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# WATER DEMANDS & UTILITY PRICING

**USING ECONOMICS TO PROMOTE UTILITY RESILIENCE**

by Amy Hardberger P.G., Saint Mary's University School of Law, San Antonio, Texas

### INTRODUCTION

Growing populations, limited resources, and climate change challenge municipal water supplies across the US. Historically, water has been undervalued — providing a perverse incentive for a utility to sell water rather than save it. Creating appropriate market signals can help remedy this situation and increase efficiency by assigning an accurate value to delivered water and sending price signals that beneficially impact behavior.

Society's ability to survive and thrive depends on the guarantee of sufficient water supplies. Yet, as current ongoing drought conditions and continuing population growth demonstrate, this is not a luxury upon which all locations can rely. Assuring sustainable water for all uses requires a hard review of how economics is applied to water.

Utilities are challenged to meet future water demands. To do this, they must accurately predict what a city's water needs will be. Traditionally, demand projections are calculated by extrapolating per capita for population projections. The danger is that demand projections often assume traditional use and do not include maximum reduction through conservation and efficiency. When usage changes in an unpredicted manner from unexpected weather changes or a spike in price, demand alters dramatically. This can create a revenue shortfall. Accordingly, many see any efforts to reduce usage as threats to the reliability of income to the utility — thereby creating an economic disincentive. However, that is not true. Revenues can be maintained as usage is reduced as long as the uncertainties are minimized.

To achieve supply longevity, customers should be aware of the importance of current supply and adjust their behavior accordingly. One way to affect demand before a shortage occurs is through appropriate pricing. Before scarcity forces a change in behavior, a customer's primary nexus for water use decisions is its price. As such, prices should reflect the value of current supply to encourage protection through conservation, efficiency, and value-based use decisions.

Current events in California illustrate some of these issues. Although the state has known drought before, the current event is being reported as the driest period in the state's recorded history and scientists worry that this is just the beginning (*see* Rogers, *California Drought: Past Dry Periods Have Lasted more than 200 Years, Scientists Say*, San Jose Mercury News (Jan, 25, 2014)). As crisis sets in, many solutions including new, expensive technologies are proposed. While an understandable suggestion, it is also ironic because despite the current shortage, Californians currently pay very little for the water they still do have. The average monthly water bill in California ranges from $40 - $70 depending on the region (*see* Wells, *West Coast Drought: Why California Water is so Cheap*, CNBC (May 28, 2015)). While water bills may well rise once current water resources are stretched to their limit, the price signal will be arriving too late. Unfortunately, this scenario is not unique to California.

## Water Pricing

### Market Prices

### Elasticity

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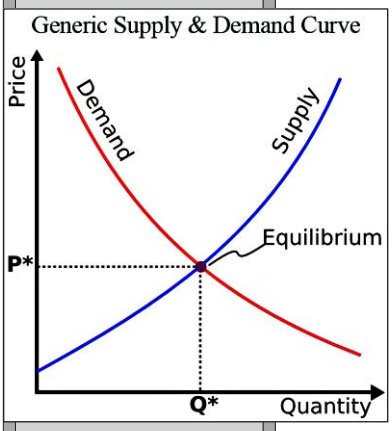
This article will briefly discuss how pricing works in a competitive market, providing a contrast to the generally monopolistic conditions under which water utilities function. Given the lack of open market forces to provide realistic and practical price signals, the article then discusses current municipal pricing challenges and offers suggestions on how to pursue a more sustainable, resilient, business model.

## MARKETS & PRICING

### Competitive Pricing

The supply and demand curve is one of the primary concepts taught in introductory economics classes. This curve is an economic model of price determination in a competitive market. Demand indicates what an item is worth to someone while supply reflects how much the market can offer. Although supply and demand are separate and can work independently with price, they often work together to determine the market price of an item.




In a competitive market, the unit price for a particular good will vary until it settles at a price point when the quantity demanded equals the quantity supplied. This results in an economic equilibrium for both price and quantity for the item. Markets are an effective system to allocate resources because when a good is in equilibrium, the price provides information to suppliers about the ideal price of, and demand for, that good.

It is a basic principle of economics that people make choices based on a rational self-interest. Based on this assumption, human behavior can be predicted once the costs and benefits associated with an option can be ascertained. Price is an obvious cost that might affect consumer decision-making. "In a market economy, prices are essential signals that tell producers and resource suppliers what and how much to produce" (Ekelund & Tollison, *Economics: Private Market and Public Choice* p10 (6th ed. 2000)). When a market goes out of equilibrium, price is what pulls it back. It is the automatic regulator that manages the balance between supply and demand. Prices also serve to allocate available commodities among competing end users. Demand and price have an inverse relationship. For most goods, as prices increases, the quantity demanded falls. For water, however, price elasticity of demand for water is only currently effective on certain types of "elastic" uses — generally non-essential uses such as outdoor watering. *See* Sidebar on Price Elasticity.

Intrinsic in a working market is the assumption that price moves goods towards their highest value use and increases overall efficiency. The ultimate goal of a market is to ensure that a good is obtained by the person who values it the most; however, with water another goal is also critical — i.e., that water does not run out. The hope is to use market mechanisms to effectuate this goal. Unfortunately, under current conditions price triggers to reduce demand most often only occur *after* the water use has outstripped available supply — i.e., essentially too late to avoid such drastic conditions.

### Municipal Water Utility Pricing Challenges

#### COST-OF-SERVICE PRICING

In the United States, municipal water rates are usually based on the water utility's cost of service. Law requires the utilities to charge reasonable rates without discrimination, while allowing for a fair rate of return on investment. Unfortunately, current cost-of-service models mandated in most areas dictate that citizens generally only pay for a utility's current costs, which may only include treatment and delivery and not a price reflecting the value of the actual water. The existing pricing model is problematic because it does not value water until there is not enough to go around. In addition, the existing pricing model has no mechanism for a rapid rate adjustment to affect behavior and scale back demand in emergency situations. This can lead to, and exacerbate, water shortages.

Cities have a heightened challenge for water because their populations continue to increase. The combination of population concentration and limited water in these areas could impact large numbers of domestic users as well as regional industrial and commercial sectors. Unlike their rural counterparts, urban dwellers depend on the municipality for the procurement and delivery of water to the point of use. Therefore, cities are not only responsible for the securing supply, they must also build and maintain the infrastructure needed for delivery and ensure it can maintain this service for newcomers.

Despite the varied array of uses and dependencies on water, existing legal water allocation schemes focus on property rights. This often does not effectively work to ensure water sustainability. As supply capacity declines, accountability between users increases. A viable water market might aid in managing water distribution between users, but this is currently problematic because current water markets are at best incomplete. This leads to price signals that do not send appropriate signals to users and can increase waste.

For municipal water utilities, the "value" of water is generally equated with current costs. The supply curve is based on the cost of production as well as demand. Thus, the least expensive water is always the first to be used, which keeps rates low. Once that supply is gone, users turn to more expensive water

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**Water Pricing**

alternatives and the corresponding cost increases. Market equilibrium will also move and the price per unit will increase causing demand, particularly for elastic uses, to decrease. This unfortunately occurs just as income is most needed to pay for new water. This system does not protect existing water resources because it undervalues them until they are depleted. This system of pricing also fails low-income users. Ratepayers must either use less water or pay more for the same supply in order to keep their bill amounts constant.

**Emergency Adjustments**

The existing model is particularly problematic in drought or emergency conditions because of its tardy response to market needs. Traditional rate models do not have a mechanism for a rapid adjustment to affect behavior and scale back demand in emergency situations. There is not a way to affect price in a proactive manner. Instead, without regulatory drought pricing measures in place, climate-oblivious pumping will occur at a time when additional conservation is especially important, thus depleting important supplies when they cannot be replaced.

**Negative Feedback**

The current business model creates negative feedback loops. Price goes up based on scarcity and the need for new expensive technology. This creates a price signal for people to use less water just as new supply comes on line and the new technology needs to be financed. Financial commitments to new projects often disincentivize conservation programming efforts because sale of water is necessary to pay for the project. This can further increase demand and the need for even more supply.

## BROKEN BUSINESS MODEL

### THE CURRENT WATER UTILITY LANDSCAPE

**Monopoly Pricing**

Utilities are essentially monopolies. They are generally the only available seller in a given market with the power to control price and supply. Because they provide essential services without competition, pricing must be regulated. Although utilities set their own rates, statutory obligations often limit what utilities can charge. In addition to cost recuperation, rates for services rendered are also limited by due process and equal protection considerations. Charges for services are limited to "just and reasonable" and must be done in an equitable and nondiscriminatory fashion. *See* Hempling, *Regulating Public Utility Performance* (2013).

Utility revenue is primarily generated to pay basic costs associated with the treatment and delivery of water, including: infrastructure capital costs; staff; and operation and maintenance — generally referred to as "cost of service." Because each of these inputs have variability, estimating future needs based on professional judgments can be difficult, creating further challenges to different approaches to rate design. Cost of service limitations may inhibit the creation of critical price signals when they are most needed.

**Regulated Rates**

One of the primary ways people purchase water is through municipal utility service billing. In this situation, a city provider, or other similar entity, holds legal access to the water and they distribute the resource to their customers for a price. Utilities are organized to be financially self-sufficient and not require income from other sources (such as taxes). As they usually function as a monopoly, their rates are regulated — as opposed to being priced in response to open market competition.

**Sales Incentives**

One major systemic problem can be quite simply stated. Water utilities rely on revenue from selling water. This fact alone can lead to supply shortages. Utilities cannot stay in business if they do not generate revenues to maintain their capital-intensive businesses. In many cases, these revenues also help to fund city budgets, further incentivizing sales over conservation. Despite this motivation to sell, per capita water consumption revenues have been trending downward while costs increase. Current water use is the equivalent to the amount used in the 1950s. *See* Alliance for Water Efficiency, *Building Better Water Rates for an Uncertain World: Balancing Revenue Management, Resource Efficiency and Fiscal Sustainability* at 7 (2014).

**Volatile Revenue**

While revenues may be variable, many costs are not. The obvious result of these trends is that more utilities are or will experience financial difficulties. Over time, this movement can affect the utility's self-sufficiency and debt service. In addition to budget shortfalls, volatile revenue streams create general utility instability.

The relationship between sales and revenue leads to flashy headlines concluding that water conversation bankrupts utilities (*see* e.g., Shaver, *Water Utilities Charge More to Offset Low-flow Toilets, Faucets and Shower Heads*, Washington Post (Aug. 3, 2014); Satija, *Texans' Water Conservation Reward: Higher Rates*, Texas Tribune (Feb. 10, 2014)). Fortunately, it is not that simple. Budget shortfalls are more often the result of bad planning, not good citizenship. Research shows that revenue uncertainty is the real threat to utility resilience, not conservation. The key to reliable revenue projections is the reduction of uncertainty through conservation — not in spite of conservation.

**Prediction Inability**

A water utility's largest source of revenue is customer sales. The inability to predict sales accurately leads to variable revenues. While utilities can plan for some level of uncertainly, a drastic divergence between predicted and actual sales can threaten the business model. This often occurs during times of severe climatic variations such as extreme drought or high precipitation events.

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## Water Pricing

### Conservation Ethic

In many cities, conservation is only encouraged or required during dry periods. Although temporary compliance may occur, use patterns revert in times of plenty. Lacking an emergency, utilities tend to collect as much revenue as possible and the conservation ethic is lost. This causes problems in the long-term because the overall availability of water resources is also declining. More supply may not be available when needed; therefore, consistent wise use of water is the best way to ensure reliable availability.

Unfortunately, because effective conservation strategies can reduce revenues, some people reach the mistaken conclusion that conservation and efficiency measures are responsible for rising water rates. In fact, as has been noted, "…money spent on efficiency stabilizes the long-term rates customers pay by limiting capital expenditures for new treatment facilities, water storage and transmission capacity." *See* Leurig, *Water Ripples: Expanding Risks for U.S. Water Providers* at 13 (2012). Attacking conservation creates future conflicts by not focusing on the more realistic relationship consumers need to have with water to ensure reliability. The real issue causing a financial shortfall is increased costs, not decreased revenues. Of course, increased costs and conservation are related in utility financials, but the necessity to update infrastructure can challenge finances even with stable water sales.

### Infrastructure Update

The solution is to reexamine the economic model, not vilify conservation. To achieve economic resilience, utilities need to generate revenues lost through conservation from other sources or avoid costs.

## UTILITY RESILIENCE: MAJOR ISSUES & OPPORTUNITIES

### Rates v. Fees

Water utility operating revenues are often made through two primary sources. The first is consumption-based rates. This is the most significant source of income. Although some amount can be predicted, these revenues vary because they are based on consumer usage. The other, less variable, major revenue source is fees. Fees can be assessed for a number of things, including: one-time connection charges; monthly service charges; late payment penalties; and drought surcharges.

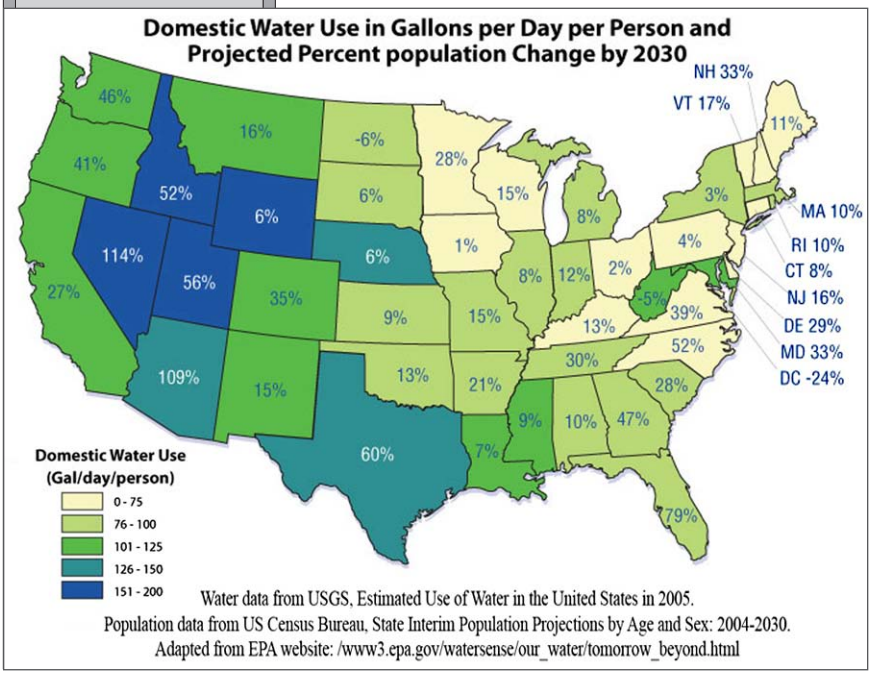
Utilities derive revenue from all classes of customers including commercial, residential and industrial. The recommendations in this article focus primarily on opportunities for residential rates; however, opportunities exist for considerable savings in the commercial and industrial sectors. Any rate design should examine opportunities to optimize all classes of user. Adjustments in other areas can also serve to alleviate the burden of the residential ratepayer.

### Variable Rates

Legally, utilities have only the right to charge "just and reasonable" rates that "provide a reasonable opportunity to earn a fair return." Ideally, prices meet the obligation of compensating the seller for their services while inducing efficient use of the resource. The vast majority of rates are based on consumption. Within this category, municipal rate structures vary considerably. While some charge a price regardless of use, others seek to penalize high volume users by charging more based on usage. *See* Water Research Foundation, *Defining a Resilient Business Model for Water Utilities* (2014).

### Reasonable Rates

In addition to recouping costs, reasonable rates can include a return on investment adequate to ensuring a good credit rating. This is critical for a utility to procure new capital for future projects. Key in this is the understanding that utilities are not only obligated to provide service in the short-term, but must continue to serve the community in the future as well. Reasonable rates do not necessarily translate into the lowest rates needed to meet a utility's obligations. There are other functions that rates can serve including affecting customer behavior and encouraging efficiency.




Accurate rates and rate structures are critical for utility health and longevity. To aid sustainable practices, rates need to create a price signal for the customer about water supply. The goal is to ensure that the price signal creates a balance between efficient use and utility reliability. Effective ratemaking is the cornerstone to balancing financial stability while encouraging the efficient use of water.

Historically, many utilities simply charged uniform rates. These flat rate structures assigned a price per user regardless of amount used. This created a predictable income for the utility; however, it often did not match true price-to-value or provide price signals to users based on their usage. These rate systems often led to wasteful behavior because variations in consumption were ignored. Subsequently, this system has largely been replaced by tiered rates.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## Water Pricing

**Inverse Rates**

**Tiered Rates**

An increasingly popular system is block or tiered rates. In this system, the unit price changes according to level of use. Block rates can either decrease with more use or increase with more use — decreasing block structures actually reward high water users because the price of water per block decreases as use increases. In contrast, inverse block or tiered rates charge higher prices for higher use, while still allowing water for basic needs to be available at a low rate. There is no set number, size, or configuration of the rate blocks required. The utility can determine the appropriate quantity of the first, least expensive block and the steepness of the block increase.

**Effective Structure**

There are many characteristics which can contribute to an effective block rate structure. The two most germane to our resilience discussion are: 1) revenue stability; and 2) rate blocks that discourage waste. Ideally the first block is for necessary indoor use and subsequent blocks are for increasing amounts of outdoor or other discretionary uses. When structured appropriately, these rates can be punitive to the small percentage of high discretionary water users and encourage conservation based on price signals.

**Pricing Impact**

Another benefit of tiered pricing is that it avoids further regulation and government intervention. If someone wants to use a higher quantity of water, they just have to more pay for it. Santa Fe, New Mexico has extremely steep tiers with the highest users paying three to four dollars per gallon more than those in the base tiers. *See* Hempling, (2013). Implementation of this rate structure reduced consumption by twenty percent even as population increased ten percent. *See* Schwartz, *Water Pricing in Two Thirsty Cities: In One, Guzzlers Pay More, and Use Less*, New York Times (May 6, 2015).

**Price Signal**

Most utility costs are fixed; therefore, variations in revenue threaten business stability. Steeply increasing tiered rate structures can provide more affordability to low-use customers and send a beneficial price signal. However, they can also result in revenue volatility, particularly during extreme weather patterns. One solution to this disconnect is the addition of fixed fees to generate a more dependable revenue stream. Fees are allocated on a per-customer basis and not a per-unit consumed basis.

**Revenue Stabilization**

**Fixed Fees**

One way cities are attempting to stabilize revenues is to shift a larger portion of income away from consumption revenue to fixed fees. For example, Fort Worth, Texas, is increasing the percentage of their income from fixed fees from seventeen to twenty-five percent of their budget. This helps cover the expenses that are not variable, including infrastructure costs needed to deliver water and treat waste water. Fixed fees can be increased in a way that is conservation-oriented if they are tied to total use.

**Flat Fees**

Flat fees can be applied for several purposes. A connection charge is a common example. A new customer pays this one-time fee based on the size of the meter connection. Another example of a flat fee is a pass-through that occurs when new equipment — such as a meter — is installed. Service fees are also common. "Service" is a broad term that can include activities such as: meter reading; billing; or other costs that would the same for each customer. Utilities can also pass through costs that are equal for each user. These are particularly useful for environmental protections such as habitat protection costs. Drought surcharges also qualify as possible flat fees. These are similar to the fuel fees that were common when gasoline prices skyrocketed.

**Fees' Drawbacks**

Although fees can help stabilize revenues and decouple revenues from usage there are some drawbacks. First, high service charges can punish low-income and low-use customers because higher unit costs are only partially tied to amount used. Second, because these costs are not tied to use, the price signal present in progressive volumetric rates can be lost.

**Avoided Rate Increases**

**Conservation & Avoided Costs**

Utilities will greatly benefit by educating their clients as to the real effects of major factors influencing water costs. They need to be cautious about stating simply that conservation will reduce bills. Depending on location-specific circumstances, this may or may not occur. The distinction between rates and billing amounts should be made clear. The reality is that operation and maintenance of existing systems is becoming more expensive — which may maintain bill amounts even with lower usage. However, conservation can avoid future rate increases. Utilities should strive to message the full impact of how potential supply and infrastructure costs made unnecessary through conservation financially benefit their ratepayers.

**Conservation Education**

Utility costs may continue to increase based on the need for infrastructure replacement and upgrades. However, better decision-making now can decrease the amount of infrastructure cities need to fix in the future — thereby eliminating or reducing an exponential increase in costs over the longer time horizon. In a startling example, a study in Westminster, Colorado showed that conservation programs implemented in 1980 yielded citizens a whopping 91% savings in rates compared to what they would currently be had the programs not started (*see* Dickinson, *The Real Relationship Between Conservation and Rising Water Rates*, National Geographic (Oct. 5, 2014)). If customers are not educated about this issue, they may feel as though they are being punished for using less whenever bills are constant or increase.

One key aspect of educating and motivating water users is to consider water saved through conservation as a type of water supply. New supply costs money and may not even be available when needed. Supply created through saved water will most likely cost much less than new supply obtained

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## Water Pricing

### Predictable Savings

**Price Elasticity**
Price elasticity refers to the relationship between the change in quantity demanded and change in price. An inelastic good will not see a signficant change in demand as a result of a price change. In contrast, a good is elastic when a small change in price results in a large change in demand. Elasticity is based on several factors including whether there is a close substitute for the good and whether the good is a necessity or luxury, with the latter being more elastic.

### Accuracy Vital

### Per Capita Usage

### Risk Factors

### Low-Income Protection Options

through expensive technologies such as desalination or pipeline projects. In Fort Worth, Texas, drops in demand allowed for delays in plant expansions, saving the city $20 million a year in borrowing costs (*see* Walton*, Price of Water 2014: Up 6 Percent in 30 Major U.S. Cities; 33 Percent Rise Since 2010*, Circle of Blue (May 7, 2014)). Giving value to existing supply and avoided new supply can shift the conversation from one of contentious public policy debates to one of straight-forward economics. Once the situation is fully understood, it is clearly wiser to manage declining demand by designing water rates that encourage consumers to conserve while collecting revenues to cover all necessary costs and keep finances stable.

**Drought Response v. Conservation Efficiencies**

An important distinction often overlooked in this discussion is the difference between conservation/efficiency savings and drought rules. It is imperative that they not be used interchangeably as the former is far more predicable than the latter. Long-term efficiency measures should motivate permanent behavior shifts, creating less reactivity in rates. For example, an efficient toilet uses over five gallons less water per flush than a traditional one. Therefore, a utility can calculate the approximate savings that will be yielded from a large-scale replacement program. Drought, on the other hand, is more difficult to calculate because the extent to which it will affect revenues is often unknown.

During times of drought, water utilities often need to impose water use restrictions that can severely decrease revenues. Because no one knows exactly when drought will hit or how long it will last, utilities are challenged to effectively plan for the resulting financial penalty. This does not have to be the case. Short of very extreme drought conditions, the "inelastic demand" from essential societal usage will largely stay the same because, by definition, it does not change. The key to fiscal survival during weather variations is to truly understand and minimize elastic demand during normal years. Once this is accomplished, less variation will occur during times of drought restrictions and revenues will be steadier.

Some utilities save in advance for reduced revenue during droughts, while others charge a drought surcharge to make up the revenue difference during reduced usage (*see* Hughes and Leurig, *Assessing Water System Revenue Risk: Considerations for Market Analysts* 14 (2013)). While drought will always impact water revenues, the amount of that impact can be minimized and managed by a utility. The more a utility strives to manage demand on a daily basis, rather than in reaction to weather events, the less volatility will be experienced.

**Addressing Uncertainty: Realistic Demand Projections**

As evidenced by the drought discussion, one of the biggest challenges to ensuring utility resiliency is uncertainty. Uncertainty can come in many forms, but perhaps the most important unknown is how much water customers will need in the future. Demand projections are used by utilities to determine the design and operation of their system and new supply needs. Because these decisions will lead to costs passed on to the customer, accuracy is critical.

Despite the critical importance of demand projections, many utilities do not even attempt their calculation. Many others assume that individual water use will continue to be the same as that of their current customers. These utilities forecast demand by applying current use data to population projections. The accuracy of these numbers is predicated on the assumption that water will be used in the future the same way it was used in the past. Not only does this not allow for new technologies and cultural shifts, it may actively discourage them. This can result in serious financial problems for utilities.

A recent example of this problem occurred in Seattle, Washington. There, a suburban water agency openly admits that they misinterpreted future demand leading to negative financial consequences. Forecasting that residents would require more water, the agency entered into a contractual agreement for water supplies at a premium price. Contrary to their assumptions, per capita water use in the area actually declined twenty to fifty percent as a result of more efficient usage, price increase, weather patterns, and code changes. Accurate demand projections would have prevented this expensive mistake. *See* Alliance for Water Efficiency, *Declining Water Sales and Utility Revenues: A Framework for Understanding and Adapting* (2012).

Demand is not static. Therefore, the process of forecasting demand should be iterative rather than linear. It should allow for adjustments based on price and other factors. Demand forecasting should move towards risk modeling that includes a range of factors including: population; pricing; climate; elastic uses; and new regulations.

**Low-Income Users**

While utilities are required to avoid undue discrimination across user groups and avoid subsidies, the persistent increase of utility pricing necessitates a focus on low-income users. Rate structure design and raising rates must include protection of low-income users who may otherwise be priced out of basic services. There are several alternatives to protect low-income users. "Lifeline rates" allow those who qualify to get a basic amount of water at a special rate. The usefulness of these often depends on the complexity of the application system and who can qualify.

Some utilities use bill payment assistance for low-income users. A utility can assist the user in reducing water use through affordability program services provided by the utility. Utilities can also apply for grants or offer donation opportunities to allow other ratepayers to donate towards the bills of those who

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**Water Pricing**

cannot pay. While this alternative is very generous, it may not be reliable for the long-term particularly as rates continue to rise. *See* Berahzer, *The Increasing Need to Address Customer Affordability,* UNC Env. Finance Blog (May, 29, 2012).

**Development Impacts**

**Impact Fees**

Another alternative to reduce the financial load on existing ratepayers is the use of impact fees. Impact fees are payments made by new developments for the purpose of providing new or expanded public capital facilities required to serve that development. These one-time fees pass along the cost of new infrastructure to the people who will most benefit from the expansion.

Impact fees are often limited to capital improvement costs and are capped at a percentage of the total. *See e.g.*, Tex. Gov't Code Ann. §§395.012 & 395.015 (West 2014). As such, conventional water supplies typically did not fall within the permissible statutory definition. However, as existing water supplies become depleted, dependence on new, expensive technology increases. These new water supply projects have large capital demands, which are appropriate for impact fees. Expanding or just applying permissible impact fees can be an effective way to both encourage smart growth and alleviate the cost impact of new supply on existing users, particularly those on a limited income.

**Peak Management**

**Peak Shaving**

Many permanent water supplies are procured to assure supply for anticipated, limited, periods of peak demand, which often occur during the hottest portions of the summer months. Managing these peak needs can avoid supply costs and level out revenue volatility. Peak shaving has been very successful in the energy industry by avoiding expensive new power plants that are only necessary on the hottest days of the year. Properly understanding demand and the reduction of elasticity can avoid unnecessary capital investments and increase revenue resilience. *See* Water Research Foundation, *Defining a Resilient Business Model for Water Utilities* (2014).

## RECOMMENDATIONS

### UTILITY PRICING TO ACHIEVE EQUITY AND RESILIENCE

**Revenue Disincentive**

While current water utility regimes seek to achieve sustainability and resilience, the focus on maintaining revenue often threatens the ability to ensure water is used most efficiently. Sale of water can actually create a disincentive to protect water resources, which can have unbeneficial long-term consequences. Applied properly, market mechanisms can be used to prevent such consequences. Upon closer examination, there is a false conflict between sales and resource protection. Shifting away from the traditional utility demand projections and billing models will allow utilities to stay in business and help assure water supply into the future.

**Expand the Meaning of "Cost of Service"**

As noted above, utility rates are currently often determined based on a limited cost-of-service analysis. Depending on the jurisdiction, rates may only be used to recoup utility's costs for items including: current operation and maintenance; capital costs; and debt service. This constrains rate collection to only those costs that have already been incurred. Only once inexpensive water resources are depleted and the utility is forced to seek additional, expensive supplies will rates increase. Changing the cost of service paradigm could improve on this result.

**Future Costs & Price Signals**

One of the problems with current cost of service models is that the ratemaking is based on historical costs rather than future costs. The goal with a broader model is to capture at least some reasonably anticipated costs to send a price signal earlier and avoid a capacity overinvestment. Even with increasing rates based on increased capital costs, most rates are still essentially reactive. In order to send the appropriate price signal, rates need to include the projected costs of extra production and treatment that will be necessary if water is not used efficiently. This incorporation of avoided supply costs would help make the water market more reflective of water in its high value capacity.

The current approach to pricing excludes many factors, which does not fully inform market drivers. Price does not reflect water's full intrinsic value. Externalities that currently are not given value, including extraction or development costs, should be included in a cost of service analysis and included in rates or additional fees.

**"Cost" Definition**

To promote sustainable, resilient practices, "cost" requires a definition broader than what has been traditionally used. Diversifying what is considered would allow rates to achieve the utility's revenue requirements while informing consumers of the currently non-monetized costs of their use — such as private and social impacts of avoidable expanded development and delivery. A more expansive definition that includes avoided additional supply costs could be defended as prudent or reasonable under the legal standard. In essence, ratepayers are paying a small price up front to avoid much larger costs later.

While rate design is legally required to remain revenue neutral, thereby limiting utilities to a fair rate of return, an inclusive calculation of costs allows for a broader cost of service determination. As long as the projected costs are measurable and defensible, they should be legally included. Cost of service — like

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## Water Pricing

value — has many meanings. This flexibility is seen in one of the scholar James C. Bonbright's criteria for rate design. He states that rates should reflect both present and future private and social costs. Bonbright argues that one purpose of rates is to control demand through pricing with the goal that customers will weigh the total cost of using a resource. "Only in this way can the customers be put in a position...to ration themselves by striking a balance between benefits received and sacrifices imposed." Bonbright, *Principles of Public Utility Rates* p.69 (1961).

**Nature of Water**

An inclusive reading of costs — particularly those that include societal costs of depletion — could be defensible under a broader reasonableness standard. Rates that protect water resources and save ratepayers future rate increases should qualify as prudent actions. Because the prudence review is the substitute for market competition, the utility would in essence be telegraphing a market signal that would not normally exist within the current utility model. Although this is not the traditional way "prudent" has been interpreted by courts, the limited nature of water resources should dictate a new understanding of the term.

**Diversify Demand Projections**

Demand projections are the basis for water supply decision-making and subsequent ratemaking. If a utility underestimates, there will not be enough water for their customers. If they continue to overestimate (as they have historically), customers will foot the bill for unnecessary expenses and the utility's business model is threatened. In any event, the trend of increased costs and declining sales being seen across the US is forcing a new look at how demand is calculated.

**Methodology Update**

Traditionally, utilities used very limited methodology to predict demand. Future water needs were ascertained by estimating population growth and extrapolating using present per capita demand. The problem with this method is that it assumes water will be used in the same way as it has in the past, which leads to inaccurate results. Determining demand in a more complex and integrated way will lead to more accurate rate predictions and infrastructure build-out. To do this, historical assumptions must be replaced with accurate information about customers' demand patterns broken down to individual users or segments of user. This includes examining not only who is using the water, but also which portions of those uses are elastic versus inelastic.

**Modelling Factors**

In lieu of linear numeric extrapolations based on population, multi-faceted demand modeling can allow a utility to add in factors that are locally relevant. In addition to population, some additional factors for consideration include: local climate; customer usage data; rates and rate structures; demographic shifts; conservation programming; and policy changes such as new land use limitations. Price elasticity of customer use will also need to be included in any calculation.

**Adopt Best Practices for Rate Setting**

Rates are an opportunity for a utility to communicate with their customers by using price as an indicator of demand and trigger behavior accordingly. However, to be effective, rates must be constructed using best practices and must be seen as more than a mechanism for basic cost recovery. Traditional rate structures that are not tied to consumption, or those that keep prices artificially low, create volatility in the revenue stream that can threaten long-term sustainability. This is particularly true during extreme weather situations when consumers respond to the natural environment to the detriment of an ill-prepared utility.

**Price Signal**

When determining a rate structure, utilities should adopt one that provides the biggest price signal to consumers, while still maintaining low prices for a basic quantity of water. This means that the rate system needs to be consumption based. Arguably any rates that are predicated on usage encourage conservation; however, some send a more effective price signal than others. An inverse tiered system that charges a low rate for the initial blocks of water and increasingly more for higher blocks is generally the most conservation-oriented structure — particularly when they are more punitive to high use customers. However, tiers alone will not create a price signal. Rate levels are as important as the structure itself and rate structures should be tailored to the local behavior.

**Basic Needs: Inelastic**

Tiered rate structures should target the elastic or discretionary portion of water demand, particularly in areas that have a high peak demand. Water uses for basic needs are inelastic. A user cannot simply require less water for health and hygiene because the price goes up, but those uses account for a very small percentage of household uses. Some indoor uses can be reduced through more efficient plumbing or behavior modifications, but the largest and most elastic water uses occur outdoors. While effective, these rate structures can create revenue volatility so they should be coupled with other income streams.

**Base Fees**

Including fees in the revenue structure can increase predictable revenue while still maintaining price signals of volumetric rates. Base fees can be set as a certain percentage of the total bill. A customer's base rate could be set based on a three-month average or the maximum month of consumption. This would protect low-income users that do not overuse, reward other low-use customers, and provide some revenue predictability. The remainder of the bill would come from variable consumption-based rates. Other flat fees that can be integrated into billing are connection service fees as well as environmental protection fees appropriate for given area. *See* Mary Tiger, *Peak Set Base: A Pricing Model for Utility Revenue Stability and Customer Conservation*, UNC Env. Finance Blog (July 10, 2012).

Water must be used in the most efficient way possible, particularly under drought conditions. It is beneficial to send a price signal as soon as possible. One alternative is to levy an additional fee during


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## Water Pricing

times of shortage when the utility needs to send an immediate price signal unrelated to traditional rates. This temporary drought surcharge would help avoid shortages and more closely align water with its appropriate value under the circumstances. This fee can either be the same for all customers or can be prorated based on use. Customers with bills in the lower tiers are charged a lower fee, while those who use the most water pay a higher fee. This methodology is legally defensible because the latter group is continuing to use discretionary water even at a critical time. Drought surcharges should be designed to affect high users and to not punish people who only use basic needs.

### Drought Surcharge

In most regions, warmer summer weather is associated with an increase in demand caused by outdoor watering even when drought is not occurring. These seasonal peaks can drive water supply development motivating utilities to procure capacity that is unutilized for the remainder of the year. When this happens prices are either increased to make up for the capital costs or the utility must encourage the sale of water. Targeting discretionary use during these peak times may reduce overall annual supply demands. Mirroring time-of-day pricing seen in the electric industry, the peak time discretionary use pricing could reflect the actual costs at the time of use, inclusive of resource depletion.

### Peak Pricing

Seasonal rates are distinct from drought fees or surcharges. The former anticipates the peak requirements of a certain season regardless of rainfall. A surcharge on the other hand, is more suited to specific, temporary circumstances. Customers can also be rewarded for reducing their peak load through peak period rebates.

**Protect Low-Income Users**

Although water rates have historically been low, they are rising rapidly. Rate increases can disproportionately impact low-income customers. As utility rates climb, some citizens face difficult decisions about where their limited income should be allocated. While utility models move towards using price as a means to affect behavior, these citizens must be considered.

### Bottom Tier Rates

Low-income protection can be accomplished by setting bottom tier rates very low for all users. Some experts have suggested the bottom tier should be provided for free. Fees can also be waived in lieu of a consumption-based subsidy. The goal is to supply a basic amount of non-discretionary water at a very affordable rate. Critics of this system feel that lowering the price dilutes the price signal; however, this system could arguably promote conservation as more people try to qualify for that rate reduction by using less water. Other alternatives include the use of lifeline rates or other affordability subsidies such as a separate discounted rate for a limited quantity or a percentage discount that can be applied to the total bill.

One of the challenges presented by any affordability programs is determining who must pay for the assistance program or the revenue shortfall produced by someone paying less than the cost of service. Some utilities make up this shortfall through revenue earned from the highest tier users. Another alternative is to simply provide direct financial assistance through bill payment aid through the utility itself, other municipal sources, or local charities.

## CONCLUSION

### True Value

Current markets lack the ability to send accurate price signals that reflect the true value of water. This erroneous information leads to unintended consequences that could rapidly deplete resources rather than protect them. This economic reality creates a disconnect when a water utility's revenues are predicated on sales.

Market adjustments need to be made in the municipal business model to ensure a revenue stream while targeting discretionary uses, such as outdoor watering.

### Rate Flexibility

Utilities also need to be given the ability to set their rates in a way that does not simply recoup costs, but actually encourages conservation and efficiency. Water providers need the ability to charge more for existing, less expensive, supplies to avoid the need to build more expensive technologies that may disincentivize conservation programs. This saves money over the long-term. Additional fees can be collected regularly or just during drought periods on a pro rata basis to trigger an immediate demand response. Adopting best practices can ensure a secure water supply while reducing business volatility and save money over the long term.

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## Fracking Impacts

# FRACKING & DRINKING WATER SOURCES

**STANFORD RESEARCHERS SHOW FRACKING'S IMPACT TO DRINKING WATER SOURCES**
**FRACKING INDUSTRY MAY HAVE WIDESPREAD IMPACTS**

by Rob Jordan, Stanford Woods Institute for the Environment

Only one industry is allowed to inject toxic chemicals into underground sources of drinking water — hydraulic fracturing, or "fracking." Concerns about this practice have riled the US political landscape and communities around the country, perhaps nowhere more so than in Pavillion, Wyoming, population 231.

**Clear Impacts**

A new study by Stanford scientists published in Environmental Science & Technology finds for the first time that fracking operations near Pavillion have had clear impact to underground sources of drinking water. The research paints a picture of unsafe practices including the dumping of drilling and production fluids containing diesel fuel, high chemical concentrations in unlined pits, and a lack of adequate cement barriers to protect groundwater.

The well field has gone through several corporate hands since the 1960s, but various fracking operators have used acid and hydraulic fracturing treatments at the same depths as water wells in the area.

**Widespread Risks**

"This is a wake-up call," said lead author Dominic DiGiulio, a visiting scholar at Stanford School of Earth, Energy & Environmental Sciences. "It's perfectly legal to inject stimulation fluids into underground drinking water resources. This may be causing widespread impacts on drinking water resources."

"Decades of activities at Pavillion put people at risk. These are not best practices for most drillers," said co-author Rob Jackson, the Michelle and Kevin Douglas Provostial Professor at Stanford's School of Earth, Energy & Environmental Sciences.

As part of the so-called "frackwater" they inject into the ground, drilling companies use proprietary blends that can include potentially dangerous chemicals such as benzene and xylene. When the wastewater comes back up after use, it often includes those and a range of potentially dangerous natural chemicals.

"There are no rules that would stop a company from doing this anywhere else," said Jackson.

The study, based on publically available records and documents obtained through the Freedom of Information Act, is part of Jackson's ongoing research on shallow fracking and its impact on groundwater. He and his colleagues have done various studies across the United States and in the Pavillion Field, an area of Wyoming's Wind River Basin pocked by more than 180 oil and gas wells, some of them plugged and abandoned.

Back in 2008, the residents of Pavillion complained of a foul taste and odor in their drinking water and questioned whether it was related to physical ailments. In 2011, the US Environmental Protection Agency (EPA) issued a preliminary report putting the tiny town at the center of a growing fracking debate.

**2011 EPA Report**

The EPA report, which linked shallow fracking to toxic compounds in aquifers, was met with heavy criticism from the drilling industry as well as state oil and gas regulators. Three years later, having never finalized its findings, EPA turned its investigation over to State of Wyoming. The State released a series of reports without firm conclusions, and, as of last month, has said it has no firm plans to take further action. In the meantime, the federal Agency for Toxic Substances and Disease Registry has advised area residents to avoid bathing, cooking or drinking with water from their taps.

### EPA Fracking Report: Science Advisory Board's Review

On June 4, 2015, EPA released its long-awaited "draft assessment" on the potential impacts to drinking water resources from hydraulic fracturing (fracking) activities. *See* Water Briefs, *TWR* #137. The oil and gas industry happily pointed to EPA's own sub headline on the press release at the time, which read that the "[A]ssessment shows hydraulic fracturing activities have not led to widespread, systemic impacts to drinking water resources… ." The draft assessment, however, has yet to be finalized after a review by the EPA Science Advisory Board (SAB), plus public review and comment.

SAB clearly has concerns with some of the conclusions in EPA's assessment and the statement in the press release, as well as the scientific justification supporting EPA's conclusions. SAB held a teleconference on March 7th, which included public comment, with the "Agenda" being "[T]o review and discuss the Science Advisory Board Panel's second draft report dated February 16, 2016 regarding SAB's review of the EPA's draft Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources (External Review Draft – June 2015)."

SAB's Second Draft, which "has not been reviewed or approved by the chartered SAB and does not represent the EPA policy" nonetheless appears to show that the SAB has significant concerns with EPA's assessment and is looking for substantial changes to the document before it is finalized. In their unfinalized Draft review, the SAB expressed concern over the lack of definition regarding "systemic" and "widespread" and stated "[t]he SAB is concerned that these major findings as presented within the Executive Summary are ambiguous and appear inconsistent with the observations, data, and levels of uncertainty presented and discussed in the body of the draft Assessment Report."

Information on the SAB process and a copy of SAB's Second Draft report is available on the SAB website at: https://yosemite.epa.gov/sab/sabpeople.nsf/WebCommittees/BOARD and select: "03/07/2016 Public Teleconference of the Science Advisory Board Hydraulic Fracturing Research Advisory Panel" or the "03/10/2016 Public Teleconference of SAB."

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## Fracking Impacts

**New Regulations?**

**More Enforcement?**

The new Stanford study goes a step beyond the 2011 EPA report to document not only the occurrence of fracking chemicals in underground sources of drinking water but also their impact on that water that is making it unsafe for use.

The ripple effect goes well beyond Pavillion.

"Geologic and groundwater conditions at Pavillion are not unique in the Rocky Mountain region," said DiGiulio. "This suggests there may be widespread impact to underground sources of drinking water as a result of unconventional oil and gas extraction."

To avoid what happened in Pavillion, Jackson and DiGiulio suggest further investigation and regulations to limit shallow fracking and require deeper protective casings. Wyoming does not require the cementing of surface casings, and only two US states — Colorado and Texas — have special requirements for shallow hydraulic fracturing. Safeguards mean little, however, if they are not enforced — something the EPA has done a mixed job with, according to Jackson.

"The EPA has consistently walked away from investigations where people and the environment appear to have been harmed" by fracking's impact on groundwater, Jackson said.

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The full article — *Impact to Underground Sources of Drinking Water and Domestic Wells from Production Well Stimulation and Completion Practices in the Pavillion, Wyoming, Field* — is available for purchase from: http://pubs.acs.org/doi/abs/10.1021/acs.est.5b04970

**Dr. Dominic DiGiulio** is currently a visiting scholar at Stanford University. He retired from EPA's Office of Research and Development after 31 years of service. He served as a Superfund Remedial Project Manager in EPA, Region III for six years. For 14 years, while at EPA's Office of Research and Development, he provided technical assistance and conducted research on gas flow and vapor transport in porous media especially in relation to implementation of air sparging and soil venting. He was EPA's principal investigator for the Pavillion ground-water investigation and the lead author in EPA's 2011 draft report on this investigation.

**Rob Jackson** is Provostial Professor and Senior Fellow at Stanford's Woods Institute for the Environment and at the Precourt Institute for Energy. His work at the Jackson lab seeks to produce the building blocks of basic scientific knowledge to guide policy solutions for global warming, energy extraction, and other environmental issues..

**Excerpts from:**

**"Meet the Man Who Showed Fracking Contaminates Water"**

by Gayathri Vaidyanathan, ClimateWire, April 4, 2016

…When former EPA scientist Dominic DiGiulio retired from EPA in 2014, he trained his sights on Pavillion, Wyoming. He felt he had to finish his work.

"EPA had basically handed the case over and a peer-reviewed document was never finalized," he said. "If it is not in the peer-reviewed literature, then it presents a problem with credibility in terms of findings. It is important that the work be seen by other scientists and enter the peer review realm so that other scientists will have access to virtually everything."

Since 2012, a trove of new data had accumulated from USGS, EPA and state regulators. He obtained EPA's methanol testing results through a Freedom of Information Act request and downloaded the rest of the information from the Wyoming oil and gas regulator's website. All of it was publicly available, waiting for the right person to spend a year crunching the information.

The end result: a peer-reviewed study that reaffirms EPA's findings that there was something suspicious going on in Pavillion. More research is needed.

The sampling wells contained methanol. They also contained high levels of diesel compounds, suggesting they may have been contaminated by open pits where operators had stored chemicals, DiGiulio said.

The deep groundwater in the region contained high levels of salt and anomalous ions that are found in fracking fluid, DiGiulio said. The chemical composition suggests that fracking fluids may have migrated directly into the aquifer through fractures, he said.

Encana had drilled shallow wells at Pavillion, at depths of less than 2,000 feet and within reach of the aquifer zone, said Rob Jackson of Stanford University. "The shallow hydraulic fracturing is a potential problem because you don't need a problem with well integrity to have chemicals migrate into drinking water," he said.

The study also shows that there is a strong upward flow of groundwater in the basin, which means contamination that is deep underground could migrate closer to the surface over time.

…EPA spokeswoman Julia Valentine said the agency hasn't yet finalized its assessment that natural gas has no "widespread, systemic impacts." As part of that process, the agency will evaluate all recent research, including DiGiulio's study, she said.

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# CELP's STATUS QUO DEFENSE IS DISINGENUOUS

**FAILURE TO ENGAGE IN PRODUCTIVE SOLUTIONS PERPETUATES PROBLEMS**

by Thomas Pors, Law Office of Thomas M. Pors (Seattle, WA)

**Water Supply Pors Response**

We live in an unfortunate era of heavy partisanship in law and politics in which the belief in one's values trumps factual investigation, intellectual honesty, and open-minded debate. The trend affects all sides of the political spectrum, and Dan Von Seggern's article, "Living Within Our Means," is a case in point. Von Seggern, staff attorney for the Center for Environmental Law & Policy (CELP), repeats his client's belief-based themes without investigating the real extent of unmet water needs or acknowledging systemic problems with our water rights permitting program relating to instream flow water rights. Instead of addressing the legal conflicts affecting the Washington Department of Ecology's management of water resources (*see* my article — "W*ashington's Water Availability Train Wreck*" — in the last issue of *The Water Report*), CELP uses platitudes and unproven assumptions to paint a scary picture designed to prevent decision-makers, including state legislators and judges, from understanding the nature of the problem and potential solutions. Why? Reasonable minds can disagree on legal and policy issues, but in this reviewer's opinion, CELP is defending the status quo of water resources law not because it is correct, but because it serves their beliefs and desired outcomes. More damaging is the impact of their beliefs and litigiousness on citizens without legal water supplies and growing communities facing building moratoria. This is a harsh judgment to make about an organization that defends the environment and natural resources for the benefit of the public, which is a worthy purpose indeed, but it is demonstrated by recent cases and forums in which CELP has participated.

**Permitting Problems**

**Broad Theory: Over-Appropriation**

Von Seggern's article theorizes broadly that all of the State of Washington's public waters, including groundwater, have been over-appropriated to the detriment of the environment; therefore, the *only* solution for future water supply is to re-allocate existing water rights, even if that means significant parts of the state become undevelopable. To support this theory, he offers four main points, all of which are rebutted below. First, he offers over-generalizations about development impacting steamflows, salmon, and treaty rights as though this were a given fact rather than a subject of inquiry under the state's water code on a case-by-case basis. Second, relating to the adoption of instream flow protection rules, he ignores state water policy and legislative directives promoting multiple uses of water and allocation according to the "maximum net benefits for the people of the state," and defends such rules based solely on their benefits for fish. Third, he assumes that senior water rights and claims in basins with junior instream flow regulations are readily marketable commodities that can be re-allocated any way the state chooses to "prioritize and distribute water" — ignoring that these are privately or municipally held rights already allocated to beneficial uses for agriculture, industry, hydropower, and municipal/domestic purposes. Fourth, he mistakes the protection of instream flows per se with the purpose of instream flow regulations — to preserve instream values such as fish habitat, water quality, recreation, and aesthetics. In so doing, Von Seggern and CELP ignore whole categories of mitigation that could preserve instream values while still allowing new appropriation of water for beneficial uses.

**"Maximum Net Benefits"**

**Instream Values**

**State Law Provides Case-by-Case Inquiry Regarding Water Availability and Impairment**

Von Seggern's article essentially proposes to terminate the State's water rights permitting program for new appropriations of water based on CELP's belief that enough water has already been appropriated. CELP is too quick to abandon a hundred-year old statutory permitting procedure that already protects water resources from impairment or detriment through standards enforced by a state agency, which is subject to appeal to protect existing water rights. The Water Code already prevents the imagined evils in Van Seggern's article by requiring applicants for new water rights to demonstrate that water is available, it's use won't impair existing water rights (including instream flows set by rule), and isn't detrimental to the public welfare. RCW 90.03.290 (four-part test). The burden of proof is on the applicant, and the legal standards tilt strongly against new groundwater appropriations anywhere in basins with instream flow regulations and stream closures. It needs to be reformed so that instream flow regulations are used to protect instream values, instead of closing the state's water resources to all other uses in ignorance of human needs and state water allocation policy.

**Four-Part Test**

**Human Needs**

Von Seggern describes the dynamic in water resources as a "conflict between human use and environmental protection" and decries the scourge of "unlimited water for increased development anywhere in the state at no cost." Both his "us vs. them" viewpoint and his over-the-top exaggeration of the scope of unmet water demands undermine the credibility of his arguments. In fact, the water needs left unmet by two recent Supreme Court decisions are very small relative to instream flows in the Skagit and Nisqually/Deschutes watersheds where instream flow regulations have prevented water availability for exempt wells

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**Water Supply Pors Response**

and new water for forecasted municipal demands. By mischaracterizing these water needs as a state-wide rampage by development forces on public resources, Van Seggern frees himself to defend the virtual shutdown of the state's water rights permitting program as necessary to prevent even more evils. This is a straw man argument, because statutory and regulatory limits on exempt well usage and a labyrinthine permitting system already prevent all but the most remote of impacts to streamflow by rural property owners, builders, and the relatively few growing communities without adequate water rights for growth. As stated in my own article last month in this point-counterpoint series, the prevailing question is not whether to protect either the environment or growing communities, it is how to sustainably protect the health of both. I have proposed solutions that would reform the State's existing permitting program for allocating water, and the concerns of the environmental community should be heard and addressed in the reform process. Unfortunately, the overheated arguments in Von Seggern's paper fuel uncertainty and confusion about a complicated set of issues, which is itself a barrier to solving the problem.

**Remote Impacts**

**"Exceedance" Standards**

It is important to understand that the fact instream flow levels are not consistently met is not evidence of a state-wide water crisis or that new water uses are drying up rivers and streams. It is instead evidence that Ecology set instream flow levels at certain "exceedance percentages" that predict the frequency at which flow levels will not be met. A 10% exceedance flow means that it is predicted to be available in the river only 10% of the time. In other words, such flows are predicted to be unmet 90% of the time. It is misleading to contend that the absence of such flows in any given year is proof of a general water availability crisis such that the state should cease and desist from granting new water rights that would otherwise meet the standards of the Water Code.

**Hydraulic Continuity**

The standards for appropriating new water for growth have grown more and more restrictive since the adoption of instream flow regulations by Ecology and recognition of hydraulic continuity between ground and surface waters. The *Foster v. Yelm* case, discussed below, illustrates the fallacy that water appropriations continue to impact streamflows, fish, and treaty rights. With respect to groundwater withdrawals in basins with closed streams, denial of a new appropriation is required if there is "any effect" on streamflow. For rivers and creeks with minimum flow levels that are unmet (which is always the case given the way minimum flows are adopted), a new groundwater withdrawal cannot increase the frequency or degree to which flows fall below the regulatory minimum. *Postema v. PCHB*, 142 Wn.2d 68, 11 P.3d 726 (2000). Applicants, hydrogeologists, and Ecology Water Resources Program officials can testify that it is virtually impossible to disprove both of these negatives, with the result that groundwater applications will be denied unless legally adequate mitigation is provided. CELP's straw man case against a raid on water resources is pure fiction.

**Straw Man Case**

**Mitigation Requirements**

Mitigation requirements have also evolved to the point where, after *Foster*, more water supply to streams has to be created using existing water rights than the conservatively modeled impacts to those streams. Even before the Supreme Court disapproved the City of Yelm's mitigated water right, the bar for demonstrating non-impairment of instream flows was exceptionally high, further demonstrating the fallacy of Von Seggern's hypothesis that instream flows are threatened by new water uses.

**Exempt Wells: True Impacts**

Von Seggern also decries the proliferation of exempt wells under RCW 90.44.050 but fails to explain that the real impact of a rural domestic exempt well is not 5,000 gallons per day per well straight from local rivers and streams. The buffering effect of aquifers and return flow of over 90% from indoor uses through septic system recharge reduces the impact to streams to miniscule levels spread out over great distances and time, less than the background fluctuations of runoff and seasonal variations in precipitation in most areas. Studies demonstrate that minor clearing of vegetation incidental to building a house in a rural setting creates more additional groundwater recharge than the net groundwater withdrawal by these rural water uses, yet these beneficial effects of rural development to streamflow are not considered in the calculus of water availability. It is disingenuous to claim broadly for every watershed that exempt wells for rural homes are drying up over-appropriated streams and impairing regulatory instream flows. In fact, the effects of exempt wells are skewed by a regulatory system in many watersheds that already protects streams as a priority before ensuring water availability for people.

**Septic Recharge**

**Groundwater Exemption**

Exempt wells are still relied upon for water supply in rural areas because the water rights permitting system is too expensive, uncertain, and cumbersome to provide reasonable access to water outside of public water system service areas, and because piping water to rural and remote areas is generally not feasible. There is a constitutional underpinning to the groundwater exemption that has yet to be tested or determined in the courts, akin to riparian groundwater rights and the reasonable use doctrine. The Legislature has protected the exemption through the years, probably for this reason, but the creeping application of instream flow regulations is catching up with the exemption in basins like the Skagit, and may expand further if the Supreme Court sides with environmental groups in the *Hirst* case. Reasonable use and conservation regulations are appropriate for all manner of water rights, including exempt wells. RCW 90.03.005. However, if anyone takes away the groundwater exemption from rural property owners, it should be the Legislature, which established the exemption in the first place, not the courts, and not an environmental organization with no responsibility to rural property owners or growing communities.

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**Water Supply Pors Response**

**"Maximum Net Benefits" Ignored**

**In-Kind Mitigation = Closure**

**OCPI Approach**

**CELP Opposes Solutions**

**Reallocation Limited**

**Instream Rules Adoption**

**De Facto Groundwater Closures**

**Instream Flow Rules Are Not Exempt from State Water Allocation Policy**

Ecology's authority to establish instream flows by rule is limited by legislative mandates, and an instream flow rule that ignores these mandates exceeds Ecology's authority and is invalid. *Swinomish v. Ecology*, 178 Wn.2d 571, 580-81, 311 P.3d 6 (2013). This includes the "maximum net benefits" directive (MNB) in both the Water Resources Act and the Water Code, at RCW 90.54.020(2) and 90.03.005, respectively. Von Seggern's article mischaracterizes the MNB directive as applying to all existing water rights when it was adopted and implies that it can be safely ignored as a limit on Ecology's authority to adopt instream flow rules. He provided no legal citation (there is none) to back up this novel interpretation, which essentially writes the MNB directive out of existence. The fact is, Ecology has ignored the MNB directive in all of its instream flow rules, opting to protect flows first and balance the public's need for water later — a "later" that doesn't exist after the *Swinomish* and *Foster* decisions resulted in Ecology's inability to fix their own short-sighted and unbalanced rules.

Von Seggern's article cites the *Swinomish* and *Foster* decisions as evidence of judicial resolve that instream flows must be protected and that only in-kind mitigation through replacement water can be allowed for water withdrawals that impair instream flows. This observation is incomplete because it ignores the consequences. If Ecology is restricted to using only replacement water instead of other mitigation techniques — then the result is the virtual closure of watersheds to new uses of water without public notice or proper rulemaking. CELP may applaud this result because they do not represent the interests of rural property owners, builders, farmers, and communities, but they and everyone else needs to recognize the legal dilemma this creates for the State of Washington. If instream flow rules prevent new uses of water for domestic and municipal purposes and cannot be repaired with OCPI-based decisions ("overriding considerations of public interest"), and if the same instream flow rules do not comply with the legislative MNB directive and other statutory requirements such as the four-part test, then the instream flow rules are subject to challenge and may be found invalid. It is a house of cards lying atop a rotten foundation. One such suit challenging the Dungeness River instream flow rule is pending, and CELP has intervened in that case to help Ecology defend the rule. Similar suits challenging the Skagit rule or others are a distinct possibility, especially if no other option remains for a solution.

Von Seggern's article demonstrates that CELP is not committed to a solution but remains willing and able to defend problematic instream flow rules and deny water to rural properties and growing communities. Adequate water should have been allocated to the public according to the "maximum net benefits" policy. When Ecology convened a group of stakeholders in 2014-15 to help find "rural water supply solutions," CELP refused to consider legislative changes or new impairment and mitigation standards that could open the door to new mitigated water supplies. Their position prevented a consensus on any solutions other than using existing water rights to meet future needs. The irony of CELP's position is that by defending rules that violate statutory standards and ignore the public's need for water, they may help bring about the demise of the very instream flow rules they want to protect. Flexibility in the application of impairment and mitigation standards, for instance, as I set out in my previous article, would eliminate the incentive that property owners, builders, and growing communities have to challenge those rules and/or seek legislative reforms. Confucius said, "The green reed which bends in the wind is stronger than the mighty oak which breaks in a storm."

**The Problem with *Swinomish* and *Foster***

Both the *Swinomish* and *Foster* cases challenged Ecology's authority to make water available for domestic and municipal uses years after adopting instream flow rules that only protected stream flows. In *Swinomish*, Ecology used the OCPI provision at RCW 90.54.020(3)(a) to reserve small quantities of groundwater in several subbasins for rural homes on exempt wells. In *Foster*, Ecology used OCPI to authorize a generous mitigation plan with substantially more environmental benefits than costs. The Supreme Court held in both cases that OCPI could not be used to reallocate water already allocated to instream flows, and that Ecology's use of OCPI to adopt reservations of water or approve mitigation plans that conflicted with adopted instream flows exceeded their authority and violated the prior appropriation doctrine. If Ecology had followed the Legislature's MNB directive and balanced the public's need for water for both instream and out-of-stream uses when adopting the instream flow rules involved in both cases, there might have been no need to use OCPI authority after the fact, and these cases and the current water allocation crisis could have been avoided.

The elimination of OCPI as a work-around to instream flow rules that unexpectedly resulted in de facto basin-wide groundwater closures has pushed the process of allocating water for new uses to extremes that could not have been anticipated by the Legislature when it authorized instream flow protection rules. Rural property owners in the Skagit basin, for example, cannot obtain building permits for single family homes until mitigation projects beyond their control are implemented by Ecology and third parties, a process that has met with considerable challenges. Skagit County was sued as result, and related property rights claims

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**Water Supply Pors Response**

could be the next water rights battleground, forced onto local government by the absence of water supply solutions. Ultimately, the lack of other solutions raises pressure on citizens to challenge the validity of the instream flow rules.

**Instream Flows Status**

Another fundamental problem with the Supreme Court's decisions in *Swinomish*, *Foster*, and *Postema* is the Court's treatment of instream flow water rights like any other out-of-stream water right, which in my opinion leads to use of the wrong impairment and mitigation standards. *See* "What are We Protecting When We Protect Instream Flows," below. Von Seggern's article fails to acknowledge or address this problem. Instream flows have the status of water rights with priority dates, and are protected from impairment by subsequently issued rights based on RCW 90.03.345. But what is the value against which impairment is measured, and for which mitigation is required? CELP opposes the idea that instream flow water rights are proxies for instream values, and CELP refers to habitat restoration and enhancement as "out-of-kind" mitigation and challenges Ecology's authority to use it.

**The Myth that Existing Water Rights Can Solve Water Supply Issues**

**Water Replacement Issues**

CELP argues for "wet" water replacement using existing water rights as the sole mitigation standard, even though this standard can't be met because it relies on a readily available market for existing water rights in all areas of the state. In other words, CELP's solution is more building moratoria, cities that can't grow, and more uncertainty and litigation regarding future water supply. Von Seggern's article assumes that senior water rights and claims are readily marketable commodities that can be re-allocated any way the state chooses to "prioritize and distribute water." Existing water rights, however, are privately or municipally held and already allocated to beneficial uses for agriculture, industry, hydropower, and municipal/domestic purposes. These rights are not transportable to new uses without abandonment of existing infrastructure and economic output, and impacts to the state economy that CELP ignores entirely. Changing and moving those rights is also subject to the same permitting system that protects instream flow water rights, which inappropriately and mistakenly closed most state groundwater to further appropriation.

**Water Banks Issues**

Early examples of water banks "funded" with privately-owned trust water rights have raised a host of issues that have yet to be resolved by the Legislature, including the limited territorial reach of water bank mitigation, artificial market pricing, lack of transparency, and arbitrariness of decision-making. The higher up one is in a watershed, especially tributaries, the less likely it is to find available water rights for mitigation. CELP's plan to require all new development to acquire existing water rights because the state is over-appropriated is ironic and self-defeating, because there are many areas of the state where existing rights simply do not exist to mitigate for the impacts of new development.

**Storage Limits**

CELP's reliance on storage options and cisterns to provide adequate water supply for mitigation of new groundwater use is premature and largely unfounded. Despite state-funded efforts to create storage that would mitigate for exempt well usage in the Skagit basin, Ecology is not hopeful that all affected areas can benefit, at least not to the degree necessary to solve existing problems created by the *Swinomish* decision. Similar expenditures in the Dungeness Basin have failed to make mitigation available in "yellow" areas designated by Ecology above the arbitrary line of water bank availability.

**Cisterns**

Cisterns are not supported by the Washington State Department of Health as drinking water supplies and treatment methods for small storage facilities are prohibitively expensive and labor intensive, affecting their feasibility as legal sources of drinking water for new development. Groundwater, by comparison, is far more reliable as a safe drinking water source, and far less expensive.

**Affordability**

Among the many problems associated with attempts to measure and mitigate exempt groundwater usage, the affordability of housing needs to be considered, especially given the rising cost of living in our cities. There are no easy answers to these issues, and CELP should not assume that closing groundwater to rural development is a sound environmental or economic policy.

**What are We Protecting When We Protect Instream Flows?**

**Instream Values Approach**

Unlike other water rights, minimum flows do not derive their value from the diversion of water. The value of minimum flow water rights is the environmental value provided to the public by being left in the stream. Most of the problems with our current instream flow protection and mitigation standards would be resolved by recognizing instream flows as environmental rights that should be protected by preventing impacts to the instream values for which they were created, such as fish habitat, water quality, aesthetics and recreation. Washington State's Pollution Control Hearings Board (PCHB) has opened the door to this approach while also protecting "base flows" of perennial rivers and streams, but Ecology has not acted on it and organizations like CELP are strongly opposed to any new mitigation flexibility. *See*, e.g., *Okanogan Wilderness League v. Ecology and Kennewick General Hospital*, PCHB No. 13-146, July 31, 2014 *Order on Motions for Summary Judgment*. Thus, a sensible approach to both protecting the environment and making mitigated water rights available to growing communities may depend on legislative action, at a time when the Legislature has more pressing issues to resolve.

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**Water Supply Pors Response**

**Value-Based Solutions**

**"Legal Injury"**

**Water Supply Crisis**

**Proposed Solution Failures**

**Access A Human Right**

CELP officials have argued that there are no standards for measuring impacts to instream values or the effectiveness of mitigation, but the truth is that they have prevented attempts to develop such standards by litigating against any mitigation other than in-kind, in-place, in-time water replacement. Von Seggern's article provides no flexibility for values-based solutions and posits that properties should simply not be developed where replacement water mitigation is not available. CELP hasn't offered to compensate property owners for the resulting loss in value to their property or to communities for their inability to grow and thrive, leaving that problem for local governments and the taxpayers to resolve. In the meantime, even efforts to improve fish habitat and water quality through mitigation of water right applications will be prevented by adhering to the fiction that any reduction of streamflow — no matter how slight or theoretical — causes a "legal injury" to instream flow rights for which there can *only* be flow-replacement mitigation. By comparison, mitigation standards relating to wetlands provide for "no net loss" of their functions and values. Why should instream flow water rights be any different?

**Conclusion**

Washington water law is bogged down in an unworkable status quo that is supported by organizations like CELP. Water supply crises in areas like the Skagit basin will grow in frequency and intensity until the Legislature is moved to fix the problem. In other words, it will get much worse before it gets better. In the meantime, Ecology can open new doors to water allocation decisions by interpreting the groundwater language in their instream flow rules based on the assumption that neither Ecology nor the Legislature intended a general groundwater closure when authorizing and adopting instream flow protection rules. Ecology can develop and apply mitigation standards based on the protection of instream values, instead of protecting aspirational flows with impossible mitigation standards. Even if it does, however, CELP will likely oppose any clarifying legislation or new mitigation approaches based on their false assumption that new water users would cause irreparable harm to the environment.

CELP's proposed solution to only allow reallocation of existing water rights as in-kind mitigation (replacement water) is unnecessary, unproven, and wildly impractical. Existing water rights are not reliably available where new uses are being developed. The creation of artificial markets and water banks for such rights raises questions about accountability and reliability. Artificial water crises like the one proposed by CELP are driving massive investments of public funds and government time and resources unnecessarily. On the other side of the debate, access to water is a fundamental human right and should not be so cavalierly rejected. CELP's energy and donations from its well-intentioned supporters would be better spent on the dual goals of protecting both the environment and communities, which can be accomplished with the help of an educated legislature and consensus building among stakeholders.

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Water Supply
Von Seggern Response

# TWO WRONGS DON'T MAKE A WATER RIGHT

WASHINGTON'S WATERS ARE ALREADY OVER-ALLOCATED

USE OF A "VALUES-BASED" IMPAIRMENT STANDARD WOULD CREATE FURTHER PROBLEMS

by Dan Von Seggern, Center for Environmental Law & Policy (Seattle, WA)

## INTRODUCTION

"Value-Based" Standard

Water Availability

Washington's salmon resources are critically important to our state's culture and economy. They are in grave danger, largely due to water being removed from streams. Once they are gone, they will be gone for good. Tom Pors' article in *The Water Report* #145 ("*Washington's Water Availability Train Wreck*"), advocating a "values-based" impairment standard for instream flows, is in reality a call to take even more water from our struggling rivers and streams. But a "values-based" standard is inherently subjective and provides no mechanism to ensure that rivers, fish, and other water users are actually protected. To the contrary, this approach would destroy the instream flow regime established by the Legislature, subvert the prior appropriations system, and guarantee that an ever-larger fraction of Washington's water would be dedicated to out-of-stream uses.

As discussed in my original article last month, water in streams goes hand-in-hand with increased fish productivity, and reduced streamflows have demonstrable impacts on fish. The "ecosystem values" or "values-based" approach is merely another name for using "out-of-kind" mitigation to justify appropriating water in violation of instream flow rules, which the Washington Supreme Court (Supreme Court) has repeatedly held is not permissible. There are no doubt problems with water availability in some rural areas. Weakening the protections for our already overburdened streams , however, is no answer. Our salmon runs simply will not recover as long as we continue to dewater streams in the name of development, regardless of what other "mitigation" measures are instituted. We must resist the temptation to withdraw additional water from Washington's streams, and instead make wise use of the water that has already been appropriated. There is ample opportunity to use "science and ingenuity" to address our water issues; in fact, we have no choice but to do so.

## DIFFERENT IMPAIRMENT STANDARD FOR INSTREAM FLOW RIGHTS UNWARRANTED

Instream Rights Status

"Impairment"

Protection Precedent

Mr. Pors asserts that instream flow rights are somehow different from water rights for out-of-stream uses, specifically that they are "environmental rights" that may be impaired in ways that other water rights cannot (the suggested "values-based impairment standard"). Mr. Pors goes so far as to suggest that the Legislature might redefine instream flow rights as different. But this basic premise is incorrect. The Washington Supreme Court has repeatedly held that instream flow rights are entitled to the same protections as other water rights, and that they are not to be impaired by subsequent withdrawals of water. *See Foster v. Ecology*, Washington Supreme Court Case No. 90386-7 (2015) (Slip. Op. at *6) (reconsideration denied March 3, 2016); *Swinomish Indian Tribal Comm'ty v. Dept. of Ecology*, 178 Wn.2d 571, 584, 311 P.3d 6 (2013); *Postema v. Pollution Cont. H'rgs Board*, 142 Wn.2d 68, 82 (2000); *see also Hubbard v. Dept. of Ecology*, 86 Wn. App. 119, 124-25 (1997).

In *Foster*, the Court stressed that the injury when an instream flow is impaired is the loss of water in the stream. *Foster* at *12. No further definition of "impairment" is needed. Consider a simple comparison: no one would seriously suggest that the rights of an irrigator who was entitled to use 100 acre-feet of water, but was delivered only 50, were not "impaired" because he was also given a new fence.

Any concept of instream flows as less worthy of protection is simply not compatible with these decisions, and the Washington State Pollution Control Hearings Board (PCHB) cases cited in Pors' "*Train Wreck*" article cannot change this. The *Okanogan Wilderness League v. Ecology* decision (Poll. Cont. Hearings Bd. No. 13-146, July 31, 2014 (Order on Motions For Summary Judgment)) flatly conflicts with Supreme Court decisions and has no value as precedent. *Squaxin Island Tribe v. Ecology*, PCHB No. 05-137 (2006) neither provides an example of "evaluation of MIFs and stream closures differently than impairment of out-of-stream water rights" nor suggests a "new regulatory impairment standard." In the *Squaxin Island* case, the PCHB said that withdrawals were not permissible if they "produce *any effects which adversely impact* the values identified in WAC 173-513-020." *Id*. at 43 (emphasis added). But the values referred to in WAC 173-513-020 are "instream flows and levels necessary to provide protection for wildlife, fish, scenic, aesthetic, environmental values, recreation, navigation, and water quality," which

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**Water Supply Von Seggern Response**

are essentially identical to what RCW 90.54.020(3)(a) commands the Washington State Department of Ecology (Ecology) to protect: "base flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic and other environmental values, and navigational values." Essentially, *Squaxin Island* stated that withdrawals could not impair instream flows — the same standard as currently applied.

**"VALUES-BASED" IMPAIRMENT STANDARD RESULT: INSTREAM FLOWS UNENFORCEABLE AND SENIOR WATER USERS HARMED**

**No Objective Standard for Protection of Instream Resources**

**Flow Certainty**

Instream flows are defined, measurable values. While it may not be met in all years, an instream flow provides an enforceable limit on how much habitat may be lost through water diversion or groundwater withdrawals and at least some certainty of protection for fish and other instream values. The vague "values-based" approach provides no such certainty and no enforceable limit on water use. Even assuming that out-of-kind mitigation could truly compensate for the effects of reduced streamflow, evaluating the mitigation proposed for a particular project is inherently subjective and particularly susceptible to political and economic pressure. As the Supreme Court noted in *Swinomish*, when any particular situation is viewed through a balancing test, "the need for potable water for rural homes is virtually assured of prevailing over environmental values." *Swinomish*, 178 Wn.2d at 587. Allowing water withdrawals that reduce streamflows to be allowed by out-of-kind mitigation schemes is a recipe for the continued ratcheting down of streamflows, degradation of the resource, and harm to fish populations.

**Balancing Test Problems**

**"Values-Based" Approach Will Harm Both Streamflows and Existing Water Users**

**Seniority System**

The prior appropriations system protects senior water users and instream flows alike from impairment by later water withdrawals. In low flow years, a water user (whether agricultural, domestic, or municipal) with a relatively junior priority date may have its water use curtailed to protect senior uses. Users who have priority dates later than the instream flow may be required to curtail their use when the flow is not met. Allowing new water uses (likely permit-exempt wells for domestic use) under out-of-kind mitigation schemes would allow the most junior water users to take water that should be part of the instream flow. By reducing instream flows, these newest uses would increase the possibility that older water users would be curtailed to protect the instream flow. Worse yet, a de minimus exception for domestic use (essentially, pretending that these withdrawals do not exist) would effectively let domestic users jump ahead of all other users.

**De Minimus Exception**

This is more than a theoretical concern. In 2015, users of Teanaway River water with priority dates as far back as 1873 were curtailed in order to protect the Yakama Nation's senior right to water in the stream for fish and aquatic life. *See* http://ecologywa.blogspot.com/2015/07/pre-statehood-water-rights-curtailed-in.html (last viewed March 17, 2016). Allowing new water uses to reduce streamflows through a "values-based" impairment standard would make this outcome more likely. As climate change reduces summer streamflows, such conflicts between users will become more frequent and accommodating all users will be even more difficult. Mr. Pors appears to understand this problem, as he states that a de minimus exception might not be applicable in the Yakima Basin "to protect adjudicated senior water rights, which could also be impaired by new groundwater uses." If this logic applies to the Yakima Basin, it surely also applies to other watersheds with very senior, even time-immemorial tribal rights (the fact that an adjudication has to date happened only in the Yakima does not change the principle involved or the priority of tribal rights in other basins).

**Senior Rights Impacted**

**Collision with Native American treaty rights**

**Practical Impacts**

The correlation between instream flow protection and protection of tribal treaty fishing rights is not merely "perceived," but is very real. Water in streams directly correlates to fish production, which implicates tribal treaty rights to fish. Mr. Pors claims that the Tribes' treaty water rights would not be affected by use of a "values-based" impairment standard (as they would still have senior water rights). This assertion is technically correct but misses the point. On paper, the Tribes would retain some of the most senior rights to water (often with a priority date of time immemorial). But in practice, either setting streamflows at levels too low to support fish or allowing new withdrawals of water without mitigation for the loss of streamflow would greatly impact the fishery resource and impinge on tribal fishing rights. Tribal rights would only be meaningfully protected if junior users, including permit-exempt domestic users, were curtailed to protect the streamflow. To the author's knowledge, Ecology has never curtailed use of permit-exempt wells and doing so will be politically very sensitive.

**Enforcement Lack**


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Here, too, the proposed "ecosystem values" scheme provides no alternative protection for these resources and no guarantee that any out-of-kind mitigation measures would actually preserve fish production. The fact that salmon and steelhead are endangered or threatened in most of Washington state shows that our obligation to preserve the resource is not being met even now. More water appropriations will make this situation worse and increase chances of a conflict.

**No Guarantees**

**LIMITING PROTECTION TO FLOWS CONSISTENTLY MET WOULD MAKE EVERY YEAR A DROUGHT YEAR**

Mr. Pors suggests that it is "absurd" to protect instream flows at levels that are not met in some or even most years, and that this results in what he claims are "accidental" closures of some basins. There are three fundamental problems with this argument.

**Flow Levels**

First, far from being "absurd," protection of the instream flow at levels that are not always met is essential to protect instream resources. In order to allow new uninterruptible uses of water (such as domestic wells) the instream flow would have to be set so low that it is met every year. Consider the practical effect of setting such a low instream flow. By definition, a flow that is met in all years is no higher than the flow in a drought year (such as 2015). Setting the instream flow at drought levels would mean that water withdrawals, both permitted and permit-exempt, could continue until the stream flow was never higher than in a drought year. Experience suggests that this is exactly what would happen in areas with high demand for water. The experience of 2015 shows the disastrous effect of such low river flows: high stream temperatures cause fish mortality, and salmon are unable to move upstream due to low water. Fish and other instream resources that could not survive a succession of artificially created drought years would be irreversibly lost. Destruction of the fisheries would cause great economic losses to the state, including thousands of jobs, and guarantee that Washington fails to meet its treaty obligations to Native American tribes.

**Basin Closures**

Second, closure of basins is not "accidental." If streams are closed to new appropriations, it is to protect instream flows that are not being consistently met. In most cases the closures are explicitly set out in the instream flow rules, which also give Ecology's reasons for closing a particular stream or groundwater basin. *See*, for example, WAC 173-503-030; -060 (explaining the basis for Skagit River instream flows and closure of groundwater in hydraulic continuity); WAC 173-511-040 (closing certain streams in the Nisqually basin specifically to protect anadromous fish); WAC 173-517-100 (closing surface streams and groundwater in Quilcene-Snow basin); and WAC 173-539A-010 (explicitly withdrawing all unappropriated groundwater in Upper Kittitas Valley).

**Conditional Uses**

Finally, setting an instream flow does not prevent all use of water. An instream flow that is unmet bars the use of water for uninterruptible uses (unless the use is mitigated). Other types of uses, though, may be accommodated. Ecology can —and in fact does — issue permits for water use that are conditioned on the instream flow. In any year where the instream flow is exceeded, the holder of such a permit may use water. Water use that does not affect streamflows, or is mitigated so that the streamflow is not impaired, is also generally allowed. As one example, the Dungeness River instream flow rule (WAC 173-518) closes surface streams and groundwater in hydraulic continuity with streams to unmitigated withdrawals. A water banking system is in place to provide mitigation. By helping to reallocate water that has already been appropriated, the water bank allows new users to obtain water without further depleting streamflows. As of this writing, there have been 119 mitigation permits issued in the Dungeness Basin for domestic use and one for stockwatering. (Amanda Cronin, Washington Water Trust, personal communication, March 14, 2016).

**Water Banking**

**UNREGULATED USE OF PUBLIC WATER RESOURCES: ECONOMICALLY INEFFICIENT & NET BENEFITS TO SOCIETY REDUCED**

**Regulation of Groundwater Use is Not a "Taking"**

**"Taking?"**

Mr. Pors suggests water regulations that prevent rural landowners from withdrawing groundwater might constitute a "taking" of private property. This, along with the argument regarding "discrimination against rural landowners," appears to start from the presumption that there is a right to use water that is appurtenant to land ownership and the view that any restriction on that presumed right is "discrimination."

**Appurtenancy**

However, the simple fact that one owns land does not confer a right to use water on that land. Our Legislature has abolished "correlative" or "riparian-like" rights to appropriate groundwater. RCW 90.44.040 (groundwater is subject to appropriation "under the terms of this chapter and not otherwise"). And nothing in the permit-exempt well statute provides such an absolute right (in fact, the Groundwater

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**Water Supply Von Seggern Response**

Code specifically provides that groundwater belongs to the public). RCW 90.44.040. The concept of water as a "fundamental human right" is also misapplied here. Whether or not water is a "basic human right" in the abstract (and no one seriously disputes that Washington residents do have access to water generally), there is clearly no "fundamental human right" to withdraw water wherever and whenever you want, at no cost and without regard to the effect on the environment. Similarly, there is no constitutional right to do so. Regulations that govern withdrawal of water are simply not a "taking" of property, any more than any other land use regulation is. *See Peterson v. Ecology*, 92 Wn.2d 306, 316, 596 P.2d 285 (1979) (groundwater permit requirement is a reasonable exercise of the state's police power and not a taking).

**Human Right**

**Societal v. Individual**

**Public Resource Users Should Bear the Cost**

The statement by Pors that "it is unethical to transfer the cost of closing the [water] resource to those who lack access to it" attempts to answer the wrong question. What should be asked is whether it is ethical to transfer the cost of water use by the few to society in general (the many). In fact, requiring water users to bear the cost of their resource use — in this case, through mitigation — is the economically efficient approach.

**"Externality"**

Economists define an "externality" as an unintentional side effect of an activity, which affects people other than those directly involved in the activity. *See* http://enviroliteracy.org/environment-society/economics/externalities/ (last viewed March 11, 2016). Where water use impacts an instream flow, the cost of water use by a few (depletion of a public resource, and loss of fish populations) is borne by the public in general (a "negative" externality). In economic terms this is considered a "market failure," and the resource is not allocated efficiently. Too much of the good in question (here, water for rural development) is produced while the overall benefits to society are reduced (in other words, "maximum net benefits" are not obtained). *See* www.economicsonline.co.uk/Market_failures/Externalities.html (last visited March 17, 2016). Put another way, not requiring that water users "pay their own way" invites a classic example of the tragedy of the commons: where a resource is seen as freely available at no cost, it is virtually guaranteed to be over-exploited and destroyed.

**"Maximum Net Benefits"**

**Users Bear Cost**

The concept that the costs of water use should be incurred by the users rather than by society at large is familiar to those living in urban or suburban areas, who pay the costs of their water use in the form of their utility bills. Any mitigation costs necessitated by operation of the municipal water system are recovered from the user. Rural water use should be no different. Simply put, there is nothing "unethical" about asking that an individual pay the cost of his resource use. This can be accomplished by requiring that a water user adequately mitigate his or her impact on the water resource, either by providing replacement water directly (through purchase of a water right) or by working through a system such as water banking. What actually would be "unethical" would be allowing the depletion of instream resources, which belong to all citizens of Washington, and the rich fisheries (and thousands of jobs) which those instream resources support, for the benefit of a relatively small number of property owners.

**Water Banks**

Viewed in terms of economic rationality the hostility to water banking is difficult to understand. Rather than "eliminat[ing] beneficial uses" of water, water banks efficiently allocate water to the uses on which users place the highest value. A water bank provides a simple, objective mechanism for rural water users to mitigate their water use. To the extent that banked water results from farmland being taken out of production, the water banking system allows farmers, who are unquestionably the best-informed about their agricultural practices, to make that decision.

**PROTECTION OF INSTREAM FLOWS & OTHER ENVIRONMENTAL ENHANCEMENTS NOT MUTUALLY EXCLUSIVE**

**Habitat Improvements**

Mr. Pors argues that by protecting instream habitat through "establishing instream flows as water rights that are not to be violated," opportunities for other habitat improvements such as planting vegetation to shade streambanks or creating holding areas for salmon are "lost." This presents a false conflict, however, and this line of reasoning ignores the fact that other types of habitat improvements can and should be done regardless of any water use issue.

**Uniqueness of Water**

This argument also depends on the premise that other habitat improvements can somehow substitute for water in the stream. In the example of wetland mitigation, there are cases where it may be possible to create an artificial wetland, or restore one that was previously filled, as a substitute. In that scheme wetlands are more-or-less fungible, and what matters is the net amount of functional wetlands present. Not so with streamflows. Where there is not enough water in the stream, there is really no stream at all, regardless of what other habitat improvements may have been made. It is illogical and improper to trade off water for other aspects of environmental improvement.


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**Water Supply Von Seggern Response**

Chapter 90.74 RCW, which discusses mitigation alternatives, defines "compensatory mitigation" as:

> restoration, creation, enhancement, or preservation of uplands, wetlands, or other aquatic resources for the purposes of compensating for unavoidable adverse impacts that remain after all appropriate and practicable avoidance and minimization has been achieved.

RCW 90.74.010(1).

Clearly avoidance and minimization of impacts (in the case of water, avoiding or minimizing new withdrawals) is to be preferred even under the statutes discussing mitigation techniques.

## CONSIDERATION OF THE FULL HYDROLOGIC CYCLE DOES NOT SUPPORT INCREASED WATER WITHDRAWALS

**Development Impacts**

Consideration of the full hydrologic cycle demonstrates that development (including rural domestic development) has impacts on streams beyond the simple withdrawal of water. Land clearing changes runoff patterns; relative to a forested area, more water runs off more quickly from cleared areas and impervious surfaces such as roofs and driveways, and less water infiltrates into the ground, where it otherwise recharges streamflows over time. The result is increased streamflow just after storm events and reduced flow at other times. For a discussion of these effects, *see* "*The Impact of Rural Development on Puget Sound Lowland Stream Hydrology and Health: A Summary for the Water Resources Program*" (Ed O'Brien, September 30, 2015) (available at: www.ecy.wa.gov/programs/wr/wrac/rwss-leg.html, last viewed March 15, 2016).

**Septic Systems**

Rather than mitigating the withdrawal of water, then, the land use changes associated with development are likely to exacerbate the effect on streamflows at critical (low-flow) times. While use of a septic system may result in some of the wastewater re-infiltrating to the aquifer or perhaps nearby streams, it is logically impossible for more water to be returned to the stream than was withdrawn. If the amount of groundwater that is withdrawn from a domestic well versus what is re-infiltrated via a septic system is to be considered in calculating mitigation requirements, then the actual withdrawal should be metered to ensure that the calculation is correct.

## CONCLUSION

**Limited Resource**

The bottom line is this: water is a limited resource, just like land, and "they are not making any more of it." Just as the available land has already been claimed, the amount of water that can reasonably be exploited has already been set aside for out-of-stream uses. The requirement that new water uses be mitigated is simply recognition of this fact. Basins are not closed "accidentally," or because the courts have misinterpreted "impairment"; they are closed because no more water can be appropriated without unacceptable impacts on fish and other aquatic resources. Whether it is called "out-of-kind mitigation," "values-based mitigation," or "flexibility in mitigation," the net effect of removing water from streams is to impair the ability of the stream to support fish and other aquatic life.

**Water Availability Issue**

The frustrations of rural property owners are understandable. But the solution to water availability issues is neither to destroy the prior appropriation system without providing a new regulatory scheme, nor to destroy what remains of our fish and wildlife resources. The only way to simultaneously provide for our growing population, protect instream resources, and honor our obligations under the federal Endangered Species Act and treaties with Native American tribes is to develop better and more economically efficient ways to allocate the water that has been appropriated, so that streamflows are not further impaired. Property owners, as would-be water users, logically share the obligation to accomplish this outcome.

**Facilitate Redistribution**

In Washington State, the successful use of "water budget neutral" approaches, including water banking, in the Dungeness and Kittitas basins suggests a path forward. The effort and energy that is now being expended in an attempt to salvage out-of-kind mitigation strategies or the "overriding consideration of the public interest" exception would be far better spent in making existing water use more efficient and in expanding structures such as water banking to facilitate redistributing the water that is already designated for out-of-stream uses. This conservation-based strategy also has the virtue of making water users more resilient to the reduced water supplies that will result from climate change.

**For Additional Information:**
Dan Von Seggern, Center for Environmental Law & Policy, 206/ 829-8299 or dvonseggern@celp.org

**Dan Von Seggern** is a staff attorney at the Center for Environmental Law & Policy (CELP), working on legal matters involving instream flows, water quality, and water policy advocacy. After graduating from the University of Washington Law School in 2007, he worked as a public defender and in civil litigation, joining CELP in 2015. Prior to his legal career, Dan spent 20 years working in chemistry, molecular biology, and gene therapy. Dan is a member of the Washington State Bar Association.

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Nano Technology

Sustainability White Paper

Unique Properties

Focus Areas

Using "Nontraditional Waters"

Treatment Efficiencies

Objectives

# NANOTECHNOLOGY & WATER SUSTAINABILITY

THE WATER SUSTAINABILITY THROUGH NANOTECHNOLOGY SIGNATURE INITIATIVE

NEW WHITE PAPER HIGHLIGHTS KEY TECHNICAL GOALS & CHALLENGES

Information compiled by your editors from the National Nanotechnology Initiative website, with edited excerpts from the whitepaper:
*Water Sustainability through Nanotechnology*

**Introduction**

Nanomaterials are all nanoscale materials or materials that contain nanoscale structures internally or on their surfaces. These can include engineered nano-objects, such as nanoparticles, nanotubes, and nanoplates, and naturally occuring nanoparticles, such as volcanic ash, sea spray, and smoke.

In operation since 2000, the National Nanotechnology Initiative (NNI) is a US Government research and development initiative involving the nanotechnology-related activities of 20 departments and independent agencies. The NNI today consists of the individual and cooperative nanotechnology-related activities of Federal agencies with a range of research and regulatory roles and responsibilities. The Nanoscale Science, Engineering, and Technology (NSET) Subcommittee coordinates planning, budgeting, program implementation, and review of the NNI. On March 22nd, the NSET released a white paper — *Water Sustainability through Nanotechnology* — enumerating the possibilities offered by nanotechnology for securing water sustainability and outlining the new "Water Sustainability through Nanotechnology Signature Initiative."

The small size and unique properties of engineered nanomaterials (ENMs) are particularly promising for addressing the pressing technical challenges related to water quality and quantity. For example, the increased surface area and reactivity of ENMs can be exploited to create precious-metal-free catalysts for water purification, and the enhanced strength-to-weight properties of nanocomposites can be used to make stronger, lighter, and more durable piping systems and components. The goal of the Water Sustainability through Nanotechnology Signature Initiative (the "Water NSI") is to take advantage of the unique properties of engineered nanomaterials to generate significant breakthroughs in addressing our Nation's water challenges. This initiative is designed to aid in the development of technological solutions that can alleviate current stresses on the water supply and provide methods to sustainably utilize water resources in the future.

The three specific thrusts of the Water NSI are as follows:

- Increase water availability using nanotechnology.
- Improve the efficiency of water delivery and use with nanotechnology.
- Enable next-generation water monitoring systems with nanotechnology.

**Increasing Water Availability**

Use of "nontraditional waters" in major water-using sectors has the potential to mitigate freshwater shortages and to provide other benefits to agriculture, energy, and industrial end-users. The term nontraditional waters is used broadly to describe all waters not traditionally used by the energy, industry, and agricultural sectors that could displace traditional sources of fresh water and potable water. This category includes saline waters, brackish or impaired ground water, municipal wastewater effluent, produced waters from oil and gas wells, agricultural return flows, and onsite grey water and rain water recovery, as well as other sources.

Nanomaterials have unique size-dependent properties, such as high surface area and reactivity, that make them ideal for treating nontraditional water sources, and these properties can enable the development of novel nanotechnology-based solutions for more efficient utilization of drinking water, nontraditional water sources, and wastewater treatment processes.

There are many nanotechnology-enabled approaches that could be applied during key steps in the water treatment process. For example, membranes can be designed with nanoscale pores that remove specific pollutants while allowing water molecules and important nutrients to pass through, and the antimicrobial properties of silver nanoparticles can be utilized for point-of-use water disinfection.

The Water NSI has identified the following key objectives:

- Use nanotechnology to double the throughput and halve the cost of filtration and membrane separation systems within 5 years.
- Demonstrate nanotechnology-enabled alternatives to reverse osmosis for desalination within 5 years. Within 10 years facilitate the transfer of these technologies from demonstration to market.


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## Nano Technology

### Delivery Improvements

### Piping & Energy Efficiencies

### Increased Sensitivity

### Water Quality Tracking

### NASA Tie-In

### Agricultural Applications

• Develop nanoscale catalysts for use in water treatment that can completely replace precious-metal–based catalysts within 10 years.

**Improving the Efficiency of Water Delivery**

Nanotechnology is uniquely poised to enable significant gains in water efficiency and to reduce energy needs associated with transporting and using water. For example, self-healing nanoscale coatings could be used to repair leaky pipes, and new nanomaterials could enable low-water-withdrawal cooling technologies for thermoelectric power generation. In addition, nanotechnology can reduce water use in other parts of the energy system. Nanotechnology-enhanced fluids can replace freshwater in hydraulic fracturing, geothermal operations, and power cycles, and nanoparticle-enhanced fluids have also shown promise as working fluids for heat exchanger.

The Water NSI has identified the following key objectives:

• Develop within 5 years nanotechnology-enabled coatings that reduce the amount of energy needed to transport water through pipes by reducing friction loss by 50%.

• Develop within 10 years nanotechnology-enabled piping systems and components that are lighter, stronger, and longer-lasting; that eliminate or greatly reduce the development of biofilms, corrosion, and scaling; and that cost less than currently used technologies.

• Within 5 years, develop low-cost photonic nanostructures to enable the use of solar thermal energy for industrial heat processes, including water purification, food processing, and enhanced oil recovery.

• Develop within 10 years low-cost, long-lived nanotechnology-enabled liquids, coatings, and materials to improve water and energy efficiency of heating and cooling by at least a factor of five while dramatically reducing maintenance needs and costs.

**Enabling Next-Generation Water Monitoring Systems**

Innovative technologies are needed to build next-generation water monitoring systems, and nanotechnology is particularly promising for the development of affordable sensors with high sensitivity, accuracy, selectivity, and fast response. For example, nanomaterials such as carbon nanotubes and inorganic nanowires offer a very high surface-to-volume ratio and can produce a large, measureable signal, even for a small concentration of target analytes, and in some cases, even for single molecules. Theoretical studies estimate that the sensitivity of nanosensors may be three to four orders of magnitude greater than the sensitivity of comparable thin-film-based sensors. Further, nanoscale detection elements, with sizes comparable to those of the corresponding recognition elements, can provide high signal-to-noise ratios to provide sufficient total detection, and nanosensors have shown promise for multifunctional sensing. Finally, nanosensors can be designed for improved sample collection and preprocessing and to aid development of portable, rapid-turnaround sensor devices, which would be particularly relevant for environmental water quality monitoring.

The Water NSI has identified the following key objectives:

• Within 5 years, develop a suite of nanotechnology-enabled sensors for continuous, real-time measurement of water quality that are more sensitive, more reliable, easier to use remotely, last longer, analyze more pollutants, and cost less than currently used sensors.

• Within 5 years, develop nanotechnology-enabled sensors and sensor networks to monitor and optimize the targeted delivery of water, nutrients, and pesticides for precision agricultural applications to minimize production inputs.

• Within 10 years, create a complete water contaminant detection and analysis system that is enabled by nanotechnology and designed for the space [NASA] environment.

[T]he motivation for specifically focusing…agriculture…warrants further description. First, irrigation accounted for 38% of total freshwater withdrawals in the United States in 2010. Yet, some experts estimate that as much as 50% of water used for irrigation is wasted due to evaporation, wind, or runoff caused by inefficient irrigation methods and systems. Nanotechnology-enabled sensors could combat these inefficiencies by collecting data on, for example, water and nutrient levels, sunlight, and soil composition, effectively enabling the application of water, nutrients, and pesticides only where and when needed. In addition to the substantial potential for conserving water, the use of precision agriculture can improve water quality by reducing the quantity of fertilizer and pesticides applied, thus minimizing runoff.

**For Additional Information:**

The 12-page whitepaper "*Water Sustainability through Nanotechnology*" is available from the National Nanotechnology Initiative website: www.nano.gov/node/1580

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## WATER BRIEFS

**STORMWATER REGS US**
**EPA PROPOSES NEW CONSTRUCTION CGP**

EPA is proposing for public comment the draft 2017 National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP). The CGP is EPA's general permit for stormwater discharges from construction activities. It covers all areas where EPA is the NPDES permitting authority, including Idaho, Massachusetts, New Hampshire, New Mexico, Indian country lands, the District of Columbia, and all US territories except the Virgin Islands. This draft permit, once finalized, will replace the existing CGP, which expires Feb. 16, 2017. EPA-authorized states issue their own stormwater permits, which must be at least as stringent as those issued by EPA.

The draft permit will have a 45-day public comment period after publication in the Federal Register. The draft permit, accompanying fact sheet, and a prepublication version of the Federal Register Notice are posted on EPA's website.

**For info:** www.epa.gov/npdes/stormwater-discharges-construction-activities#cgp2017

**COLUMBIA TREATY NW**
**CANADIAN NEGOTIATION COMMITMENT**

At a March 10th State Department lunch with Canadian Prime Minister Justin Trudeau hosted by Secretary of State John Kerry, US Senator Maria Cantwell (D-WA) received commitments from the Prime Minister and Minister of Foreign Affairs to move forward with talks on modernization of the Columbia River Treaty. *See* Miller, *TWR* #101; Bankes & Cosens, *TWRs* #105 & #129; Army Corps, *TWR* #116; US Entity, *TWR* #117; Christensen, *TWR* #125; and Light, *TWR* #133.

Specifically, Trudeau confirmed the need for US-Canadian talks and committed to focusing on appointing a negotiating team. The US appointed Brian Doherty as the US Chief Negotiator for the Columbia River Treaty in 2015. The commitment came after Senator Cantwell sent a letter urging the Prime Minister to prioritize U.S.-Canadian negotiations of the Columbia River Treaty "to modernize the treaty in a way that balances flood control, ecosystem-based function, and hydropower generation."

The Columbia River Treaty between the United States and Canada was ratified in 1964 and controls the water flows on the Columbia River for flood control and power generation. As of September 2014, either the US or Canada can terminate the Columbia River Treaty or seek changes by providing ten years notice to the other side. Neither party to the Treaty has done so.

Senator Cantwell's website includes related press releases and the full text of her letter to the Prime Minister.

**For info:** www.cantwell.senate.gov/news/press-releases

**RIO GRANDE WATER NM**
**BENEFICIAL USE ACCOUNTING**

The WildEarth Guardians (Guardians) filed a lawsuit in New Mexico state district court on March 21st demanding that the State Engineer of New Mexico hold the Middle Rio Grande Conservancy District (District) accountable for its unrestrained use of the river in central New Mexico. The suit calls on the District to prove that it has actually used the large quantity of water it claimed upon receiving its permits from the State Engineer 80 years ago. Guardians maintains the District has long avoided proving its actual beneficial use in order to continue expanding its irrigated acreage.

Guardians is requesting the court compel the State Engineer to perform his mandatory duty under the law to either set a date by which the District must prove actual use of the water it claimed in 1925 or cancel the permits. Guardians are asserting that state law requires a permit holder "prove beneficial use" of the water it claimed by the date certain set in the permit. The State granted extensions to the District from 1935 to 1987 and the District did not prove its beneficial use. In 1997, after another decade of inaction, State Engineer Tom Turney set a deadline of December 31, 1997 for completion of a water accounting. As of the date of this lawsuit, the District continues to skirt its mandate, according to Guardians.

The group also simultaneously filed two applications with the State Engineer to appropriate water to store in the Environmental Pool in Abiquiu Reservoir and sustain environmental flows in the Rio Grande. The applications claim any and all water the District has not put to beneficial use and dedicates it in the future to protect and restore flows, habitat, and ecosystems important for the survival of fish, wildlife, and plants of the Rio Grande.

**For info:** Jen Pelz, Guardians, 303/ 884-2702 or jpelz@wildearthguardians.org; Samantha Ruscavage-Barz, Guardians, 505/ 401-4180

**GROUNDWATER BANK CA**
**INITIAL STUDY RELEASED**

The San Joaquin River Restoration Program has released for public review a draft environmental assessment/initial study (EA/IS) for a new groundwater recharge banking project in Tulare County, California. The proposed project includes constructing a 532-acre groundwater recharge basin, installing a 4.5 mile pipeline connecting the new recharge basin to the Friant-Kern Canal, and installing eleven groundwater recovery wells within the Pixley Irrigation District.

These actions would allow the Pixley and Delano-Earlimart Irrigation Districts to expand groundwater recharge efforts and improve groundwater levels. The proposed project would also contribute to the San Joaquin River Restoration Program.

The US Bureau of Reclamation would provide partial funding for construction of the proposed project, under Public Law 111-11, which authorizes Reclamation to provide financial assistance to local agencies within its Central Valley Project for planning, designing, and constructing local facilities to bank water underground or recharge groundwater.

Written comments on the Draft EA/IS are due by April 28th.

**For info:** Becky Victorine, Reclamation, 916/ 978-4624; EA/IS available at: www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=25157

**REUSE & CONSERVATION US**
**EPA RESEARCH FUNDING**

EPA has announced funding to five institutions to research human and ecological health impacts associated with water reuse and conservation practices.

The following institutions received funding through EPA's Science to Achieve Results (STAR) program: Water Environment Research Foundation (WERF) Alexandria, VA, to actively identify contaminant hotspots, assess the impact of those hotspots on human and ecological health, and quantify the impact of water reuse and management solutions; University of Illinois at Urbana-Champaign Urbana,


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## WATER BRIEFS

IL to develop a new framework to understand how adaptive UV and solar-based disinfection systems reduce the persistence of viral pathogens in wastewater for sustainable reuse; Utah State University, Logan, UT to assess the impacts and benefits of stormwater harvesting using Managed Aquifer Recharge to develop new water supplies in arid western urban ecosystems; University of Nevada, Las Vegas, NV, to quantify microbial risk and compare the sustainability of indirect and direct potable water reuse systems in the United States; and University of California Riverside, Riverside, CA, to measure levels of contaminants of emerging concern in common vegetables and other food crops irrigated with treated wastewater, and to evaluate human dietary exposure.

**For info:** Cathy Milbourn, EPA, 202/564-7849, Milbourn.cathy@epa.gov or https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/recipients.display/rfa_id/591/records_per_page/ALL

### SUCTION DREDGING OR MORATORIUM UPHELD

On March 25, a federal district court (Court) in Oregon held that a state law restricting motorized gold mining in and along sensitive salmon streams "is a valid state environmental regulation that is not preempted by federal law." *Joshua Caleb Bohmker, et al. v. State of Oregon, et al.*, Case No. 1:15-cv-01975-CL, Order Granting Summary Judgment (March 25, 2016), page 4. The Court found that the State of Oregon has the right to regulate federal, as well as state land, to protect water quality and fish habitat, and that the state law does not conflict with federal law.

At issue in the case was Oregon's Senate Bill 838, passed in 2013 to implement a five-year moratorium on equipment such as suction dredges and other motorized mining equipment in and near habitat essential for salmon — upon "finding that motorized mining in and directly adjacent to the beds and banks of Oregon's rivers and streams can pose significant risks to Oregon's natural and cultural resources" according to the Oregon Department of Environmental Quality's (ODEQ's) website (see www.deq.state.or.us/wq/wqpermit/mining.htm). "…SB 838 imposed a moratorium on motorized mining for gold, silver and other precious metals that goes into effect Jan. 2, 2016 and lasts until Jan. 2, 2021. The moratorium does not prohibit all motorized placer mining but establishes certain restrictions and prohibitions. It reduces the number of streams open to motorized suction dredge mining. It also prohibits removal or disturbance of vegetation resulting from motorized placer mining activities within 100 yards of most waterways in a manner that may affect water quality." ODEQ website. Suction dredging works by vacuuming sediments from a streambed into a sluice, which separates out gold and then flushes any remaining debris and water back to the river.

Individual miners, mining groups and associations, and businesses related to the mining industry brought the lawsuit against the State of Oregon last October alleging that federal laws, such as the 1872 Mining act, preempt SB 838. The plaintiffs sought declaratory relief to prevent enforcement of SB 838. Environmental groups and commercial fishing interests — including Rogue Riverkeeper, the Pacific Coast Federation of Fishermen's Associations, Oregon Coast Alliance, Cascadia Wildlands, Native Fish Society and the Center for Biological Diversity — intervened on behalf of the state and are represented by the Western Environmental Law Center and Western Mining Action Project.

**For info:** ODEQ website: www.deq.state.or.us/wq/wqpermit/mining.htm; Court's Order of 3/25/16 available at: www.westernlaw.org/sites/default/files/2016.03.25-Suction%20Dredge%20Decision.pdf

### INSTREAM FLOW GUIDE CA TRANSACTIONS RESOURCE

The Small Watershed Instream Flow Transfers Working Group (SWIFT) has released a new resource for landowners and water diverters in California: *A Practitioner's Guide to Instream Flow Transactions in California*. This handbook is a practical guide to navigating the complex world of water rights for the purpose of leaving water instream.

The Guide describes some of the most common types of instream flow transactions and how to navigate the State's instream flow dedication process to change a water right (as permitted by California Water Code Section 1707), and provides case studies to show how the process has worked in real life.

**For info:** Guide available at: www.calinstreamguide.org

### WASTEWATER EFFLUENT MT PRIVATE SKI AREA SPILL

In early March, the Yellowstone Club, a private members-only ski area in Montana, experienced a failure of its wastewater effluent holding pond that resulted in a spill of approximately 30 million gallons of effluent. The incident lasted from March 3 through March 7.

Essentially ice caused the "…discharge to occur. The water then ran down the steep slope, scouring out a portion of the hillside, carrying the sediment with it...eventually reaching the West Gallatin River..." Montana Department of Environmental Quality (MDEQ) Incident Report, March 16, 2016, page 2.

MDEQ is in the midst of preparing three reports on the incident: (1) *Effects on Water Quality Standards for Human Health*, released March 17th; (2) *Effects on Aquatic Life*, released April 4th; and (3) *Levels of Pharmaceuticals* (pending). MDEQ concluded that "[N]o human health water quality standards were exceeded during the March 5th-7th period at any of DEQ's ten sampling sites...". Part 1 Report.

In Part 2 Aquatic Life, MDEQ's findings included the following: "Even without additional fish mortality [five dead westslope cutthroat trout were found], there will likely be sublethal TSS and turbidity impacts on fish and aquatic life in the affected tributaries in the coming months. If elevated turbidity lingers beyond runoff, the additional phosphorus carried by the suspended particles could induce nuisance-attached algal growth…One exceedance of Montana's acute ammonia standards was documented on Second Yellow Mule Creek on March 5th…Turbidity exceeded Montana's standards at all tributary sites for the entire study period (March 5th-12th), while in the mainstem Gallatin River turbidity exceeded the standard until March 9th…Looking to the future, there is a good deal of uncertainty as to the long-term effects on fish and aquatic life." See Part 2 Report for details on MDEQ website.

MDEQ noted that it "will also be working on an enforcement action for Water Quality Act violations for turbidity caused by this event, and other potential violations."

**For info:** MDEQ website: http://deq.mt.gov/Water/WPB/mpdes/Gallatin-BigSkyWastewaterSpill; Yellowstone Club website: http://yccommunityinfo.com/

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## WATER BRIEFS

**DAM REMOVAL OR/CA**

**NEW KLAMATH AGREEMENTS SIGNED**

On April 6, the US Department of the Interior, US Department of Commerce, PacificCorp, and the states of Oregon and California signed an agreement that is expected to remove four dams on the Klamath River by 2020. Following a process administered by the Federal Energy Regulatory Commission (FERC) — instead of going through Congressional authorization for dam removal — the project will result in one of the largest river restoration efforts in the nation.

The four PacifiCorp dams on the Klamath River are operated for hydroelectric power generation. Modern environmental laws require that the dams need to be retrofitted to provide fish passage. The Oregon and California public utility commissions found that the original Klamath Hydroelectric Settlement Agreement (KHSA) was a prudent alternative for PacifiCorp's customers.

State and federal officials also signed a new, separate agreement with irrigation interests and other parties known as the 2016 Klamath Power and Facilities Agreement (KPFA). This agreement will help Basin irrigators avoid potentially adverse financial and regulatory impacts associated with the return of fish runs anticipated after dam removal. This new agreement acknowledges that additional work is necessary to restore the Basin, advance fisheries recovery, uphold trust responsibilities to the tribes and sustain the region's farming and ranching. Many of these efforts will require Congressional action, and the agreement commits the signatories to actively cooperate with all Basin stakeholders — Members of Congress, tribes, farmers and others — to develop additional agreements over the next year.

The signing ceremony took place April 6th at the mouth of the Klamath River on the Yurok Indian Reservation. Oregon Gov. Kate Brown, California Gov. Edmund G. Brown Jr., US Secretary of the Interior Sally Jewell, NOAA Administrator Dr. Kathryn Sullivan, and President and CEO of Pacific Power Stefan Bird participated, along with Congressman Jared Huffman, tribes, water users and nongovernmental organizations.

The newly amended dam removal agreement, which uses existing nonfederal funding and follows the same timeline as the original agreement, will be filed with FERC on or about July 1 for consideration under their established processes. Under the agreement, dam owner PacifiCorp will transfer its license to operate the Klamath River dams to a private company known as the Klamath River Renewal Corporation. This company will oversee the dam removal in 2020. PacifiCorp will continue to operate the dams until they are decommissioned.

In 2010, Klamath Basin stakeholders signed the Klamath Basin Restoration Agreement (KBRA) and the Klamath Hydroelectric Settlement Agreement (KHSA). In 2014, the Upper Klamath Basin Comprehensive Agreement (UKBCA) was signed. Members of the California and Oregon delegations introduced legislation in the past two Congresses to advance the hard-fought KHSA and two related Klamath agreements. However, Congress adjourned last year without authorizing them. The expiration of the KBRA last December caused uncertainty in moving forward with the KHSA and UKBCA. In early 2016, the parties, who have spent years negotiating the pacts, resolved to find a new path forward. The amended KHSA and the 2016 Klamath Power and Facilities Agreement are the result of those collaborative discussions. *See* Simmons, *TWR* #143 (Jan. 15, 2016), for additional information about the process.

**For info:** Amended KHSA and KPFA available at: www.doi.gov/

**MWD RATE CASE CA**

**ATTORNEYS' FEES AWARD**

On March 24, San Francisco Superior Court Judge Curtis E.A. Karnow ruled that the Metropolitan Water District of Southern California (MWD) must pay $8.9 million in attorneys' fees to the San Diego County Water Authority (Water Authority), as the prevailing party in lawsuits involving MWD's transportation rates for 2011-2014. Records disclosed by MWD show that it has spent more than $20 million on its attorney's fees in the case with MWD. Previously, the Judge also awarded the Water Authority more than $320,000 in court costs. MWD has filed a motion for a new trial on the underlying decisions so it remains unclear as to when the case will be finalized.

The Water Authority's lawsuits stem from historic agreements the agency signed in 2003 to secure independent sources of water from the Colorado River and reduce the San Diego region's once near-total reliance on MWD for water. To transport its Colorado River water supplies to San Diego County, the Water Authority must use pipelines controlled by MWD, which has a monopoly on imported water distribution facilities in Southern California. The Water Authority asserted that MWD's current rates were expressly designed to protect its monopoly and to discriminate against the Water Authority by shifting unrelated water supply costs onto transportation rates, while illegally subsidizing MWD's water supply rate to the benefit of its 25 other member agencies. The Water Authority filed its first rate lawsuit against MWD in 2010, then filed a second suit in 2012 because MWD refused to reform its rates.

Despite the Superior Court's ruling in two cases spanning four years of MWD's rates (2011-2014), the Water Authority maintains that MWD is poised to adopt two more years of illegal rates — for 2017 and 2018 — at its April 12, 2016, board meeting. The Water Authority filed suit challenging MWD's 2015 and 2016 rates, which also use the same illegal rate allocation. That case, which raises the same issues, has been stayed pending the outcome of appeals on the prior two cases.

The award of attorneys' fees by Judge Karnow followed his final judgment in November 2015 that affirmed victories by the Water Authority in both phases of two lawsuits challenging MWD's rates. Karnow: invalidated MWD's transportation rates for 2011-2014, finding that they violated numerous provisions of California law and the state Constitution; ordered MWD to pay the Water Authority $188.3 million in damages and $46.6 million in prejudgment interest; and ordered MWD to recalculate the Water Authority's statutory right to MWD water supply — a right MWD had illegally under-calculated by tens of thousands of acre-feet annually for more than a decade, according to the Water Authority. *See* Water Briefs, *TWR* #138, for additional information on the rate case.

**For info:** Court documents and additional information available at Water Authority's website: www.sdcwa.org/mwdrate-challenge


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## CALENDAR

**April 18 OR**
**Cleanup Costs - Who Pays? How Much? (Conference), Portland.** World Trade Center. For info: Environmental Law Education Center, 503/ 282-5220 or www.elecenter.com

**April 18-19 WA**
**Clean Water & Stormwater Seminar, Seattle.** Courtyard Seattle Downtown. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

**April 19-20 UAE**
**Global Water Summit 2016, Abu Dhabi.** Jumeriah at Etihad Towers. Organized by Global Water Intelligence. For info: www.watermeetsmoney.com/agenda

**April 20 WA**
**Wild & Scenic Film Festival, Seattle.** SIFF Cinema Uptown. Fundraiser for Washington Water Trust. For info: www.washingtonwatertrust.org/calendar?id=169

**April 20 CA**
**Urban Water Conservation Public Workshop, Sacramento.** Cal/EPA Headquarters Bldg., 1001 I Street, 1 pm. Presented by State Water Resources Control Board; Written Comments due Noon, April 14. For info: www.waterboards.ca.gov/water_issues/programs/conservation_portal/emergency_regulation.shtml

**April 20-21 CA**
**25th California Water Policy Conference, Davis.** UC Davis Conference Center. For info: http://cawaterpolicy.org/

**April 20-22 NC**
**2016 Design-Build for Water/ Wastewater Conference, Charlotte.** Charlotte Convention Ctr. Presented by DBIA, AWWA & WEF. For info: www.dbia.org/Conferences/

**April 21 CO**
**2016 GWC Distinguished Lecture: Bill Hedden, Exec. Director of Grand Canyon Trust, Boulder.** UC Law School, Wolf Law Bldg., Wittemyer Courtroom. Registration Required. For info: Getches Wilkinson Center, www.colorado.edu/law/research/gwc/events

**April 21-22 CA**
**2016 Green California Summit & Exposition: Greening the Golden State, Sacramento.** Sacramento Convention Center. Presented by Green Technology. For info: http://www.green-technology.org/

**April 24-27 CO**
**Solving Groundwater Challenges Through Research & Practice: National Ground Water Ass'n 2016 Groundwater Summit Technical Conference, Denver.** For info: www.groundwatersummit.org/

**April 25-27 AK**
**Water-Energy-Environment: 2016 Spring American Water Resources Association (AWRA) Conference, Anchorage.** Sheraton Anchorage. For info: www.awra.org/meetings/Anchorage2016/

**April 26 CA**
**Groundwater Recharge & Storage - Fees & Processing for Temporary Permits Workshop, Sacramento.** Cal/EPA Headquarters Bldg., 1001 I Street, 1 pm. Presented by State Water Resources Control Board; Written Comments due 5 pm April 29. For info: Sarah Sugar, SWRCB, 916/ 341-5426 or Sarah.Sugar@waterboards.ca.gov

**April 28 CO**
**The Groundwater Viability Initiative: Integrating Groundwater and Surface Water Management Workshop, Denver.** AWRA - NGWA Workshop. For info: www.ngwa.org/Events-Education/shortcourses/Pages/347apr16.aspx

**April 28 CA**
**WATER 2016: Third Annual Conference on California Water Policy, Sacramento.** Masonic Temple. Capitol Weekly & UC Center Presentation. For info: Kathy Brown, Capitol Weekly, 916/ 444-7665 or kathy.brown@capitolweekly.net

**April 29 AK**
**Permitting Strategies in Alaska Seminar, Anchorage.** Dena'ina Civic & Convention Center. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup.net or www.theseminargroup.net

**May 2-6 FL**
**10th National Monitoring Conference: Working Together for Clean Water, Tampa.** Tampa Convention Ctr. Sponsored by the National Water Quality Monitoring Council (NWQMC). For info: http://acwi.gov/monitoring/conference/2016/index.html

**May 3 NV**
**Water Management, Science & the Law Seminar, Reno.** Peppermill Resort Hotel. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

**May 3-4 TX**
**Environmental Trade Fair & Conference, Austin.** Austin Convention Ctr. Sponsored by Texas Commission on Environmental Quality. For info: www.tceq.texas.gov/p2/events/etfc/etf.html

**May 3-6 CA**
**ACWA 2016 Spring Conference & Exhibition, Monterey.** Monterey Portola & Marriott Hotels. Presented by Association of California Water Agencies. For info: http://www.acwa.com/events/acwa-2016-spring-conference-exhibition

**May 4-5 MA**
**Ceres Conference 2016: The New Nexus of Sustainability, Boston.** Boston Park Plaza Hotel. For info: www.ceresconference.org

**May 6 WA**
**Source Control: Preventing Contamination & Re-Contamination Conference, Seattle.** WA State Convention Ctr. For info: Environmental Law Education Center, 503/ 282-5220 or www.elecenter.com

**May 9 CO**
**Colorado Water Law Conference, Denver.** Grand Hyatt. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

**May 9 AZ**
**Hydrology & the Law Seminar, Phoenix.** Renaissance Phoenix Downtown Hotel. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

**May 11 DC**
**2016 National Wetlands Awards, Washington.** U.S. Botanical Garden, 100 Maryland Avenue. For info: www.nationalwetlandsawards.org

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

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

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

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

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Water Rights, Water Quality & Water Solutions in the West
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## CALENDAR

(continued from previous page)

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

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

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

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

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

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

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

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

**June 1 ID**
**National Climate Boot Camp: Tribal Needs & Concerns Related to Climate Change, Moscow.** University of Idaho. Presented by USGS & University of Idaho. For info: www.usgs.gov/newsroom

**June 2 CA**
**Third Annual California Water Summit, Sacramento.** The Westin Sacramento. For info: www.ca.watersummit.com

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

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Floodplain Development:
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**For Information: www.TheSeminarGroup.net**
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