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Water Rights, Water Quality & Water Solutions in the West

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WATER MARKETS IN THE WESTERN US

DEVELOPING HEALTHY MARKETS — ISSUES AND OPPORTUNITIES

by Bruce Aylward, AMP Insights (Beaverton, OR)

INTRODUCTION

This article will summarize the findings and conclusions of an effort to understand and present the conditions, policies, and laws that lead water markets in the Western US to function as a useful counterpart to other tools for sustainable water management. The full 94-page Report — *Political Economy of Water Markets in the Western United States* by Bruce Aylward, Davíd Pilz, Megan Dyson, Carl J. Bauer, Leslie Sanchez and Amy Hardberger — was prepared with financial support from the Rockefeller Foundation and is available for download at AMP Insights' website: www.ampinsights.com/rock-report.

The Report identifies market, policy, institutional, legal, or combined imperfections and failures that are impeding water market function. The Report finds that inadequate markets lock up water in traditional uses in spite of opportunities for beneficial trades that promote the productivity of water in its many economic, environmental, and social guises. The Report aims at developing a framework that can help identify critical bottlenecks and limitations that stand in the way of water markets living up to their potential contribution to sustainable water management.

Water markets are embedded within a particular basin water management setting *and* governance framework. The context for markets is determined by geography and the local rules of the game. Assessment of market activity, efficiency, and outcomes for the purpose of recommending reforms or other solutions need to emerge out of the application of a multidisciplinary conceptual framework relevant to this context. One-size-fits-all solutions are generally not effective in natural resource management. Water markets are ultimately a local resource allocation opportunity. The best practice is to work collaboratively from within the specific setting and the historical context to arrive at a shared understanding of issues and alternatives. Tailored and appropriate solutions with broad stakeholder acceptance can then be developed.

Developing an efficient water market can be a tall order. The multi-functionality of water, the diversity of involved stakeholders and societal sectors, and breadth of scale (local to national to global) of those with a "stake" in a particular basin must all be addressed. However, water markets should not be an add-on that comes at the end of a planning process. A water market is a potential tool that needs to be included along with other alternatives during the water planning assessment.

This article will begin with a brief review of "markets" and "water markets" as conceptual frameworks. These concepts are then applied to water markets in the American West. Beginning with analysis of the enabling conditions for markets, the article examines how market shortcomings can be resolved through collective action. The presence or absence of conditions conducive to healthy, competitive, markets in the West is then considered. The aim of this assessment is to illustrate the range of potential issues that can affect market activity and efficiency, as well as social and environmental outcomes. As institutional failures, political and bureaucratic shortcomings, economic inefficiencies, and other stumbling blocks are identified, an effort is made to summarize potential solutions — be they policy reforms or other actions. Key policy responses to promote healthy water markets are identified and brief conclusions are presented.

Water Markets

Markets

Transactions

Market Rules

Water Marketplace

Water Trades

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MARKETS & WATER

In common usage, a market is a place where buyers and sellers meet to buy and sell goods. In most parts of the world when you go to a market it is a physical space where a large number of sellers display and hawk their wares to a large number of buyers. In developed economies, when shoppers go to the supermarket for their groceries it is just one store — albeit one displaying similar products from many producers (at a fixed price). Alternatively, in the real estate market there are many property owners with properties for sale and many interested buyers, but no real physical marketplace. In the real estate market, brokers representing a seller and a buyer facilitate the real estate transaction. The physical marketplace, if there is one, is the trek from house-to-house with your broker or a virtual trek through an online marketplace. The trade in the real estate market is simply the aggregate sum of these many real estate transactions. Underlying a market in real property is a body of real property law that sets out the nature of the property and the rules that govern the exchange of this property. Similarly, any marketplace — even online "virtual" marketplaces — will have its own set of rules (e.g., terms and conditions on eBay™).

A market, then, functions within a set of rules that govern the voluntary exchange of property ("transactions") between buyers and sellers. A marketplace is a physical or other (e.g., online) place that is organized by a buyer, a seller, or some intermediary for the purpose of facilitating transactions. Trade is simply the aggregate number and amount of transactions in the market. These concepts can be usefully applied to clearly define water markets.

A water rights market is a set of rules, set by the appropriate authority, to govern the exchange of water rights between willing buyers and sellers. The rules define the property involved — the water rights — as well as the process by which the temporary or permanent transfer of water rights from one use/user to another is accomplished. Creating a water market refers to the establishment of rules and agreements that govern transactions in water rights within a given jurisdiction and hydrographic setting.

A water marketplace is a specific mechanism developed as a place where market participants can obtain market information and/or conduct transactions. Examples of water marketplaces include: water brokerages; water banks/exchanges; water auctions; and smart markets (automated, algorithmic trading platforms). A water marketplace may promulgate its own rules for eligibility, participation, and market clearing. However, it is the applicable laws and regulations governing the water rights market that give the marketplace transactions legitimacy. Marketplaces may involve manual or online bidding and manual or automated clearing.

Trade in a water rights market represents the set of water right transactions in: unregulated (natural) flow; regulated or stored water; or groundwater. Trades in a water rights market are executed between willing sellers and willing buyers for the purpose of meeting unmet, new, or different demands from those of existing permitted water supplies. Purchase of water rights with the sole intent of renting them out for income and/or holding them for capital appreciation is also a potential source of market activity — at least in well-developed and liquid markets. [Editor's Note: One must keep in mind, however, the limits of the "anti-speculation" doctrine, which exists in western states in one form or another to prevent speculation in water rights. *See* Zellmer, *TWR* #50, Moon *TWR* #94, and Meyers, *TWR* #142.]

A water market may be defined more broadly than as simply a market for water rights. A "water market transaction" may refer simply to the purchase of the water right (either on its own or along with the land). However, water transactions can also include the purchase of some amount of water available under a water right, or a payment to incentivize a change in water use — these are alternatives to the more traditional transactions and may involve either time-limited or permanent water right purchases.

Water Market Potential

In the face of increasing water scarcity and conflict over human and ecosystem uses of water (including instream uses) there is a need for effective or "healthy" water markets to achieve a balancing of the following outcomes:

- Efficacy: effectively managing supply and demand for water, and where possible, managing conflict over water, in response to driving forces and changing circumstances
- Economic Efficiency: achieving efficacy in a cost-effective and timely manner
- Environmental and Social Sustainability: avoiding adverse impacts and providing pathways to social inclusion and equity, as well as environmental conservation and restoration and ecosystem resiliency

How this balance plays out in a given location will depend on the area's setting and history, amongst other factors, as well as what the particular market is designed to accomplish.

WATER MARKETS: A CONCEPTUAL FRAMEWORK

A conceptual understanding of water markets relies on appreciating that while water is an economic good, it also has public good or public interest characteristics. As such, water is not a purely private good. Water should not be, and generally is not, treated as private property and left solely to the free market to allocate. Instead, water is viewed as public property managed for the benefit of the people, and in some states protected in that manner in the state's Constitution. In capitalist economies this generally means extending property rights for the *use* (as opposed to outright *ownership*) of water; thus, water rights are

Water Markets

Necessary Conditions

sometimes referred to as "usufructary rights." A water market allows for the amounts of water allocated for these uses to be exchanged in some fashion. Using markets to reallocate water rights must therefore logically be set firmly within the bounds of collective action so as to set rules for market interactions which assure public benefits and not just private and commercial preferences.

In jurisdictions that grant use-rights to water there are three generally accepted conditions necessary to enable water markets: 1) scarcity; 2) well-defined and secure property rights; and 3) the ability to trade. Scarcity is necessary to enable any market — because if the good or service is not scarce then no one will take the effort to find a seller. In other words, scarcity drives demand. Second, in order for a buyer to expend resources in the market the buyer must obtain something of value. A well-defined and secure property right provides assurances that what a buyer purchases is for their own consumption — i.e., that the buyer can exclude others from enjoying it — and that the good or service is "as advertised." Additionally, in order for trades to occur the relevant governing institutions must recognize trades and confirm that buyers may use the goods they purchase for their intended use.

Flexibility & Tradability

Two more concepts are necessary to fully capture the concept of healthy water markets: flexible property rights and transferability/tradability.

Flexibility

Flexibility in water rights and the water right administration systems is essential for public policy to adapt water management to changing values and changing circumstances. This might imply, from the right holders perspective, that the security of rights is lessened — but flexibility reflects the necessary balancing act between collective benefits and individual property rights.

Transferability

The ability to trade necessarily includes the ability to transfer acquired rights to new uses. When trade in water rights takes place, the new user may want or need to change one or more the parameters of the water right they purchased (place of use, type of use, location of use, and others). This is referred to as "transferability." The relevance of this to healthy markets is that transfers that may erode beneficial environmental or social uses and values must be properly reviewed, assessed, and modified as necessary. This is, generally speaking, a regulatory function. For markets to be healthy these regulatory protections must be effective. The necessary capacity in the regulatory entities and civil society must be present to ensure this function is carried out. It is therefore vital to be clear that tradability of rights involves both the trade and the transfer of these rights, and that the transfer requires the necessary regulatory protections and capacities.

Regulatory Protections

Each of these enabling conditions represents a set of rules that either leads towards or away from market activity and/or market activity that can be deemed healthy. To some extent the degree to which these enabling conditions are in place reflect how well (or how poorly) collective action has resolved the issue of water governance and management for public benefit. Nonetheless, as with any marketed commodity, there is another layer of conditions for a competitive market that can be identified and analyzed. These other attributes of a healthy water markets framework are summarized in Figure 1, below, along with the general approach of the conceptual framework. The remainder of this article applies this conceptual framework to water markets in the Western US.

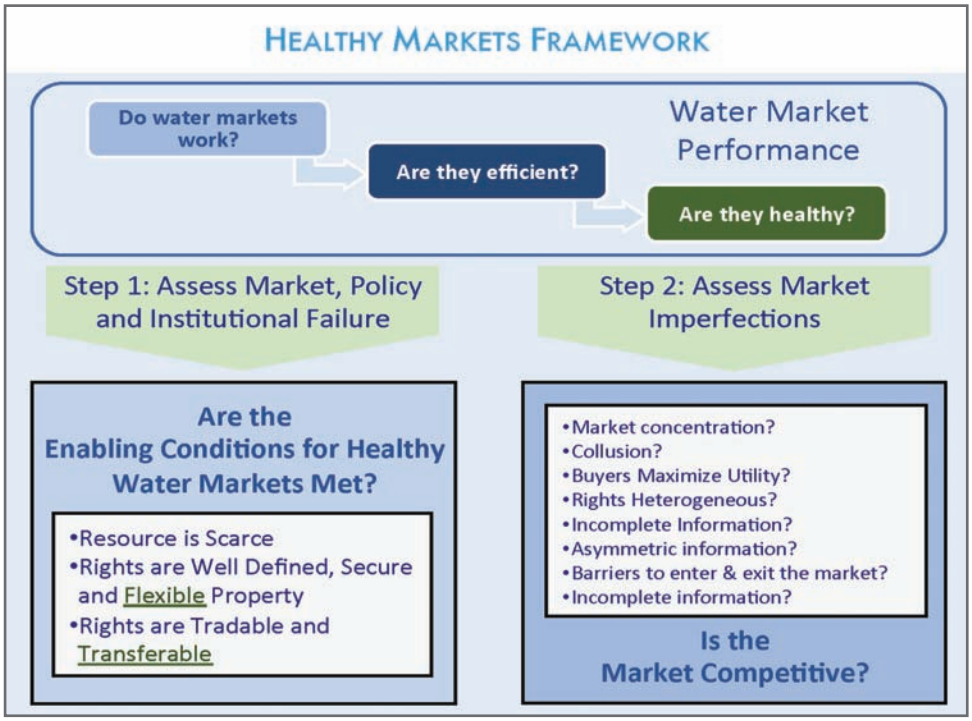


Figure 1: Water Market Approach & Attributes

Water Markets

Scarcity

Groundwater Source

Conjunctive Use

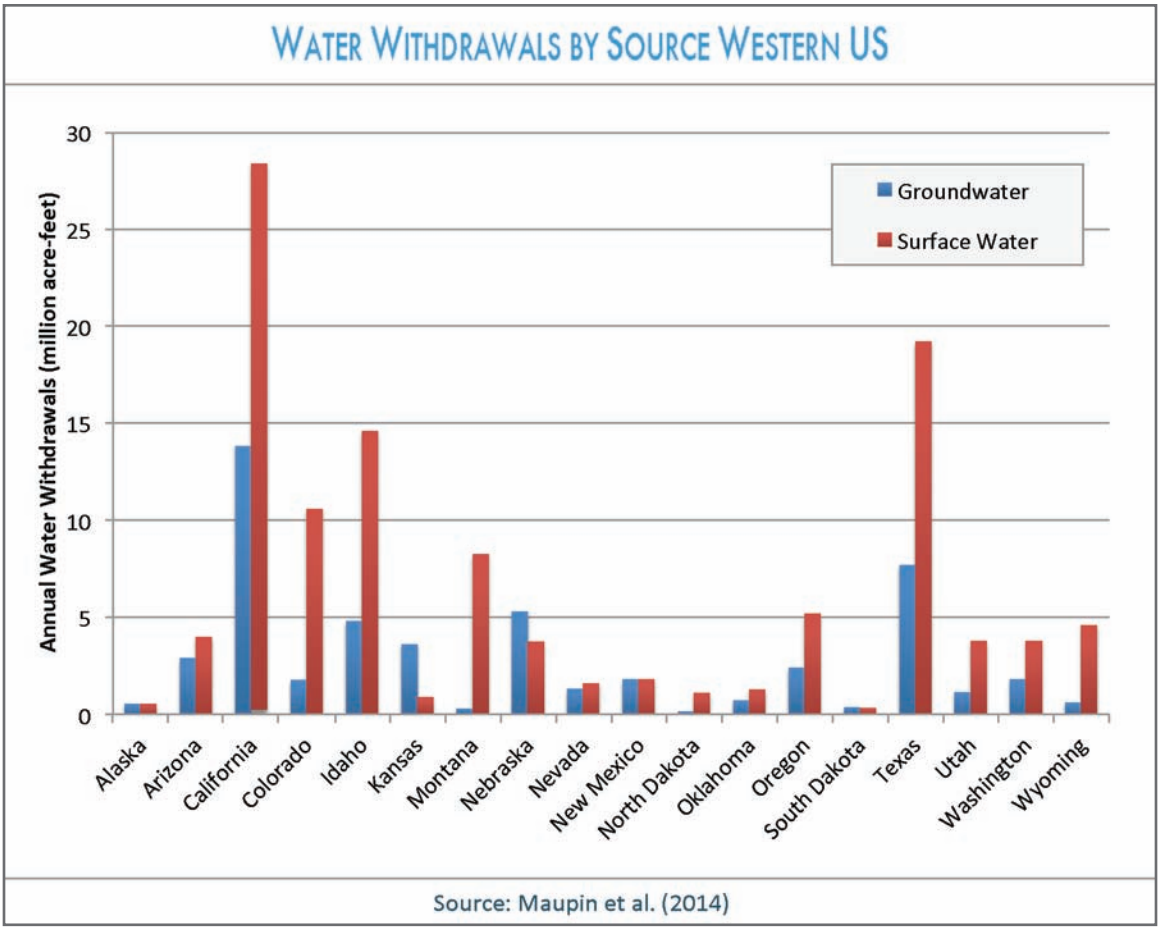
WATER MARKETS IN THE WESTERN US

It is a fundamental tenet of economics that resource scarcity drives trade. Whether and to what extent water is in scarce supply is a fundamental precondition for water markets and water trade. The first topic addressed is, therefore, how physical conditions interact (or don't) with the legalities of surface and groundwater rights systems in the Western US. However, scarcity's relation to the likelihood of water trading goes beyond the simple question of limited supply. The degree of scarcity drives economic behavior and the search for water to meet needs. The perception of scarcity as felt by a prospective water user (or buyer) is driven by the availability of alternatives and loopholes. In addition, scarcity may exist for a given user, but fail to materially affect market trade if the user is excluded from the market. Each of these topics is examined in the context of apparent physical and legal water scarcity in the Western US.

Scarcity

Throughout the Western US, water use is allocated under the Prior Appropriation Doctrine wherein those earliest in time establishing their rights to use water continue to have prioritized rights to the water relative to water rights established at a later date. Allocation under Prior Appropriation has led to full- or over-appropriation of legal rights to surface water in most of the West.

The physical scarcity of surface water to fulfill water rights drives market activity. However, water is not scarce if groundwater is freely available. Thus, scarcity and the incentive to engage in markets to meet water demand also depends on an area's groundwater code. Here there are considerable differences amongst the western states. Some states issue pumping rights only up to some notion of an annual pumping limit while others allow new uses without regard to any limit. A further issue is whether states administer surface water and groundwater as separate resources or "conjunctively" as one resource. When groundwater is treated separately from surface water, new groundwater users not only avoid the need to rely on the surface water market to obtain water, but their pumping often results in water being drawn away from the water supply used by senior surface water users. The trend over the last couple of decades is to move towards conjunctive management — i.e., managing surface water and groundwater in relation to each other. *See*, *e.g.*, Moon, *TWR* #86 — *Conjunctive Use Decisions: Applying the Prior Appropriation Doctrine to Groundwater Use*. Conjunctive management may allow new groundwater uses only when they are offset by reductions in existing surface or groundwater uses. Establishing groundwater offsets represents a step towards prudent management and creates a legal scarcity that enables market activity.



Water Markets

Alternatives

The physical or legal aspects of scarcity vary across jurisdictions and basins. Scarcity not only motivates markets, but also the search for other innovative supply and demand management alternatives. Many such alternatives exist and may appear less expensive than a water market. Add to this the many imperfections and inefficiencies of the market itself and it is not surprising that much demand goes to these alternatives or towards finding loopholes (e.g., unregulated groundwater) to enable new supply. The result is that market activity is less than might be expected.

Concerning alternatives, loopholes, and markets one or both of these two situations usually apply:

1. The resource costs of satisfying new uses through supply and demand management alternatives is unnecessarily high given the lower value of marginal uses of water in many basins (and therefore the lower resource costs if markets are enabled).
2. The cost of satisfying new uses through loopholes appears low to those using them to meet new demands, but this gives a false picture of the costs of this activity as the loophole externalizes costs onto other water uses and users, particularly the environment.

Unmet Demands

Finally, the exclusion of certain demands from market participation will reduce scarcity and market activity. More to the point, closing markets to environmental and other demands leads to unmet demands and pressure to convey these demands through other routes, including litigation and policy reform. Given the political economy of water, the shutting down of one avenue — i.e. markets — simply leads actors with unmet demands to pursue other avenues. Closing of the economic route through markets forces the demand into the political and judicial arenas.

Security of Rights

Well-Defined, Secure and Flexible Property Rights

A system of well-defined and enforceable property rights is foundational for a functioning water market. Whether or not a water right can be defined, enforced, and transferred is directly related to whether the right is measurable and marketable. In general, the right to use water is well-defined in the western states. In theory, these rights are also extremely secure. However, there are a series of practical issues which, when present in a particular jurisdiction or basin, undermine the security of these rights and therefore may undermine market activity. While the security of rights may enhance market activity it does not necessarily promote healthy markets. An extreme degree of security provided to water rights may render the rights inflexible from the perspective of public policy. Such inflexibility may place private interests over public interests and limit the ability of public policy to adapt to changing circumstances.

"Taking" Protection

Many elements of appropriative rights are well enumerated, granted in perpetuity, administered effectively, and protected from "taking" by the US Constitution. However, a number of specific caveats and exceptions may exist.

Caveats to Security

Caveats and exceptions may include:

- Consumptive and non-consumptive portions of rights are not defined as part of the water right and, thus, must be discovered through transfer processes.
- Depending on the context, the Public Trust Doctrine may undermine the security of water rights, permitting their regulation or expropriation without compensation (*see* Hobbs, *TWR* #36 and #137; Walston, *TWR* #157).
- The absence of adjudication is an important factor that can limit the security of water rights, particularly with respect to permanent transfers ("adjudication" is the process by which water rights' validity and amounts are determined by a court).
- Effective administration of water rights within an irrigation community does not necessarily mean that they will be equally well administered once changed to other uses — particularly environmental uses.
- Specific threats to water right security come from exempt uses, open access groundwater use, poorly regulated queuing for new permits and "sleeper" rights (i.e., rights that may be resuscitated when a market emerges).

Finally, a high degree of security of appropriative rights means that from a policy perspective they are fixed and not flexible. This pushes public policy towards incentive-based fiscal policy and legal reform as tools for shaping water use and reallocating water rights.

Administration of Rights

Tradability and Transferability of Entitlements and Allocations

Water rights in the Western US reflect the permission granted by the state (or relevant authority) to the right holder to use the water resource according to the terms and conditions of the right. As the state retains ownership of the water on behalf of the public, it remains responsible for administering the use of rights under the state's water code. The trading of a water right therefore typically must accomplish not just a change in ownership but also an administrative change to the right to use water. Trading in western water rights is thus a two-step process. The transaction costs and impacts on water right values (for the buyer and the seller) associated with these two steps are critical to the availability of gains from trade in a market and thus have an important impact on the level of trade.

Transaction Costs

Water Markets

Change of Use

Not surprisingly given the nature of water rights in the Western US as private property, the ability to trade water rights is well established. However, a significant constraint on market activity may arise when the buyer goes to consummate a water right transaction by changing the elements of the water right so as to put the water to the new use. Carrying out this step with the relevant administrative or judicial authority can be costly and time consuming. This raises the impact of transaction costs borne by the buyer and seller. The outcome of the process can also result in the transfer of an amount of water less than that of the original water right, reducing the gains from trade. Both of these outcomes will limit activity in the water market.

Major determinants of tradability and transferability of western water rights include:

- Flexibility in administering temporary trades of appropriative groundwater rights is beneficial, i.e., allowing senior users to make out-of-priority trades of allocations to junior users.

No Injury Rules

- While seemingly restrictive and often onerous in terms of process, requirements of appurtenancy for irrigation rights and a proper injury review seem inescapable given the way appropriative rights are defined ("no injury" rules apply to protect junior users from being injured by the change in a water right; "appurtenancy" is the requirement that water rights be fixed or "appurtenant" to a specific piece of land).
- Though injury protections are essential to protect existing uses, including environmental rights or residual waters (and thus important to healthy water markets), the administration of transfers often errs in favor of avoiding any risk of injury to junior users.
- Historic consumptive use approaches to transfer end up favoring minimal transfer quantities and may undervalue environmental transfers and efforts to implement conserved water transactions.

Risk Avoidance

- This tendency towards risk avoidance ultimately increases the transaction costs and lowers the gains from water trading and therefore favors existing junior users over prospective new users wishing to participate in the water market.
- The ability of environmental buyers to participate in markets and consummate their trades with transfers to environmental use is still circumscribed in many jurisdictions and basins.

Market Imperfections

An imperfect market is one where the economic conditions for a perfectly competitive market are not present. Based on the standard neoclassical economic model of competitive markets, there are a number of market imperfections to which water markets in the Western US are susceptible.

Market imperfections include:

- Market concentration and collusion
- Heterogeneous products
- Incomplete information
- Asymmetric information
- Barriers to market entry

A number of the following imperfections may limit market activity by closing markets or by reducing the potential gains from trade:

Market Concentration

1. Market Concentration in one irrigation entity, or amongst a few irrigation entities, often exists at the basin scale. This enables these entities to individually or collectively (through collusion) concentrate political power and exercise market power to control and limit access to their patrons and water marketing. This may lead to the extraction of higher than efficient prices when rights are sold, thereby satisfying fewer demands, but just as often it leads to a market closed to outside interests.

"Insiders" Information

2. Asymmetric Information favors market "insiders" and large entities that are frequent participants in the market. This can skew pricing in favor of insiders — leading to low participation rates or remorse and distrust of the market by the casual participant.

Pricing

3. The Endowment Effect leads potential sellers to focus on the loss they will experience from giving up the right and not on the gains from trade in the market, implying that a significant price premium is needed to tempt these water users into the market.

There are also a number of market conditions that adversely affect trade by limiting the efficiency of the market:

Value Appraisal

1. Heterogeneity of water right priorities make due diligence on the expected reliability of a water right and appraisal of value more difficult and costly for the prospective buyer. This complexity is magnified when a buyer wants to purchase and *remove* a water right from an irrigation entity where there are multiple classes of rights but by customary practice available water is shared without regard to priority. Where different sources of water are layered on for a given irrigation use, disentangling these sources is another complicating factor.

Information Accuracy

2. Incomplete Information, e.g., a lack of, or poor, data on water rights, their extent, validity, and transferability creates uncertainty for buyers and sellers reducing market participation.

Water Markets

Advancing Activity

Reallocation

Security > Flexibility

Incentives

Buy-Backs, Changes, & Subsidies

Efficiency

"Use It or Lose It"

3. Barriers/High Costs to Entry (and exit), e.g., fees, qualifications, and the need for specialized advice in order to participate in the market impede the efficient entry/exit of buyers/sellers to the market.

A few potentially constructive ways of addressing these imperfections or using their existence to advance market activity include:

1. Market Concentration may also be useful in increasing leverage on the buy side of markets. Where public or public interest organizations represent the unmet needs for water for municipal, industrial, or environmental purposes they may also band together to exercise political and market power. This may assist in opening up markets and can keep costs down for new water users where there are willing sellers.
2. Heterogeneity. Just because rights are heterogeneous with respect to priority date does not necessarily imply that each class of priority is a distinct product. When set against the available water supply and when the full range of sources used in irrigation are considered the system may reduce to a lesser number of products with their own reliability, which may reduce the transaction cost burden of heterogeneity.
3. Smart Markets (automated, algorithmic trading platforms) provide an intriguing opportunity to limit the inequities that emerge due to asymmetric information and thus may encourage higher participation in transactions programs.

POLICY CONSIDERATIONS & RESPONSES

The picture that emerges from the conceptual framework is of an appropriative system of water rights that was designed to foster the development of water resources but that was not constructed with the reallocation of water rights in mind — and often not with groundwater sustainability or the water needs of ecosystems in mind. The basic conditions for market activity are present due to the underlying presence of scarcity, well-defined and secure rights, and the ability to trade and transfer rights. However, there exist a raft of issues and loopholes with respect to these conditions that limit or impede market activity. Diving more deeply into market conditions, a number of market imperfections are present which lead to further restraint of trade and inefficiencies that impede trade.

Perhaps the most significant of the Report's finding is that the high degree of security afforded to water rights in the Western US is accompanied by a corresponding low degree of flexibility in the rights. While security empowers markets, the lack of flexibility constrains collective action. Inflexibility limits the ability of public policy to intervene and directly reallocate water, set limits, or adjust allocations, i.e., to deploy a command and control approach to water allocations. Thus, policy responses to water management and markets are largely incentive-based.

Incentive-based policy responses fall into one of two arenas:

1. Using fiscal policy: changing incentives and allocations while working within the existing rules
2. Engaging in policy reform by changing the rules of the game, but doing so in a way that adds to the range of benefits rather than taking away rights from existing users

Fiscal Policy Options

Incentive-based fiscal policy consists of three main instruments: water charges; subsidies; and buy-backs. Fiscal policy always remains an option for government, even if water markets are not performing well. Charges on water use and subsidies for water use efficiency are two administrative approaches to incentivizing efficiency and changes in water use. The alternative to achieving a change in water allocation is for government to simply buy-back water rights and retire them or dedicate them to new (and public) uses. While markets are theoretically a more pleasing approach to the economist, all three fiscal instruments are potential policy tools. In the Western US, however, the political economy of water charges are a difficult prospect and have yet to be deployed. Subsidy programs are very much in vogue in the western states, but do not always lead to healthy outcomes. By design or by a lack of proper design these funds can end up subsidizing additional private consumptive use of water — leaving less residual water for the environment. Buy-backs for the environment and other purposes are also a frequent tool of public policy, particularly to address endangered species issues.

Policy Reform Options

Upon careful analysis it seems that the old adage about "use it or lose it" is now a bit dated. There are many circumstances in which there are incentives for irrigators and irrigation delivery entities to improve their water use efficiency. These include policy reforms that encourages efficiency through the trading of saved water or, at least, eliminating the chilling effect of partial forfeiture. It can be argued that the inflexible nature of water rights has led to induced innovation. Creating new flexibilities in the administration of water rights system is an avenue to address the lack of flexibility inherent in the water rights themselves. *See*, e.g., Waskom, *TWR* #147 — "*Use It or Lose It*" *in Colorado Water Law.*

Water Markets

Reforms for Flexibility

Examples include reforms to authorize:

- Conserved (salvaged) water programs that enable savings from water use efficiency projects to be permitted as new rights (while avoiding injury), thereby creating new incentives for conservation.
- Restrictions/elimination of partial forfeiture to allay irrigator fears that they must always use the full rate and duty under their right or lose a portion of their right.
- Dual purpose irrigation and instream rights that create new flexibility in moving from one use to another and back again.
- Expedited leasing programs that proceed in a timely fashion yet provide the state the ability to rescind leases should problems arise.
- Surface to groundwater mitigation programs that enable new groundwater demands to be met by offsetting pumping impacts with instream transfers and other water projects.
- Planned performance. Local water plans that enable water users to jointly manage water to a set of planned performance targets, while flexibly managing water between users within the plan.
- State-run administrative water banks that provide a flexible means of unbundling and bundling short-term water leases, as well as convenient withdrawal for new uses of banked rights.

Innovation in technology and policy should continue to address these problems in a proactive manner.

States' Experimentation

State-by-state experimentation with creating this flexibility is ongoing. There is presently constant activity across the states to find new pathways to enable water marketing. Unfortunately, these efforts by their very nature originate and are applied in a single state, often with little investment in evaluation and learning from other states' experiences. Some efforts have been made to foster interstate communication and cross-fertilization but arguably not to the extent desirable, and this exchange is also limited by the underinvestment in learning. The result is that when a state takes up new policy reforms they often end up "reinventing the wheel." Even within states that share common policy approaches (such as temporary instream leasing or conserved water programs), no two programs are the same. Rather than replicate what is working in another state, each successive reform often starts from scratch. Greater cross-state communication, exchange, and coordination would therefore be useful.

CONCLUSIONS

The big question is: how can western water be managed more sustainably and what can water markets contribute to that effort?

Framework

The Report — *Political Economy of Water Markets in the Western United States* — applies a conceptual framework for understanding water market function to water markets in the Western US. The effort is ambitious given the wide-ranging geography, as well as the variety of local, state and federal rules governing water. In the face of the legal, economic and socio-political complexity of water rights and water markets, the process of assessing current market conditions against desired outcomes and identifying paths towards healthy water markets will never be reducible to a formula. Understanding the multidisciplinary issues involved is as much art as science. Like any craft, proficiency requires long hours in the workshop. Moreover, for better or worse, each basin and each set of stakeholders seem to need to follow their own inquiry to come out on the other side with ideas, proposals, and solutions that meet with the general acceptance necessary to move forward.

Markets as Means

However, this cautionary note is as much about the stream-by-stream, watershed-by-watershed, and basin-by-basin search for improved water management as it is about water market design. Indeed, a healthy market must sit within the context of collective action around managing water sustainably. Markets are means not ends.

Changing Needs

Water transactions are a powerful tool and water transaction programs therefore need to be carefully designed and evaluated. Markets surely can play an important role in mediating between the changing needs for water, whether in the form of long-term reallocation of water or in meeting drought-year needs. Deploying the power of markets within the scope of political agreement over water transaction programs remains a challenging but desirable objective. Using policy reform to add to the rules and create flexibility in water marketing — particularly for temporary transactions — is likely to be integral to such an effort.

Management Shortcomings

There are, however, two shortcomings in the management of water quantity in the West that markets will not solve on their own: 1) unsustainable extraction of groundwater; and 2) meeting environmental flow needs. There are three incentive-based fiscal policies and one command and control regulatory approach available to achieve these policy objectives:

Policy Incentives

Buy-backs. Government and civil society can allocate funds to use markets to buy-back water rights for retirement or dedication to environmental flows. The success or failure of this approach rests on the extent to which the market is active, efficient, and healthy.

Subsidized efficiency: allocating funding to subsidize water use efficiency. This is an attractive and valuable option. Such programs need to be much more carefully designed, projects vetted more carefully, and program evaluations carried out in an independent, participatory, and transparent fashion. Importantly, such programs need to avoid adverse affects to environmental flows that still remain in western waterways. The idea that public funds should subsidize private benefits and create costs to the public should be untenable in the 21st Century. While promising if well implemented,

Water Markets

it is critical to recall that efficiency improvements simply move water around the system differently, they do not create new units of water. Ultimately the utility of such investments is limited. It is also worth noting that adopting policy reforms to encourage conserved or salvaged water brings these funds into the market for water as efficiency gains become permitted uses that can be traded. There is ample room for demand management strategies and markets to work together if so designed.

Charging for water. This alternative appears difficult politically and perhaps even unnecessary (at least if markets are working).

It is useful to compare two possible futures for the western states.

Healthy Markets v. Status Quo

In the first, healthy markets flower across the west. Collaborative water transactions programs and active markets reallocate water amongst private and public interests in an efficient and healthy manner. In this future, the limiting factor on sustainability is the amount of funds necessary to incentivize water use efficiency and buy-back water to address over-appropriation and environmental flows. Because the total scale of the problem in the Western US is unknown, it is not even possible to hazard a guess at the eventual price tag. Given the prospect of limited funding such efforts will need to be prioritized. But, all-in-all, under this scenario the prospect for an all out crisis is abated as economic needs are met and longer-term problems are chipped away at over time.

A second, less rosy, "business-as-usual" scenario is also possible. The crux of the matter is that water rights are very secure in the Western US and offer little flexibility for public policy to support water allocation that meets the changing needs and the demands of a changing climate. If policy does not evolve towards more competitive and healthy markets, the utility of the market tool is called into question. For example, if reforms do not level the playing field between seller and buyer then irrigation entities may continue to deploy their market power to close markets, restrict trading, and broker excess profits for their constituents. As a consequence the cost of buy-back programs simply go up.

If markets are not allowed to function in an active, efficient, and healthy manner, water ends up locked in traditional uses and is not available to meet changing needs. Buy-backs would become nigh impossible and hugely expensive. Subsidy programs for water use efficiency would no doubt be deployed but won't close the gap for new consumptive demands or adequately address climate change.

Changes or Consequences

Should such a stalemate persist, policy makers really only have two options. First, is simply to assess large charges on water use and let the economics determine which users have high enough value water uses to actually call on their water right. At that point, perhaps, interest in selling rights to new high value users would be piqued and lead to a renewed effort to create functional water markets. Second, policymakers still have the option of condemnation of existing water rights in order to make water available for new consumptive demands, sustain groundwater resources over the long run, and provide for environmental needs.

The point of painting this dark scenario is not to suggest that any of the business-as-usual scenario is desirable. The point is that developing healthy water markets is not really an optional exercise if the goal is sustainable water management. Functional markets are vital to avoiding chaos and dysfunction.

The good news is that efforts and experimentation with improving markets is underway. The bad news is that the level and quality of the effort and the seriousness with which the effort is taken in some quarters does not engender optimism as to the ultimate outcome. Further, the time that is available to improve the situation, while not clear, appears to be shrinking given the unrelenting pace of climate change.

Innovation v. Effectiveness

There is a saying in Silicon Valley that people often mistake innovation for effectiveness. Innovation for innovation's sake does not always produce desired outcomes. Water markets are innovative and can be effective at meeting specific water management outcomes. However, it often seems like there is more pressure to try new things in the water market realm in the western states than to simply work hard to replicate what has already proved effective. Based on the case studies and analysis in the Report, many things are obviously not working to facilitate healthy water markets. But a number of things are, or could be, effective with a concerted effort at cross-pollination, education, and sharing of implementation experiences. To be sure, the political economy of the changes necessary to adopt effective policies in the many contexts that currently lack them does not mitigate in favor of easy success.

As noted herein, though, the alternatives (most notably the status quo) leave the West's water trapped where it is today — in places that do not uniformly maximize water value for the economy, the environment, and broadly, communities across the American West.

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Texas Planning

TEXAS WATER PLANNING

REGIONAL WATER PLANNING PROCESS: A TEXAS SUCCESS STORY

by Bech Bruun, Chairman, Texas Water Development Board

INTRODUCTION

One might say that the old adage "Life is what happens while you are busy making plans" could be applied to the relative disconnect between water plans and water development in Texas prior to 1997. Although the state began developing state water plans in 1961, too few water projects were being implemented to address the state's drought risks and its need for adequate water supplies for a growing population. There was a significant "reality gap" between the state's water plans and what was actually implemented.

"Bottom Up" Process

In 1997, however, visionary state leadership created a new, cyclical, "bottom up" regional water planning process. The cyclical process ensures a realistic assessment of water needs and feasible responses to meeting those needs. At the same time, the cyclical process keeps the state water plan relevant by incorporating new information, the latest science, and recent legislative policy every five years. The recent release of the 2017 State Water Plan marks the fourth state water plan under this new process.

Tremendous future population growth and our vibrant economy require that Texas continue to map out future water supplies and ensure that we will continue to have enough for future generations.

BACKGROUND: TEXAS WATER PLANNING HISTORY

Drought Response

The Texas Water Development Board's (TWDB's) predecessor agency and state water planning, in general, came about as a direct response to the drought of the 1950s, which remains Texas' worst statewide drought of record. The Water Planning Act of 1957 charged the agency with the responsibility for water resource planning, including developing state water plans, and in 1961 the agency produced the first state water plan. An observation in that plan has continued to ring true throughout the past 60 years: "If Texans cannot change the weather, they can at least, through sound, farsighted planning, conserve and develop water resources to supply their needs." *A Plan for Meeting the 1980 Water Requirements of Texas*. Texas Board of Water Engineers, 1961. Available from: www.twdb.texas.gov/publications/State_Water_Plan/1961/1961.pdf.

Regional Planning

Five-Year Cycle

In 1996, another severe statewide drought revealed once again Texas' vulnerability to drought and served as a catalyst in 1997 to the Texas Legislature's deliberate move to change how Texas plans for water supply. The new approach, built on a more stakeholder, regionally driven approach, formalized a regional water planning process based on 16 planning groups representing 16 regional water planning areas (A–P). Each planning group was required to prepare its own regional water plan on five-year cycles. The goal was to improve state water planning so that more projects would be developed to meet Texas' rapidly growing water needs to provide for public health and safety and our economy under drought conditions. Each planning group was charged with self-governance including maintaining the minimum statutorily required membership categories (counties, municipalities, industries, agriculture, environment, small business, electric generation utilities, river authorities, water districts, water utilities, the general public, and groundwater management areas). They are not considered political subdivisions of the state.

The shift to a regional water planning approach was partly an indication that many of the previous state water plans were not viewed as realistic or specific enough to forecast or facilitate actual project implementation. Although any 50-year plan has a significant amount of uncertainty and therefore remains subject to change, it is important to both policy-makers and water providers that what is laid out in each plan is at least credibly feasible, particularly as it applies to the near-term timeframe. At the same time, the regional water planning process needed to be balanced enough to develop meaningful state water plans while protecting the state's interests and upholding certain planning principles.

Local/Regional Funding

A more local approach to developing state water plans made sense considering it was (and remains) the local and regional water providers that directly implement and pay for water projects. Other than providing financial assistance programs, primarily in the form of low-interest loans, the State of Texas does not, in general, sponsor or directly pay for state water plan projects. The TWDB does take partial ownership interest in a very limited number of larger capacity projects. These projects are eventually bought out by sponsors as their need for water reaches the full project capacity.

Regional Strategies

The new regional planning process also fundamentally changed the dynamic of water planning by shifting the decision-making about water management strategies from the state's purview to regional water planning groups. Up until then, the state had been responsible for recommending the projects in the state water plan. The result was that large portions of the state water plans were effectively gathering dust on a shelf while water providers either proceeded differently or did not proceed at all to implement many projects.

Texas Planning

The new process set Texas apart from other states primarily by:

- designating regional water planning areas and regional water planning group members that develop plans in a bottom-up manner
- basing the state water plan on the 16 regional water plans
- requiring the development of regional and state water plans every five years
- providing regular legislative appropriations
- using the historical drought conditions as the benchmark for the plan development

Participation Incentives

The Legislature's bold shift to regional planning meant that 16 planning groups were given the responsibility to identify the best approaches to meeting Texas' future water needs. The Legislature incentivized participation in the process through water rights and the state's financial assistance programs. The Texas Commission on Environmental Quality (TCEQ) may not issue a water right unless it addresses a water supply need in a manner consistent with the regional and state water plans. Projects applying for financial assistance from the TWDB must also be consistent with the plans.

State's Duties

The shift to regional planning also meant that because the state water plan incorporated the regional water plans, the state would not, as a matter of course, directly add or remove specific projects as long as the planning groups developed their regional plans in accordance with statute and rules. Texas Water Code (TWC) § 16.053; 31 Texas Administrative Code (TAC) §§ 357, 358.

The TWDB shapes the regional and state water plans through developing and implementing its own rules and guidance and by making state policy recommendations in the state water plans. The Board is also responsible for resolving interregional conflicts and may be approached directly by any local water provider that believes its requested change to a regional plan was not sufficiently addressed by a regional water planning group. TWC § 16.054; 31 TAC § 357.51.

Drought Preparedness

As a part of the new process, planning groups were required to evaluate how each municipal and non-municipal water user group (and numerous major water providers) would fare under drought conditions over the next 50 years.

Drought preparedness includes:

- forecasting population and water demands
- assessing existing water supplies
- identifying water needs (potential shortages)
- recommending strategies for each entity to meet those potential shortages under drought conditions

The resulting water plans provide detailed "snapshots" of what Texas water supplies would look like if drought conditions were to recur within each of the next five decades. The plans recommend, in detail, feasible actions to respond to drought and address potential water shortages.

WATER PLANNING ACHIEVEMENTS

Stakeholder Input

The fact that Texas' regional water planning process has successfully produced four comprehensive and highly credible state water plans, with relatively little controversy, is an achievement in itself. Each plan is based on an enormous amount of stakeholder input and is the result of five years of planning effort by hundreds of planning group members and their consultants. There are many dimensions to these successes that other states and countries might find enviable. Perhaps most notably, no other fast-growing state has produced a water plan that more clearly demonstrates how its local water suppliers can provide affordable water to its citizens over the long term.

More Substance & Less Conjecture

Direct Involvement

The state water plans developed through the regional water planning process have increased the amount and quality of direct stakeholder input, which, in turn, provides more accurate, detailed, actionable information about very specific water sources, water users, and recommended projects than previous plans.

By more directly involving those responsible for implementing projects and developing detailed numerical analyses, the new plans — and hence the overall state plan — better articulate the basis for and coherent path to implementing each project. The most recent 2017 State Water Plan shows very explicitly how Texas can affordably meet nearly all of its anticipated municipal water demands for the next 50 years. There are a few municipal needs that are shown as unmet by the plan, but those needs may be significantly less (depending upon future regulatory decisions) and, in all cases, would not be expected to impact public health and safety.

Demand, Supply, & Strategy

The 2017 Plan's conclusions do not rely on over-simplified aggregations of water demands and supplies and optimistic prose. They are based, instead, on: detailed assessments of projected water demands; existing supplies to which users are already connected; and strategy recommendations for each of the more than 2,600 water users identified in this cycle of planning. The 5,500 recommended strategies are, in turn, associated with a specific water source (such as a reservoir or aquifer) that has been further evaluated to ensure that implementing each strategy would not overextend its dedicated water source. Finally, these strategies would require 2,500 specific capital investments, each of which has an estimated cost and online date. Importantly, the vast majority of projects also have a named sponsor entity to take ownership, implement, and pay for the infrastructure.

Texas Planning

Open Planning

Local Involvement & Transparency

The regional water planning process requires the participation and efforts of hundreds of individuals. For example, in the last planning cycle, there were more than 450 voting members on the regional planning groups. In addition, all planning group meetings must be open to the public. The regional water planning process for the 2017 State Water Plan included approximately 400 public meetings and hearings held in the 16 regions and extensive data gathering from water users and water providers.

Most of these meetings were an integral part of developing information for the draft regional water plans, including the process of making decisions about the plan contents. The public and other stakeholders could participate in and speak at all of these public meetings. There were also 16 public hearings held in each respective region once the draft plans were prepared. Additional public meetings at which the planning groups considered and responded to public and other comments and made final changes to the plans followed those meetings. Finally, a public hearing was held on the state water plan in Austin.

Independence

Comprehensive, Balanced Plans

As demonstrated over the last four planning cycles, independent planning groups are capable of operating effectively to develop sensible water plans. A cursory comparison of the general types and shares of strategies recommended in the last four state water plans indicates that, at an aggregate level, planning groups are not influenced by political fads and the overall process is robust.

Although the terms "update" or "revision" are sometimes used in discussing water plans, each regional and state water plan is, in fact, a stand-alone plan that is based on a renewed look at water demands, potential shortages, and potentially feasible strategies.

Cycle-to-Cycle Changes

Though there are seldom drastic changes in plans from cycle to cycle, the planning groups do revisit all strategies in each cycle to replace those strategies that are no longer feasible in the new plan. Even strategies that may have been recommended in previous plans must be updated, for example, to reflect updated costs, and, if appropriate, recommended anew. Not surprisingly, some strategies appear in multiple, sequential plans, whereas other strategies and projects previously recommended are not recommended in the next plan. Cycle-to-cycle changes to a region's recommended water management strategies are the result of a variety of factors. These factors include changes in each cycle's water demand projections and quantified water availability (for example, as a result of new managed available groundwater values or new drought of record conditions), completed projects, and other new or changed information.

Change Examples

Examples of changes between water plans that are not associated with project implementation include the following:

- A number of surface water projects, including major reservoirs, that over the years were recommended strategies in at least one regional water planning cycle are no longer recommended strategies. These include: Bedias Reservoir; Lake 8; Little River Main-stem Reservoir; Post Reservoir; Nueces Off-channel Reservoir; and Texana Stage II Reservoir. Both the Laredo and Brownsville weir projects and a major Lower Colorado River Authority-San Antonio Water System project are no longer recommended strategies in the state water plan. On the other hand, dredging Lake Lavon and Lake Wright Patman are new strategies in the 2017 State Water Plan.

Desalination

- The Region K seawater desalination project, located in Matagorda County, and recommended in the 2007 State Water Plan is no longer a proposed strategy. Both the Laguna Madre and Laguna Vista seawater desalination projects recommended in the 2012 plan are not included in the 2017 plan due to feasibility issues. Between the 2012 and 2017 plans, the Freeport seawater desalination project capacity was reduced to approximately one-third its previously recommended size, and the proposed Brownsville project capacity was increased four-fold over the previous plan.

Aquifer Storage

- There is a new aquifer storage and recovery strategy recommended for New Braunfels in the 2017 State Water Plan. On the other hand, the previously proposed City of Bandera aquifer storage and recovery strategy is not in the current state water plan.
- To respond to new desired future conditions of aquifers, numerous strategies have been changed, including downsizing of projects. One clear change involves the 2012 State Water Plan strategy called Overdraft of Trinity Aquifer in Region C that became infeasible due to new desired future conditions and was therefore not included in the 2017 State Water Plan.

Continuity & Stability

The lack of volatility between water plans is due to various factors, including the planning groups' ability to maintain their membership, strong planning group leadership, and, most importantly, the thorough regional water planning framework that guides the overall process. Throughout their work, the planning groups also benefit from local water plans and the deep knowledge and perspectives brought to the table by those water providers who will have to implement the plan.

Public Input

Individual planning group members do not recommend strategies in a vacuum. The regional water planning process requires that the planning group identify, evaluate, and consider potential strategies all while requiring public input on those strategies. In addition, the process relies on certain required technical evaluations performed by professional technical consultants. Not surprisingly then, the plans for the most part have changed in a logical and reasonable fashion from one to the next.

Texas Planning

Constraint-Based

Modeling Importance

Groundwater Availability

Technical Analysis

Common Methodology

Required Steps

Conflicts Addressed

Local Costs Impacts

KEY FACTORS IN WATER PLANNING SUCCESS

A number of features contribute to the success of Texas' regional water planning process, including: science-based data; involvement of local and regional entities who will sponsor and pay for the projects; the stability of the planning process; the cyclic nature of planning; and the role of the state.

The adherence to basic planning parameters and the frequent opportunity to improve the process have resulted in comprehensive, credible state water plans that provide a coherent picture of how Texas can meet its water needs. Whereas other states' water plans often include large amounts of text and limited numbers and specifics, one of the strengths of Texas' water plan is the detailed numbers that speak for themselves.

Science-Based, Quantitative Planning

The only responsible way to ensure that cities and businesses aren't short of water is to use realistic forecasts and plan for only the amount of water that can legally and physically be pumped in drought conditions without over-allocating any water sources. The emphasis on constraint-based, numerical water planning using the best available, actionable information has obligated planning groups to explicitly recognize water resource limits and develop credible plans within those limits.

Because the regional water plans are founded on science-based, water resource constraints, they have been highly defensible and meaningful. Managing natural resources responsibly requires translating policy decisions into numbers in the same way that producing a responsible financial budget requires a detailed balance sheet with expected income and expenditures. Thanks to significant investments by the Texas Legislature in developing surface water and groundwater models, we are well ahead of most other states in our ability to translate state and local level policy into quantifiable surface water and groundwater availabilities for each of our river basins and aquifers. Those numerical models have played a key role in shaping and legitimizing the adopted regional and state water plans.

Firm surface water supply estimates are based on the surface water models that are used for permitting and maintained by the TCEQ. Groundwater availability is limited by the requirement that regional water plans must be consistent with desired future conditions. Desired future conditions represent the desired, quantified conditions of groundwater resources, such as water levels, water quality, spring flows, or volumes, at a specified time or times in the future or in perpetuity. The vast majority of groundwater that can be pumped in drought is determined through policy decisions of conservation districts within a single groundwater management area that are then translated into modeled available groundwater values using the TWDB-approved groundwater availability models.

The integrity and coherency of the regional and state water plans rely on the consistent use of a variety of credible data and application of widely accepted technical analyses. Municipal water demand forecasts in all 16 regional water plans, for example, are based on federal census data, a common set of statewide, historic water use data collected by the TWDB, and sophisticated population projections modeled by the State Demographer at the Texas State Data Center. Although regions have the ability to request justified changes to this projection data, the TWDB maintains the overall integrity of the statewide numbers, including limits at the county, regional, and state level, by acting as the sole arbiter of the final projections.

The regions' reservoir firm yield analyses must also follow a common methodology based on industry practice. Additionally, project cost estimates are based on a common set of assumptions and are supported by a standardized costing tool developed by the TWDB specifically for use by the regions.

The overarching framework of the planning process does not permit planning groups to simply ignore unpleasant realities or sidestep tough decisions. Statutes and planning rules require that planning groups address specific water planning steps, each structured to lead to a concrete numerical outcome or recommendation. These processes have led to conflicts that must be resolved by those best suited to address them: regional water planning groups and their stakeholders. The resulting conflicts have been productive. Conflicts tend to improve stakeholder understanding, strengthen the basis for decision-making, and advance research and policy discussions that help avoid, or at least better inform, future conflicts.

Conflict means that there is something at stake and participants are wrestling with important water issues that probably do not have easy solutions. Acknowledging conflicts and making associated recommendations in the plans can provide stakeholders and project sponsors with greater certainty than if the issues are left unresolved indefinitely. Because regional plans cannot simply ignore disagreements or plaster over numerical discrepancies with vague and optimistic language, they must work at resolving these conflicts in a public setting, which strengthens the water plans.

Essential Role of Project Sponsors

A natural tension exists between the local and regional providers that must implement water supply projects, the regional water planning stakeholder process, and the scale and goals of a state water plan. In the end, planning groups and those responsible for actually developing water projects naturally consider their own interests and geography. Thus far, planning groups have recommended projects, large and small, that, in the current context of water rights and water provision, are considered feasible and make the best economic and logistic sense with regard to actual implementation. As long as the cost is borne by local entities, planning groups will continue to choose strategies that they believe can be reasonably implemented and financed by local sponsors in a timely manner.

Texas Planning

Multi-Region Projects

The current planning framework provides the opportunity for multi-region projects that serve large areas of Texas. To this end, planning groups already include representation of interests outside their region that cooperate in the planning process. Each planning group includes liaisons from adjacent planning groups who facilitate the sharing of information and help coordinate planning activities. The limited number of multi-region strategies is at least partly the product of well-chosen regional planning areas.

Regional water planning areas serve as administrative and planning boundaries only and do not include any authority to limit other regional water planning groups, water providers, or water users' ability to maintain existing or shared water supplies or to secure additional water supplies that may be located within any other regional water planning area.

In developing their plans, the planning groups consider water resources, including state-owned surface water, located outside the regional water planning area and may consider including water providers and water users outside their region when developing strategies. In the 2017 State Water Plan, roughly one-fifth of all new water supplies associated with recommended water management strategies in 2070 originate from water sources associated with other planning regions.

State Role

The state has a clear role in setting the overall course and goals of the planning process, including providing guidance and requiring that each plan attempt to meet statewide water needs where feasible. Texas' planning framework does not promote any one technology over another, for example through direct financial incentives. The Texas Water Code's agnostic approach toward both the type of technology and the scale of projects that may be recommended makes sense for a large, diverse state. It also means that, in the end, strategy recommendations remain those of planning groups.

Group Stability

Stability of Planning Group Memberships

Planning groups remain relatively stable. Membership of planning groups has generally not experienced disruptive levels of turnover. TWC 16.053(e)(5). Planning groups are required to consider all potentially feasible strategies when addressing their future water needs. Statute does not describe the universe of potential strategy types but does specify a number of categories of particular interest.

Conservation Consideration

Conservation in particular has a somewhat higher threshold of consideration. If conservation is considered but is not recommended for an entity with an anticipated shortage, the planning group must *document the reason* for not recommending conservation. 31 TAC 357.34(g)((2)(B). Planning groups maintain their own bylaws and adjust and replenish their membership as needed in accordance with their bylaws.

Requirements Working

In 2016, the TWDB solicited comments and held a public work session specifically to consider the membership and operation of the planning groups. A Board member roundtable discussion with the chairs or designated representatives of the 16 planning groups considered the public comments received and a summary of the 16 regional planning groups' existing bylaws and membership requirements. Based on that discussion as well as the limited number of and nature of the received comments, it was apparent that there are not significant issues with the legal requirements for regional water planning group membership or widespread concerns with how planning groups maintain their membership. Planning groups have flexibility to successfully recruit engaged members who represent the required interest categories and have successfully accommodated statutory changes to their planning group membership. In addition, many planning groups have more than the required number of voting positions to ensure that a broader number of interests are represented on the planning groups (Figure 1).

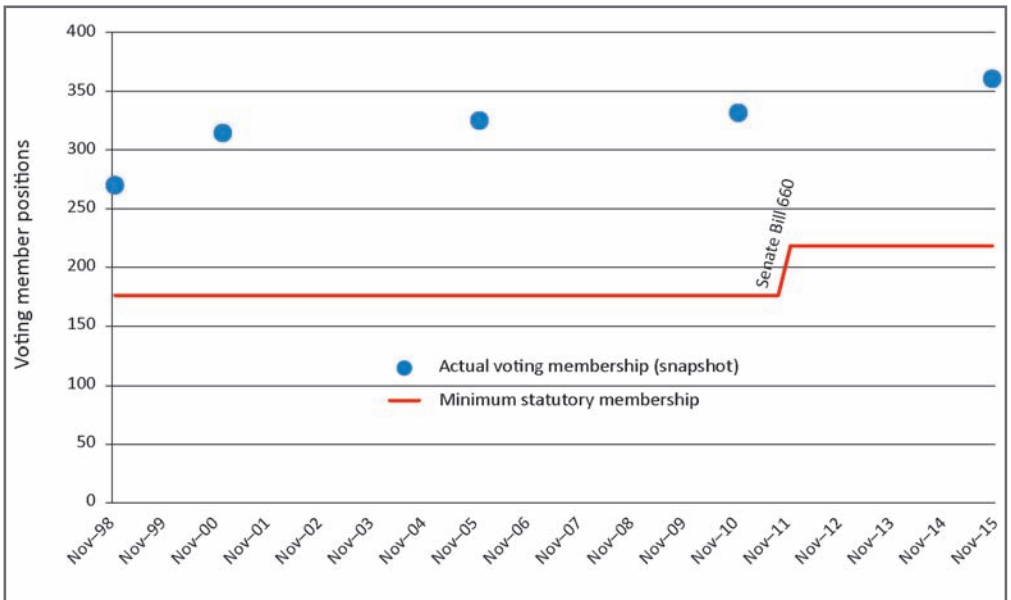

Figure 1. Number of statutory versus actual planning group voting positions over time.

Texas Planning

Five-Year Cycle Benefits

Feedback Loop

Funding Continuity

Per Capita Water Use

Energy Market

Drought Response

Interregional Conflicts

Groundwater "Peak Factor"

Regular Planning Cycles

The regularity of five-year regional and state planning cycles required by current statute — together with the built-in flexibility of the process — facilitates a predictable and stable planning process that rapidly incorporates legislative policy direction, new information, and innovations as they arise.

Developing regional and state water plans every five years encourages engagement and retention of institutional knowledge. Developing detailed, bottom-up regional water plans on either a more intermittent basis or on a significantly longer planning cycle would at some point become very challenging as planning group members and other participants would have to be entirely reoriented to each new cycle. Another challenge would be the reduced expertise of technical consultants and agency staff that support the nuts and bolts of the planning process. The quality of the plans would undoubtedly reflect these drawbacks.

Cyclical planning sets up a feedback loop which keeps the process responsive to criticisms and legislative policy changes and able to incorporate new scientific data and other improvements. Regular planning cycles also serve to test the viability and longevity of proposed projects. Projects that no longer make sense, for example due to changing economics, are sifted out along the way. The planning process itself has been adjusted over the years so that plan content and delivery mode are continually improving.

The TWDB continues to look for ways to improve plans and add value to the process. The Interactive 2017 State Water Plan website (see below) is the most notable product of a long series of improvements in how we collect, organize, and deliver planning data. It allows stakeholders to easily explore and consume the enormous amount of planning information, which informs subsequent planning cycles.

Keeping the regional and state water plans up-to-date helps ensure continuity in funding state water plan projects. In 2013, the Texas Legislature and Texas voters created the State Water Implementation Fund for Texas (SWIFT), the State Water Implementation Revenue Fund for Texas (SWIRFT), and authorized a $2 billion transfer from the state's Rainy Day Fund to finance projects in the state water plan. The SWIFT program leverages SWIFT funds through the issuance of SWIRFT revenue bonds. Because projects funded through the SWIFT program must be included in the state water plan, it is beneficial to regularly update the state water plan to ensure that stakeholders know when to participate and propose projects so that the plans contain current information on projects that are eligible for SWIFT. The alternative would likely involve frequent but irregular amendments to the regional water plans.

Since 1997, there have been a variety of changes introduced to the plans and planning process.

Second Cycle Changes (2003–2007)

During the first cycle of regional water planning, a portion of water savings generated through non-passive conservation strategies, beyond those anticipated to be achieved due to existing state and federal plumbing standards, was incorporated directly into the water demand projections developed by the TWDB. That approach could be interpreted to suggest that an additional lowering of per capita water use, for example, was inevitable. In response to criticisms, in the second cycle estimates of future non-passive water savings were shifted from the demand side of the planning equation to the supply side. This still current approach better reflects the fact that a significant portion of future water savings will only be realized through the proactive implementation of conservation strategies by sponsors.

The second planning cycle also expanded to include the first rural water utilities, incorporated surface water availability models and the initial TWDB groundwater availability models, and required reporting of state financial assistance needed to implement the plan.

Third Cycle Changes (2008–2012)

The third cycle of planning added new groundwater management area representatives to the planning groups and incorporated updated power and mining (including hydraulic fracturing) water demand projections in response to a rapidly changing energy market.

Fourth Cycle Changes (2013–2017)

The recently completed planning cycle incorporated project prioritizations required by House Bill 4 from the 84th Texas Legislature. It also included many new modeled available groundwater values statewide and took into consideration the recent 2010–14 drought conditions as well as TCEQ's newly adopted environmental flow standards. The state's drought response planning was expanded to include requiring new information to address drought risks of small municipalities. Each regional plan included a chapter on drought response. Planning groups identified potential alternative water sources for small water suppliers that rely on a single source of water. The groups also identified existing emergency interconnects between water systems and potential new emergency water supply connections.

Fifth Cycle Changes (2018–2022)

For the fifth cycle of state and regional water planning, the agency has revised planning rules to provide an earlier opportunity for planning groups to review each other's plans to address potential interregional conflicts. In response to stakeholder concerns during the fourth cycle, the TWDB has also revised its planning rules to include a modeled available groundwater "peak factor" that ensures regional water plans have the ability to fully reflect how the groundwater conservation districts anticipate managing groundwater pumping in drought conditions (31 TAC 357.10 (20); process 357.32(d)(3)). This rule change eliminated the effect of managed available groundwater values acting as immovable "hard caps" on groundwater *pumping* that could be reflected in the regional water plans.

Texas Planning

Utility-Based Planning

Rural Providers

Legal Framework (State)

Demand Projections

In addition, the TWDB responded to stakeholder input by implementing a shift to utility-based water planning instead of using the political boundaries of municipalities. This means that the next plan will include population, water demands, potential water shortages, and strategies that reflect specific retail water providers. This change will improve the understanding of the planning process, better align historical data with planning and implementation, reduce work effort, and make it easier to align state water plan project loans with sponsors and beneficiaries. This major improvement requires significant agency effort on the front-end but is expected to greatly improve the planning process. As a result, it will be easier to understand which entities actually need water and who will implement projects.

We also have also increased the level of information on rural water providers in the next water plan. Utility threshold criteria was lowered and standardized for identifying individual municipal water user groups that will be explicitly included for planning. This will shift approximately one million rural water users from the current aggregated "county-other" category (Figure 2) into their own, separate water user groups. As a result, approximately one million more citizens served by rural category utilities will be able to find more specific information in the plans about the water needs and recommended strategies for their communities.

Significant State Role

The successful development of a coherent, credible state water plan is partly due to a strong state role in the form of a thorough statutory and administrative rule framework that requires active state involvement.

Statute, administrative rules, and agency guidance lay out certain steps and constraints to be considered before planning decisions are made. This framework includes: statutory goals; fundamental planning principles laid out in administrative rules; and very specific guidance requirements for what must be calculated and presented in the plans. These requirements ensure that planning groups meet minimum levels of detail, perform prescribed analyses, and consider certain types of strategies before making recommendations. Together with TWDB's extensive plan reviews and approval, the entire process ensures credibility and produces regional plans that combine to form a meaningful state water plan.

The TWDB continues to play an active role in overseeing and facilitating certain activities. Key among them is developing and adopting all population and water demand projections. The TWDB uses information from the Texas State Demographer and our historical water use survey data to develop the projections. The drafts are vetted through the planning groups who receive public input. At the beginning of each five-year planning cycle, the TWDB develops these statewide projections and maintains control over them throughout the process. Whereas planning groups adopt their regional water plans, the water demands are adopted well ahead of time by the TWDB's Board in consultation with our sister agencies, Texas Parks and Wildlife, the TCEQ, and the Texas Department of Agriculture. These projections underpin each planning cycle and must be both well-founded and widely accepted. Partly in response to comments on the 2017 State Water Plan, the methods of projecting irrigation, power generation, and manufacturing water demands are being updated to improve both their quality and the ease with which they can be updated by the TWDB.

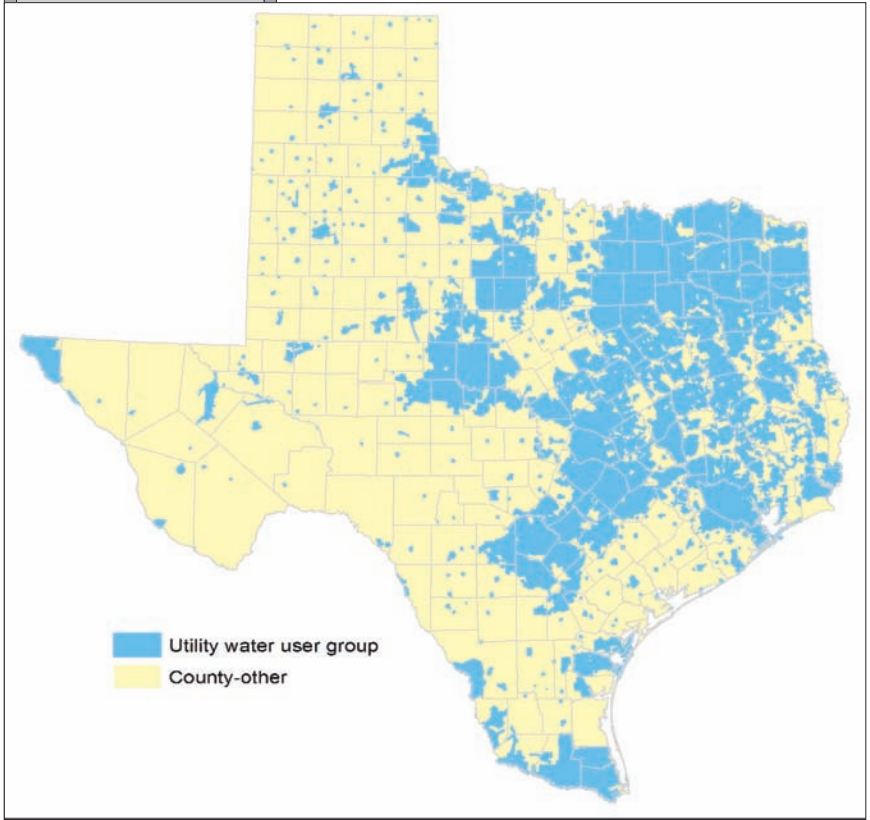

Figure 2. Statewide municipal water user group designations

As a knowledgeable arbiter, the TWDB maintains final control over these long-range forecasts to maintain the credibility of the water plan. Otherwise, the plan might be undermined by over-inflated local projections containing over-optimistic growth projections. In doing so, the TWDB solicits and relies on stakeholders for information to strengthen and improve the accuracy of these projections. At any time, planning groups may request revisions to these projections that, if adopted by the Board, would also amend the state water plan.

We have been recently reminded of the scrutiny these projections attract and the importance of maintaining their credibility as we cooperate with the US Army Corps and the US Environmental Protection Agency in support of state water plan projects that are now pursuing federal permits. Justification of projects depends partly on whether these agencies are convinced of the veracity and reasonableness of the underlying water demands.

Texas Planning

Assistance

Regional water planning groups rely on the TWDB's technical and administrative assistance. In addition to detailed guidance documents and technical support, a TWDB planning team member attends every planning group meeting as a non-voting member. The TWDB provides unbiased administrative and technical assistance to ensure the planning group meets deadlines and requirements. By providing answers in real time during meetings, TWDB staff has been an invaluable resource that frequently helps participants to avoid confusion, understand requirements, and expend their limited funds wisely.

CONCLUSION

Texas has produced four state water plans through this five-year regional planning process that take a hard look at what we could face in future droughts and very specifically address those challenges.

Planning Results

Twenty years of regional planning has demonstrated:

- the benefits of cyclical water planning performed at a regional level
- that a very open, bottom-up stakeholder-driven process can be stable and robust
- the paramount importance of good science and data, which underpin the process and plans
- the importance of maintaining a strong and active state role in both funding and guiding the process, including as the arbiter of population and water demand forecasts

Multiple Benefits

Other equally important intangible benefits result from a credible, up-to-date state water plan. For instance, bond underwriters, rating agencies, and potential bond investors beyond Texas have made it clear that having an up-to-date state water plan as the backdrop for the SWIFT loan program enhances the appeal of our bond offerings. The resulting demand for, prices of, and confidence in our bond sales translate to lower interest rates that the TWDB is able to pass along through our project loans.

Public Process

Other benefits include an accessible and transparent water plan that Texans can understand, take ownership of, and improve upon. The very public process of regional water planning has taught many citizens about water issues and water planning. This, in turn, encourages greater involvement of stakeholders in subsequent planning cycles. It also promotes general public awareness of where their water comes from, which studies show is the best way to increase conservation efforts of Texans.

Regular planning cycles and feedback drive continual improvements in the planning process and better inform state water policies. The creation of the SWIFT financial assistance program, for example, was a vital new addition to the state's ability to implement state water plan projects. Finally, while it is difficult to quantify, a credible, comprehensive, and up-to-date state water plan has enhanced Texas' ability to attract businesses and talented people.

Taking Ownership of Plans

When representatives of the 16 regional planning groups met in Austin in November 2016 to discuss the regional planning process, there was clear consensus on the success of the process. It provides the planning groups with the flexibility to determine their own solutions while also ensuring there is structure and guidance from the state.

The goal of the regional water planning process, however, is not to just produce plans. It is to guide and facilitate development of sufficient water supply for a growing population and vigorous economy.

The most telling question that must be answered about the regional and state water planning process, then, is this: is more water for Texas being developed because of these water plans? The answer is a very simple, but definite, "Yes."

The 2017 State Water Plan details strategies capable of producing approximately 8.3 million acre-feet of water when completed. More than $1.6 billion has already been put toward water plan projects in just the first two funding cycles of the SWIFT. Those projects alone, once completed, will produce more than 1.2 million acre-feet of additional water supply for Texas. In other words, we know the process is working.

For Additional Information:

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Texas 2017 State Water Plan website: www.twdb.texas.gov/waterplanning/swp/2017/

Editors' Note: The above article has been adapted from *The Regional Water Planning Process: A Texas Success Story*, which originally appeared in the Texas Water Journal (Vol. 8, No. 1, 2017). The Texas Water Journal is an excellent, open-source, peer-reviewed, online publication produced in cooperation with the Texas Water Resources Institute. *See* https://journals.tdl.org/twj/index.php/twj.

Bech Bruun has served as a Board member of the Texas Water Development Board since September 1, 2013. Governor Greg Abbott designated him chairman in June 2015. Prior to his appointment to the Board, Mr. Bruun served on the senior staff of Governor Rick Perry's administration. Mr. Bruun has also worked as the government and customer relations manager for the Brazos River Authority. During the 81st Legislative Session, Bruun served as chief of staff to State Representative Todd Hunter (District 32) and as general counsel to the House Committee on Judiciary and Civil Jurisprudence. Mr. Bruun currently is a gubernatorial appointee to the Western States Water Council and the Texas Environmental Flows Advisory Group. He also serves as an ex-officio member of the Texas Farm and Ranch Lands Conservation Council. Mr. Bruun received a bachelor's degree in business administration from the University of Texas at Austin and a law degree from the University of Texas School of Law. He is a member of the State Bar of Texas.

Tribal Settlements

Settlement Option

Adjudication v. Settlement

Federal Negotiating Teams

Federal Policy

Colorado River Basin

Little Colorado River Adjudication

STATE-TRIBAL WATER RIGHTS SETTLEMENTS UPDATE

Compiled by David Moon, Editor

Introduction

Tribal water rights settlements in the United States have been increasingly implemented over the last few decades. The importance of these settlements — not only for tribes but for all water users impacted by the settlements — cannot be overstated. In many cases, the reserved water rights of the tribes have been long dormant and water users are only now faced with the consequences of tribes asserting their rights.

During our first 13 years of publication, *The Water Report* has extensively covered tribal water rights issues. Adjudication of water rights has taken on particular importance in the West and such litigation or the threat of it has brought settlement options to the forefront for tribal water rights. A comprehensive overview appeared in 2008: "*Indian Water Rights: The Era of Settlements*" by Jeanne S. Whiteing, Whiteing & Smith (*TWR* #51). *The Water Report* wants to express special thanks to Michelle Bushman and the Western States Water Council for providing information for this update. Without their help, this article would not have been possible.

Adjudications and other forms of litigation of tribal water rights are expensive, extremely time-consuming, and outcomes are uncertain. Tribes have increasingly turned to settlements as a way to avoid litigation while determining the extent of their water rights. Importantly, settlements can also provide flexibility by addressing other outstanding issues, such as water quality or funding of needed tribal water systems, that cannot be dealt with in an adjudication proceeding — which is limited to the determination of water rights.

This article provides an update of tribal water rights settlements in 11 of the western states, providing basic information on the settlements progress and status. Sources of information for this update include: information from members of the Western States Water Council; status updates and other documents in court cases; testimony and reports before Congress and State Legislatures; the Department of the Interior's list of Federal Indian Water Rights Negotiating Teams; summaries from State water rights websites and the Native American Rights Fund; and supplemental information from some local news articles.

In regard to the various Federal Water Rights Negotiating Teams mentioned at times in the article, *see* Mecham, *TWR* #111: "*Indian Water Right Negotiations: Interior's Considerations When Appointing Federal Negotiation Teams.*"

Recommended reading on this subject includes an article in the August 15, 2015 issue of *The Water Report* (#138*)* by L. Michael Bogert of Parsons, Behle & Latimer, entitled "*Federal Water Policy & Indian Water Rights Settlements*." Another recommended article focusing on Pacific Northwest tribes, is "*Indian Reserved Rights in the 21st Century: Recent Developments in the Pacific Northwest*" (*TWR* #154: Dec. 15, 2016) by Duane Mecham, Acting Deputy Director of the Secretary's Indian Water Rights Office, US Dept. of the Interior.

Arizona

Hualapai Tribe

In 2011, the United States established a Federal Water Rights Negotiating Team to negotiate a comprehensive settlement of all the Hualapai Tribe's water rights claims in the Colorado, Verde, and Bill Williams River basins. The Tribe entered discussions with the Arizona Department of Water Resources (ADWR), the Salt River Project (SRP), and the Central Arizona Water Conservation District (CAWCD) regarding the Tribe's claims to the Colorado River and groundwater for its main reservation, as well as other waters for lands held in trust. Following a change application filed by Freeport Minerals Corporation, to sever and transfer surface rights on a ranch to wells near its mines, the Tribe also entered negotiations with Freeport and others regarding water rights claims in the Bill Williams watershed. In 2012, the negotiations were consolidated, but bifurcated into two phases for practical reasons (some of the water rights at issue faced forfeiture within a timeframe too short to complete a comprehensive settlement). In June 2014, Phase 1 of the settlement was complete and was introduced to Congress as the Bill Williams River Water Rights Settlement Act. The Act, which did not require any appropriations, was passed and signed into law December 2014 (Pub. L. 113-223), and became enforceable on December 11, 2015. Phase 2 of the comprehensive settlement continued forward in 2016, to resolve the Tribe's remaining water rights claims to water from the Colorado River, the Verde River, and the Bill Williams River.

Navajo Nation / Hopi Tribe / San Juan Southern Paiute Tribe

The Tribes and Nation are part of the Little Colorado River adjudication, started in 1978, *In re: The General Adjudication of all Rights to use water in the Little Colorado River System and Source* (Superior Ct. No. 6417). Settlement negotiations started as early as 1995. In 2008, the preliminary Hydrographic Survey Report (HSR) for water uses on the Hopi Reservation was released by the ADWR. In 2010, the Court delayed the litigation schedule for substantive progress toward a settlement agreement. The draft settlement was approved in 2010, and after some further modifications, the settlement was introduced for

Tribal Settlements

Congressional approval in 2012, but did not pass. In the meantime, the parties agreed that ADWR should continue working on the final Hopi HSR, and in 2011 various legal matters were briefed.

Hopi HSR

Objections to the Hopi HSR were filed in 2013, and the Court requested a final HSR by December 2015. In 2016, the Special Master reviewed objections to the HSR for the Hopi Reservation, and after oral arguments found that the objections did not satisfy the statutory requirements. The Navajo Nation filed a motion to request additional information about the Hopi Tribe's water rights attributes and about their experts. The Special Master reviewed over 90 title documents, and in September 2016 submitted a report on priority dates for land acquired by the federal government in the Hopi Reservation. For the Navajo Nation, ADWR will be preparing three HSRs in the next three years, and the Navajo Nation will be filing amended claims to deal with separate categories of water uses. The United States' expert reports were due in January 2017, and the Navajo Nation requested a two-month extension for their expert reports, which was granted. The Special Master set a hearing for March 1, 2017, to consider objections and information contained within the parties' expert reports.

Navajo HSRs

San Carlos Apache Tribe

The United States obtained water entitlements for the Tribe with the Globe Equity Act of 1935. The full extent and nature of the Tribe's rights were uncertain, however, and the Tribe's claims became part of the *General Adjudication of the Gila River System and Source*. The Tribe entered into a Central Arizona Project (CAP) contract for water from the Black River in 1980. The CAP allocation of water and the Tribe's ability to lease the water off-reservation was modified under the 1992 Water Rights Settlement Act and subsequent 1999 Settlement Agreement.

Gila River Adjudication

The 2004 Arizona Water Rights Settlement Act (Pub. L. 108-451) included a placeholder to preserve the Tribe's water rights claims while settlement negotiations continued on remaining claims, and appropriated funds for technical and legal efforts toward settlement negotiations, as well as funds to complete the San Carlos Irrigation Project started in the 1930s.

In 2006, the Tribe argued to the Arizona Supreme Court that its reserved water rights should not be limited by the 1935 Globe Equity Act, but the Court disagreed (*Gila VI*, 127 P.3d 882).

Consent Decree Limitation

Editor's Note: On February 9, 2006, the Arizona Supreme Court (Court) issued an order on an interlocutory appeal from the Gila River general stream adjudication, holding that a consent decree entered in 1935 in a federal court case precludes claims by the San Carlos Apache Tribe (Tribe) to additional water from the Gila River mainstem. The court decided, however, that the Tribe's claims for additional water from tributaries of the Gila River were not included in the 1935 decree and, therefore, can be pursued in the present adjudication proceeding. The consent decree from the earlier case came to be known as the Globe Equity Decree (1935 Decree).

All the issues in the case [before the Court] "turn on the preclusive effect of the 1935 Decree" (Opinion, page 8). As noted by the court in its Opinion at page 11, "claim preclusion" is a legal doctrine that was "formerly referred to as res judicata."

Tribal Claims Precluded

Among other arguments, the Tribe maintained that the 1935 Decree adjudicated only its appropriative rights and not aboriginal or *Winters* Doctrine rights, while other parties claimed that the Decree adjudicated all claims of the Tribe to the mainstem. The court concluded: "Based on the language of the Complaint, the Amended Complaint, and the Decree, we conclude that all of the Tribe's water rights, under all theories, to the Gila River mainstem were placed at issue and resolved in the Globe Equity litigation. The Decree precludes all further claims to the mainstem of the Gila River by the parties to the Decree." Opinion, page 33. From: Water Briefs, *TWR* #26: April 15, 2006.

Federal Reserved Rights

Since at least 2005, the Tribe has been involved in the San Pedro River Watershed consolidated cases (W1-11-1174), objecting to half of the United States' thirty Public Water Reserve No. 107 federal reserved rights claims to springs located either on or near the southwest boundary of the reservation. Part of the problem is that the location of the reservation boundary is disputed between the Tribe and the United States. By 2014, the location of the springs and their direction of flow had been determined, and the Tribe and the United States were working on a settlement agreement. By April 2016, the United States and the San Carlos Apache Tribe submitted a Joint Report, as well as a Stipulation to Resolve Objections from the Gila River Indian Community, the SRP, the Yavapai-Apache Nation, and the Tonto Apache Tribe over sixteen of the water rights claims. In a September 2016 Status Report, the United States was reviewing the issue of whether to maintain its state-based claims for three springs. By the January 2017 Status Report, the United States had withdrawn those claims. The final stipulations and pleadings to complete settlement were due to be submitted to the Special Master by March 3, 2017.

Reclamation MOU

In 2013, the Tribe and the Bureau of Reclamation signed a Memorandum of Understanding (MOU) that gives the Tribe access to the Black River and authorizes negotiations for a contract to deliver decreed and non-decreed water from the Black River to the reservation and adjoining areas.

Tohono O'odham Nation

Unresolved Claims

Parts of the Nation's water rights settlements were resolved in the 1982 Southern Arizona Water Rights Settlement Act and Title III of the 2004 Arizona Water Settlements Act. The Nation still has unresolved claims in the Sif Oidak District. The Nation approved a settlement proposal in 2009 on the Sif Oidak claims. In 2011, the Department of the Interior appointed a Federal Indian Water Rights Negotiating Team

Tribal Settlements

Mexico Issues

CAP Contract

CAP Allocation

Verde Ditch Operations

Jurisdiction Issue

Santa Margarita River Adjudication

Quantification

Settlement Approved

to assist in settling the Nation's water right claims, on the condition that the negotiation be a comprehensive settlement of the Nation's remaining claims in Arizona. The Negotiating Team agreed to exclude issues involving groundwater pumping in Mexico, as well as surface waters flowing to and from Mexico. The comprehensive negotiations include nine districts in addition to Sif Oidak. The Negotiating Team agreed to resolve the Sif Oidak claims while issues involving the remaining nine districts are researched and discussed. Negotiations continued through 2016.

Tonto Apache Tribe

In 1980, the Tonto Apache Tribe signed a water delivery contract with Central Arizona Project (CAP), but the location of the reservation made it physically impossible to divert the Tribe's allocation until the nearby Town of Payson entered an agreement with the Salt River Project (SRP) to bring the water closer. The Tribe's allocation of CAP water is to be credited against its federally reserved water rights once they are quantified. In 2014, the Tonto Apache Tribe's request for a Federal Water Rights Negotiation Team, supported by the nearby Town of Payson, was granted, and negotiations between the Tribe, the United States, and ADWR continued through 2016. The parties are hoping to be able to introduce federal legislation in 2017.

Yavapai-Apache Nation of the Camp Verde Indian Reservation

The Nation has worked toward the negotiation and settlement of its federal water rights for over 40 years. The Nation is part of the statewide adjudication (*In Re General Adjudication of all rights to use water in the Gila River System and Source*). In 2004, the Nation was allocated 1,500 acre-feet of CAP water as part of the Arizona Water Settlements Act (Pub. L. 108-451). The ongoing request for a Federal Water Rights Negotiating Team began in the 1980s and was finally granted in 2010. Negotiations stalled in 2011 over key provisions of the agreement. In 2013, the Nation was working with the Department of the Interior to secure funding through the technical assistance funds to ensure that the negotiations would continue.

In 2015, the Verde Ditch Company (VDC) and SRP sought to establish a procedure through an MOU for some VDC shareholders to confirm which water uses from the Verde Ditch are historic and to categorize types of water users. While the procedure is internal, qualitative, and not intended to replace the statewide adjudication of claims and their priority dates, quantities, purpose or season of use — the MOU excluded the Yavapai-Apache Nation claims and uses, despite the Nation's status as an irrigator and shareholder in the VDC. The Nation sought modifications to the MOU that would protect the rights of individual shareholders and provide a fair and transparent process, and important improvements were made. The VDC operates under a 1909 *Hance v. Arnold* case that governs the operations of the Verde Ditch, requiring Court approval of any subsequent modifications. When the VDC and SRP sought Court approval of the MOU in August 2015, the United States objected, arguing that the water rights were already before the statewide adjudication, and that the *Hance v. Arnold* court did not have jurisdiction. The court disagreed, and directed the SRP and VDC to proceed in drafting their new MOU. The United States appealed the decision to the Arizona Court of Appeals, Division 1 (*USA v. Verde Ditch, et al*., #15-0690), challenging the court's jurisdiction over the Verde Ditch. The appeal has been briefed, and oral arguments are scheduled for February 8, 2017. The new MOU has been postponed pending the outcome of the appeal.

Editor's Note: For information regarding Adjudications and Indian Water Rights Settlements in Arizona, see the Arizona Department of Water Resources website at: www.azwater.gov/AzDWR/SurfaceWater/Adjudications/default.htm#FinalHopiHSR

California

Cahuilla Band of Mission Indians / Pechanga Band of Luiseno Mission Indians / Ramona Band

In 1951, *United States v. Fallbrook Public Utility District, et al*. (3:51-cv-1247) initiated the adjudication of water rights in the Santa Margarita River Watershed, including the rights of the Pechanga, Ramona, and Cahuilla tribes. The tribal federally reserve water rights were acknowledged by a 1966 Fallbrook Decree, but were left unquantified. In efforts to avoid further litigation, the Pechanga worked collaboratively with their neighbors to develop mutual private agreements to share and manage the limited water resources. These efforts resulted in the Groundwater Management Agreement in 2006 and the Recycled Water Agreement in 2007; however, neither of the agreements addressed the scope of the Pechanga Band's overall water rights to the Santa Margarita River Watershed.

In 2006, the Pechanga Band sought settlement of the water rights claims and requested a Federal Water Rights Negotiation Team, which was granted in 2008. In the meantime, the Ramona and Cahuilla Bands sought to intervene in the *Fallbrook* case to quantify their respective water rights in the Santa Margarita River Watershed.

Negotiations began in 2008, and a settlement was completed in April 2016. The Pechanga Band of Luiseno Mission Indians Water Rights Settlement Act was approved by Congress as part of the Water Infrastructure Improvements for the Nation (WIIN) Act (S.612, §§3401 et seq.) on December 10, 2016, and signed into law by President Obama on December 16, 2016 (Pub. L. 114-322). The Act confirms the water

Tribal Settlements

rights settlement between the Pechanga Band, the United States, the Rancho California Water District, the Eastern Municipal Water District, and the Metropolitan Water District. It guarantees a permanent supply of water to the Pechanga Band, up to 4,994 acre-feet per year under the *Fallbrook* Decree, and provides coordinated water resource management among the Tribe and Water Districts within the Santa Margarita Basin. It also authorizes $28.5 million for water quality, infrastructure, recycling, and delivery.

Tule River Indian Tribe

Storage Construction

The Tribe began efforts to secure its water rights in 1971. In 2007, the Tribe successfully settled its water rights in an agreement with water users on the South Fork Tule River, quantifying their reserved rights while allowing non-tribal neighbors to continue their historic uses. The agreement is between the Tribe, the Tule River Association, and the South Tule Independent Ditch Company, and recognizes the Tribe's consumptive right to water in the amount of 5,828 acre-feet per year and the right to construct adequate storage to put that quantity of water to beneficial use.

Since then, the Tribe has sought Congressional ratification of the settlement agreement and funding for infrastructure and storage reservoirs on the Tule Reservation to enable the Tribe to access the water. Bills introduced in 2007, 2008, and 2009 did not pass. In 2013, the Water Settlement Technical Report was completed, an important step toward implementation and ratification of the settlement agreement. As of December 2016, the Tribe continued to negotiate with the United States to reach agreement on an infrastructure plan and associated costs.

Agua Caliente Band of Cahuilla Indians

Reserved Right: Groundwater Source

After more than 20 years of efforts to resolve concerns over the quality and quantity of water in the aquifer underlying the Coachella Valley, the Agua Caliente Band of Cahuilla Indians filed a lawsuit in May 2013, *Agua Caliente Band of Cahuilla Indians v. Coachella Valley Water District, et al*. (U.S. District Court, Central District of California, EDCV 13-883). The case asks the Court to declare and quantify the existence of the tribe's water rights as the senior rights in the Coachella Valley under federal law. In March 2015, the Court ruled on summary judgment that the Agua Caliente Band of Cahuilla Indians has a reserved right to water, and groundwater is a water source available to fulfill that right. The Court denied the Tribe's claim for aboriginal title to groundwater.

The water districts filed a petition with the 9th Circuit Court of Appeals for interlocutory review of the portion of the District Court's order addressing the inclusion of groundwater in the Tribe's reserved right to water. The parties briefed the issue during the Fall and Winter of 2015-2016, and oral argument was held October 17, 2016. The parties are determining how Phase 2 of the case, which deals with issues such as water quality and what standards will be used to quantify the tribe's rights, will proceed.

9th Circuit Upholds Groundwater Right

Editor's Note: On March 7, 2017, the US Court of Appeals for the Ninth Circuit (9th Circuit or Court) upheld a federal district court's 2015 ruling that the Agua Caliente Band of Cahuilla Indians (Tribe) "has a reserved right to groundwater underlying its reservation as a result of the purpose for which the reservation was established." *Agua Caliente Band of Cahuilla Indians, et al. v. Coachella Valley Water District, et al*., Case No. 15-55896 (March 7, 2017); *Slip Op*. at 6. The decision is extremely important for its precedence value in western water law, as the Court itself noted "...we recognize that there is no controlling federal appellate authority addressing whether the reserved rights doctrine applies to groundwater." *Id*. at 5. The 9th Circuit's decision was based on the finding that the "United States impliedly reserved appurtenant water sources, including groundwater, when it created the Tribe's reservation in California's arid Coachella Valley." *Id*. The unanimous three-judge panel's decision, written by Judge Richard Tallman, is the first time a federal appeals court held that the *Winters* doctrine encompasses groundwater.

Moon, *TWR* #158 (April 15, 2017) *see also* Moon, *TWR* #134.

Idaho

Coeur d'Alene Tribe

Lake Level

In 2008, Idaho initiated the Coeur d'Alene-Spokane River Basin Adjudication (Case No. 49576). The United States filed 353 federal reserved water right claims on behalf of the Coeur d'Alene Tribe, many of which are aimed at maintaining the current water elevation level of Lake Coeur d'Alene. In 2014, the Idaho Legislature passed a resolution (HCR 062) in support of negotiation efforts (rather than prolonged litigation) to settle the Tribe's claims.

Settlement Discussions

In August 2015, the Coeur d'Alene Tribe, State of Idaho, the United States, and other stakeholders lodged a Memorandum of Agreement (MOA) with the Coeur d'Alene-Spokane River Basin Adjudication (CSRBA) (Subcase No. 91-7755) outlining the framework for pursuing settlement discussions regarding the Tribal claims. In 2016, caucus meetings were held in March and October for those objecting to claims.

Basin Claims

As of the April 2017 Status Report, 11,830 water rights claims have been filed across five CSRBA basins, with 7,624 claims remaining to be reported to the Court in 2017-2018. Approximately 85,000 objections have been filed on 445 Federal Reserved Rights water claims, of which 353 are Bureau of Indian Affairs sub-cases. The Director's Report has been filed in four basins, and the preliminary Director's Report is expected for the fifth basin in the Summer/Fall of 2017. *See* Idaho Dept. of Water Resources website: www.idwr.idaho.gov/water-rights/adjudication/.

Tribal Settlements

Kansas

Kickapoo Tribe

Reservoir Proposed

In 1994, the Kickapoo Tribe entered into an agreement with the Nehama Brown Watershed Joint District No. 7 (Watershed District), the Watershed Plan and Environmental Impact Statement for the Upper Delaware and Tributaries Watershed. Under the agreement, the parties planned to jointly develop a reservoir project and construct multiple dams to address the Tribe's water rights and needs, as well as improve soil conservation and flood prevention.

The reservoir has not been built, and water resources in the watershed continued to be developed by the non-Indian community. In 2006, the Tribe filed suit in the U.S. District Court of Kansas, *Kickapoo Tribe of Indians of the Kickapoo Reservation in Kansas v. Nehama Brown Watershed Joint District No. 7* (Case No. 06-cv-2248). The Tribe's claims focused in part on contract interpretation, and whether the contract unambiguously required the Watershed District to exercise its power of eminent domain to condemn non-Indian-owned land for the reservoir project that the Tribe was unable to acquire on its own.

Contract: Interpretation & Condemnation

In 2007, the parties took a break from litigation to explore settlement possibilities, where the Tribe's senior reserved water rights were acknowledged. The parties discussed "the amount of water needed to satisfy the Tribe's rights, the source of that water, and the means to effectively collect, store and deliver that water." In 2010, the State of Kansas and the Tribe were able to draft a Condemnation Agreement for the water storage project, but the Watershed District rejected the agreement in 2011. The Federal Court found in favor of the Watershed District regarding the interpretation of the contract. The Tribe has purchased approximately 80% of the land rights needed for the project, and is evaluating an alternative means to secure the remaining land.

Municipal Build-Out v, "PIA" Method

Negotiations continued from 2011-2016. On September 8, 2016, the State of Kansas and the Kickapoo Tribe of Kansas settled the decade-long lawsuit. The Water Rights Settlement Agreement recognizes the Tribe's senior water rights in the Delaware River Watershed, with an 1832 priority date. Direct use and storage allowances under the agreement were determined based on municipal build-out concept, using methods consistent with the Kansas law for Kansas water users. This method was determined by both the State and Tribe to be superior to the traditional method of quantifying Tribal reserve water rights based on "practicable irrigable acreage." The settlement includes an MOA that establishes clear and transparent procedures for communication, monitoring, and protection of the tribal water right, and provides a process of annual reviews by the State and Tribe to insure the MOA remains current, especially as the Tribe develops storage.

While downstream State water rights could be affected as the Tribe uses and stores water that formerly made its way downstream, very few water rights are immediately downstream of the reservation. The agreement will be forwarded to Congress for ratification with a request for the appropriation of funds for the construction of a reservoir in the area.

Settlement Components

Editor's Note: Some of the main components of the Settlement Agreement are:

- Delaware River Basin has sufficient water supplies to satisfy the rights of the Tribe without reducing established water rights of Kansas water right holders;
- Tribal Water Right (Right) consists of annual direct use amount plus maximum amount in storage: direct use of 4,705 acre feet for all present and future uses and annual indirect use – defined as evaporate and seepage values;
- Metering of Tribal consumption and annual water use reporting by Tribe to Kansas Division of Water Resources (DWR);
- Agreement specifies who may use the Right, where and under what conditions;
- DWR protects the Right in times of shortage, when non-domestic junior water users are impairing the Right (if DWR finds impairment, it curtails junior upstream rights to protect tribal usage);
- Tribe, State (and eventually the US) enter into a Memorandum of Agreement (MOA) setting out the specific administrative details for the Right and junior State water rights;
- Reporting, Cooperation and Communication between State and Tribe for access to Tribal property where/when necessary;
- Tribe will adopt a Tribal Water Code to govern tribal members' water use; and
- Judicial enforcement in case of disputes concerning the interpretation and implementation of the Settlement Agreement and MOA.

See Water Briefs, *TWR* #152: Oct, 15, 2016.

Montana

Blackfeet Nation

Water Rights Compact

The Blackfeet Nation, the United States, and the State of Montana entered into a water rights compact after 20 years of negotiations. *See* "*Blackfeet Water Rights Compact: Montana Compact Commission Approval*" (*TWR* #39, Water Briefs: May 15, 2007). The compact was approved by the Montana Legislature in 2009. The compact will provide water and economic development for the Blackfeet Nation while protecting the rights of water users locally and downstream on the Milk River. Legislation to ratify the compact was introduced in Congress in 2010, 2011, and 2013. The 2015 iteration was introduced

Tribal Settlements

Compact Commission

in the Senate as S.1125, and passed in December 2016 as part of Title III of the Water Infrastructure Improvements for the Nation (WIIN) Act (Pub. L. 114-322). The members of the Blackfeet Nation voted to approve the compact on April 20, 2017. The Compact and Settlement will provide more than $470 million for water related projects, according to the Nations (federal contribution of $422 million and Montana contribution of $49 million).

Editor's Note: The settlement process utilized by the state of Montana is unique among the states for water right negotiations. The 1979 Montana Legislature established the Reserved Water Rights Compact Commission (RWRCC) as part of the state-wide general stream adjudication process to negotiate settlements with Montana Indian tribes and federal agencies claiming reserved water rights within Montana.

The RWRCC's mission was to conclude compacts for the equitable division and apportionment of waters between: the State of Montana, its people and the several Indian tribes claiming reserved water rights within the state (MCA 85-2-701); and the State, its people and the federal government claiming non-Indian reserved water within the state (MCA 85-2-703).

Eighteen reserved water right compacts have been negotiated and ratified by the Montana Legislature including seven Montana Indian reservations, national parks, forests and wildlife refuges, and federally designated wild and scenic rivers.

For info: Reserve Water Right Compact Commission and Compact Implementation website: http://dnrc.mt.gov/divisions/reserved-water-rights-compact-commission

Confederated Salish and Kootenai Tribes

Revised Compact Approved

Irrigation & Instream Flows

The Confederated Salish and Kootenai Tribes, the United States, and the State of Montana entered into a water rights compact after nearly 15 years of negotiations. In 2013, the Montana Legislature killed in committee a bill to approve the Compact, but after renegotiations of key provisions, relating to irrigation use and instream flows on the Reservation, the Montana Legislature approved a revised compact during its 2015 session. Federal legislation to authorize the compact was introduced in May 2016 (S. 3013). *See* Weiner & Stermitz, *TWR* #114; Water Briefs, *TWR* #119 & #132.

Editor's Note: The Compact makes new water available for commercial and irrigation use, ends the water administration void on the Flathead Reservation, allows for economic development under conditions of legal certainty on and off the CSKT Reservation, and facilitates completion of Montana's statewide general stream adjudication. The Compact will also establish a technical team with irrigator representation to implement irrigation project upgrades to protect historic irrigation use and meet Tribal in-stream flow targets. Water Briefs, *TWR* #135.

Gros Ventre and Assiniboine Tribes

Awaiting Congressional Approval

The Gros Ventre and Assiniboine Tribes share the Fort Belknap Indian Reservation. A compact between Montana and the Gros Ventre and Assiniboine Tribes of the Fort Belknap Indian Reservation was ratified by the Montana Legislature in 2001. The compact protects water rights for domestic, livestock, and irrigation uses, as well as emergency use for public health and safety. Negotiations continue on a federal bill, which must be approved by Congress. A bill was introduced in Congress in 2011 and again in 2013, but no action has been taken.

For info: RWRCC website: http://dnrc.mt.gov/divisions/reserved-water-rights-compact-commission

Nevada

Walker River Paiute Tribe / Bridgeport Paiute Indian Colony / Yerington Paiute Tribe

1924 Litigation

Reservoir Claim

Groundwater Rights

Mediation

The Federal Court (Court) litigation over rights to and administration of the Walker River system began in 1924 — when the United States sued the Walker River Irrigation District (WRID) and others to quiet title to a federal reserved water right claim for the Walker River Paiute Reservation — after upstream users prevented water from reaching the Reservation (*United States v. Walker River Irrigation District*, (U.S. District Court for Nevada)). Following trial, the Court entered a judicial Decree in 1936, modified in 1940, which quantified the Tribe's water rights. In 1992, the parties requested the Court to address additional claims to water from the Walker River System under its continuing jurisdiction to administer the Decree. The Walker River Paiute Tribe's claims include the right to water from a reservoir built on the reservation in the late 1930s, federal reserved water rights for lands restored or added to the Tribe after 1936, and reserved rights to groundwater, none of which was addressed by the previous Decree. The United States made additional claims on behalf of the Bridgeport Paiute Indian Colony and the Yerington Paiute Tribe (among other military, BLM and National Forest federal claims). A Federal Water Rights Negotiation Team was assigned to the three Tribes in 1999.

In 2003, the parties engaged in Court-ordered mediation while litigation was stayed. By 2006, the parties had not agreed on any of the basic issues, and the Walker River Paiute Tribe withdrew from the mediation process. The stay was lifted and litigation continued forward. In June 2010, the Tribe began discussions with the States of Nevada and California regarding possible settlement options to resolve the Tribe's pending claims that may not have been explored during the past mediation efforts. A number of circumstances had changed since 2006 that led the Tribe to believe a settlement might be possible.

Tribal Settlements

Rights Expansion Precluded

In May 2015, the Court (Case No. 3:73-cv-127, In Equity No. C-125-B) granted a motion to dismiss the claims of the Walker River Paiute Tribe and the United States (including the Bridgeport Paiute Indian Colony and the Yerington Paiute Tribe), holding that the adjudication and 1940 Decree precluded an expansion of water rights in the Walker River or its branches or tributaries with the same senior priority dates. The Walker River Paiute Tribe and the US appealed the decision to the 9th Circuit (*United States et al. v. Walker River Irrigation District et al.* (15-16479)). A second appeal was consolidated with this one in October 2015. Briefing from the various parties continued and was scheduled to end March 3, 2017.
Editor's Note: *See* Walston, *TWR* #157, for a discussion regarding the Public Trust Doctrine and tribal water rights in the *Walker River* case.

New Mexico

Litigation Resumes

Pueblo of Jemez / Pueblo of Zia / Pueblo of Santa Ana

Adjudication of the Jemez River System began in 1983 with *United States v. Abousleman, et al.* (No. 83cv01041). The Special Master issued a report and recommended rulings in 1990 and again in 1995. The Court entered a partial final decree in 2000 on the non-Pueblo, non-federal water rights in the Jemez River System. The parties briefed their positions with regard to the Indian water rights claims in 2004. The parties then entered settlement negotiations, reaching Settlement Principles in 2008 to establish a framework for final resolution of the Pueblos' water rights claims. Negotiations were unsuccessful. In 2012, the parties resumed litigation. The parties briefed various threshold legal issues in 2013 through 2015. A decision on the threshold issues is still pending.

Pueblo of Acoma / Pueblo of Laguna / Navajo Nation

The Rio San Jose adjudication proceeding began in 1983, *New Mexico v. Kerr-McGee Corporation* (New Mexico 13th Judicial District, CB-83-190-CV and CB-83-220-CV (Consolidated)). Six-month stays from litigation were sought and granted for purposes of settlement negotiations in early 2014 and 2015. In May 2015, the United States, the Pueblos of Acoma and Laguna, and the State of New Mexico engaged a retired judge as a mediator and, after extensive mediation sessions and meetings, the parties made substantial progress toward a comprehensive settlement agreement. In October 2015, the United States, the Pueblos of Acoma and Laguna, and the State of New Mexico filed a joint motion to extend litigation deadlines. The Court granted the motion in January 2016. In May 2016, the court granted a similar motion to vacate pre-trial deadlines, with the exception of hearings to preserve expert testimony. As of the November 2016 Status Report, the parties had a provisional agreement and continued to meet regularly to pursue final settlement terms. The parties were looking at alternative long-term water supplies and water quality data, and assessing the best design and costs to build storage and delivery infrastructure to provide "wet" water to the Pueblos. They identified two hydrologic models to evaluate the water supply options.

Provisional Agreement

Storage Delivery

Zuni Tribe / Ramah Navajo Nation

The Zuni River adjudication, *United States* [now *New Mexico*] *v. A&R Productions, et al.* (US Dist. Ct. No. 01-cv-0072) was filed in 2001. Most of the non-tribal claims in the adjudication have been resolved. In 2007, the tribal claims became part of sub-proceedings. In 2013, the parties requested a stay of the case to explore settlement negotiations. In 2014, the United States, Zuni Tribe, Navajo Nation, and the State of New Mexico completed several depositions and prepared a *Negotiation Process and Confidentiality Agreement for Settlement Discussions Concerning the Zuni River Cases in New Mexico*. They also created a negotiation technical committee to work on a hydrologic model and technical reports relevant to the sub-proceeding. Per Joint Status Reports filed with the court each June and December (2014-2016), the Zuni Tribe continues to work with the United States on drafting a settlement proposal, while the technical committee continues to meet regularly to develop a model to assist settlement and administrative initiatives.

Hydrologic Model & Technical Reports

Editor's Note: For information about Indian Water Rights Settlements in New Mexico, see the State Engineer's website at: www.ose.state.nm.us/Legal/settlements_IWR.php; Myron Armijo, Native American Tribal Liaison with the Office of the State Engineer, 505/ 383-4091 or myron.armijo@state.nm.us

Oklahoma

Choctaw / Chickasaw Nations

2011 Lawsuit

In 2011, following a decade of negotiation relating to Oklahoma's water plan, the Chickasaw and Choctaw Nations filed a lawsuit in the U.S. District Court for the Western District of Oklahoma (*Chickasaw Nation et al. v. Fallin et al.*, Case 5:11-cv-927) against the State of Oklahoma and Oklahoma City over management of southeastern Oklahoma surface water, including the removal of water from Sardis Lake to be pumped through a pipeline to Oklahoma City. *See* Moon, *TWR* #91.

Allotments

The Chickasaw and Choctaw Nations in Oklahoma do not have reservations, since the lands were allotted to individual tribal members, owned in fee simple by the Tribal members. In some cases, land allotments have been transferred to non-Indian owners. However, there are multiple treaties between the Tribes and the U.S. Government that may impact the extent of the Tribes' rights to water.

In 2012, the parties mediated for a year, creating a panel of interested stakeholders and laying the foundation for settlement negotiations. Negotiations commenced in 2013, and in August 2016,

Tribal Settlements

Ownership & Authority

Lake Level

Municipal Supply

Federal Debt

Out-of-State Use

the Chickasaw and Choctaw Nations, Oklahoma City, and the State of Oklahoma were able to reach an agreement. The settlement was approved by Congress as part of the WIIN Act (S.612, §3608) on December 10, 2016, and signed into law by President Obama on December 16, 2016 (Pub. L. 114-322). The settlement resolves long-standing questions and multiple court actions over water rights ownership and regulatory authority over the waters of the Choctaw and Chickasaw Nations' historic treaty territories, particularly water use conflicts over Sardis Lake and Kiamichi Basin in southeastern Oklahoma. *See* Water Briefs, *TWR* #151.

The agreement provides a framework that fosters intergovernmental collaboration on water resources management and future allocations, ensuring that the Choctaw and Chickasaw Nations have a voice in specific proceedings addressing water resources within their treaty territories. It also protects existing water rights and current and future water needs of communities throughout the region, and affirms the role of the State and the Oklahoma Water Resources Board in water rights permitting and administration. The agreement will implement a system of lake level release restrictions for Oklahoma City's measured use of Sardis Lake and the Kiamichi River for municipal water supply purposes, while supporting critical recreation, fish and wildlife uses through the Oklahoma Department of Wildlife Conservation's lake level management plan. It also resolves the outstanding debt owed to the federal government associated with Sardis Lake. The settlement calls for a commission to evaluate the impacts of future proposals for out-of-state water use or diversion, which would remain subject to State legislative authorization. If the Oklahoma Legislature approves such a proposal in the future, the agreement ensures that any proceeds would meet water and wastewater infrastructure needs, particularly in southeastern Oklahoma. *See TWR* #154: "*Oklahoma State - Tribal Settlement: Persistence & Shared Principles Result in Historic Water Agreement*" by Duane Smith & Brian Vance.

Oregon

Water Management

Confederated Tribes of the Umatilla Indian Reservation

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have worked with the State of Oregon, local irrigators and the US Bureau of Reclamation over many years to improve water management in the Umatilla Basin. The community collaboration produced the successful 1988 Umatilla Basin Project Act (Pub. L. 100-557), and allowed Tribal input into Oregon's Integrated Water Resources Strategy, completed in 2012.

Resources Modeling Tool

A Federal Water Rights Negotiating Team was assigned to the CTUIR in September 2012, beginning the formal negotiations of the federal reserved water rights, building on the relationships already developed between communities. In 2013, a technical team for the Tribe began developing a water resources modeling tool, using water data from Oregon and U.S. Geological Survey (USGS). The Oregon Water Resources Department (OWRD) began analyzing the Umatilla River Basin RiverWare Model in 2014 and provided feedback in early 2015. The CTUIR sought additional FY2016 Budget funding support from Congress in March 2015 for the technical and legal aspects of the water rights negotiations so that the current progress is not delayed. Additional phases of the USGS Umatilla Basin Groundwater Study are on hold until further funding is secured. In the meantime, negotiations and discussions continue, with topics including the protection of instream flows for fisheries and associated cultural traditions, while also providing water for economic and agricultural development.

For Info: CTUIR Water Resources, Director David Haire, 541/ 276-3447 or WaterResources@ctuir.org

Klamath Adjudication

Klamath Tribes

The 40-year Klamath Basin Adjudication has proceeded through Oregon's adjudication process to quantify the relative water rights of the Klamath River Basin. In an effort to settle portions of that litigation, the Klamath water settlement agreements attempt to resolve complex water and management issues between members of the United States, Klamath Tribes, Yurok Tribe, Karuk Tribe, States of Oregon and California, Upper and Lower Basin water users, and Power stakeholders.

In 2010, the Klamath Basin Restoration Agreement (KBRA) and Klamath Hydroelectric Settlement Agreement (KHSA) were reached, and the Upper Klamath Basin Comprehensive Agreement (UKBCA) was signed in April 2014. Implementation meetings began immediately and continued through 2015,while Congressional approval of the suite of Agreements (S.133) was sought. As contemplated in the UKBCA, the Klamath Tribes participated in the rules advisory committee formed by the OWRD, to assist in developing rules for the management of groundwater for the benefit of senior water rights holders.

Fishery Restoration

The KBRA, a regionally-brokered fishery restoration and water management deal, terminated on December 31, 2015, due to a lack of federal authorizing legislation. The KHSA and the UKBCA remain in effect, but are inter-dependent with the recently terminated KBRA. The parties conferred to determine the fate of the two remaining agreements and decide whether the goals of the KBRA could be achieved in some fashion. On April 6, 2016, the Department of the Interior, Department of Commerce, PacifiCorp, and the states of Oregon and California signed an amended KHSA and a new Klamath Power and Facilities Agreement (KPFA), with plans to follow a process administered by the Federal Energy Regulatory Commission (FERC) in order to remove four dams on the Klamath River by 2020. In September 2016,

Tribal Settlements

Dam Removal

PacifiCorp submitted the amended KHSA and dam removal plans to FERC for approval, with letters of support from the Department of the Interior and the National Oceanic and Atmospheric Administration sent in October 2016. That process is expected to continue through 2017.

For an excellent article that discusses the various agreements in the Klamath Basin is crucial to understanding the process, *see "Klamath Basin Restoration Agreement Terminates Due To Lack of Timely Authorizing Legislation - What's What & What's Next*" by Paul S. Simmons, Somach Simmons & Dunn (*TWR* #143: January 15, 2016).

Utah

Navajo Nation

In 2003, the Navajo Nation and the State of Utah executed an MOA to resolve the Nation's reserved water rights claims in Utah. Within a few years, they formulated basic points to resolve the Nation's claims. They also began requesting federal participation in the negotiation process. A Federal Water Rights Negotiation Team was assigned in 2013. In March 2015, Utah Governor Gary Herbert signed a legislative resolution to support the negotiated settlement of the federal reserved water rights claims. *See* Water Briefs, *TWR* #144: Feb. 15, 2016 for additional background information about the Settlement Agreement.

Federal Legislation

Federal legislation was introduced in the Senate as the Navajo Utah Water Rights Settlement Act (S. 3482) in November 2016. On March 23, 2017, the Navajo Nation Council (Council) sent out a press release concerning the Utah Navajo Water Rights Settlement, noting that Senator Orrin G. Hatch (R-UT) has introduced a congressional bill that seeks the approval of the Utah Navajo Water Rights Settlement to benefit the Navajo Nation and the state of Utah. The Council issued its support for the settlement in January 2015 when Council Delegate Davis Filfred (Mexican Water, Aneth, Teecnospos, Tółikan, Red Mesa), who represents five Navajo chapters in Utah, sponsored legislation supporting the proposed settlement, which would also provide funding for water infrastructure development for the chapters in Utah. For info: Crystalyne Curley 928/ 286-7918; nnlb.communications@gmail.com or www.navajonationcouncil.org/

Water Infrastructure

Washington

Lummi Nation / Nooksack Indian Tribe

In 1995, a Federal Water Rights Negotiation Team was appointed to help resolve disputes over groundwater. Litigation was filed in 2001 after negotiations stalled. A negotiated settlement was approved by the District Court in 2007. An appeal to the 9th Circuit was resolved in 2009, and a settlement over groundwater use for the Lummi Peninsula, part of the reservation, is currently being implemented. Conflict remains over water for the remainder of the reservation. *See* "*Tribal Groundwater Rights: Lummi Nation Settlement in Washington*" (*TWR* #46, Water Briefs: December 15, 2007).

Groundwater Settlement

The Nation and Tribe have been involved in addressing conflicts over water allocation in the Nooksack River watershed and participating in the State of Washington's Water Resource Inventory Area 1 (WRIA 1) Watershed Management Project. The parties hoped that collaboration in the WRIA 1 project, with its data collection and technical analyses, would resolve water resource concerns without litigation. The Lummi Nation and Nooksack Indian Tribe withdrew from settlement negotiations in 2010, sending a letter to the US Department of the Interior in 2011 to request litigation to quantify the tribal instream flow rights. The United States appointed a litigation team and hired technical experts.

Instream Flow Quantity

In 2013, the parties held a Water Supply Symposium in an effort to revive WRIA 1 efforts, and settlement negotiations have resumed. In June 2015, the Lummi Nation proposed a "conceptual settlement" to community stakeholders, seeking feedback. In 2016, tribal efforts continued to reach out to the State of Washington with its Water Rights Settlement Initiative.

CONCLUSION

The huge costs and risks of litigation inherent in the determination of tribal water rights is by now well understood by the various parties involved in the western United States. Negotiations, on the other hand, provide opportunites for compromise and flexibility, plus the inclusion in a settlement of other water issues that cannot otherwise be addressed in an adjudication. Although the final compromises are sometimes disputed fiercely by factions within either the tribal community or the water user community, in the final analysis settlements provide the opportunity to eliminate uncertainty, satisfy the important needs of all the parties, and establish working relationships for water systems for the future.

For Additional Information:
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See also TWR Index of Articles, *TRIBAL WATER RIGHTS* at*:* www.thewaterreport.com

WATER BRIEFS

PRODUCED WATER REUSE OK

OILFIELD REUSE

On April 26, the Oklahoma Water Resources Board (OWRB) released a detailed study designed to look at ways that water produced in oil and natural gas operations may be recycled or reused instead of being injected into underground disposal wells for disposal. "Oklahoma Water for 2060: Produced Water Reuse and Recycle" (Report) assesses potential alternatives to current practices of injecting produced water from oil and gas wells into disposal wells in Oklahoma. A 17-member Produced Water Working Group (PWWG), led by the Oklahoma Water Resources Board, was tasked with studying and recommending alternatives. The 266-page Report identified several options warranting further study, including treatment and reuse of produced water by local oil and gas operations, transfer to areas of high demand, and use of evaporation technologies.

Produced water is a term used in the oil and gas industry to describe water that is produced as a byproduct along with the oil and gas. This includes naturally occurring formation water associated with the oil and gas in the reservoir as well as water used in well drilling and completions activities that returns to the surface with the product over time. On December 1, 2015, in a press release to introduce formation of the PWWG, Governor Mary Fallin pointed out the need for the Report as follows: "Nearly 1.5 billion barrels of produced water were disposed underground in Oklahoma in 2014. Underground injection of produced water is correlated with recent earthquakes in Oklahoma and has led to the Oklahoma Corporation Commission reducing disposal volumes in certain areas."

The Report essentially concludes that the cost-effectiveness issue at this point makes oilfield reuse the most viable alternative to underground injection of produced water. The Executive Summary set out Key Findings. "Produced water re-use by the oil and gas industry is the most viable cost-effective alternative due to minimal water treatment needs and thus low treatment costs. Increased inter-organizational planning and sharing of resources to improve re-use viability are required. The oil and gas industry has built limited water pipeline networks to date; however, planned cooperative expansion of the water distribution systems over time would reduce conveyance costs and further facilitate produced water use for hydraulic fracturing." Executive Summary, page iii.

Turning to the issue of alternative reuse options for produced water, the Report notes limitations imposed by treatment costs. "Water treatment and desalination techniques of produced water should be further investigated and developed if the PWWG intends to reduce the majority of water produced in the state. Although current technologies are technically implementable, they appear impractical at this time. The cases presented in this report were found to be the most expensive strategies by more than four times current disposal costs. Water treatment at or near fresh water levels could produce water for power, industry, and other beneficial uses including the potential to be discharged and augment local stream flow; thereby making PW an added benefit rather than a liability." *Id*.

The Report also explored the evaporation option. "Evaporation techniques for produced water should be further investigated and developed. Due to low water treatment costs and potentially limited water conveyance requirements, evaporation technology could be a viable alternative to disposal." *Id*. at iv.

The Report sets forth seven recommendations for moving forward with disposal of produced water: (1) reduce the challenges to water reuse through targeted regulations and legislation (five subpoints regarding improving permitting); (2) further investigate methods to facilitate the re-use of produced water in oil and gas operations; (3) study further the feasibility of the transferring Miss. Lime produced water to the STACK play; (4) conduct a more detailed evaluation of evaporation as an alternative to injection; (5) identify research needs and potential funding partnerships to further accomplish the group's goals (includes economic feasibility, new technologies, potential agricultural uses, aquifer recharge, and other beneficial uses of treated water); (6) continue the PWWG or subgroups to identify opportunities to continue to push cooperative planning and development of new techniques, infrastructure, new legislation and regulatory structure; and (7) support and build upon the Water for 2060 Advisory Council 2015 water conservation findings and recommendations to the Governor and the Legislature to facilitate increased sharing of information and supplies between industrial users and promote industrial use of marginal quality waters. *Id.* at iv-v.

Reuse water quality issues are prominent where options outside of oilfield disposal are concerned. Among the recommendations for "research needs" (part 5) is the suggestion, "[I]dentify toxicological risks and protective water quality targets to ensure that the environment and public health are adequately protected under various reuse scenarios;" (*Id*. at v). The Report also includes a section on "Challenges, Opportunities and Risks," which includes discussions on:

- Cost to Transport and Treat Water for Re-use and Recycling
- Water Treatment Facility Bonding Requirements
- Ownership and Value of Produced Water
- Legal Custody of Water as it Relates to Potential Spills
- Right-of-Way and landowner negotiations
- Discharge Permit Challenges Including Timing

Ten representative cases were developed and further assessed by coupling a potential produced water user or alternative disposal method to an existing adjoining produced water source and evaluating the economics of each case in order for the PWWG to prioritize and make recommendations. The costs for the ten cases range from $0.57 per barrel of water to more than $7 per barrel of water.

For info: Report available at OWRB website: www.owrb.ok.gov/2060/pwwg.php

WATER BRIEFS

BORDER WALL & TREATY US 1970 TREATY RESTRICTIONS

The campaign promise of President Trump to "build a wall" and have Mexico pay for it has run into more than just the political and monetary issues raised by opponents in the US. The US has a treaty with Mexico which deals directly with the issue of "construction works" by either country in the floodplain of the Rio Grande or Colorado River. This is of particular importance for the Rio Grande, as it forms the border with Mexico for some 1,254 miles of the total of 1,954 miles of border. The actual title of the Treaty illustrates what it involves: "*Treaty to Resolve Pending Geographical Differences and Maintain the Rio Grande and Colorado River as the International Boundary.*" The International Boundary and Water Commission (IBWC), which is composed of a United States Section and a Mexico Section, oversees the Treaty, as well as other aspects of the border and water resources in both countries.

"The Treaty of November 23, 1970 resolved all pending boundary differences and provided for maintaining the Rio Grande and the Colorado River as the international boundary. The Rio Grande was reestablished as the boundary throughout its 1,254-mile (2,019 km) limitrophe section. The Treaty includes provisions for restoring and preserving the character of the Rio Grande as the international boundary where that character has been lost, to minimize changes in the channel, and to resolve problems of sovereignty that might arise due to future changes in the channel of the Rio Grande. It provides for procedures designed to avoid the loss of territory by either country incident to future changes in the river's course... ." IBWC website: www.ibwc.gov/About_Us/About_Us.html.

President Trump's push to construct a border wall could violate the Treaty's provisions that govern construction in the floodplain of the Rio Grande. "Both in the main channel of the river and on adjacent lands to a distance on either side of the international boundary recommended by the Commission [IBWC] and approved by the two Governments, each Contracting State [US and Mexico] *shall prohibit* the construction of works in its territory which, in the judgment of the Commission, may cause deflection or obstruction of the normal flow of the river or of its flood flows." Article IV, B (1), Treaty of November 23, 1970, page 21 (emphasis added). In an interview with NPR reporter John Burnett, the chief Mexican engineer on the IBWC, Antonio Rascón, raised the issue: "For us, we are not in agreement with construction of a wall in the floodplain that affects the trans-border flow of water. In general, we have been complaining about the fence since 1992. We're talking 25 years. That's when they installed the first fence in San Diego, and it's been advancing and advancing."

The Treaty sets forth the remedy if either the US or Mexico violates this prohibition: "If the Commission [IBWC] should determine that any of the works constructed by one of the two Contracting States is in the channel of the river or within its territory causes such adverse effects on the territory of the other Contracting State, the Government of the Contracting State that constructed the works shall remove them or modify them and, by agreement of the Commission, shall repair or compensate for the damages sustained by the other Contracting State." Treaty, Article IV, B(2), page 22. In other words, if the Commission finds that a US wall caused "adverse effects," the Treaty obligates the US to remove or modify the "works" and either repair or compensate for any damages suffered by Mexico.

For info: International Boundary and Water Commission website at: www.ibwc.gov/home.html; Treaty available at: www.ibwc.gov/Treaties_Minutes/treaties.html

CONSERVATION CHANGES CA STANDARDS RESCINDED

On April 26, California's State Water Resources Control Board (SWRCB) rescinded the water supply "stress test" requirements and remaining mandatory conservation standards for urban water suppliers, while keeping in place water use reporting requirements and prohibitions against wasteful practices. The action was in response to Governor Brown's announcement of April 7 that after unprecedented water conservation and plentiful winter rain and snow, the Governor was ending the drought state of emergency in most of California.

The Governor's executive order directed SWRCB to keep in place the temporary requirements for monthly water use reporting and prohibitions against wasteful water use practices while the Board works to develop permanent reporting and wasteful use regulations. The temporary requirements will remain in effect until November 25, when the emergency regulation expires.

The current prohibitions against wasteful water use practices include outdoor watering during or within 48 hours after a rain event; hosing down a sidewalk instead of using a broom or a brush; overwatering a landscape to where water is running off onto the sidewalk or into the gutter; and irrigating ornamental turf on public street medians.

The long-term conservation framework, also released April 7, includes recommendations to establish permanent water conservation standards and improved agricultural and urban water management planning to better prepare for more frequent and severe droughts due to climate change. As part of the framework, the Governor released proposed legislation to establish long-term water conservation measures and improved planning for more frequent and severe droughts.

Among other things, the proposed legislation:

- Requires SWRCB, in consultation with the Department of Water Resources, to set long-term urban water use efficiency standards by May 20, 2021
- Includes a robust public participation process to provide SWRCB and DWR with critical input from local agencies, tribal governments, nongovernmental organizations, the business sector, academics, and others
- Requires urban water suppliers to plan for droughts lasting five or more years
- Establishes new drought planning

WATER BRIEFS

and water efficiency reporting requirements for agricultural water suppliers

For info: Kathy Frevert, SWRCB, kathy.frevert@waterboards.ca.gov or http://saveourwater.com/

COAL STRIP MINE — AK

CHUITNA PROJECT SUSPENDED

On March 30, PacRim Coal, LP (PacRim), submitted a letter to the US Army Corps of Engineers (Corps) announcing its decision "to suspend pursuit of permitting efforts on the Chuitna Coal Project." PacRim proposed to strip-mine a riverbed and surrounding wetlands, which are spawning grounds for all five of the wild Pacific salmon species. The proposal for a 25,000 acre open pit coal mine included removal of 13.7 miles of the river bed from bank to bank and 350 feet down. The Native American Rights Fund (NARF) of Boulder, Colorado represented the Tubughna (the residents of the Native Village of Tyonek) in their opposition to the Chuitna Coal Project. *See* Moon, *TWR* #141 for additional details on the Chuitna Coal Project and related issues, including instream water applications and PacRim's traditional water right applications for the coal mine.

For nearly four decades, Native Village of Tyonek (NVT) has been fighting proposed coal development in the Ch'u'itnu (Chuitna or Chuit River) watershed. NVT sits just seven miles from the proposed project site, forty miles across Cook Inlet from Anchorage, Alaska, next to the mouth of the Ch'u'itnu. The project proposal consisted of a surface coal mine and associated support facilities. The project predicted a minimum 25-year mine life with a production rate of up to 12 million tons a year.

For other information concerning the Chuitna Coal Project see the Alaska Department of Natural Resources, Mining Land & Water website at: http://dnr.alaska.gov/mlw/mining/largemine/chuitna/.

For info: Wesley James Furlong, NARF, 907/ 276-0680 or wfurlong@narf.org

WATER EFFICIENCY — WEST

WATER CLOSETS STUDY

In a study released on April 18, the Alliance for Water Efficiency (AWE) and Plumbing Manufacturers International (PMI) found that water-efficient toilets could potentially save up to 170 billion potable gallons of water per year across five states facing water scarcity. The "Saturation Study of Non-Efficient Water Closets in Key States" focused on Arizona, California, Colorado, Georgia and Texas — all states that have experienced serious water shortages. The savings projected by the study could be achieved if non-efficient toilets in residential properties are replaced with water-efficient ones. This five-state savings can be extrapolated to an estimate of up to 360 billion potable gallons of water per year saved nationally.

This research produces important direction for water managers nationwide, as 40 out of 50 states anticipate water shortages in the coming years, according to a Government Accountability Office survey of state water managers published in 2013. Toilet flushing is the largest single indoor use of water, representing 24% of total use in single-family homes.

The five-state water savings estimate was calculated after the study's research determined that more than 13 million non-efficient toilets, with gallons per flush (gpf) of more than 1.6 gallons, remain installed in Arizona, California, Colorado, Georgia and Texas residences. These 13 million toilets comprise about 21% of all toilets installed in these states; therefore, about 79% of installed residential toilets in these states are already efficient at 1.6 gpf or less. At the current 4% annual toilet replacement rate, the potential savings illustrated in the study will not occur for another 15 to 30 years unless replacement programs are accelerated.

At the federal level, proposed cost cutting at EPA threatens the WaterSense program, a voluntary public-private partnership initiative to encourage the use of water-efficient toilets, showerheads, faucets, and other plumbing products. Through the use of the more than 16,000 WaterSense product models on the market, the nation has already saved more than 1 trillion gallons of water over the past 10 years.

For info: Report available at: www.allianceforwaterefficiency.org/AWE-PMI-Report.aspx; Megan Chery, AWE, 773/ 360-5100 or megan@a4we.org; Ray Valek, PMI, 708/ 352-8695 or ray@valekco.com

GROUNDWATER USE — UT/NV

DEVELOPMENT IMPACT STUDY

On April 14, USGS released a study concerning the cumulative effects of groundwater development on groundwater resources managed by, and other groundwater resources of interest to, the US Bureau of Land Management, the National Park Service, and the US Fish and Wildlife Service (collectively, "DOI agencies") in Snake Valley and surrounding areas in Utah and Nevada (Open-File Report 2017-1026). The new water uses that potentially concern the DOI agencies include 12 water-right applications filed in 2005, totaling approximately 8,864 acre-feet per year. To date, only one of these applications has been approved and partially developed. In addition, the DOI agencies are interested in the potential effects of three new water-right applications (UT 18-756, UT 18-758, and UT 18-759) and one water-right change application (UT a40687), which were the subject of a water-right hearing on April 19, 2016. For additional background on the Las Vegas water right applications, see Moon, *TWR* #119 and Water Briefs, *TWR* #136.

This report presents a hydrogeologic analysis of areas in and around Snake Valley to assess potential effects of existing and future groundwater development on groundwater resources, specifically groundwater discharge sites, of interest to the DOI agencies. A previously developed steady-state numerical groundwater-flow model was modified to transient conditions with respect to well withdrawals and used to quantify drawdown and capture (withdrawals that result in depletion) of natural discharge from existing and proposed groundwater withdrawals. The original steady-state model simulates and was calibrated

WATER BRIEFS

to 2009 conditions. To investigate the potential effects of existing and proposed groundwater withdrawals on the groundwater resources of interest to the DOI agencies, 10 withdrawal scenarios were simulated. All scenarios were simulated for periods of 5, 10, 15, 30, 55, and 105 years from the start of 2010; additionally, all scenarios were simulated to a new steady state to determine ultimate long-term effects.. Capture maps were also constructed. The simulations used to develop the capture maps test the response of the system, specifically the reduction of natural discharge, to future stresses at a point in the area represented by the model. These maps can be used as a tool to determine the source of water to, and potential effects at specific areas from, future well withdrawals.

Downward trends in water levels measured in wells indicate that existing groundwater withdrawals in Snake Valley are affecting water levels. The numerical model simulates similar downward trends in water levels. Simulated drawdowns in the model, however, are generally less than observed water-level declines. At the groundwater discharge sites of interest to the DOI agencies, simulated drawdowns from existing well withdrawals (projected into the future) range from 0 to about 50 feet. Following the addition of the proposed withdrawals, simulated drawdowns at some sites increase by 25 feet. Simulated drawdown resulting from the proposed withdrawals began in as few as 5 years after 2014 at several of the sites. At the groundwater discharge sites of interest to the DOI agencies, simulated capture of natural discharge resulting from the existing withdrawals ranged from 0 to 87 percent. Following the addition of the proposed withdrawals, simulated capture at several of the sites reached 100 percent, indicating that groundwater discharge at that site would cease. Simulated capture following the addition of the proposed withdrawals increased in as few as five years after 2014 at several of the sites.
For info: Report available at: https://pubs.er.usgs.gov/publication/ofr20171026; USGS Utah Water Science Center, http://ut.water.usgs.gov/

FISH CONSUMPTION US

RISK COMMUNICATIONS

The Office of Inspector General (OIG) of EPA issued a report on April 12 entitled *EPA Needs to Provide Leadership and Better Guidance to Improve Fish Advisory Risk Communications* (Report #17-P-0174). The overall finding of Report was that without EPA guidance and assistance, subsistence fishers, including tribes, will continue to consume unhealthy amounts of contaminated fish.

The Report found that some subsistence fishers, tribes, sport fishers and other groups consume large amounts of contaminated fish without health warnings. Although most states and some tribes have fish advisories in place, this information is often confusing, complex, and does not effectively reach those segments of the population. Fish advisories differ from state to state, between states and tribes, and across state and tribal borders, which in some cases leads to multiple advisories with conflicting advice for a single waterbody. In addition, although the EPA's risk communication guidance recommends evaluations of fish advisories, OIG found that less than half of states, and no tribes, have evaluated the effectiveness of their fish advisories.

The report also found that EPA has not assessed methylmercury as proposed in the agency's published Integrated Risk Information System (IRIS) agendas. EPA included methylmercury on its 2012 IRIS agenda for assessment, and on its 2015 IRIS agenda as a priority for assessment. However, to date, the agency has not commenced the assessment. Currently, EPA's 2001 reference dose for methylmercury is an agency-supported value that the EPA continues to accept for decision-making. Because of its importance in developing water quality standards, and ultimately fish advisories, the RfD (reference dose) should be accurate to ensure that effective fish advisory information is communicated.

The OIG Report recommend that EPA's Office of Water provide updated fish advisory guidance to states and tribes, work with states and tribes to develop best practices to evaluate the effectiveness of fish advisories, and develop and implement methods to ensure tribal members receive current fish advisory information. It was also recommended that EPA's Office of Research and Development conduct an assessment for methylmercury to determine whether the reference dose requires updating as proposed in the 2012 and 2015 IRIS agendas.

After receiving responses to the draft report from the two EPA offices, OIG met to discuss their comments. Based on the follow-up discussion and supplemental information provided by both offices, OIG found that their corrective actions and milestone dates met the intent of the recommendations (Appendix C); thus all of OIG's recommendations were resolved.
For info: Report available at www.epa.gov/office-inspector-general/oig-reports#2017

EMINENT DOMAIN US

CONDEMNATION WHITE PAPER

Students at the Texas A&M University School of Law on April 18th published a white paper offering a survey of eminent domain laws in Texas and around the country. "A Survey of Eminent Domain Law in Texas and the Nation" was prepared by the students and presented to members of the Texas Legislature. In light of eminent domain reform bills currently working their way through the Texas Legislature, it is clearly of interest. For example, Texas law does not currently have an attorney fee provision that would allow a landowner to recover his or her attorney's fees if they are able to recover more money for their property than was initially offered by the condemnor. This is one of the major changes that is included in the pending eminent domain reform legislation, Senate Bill 740, in the Texas Legislature (as of April 18th). This paper looks at the availability of attorney fee recovery across the nation and provides maps and discussions of what statutes exist in different states.
For info: PDF of the White Paper available upon request from *The Water Report*

CALENDAR

May 18-19 TX
7th Annual Water Reuse in Texas Conference, El Paso. TBA. For info: https://eventegg.com/water-reuse-texas/

May 19 OR
Oregon Source Control Conference, Portland. World Trade Center Two, 121 SW Salmon Street. For info: Environmental Law Education Center, 503-282-5220 or www.elecenter.com/

May 19 OR
Oregon State Bar Agricultural Law Section Annual "Round-Up" CLE Program, The Dalles. The Columbia Gorge Discovery Center. 10 am - 3:30 pm. For info: Janine Hume, 503/ 227-1111, jhume@sussmanshank.com or https://agsection.wordpress.com/

May 21-23 GA
2017 Industrial & Commercial Water Reuse Conference, Atlanta. Westin Peachtree Plaza. For info: https://watereuse.org/news-events/event-calendar

May 23 WEB
Enforcement and Compliance History Online (ECHO) Webinar, WEB. Presented by EPA; 1:30 pm EDT. For info: https://echo.epa.gov/ or https://echo.epa.gov/help/training#upcoming

May 23 WEB
Stormwater Finance Webinar: EPA's Water Infrastructure & Resiliency Finance Center, WEB. 2-3 pm EST. For info: www.epa.gov/waterfinancecenter/leading-edge-stormwater-financing-webinars

May 23 WEB
Innovating the Utility Business Model: Getting Creative With Revenue, WEB. 9 am PDT. For info: http://www.allianceforwaterefficiency.org/Innovating-Utility-Business-Model-Webinar.aspx

May 24 OR
The Art of Un-Rulemaking: How Does a Federal Agency Unwind a Federal Regulation It Has Already Adopted? CLE, Portland. Red Star Tavern, 503 SW Alder Street, Noon - 1:45 pm. Presented by the Energy, Telecom & Utility Law Section of the Oregon BAR. For info: RSVP to Tim McMahan at: tim.mcmahan@stoel.com

May 25 CA
2017 Santa Ana River Watershed Conference: Pressing Issues in the Watershed Spanning Orange, Riverside & San Bernadino Counties, Ontario. Ontario Convention Ctr. Convened by the Santa Ana Watershed Project Authority & Coordinated by Water Education Foundation. For info: http://www.watereducation.org/OWOW2017

May 29-June 2 Mexico
XVI World Water Congress: Bridging Science & Policy, Cancun. Organized by the International Water Resources Assoc. For info: www.worldwatercongress.com/

June 1-2 WA
Shoreline Regulation in Washington State Seminar, Seattle. Hilton Garden Inn Downtown. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

June 1-2 WA
Tribal Water in the Pacific Northwest Conference, Seattle. Courtyard Seattle Downtown/Pioneer Square. For info: Law Seminars Int'l, 206/ 567-4490 or www.lawseminars.com

June 6-7 Ireland
Blue Tech Forum 2017: Water and the 4th Industrial Revolution, Dublin. The Marker Hotel. For info: http://www.bluetechforum.com/

June 8 WEB
Long-Term Changes in the Quality of Our Nation's Rivers & Streams: National Water Quality Management Council Webinar, WEB. 10 am PDT. For info: https://doilearn2.webex.com

June 8 CA
Developing Water Resources in Southern California Seminar, Los Angeles. DoubleTree by Hilton Los Angeles Downtown. For info: Law Seminars Int'l, 206/ 567-4490 or www.lawseminars.com

June 8-9 CO
Fighting Back on the Colorado River: Carving Out Progress on Multiple Fronts: 2017 Martz Summer Conference, Boulder. UC School of Law, Wolf Law Bldg. Presented by Getches-Wilkinson Center. For info: www.colorado.edu/law/research/gwc/events

June 11-14 PA
ACE 17: Annual Conference & Exposition, Philadelphia. Pennsylvania Convention Center. Presented by American Water Works Association. For info: www.awwa.org/conferences-education/conferences/annual-conference.aspx

June 12-13 CA
2017 California Water Law & Policy MCLE Conference: "Coping With Drought, Floods & the New Federal Administration", San Francisco. Hotel Nikko. Presented by Argent Communications Group. For info: www.registrationheadquarters.com/events/

June 12-13 ID
Idaho Water Users Assoc. Summer Water Law & Resource Issues Seminar, Sun Valley. TBA. For info: IWUA, 208/ 344-6690 or www.iwua.org/

June 12-13 CO
Endangered Species Act, Wetlands, Stormwater & Floodplain Regulatory Compliance for Energy and Utilities, Denver. EUCI Offices, 4601 DTC Blvd., Ste. 800. For info: www.euci.com/event_post/0617-endangered-species-act/

June 12-14 FL
Nutrient Symposium 2017, Fort Lauderdale. Hyatt Regency. Presented by Water Environment Federation. For info: http://www.wef.org/Nutrients/

June 13 WEB
Diverse Uses of Volunteer Water-Quality Data: National Water Quality Management Council Webinar, WEB. 11 am PDT. For info: https://doilearn2.webex.com

June 14-16 CA
Bay-Delta Tour 2017, Delta. Sacramento-San Joaquin Delta. Presented by Water Education Foundation. For info: http://www.watereducation.org/tour/bay-delta-tour-2017

June 15 WA
Celebrate Water - Center for Environmental Law & Policy Annual Fundraiser, Seattle. Ivar's Salmon House. For info: CELP, http://celebratewater2017.bpt.me/ or http://celp.org

June 15-16 CA
California Wetlands Conference, Los Angeles. InterContinental Century City. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

June 16 CA
10th Annual Orange County Water Summit: Finding New Water Supplies, Anaheim. Grand California Hotel at Disneyland. For info: www.ocwatersummit.com/

June 20 OR
Managing Stormwater in Oregon: The Business of Stormwater Regulation & Compliance, Portland. Red Lion Hotel on the River - Jantzen Beach. Presented by the Northwesst Environmental Business Council. For info: www.nebc.org/ or www.stormwaterconf.com/or17/

June 20 NE
Republican River Basin-Wide Water Management Plan Meeting, Cambridge. Cambridge Community Center, 722 Patterson Ave. Hosted by Nebraska Dept. of Natural Resources. For info: http://dnr.nebraska.gov/RRBWP/project-and-meeting-schedule

June 20-22 NM
2nd Annual Conference on Environmental Conditions of the Animas & San Juan Watersheds (Emphasis on Gold King Mine & Mine Waste Issues), Farmington. San Juan College, Henderson Fine Arts Center. Presented by New Mexico Environment Department. For info: https://animas.nmwrri.nmsu.edu/2017/

June 21 TX
Dam Safety Workshop, Decatur. Decatur Civic Center. Presented by Texas Commission on Environmental Quality. For info: www.tceq.texas.gov/p2/events

June 22-23 WA
Clean Water & Stormwater: Executive Orders & About Face on Fed Policies, Adaptation at the State Level & What's Next Conference, Seattle. Washington State Convention Ctr. For info: Law Seminars Int'l, 206/ 567-4490 or www.lawseminars.com

June 22-23 NV
19th Annual Law of the Colorado River Conference, Las Vegas. Caesars Palace. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

June 27-29 CA
Western States Water Council Meeting - Summer 2017 (184th), Rohnert Park. DoubleTree by Hilton Sonoma-Wine Country. For info: WSWC, www.westernstateswater.org

June 27-29 LA
One Water Summit 2017, New Orleans. InterContinental New Orleans. Presented by US Water Alliance. For info: http://uswateralliance.org/summit/one-water-summit-2017

July 9-10 CA
Sustainable Groundwater Planning in California Seminar, Sacramento. Marriott Courtyard Sacramento Cal Expo. For info: Law Seminars Int'l, 206/ 567-4490 or www.lawseminars.com

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