

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

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	In This Issue: Yakima River Basin Integrated Plan 1 Basin Plan Benefit/Cost Analysis

## 🗱 YAKIMA RIVER BASIN INTEGRATED PLAN 📓

IMPLEMENTING BASIN-SCALE WATER MANAGEMENT & CLIMATE ADAPTATION

by Steve Malloch, Western Water Futures, LLC and Michael Garrity, American Rivers

**Editors' Introduction**: At the direction of the Washington State Legislature, a *Benefit-Cost Analysis of the Yakima Basin Integrated Plan Projects* was released on December 15, 2014. Some supporters of the Yakima Basin Integrated Plan took exception to some of the report's findings. What follows are articles and responses by two of the Plan's supporters and the principal author of the B-C Analysis — minimally edited to match *The Water Report*'s usual format.

#### INTRODUCTION

Climate adaptation and ecosystem restoration do not always fit easily in the same approach in the water world — in a warming world, competition for already scarce resources may make restoration even more difficult in many parts of the West. In the Yakima River Basin of eastern Washington, an unusual set of actors have put aside longstanding differences to engage in a serious and complex effort to restore hundreds of thousands of salmon to a basin where they were all but extirpated while at the same time providing improved reliability of water supplies for irrigated agriculture, cities, and domestic use. This effort is not without controversy, as it will take decades to complete, be expensive, and rely on tradeoffs that not all embrace.

The Yakima Basin Integrated Plan was previously described by the authors in *The Water Report* #106 (December 15, 2012), which was followed by a reply from opponents and a rebuttal by the authors in *The Water Report* #108. [Editors' note: past issues of *The Water Report* are available in electronic format (PDF) to subscribers upon request: TheWaterReport@yahoo.com].

This article will briefly summarize the Yakima Basin Integrated Plan, provide updates on the status of plan, and respond to a recent economic analysis of the plan.

#### BACKGROUND

#### THE YAKIMA RIVER BASIN

Washington's Yakima River is located on the arid east side of the state, nestled between the Cascade Mountain crest and the Columbia River. Water development in the basin has worked spectacularly well to grow crops and the Yakima basin's agricultural economy. In the 6,155 square mile basin, there are about 500,000 acres of irrigated land supporting an agricultural economy valued at \$3.4 billion. Average annual water supply is about 3.3 million acre-feet, with deliveries of about 1.7 million acre-feet. Notable crops include apples, sweet cherries, most of the hops grown in the U.S. and increasingly well regarded wine grapes, along with vegetables, stone fruit, dairies, cattle, timothy hay exported to feed exotic horses, and a variety of other crops.

## Yakima Basin Plan

Phased Development

### Development Costs

**Reliable Supply** 

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Copyright© 2015 Envirotech Publications, Incorporated Water development proceeded in phases. Early private and small cooperative irrigation works gave way to larger and railroad financed projects in the late 1800's. By the turn of the century, natural flow water rights (as opposed to storage rights) fully consumed the rivers. Bigger projects were needed, including water storage. In 1905, the Yakima Project — one of the earliest US Bureau of Reclamation (Reclamation) projects — was authorized. The Yakima Project claimed all remaining unappropriated water in the basin, and included five main storage reservoirs and hundreds of miles of canals. Reclamation water contractors who depend on the federal supply occupy a uniformly junior position in the basin's water rights hierarchy.

That development had a high cost. Pre-settlement salmon runs in the basin are estimated to have ranged from 360,000 to 900,000 annually, and were the source of much of the food for Native Americans. As irrigation works were built, damming and diverting the basin's water, salmon numbers plummeted. Sockeye, summer Chinook and coho were extirpated. Steelhead and bull trout were listed under the federal Endangered Species Act in the late 1990s. A treaty signed with the Confederated Tribes and Bands of the Yakama Nation in 1859 reserved to the Yakama the right to hunt and fish. Reclamation's Yakima Project sealed the fishery's doom by constructing large reservoirs without fish passage. By the 1980s as few as 8,000 salmon returned. The treaty right remained intact, but there weren't fish to catch.

The benefit of that water infrastructure development, of course, was a much more reliable water supply. With the Reclamation project, modest reservoir storage of about 30% annual runoff combined with the upper Yakima basin's remarkably consistent and deep winter snowpack, made drought and serious water shortage rare.



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Yakima Basin Plan Water Enhancement Legislation	As in many places in the west, drought spurs interest in changes to the water-infrastructure status quo. The great west-wide 1977 drought prompted the Yakima River Basin Water Enhancement Project (YRBWEP I) in 1979 and 1984 — federal legislation which focused on fish screens and passage. Subsequent droughts in the 1990's prompted a second phase of federal legislation in 1994, YRBWEP II, which focused on water conservation and efficiency, along with habitat restoration and acquisition. Yakima basin interests have long envisioned a Phase III that would include new or expanded reservoir storage. In 2003, Congress authorized a feasibility study of a massive project that would divert and pump Columbia River water into the basin, and store it in a massive off-stream reservoir. The Black Rock project stalled in 2008 when analysis found it returned 13 cents on the dollar of investment, and had serious potential to speed movement of radioactive waste from the decommissioned Hanford nuclear production Superfund site towards the Columbia River. Climate scientists at the University of Washington and elsewhere identified the Yakima basin as significantly sensitive to loss of snowpack, both because the low to mid-elevation snowpack is sensitive to
Climate Concerns	climate change and because of the relatively low ratio of reservoir storage to annual water use in the basin. This year (2015) demonstrates the concern. Precipitation fell mostly as rain which filled the reservoirs to capacity, but snowpack was only 12 percent of normal on April 1 in the Yakima basin. The result is Reclamation's forecast of a 60% water supply for its contractors. The full reservoirs cannot make up for the storage provided by the historically reliable snowpack. This is exactly the scenario forecasted by most climate models. Climate concerns, coupled with this history of faltering fisheries and wilted water projects, prompted the need for a new approach.
Altorrativos	YAKIMA BASIN INTEGRATED PLAN As the fate of the Black Rock Project became apparent and prompted by the need for a broader set
Studied	of alternatives under Washington State's Environmental Policy Act, the State's Department of Ecology (Ecology) began exploring alternatives that would respond to signals of openness to flexibility from the water and fishery powerhouses in the basin, the Yakama Nation and the Roza Irrigation District. In an Environmental Impact Statement (EIS) for Black Rock, Ecology laid out the outlines of what would become, after several years of process and a basin study under the federal SECURE Water Act of 2009,
Addressing	the Yakima Basin Integrated Plan (YBIP). In July, 2013, Reclamation issued a Record of Decision on a programmatic EIS for YBIP.
&	At its heart, YBIP is a set of pragmatic actions that address the major water supply issues and
Ecosystem	over the next 30 years in a way that carefully orchestrates improving the position of each of the major
Restoration	interests in a balanced fashion.
	<ul> <li>FISH PASSAGE AT ALL SIX OF THE RECLAMATION RESERVOIRS: None of the Reclamation reservoirs included fish passage when built between 1910 and 1933. Sockeye stand to benefit most from fish passage, because they relied upon glacial lakes that were inundated by building of the dams, although other anadromous and resident fish species, including bull trout, are anticipated to greatly benefit from access to good quality habitat on public lands in the higher elevation, cold water areas above the dams.</li> <li>MODIFICATION TO MAKE BETTER USE OF EXISTING FACILITIES: These changes include reducing water diversions for hydropower; raising Cle Elum Reservoir by 3 feet; and building a new water conveyance tunnel to make better use of existing radius and building a new water conveyance tunnel to make better use of existing radius and building a new water conveyance tunnel to make better use of existing radius and building a new water conveyance tunnel to make better use of existing radius and building a new water conveyance tunnel to make better use of existing radius and building and the bareful labeled to be a bareful to be building and the bareful labeled to be a bareful to be better use of existing radius and building a new water conveyance tunnel to be better use of existing radius and building and the bareful labeled to be a bareful to be bareful to be a bareful to be bareful to be a bareful to be bareful to barefu</li></ul>
Basin Plan Elements	<ul> <li>make better use of existing reservoir capacity while reducing flows harmful to juvenile salmon rearing.</li> <li>INCREASED SURFACE WATER STORAGE FOR BOTH WATER SUPPLY AND FISHERIES: These projects range from expensive to very expensive. Most economical is tapping inactive storage in Kachess Reservoir below the reservoir outlet so that up to 200,000 acre-feet of water could be used for drought relief. Expansion of Bumping Reservoir by building a new dam downstream is more expensive, and would yield an additional 165,500 acre feet; this project is controversial because it would inundate about 980 acres of old-growth forest, bull trout spawning habitat, and homes on leased US Forest Service land occupied by vocal critics. The most expensive project is construction of Wymer Reservoir, a new off-stream, pumped-storage reservoir in the lower Yakima River canyon. Reclamation and Ecology are looking at alternatives to reduce the size and cost of this project.</li> <li>GROUNDWATER STORAGE: Groundwater storage envisioned includes both pumped aquifer storage and recovery, and selective surface infiltration ponds where hydrogeology allows.</li> <li>HABITAT PROTECTION AND ENHANCEMENT: In addition to significant habitat acquisition and restoration in the basin's rivers, streams, and floodplains, YBIP included acquisition of 15,000 acres of private lands in the tributary Teanaway River basin, and 10,000 acres of private lands interspersed ("checkerboarded") within the boundaries of National Forests.</li> <li>ENHANCED WATER CONSERVATION: A major target was conserving up to 170,000 acre-feet annually in wet years by reduction in conveyance and operational losses through lining and piping canals and ditches, and application efficiency. While conservation does not "make new water" and works only when water is available, will increase flows for fish.</li> </ul>

Yakima Basin Plan	• MARKET REALLOCATION OF WATER: Effective water marketing is a bedrock element of YBIP, but one that is a work in progress. Initially the effort will be to make the existing mechanisms more effective. In the process, we anticipate that changes to laws, policies and institutions will be needed to make markets work effectively and comprehensively. Largely because markets did not provide significant relief to junior water rights holders in prior droughts, water districts are reluctant to rely heavily on water markets in future droughts.
Fish Returns	Goals for YBIP are high. On the fishery side, current annual salmon returns are in the range of 25-
&	deliveries to the junior. Reclamation water rights in even the dry years of record, as well as increase
Water Delivery	supplies for municipal, industrial, and domestic use.
Integrated Approach	The difference between traditional water projects and YBIP is integration and scale — the pieces are intended to work together to address: improved use of water; improved water supply reliability; adaptation to anticipated effects of climate change; meaningful fishery restoration that bring stocks back to a substantial portion of historic runs; and land conservation that supports both the water supply and fishery goals.
Fishery Improvements	For the environment, the main shift in thinking was in taking on fishery issues — but not as "mitigation" for additional harm arising from water infrastructure development, and not in a simplistic "dams for the environment" fashion. Instead, during the YBIP formulation process, stakeholders asked the question "what do we need to do to have sustainable fisheries in the basin?" The answer started with fish passage to allow fish access to high elevation, cold-water habitat above the dams. Beyond that, YBIP looked to achieve multiple objectives by improving floodplain habitat while also serving to reduce flood risk to humans by setting back levees and opening side channels. Further, when looking at ESA-listed steelhead, YBIP addressed the problem of the need for additional habitat by proposing to acquire a 45,000 parcel of commercial forest lands that includes prime potential steelhead habitat. Linking upland state and federal forest management to water supply reliability and fishery restoration is central to the YBIP approach.
	VRIP: Present Status & Results to Data
	Since the December 2012 YBIP article in <i>The Water Report</i> rapid progress has been made towards
Initial Results	implementation, with funding, planning, process, and early action items.
	INCLUDED AMONG THE MOST SIGNIFICANT OF THE RESULTS ARE:
Legislation	2013 STATE LEGISLATION: YBIP started 2013 as the first legislative priority rolled out by newly-elected
&	request to the legislature for furthering VBIP which included funding for a down payment for land
Funding	acquisition. When the owner of the first target for acquisition — with land in the Teanaway River
-	tributary to the Yakima — decided it was willing to sell its entire 50,000 acre holding for \$100 million,
	funding for the Yakima project, and the Teanaway acquisition, became the political pivot for the
	entire biennial state capital budget in a tight budget year. To the astonishment of most observers, the
	Republican majority in the Senate was willing to buy the entire Teanaway in one transaction rather than
	TEANAWAY BURCHASE AND COMMUNITY EOREST: With funding in hand, the Teanaway acquisition, originally
Land	slated for 45,000 acres, became a 50,000 acre closed deal by the end of 2013. The legislature decided
Purchases	to enroll the Teanaway lands in a new status — "Community Forest" — jointly managed by the State's
	Department of Natural Resources and the Department of Fish and Wildlife for multiple purposes,
	consistent with the YBIP goals. Setting up management goals and processes of the Teanaway
	privately held "checkerboard" forest lands in the upper Yakima thanks to a Land and Water Conservation
	Fund allocation tied to the YBIP. The rest of the checkerboard in the upper Yakima was purchased in
	2014 by The Nature Conservancy (TNC) in a transaction that occurred outside the auspices of the YBIP.
	The net result is that between YBIP and TNC, development threats to lands in the upper watersheds of the Yakima Basin are averted, and conservation and sustainable management of those lands can now be undertaken.
Environmental	NEPA AND SEPA PROCESSES: As a joint federal and state project, YBIP is subject to both state and federal
Doviou	environmental review processes. In July 2013, Reclamation issued a Record of Decision on the
Keview	programmatic EIS for YBIP; despite vocal opposition, especially to the reservoir elements of the plan, to
	uate, no inigation followed. In September 2014, Reclamation released a draft EIS on raising the pool of Cle Flum Reservoir by three feet. In January 2015, Reclamation released a draft EIS for the first really
Infractore	large water infrastructure projects, accessing 200.000 acre-feet of water in inactive storage through the
Projecto	Kachess Drought Relief Pumping Plant (KDRP) and the Keechelus to Kachess Conveyance (K2K) that
rojects	serves to reduce high flows harmful to juvenile salmon rearing in the upper Yakima River and to help
	refill Kachess when water in inactive storage is used.

	FISH AND FISH PASSAGE AT LAKE CLE ELUM: The Yakama Nation's fishery program began trapping sockeye
Yakima	from other parts of the Columbia River system and hauling them to Lake Cle Elum in 2009. In the fall
	of 2013 the first sockeye hatched in the Cle Elum system returned, heralding a system that will soon
Basin Plan	be reborn. In 2014, 2,600 naturally spawned sockeye returned, more than replacing the 2,500 salmon
	that spawned them in 2010. With the fish in the system and successfully returning, it is now up to
	Reclamation to build facilities to allow the fish to do what comes naturally.
Fish Passage	After years of work, engineers at Reclamation's Denver Office have developed a successful design
0	for downstream passage of juvenile salmon at Lake Cle Elum. Downstream passage is complicated in
	the water column while the outlet of most dams is much deeper. No really successful downstream
	nassage design had been developed for reservoirs where the water level changes so significantly
	Following many attempts at multi-level inlet passage designs, which had unaccentable transport water
	velocity and turbulence that could harm fish Reclamation has finally created a design that works in scale
	models. Engineering of the full-scale project is in progress and construction on the upstream adult fish
	passage system is scheduled for later this year.
	FEDERAL LEGISLATION AND INITIAL DEVELOPMENT PHASE OF YBIP: Stakeholders spent significant time in 2014
Draft Federal	negotiating terms for draft federal legislation. Despite years of working together, negotiating proposed
Legislation	federal legislation among the many stakeholders possessing strong and divergent interests could have
U	riven the cohesion of the project proponents. It did not. In early 2015, draft legislation was delivered to
	Senator Maria Cantwell for her consideration. While the draft is not public at the time of this writing,
	significant elements of the agreement it embodied have been released.
Legislation	AMONG THE DRAFT LEGISLATION S SIGNIFICANT ELEMENTS ARE THE FOLLOWING:
Flomonts	AUTHORIZATION OF THE INITIAL DEVELOPMENT PHASE MAJOR PROJECTS. One of the criticisms of Y BIP is that it is a 20+ year \$4 billion project too big and too expensive for these times. While no one
Liements	thought all of VBIP would be implemented quickly there were implicit priorities. However, only
	a preliminary implementation schedule was included in YBIP documents and no formal phasing
	was proposed. In the draft legislation, the large projects of an initial development phase are laid
	out, as well as progress to be achieved during the first phase of implementing YBIP's programmatic
	elements. In addition to otherwise authorized projects (such as the Cle Elum pool raise and fish
	passage, water marketing, and habitat projects) this initial phase includes:
	• KACHESS DROUGHT RELIEF PUMPING PLANT (KDRPP): Making better use of existing infrastructure was
Major Projects	a priority for YBIP, so gaining access to 200,000 acre-feet of water in inactive storage, which is
	the most cost effective of the supply project, was both a policy and an economic priority. This
	project also does not have the impact of inundating new land. A draft EIS has been released (see
	WWW.USDF.gov/pfi/pfograms/eis/kkc/kkcdels.pdf).
	a water supply option that helped to refill Kachess after drawdown from KDRPP. Refined
	engineering found the primary benefit of the project is to reduce flows in the upper Yakima
	River, which improves salmon spawning habitat, with secondary water supply benefit. A draft
	EIS has been released (see www.usbr.gov/pn/programs/eis/kkc/kkcdeis.pdf).
	• CONSERVATION PROJECTS: These include continued water conservation and efficiency projects that
	would yield 85,000 acre-feet of water, or half the YBIP's 30-year target in ten years.
	• FISH PASSAGE AT A SECOND RECLAMATION RESERVOIR: The most obvious target for a second fish
	passage facility is Rimrock Reservoir on the Tieton River because there is more habitat
	upstream of the dam than at any other reservoir. As with fish passage for Cle Elum, downstream
	passage is a technical challenge due to fluctuating reservoir levels so the Cle Elum engineering
	• CROUNDWATER REGULARCE PROJECT POSSIBLE.
	ADDITIONAL PROJECT PURPOSES: The draft legislation adds authorized nurposes for the project including
Additional	municipal industrial and domestic uses. It also goes far beyond authorizing fish and wildlife as a
Purposes	project purpose, setting a goal of recovering and maintaining self-sustaining harvestable populations
Authorized	of native fish, both anadromous and resident species, throughout their historic distribution range in
mumonzeu	the Yakima Basin.
	EXPANSION OF CONSERVATION AND HABITAT PROJECTS IN TRIBUTARIES: Many of the most compelling habitat
	restoration projects require water conservation in tributaries, where existing federal law does not
	authorize Yakima Project investment. The water conservation programs are extended upstream to
	the tributaries.
Users'	REPAYMENT TERMS FOR IRRIGATION WATER USERS: Longstanding criticism of Reclamation water projects
Repayment	Incused on highly subsidized repayment terms (40-60 year repayment at zero interest with costs shifted to hydropower when even that financing subsidir eveneded irrigators' "ability to reas").
Terms	since to hydropower when even that inflation subsidy exceeded infigators adding to pay ). For the Initial Development Phase water users agreed to an interest rate at the federal cost of long term
	funds, reasonable renavment terms, and no use of "ability to nay" cost shifting provisions
	reasonable repayment terms, and no use of ability to pay cost-siniting provisions.



for fishing, just as sockeye seasons do on Lake Washington (where they are increasingly rare) and

Yakima	year may be a preview of typical conditions by 2070 ( <i>see</i> http://cliffmass.blogspot.com/2015/02/the- winter-of-2070.html). This less severe data set skews the results for projects that are intended to address
Basin Plan	Increasingly frequent severe water shortages.
	the moderate climate change scenarios used by the WRC as the scenario most likely to occur seems
	increasingly optimistic. More pessimistic climate change scenarios increased B-C ratios and made
	KDRPP (barely) cost effective even on a stand-alone basis. KDRPP is the only major water supply
	project proposed for the YBIP's initial development phase.
Irrigatore'	When Dr. Jonathan Yoder, the report's lead author (and author of the article following ours in this interval $T_{\rm eff}$ with the standard standard the standard sta
Contributions	districts were willing to pay the full cost of a project, would that cause him to reassess his economic
Contributions	analysis? His answer was ves. The irrigation districts involved are proposing to pay essentially full
	cost for KDRPP — minus only the small subsidy involved in using federal cost of funds rather than
	borrowing on the municipal bond market. This suggests that the irrigation districts place a high value
	on the insurance policy KDRPP represents, especially for high value and high investment crops such as
	orchards and vineyards. Should they have the opportunity to, and choose to, go forward with the project, their economic analysis will be backed by real financial commitment
Flow	The K2K conveyance project has evolved into primarily a flow management project for the fishery
Management	rather than a water supply project. While the WRC study places a very low value on infrastructure for
	flow augmentation, it is unclear how it would value infrastructure like K2K, which seeks to reduce high
	irrigation conveyance flows to more natural flows better for salmon and steelhead rearing and spawning
	In what will, with K2K, become a highly productive reach of river for salmon spawning and rearing.
Deferred	Reservoir expansion — are deferred for subsequent phases of YBIP. By then, the effects of climate
Projects	change and increased water marketing may provide a better basis for evaluating the benefit of the
,	projects. Economic analysis, like weather forecasting, is pretty good in the short term. Performing
	economic analysis of a water plan over 30 or 40 years means making assumptions of drought frequency,
	agricultural markets, technological change, population trends and other factors that are really hard to predict. Some guesses are likely to be right, others will be wrong. Appropriately, the draft federal VBIP
	legislation includes a provision calling for updating water demand and supply analyses before proceeding
	to authorize a subsequent phase of YBIP.
Conservation	WATER CONSERVATION: The WRC study found water conservation literally valueless, because it does not
&	create "new water" — the water in this fully appropriated basin is already claimed, including conserved
Targeted Use	the systems level approach that tighter systems (those with less uncontrolled loss) are more manageable
	The conserved water can be used with intent, for fish or farms, rather than haphazardly. If this benefit is
	not captured by an economic analysis, the analysis is lacking, not the conservation.
	UNQUANTIFIED BENEFITS: It is hard to fault the WRC study for avenues of investigation it did not take while
	under significant time constraints. The Ecology and Reclamation study found adequate benefits to justify the project in the salmon fishery restoration irrigation economy and municipal and industrial uses and
	stopped They too did not look farther
	Among the unquantified benefits missed by both studies are:
Unquantified	• POTENTIAL FOR DELISTING MID-COLUMBIA STEELHEAD FROM ESA PROTECTION: Mid-Columbia River steelhead
Benefits	are close to being restored to population levels and distribution that warrant delisting. When a strong
	population is restored in the Teanaway River and other key tributaries, which is a hear-term Y BIP goal ESA protection could be lifted. While the economic value of that is hard to quantify it surely
	cannot be low. When species are listed, the outerv is almost always that listing species has negative
	economic consequences due to legal uncertainty and reduced flexibility for resource managers.
	When species are de-listed it must have positive economic effects.
	• BULL TROUT: YBIP is also designed to support ESA-listed bull trout populations through fish passage
	that would allow migration and gene transfer in the system and additional nutrients as well as habitat restoration
	• RECREATION: A strong salmon fishery in the Yakima would have both direct and indirect value.
	Fishing is expensive and draws anglers from long distances. The Yakima River Canyon's already
	famous trout fishery, as well as tributary trout fisheries, would certainly benefit from the added
	nutrients brought into the system from the ocean. Fish watching as well as watching other animals
	and bit as tea by the fish is likely to have benefit, just as eagle viewing at washington's Skagit River does. Already tourists are beginning to gather in the fall on the Cooper River bridge to watch
	spawning sockeye reintroduced by the Yakama Nation. That same sockeye fishery. less than 100
	miles from Seattle, will eventually generate significant revenue for local communities when it opens

Lake Wenatchee.

Yakima Basin Plan Unquantified Benefits (Continued)	<ul> <li>ECOSYSTEM SERVICES: We encouraged both WRC and the Reclamation-Ecology study to look at the ecosystem services benefits of headwaters protection, floodplain restoration, and other restoration actions in terms of the benefits to clean water, water supply (in- and out-of-stream), and flood safety. Ecosystem services analysis is legitimate enough to have been included in the new White House Principles and Guidelines to guide federal water investments, and the failure of any entity to date to analyze the ecosystem services provided and protected by the YBIP is unfortunate and a problem waiting to be addressed.</li> <li>TREATY RIGHTS: Also difficult to quantify is fulfillment of the Yakama Nation's 1855 Treaty rights that include hunting and fishing. Without fish in the rivers, those rights are meaningless.</li> <li>GETTING THINGS DONE: Before the YBIP, progress on land acquisition, water conservation, habitat restoration, and especially fish passage, was moving slowly, if at all. The cooperation between stakeholders directly brought about through the YBIP has unleashed rapid progress on all these fronts. The Teanaway is now protected, which would not have happened without the YBIP. Manastash Creek is a perennial stream for the first time in 100 years thanks to outright enthusiasm for water conservation and stream restoration by local irrigators. Reclamation is about to break ground on Cle Elum fish passage. And drought relief is on its way for farmers from KDRPP. The benefits of collaboration are sometimes dismissed as "intangible," but the results this collaboration is achieving are visible and real. The working relationships formed will have added benefit when hard decisions have to made during drought years like 2015 is shaping up to be.</li> </ul>
Elements in Isolation Interrelated Challenges	<b>CONCLUSION</b> The WRC study looks at each element in isolation as was its charge from the legislature. It is no surprise that when examined in isolation the analysis finds parts of the YBIP worth doing and others not worth the price. Looking at projects in isolation, most any stakeholder might come to a similar conclusion whether based on economics or personal values. The project was developed to address many needs along the Yakima River, not just economic needs, and looks ahead to climate changed conditions never before experienced. Supporters of the YBIP are working to find political and technical solutions to a huge set of problems — decimated salmon, ESA-listed steelhead and bull trout, drought, climate change, flood management, and maintaining a strong agricultural and recreational economy. After years of litigation and progress toward solving the basin's problems only in fits and starts, the YBIP provides a solution with a fighting chance of outpacing challenges like climate change and population growth. A study that disaggregates YBIP actions can help refine future choices, but the only way to meet fishery and water supply challenges in a complex watershed like the Yakima Basin is through the approach the YBIP embraces and models. <b>For ADDITIONAL INFORMATION:</b> STEVE MALLOCH, Western Water Futures LLC, 206/ 818-0482 or spmalloch@gmail.com MICHAEL GARRITY, American Rivers, 206/ 852-5583 or mgarrity@americanrivers.org Washington State Department of Ecology's Yakima Basin Integrated Plan website: www.ecy.wa.gov/programs/wr/cwp/ybip.html
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Basin Integrated Plan and the Washington State Department of Ecology's Office of the Columbia River. Prior to joining American Rivers, Michael was a law clerk for the Washington State Court of Appeals and a legal intern for the Sierra Club. Michael holds a B.A. in History

Washington and California.

	🛛 💓 YAKIMA BASIN INTEGRATED PLAN BENEFIT-COST ANALYSIS 🚿		
Yakima	AN APPEAL FOR EVIDENCE-BASED DISCOURSE ABOUT THE		
Basin Plan	STATE OF WASHINGTON WATER RESEARCH CENTER STUDY OF THE YAKIMA BASIN INTEGRATED PLAN		
Benefits/Costs	by Jonathan Yoder		
	Professor School of Economic Sciences, Washington State University (Pullman, Washington)		
	Director, State of Washington Water Research Center (Pullman, Washington)		
	Acknowledgements: I thank several of the co-authors of the Benefit-Cost Analysis of the Yakima Basin Integrated Plan Projects (http://swwrc.wsu.edu/2014ybip/) for helpful comments. However, I am solely responsible for the content of this article.		
	INTRODUCTION		
Legislature's	The Washington State Legislature charged the State of Washington Water Research Center (WRC)		
Direction	to carry out a <b>b</b> enefit- <b>c</b> ost (B-C) analysis of the Yakima Basin Integrated Plan (YBIP) projects, which it		
	The WRC research team was fortunate to be able to build upon prior work in the form of an earlier		
Previous	B-C analysis, called the Four Accounts (FA) analysis (ECONorthwest et al., 2012), and an extensive set of		
Analysis	supporting studies of the YBIP and its component proposed projects. The FA analysis was commissioned		
5	by the US Bureau of Reclamation (Reclamation) and the State of Washington's Department of Ecology Office of Columbia River (OCR), both of whom are active in the design and planning of the VBIP. The FA		
	analysis reports that the YBIP as a whole passes a B-C test (such that benefits outweigh costs).		
	The FA analysis is a B-C analysis limited to a comparison of the full YBIP against a "No YBIP"		
	alternative. In contrast, the WRC was charged to perform B-C analysis of individual projects within the		
	YBIP. The WRC study therefore required a new careful analysis of the contribution of individual projects to the VPIP. In addition, as always in research and awars, the WPC research team took the appartunity to		
	update and improve on methods used in the earlier studies wherever possible.		
Results	Because of the methodological improvements and the difference in objectives, the results of the two		
<b>Ites wite</b>	studies differ in several ways. Based on the new WRC analysis, none of the water storage projects pass a		
	B-C as part the YBIP, but fish passage projects do. Further, the WRC study finds that the YBIP as a whole		
	As academic researchers working on behalf of the WRC mission and respective university values of		
Science-Based	independent, science-based research, we do not have the luxury of deciding ahead of time what the results		
Research	of a research study will, or should be. Results must follow from defensible methodological foundations.		
	The WRC study includes no policy prescriptions whatsoever, and the results should not be construed to		
Criticisms	Indicate a policy position held by any of the WRC study authors.		
Citticisiiis	of the YBIP than the previous B-C work commissioned by the YBIP proposal developers. YBIP proponents		
	have leveled several criticisms at the WRC study since its publication. Many have originated from the		
	YBIP Implementation Committee (IPIC), and several of these are included in Malloch and Garrity's article		
	in <i>The Water Report</i> (this issue, hereafter referred to as MG). Garrity is a member of the IPIC, and Malloch is affiliated with the larger VBIP Workgroup		
	The objective of this present article is to respond to the most salient published criticisms. It is not		
Seeking	possible due to space limitations nor would it be effective to try to respond to all criticisms that have been		
Evidence-Based	forwarded by YBIP proponents. Nonetheless, this article provides evidence and explanation to show		
Debate	that many of the claims to date against the WRC study are unsupported or unsupportable, misleading, or		
	itself, but to dispel unsupportable criticisms of WRC study, and to respond constructively to legitimate		
	ones. My hope moving forward is to invite and participate in an evidence-based debate about the complex		
	issues surrounding the YBIP.		
	The WRC study is not perfect; no study of an economic and environmental system as complex as		
	the Yakima Basin could be. It necessarily relies on assumptions and methods deserving of debate and broad consideration of evidence. Nonetheless, my appraisal is that ariticizens to data do not provide		
	clear implications or convincing evidence to substantively alter the WRC assessment However recently		
	published increases in two YBIP water storage project cost estimates are more consequential for initial		
	YBIP development proposals.		

	RESPONSE TO CRITICISMS
Yakima	A synopsis of some of the criticisms and my responses are provided first. Supporting evidence
Basin Plan	provided thereafter is organized to coincide with the flow of MG's commentary on the WRC report.
Benefits/Costs	
Denenits Costs	SALIENI CRITICISMS Claim: "The WPC study assumed your slow rates of fish! nonulation growth which strongly shows
Fish Run	economic analysis using a time-value of money approach"
Growth	<b>Response:</b> To the contrary, the WRC study provides a wide range of results including the high rates of growth implicitly assumed in the FA analysis. We justify lower growth rates within this range based on peer-reviewed analysis and the definition of the YBIP itself.
Martating	<b>Claim:</b> "the WRC study assumed few significant constraints to water marketing."
Restraints	<b>Response:</b> This is untrue. The WRC study provides results for a full spectrum of market outcomes, from completely ineffectual markets to fully efficient markets. Although we provide extensive discussion of water market frictions and constraints and their likely impacts, we justify an emphasis on intermediate market autoemerge less market stores are completely in the EA analysis.
	market outcomes less restrictive than those assumed in the FA analysis.
Data Set Range	severe droughts, because drought has occurred more often in recent years, and used a different standard for drought."
	<b>Response:</b> This is true, but the implication that the WRC study simply assumes a less adverse climate is false. We provide results based on a broad range of climate scenarios, from a historical climate regime to climate regimes substantially more adverse than that assumed in the FA analysis.
Irrigation	Claim: If irrigation districts propose to pay the cost of storage projects, the WRC results must be suspect.
Payments	<b>Response:</b> This claim misconstrues a misquoted statement I made to suggest that I concede doubt in our results. My intent was not to convey doubt in our results, but to convey doubt in the claim that irrigation districts will pay the full costs of YBIP water storage projects.
	Claim: "The WRC study found water conservation literally valueless, because it does not create 'new
Conservation	water '— the water in this fully appropriated basin is already claimed, including conserved water."
Worth	<b>Response:</b> This is easily falsifiable by reading the WRC report. Further, the WRC clearly and openly delineates data limitations that limit our ability for a full accounting of conservation benefits. Ancillary claims in MG (discussed below) misconstrue the nature of the limitations of our study with respect to conservation benefits.
Disaggregated Analysis	<b>Claim:</b> <i>"A disaggregated analysis divides the plan into individual components and evaluates the efficacy of those components in isolation," and "it is inappropriate to perform B-C analysis in the component parts of the YBIP."</i> (Garrity et al. 2015).
	<b>Response:</b> This claim is logically unsupportable. The WRC study goes to great length to account for the interrelationships among projects in order to assess individual components in a logically defensible way.
	CATAGORIZED CRITICISMS: SUPPORTING EVIDENCE & DISCUSSION
	The section headings below correspond to those in MG.
	FISH RECOVERY
Fish Recovery	<b>Claim:</b> "The WRC study assumed very slow rates of [fish] population growth, which strongly skews
Rates	<b>Response:</b> Please refer to the WRC report discussion beginning on page 93. The salmonid population
	growth rates relied on in the WRC study (5 percent, and for comparison 10 percent) are based on the
	most comprehensive meta-analysis published in a peer-reviewed journal article to date (McClure et al.
	2003). A 5 percent growth rate is higher than 85 percent of the population growth rates estimated for
	columbia River Salmonids. The FA analysis did not report population growth rates, nowever, the lower and upper bound estimates for sockeye abundance in the timeline demand 20 to 40 percent growths
	rates, the latter of which is higher than any reported in McClure et al. (2003). Although instantaneous or
	single-year rates may approach and even exceed these higher values in special circumstances, such as at
	the initiation of a recolonization (e.g. Pess et al. 2014), expecting population growth rates to be sustained
	at 40 per cent for the duration of the YBIP planning period is inconsistent with current understanding of salmon population biology (Milner et al. 2003) and therefore unreasonable. Thus, relative to the
	existing peer-reviewed literature, the growth rates we assume are not "verv slow" as MG claim, but are
	more reasonably described as optimistic. Given the way in which we rely on peer-reviewed literature on
	population growth rates, we dispute MG's claim that we assume return rates much lower than previous
	analyses by other fisheries biologists.

Yakima
Basin Plan
Benefits/Costs

Hatchery Considerations

> Water Marketing Spectrum

That said, the growth estimates used in the WRC analysis based on McClure et al. (2003) do not account for additional importation and/or hatchery investments in the Yakima Basin beyond that which has supported the existing populations, which act as the baseline for our growth estimates. Future importation and/or hatchery investments would support higher abundance growth rates (*see* WRC analysis Appendix discussion starting on p. 162, and specifically pp. 164-166). We did not include further hatchery and introduced fish in our calculations because these planned future restoration activities are not part of the YRBWEP's definition of the YBIP, and our legislative charge was to consider YBIP projects. If the YBIP is to be credited for fish abundance increases supported by hatchery and importation (thereby making the comparison to sockeye growth in the Okanogan as cited by MG more legitimate), then the costs of these programs should be included in the B-C analysis. The FA analysis relied on these high growth rates but did not account for the cost of activities to support them, which skews the B-C estimates for fish benefits upward.

### WATER MARKETING

Claim: "...the WRC study assumed few significant constraints to water marketing."

**Response:** This statement is incorrect. The WRC study reports results representing a full spectrum of water market outcomes, described in substantial detail (e.g. p. 38-41, and p. 144-148). We also spend three pages (p. 41-44) describing market frictions that can lead to attenuated market outcomes. The market outcomes we consider range from what we call "no trade" (or "proportional curtailment") to full trade (with and without transaction costs). "No trade" in our working definition is extremely restrictive. It mean that no markets function at all, and that irrigators ignore differences in economic returns to water across crops and curtail water to all crop types regardless of return (see p. 38-39). The no trade and full trade scenarios are unrealistic "bookends" that we use to define the full range of possible outcomes. In addition, we subtract liberal estimates of transaction costs based on existing literature from the estimated gains from trade. Although we provide results for this full range of market regimes, we justify and focus on intermediate market outcomes, which we show are remarkably similar to estimates in the FA analysis, all else being equal.

ESTIMATED COSTS FOR YAKIMA INTEGRATED PLAN DEVELOPMENT 30 YEAR IMPLEMENTATION PERIOD				
INTEGRATED PLAN ELEMENT	INITIAL DEVELOPMENT PHASE (Decade 1)	INTERMEDIATE DEVELOPMENT PHASE (Decade 2)	FINAL DEVELOPMENT PHASE (Decade 3)	FULL DEVELOPMENT COSTS (3 Decades)
Habitat/Watershed Protection and Enhancement	\$201,700,000	\$139,400,000	\$139,400,000	\$480,500,000
Fish Passage (6 projects)	\$186,400,000	\$133,600,000	\$108,400,000	\$428,400,000
Surface Water Storage	\$413,900,000	\$1,003,600,000	\$999,000,000	\$2,416,500,000
Groundwater Storage - Regional and Municipal	\$6,400,000	\$58,400,000	\$58,400,000	\$123,200,000
Structural and Operational Changes	\$150,000	\$63,500,000	\$63,500,000	\$127,150,000
Enhanced Water Conservation	\$87,500,000	\$171,000,000	\$171,000,000	\$429,500,000
Market Driven Reallocation	\$850,000	\$1,050,000	\$1,050,000	\$2,950,000
Integrated Plan Update Costs		\$1,500,000	\$1,500,000	\$3,000,000
TOTAL	\$896,900,000	\$1,572,050,000	\$1,542,250,000	\$4,011,200,000

WA Dept of Ecology Legislative Report, December 2014 See: www.ecy.wa.gov/programs/wr/cwp/images/pdf/YBIP\_LEG\_REPORT\_2014.pdf

Yakima **Basin Plan Benefits/Costs** Market Effectiveness Questioned Market Development "Need" & Pricing Water Storage **Cost Impacts** Drought Frequency Considerations Adverse **Climate Change** 

It is also noteworthy that FA analysis assumptions are empirically very nearly equivalent to our "no trade" scenario (bottom of p. 70, top of page 71). This assumption leads to the highest possible range of YBIP benefit estimates. Thus, while the WRC study does not "assume few constraints" as MG claim, the FA analysis in contrast is based on untenable implicit and very restrictive assumptions about markets and on-farm economic decisions, that assume uneconomic behavior on the part of irrigators and happen to maximize the estimated potential benefits of YBIP infrastructure projects relative to all other possible market assumptions.

The Yakima River Basin Integrated Plan Implementation Committee (2014) makes a corollary to the above claim by stating in various ways that the WRC study overestimates the extent to which markets can alleviate water scarcity issues in the basin:

"Actual experience during the 2005 drought, when most barriers to transfer of water were greatly reduced or eliminated, demonstrated that quantities of water generated from marketing approaches paled in comparison to actual water needs."

This claim requires a two-part response. First, the 2005 experience represents the market status quo ten years ago. A good deal of water market development has happened since then. The implication that water markets can't be more effective than they were in 2005 is therefore questionable at best. History is rife with examples of market development in the face of increasing potential gains from trade. You need only look to the Upper Kittias water market for exempt well mitigation that has developed since then as an example (Cronin and Fowler 2012).

Now I will pick on the word "need" as used by both MG and the Yakima Basin Integrated Plan Implementation Committee. If buyers had offered more than they did (reportedly around \$158 per acre-foot), they likely would have been able to purchase more water. But their offer suggests that they did not need the water enough to pay a higher price. This is not to denigrate the economic hardship that a drought can create; these economic hardships are real. The point is that satisfying a "need" always comes at a cost. One can purchase summer water by purchasing more storage at the cost of infrastructure. Or one can purchase water based on existing water infrastructure at the opportunity cost of that water for competing uses. The question is, which approach (or combination of approaches) provides the highest net benefits?

Further, to imply that water markets would not move as much water around as would be provided by the YBIP water storage projects hints at the fact that the benefits of more water storage are overshadowed by the costs of more water storage. Thus, MG's statement "We are less convinced that water marketing eliminates the need for any additional storage in the basin..." is not a meaningful statement in the real world of tradeoffs. Of course markets will not eliminate wants for more water storage, but they can alleviate the economic impact of drought. Another statement made by an IPIC member in testimony to the Washington State Senate Ways and Means Committee is that the "bulk of the water that was identified in that study [for market transfer] is absolutely not transferable" — (beginning at minute 45:10 Sandison et al. 2015). There are many facets of this broad statement (and preceding statements in this testimony) that I could address constructively, but I will note only that no evidence whatsoever was given to support this claim.

#### **INFRASTRUCTURE PROJECTS**

**Claim:** "The WRC relied on a longer data set that included less frequent and less severe droughts, because drought has occurred more often in recent years, and used a different standard for drought."

**Response:** We did indeed use a longer dataset than the FA analysis, and it does make a big difference in the value of YBIP storage projects. However, a quick look at the WRC analysis Figure 14 illustrates the first reason why this statement is misleading at best: we use the data from 1925 onward, and there is a series of droughts and concomitant curtailments between 1925 and 1945 that is as adverse as the recent years since 1970. To the extent that the hydrological cycle is stationary, this series should indeed provide more information than the data relied on in the FA analysis, and it should therefore be used.

Despite the implication of MG, use of the longer dataset does not imply that we ignored the potential for (non-stationary) adverse climate change. To the contrary: we ran four climate scenarios ranging from historical to adverse. We chose to emphasize one particular climate scenario (CMIP3 CGCM 3.1, which is more adverse than historic in terms of curtailments) precisely because the average annual curtailment rates matched the FA curtailments most closely (but slightly more adverse) under baseline (no YBIP) conditions.

Now consider the climatological assumptions used in the FA analysis: one-year droughts happen every five years, and three-year droughts happen every 20 years. Without the YBIP, proratable rights are assumed to be prorated to 30 per cent of entitlements in each drought year. Figure 14 of the WRC analysis includes simulated average curtailments that are very similar to actual curtailments, and shows that curtailment reached 70 per cent (30 per cent proration) just once in recent years. FA then does a sensitivity analysis assuming proration rates of 20 per cent and 40 per cent.

Yakima Basin Plan Benefits/Costs Curtailment	The more important difference between the WRC and FA analyses is that the FA assumes that the full YBIP would guarantee a minimum of 70 per cent proration, so that for every drought year, the YBIP is assumed to reduce curtailment from 70 per cent to 30 per cent (again, with sensitivity analysis based on 20 per cent and 40 per cent proration during drought years). The empirical/theoretical basis of this assumption of the impact of the YBIP on curtailment is weak to nonexistent ( <i>see</i> the FA analysis section 2.2.2.1 and onward for details), yet this is a big difference in curtailment. So big, in fact, that the reduction in average curtailment due to the YBIP in the FA analysis is eight-times the difference in average curtailment shown in the WRC study to results from YBIP implementation based on YAKRW hydrological simulations (see p. 66-68 in the WRC analysis).
	Editor's Note: VAKIMA BASIN'S PROBATABLE WATER BIGHTS
A 1945 Consent Do <i>Kittitas Reclamation Dis</i> Division, Jan. 1945)). F (TWSA). Pre-1905 righr right holders receive an "proratable" and are cu there is a "call" for wate amount of their right). Thave never been shorter rights. Prior to the regi had not yet been a seri- several years where pro serious economic pain.	ecree created an unusual water rights structure in the Yakima River Basin (the decree was issued in <i>strict v. Sunnyside Valley Irrigation District</i> , Civil Action No. 21 (Eastern District of Washington, Southern Pursuant to the 1945 Consent Decree, Reclamation annually determines the Total Water Supply Available ts amounting to about half of the Basin's surface water rights receive their full water supply before junior ny. Next up are users whose rights date to the1905 Reclamation appropriation. These rights are termed it back equally in any shortage. Post-1905 rights receive no water if the proratable rights are shorted and er (i.e., a senior water right owner requests regulation of junior users so that the senior user receives the full The most senior rights holders thus had little concern about their water supplies because they historically ed. However, the largest and most economically productive water districts rely in large part on proratable onally historic 1977 drought, proration was of only modest concern for the Reclamation irrigators — there ous shortage of water that resulted in significant proration. Since the Seventies, however, there have been oratable rights holders received less than 70% of their water, the threshold irrigators see as causing very Adapted from Garrity and Malloch, <i>TWR</i> #106.
	After implying that we chose to emphasize less adverse climate results, MG cite the Cliff Mass
Climate Inputs	Weather Blog (http://cliffmass.blogspot.com/2015/02/the-winter-of-2070.html). Interestingly, a careful comparison of the contents of this blog (based on the first map and graph and accompanying text) and the climate regime summary statistics reported in WRC study Table 3 (p. 28) shows that the HADGEM climate regime for which we report results is substantially more adverse in terms of both temperature and precipitation change than that favored in the Cliff Mass Weather Blog. Like the IPCC, we make no claims as to which scenario to rely on beyond the more frequent use of CGCM 1 for comparison to the FA analysis. Thus, we do not assume a benign climate — we report a range of results for a range of alignetes for readers to assors for themselves.
	To be fair, the FA analysis did not have access to the modeling data used in the WRC analysis, and we do not fault them for that. One of the consulting firms who contributed to the FA analysis and subsequently helped develop the YAKRW modeling framework is now using YAKRW for further analysis commissioned by Reclamation. It is somewhat surprising that MG suggest continued reliance on old modeling assumptions when the authors themselves have moved on to more scientifically defensible data methods.
	<b>Claim:</b> "The irrigation districts involved are proposing to pay essentially full cost for KDRPP — minus only the small subsidy involved in using federal cost of funds rather than borrowing on the municipal
	bond market."
Irrigators'	<b>Kesponse:</b> In testimony at the Washington State House Ways and Means Committee work session (Sandison et al. 2015, starting at about minute 44.20), another IPIC committee member stated that
Payments	irrigators have included in draft legislation at the Federal level that they will pay their share of the construction, operation, maintenance costs, and interest, of the Kachess Drought Relief Pumping Plant (KDRPP) proportional to their share of the irrigation benefits, and that the WRC study failed to account for this fact. I will make several points about these claims.
	First, no matter how the project costs are divided up among irrigation beneficiaries, these "fair shares" would still sum up to more than the benefits except under the most adverse climate and restrictive market
Enderel E	conditions (WRC study, Table 29, page 107). Although see below: the higher KDRPP cost estimates always outweigh the out-of-stream benefits. Because federal water infrastructure investments have
Requirements	been required to satisfy a B-C test such that the benefits are larger than costs, the relevance of this draft
Requirements	legislation is questionable (Hahn and Sunstein 2002; US Water Resources Council 1983; Council on Environmental Quality 2014), because the project would not be eligible for federal funds. Needless to
	say, signed and binding service contracts with Reclamation would be more convincing.
State Funding	Second, to the extent that funding is provided by the State of Washington and not the Federal government, it is likely to be funded at least in part under RCW 90.90, which does not require full or even partial cost recovery of water supply development (RCW 90.90.100 (6); http://apps.leg.wa.gov/rcw/default.aspx?cite=90.90.100). So, I am skeptical about the likelihood of full construction cost recovery without credible evidence of contractual commitment to full cost recovery by the Federal and/or State governments.

Yakima Basin Plan Benefits/Costs

#### Cost Estimate Developments

Irrigators' Cost Share Implications

#### Repayment Claims

Third, construction, operation, maintenance costs, and interest, are not the full cost of these projects. For example, as noted in the WRC analysis (p. 107), the Draft Environmental Impact Statement (DEIS) for the Kachess Drought Relief Pumping Plant and the Keechelus Reservoir-to-Kachess Reservoir Conveyance (KKC) recognizes that property values around Kachess may be harmed (Reclamation 2015). A full accounting of costs would include these costs potentially imposed on Kachess property owners. I doubt these costs are being considered by the irrigation districts, but they should be if they are going to make claims of full cost repayment.

Fourth, the estimated costs in the KDRPP and KKC have been updated in the KDRPP/KKC DEIS, which was published very shortly before the WRC report was due. The WRC analysis relies on earlier engineering cost estimates for the proposed YBIP projects, but the new cost estimates are higher, and this has important implications for the B-C analysis. A B-C test is satisfied if the B/C ratio (benefits divided by costs) is 1 or larger, such that benefits are at least as large as the costs. The WRC analysis finds that KDRPP provides a B/C ratio of 1.27 (Table 29, p. 107) based on out-of-stream uses under the most restrictive market and climate conditions, if implemented alone without other YBIP water storage projects, and assuming the old KDRPP cost estimate of \$196 million. Under those same conditions, KDRPP combined with KKC provides a B/C ratio of 1.53 at an estimated cost of \$334 million. The new KDRPP cost estimates reported in the DEIS (alternatives 2A and 2B) are \$434.4 million and \$380.7 million, respectively — which are about double that of the earlier KDRPP estimates. Given these costs, the maximum B/C ratio provided for KDRPP alone is 0.65, which means KDRPP alone never satisfies a B-C test based on out-of-stream uses. KKC costs are also higher, at \$221.3 million to \$254.4 million for alternatives 3A and 3B. The consequence is that KDRPP+KKC now also fails to satisfy a B-C test under any market and climate conditions, with a maximum B-C ratio of 0.84 under the most adverse climate and restrictive market assumptions. It should be noted, as we do in the WRC report, that these B-C ratios do not include potential instream flow benefits, but the analysis and caveats that we provide about instream flow benefits in the WRC report still holds (e.g. p. 100-103). However, they also do not include the potential property value diminution that may be incurred due to these projects.

Finally, as noted by MG, I was asked at a Yakima River Basin Watershed Enhancement Workgroup meeting (the workgroup tasked with developing the YBIP, which includes the IPIC) if I would reassess the WRC results if irrigation districts paid the full cost of their projects. The Workgroup meeting minutes state that I said if the irrigation districts fully cover the costs of the water supply projects, this would indeed demonstrate that the benefits estimated in the WSU study indeed are too low (Reclamation 2014b). I am virtually certain this paraphrases and misconstrues what I said (note that there are no quotation marks in the meeting minutes), but my misrepresented response has now apparently become a talking point for YBIP proponents as a foundation to attempt to dismiss the WRC study.

Whatever my exact language, my response was an attempt to be forthright but diplomatic. As an applied, empirically-minded professional economist, intellectual honesty requires me to admit that if a person or group puts their money where their mouth is and actually pays the full cost for something, this is strong evidence that the benefits may outweigh the costs. However, my language was intended to convey doubt about the irrigation districts' claims about repayment rather than to indicate doubt in our results.

It remains true that if the irrigation districts really pays the full economic costs of these water infrastructure costs or even the share of the full economic costs equal to their share of the benefits, it would give me pause in light of my general professional experience as an economist that leads me to take actual investment seriously as an indicator of value. But this outcome seemed then to be unlikely, and even more so now. Even if irrigation districts did pay the full costs, assenting to reassessment does not imply fault in our report beyond what we already state as limitations of our study.

### WATER CONSERVATION

Conservation Valuation Claim: "The WRC study found water conservation literally valueless, because it does not create 'new water' – the water in this fully appropriated basin is already claimed, including conserved water."
Response: This is a misstatement of our findings. We report B/C ratios as high as 0.16 for agricultural conservation based on out-of-stream uses (Table 36 on page 113), which means that we do not, literally, find them valueless. In addition, while we cannot effectively quantify instream flow benefits, we clearly state on page 113 that our reported benefits for agricultural conservation are underestimates in this regard.

Secondly, nowhere do we, nor would an economist, state that water conservation or any other movement of water within a system is "valueless, because it does not create 'new water'." Markets themselves move water from one use to another without "creating new water" and provide gains from trade, as we show extensively on the WRC analysis. Put another way, water reallocation by conservation practices or by water markets is not a "zero sum game" as has been suggested (Yakima River Basin Integrated Plan Implementation Committee 2014).

	Thirdly, the other factor that we do not quantify is that the type of water reallocation that may result
Vakima	from the agricultural conservation activities proposed under the YBIP may impose costs on others.
	Indeed, the Kennewick Irrigation District submitted a comment to the WRC stating concern that the
Basin Plan	YBIP conservation activities may negatively affect the return flows that they rely on for irrigation.
Benefits/Costs	Unfortunately, as stated in the WRC, the hydrological model upon which we rely does not capture these
	potential effects below the Parker Gage, so we are unable to quantify these impacts.
<b>Return Flows</b>	UNQUANTIEIED DENEEUTS
	UNQUANTIFIED BENEFITS Delisting of Listed Selmonids due to VRIP Development
	The WRC did not have the time or canacity to consider the net benefits of delisting steelhead and/or
Endangered	hull trout. This would indeed have economic consequences, but I am not so sure the net benefits "cannot
Spacios Act	be low" — as MG suggest. Delisting may likely reduce landowner habitat maintenance and offset
Delisting	requirements and associated costs. But reducing these requirements would presumably have negative
Delisting	consequences on further potential recovery to the extent that continuing these activities support abundance
Effects	(unless they are worthless in the first place). These impacts should be accounted for in such an analysis.
	Further, delisting would reduce or eliminate federal support for restoration actions. There have been 349
	habitat restoration projects since 1991, with expenses reported for 71 per cent of those totaling \$63 million,
	with a rapid increase in annual funding in the post-1999 period (Katz et al. 2007). For the five-year period
	from 2005-2009 the total expenses on habitat were \$33 million or \$6.6 million/year unadjusted for inflation
	(NOAA 2013). All of this represents capital inflows into the Yakima basin, which would largely disappear
	impact would the reintroduction of so many sockeye to the basin have on steelhead abundance? I do not
	have answers to any of these questions, but the net result is less obvious to me than it annarently is to MG
	Recreation
Recreation	MG imply that the WRC study does not account for increased recreation benefits due to the predicted
Benefits	increase in salmon abundances due to the YBIP. In fact, the fish valuation approach used in both the FA
Denemos	analysis and the WRC analysis captures these benefits in principle by estimating both use and non-use
	values for fish in an integrated way. While there are certainly weaknesses to this approach that we discuss
	in substantial detail (see Section 3 starting on p. 55 and Appendix Section f), the approach's breadth
	of scope — which includes recreation benefits among others — is its primary strength, not one of its
	Weaknesses.
	As MG note, there are several aspects of these complex systems that neither the WRC analysis
	nor the FA analysis capture. In response to MG a brief note on flood costs and the potential for YBIP
Flood Risk	flood benefits is worthwhile, with some very back-of-the-envelope calculations using what is probably
Costs	incomplete data. Based on the Upper Yakima River Comprehensive Flood Hazard Management Plan
	(Otak, Inc. and KCM inc. 2007), reported flood damage from 1909 to 2003 sums to \$34.75 million, in
	nominal dollars, or $369,741/year$ on average. Deflated by the CPI (base year = 2012), this amounts to
	an average of \$1.21 million/year in damage. The discounted net present value of an annuity over 100
	years (assuming the same flood risk distribution) would be \$29.7 million. Thus, if the same flood regime
	without the VBIP (there are many caveate to the interpretation of this number). It is unclear how much
	the VBIP could reduce flood risk below the new dam configurations in part because this would depend on
	dam operations in response to flood risk. However, it is likely that the YBIP would reduce only a fraction
	of this risk (such that flood risk is not zero if the YBIP is implemented). As such, any flood risk reduction
	benefits would be lower than \$29.7 million (probably substantially so). In relation to the out-of-stream use
	shortfalls above \$2 billion (WRC analysis, table 19), this is unlikely to make much of a difference.
Treatre	Treaty Rights
	MG claim that we do not quantify the value of the Yakama Nation's 1855 treaty rights. The fish
Considerations	valuation benefit estimates capture the value of improving fisheries, and so in principle would include the
	value of fish, and therefore exercise of treaty rights in relation to those fish. Again, however, the valuation
	analysis authors) do not address these treaty-related values explicitly or independently
	Getting Things Done
	The development of a collaboration between groups who were in the past at odds with each other
Assessing	is indeed commendable, productive, and even inspirational to the extent that it has been inclusive and
Collaboration's	comprehensive (a point of contention in YRBWEP meeting public comments; Reclamation, 2014a).
Product	However, from the perspective of a B-C analysis, process leads to results — or at least a proposal — and in
	this case, the proposal is the YBIP. I do not discount the enthusiasm, satisfaction, and even spillover effects
	of participants in this process, but from the perspective of the legislative charge of the WRC, effectiveness
	of the collaboration is defined by the product of its efforts with respect to the YBIP, which the WRC was
	charged to assess in benefit/cost terms.

Disaggregation	
Yakima The YBIP is a set of projects designed to work together to address a number of issues inter	related
<b>Basin Plan</b> I through water in the basin (Garrity et al. 2015). YBIP proponents have argued that because of interconnectedness, it is nonsensical and/or misleading to evaluate the individual component p	this arts of the
<b>Benefits/Costs</b> YBIP. Analogues to this claim have been made several times, and I will use some of them as a	basis of
response.	
<b>Claim:</b> "A disaggregated analysis divides the plan into individual components and evaluates the	he efficacy
<b>Interdependency</b> of those components in isolation. That approach is contrary to the essence of integrated pla	nning, which
<b>Recognition</b> Recognition <i>seeks to capture the synergy of a comprehensive [set, sic] interrelated set of projects and act internet at a set of projects at a set of pr</i>	ions that are
<b>Response:</b> To the contrary, it is indeed logically supportable and possible to estimate the bene	fits
of individual components of a system of projects such as the YBIP, in which the outcomes an	e
interdependent. The key is to recognize that the benefits of any given project are dependent	on whether
or not other projects are implemented.	in stars and
Benefits from fish passage projects in the basin are likely to be dependent to some degree flows and habitat quality above and below the fish passage project. The benefits from one w	on instream
storage project are likely to depend on which of the other storage projects are implemented.	Accounting
for this conditionality is logically equivalent to accounting for the interconnectedness in the	system.
Economists frequently apply this sort of analysis when modeling multi-input and multi-outp	at production
relationships.	
<b>Conditionality</b> Unfortunately, interdependence of project impacts means that there cannot be just one ans question: "what are the benefits of the Wymer Dam and Reservoir?" The value of the Wymer	er Dam
depends on which other water storage projects are also built. The entire WRC analysis is bu	ilt around
accounting for this conditionality, thereby accounting for interconnectedness. For example,	the Methods
section of the WRC analysis begins with a discussion of how to address this interdependence	e (WRC
analysis, p. 16-17). In the Executive Summary (p. 11-17), we summarize a set of estimates the	at represent
implemented as a part of the full YBIP implementation. These two sets of benefits are differ	ent from
each other for each respective project precisely because the system is economically and physically and physical	ically
integrated.	
Thus, accounting for conditionality in our "disaggregated analysis" by definition means the	at the
accounting for interdependencies that YBIP proponents contend lead to synergies, as the following the interdependencies as the following the synergies as the sy	owing quote
suggests:	o ning quote
"This is clearly a case where the whole is greater than the sum of the parts, but we're alw	vays going
to have the challenge to explain that to people."	Donortmont
(Prengaman 2013, quoting the Director of the Office of Columbia River, State of Washington	Department
Interestingly, to make this claim requires the ability to assess both the parts, and the whole	— a
<b>Conditional</b> comparison that the first claim (above) against disaggregation suggests is inappropriate. And	l more
<b>Costs</b> interestingly, while this adage is often used, it is not always true. To illustrate, the WRC ana	lysis
estimates the value of water storage projects conditional on whether the other storage project implemented. Our results show that if all storage projects are implemented, each provides k	s are
than if any of them were to be implemented alone (see for example Table 12). The last water	er storage
project provides less insurance value per acre-foot of water it provides than does the first. Ir	other
words, one might instead say the whole is worth less than the sum of its parts.	
Granted, using only the water storage projects to illustrate this point ignores the contributi	on that
do these synergies lie? Lillustrated above conceptually (and we discuss in the WRC report)	bat there
Accounting and these synergies net in individued doo've conceptually (and we discuss in the write report) may be physical and therefore economic synergies between instream flows, habitat conserva	tion, and fish
passage. To the extent that adding storage makes it easier (less costly) to provide instream f	ows, then
there is an indirect synergy between storage and other fish-related investments, through instr	eam flow
augmentation. The problem is that: (a) WKC analysis results suggest that any synergies are in to support positive B/C ratios for the water storage projects; and (b) purchasing rights for inc	tream flows
would be less costly than YBIP water storage development if the market infrastructure were	to develop to
do so.	
<b>Conditional</b> In summary, the claim that individual projects within an integrated system cannot be asses	sed simply
Analysis does not hold up. Conditional analysis of outcomes from decisions about one of many interce	lependent
projects can be done in an economically meaningful way, and is not contrary to understanding contributions of individual components to an integrated system.	g me

Yakima Basin Plan Benefits/Costs Individual Project Contributions	This fact does not negate the concept of Integrated Water Resource Management processes and goals, and I recognize that benefit-cost analysis results are not the only factor that are or should be considered in policy decisions regarding complex economic-environmental systems. However, I am convinced that a clear understanding of the contributions of each project are knowable (or at least legitimately estimable), and are an important part of the body of information useful for such decisions. Indeed, in the context of political process, and even from an economic perspective, the question about what to do when B-C analysis does not support individual components of an integrated plan that might satisfy a B-C test as a whole is a legitimate problem, but it should be confronted head-on rather than by dismissing conditional contributions of each of the components (for pithy comment on this point, <i>see</i> Campana (2015) — "References" appear below). In the last sentence of their article MG state that "A study that disaggregates YBIP actions can help refine future choices" I agree with them on this point; except why must we wait for the future? <b>FOR ADDITIONAL INFORMATION:</b> JON YODER, Washington State University, 509/ 335-8596 or yoder@wsu.edu
Jonathan Yoder is a Pr Washington Water Re policy, and has been	ofessor in the School of Economic Sciences at Washington State University and Director of the State of esearch Center (swwrc.wsu.edu). Yoder specializes in environmental and natural resource economics and carrying out water-related research for over 15 years.
References Campana, Michael, 2015. "IWRM Comundrum: Consensus & the Dogs of Benefit-Cost Analysis" WaterWired. February 15. http://aquadoc. typepad.com/waterwired/2015/02/iwrm-conundrum.html. Council on Environmental Quality. 2014. "Updated Principles, Requirements and Guidelines for Water and Land Related Resources Implementation Studies" www.whitehouse gov/administration/cop/ceq/initiatives/PandG. Cronin, Amanda, and Lara Fowlet. 2012. "Northwest Water Banking: Meeting Instream and out of Stream Water Needs in the Pacific Northwest" 102: 10–16. ECONorthwest, Natural Resources Economics, and ESA Adolfson. 2012. "Yakima River Basin Integrated Water Resource Management Plan Four Accounts Analysis" www.usbt.gov/pn/programs/ythwepriperopts/fouraccounts.pdf. Garrity, Michael, Mike Leita, Phil Rigdon, Ron VanGundy, Michael Livingston, Urban Eberhart, Lisa Pelly, Paul Jewell, and Derek Sandison. 2015. "The Yakima Integrated Plan: Benefit/Cost Analysis — More than Simply the Sum of Its Parts" Washington State Department of Ecology. Accessed March 9. www.eyw.gov/programs/vr/twey/images/pdf/Cost-Ben-Feb.pdf. Hahn, Robert W., and Cass R. Sunstein. 2002. "A New Executive Order for Improving Federal Regulation? Deeper and Wider Cost-Benefit Analysis" University of Pennsylvania Law Review 150 (5): 1489–1552. doi:10.22017/312946. McClure, Michelle M., Elizabeth E. Holmes, Beth L. Sanderson, and Chris E. Lordan. 2003. "A Large-Scale, Multispecies Status Assessment: Anadromous Salmonids in the Columbia River Basin" Ecological Applications 13 (4): 964–89. Milner, N. J., J. M. Eliott, J. D. Armstrong, R. Gardiner, J. S. Wellon, and M. Ladle. 2003. "The Natural Control of Salmon and Trout Populations in Stream" Fisheries Research, The Scientific Basis for Management of Salmonid stocks in the British Isles, 62 (2): 111–25. doi:10.1016/S0165-7.836(02)00157-1. NOAA. 2013. "PNSHP Database" Pacific Northwest Salmon Habitat Project Tracking Database. www.webaps.mvfsc.noa	

Cost Analysis of the Yakima Integrated Plan Implementation Committee. 2014. "Public Comment. Re: Washington State University (WSU) Benefit-Cost Analysis of the Yakima Integrated Plan Projects, Report to the Legislature" www.usbr.gov/pn/programs/yrbwep/2011integratedplan/ 2014meetings/2014-12-17/report.pdf.

Valcima	TO JONATHAN VODER'S ARTICLE
Takilla	
Basin Plan	
Responses	At the outset, we would like to thank Professor Yoder and his team for their work reviewing the
	Yakima Basin Integrated Plan (YBIP). To their credit, they thoroughly analyzed a considerable amount of
	economic, fishery, and hydrological data in a short time period. In responding to the article we produced
	for <i>The Water Report</i> , Professor Yoder offered a vigorous and detailed defense, helping us — being
	As conservation activists, we are acutely aware of the various ways <b>b</b> enefit_cost (B-C analysis) below
Analysis	to sort out projects that have societal economic and environmental merit from those that do not. However
Ironies	we are also acutely aware of the long history of abuse of B-C analysis in water resources projects. The
	irony is that typically that abuse is slanted towards justifying projects with enormous unaccounted-
	for environmental costs. Here, we are in the less typical role of defending enormous accounted-for
	environmental benefits that are being used to justify a plan that includes new water infrastructure along
I.I.a. and	with major environmental restoration and protection measures.
Unusual	As has been the case many times in the development of the YBIP, we find ourselves in new and
Amance	Reclamation the Vakama Nation irrigation districts and conservative central Washington counties
	which are all also supporting the enormous accounted-for environmental benefits of this project. As
Ongoing	environmentalists, we also find ourselves in the unusual position of being "insiders" to a complex process.
Innovations	Our success so far at helping to shape the YBIP to be the innovative and effective program we'd hoped for
milovations	(while continuing to work with our fellow stakeholders) has given us confidence that the package can and
	will be improved as it moves forward. Those who see the package and the process as more static — an
	understandable point of view for those on the outside of a complex process — are less likely to believe
	VBIP has evolved since the 2011 report on the programmatic concept (which is what the WRC report
Adaptable	had to analyze because it is the most recent complete statement and it is what the legislature directed) and
Process	it will continue to do so. For example, we expect that the balance among some of the elements of the YBIP
	will shift over time — especially in the balance between water marketing and surface storage. There is
	nothing in the YBIP agreement that precludes adaptation and adjustment to evolving political, economic,
	climatic, or environmental information. In fact, evolution is anticipated, with alternatives for many of the
	project elements should the initially proposed ones become infeasible. Indeed, the current phasing of the VPID which was not contamplated by the 2011 write up reflects a major stan in this direction. There is
	great social and environmental value to pursuing adjustments to the plan over time instead of blowing it
	up because the entire thing is not perfect. Political and social hurdles would instantly cripple any plan
	designed to meet only environmental or only out-of-stream water supply goals. In other words, criticism of
Analysis	the plan can and should improve it — not destroy it.
Impetus	As Professor Yoder is clearly aware, there are two significant reasons the Washington Water Research
	Center was asked to do this work by the Washington State Legislature.
	First, in developing the YBIP, there was a desire from a minority of the proponents to do a careful analysis of the barofits and casts of each project element; however, the Pureou of Poelemetion and the
	Department of Ecology chose to focus on analysis of the whole plan and defer project-by-project analysis
Appropriate	until the elements were ready for authorization or implementation. We agree with the state legislature
Iiming	that the kind of project-by-project review WRC used is a valid lens to apply to the YBIP and inform its
	implementation. Our difference is in when that review should be done and for which project elements that
	review is now ripe. Some of the projects WRC reviews have no realistic chance of being authorized for
	ten to as much as 25 or 30 years in the future, because they are not part of the YBIP's initial development
	phase. For the two biggest water infrastructure projects — new or expanded reservoirs at Wymer and
	are not currently economically justified. The 2008 Vakima Basin Storage Study arrived at very similar
	conclusions. After a series of winters such as that of 2015, with reasonable precipitation but very little
	snow (conditions consistent with climate model results), and rational economic response in agricultural
	practices, those big infrastructure projects may or may not be justifiable. To do the analysis now essentially
Opponents'	prejudges decisions that will be made ten, twenty, or thirty years from now.
Purposes	Which is, of course, the second reason. Within the Washington State Legislature, there are skeptics
I ur poses	and opponents of water supply infrastructure spending on the east side of the Cascades; Professor Yoder's
	analysis neips them make their case.

	However, the initial development phase of the YBIP is now ripe for careful analysis as it is ready for
Yakima	action in both DC and Olympia to authorize or fund the major elements. (See the initial article in The
Desire Diere	Water Report for a description of the initial development phase, but in brief it includes: fish passage at Cle
Dasin Plan	Elum and Rimrock reservoirs, the Kachess Drought Relief Pumping Plant (KDRPP), and the Keechelus
Kesponses	to Kachess conveyance (K2K); as well as water conservation; habitat improvement; water marketing; and
	groundwater storage; Yakima River Basin Integrated Water Plan: Strange Bedfellows take Risks, Find
	<i>Common Ground, TWR</i> #100, Dec. 15, 2012). For the major elements requiring rederat authorization 
Eurodia a Doubto	As Professor Yoder notes, the WRC study casts doubt on whether those projects as currently envisioned
Funding Double	will pass a B-C analysis. If under the Bureau of Reclamation's analysis one or both of the projects do not
	pass muster, the prospect of legislative authorization or appropriation for those projects dims.
	We also want to reply to several of Professor Yoder's responses where he makes valid points:
	Aggregated v. Disaggregated Analysis
	We agree with Professor Yoder that disaggregation is important as a means to winnow project options
Overall Benefits	and elements to get the best overall outcome. However, for the new model of water planning — "integrated
Overun Denemis	especially when as is almost certainly true for the Yakima, the most beneficial parts of a project simply
	would never happen without also including elements with less benefit. This is a problem long faced in
	western water — many multi-purpose water supply projects were justified based on hydropower or flood
	control benefits. How to fairly and usefully evaluate the new "integrated" projects is a work in progress.
	Fishery Benefits
Four Accounts	The most stark and important difference between the Four Accounts and the WRC analyses is in the
<b>v.</b>	benefit ascribed to fishery benefits in the Four Accounts analysis. While there are several factors in arriving
WRC Analysis	at this smaller number the most important one is the rate of population growth especially for sockeye
	being actively reintroduced to habitat blocked for a century by Bureau of Reclamation dams. For sockeye,
	the Four Accounts analysis focused on potential colonization of this new habitat, while the WRC analysis
	notes the difficulty in increasing Columbia Basin salmon populations which are subject to dam passage,
	river, and ocean condition constraints — even as it concludes that recent salmon population increases in
	other parts of the Columbia Basin despite those constraints reduce the value of restoring salmon in the
0.1	Fortunately with sockeye already returning in surprising numbers to the Cle Elum River due to early
Sockeye	efforts by the Yakama Nation, an empirical early population growth rate will be known in a couple of years.
Kebbullu	(Whether these reintroduction efforts are part of the plan or not is perhaps more a philosophical than factual
	debate — the Yakama Nation effort predates the Integrated Plan, but it also was implemented in hopes of
	increasing the likelihood that the YBIP will successfully and quickly fund state-of-the-art fish passage and
	the associated Cle Elum Reservoir pool raise before a bad drought year highlights the long-term inadequacy of the current erudely designed downstream fish passage system that only works when the reservoir is full)
Analysis	Also the WRC report nounces on a simplification made in the Four Accounts analysis: for the level
Simplification	of analysis needed for a programmatic analysis, the Four Accounts analysis ascribed only the cost of fish
· ···· · · · · · · · · · · · · · · · ·	passage to sockeye recovery, while all other flow and habitat work was ascribed to the other species. The
	result was that the cost of sockeye recovery included only the fish passage, and the costs for other salmon
	species, bull trout and steelhead recovery included only habitat and flow work. Sockeye will need at
	least some of the flow and habitat work, and the other species will benefit from fish passage. WRC used
	that simplification and found that fish passage passed a B-C analysis, while the flow and habitat work
Interplay	While we are no more biologists than we are economists a thorough study of the internlay between
Evaluation	habitat restoration, fish passage, and flow improvements is clearly warranted. Water management —
Warranted	including reservoir and groundwater storage, water conservation, and how water markets are pursued and
	applied — will greatly affect flows and water temperatures, and the studies undergirding the YBIP, let alone
	the WRC report, have at most only scratched the surface of these interactions.
	Water Marketing We agree with the WDC report that water merketing should be given more weight by the VDD and in
Marketing	we agree with the with report that water marketing should be given more weight by the Y BIP and in the Vakima basin generally than it has been to date. How far water marketing can go toward addressing
Potential	the many problems in the Yakima in a socially, economically, and environmentally accentable manner is an
	open question, but one that should be explored more thoroughly. In many western basins, market transfers
	of water are spurred in the first major water short year after a basin adjudication. Given this year's
	snowpack, and the all-but-completed Yakima adjudication, we may have those conditions now.

Who Pays and How Much?
A point of contention is how much the irrigation districts are willing to, or can, pay. The implication from the WRC report is that the irrigation districts should not be willing to pay for the water supply infrastructure in the initial development phase (primarily the Kachess Drought Relief Pumping Plant and a portion of the K2K Pipeline) as they do not pass its B-C analysis test. However, the irrigation districts have publicly stated and inserted language in draft federal legislation that states that they are willing to pay
for those projects, with interest, over a reasonable time period. The economic calculus of the WRC and the offer by the irrigation districts are very different. Professor Yoder is correct that signed contracts are more convincing than an offer or draft legislation. On this point, the WRC team might ask whether the irrigation districts have information that was not taken into account in the economic analysis. Similarly, the irrigation districts might reconsider the economic rationality of their offer. Both might consider the shifts in climate already evident in the Yakima Basin and the effects of that shift on crop mix and economics. If the YBIP is to progress on authorization and funding, leaders in Congress, the state legislature, and the White House Office of Management and Budget will insist on water users paying for their share of water infrastructure, including interest. This is in alignment with the irrigators' stated intent. If it turns out the irrigators cannot afford surface storage, or only a portion of it, critics of the YBIP's surface storage projects will have much less to worry about — the full suite of projects may remain on paper, but they will not be built.
<b>JONATHAN YODER'S RESPONSE</b> My interest in this exchange with Malloch and Garrity has been to address and move beyond some persistent assertions about the WRC report that have curtailed what could be a more substantive and constructive discourse about the report itself, the economics of the YBIP, and the debate about the sometimes-uncomfortable role of Benefit-Cost analysis in integrated water resource management. I could quibble with a few of Malloch and Garrity's statements about the WRC report in their final response, but I commend their focus on some of the more substantive and complex historical, political, and methodological issues that remain. I am hopeful that this exchange will improve understanding about the WRC study and to further inform debate and decisions about the Yakima Basin Integrated Plan.
<b>CALIFORNIA GROUNDWATER REGULATION</b> INTO THE TRENCHES: AN EARLY ASSESSMENT OF CALIFORNIA'S NEW GROUNDWATER LEGISLATION by David Aladjem, Downey Brand LLP (Sacramento, California)
<b>INTRODUCTION</b> Last year, many Californians were giddy that the state would finally come into the modern ages and implement a statewide program to regulate the use of groundwater. Many other Californians were dejected, feeling that the Legislature had ignored their legitimate interests in favor of a "feel-good" measure that forced them to sacrifice their livelihood for the benefit of endangered fish. The diametrically opposed perspectives were aggravated by what some scientists believe is the worst three-year drought period in 1,200 years, heightening the stakes and the rhetoric from all parties. From your author's perspective, the three bills (Assembly Bill (AB) 1739 and Senate Bills (SBs) 1168 and 1319) that constitute the Sustainable Groundwater Management Act of 2014 (SGMA) are, with the possible exception of the 2009 Comprehensive Water Package, the most important water legislation enacted in California since the passage of the Burns-Porter Act, which authorized the State Water Project in 1960. However, history will probably see the passage of the legislation as relatively easy by comparison with the hard work yet to be done in order to actually manage California's groundwater in a sustainable fashion. If the groundwater legislation is implemented in a manner that avoids unnecessary conflicts, in a decade we may look back on the legislation as a great success. On the other hand, if the many parties that have important roles to play fail to implement the legislation in a practical manner, we will look back on the legislation as a wasted opportunity and as one of the many reasons that California's agricultural industry suffered mair decline



	Groundwater Sust
California	A key element
Groundwater	- 1.e., one or more
T	to the basin, or that
Law	been adjudicated (cl
	groundwater manag
"Sustainable	the groundwater bas
Yield"	yield" (as noted abo
	a state of overdraft
	basins to reach a sta
CEQA	need to develop suc
Exemption	author this exempti
	New Local Author
	One of the critic
	laws did not give lo
Local Powers	balance with the sus
	agencies a broad arr
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	ability to investigate
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Plans	10726.6(e) Thus
	consultation with a
	interest. Once the g
	dissatisfied with the
	limited. This provis
	would likely be tied
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	basin is being mana
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#### ainability Plans

of the legislation is the new requirement that groundwater sustainability agencies local public agencies that extract groundwater from the basin, provide surface water have land-use authority for the basin or the county if no other local agency applies lwater sustainability plans." As a general matter, groundwater basins that have already hiefly in Southern California) or those agencies that have ongoing and successful gement programs will only need to provide annual reports to DWR demonstrating that sin is being managed in a manner that is consistent with the long-term "sustainable ove, essentially the historical concept of "safe yield"). Groundwater basins that are in will need to develop groundwater sustainability plans by 2020 that would enable the te of sustainable yield by 2040. Most of the remaining non-overdrafted basins will ch plans by 2022. Significantly, the development of groundwater sustainability plans is quirements of the California Environmental Quality Act (CEQA). In the opinion of your ion will save at least a year in the development of the required plans. ities

icisms of past groundwater legislation (AB 3030 and SB 1938) has been that these cal agencies the authority they really needed to bring groundwater extractions into stainable yield of the basin. The new legislation grants groundwater sustainability ray of new authorities, modeled on the specific authorities that the Legislature has in specific groundwater management agencies. Such authorities include not only the e and determine the sustainable yield of a groundwater basin, but also the ability to limit tions, require wells be separated by sufficient distance to prevent well interference, undwater management, and enforce the terms of a groundwater sustainability plan. **Multiple Interests** 

groundwater sustainability plan, a groundwater sustainability agency must consider the y of different stakeholders, including beneficial users of water, environmental interests, munities, and others. (Water Code section 10723.2). However, after considering developing a groundwater sustainability plan, any judicial challenges to the plan are ne deferential standard that applies to challenges to a general plan. (Water Code section a groundwater sustainability agency is legally required to develop the plan through variety of stakeholders so as to try to ensure that the plan best serves the public groundwater sustainability agency adopts a plan, though, the ability of interests that are terms of a groundwater sustainability plan to challenge that plan in court will be quite sion of the law is extremely important — without it, groundwater sustainability plans up in court for years.

#### Management

l amendments to the legislation dealt with the situation where most of a groundwater ged in a sound manner but some area (perhaps an area outside the boundaries of a resists the limitations on pumping, or the imposition of charges for the groundwater hat are being imposed on the remainder of the basin. In these cases, the legislation now the SWRCB to penalize those portions of the basin that are managing groundwater hion, and instead directs that any "state intervention" focus only on the areas that are agement. (Water Code section 10735.2(e)). This last-minute amendment that rewards benalizes those who want to dig in their heels is extremely important; it gives water implement the new law fairly the ability to move forward productively in spite of the ction on the part of a small group. In any endeavor as complicated as a groundwater it is impossible to develop a plan that will please all interests. The Legislature properly hat has strong support from most interests should be allowed to proceed.

ministration has insisted, from the beginning of this effort, that the SWRCB must under certain conditions: (i) no local agency is willing to serve as a groundwater cy; (ii) the groundwater sustainability agency does not complete a groundwater n a timely fashion; (iii) the groundwater sustainability plan is inadequate, and remains DWR and efforts to cure the deficiencies; or (iv) the groundwater sustainability plan ed and simply does not work. There was general agreement by most stakeholders ions. The objections have all been to the standards that the SWRCB will use to e legislation terms a "probationary basin" and the standards that the SWRCB will an "interim plan" for the basin. The late amendment discussed above (contained in that prevents state intervention in areas that are engaged in sustainable groundwater rs these concerns to some extent by limiting the SWRCB's authority only to areas that te actions (or inaction) to thwart groundwater management.

	OPPORTUNITIES & CHALLENGES		
California Groundwater Law	The new legislation presents water managers, water rights holders, DWR, and SWRCB with a large number of opportunities and challenges. Collectively, the manner in which we address these opportunities and challenges may make it possible for California to emerge from the current drought with a more reliable and environmentally sensitive water management system, thereby fulfilling much of the promise of the Delta Reform Act's policy of "co-equal goals."		
	Opportunities		
Existing Rights	<b>Preservation of Water Rights</b> As described above, the simple and straightforward language quoted earlier in this article regarding the protection of water rights offers strong evidence that the Legislature — contrary to a chorus of voices that have filled the news media over the past year — fully intends to respect existing water rights and has no desire to change the current water right system.		
	It is impossible to overstate the importance of the Legislature's reaffirmation of water rights. At least since the Court of Appeal's decision in <i>Imperial Irrigation District v. State Water Resources Control Board</i>		
	225 Cal.App.3d 548, 573 (1990), wherein the Court of Appeals concluded its decision with the opinion		
	that water law in California had "passed beyond traditional concepts of vested and immutable rights," there have been a number of parties who have taken the position that California's water right system is an archaic		
	and anachronistic relic of the 19th century that should be discarded like week-old garbage. The continuing		
	drought has reinforced those notions; indeed, Governor Brown recently indicated that he believes that some changes in the water rights system (as of yet unspecified but not "transformative") will be needed. The		
	California Supreme Court, however, firmly rejected the notion of modifying water rights or the priority		
Priority System	"[W]ater right priority has long been <i>the central principle</i> in California water law." (emphasis added).		
Confirmed	Further, when confronted with the dicta from the <i>Imperial Irrigation District</i> decision, the Supreme Court		
	rights and instead allocate water based entirely on equitable principles." <i>Id.</i> at 1251. Thus, contrary to the		
	wishful thinking contained in the <i>Imperial Irrigation District</i> dicta, the judiciary has firmly embraced the priority system as the foundation of California water law. Nothing in SGMA would change that conclusion		
	[Editor's Note: "Dicta" refers to a comment in a court's opinion that provides insight into the court's view,		
	but does not provide precedential value because it was not part of the legal basis for judgment. Although the comment may be cited later, it does not have the full force of a "precedent" (i.e., previous court		
	decisions or interpretations)].		
Priority:	the Supreme Court in <i>City of Barstow</i> , that the water right priority system is the paramount principle of		
Paramount Principle"	California water law. However, since the Supreme Court's decision in <i>City of Barstow</i> , there has been the question of whether the Legislature would follow the Supreme Court's lead or use its constitutional		
1	authority to seek to change the water right system. The Legislature had the opportunity to overturn (or at		
	least modify) the Supreme Court's affirmation of water rights in 2009 when it enacted the Delta Reform Act. The Legislature failed to take that opportunity. In enacting Water Code section 85031, the Legislature		
	phrased the protection of water rights entirely in the negative ("This division does not diminish, impair,		
	or any other water rights protections."). As a result, one could argue that the Legislature was not actively		
	embracing water rights but merely not altering water rights. However, the language of section 1(b)(4) of AB 1739, which states that it is the Legislature's intent to "respect" water rights, now puts the matter		
	positively and embraces the protection of water rights as an essential part of sustainable groundwater		
Legislative	had the opportunity in both sessions to modify the system of water rights (either to help preserve the Delta		
Ammation	or to address groundwater overdraft) and instead embraced the concept of protecting water rights. It		
	priority system is here to stay. Consequently, the interests that have consistently sought to modify water		
	rights of others over the past two decades plus should devote their energies to working within the water		
	New Tools for Water Districts		
Historic	From the perspective of local agencies, the SGMA offers many water district managers an impressive set of tools that they can use to manage groundwater in a sustainable manner. Prior to this logislation, there		
Management	were — effectively — two different classes of agencies that could manage groundwater.		
	First, there were agencies that had been specially created by the Legislature to manage groundwater in a specific area and, for that purpose, had been granted special powers. The oldest of these special districts		

is probably the Orange County Water District, but there are a number of other districts across the state.



	However, given the importance of moving quickly toward improved groundwater management, the
California	Brown Administration should seek substantial additional resources from the General Fund to assist local
Croundwator	agencies in this effort. Such funding should not be viewed as a "hand-out" to local agencies, but rather an
Gibulluwalei	Investment in the public good of sustainable groundwater management that benefits all Californians. The Brown Administration has been guite thoughtful in framing the issue as part of the legislation; it is to be
Law	hoped that the Administration will continue those efforts as part of implementing the legislation
	One aspect of the challenge of developing groundwater sustainability plans that has not received
	much attention is the way that these plans are likely to vary from agency to agency and from region to
Plans'	region. For instance, it is obvious that a groundwater sustainability plan for an area that is not in overdraft
Variety	will be quite different from a plan for an area that has been in overdraft for decades. Similarly, a plan for
	an urban or urbanizing area will be quite different from a plan for an area where over 90% of the land is
	California and plans in coastal areas will be different from plans in inland areas. Given this variety of
	plans, assessing progress (either on the part of local governing boards or on the part of DWR or SWRCB)
	will be a challenge. The temptation will be to move to a "one-size-fits-all" approach, which is precisely the
	opposite of what the Legislature desired. There will need to be some experimentation and some tolerance
Tolerance	for differing approaches as the new legislation is implemented. To its credit, staff and consultants from DWP have been actively engaged in a "listening tour" wherein they have been visiting groundwater
Needed	basins around the state and attempting to understand the local issues associated with the implementation of
	SGMA. Hopefully, when DWR begins to issue the regulations that will implement SGMA and define the
	requirements for groundwater sustainability plans and compliance, the lessons from the "listening tour" will
	prompt DWR to focus on the performance standard of sustainability rather than prescribing the manner in
	which agencies must attain sustainability.
	The legislation is vague about which local agencies will become the groundwater sustainability
Multiple	agency for a particular basin and how multiple agencies will coordinate their efforts. This ambiguity
Authorities	was intentional; there are too many different circumstances across California to legislate a "one-size-fits-
	all" approach to identifying a groundwater sustainability agency. However, in addition to the challenge
	additional challenge associated with coordinating multiple agencies in large groundwater basins. If the
	development and implementation of groundwater sustainability plans bogs down, this lack of clarity in the
	legislation is one likely culprit.
Shared	Since the enactment of SGMA, your author has observed that this question of governance has come
Governance	to the forefront in the minds of local water managers. As a general matter, there is consensus that water agencies need to work together to solve their collective groundwater problems: the guestion is how to do
	so in an effective manner. Some groups of agencies are contemplating establishing joint powers authorities
	(i.e., new public agencies) that would be responsible for coordinating efforts; other groups are considering
	accomplishing the same goal by means of memoranda of understanding or contracts. It will be interesting
	to see how varied the means to accomplish the shared governance goal will be.
	Section 10733 2 directs DWR to adopt regulations to evaluate the development and implementation
Plans'	of groundwater sustainability plans, as well as the coordination agreements needed to manage large
Evaluations	groundwater basins. That section also directs DWR to evaluate baseline conditions for the availability
	(or lack of availability) of surface water. DWR is required to adopt these regulations as emergency
	that are sufficiently broad to address the variety of groundwater basins in California and yet that provide
	sufficiently detailed guidance to help local agencies through a very complicated set of technical issues will
Water	be quite difficult. Adding to the difficulty is the requirement that DWR issue these regulations by June
Availability	1, 2016. DWR would be wise to rely heavily on the experience and expertise of an expert committee of
	experienced water district managers drawn from across California in developing these regulations. Without that "on the ground" experience, it seems likely that the regulations will interfere with rother than
	encourage — the development of sound groundwater sustainability plans.
	The "Light Touch" of State Intervention
<u></u>	SGMA attempts to provide for state intervention where local efforts are not successful, consistent with
State	the "light touch" that SWRCB Chair Felicia Marcus has been advocating. However, the language of the
Cooperation	important that the SWRCB work cooperatively with local agencies and DWR to develop sustainable
	groundwater management and not be quick to pull out the regulatory hammer. The SWRCB has been
	successful in the past in navigating similar terrain — most notably in assisting parties in coming to the
	so-called "Phase 8 Settlement" relating the Bay-Delta hearings. It is to be hoped that the SWRCB can
	continue to avoid the pittall of intervening prematurely in groundwater disputes across the state. To date,

all indications are that the SWRCB is proposing to work with a "light touch."

California

Groundwater

Law

"Significant

Depletions"

"Interconnected"

Water

David Aladjem helps

clients throughout

#### **Interconnected Surface and Groundwaters**

In section 10735.8(b)(1), the legislation grants the SWRCB the authority to impose an interim plan as a general matter on basins where groundwater extractions result in "significant depletions of interconnected surface waters." On its face, this language seems to be limited to those situations where there is a direct and substantial relationship between surface waters and groundwater and so would be the groundwater equivalent of a "subterranean stream flowing through a known and definite channel." After all, the term "interconnected surface water" is a longstanding term of art in California water law, with a series of century-old cases defining the relationship between surface and groundwater. However, the question of what constitutes a "significant depletion" is likely to prove controversial. If the SWRCB were to take the position that any groundwater extraction that causes or contributes to a stream reach being a "losing reach" (i.e., a reach where water in the stream percolates into the ground), then it would effectively assert control over all uses of water in the Central Valley and much of coastal California. On the other hand, if the SWRCB were to follow the historic case law on interconnected streams, it would only develop interim plans in the most obvious cases of excessive groundwater extractions, thereby living up to SWRCB Chair Marcus' promise to intervene with a "light touch." As mentioned, the challenge for the SWRCB will be to not pull out the regulatory hammer before all other avenues have been exhausted.

#### **Basin Boundaries**

Perhaps the "sleeper" issue that will need to be addressed over the next year or two is the question of defining the boundaries of the groundwater basins to be managed under SGMA. The legislation states that the basin boundaries identified in DWR Bulletin 118 are presumed to be the correct basin boundaries. However, most of the technical work that was used in developing those basin boundaries dates from the 1950's and 1960's. To say the least, there have been advances in our understanding of the geohydrology of California since that time and very little of that new information has been incorporated into Bulletin 118 due to budgetary constraints. (For context, the last complete update of Bulletin 118 was in 1980). In addition, many of the basin boundaries that were identified in Bulletin 118 — especially in the large groundwater basin that underlies the San Joaquin Valley — were drawn along political boundaries, not along geohydrologic features. That approach made sense at the time and still may make sense as a way to ease the governance issues described above. However, it may also create additional problems because the new geohydrologic information may make it more difficult to distinguish among basins by, for instance, identifying fault zones rather than fault lines. In this way, better data may simply provide additional ammunition for the competing parties rather than fostering cooperative governance.

#### CONCLUSION

#### THOUGHTS ON IMPLEMENTATION

SGMA represents a sea change in the way that California thinks about groundwater management. The new law does not actually change the legal standards for the management of groundwater because managing to "sustainable yield" is really not very different from managing to "safe yield." It also doesn't — yet — provide the technical or financial assistance that has been lacking in many water districts. Nor can we yet say that SGMA will provide the political will on the part of local agencies to tackle very difficult groundwater management problems, especially in light of the current drought. Instead, the importance of SGMA is that it represents a collective decision on the part of California water agencies, stakeholders, and the State of California to locate the authority and responsibility for groundwater management on local agencies. In addition, it gives these agencies the financial tools to pay for the very expensive task of groundwater management.

In these respects, SGMA is quite different from the previous paradigm of solving groundwater problems by bringing in supplemental surface water. That paradigm served California well; it enabled Southern California to develop as one of the drivers of the Nation's economy and it enabled the San Joaquin Valley to become the premier source of the Nation's food and fiber. But, with the decline of the fisheries in the Sacramento and San Joaquin river systems, the sources of supplemental water have become more and more uncertain. Thus, SGMA is focused on local solutions to groundwater problems and it empowers local agencies to solve those problems in ways that are tailored to local circumstances.

To date, the implementation of SGMA seems to be careful and thoughtful. To be sure, there already have been individuals who have threatened to litigate issues in order to prevent local agencies from proceeding through the SGMA process. On the whole, however, it seems that local agencies, stakeholders and — most importantly — the State of California, have all recognized that there is a tremendous opportunity to move toward a long-term solution for many of the State's water problems. So far, California is taking that opportunity.

#### FOR ADDITIONAL INFORMATION:

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California manage and resolve water resources

management problems. especially those at the intersection of water rights, endangered species, and CEQA/ NEPA. He represents water districts, cities, counties and private companies in obtaining. developing and protecting their water rights. He regularly represents clients in connection with water transfers and about the conjunctive use of surface water and groundwater. As both general counsel and special counsel, David provides clients with unparalleled experience and insight in dealing with the regulatory maze and in negotiating with other water rights holders, state and federal agencies and environmental groups. He practices regularly before the State Water **Resources Control** Board, the California Department of Water Resources and other state and federal agencies with control over water resources or endangered species. Recently, David was one of the lawyers who spent untold hours crafting proposals for the new groundwater legislation and who spent much time during the legislative process working on behalf of clients to improve the legislation.

**ERRATA:** In TWR #134, the article by Editor David Moon, entitled "The *Winters* Doctrine & Tribal Groundwater: *Agua Caliente Band of Cahuilla Indians v. Coachella Valley Water District et al.*" incorrectly referred to the Agua Caliente Band of Cahuilla Indians as the Aqua Caliente several times. We apologize for this oversight.

# PREFERENCES REJECTED TX "SENIOR RIGHTS" PROTECTED

On April 2, the 13th Court of Appeals (Court) in Corpus Christi upheld a state appeals court and found in favor of "senior" water rights holders in a Brazos River case over the use of "preferences" during water shortages. TCEQ v. Texas Farm Bureau, et al., No. 13-13-00415-CV (April 2, 2015). The Court ruled that the Texas Commission on Environmental Quality (TCEQ) cannot give special or preferential treatment to domestic or power purposes — and thereby overrule the normal priority system of the Prior Appropriation Doctrine — even if the state has declared such a preference necessary to protect the "public health, safety and welfare." Western states approach "preferences" differently and have struggled with assertions regarding the Prior Appropriation Doctrine and the use of preferences when drought is particularly acute. See Clyde, TWR #83 and Fitzsimmons & Sledge, TWR #123.

"One of the primary concepts of Texas water law is the doctrine of prior appropriation. Under the doctrine, the possessor of a more senior water right has priority over junior water right holders." Slip. Op. at 2. Dow Chemical Company, which holds senior water rights in the lower Brazos near the Texas coast, made a "call" for water from junior users so that it could fully exercise its water rights. "The [TCEQ] executive director suspended the use of water rights with a priority date junior to Dow's priority date. As permitted in Section 36.5(c) of the Drought Rules, however, TCEQ's executive director elected not to suspend the use of certain water rights designated for use as municipal water supplies or for electric power generation, based on public health, safety and welfare concerns." Id. at 4.

The Court's decision dealt with two arguments asserted by TCEQ: first,

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that the lower court erred in finding the Drought Rules invalid based on statutory construction of the applicable law (*id.* at 5); and second, that its holding that TCEQ did not have sufficient agency authority to exempt certain junior water rights from a priority "call" was "counter to the policies and duties identified by the Legislature, the State Constitution, and the courts." *Id.* at 13.

Regarding the statutory construction, the Court "conclude[d that] the district court correctly found that section 11.053(a) requires TCEQ to apply the section 11.053(b) factors within the framework of 'first in time, first in right.'" *Id.* at 12-13. The Court determined that the clear language of the statute which set forth the "first in time" principle was clear: "A plain reading of the statute indicates that the Legislature intended for the priority system established under section 11.027 to take precedence in any type of suspension or adjustment." *Id.* at 11.

The Court's decision regarding agency authority also turned on the legislative mandate. "While we recognize TCEQ's authority to manage and regulate the state's scarce water resources, such authority must not exceed its express legislative mandate. [citation omitted]. We conclude that TCEQ's police power and general authority does not allow TCEQ to exempt junior preferred water rights from suspension based on public health, safety, and welfare concerns. Rather, section 11.053 specifically sets forth the limits of the agency's powers in times of drought. See Pub. Util. Comm'n, 53 S.W.3d at 316." Id. at 15. For info: Decision available at: http:// s3.amazonaws.com/static.texastribune. org/media/documents/Opinion\_--\_TCEQ\_v.\_Texas\_Farm\_Bureau\_ 00826787x7A30F\_1.pdf

#### INSTREAM FLOW RIGHTS CO STATE AGENCY AUTHORITY

On April 6, the Colorado Supreme Court (Court), in an opinion authored by Justice Allison Eid, affirmed the water court's judgment and held that when the Colorado Water Conservation Board (CWCB) decides to make an instream flow (ISF) appropriation it acts in a quasi-legislative capacity — rather than in a quasi-judicial capacity, which would be the case where an adjudication of rights of any specific party occurs. *Colo. Water Conservation Bd. v. Farmers Water Development Co.*, 2015 CO 21 (April 6, 2015). Ultimately, the Court based the decision on its view that "the focus of the CWCB's instream flow appropriation is not on the rights of identifiable individuals or entities, but instead on the furtherance of a policy of preserving the natural environment of the people of Colorado." *Advance Sheet* at 20.

Farmers Water Development Company (Farmers) argued that the CWCB's instream flow determination would impermissibly affect the rights of holders of vested rights in the San Miquel River. For several reasons, the Court found the argument "without merit" (*id.* at 19), concluding that "[I]n short, because instream flows are junior water rights which cannot place a call on senior water rights, we find Farmers' argument regarding injury to other water rights unconvincing." Obviously important to this finding was the fact that "the CWCB delayed its administrative process [to set an instream flow] to allow water users in the basin to adjudicate water rights for future needs, and Farmers chose not to file for water rights during the postponement period." Id. at 20.

Farmers maintained that CWCB's decision was quasi-judicial, and thus, that "the procedures followed by the CWCB did not meet the dictates of procedural due process" that would be necessary if water rights were being adjudicated. "The water court disagreed, concluding that the CWCB was acting in a quasi-legislative capacity when it decided to appropriate the San Miquel ISF because, among other things, it was not adjudicating individual rights." Id. at 3-4. The CWCB was acting under its "exclusive authority, on behalf of the people of the state of Colorado, to appropriate...such waters of natural stream and lakes as the board determines may be required for minimum stream flows...to preserve the natural environment to a reasonable degree. § 37-92-102(3), C.R.S. (2014)(emphasis added)."

Any water professionals interested in Colorado's system for determining instream flow rights are advised to review the opinion is detail. **For info:** Opinion available at: www. courts.state.co.us

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#### WATER TRANSFERS RECLAMATION OPTIONS

CA

The US Bureau of Reclamation is proposing to implement a long-term water transfer program to facilitate voluntary water transfers from willing sellers upstream of the Delta to water users south of the Delta and in the San Francisco Bay Area for transfers that use state and federal water systems. Water transfers would occur through various methods such as groundwater substitution, cropland idling, reservoir release, and conservation, and would include individual and multiyear transfers from 2015 through 2024.

The program's Record of Decision was signed on May 1, 2015 and is available, along with other related documents at the website listed below. **For info:** Brad Hubbard, 916/ 978-5204, bhubbard@usbr.gov, or www. usbr.gov/mp/nepa/nepa\_projdetails. cfm?Project\_ID=18361

# TRIBAL COMPACT SIGNED MT CSKT WATER COMPACT

On April 24, Governor Steve Bullock was joined by Sen. Chas Vincent and tribal leaders from the Confederated Salish and Kootenai Tribes (CSKT) as he signed the CSKT Water Compact (Compact) into law. The Compact had been embroiled in a controversy before Montana's Legilature, which failed to approve it during the 2013 legislative session. *See* Weiner and Stermitz, *TWR* #114; Water Briefs, *TWR* #119 and #132.

According to the Governor's office, once implemented, the Compact will honor tribal treaty rights, while protecting water access for farmers and ranchers both on and off the reservation, as well as avoiding the uncertainty that decades of litigation would cause. It is the final tribal water compact to be approved by the Montana Legislature. The Compact will make new water available for commercial and irrigation use, end the water administration void on the Flathead Reservation, allow for economic development under conditions of legal certainty on and off the CSKT Reservation, and facilitate the completion of the statewide general stream adjudication. In addition, the Compact would establish a technical team with irrigator representation to implement irrigation project upgrades to protect historic irrigation use and meet Tribal in-stream flow targets.

The Compact now goes to the US Congress and the CSKT's Council for final approval.

For info: Compact bill available at: http://leg.mt.gov/bills/2015/billhtml/ SB0262.htm

#### GROUNDWATER CASE TX TAKINGS UPHELD

On May 1, the Texas Supreme Court announced that it had denied petitions to consider appeals from both parties in the *Braggs v. Edwards* Aquifer Authority case. The result of the Supreme Court's surprise denial to hear the case is that the decision of the Fourth Court of Appeals in San Antonio, Texas - that a "takings" occurred and compensation is due — stands as the law in Texas. Braggs v. Edwards Aquifer Authority, No. 04-11-000018-CV (Tex. App.-San Antonio; Aug.28, 2013). The case is remanded to the trial court for that court to determine adequate compensation for the Braggs for the "takings" caused by the regulations of the Edwards Aquifer Authority (EAA).

The compensation determination will be based on the method that the Court of Appeals (Court) set out in its 2013 decision. The Braggs are entitled to compensation based on a comparison of the value of the property (as a commercial-grade pecan orchard ) with unlimited access to Edwards Aquifer water versus the value of the property (as a commercial-grade pecan orchard) with no access or limited access to Edwards Aquifer water. An interesting factual note is that the Braggs had no historical groundwater use on the D'Hanis Orchard, one of the two pecan orchards for which they were found to be entitled to compensation for the taking. That fact led the EAA to deny the Braggs permit application for that orchard, based on the regulations of the 1993 Edwards Aquifer Authority Act (Act).

The Court's 2013 decision found that the EAA was liable because it is the state agency responsible for permitting and regulating groundwater withdrawals under the regulatory scheme of the Act. That Court affirmed the trial court's decision that a regulatory taking had occurred, applying the factors of the *Penn Central* takings test, and held that the Braggs were entitled to compensation. The Court also decided that the statute of limitations for the Braggs' takings claims began running in 2004 and 2005 when EAA acted on the permit applications, rather than beginning on the date the Act was passed.

For additional information about the Court of Appeals decision and "takings" law in Texas, *see* McCarthy, *TWR* #99, Trejo, *TWR* #119 and Fitzsimmons & Sledge, *TWR* #123. **For info:** Court of Appeals Ruling at: www.edwardsaquifer.net/pdf/Bragg\_ Appeals\_Court\_ruling.pdf

#### GROUNDWATER PROGRAM CA program website

California's State Water Resources Control Board (SWRCB) announced the launch of Groundwater Management Program website on April 16th. The Groundwater Management Program website will provide the latest updates on State Water Board groundwater management activities, information on the Sustainable Groundwater Management Act, and tools and resources to assist local agencies.

The Groundwater Management Program's mission is to work in partnership with local management efforts to develop credible, long-term solutions that preserve and enhance the viability of groundwater resources for human and environmental needs. *See* David Aladjem's article on Groundwater in California, earlier in this issue of *TWR*.

Questions about the Program should be directed to groundwater\_ management@waterboards.ca.gov. For info: Website at: www.waterboards. ca.gov/water\_issues/programs/gmp/ index.shtml

WA

#### REVERSE AUCTION LEASING INSTREAM FLOW

With a drought looming, the Washington Department of Ecology (Ecology) is looking to lease water from irrigators to keep streams from going dry in the upper Yakima River Basin for the 2015 irrigation season. The agency held workshops in Yakima and Cle Elum in early April to explain how farmers can get paid for forgoing their senior water diversions and not planting a crop for the entire 2015 irrigation season. Snowpack conditions across Washigton are at record lows, prompting Governor Jay Inslee on March 13 to declare a drought in three regions: Central Washington including Yakima and Wenatchee, Walla Walla

and the Olympic Peninsula. US Bureau of Reclamation's March 9 forecast anticipates that pro-ratable water users will receive 73% of their full entitlement.

"Our leasing program is the primary component of our drought response here," said Sage Park, water resources manager in Ecology's Central Regional Office in Yakima. "With snowpack levels dangerously low, the upper tributary streams are at greatest risk of going dry. These creeks feed the main-stem river that delivers water downstream to other senior water users." The leasing program targets senior water rights in tributaries in the upper basin above where the Yakima, Naches, and Tieton rivers meet at the city of Yakima.

In a reverse-auction, water right holders declare the price they are willing to take to lease their water to the state through a bid process. As of April 1, Ecology was leasing water only in the Yakima Basin. Ecology's website notes that they have a total budget of \$500,000. Alternative programs will be considered as drought response continues to be assessed. More information is available on Ecology's website. The reverse auction is a cooperative effort with Washington Water Trust, and Trout Unlimited - Washington Water Project, non-profit organizations that focus on cooperative agreements to transfer water to instream flow. Water rights leased by Ecology will be managed as instream flow water rights within the state's Trust Water **Rights Program.** 

For info: Joye Redfield-Wilder, Ecology, 509/ 575-2610, joye.redfieldwilder@ecy.wa.gov, or www.ecy. wa.gov/programs/wr/cro/yrtrwra2015. html

#### WATER WITHDRAWALS WA USGS REPORT RELEASED

The US Geological Survey USGS) recently released the Estimated Freshwater Withdrawals in Washington, 2010 Report, which covers freshwater withdrawals in Washington from 2005 -2010. Since 1950, USGS has compiled and published five-year intervals of data on the amount of water used in homes, businesses, industries, and farms throughout the state. The Estimated Freshwater Withdrawals in Washington Report presents the regional, county, and state-level averages for freshwater withdrawals in 2010.

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Water use in Washington has evolved substantially over the years. While our ability to control and divert water supplies has advanced, it is still difficult to keep accurate accounts of the specific amounts of water withdrawn and used throughout the state. As water availability and allocation become increasingly important topics of discussion, this kind of long-term, water-use data will be essential in future resource management decisions.

The total estimated freshwater withdrawals decreased 15% from 2005 to 2010, largely due to decreases in irrigation and thermoelectric power withdrawals. The overall amount of freshwater withdrawals for offstream uses in 2010 was estimated to be about 4,885 million gallons per day (Mgal/d), with average per capita withdrawals rating at 726 gal/day. Approximately 1/3 of the water withdrawn was from groundwater, and the rest was withdrawn from surface water. **For info:** Report at: http://pubs.usgs. gov/sir/2015/5037/pdf/sir2015-5037.pdf

#### TRIBE / OIL TRAINS SWINOMISH LAWSUIT FILED

On April 7, the Swinomish Indian Tribal Community (Tribe) filed a lawsuit in federal court against BNSF Railway (BNSF) for violating the terms of an easement agreement allowing trains to cross its Reservation in Skagit County, Washington. The alleged violations involve "unit trains" of 100 railcars or more carrying Bakken Crude to area refineries. The oil cars pass over the Swinomish Channel and Padilla Bay, which are part of the Tribe's fishing grounds.

WA

Train tracks running across the Reservation were laid in the late 1800's, without consent from the Swinomish or federal government. The tracks currently serve two Anacortes, Washington, refineries. In 1991, the Tribe and BNSF signed an agreement settling a lawsuit filed by the Tribe in 1976 for nearly a century of trespass, and granting BNSF an easement with important conditions: BNSF would regularly update the Tribe on the type of cargo; and only one train of 25 railcars would cross the Reservation in each direction daily. In return, the Tribe agreed not to "arbitrarily withhold permission" if there was a future BNSF request to increase the number of trains or cars.

In 2012, the Tribe learned that "unit trains" of 100 railcars or more were beginning to cross the Reservation. Currently, BNSF is reportedly running six 100-car "unit trains" per week across the Reservation, more than four times as many railcars daily as permitted by the easement. Each train carries 2.8 to 3.4 million gallons of Bakken Crude, a particularly dangerous and explosive cargo.

The Tribe never granted BNSF permission to increase the number of railcars and repeatedly demanded BNSF to stop violating the easement. So far, BNSF has refused.

The Tribe's press release noted that Bakken Crude is a notoriously dangerous cargo:

- US Pipeline and Hazardous Materials Safety Administration found: "(Bakken) crude has a higher gas content, higher vapor pressure, lower flashpoint and boiling point and thus a higher degree of volatility than most other crudes in the US, which correlates to increased ignitability and inflammability."
- US Department of Transportation noted: "There is reason to believe that derailments of HHFT (high-hazard flammable trains) will continue to involve more cars than derailments of other types of trains. There are many unique features to the operation of unit trains to differentiate their risk. The trains are longer, heavier in total, more challenging to control, and can produce considerably higher buff and draft forces which affect train stability." (Docket No. PHMSA-2012-0082)
- US Department of Transportation noted that: "releases of petroleum crude oil, subsequent fires, and environmental damage resulting from such releases represent an imminent hazard..." (Emergency Restriction/ Prohibition Order, Docket No. DOT-OST-2014-0067)

The lawsuit seeks a permanent injunction prohibiting BNSF from running more than one train of 25 cars in each direction and shipping Bakken Crude across the Reservation. The Tribe also seeks judgements against BNSF for trespass and breach of contract. **For info:** Swinomish News: www. swinomish-nsn.gov/news Swinomish Complaint: www. swinomish-nsn.gov/media/43935/show\_ temp.pdf

### WATER BRIEFS

# GREEN INFRASTRUCTURE US HUD REPORT

The "Green Infrastructure and the Sustainable Communities Initiative" report, published by HUD's Office of Economic Resilience, shares the green infrastructure best practices and outputs of grantees under HUD's Sustainable Communities Initiative (SCI). As part of HUD's commitment under the Green Infrastructure Collaborative, the report features 30 HUD SCI grantees which have incorporated green infrastructure strategies and projects within their Community Challenge and Regional Planning grants.

Project overviews detail the specific goals related to green infrastructure and the green infrastructure outputs or outcomes that are likely to result. Each profile includes links to other resources with more detailed information. **For info:** HUD Office of Economic Resiliency website: www.hud. gov/resilience

Report available at: http://portal.hud. gov/hudportal/documents/huddoc?id=gr eeninfrastructsci.pdf HUD Office of Economic Resiliency

US

website: www.hud.gov/resilience

#### AG CONSERVATION USDA REGIONAL CONSERVATION PARTNERSHIP

On May 4, 2015, Agriculture Secretary Tom Vilsack announced an investment of up to \$235 million to improve the nation's water quality, combat drought, enhance soil health, support wildlife habitat and protect agricultural viability. The funding is being made available through the Regional Conservation Partnership Program (RCPP), the newest conservation tool of the USDA's Natural Resources Conservation Service (NRCS).

RCPP, created by the 2014 Farm Bill, empowers local leaders to work with multiple partners — such as private companies, local and tribal governments, universities, non-profit groups and other non-government partners — along with farmers, ranchers, and forest landowners to design solutions that work best for their region. The RCPP program helps USDA build on alreadyrecord enrollment in conservation programs, with over 500,000 producers participating to protect land and water on over 400 million acres nationwide.

Secretary Vilsack made the announcement at a signing ceremony in Denver for the Colorado Pressurized Small Hydropower Partnership Project, a 2015-funded project that focuses on water quantity resource concerns in Colorado. The project, which will receive \$1.8 million in NRCS support alongside local partner investments, will facilitate the conversion of flood irrigation systems to more resourceefficient pressurized irrigation systems with integrated hydropower.

In January, USDA announced \$394 million in awards in the first round of RCPP applications (which represented two years' worth of funding for fiscal years 2014 and 2015). USDA is now accepting proposals for the RCPPs second round. Pre-proposals are due July 8, 2015. For more information on applying, visit the RCPP website. **For info:** RCPP website: www.nrcs. usda.gov/wps/portal/nrcs/main/national/ programs/farmbill/rcpp/

#### FLOOD INSURANCE US NATIONAL RESEARCH COUNCIL REPORT

The National Research Council recently released its "Affordability of National Flood Insurance Program Premiums, Report 1. The Report states that given projections of sea-level rise and extreme precipitation from climate change, the US will experience more frequent and more severe flood events in coming years. National Flood Insurance Program policies, therefore, should be geared toward making relocation the easiest and most attractive option for property owners to pursue. The Report discusses measures that could make flood insurance more affordable for all policyholders and provides a framework for policymakers to use in designing targeted assistance programs. For info: Report available at: http://dels. nas.edu/Report/Affordability-National-Flood-Insurance-Program/21709

#### EDWARDS AQUIFER HCP TX NATIONAL ACADEMIES REPORT

The National Academies' Water Science and Technology Board recently released its review of the 15-year Habitat Conservation Plan (HCP) for the Edwards Aquifer in Texas (*see* Gulley & Votteler, *TWR* #124).

The Edwards Aquifer is the primary source of water for drinking and irrigation in the San Antonio area, and supplies the two largest freshwater springs in Texas, Comal Springs and San Marcos Springs. Both springs are used for recreation and are home to several species of fish, amphibians, insects, and plants found nowhere else. Seven Edwards Aquifer species are on the federal Endangered Species List because they are vulnerable to reduced spring flows caused by drought and pumping. To protect these species, the Edwards Aquifer Authority and four other local entities have created a 15-year Habitat Conservation Plan. The National Academies' report is the first product of a three-phase study to provide advice to the Edwards Aquifer Authority on various scientific aspects of the Habitat Conservation Plan to help improve the management of the aquifer. The report finds that overall, the Edwards Aquifer Authority is doing an excellent job in implementing many aspects of a complex habitat conservation plan, and that addressing several overarching scientific and modeling issues would further strengthen the plan.

For info: Report available from: http:// dels.nas.edu/Report/Review-Edwards-Aquifer-Habitat/21699

US

#### SDWA COMPLIANCE

EPA ONLINE TRACKING SYSTEM

EPA has announced the Safe Drinking Water Act (SDWA) Dashboard, a user-friendly website that presents data about violations and the compliance status of public water systems. The Dashboard contains interactive charts and graphs that provide information regarding the compliance of public water systems with federal drinking water regulations, as well as enforcement actions. The Dashboard provides an overview of the SDWA regulatory activities of EPA and the implementing states, tribes, and territories. The Dashboard also provides an easy-to-use summary of key activities to answer questions like: which public water systems are regulated, how many public water systems have been inspected, how many systems have had alleged violations identified and enforcement action taken, and how many systems have returned to compliance.

## **CALENDAR**

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#### CA May 15 Hot Topics in California's Water: Drought, Finding Water, The Water Bond & Interpreting **New Groundwater Regulation** Seminar, Los Angeles. DoubleTree LA Downtown. For info: The Seminar Group, 800/ 574-4852, info@theseminargroup. net or www.theseminargroup.net

#### May 15

AZ **Agribusiness & Water Council** of Arizona Annual Meeting & Water Conference, Tempe. SRP's PERA Facility, 1 E. Continental Drive. For info: www. agribusinessarizona.org

#### May 20

CA **Bay-Delta Drought Workshop**, Sacramento. CalEPA Headquarters Bldg., 9:00am. Presented by the State Water Resources Control Board. For info: http://www.waterboards. ca.gov/waterrights/water issues/ programs/drought/index.shtml#

OR <u>May 21</u> **Managing Stormwater in Oregon Conference**, Portland. Sheraton Portland Airport, 8235 NE Airport Way. Presented by Northwest Environmental Business Council. For info: www.nebc.org/EventDetail. aspx?Id=158

WA <u>May 21</u> **Celebrate Water - CELP's** Annual Fundraiser, Seattle. Ivar's Salmon House. Presented by The Center for Environmental Law & Policy. For info: www. celp.org/events/celebrate-water/

May 21	DC
National Wetlands Awards	
Ceremony, Washington. U.S.	
Botanic Garden. Presented	
by the Environmental Law	
Institute. For info: www.	
nationalwetlandsawards.org	

May 25-29 Scotland World Water Congress XV: Global Water - A **Resource for Development**, Edinburgh. Edinburgh Int'l Conference Ctr. For info: http:// worldwatercongress.com/

### **May 26**

**Advanced Topics in LID Design: Hydrologic Modeling** Workshop, Everett. WSU Extension Center. For info: www.brownpapertickets. com/event/1423879

#### May 27-29

**Natural Resources Law Teachers Institute, Salt Lake** City. S.J. Quinney College of Law. Presented by Rocky Mt. Mineral Law Foundation. For info: www.rmmlf.org/confrnce/ NRLT15news.pdf

WA May 28-29 **Advanced Topics in LID Design: Rainwater Collection** Systems & Green Roofs Workshop, Spokane. Downtown Branch Spokane Library. For info: www.brownpapertickets. com/event/1165939

### May 31-June 5

Ass'n of State Floodplain **Manager's Annual Flodplain Management Conference:** Mitigation on My Mind, Atlanta. Hyatt Regency. For info: http://asfpmconference.org/

#### **May 29**

Hydrology and the Law Seminar, Seattle. Washington State Convention Ctr. For info: Law Seminars Int'l, 800/854-8009, registrar@lawseminars.com or www.lawseminars.com

**June 1-2 Ontario** Grey to Green Conference, Toronto. Presented by Green Roofs for Healthy Cities. For info: www.greytogreenconference.org/

June 2 CO 7th Annual RiverBank Fundraiser, Denver. McNichols Civic Center Bldg. For info: ColoradoWaterTrust.org

CO **June 4-5** 33rd Annual Water Law **Conference**, Denver. The Four Seasons Hotel. Presented by ABA. For info: http://shop.americanbar.org/ ebus/ABAEventsCalendar/ EventDetails. aspx?productId=134956288

#### June 7-10 **American Water Works Association Annual Conference**

& Exposition - ACE 15. Anaheim. Anaheim Convention Ctr. For info: www.awwa. org/conferences-education/ conferences/annual-conference. aspx

### June 8

**Environmental Cleanup Conference: CERCLA & MTCA/Advanced Sediments** Topics, Seattle. Washington Convention Center. For info: Environmental Law Education Center, 503/ 282-5220 or www. elecenter.com

#### **June 9-10** AZ **Indigenous Perspectives on Sustainable Water Practices** - Water Resources Research **Center Annual Conference.** Chandler. Wild Horse Pass Hotel & Casino. Presented by WRRC & the Gila River Indian Community. For info: http://wrrc.arizona. edu/conf-2015

#### TX June 10 Dam Safety Workshop, Decautur. Decatur Civic Center. 8am-2pm. Presented by TCEO. For info: www.tceq.texas.gov/p2/ events/dam-safety.html

### June 12

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

June 15-16 GA **Municipal Wet Weather** Stormwater Conference, Atlanta. Holiday Inn Atlanta-Perimeter. Presented by EPA Region 4 & the Southeast Chapter of the Int'l Erosion Control Ass'n Region One. For info: www. ieca.org/conference/roadshow/ atlantams4.asp

June 15-16 CA 2015 California Water Law & Policy MCLE Conference, San Francisco. Hotel Nikko. For info: www.bbklaw. com/?t=40&an=38936

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June 15-17 LA AWRA 2015 Summer Specialty **Conference on Climate Change** Adaptation, New Orleans. Hyatt Regency French Quarter. Presented by American Water Resources Ass'n. For info: www. awra.org

June 16-18

NV Water Is Not for Gambling: **Utilizing Science to Reduce Uncertainty - 2015 UCOWR** Conference, Las Vegas. Green Valley Ranch. Presented by Universities Council on Water Resources. For info: http:// acwi.gov/ACWI-featuresbox/UCOWR 2015 call for abstracts.pdf

June 16-19 NV The New MODFLOW **Course: Theory & Hands-On Applications Course, Las Vegas.** The Orleans Hotel. Presented by Nat'l Groundwater Ass'n. For info: www.ngwa.org/Events-Education/shortcourses/Pages/ 258jun15.aspx

June 22-23 CA **Tribal Environmental Quality** Protection Seminar, Cabazon. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars. com or www.lawseminars.com

ID June 22-23 IWUA Summer Water Law & **Resource Issues Seminar, Sun** Valley. Presented by Idaho Water Users Ass'n. For info: www.iwua. org/

**June 23-24** OR **Extreme Events & Climate** Adaptation Planning, Free **EPA Workshop for the Water** Utility Sector, Portland. TBA. For info: Michael Cox, EPA, Cox.Michael@epa.gov; EPA Climate Ready Water Utilities website: www.epa. gov/climatereadyutilities

June 24-26 NV Western Governors' Association Annual Meeting, Lake Tahoe. For info: www.westgov.org/



260 N. Polk Street • Eugene, OR 97402

### CALENDAR -

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(continued from previous page)

June 25TXDam Safety Workshop, Austin.J.J. Pickle Center Austin, 8am-2pm. Presented by TCEQ. Forinfo: www.tceq.texas.gov/p2/events/dam-safety.html

June 24-26CABay-Delta Tour 2015, BayDelta. Presented by WaterEducation Foundation. Forinfo: www.watereducation.org/tour/bay-delta-tour-2015

#### July 8

Dam Safety Workshop, Kilgore. Devall Student Ctr., 8am-2pm. Presented by TCEQ. For info: www.tceq.texas.gov/p2/events/ dam-safety.html

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#### <u>July 15</u>

lawseminars.com

Hydrology and the Law Seminar, Santa Fe. La Fonda Hotel. For info: Law Seminars Int'l, 800/ 854-8009, registrar@ lawseminars.com or www. July 16-17 NM Natural Resources Damages Seminar, Santa Fe. La Fonda Hotel. For info: Law Seminars Int'l, 800/ 854-8009, registrar@ lawseminars.com or www. lawseminars.com

#### July 16-18

Rocky Mt. Mineral Law Foundation 61st Annual Institute, Anchorage. Dena'ina Convention Ctr. For info: www. rmmlf.org

#### July 20 CA Municipal Water Utility Ratemaking Seminar, Sacramento. Courtyard Marriott Midtown. For info: Law Seminars Int'l, 800/ 854-8009, registrar@ lawseminars.com or www. lawseminars.com

July 22-24OROregon Assoc. of Clean WaterAgencies Annual Conference,Bend. Mt. Bachelor VillageResort. For info: www.oracwa.org

July 26-29NC70th Annual SWCSInternational Conference:Coming Home to Conservation- Putting Science Into Practice,Greensboro. Sheraton FourSeasons Hotel. Presented bythe Soil & Water ConservationSociety. For info: www.swcs.org/en/conferences/2015\_annual\_



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www.nebc.org