s) website. AWBA is the state agency that facilitates underground water storage in locations around Arizona. The AWBA pages offer viewers a far more simple, readable, and approachable home page that renders navigation far easier. A big feature of the new website is its interactivity. It provides viewers with a simple-to-use map of Arizona’s long-term storage locations, as well as a wealth of easily accessible data.

The interactive map was designed for a variety of uses. In addition to allowing visitors to view AWBA credits at each storage facility, the interactive GIS map allows user to download the full data into Excel. “As you would expect, the GIS map will probably be used differently by different audiences,” said Simone Kjolsrud, the Water Bank’s technical administrator, who used her expertise in website design to perform the update. “For some people it just helps to provide a big picture geographical understanding of where the Water Bank has stored water, or purchased credits, over time.”

Kjolsrud explained other capabilities of the interactive map. “For others, they might be interested in learning more detailed information about exactly how many credits the Water Bank has at each type of storage facility within each Active Management Area, whether it be in an Underground

WATER BRIEFS

Storage Facility (which physically stores water in the aquifer through direct recharge), or a Groundwater Savings Facility (an indirect recharge facility that uses surface water, such as Central Arizona Project water, in lieu of pumped groundwater)." The idea is to provide transparency and information for people interested in Water Banks, storage facilities for Banks developing credits, and the locations of those credits.

For info: Water Bank Map available at: <https://waterbank.az.gov/lsc-map>

LEAD PIPES REPLACEMENT CO VARIANCE DECISION

EPA is approving a variance under the Safe Drinking Water Act (SDWA) for Denver Water, as announced in the Federal Register on December 20, 2019. Denver Water estimates that it has 64,000 lead service lines (LSLs). Denver Water is committing to taking proactive steps to replace all LSLs in 15 years. This variance will allow Denver Water to implement a Lead Reduction Program Plan (LRPP) as an alternative to using orthophosphate as a corrosion control treatment to reduce lead concentrations in drinking water. Denver Water will provide water filters and spare cartridges while homes are waiting for their lead pipe replacement.

Denver Water's LRPP is expected to be as protective in lowering lead levels as the requirements under the Lead and Copper Rule (LCR). This variance is effective for an initial period of three years and may be extended if Denver Water demonstrates the effectiveness of this alternative approach. Concurrent with this action, the EPA is asking for comments on the potential criteria for how the Agency will determine whether to extend this variance for up to an additional twelve years. The EPA is accepting public comments on these criteria and on the EPA's interpretation of the statutory standard for future variance requests, as described under Supplementary Information in the Federal Register.

For info: Natalie Cannon, EPA, 303/312-6625; Variance documents available through docket number EPA-R08-OW-2019-0404 at: www.regulations.gov

NITRATE LOADS STABLE US MORE DECREASES NEEDED

A study recently published in the Journal of Environmental Quality concerning nitrate loads in the Mississippi River Basin shows that upstream projects to lessen the amount of nutrients reaching the Gulf of Mexico have not resulted in significant reductions. *Network Controls on Mean and Variance of Nitrate Loads from the Mississippi River to the Gulf of Mexico*, by John T. Crawford, Edward G. Stets, and Lori A. Sprague, examined the 2002 to 2012 time period.

Excessive nitrate loading to the Gulf of Mexico (GoM) has caused widespread hypoxia over many decades. Despite recent reductions in nitrate loads observed at local scales, decreases in nitrate loading from the Mississippi River basin (MRB) to the GoM have been small (1.58% during 2002–2012) with a low level of analytical confidence in this trend. This study seeks to determine the reasons why local-scale improvements have not translated into reductions at the Mississippi River's outlet. The study estimated annual nitrate loads from 166 sites in the MRB over the 2002 to 2012 period. The Upper Mississippi and Ohio Rivers together dominate the average nitrate load, but very large interannual variability is driven primarily by the Upper Mississippi River.

Within the Upper Mississippi River basin, decreasing trends in nitrate loading were common and the greatest improvements occurred at sites with the highest initial nitrate loads (the worst water quality). However, these improvements were balanced with increasing nitrate loads in other parts of the basin, such that the mean trend in load was near zero. Although load reductions in either the Ohio or Upper Mississippi basins have the potential to reduce the loads to the GoM, the improvements have not yet been large enough or widespread enough to lead to a change at the outlet. This analysis provides a basin-wide perspective on recent nitrate trends and the contribution of tributary basins to the mean and variability of nitrate loading to the GoM.

For info: Study available at: [>> "Surface Water Quality"](https://dl.sciencesocieties.org/publications/jeq/tocs/48/6)

FINAL EIS CA PROJECT OPERATIONS

On December 19, the Bureau of Reclamation announced what it listed as a major step to optimize water deliveries and power production for California communities and farms in an environmentally sound manner. The agency released a final environmental impact statement analyzing Central Valley Project and State Water Project long-term operations based on new biological opinions from the US Fish and Wildlife Service and NOAA Fisheries to protect threatened and endangered species.

"This is a vital milestone for water reliability in California. It ensures our actions improve the quality of life for people and protect our environment," said California-Great Basin Regional Director Ernest Conant. "We've embraced the latest science to allow real-time monitoring and other operational improvements throughout the system to protect fish."

The EIS outlines several alternatives for operating the CVP and SWP. The preferred alternative best balances the need to provide a safe and reliable water supply to farms, families, and communities with protections for critical species. Actions include real-time monitoring of endangered species, habitat restoration, and improving temperature management strategies.

Specifically, the alternative provides better cold water management at Shasta Reservoir to directly benefit spawning salmon; a \$14 million investment to accelerate ongoing reintroduction efforts of imperiled winter-run chinook salmon populations on Battle Creek and other Sacramento River tributaries; and an additional \$50 million for a conservation hatchery in the Delta that will assist with the recovery of the Delta smelt and other Delta species of concern.

Reclamation expects to finalize these actions with a record of decision in 2020.

For info: Final EIS available at: www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=39181

January 22-23 TX 11th TCEQ State of the Bay Symposium (Galveston Bay), Galveston. Moody Gardens Convention Center. Presented by Texas Commission on Environmental Quality. For info: www.tceq.texas.gov/p2/events/state-of-the-bay-symposium	February 4-6 HI Pacific Water Conference, Honolulu. Hawai'i Convention Center. Presented by American Water Works Assoc. For info: 10times.com/pacific-water-conference	February 25-28 CA WEF/AWWA Water Utility Management Conference - Latest Approaches, Practices, Processes, Garden Grove. Hyatt Regency. Presented by World Environment Federation / American Water Works Assoc. For info: www.awwa.org/Events-Education/Events-Calendar	March 3-4 MT Montana Water Summit: At the Confluence of Land & Water, Helena. Presented by the Montana Department of Natural Resources & Conservation. For info: http://dnrc.mt.gov/divisions/water
January 23 TX 6th Annual TAWC Water College, Lubbock. Lubbock Memorial Civic Center. Presented by Texas Alliance for Water Conservation. For info: www.depts.ttu.edu/tawc/	February 10-11 GA International Symposium on Potable Reuse - Latest Innovations in Treatment & Technology, Atlanta. W Atlanta Downtown. Presented by American Water Works Assoc. For info: www.awwa.org/Events-Education/Events-Calendar	February 26 CA Water & Environmental Law Program Speaker Series: Mark Arax, Water Journalist & Author, Sacramento. McGeorge School of Law. Presented by Water & Environmental Program. For info: Jennifer Harder at jharder@pacific.edu	March 5 OR Immerse 2020 - A Benefit for The Freshwater Trust, Portland. Redd on Salmon Street, 831 SE Salmon Street; 5:30 - 9 pm. For info: www.thefreshwatertrust.org
January 23-24 WA Electric Power in the West Conference, Seattle. John Davis Conference Center, 920 Fifth Avenue, Ste. 3300. For info: Law Seminars International, 206/ 567-4490 or www.lawseminars.com/	February 11 WY Crow Creek Restoration - Water Forum, Cheyenne. Water Development Office, 6920 Yellowtail Road, 10 am - Noon. Presented by Wyoming State Engineer's Office. For info: Jeff Cowley, WSEO, 307/ 777-7641, jeff.cowley@wyo.gov or https://sites.google.com/a/wyo.gov/seo/interstate-streams/water-forum	February 27-28 TX Texas Wetlands Conference, Houston. JW Marriott by the Galleria. For info: CLE Int'l, 800/ 873-7130, live@cle.com or www.cle.com	March 5-6 MT Real Estate & Land Use Law Seminar, Missoula. DoubleTree by Hilton Missoula Edgewater. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net
January 23-24 WA Endangered Species Act Seminar, Seattle. Washington Athletic Club, 1325 6th Avenue. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net	February 11-13 NV Nevada Water Resources Association Annual Conference & 2020 Water Reuse Summit, Las Vegas. Tuscany Suites & Casino. For info: www.nvwr.org/upcomingeventcalendar	February 27-28 CA Environmental & Land Use Issues in Cannabis & Industrial Hemp Conference, Oakland. Oakland Marriott City Center. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net	March 10 WY Update on GIS Data Model Implementation Study & Water Supply Index - Water Forum, Cheyenne. Water Development Office, 6920 Yellowtail Road, 10 am - Noon. Presented by Wyoming State Engineer's Office. For info: Jeff Cowley, WSEO, 307/ 777-7641, jeff.cowley@wyo.gov or https://sites.google.com/a/wyo.gov/seo/interstate-streams/water-forum
January 23-24 CO Project Management for Water and Wastewater Utilities, Greenwood Village. Plaza One Tower Conference Center. For info: www.euci.com/event	February 16-21 CA Ocean Sciences Meeting 2020, San Diego. San Diego Convention Center. Presented by American Geophysical Union, Assoc. for the Sciences of Limnology and Oceanography and The Oceanography Society. For info: www2.agu.org/ocean-sciences-meeting	March 2-3 NC Invasive Zebra and Quagga Mussels Mitigation Training Course, Charlotte. Hilton Garden Inn. For info: www.euci.com/event_post/0320-mussel-mitigation/	March 11 OR 2020 Superfund Conference: Getting to Cleanup - Laws & Science, Portland. TBA. For info: Environmental Law Education Center: www.elecenter.com
January 26-29 IL 80th Midwest Fish & Wildlife Conference - "Bringing Science Back to the Forefront of Resource Management", Springfield. BOS Center. Presented by American Fisheries Society. For info: www.midwestfw.org/	February 20-21 NV Family Farm Alliance 2020 Annual Meeting & Conference, Reno. Eldorado Resort & Casino. For info: www.familyfarmalliance.org	March 2-3 CO Special Institute for Young Natural Resources Lawyers & Landmen, Denver. The Oxford Hotel. Presented by Rocky Mountain Mineral Law Foundation. For info: www.rmmlf.org/conferences	March 11 OR EPA Portland Harbor Public Forum, Portland. TBD. DEQ & CAG Support. For info: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=1002155
January 29 OR Sediment Remediation Conference: Design & Cleanup Technologies - What's Effective?, Portland. World Trade Center, 121 SW Salmon Street. For info: Environmental Law Education Center: www.elecenter.com	February 25-27 DC Association of California Water Agencies' Annual Washington DC Conference, Washington. St. Regis Hotel. For info: www.acwa.com/events/	March 2-3 TX North American Shale Water Management 2020: Reducing the Cost of Water Recycling & Use (Exhibition & Conference), Houston. Aloft Houston Katy. For info: www.shale-water-management.com/?join=VR	March 11-12 Chile 2nd International Investment Conference & Exhibition Desalination Latin America, Santiago. Intercontinental Santiago Hotel. Presented by Desalination Latin America. For info: https://desalinationlatinamerica.com/
January 30 PA Eighth Annual Green Infrastructure Conference, Philadelphia. Ballard Spahr, 1735 Market Street, 48th Floor. Presented by Environmental Law Institute. For info: www.eli.org/events/eighth-annual-green-infrastructure-conference			March 12 WA Managing Stormwater in Washington Conference - 12th Annual, Tacoma. Tacoma Convention Center. Presented by Northwest Environmental Business Council. For info: washingtonstormwater.com



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CALENDAR

(continued from previous page)

March 12 **CA**

Association of California Water Agencies' Legislative Symposium, Sacramento. Sutter Club. For info: www.acwa.com/events/

March 12-13 **AZ**

Law of the Colorado River Conference, Scottsdale. Hilton Hotel. For info: CLE Int'l, 800/873-7130, live@cle.com or www.cle.com

March 16 **AZ**

Membrane Technology Conference, Phoenix. Phoenix Convention Center. Presented by American Water Works Assoc. For info: www.awwa.org/Events-Education/Events-Calendar

March 17 **ID**

PFAS Workshop, Boise. Grove Hotel. Presented by Northwest Environmental Business Council. For info: <https://nebc.regfox.com/pfas-workshop-boise-march-19-2020>

March 19-20 **OR**

Shoreline Regulation, Permitting & Development Seminar, Seaside. Seaside Civic & Convention Center. For info: The Seminar Group, 800/574-4852, info@theseminargroup.net or www.theseminargroup.net

March 20-21 **OR**

Pacific Northwest Ground Water Exposition, Portland. Red Lion Hotel. presented by Pacific Northwest Ground Water Assoc. For info: pnwgsa.org

March 24-26 **CA**

Water Innovation Week 2020: The Next Decade, San Francisco. Presented by Imagine H2O. For info: www.imagineh2o.org/wiwi2020

March 27 **AZ**

Water at the Crossroads: The Next 40 Years: WRRRC Annual Conference 2020, Phoenix. Black Canyon Conference Center, 9440 N. 25th Avenue. Presented by the Water Resources Research Center. For info: <https://wrrc.arizona.edu/wrrc-conference-2020>

March 27-29 **TX**

Cattle Raisers Convention & Expo, Fort Worth. Fort Worth Convention Center. Presented by the Texas & Southwestern Cattle Raisers Assoc. For info: <http://cattleraisersconvention.com/>

March 29-April 1 **MN**

Sustainable Water Management Conference, Minneapolis. Hyatt Regency. Presented by American Water Works Assoc. For info: www.awwa.org/Events-Education/Events-Calendar

March 30-April 3 **VA**

WSWC/ICWP/NWSA Washington, DC Roundtable * WSWC Spring (192nd) Meeting * WSWC/WestFAST Forum, Arlington. DoubleTree Hotel Crystal City. Presented by the Western States Water Council, Interstate Council on Water Policy & the National Water Supply Alliance. For info: www.westernstateswater.org/upcoming-meetings/ or www.icwp.org

March 31-April 3 **TX**

Texas Water 2020: Exhibition & Conference, Fort Worth. Fort Worth Convention Center. For info: www.txwater.org

April 1-3 **FL**

Vision 20/20 Convention & Exhibition, Orlando. Rosen Centre Hotel. Presented by Water Treatment Industry. For info: www.wqa.org/convention

April 6-9 **CA**

The West's Growing Water Needs in the Face of Water Shortages: California-Nevada Section of the American Water Works Association Annual Conference & Exposition, Anaheim. Disneyland Hotel. For info: www.acwa.com/events/ca-nv-awwa-spring-conference-2020/

April 7-8 **NM**

Law of the Rio Grande: Hot Topics in Water Management & Conservation Conference, Santa Fe. La Fonda. For info: CLE Int'l, 800/873-7130, live@cle.com or www.cle.com