

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

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AQUIFER STORAGE RECOVERY

Expanding Possibilities in the Western United States by Cat Shrier, Senior Water Resources Engineer, Golder Associates Inc. (Denver, CO)

Introduction

Aquifer storage and recovery (ASR) is a technology in which treated water is injected through a well into an aquifer for storage, and later recovered for use, usually from the same well. The majority of ASR systems have typically been used for storing drinking water supplies. Particularly in Western states, however, ASR systems (including those that use treated waste water, stormwater, and drinking water) have been or are being developed to store water for industrial, irrigation, livestock, and aquatic habitat uses. The number of potable and non-potable ASR systems is rising. As of 2004, 12 of the 17 contiguous western states had operational or pilot stage ASR facilities, including sites in Arizona, California, Colorado, Idaho, Kansas, Nevada, New Mexico, Oregon, Texas, Utah, Washington, and Wyoming (see Figure 1 below). Many western states have

developed new laws and incentives to facilitate the development of ASR systems, such as statutes and rules clarifying the application of prior appropriation water law to ASR and streamlining the permitting process. Specific citations of state laws and rules addressing ASR, along with information on agency contacts and permitting processes in each state with operational or pilot ASR facilities, are provided in the appendices of a report prepared by the author and published by the American Water Works Association (AWWA) in 2002 on the results of a survey and analysis of ASR systems and associated regulatory programs in the United States (Shrier 2002). [NOTE: The same survey report also provides details on system design, operations, and intended uses of nearly 50 ASR facilities throughout the county. With high rates of population growth and a heightened awareness of the need to address increasing water demands in light of environmental concerns, plus recent drought conditions, ASR appears likely to become an

Figure 1 States with ASR Activity



even greater part of the water supply system for potable as well as non-potable uses throughout the West.

Reasons for Using ASR in Western States

ASR facilities are often designed and operated with one or two primary purposes in mind, although facility owners/operators often cite multiple secondary objectives, such as managing groundwater levels or preventing saltwater intrusion. These reasons hold true for ASR facility owners/operators nationwide. Factors such as climate, hydrology, and legal aspects of water use in western states have made this technology particularly appealing in the West, where a number of creative ASR applications have been developed.

Reasons for using ASR may also apply to other forms of groundwater recharge being employed in the West, such as bank filtration, basin recharge, and land use management.

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ASR	ASR differs from other forms of groundwater recharge in that the owner/operator of an ASR facility intends to remove the same water that has been injected, typically from the same well or a proximate w for a specific use. ASR systems are designed and operated, and the source water treated, to ensure that the stored water will be available, recoverable, and of the appropriate quality for that intended use. As		
Uses	opposed to other forms of aquifer recharge for regional maintenance or improving groundwater levels of		
Incentives	quality, the design and operations of an ASR well tend to be devised for greater hydraulic control to prevent movement of the injected water away from the storage zone and to maintain good water quality While the general intent of regulating ASR and other forms of groundwater recharge/underground injection is the same, (particularly with regard to protection of groundwater quality), the logistics of developing permits for an ASR facility may be different in that the regulatory agency is working with a single municipality, water company, or other entity, rather than a consortium of interests that may comprise a groundwater management district. As may be inferred from the post-demonstration stage success of the ASR projects developed under the United States Bureau of Reclamation Groundwater Demonstration Project, the owners/operators of ASR facilities may also have a greater legal, financial, and economic ability and incentive to ensure continued successful operations of ASR facilities than the	1	
	owners/operators of regional groundwater management programs that include some form of aquifer recharge.		
Connect	Some of the reasons for using ASR cited by owners/operators in western states, as identified durin survey completed by the author on behalf of the American Water Works Association (Shrier, 2002) and subsequent contacts with ASR facility owners/operators, include the following:		
Seasonal Supply	SEASONAL AVAILABILITY OF WATER SUPPLIES (CLIMATE AND HYDROLOGY) Figure 2 South Platte River at Julesburg, Co		
o wpprj	The climates of many western Station Number: 0676400		
The Water Papart	states are marked by extreme sea- sonal variability of water supply (see Figure 2), which are tied to various climate patterns bringing moisture to inland states and the impacts on precipitation patterns from the mountain ranges that overlay much of the West. The natural storage provided through much of the winter by snowpack, followed by high streamflows during spring melts, also contributes to the natural variability in water supply throughout the year. Western states generally have arid		
The Water Report (ISSN pending) is published	and semiarid climates. Some regions		
monthly by Envirotech Publications, Inc.	may see little rain and low or no streamflows outside of the high precipitation or high flow seasons. Historically, on-stream and off-stream surface water reservoirs have been developed to capture these hi	ioh	
260 North Polk Street,	flows, prevent floods, and otherwise regulate the streamflows and availability of water supplies through	0	
Eugene, OR 97402 Editors: David Light &	out the year. As noted below, surface water reservoirs are increasingly difficult to develop, and ASR		
David Moon Phone: 541/ 343-8504	provides an alternative means of capturing water during seasons of high availability for use during dry seasons.		
Cellular: 541/ 517-5608 Fax: 541/ 683-8279	SEASONAL AVAILABILITY OF WATER SUPPLIES (WATER RIGHTS)		
email:	Under the prior appropriation legal system used throughout the western states, the most "senior" water rights (i.e., those established the earliest) are typically for mining, followed by agriculture, and the	ien	

water rights (i.e., those established the earliest) are typically for mining, followed by agriculture, and then thewaterreport@hotmail.com cities. The greatest population growth is occurring in the newest suburbs with the most junior water rights. The US Census Bureau found the five fastest growing counties to include: Douglas County, www.thewaterreport.com Subscription Rates: \$249 Colorado, which contains suburban communities south of Denver; and Rockwall County, Texas, which per year; Multiple subscripcontains suburbs of east of Dallas. Both Douglas and Rockwall counties had population growths of about 27% in just three years (2000-2003). The Census Bureau's list of the 50 fastest growing counties for that Postmaster: Please send same 3-year period also includes other counties — largely containing suburbs around major Western address corrections to The cities - in Colorado, Texas, South Dakota, Utah, Idaho, California, and Nevada. Water Report, 260 North

> While some suburban municipalities in these and other growing Western counties may have the financial resources to buy or lease agricultural water rights, changing the use on these water rights (i.e., moving water from the farms to the cities) can be difficult legally and sensitive politically. The period of peak demands for municipal uses (summer) is also when agricultural demands — with more senior water

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ASR Water Right Considerations	rights — are greatest. Older, more established municipal water providers with existing storage and treatment facilities and relatively senior water rights (e.g. Denver Water and the Metropolitan Water District in Los Angeles) may be willing to develop agreements with newer suburban communities to provide water during wet periods, but are likely to focus on their own service areas during periods of shortage. (In Texas, where groundwater is not included within the <i>prior appropriation</i> system, ASR systems have been developed using source water from other groundwater aquifers in order to avoid water rights requirements associated with surface water, which are considered "waters of the State.") If adequate groundwater storage zones are available, ASR systems provide a means by which municipalities with junior water rights can develop storage facilities relatively quickly (when compared with the time it takes to develop surface water storage facilities). ASR systems can serve to capture water during seasons when those junior water rights are available or when water rights transfers and exchanges can be arranged with more capitor water storage.
"Flattening" Supply	 with more senior water rights holders. The water thus secured may then be recovered during periods when more junior water right holders do not have access to water because senior water right holders have claims to all that is available. LIMITATIONS ON SURFACE WATER STORAGE AVAILABILITY OR VIABILITY One means of "flattening" the seasonal supply and demand of water (i.e. reducing the peaks and increasing the lows) is, of course, surface water reservoirs. BOR and the US Army Corps of Engineers (Corps), as well as smaller entities, carried out extensive dam-building activity throughout the West in the last century. Many of the best sites (from an engineering and financial standpoint) have already been developed. Further reservoir development has been slowed by increasing permitting requirements and
Fewer Impacts	required public input processes (and associated legal issues and expenses). There are particular concerns regarding impacts of on-stream dams and diversion of surface water to off-stream reservoirs on stream habitat and instream flows necessary to support wildlife, particularly threatened and endangered species. ASR has been viewed as a form of water storage that can be developed with fewer impacts to habitat and stream flows (particularly for endangered species). Other land and water use concerns that can arise during development and permitting of surface water supplies (e.g., condemnation of land and relocation of communities; impacts on surface water recreational activities) are also lessened. There may be issues associated with ASR regarding losses of recharged water during underground storage (due to mixing of stored water with native water, movement of groundwater, or groundwater-surface water interactions). Underground storage at ASR sites, however, does not involve the evaporation losses of surface storage.
	ASR Crow Reservoir Treatment Plan Distribution System System Stribution Stribut

	Another advantage of underground storage over surface storage is the "portability" of ASR — i.e., ASR
ASR	facilities can provide localized storage to serve the areas of demand (assuming these areas overlie a
Portability	suitable aquifer storage zone), which may not be near a surface water storage site. ASR facilities are also
Tortubility	being developed as part of more comprehensive conjunctive water management projects, which may involve a combination of small, surface storage facilities to capture rapidly-arriving high flows (e.g.
	during spring melts) until that water can be diverted to a wellfield for recharge to an underground storage
	zone using ASR technology.
Maximizing	MAXIMIZATION OF USE OF WATER TREATMENT AND DELIVERY SYSTEM CAPACITY One major incentive cited by ASR facility owners/operators for using this technology is as a means
Infrastructure	of maximizing the use of existing water infrastructure including transmission and treatment facilities.
Use	ASR facilities intended for potable use typically treat water to primary and secondary drinking water standards prior to injection. A few (27% of facilities responding to an AWWA survey) perform some
— • •	additional pre-injection treatment at the wellhead (e.g. pH adjustments) to improve injection operations
Treatment	and prevent geochemical interactions between the stored and native waters underground (Shrier 2002).
	Other than disinfection, most ASR facilities perform no additional post-recovery treatment before introducing the recovered water into their water supplies. Of the responding facilities, 42% perform
	minimal post-recovery treatment prior to injection (e.g. pH adjustments, iron and manganese removal, and
	filtration or turbidity reduction). Thus, ASR enables facility owners/operators to shift the demand on the
	treatment facilities to non-peak periods by treating the stored water to drinking water standards prior to injection. The capacity of water treatment facilities is typically designed to meet peak treatment de-
	mands. Increasing non-peak use and decreasing peak use of water treatment facilities also enable water
	providers to delay the need for capital investments for increased treatment capacity. Similarly, transmission capacity is sized for peak demand use. Because ASR storage is typically
Transmission	conducted during off-peak demand periods, the idle system transmission capacity is put to use during the
Capacity	recharge stage of ASR to deliver water to recharge sites. Running water through the distribution system
	helps to maintain a more constant pressure. Depending upon the configuration of the existing water system, the ASR system can be designed to maximize the use of transmission systems while maintaining
	pressure and flow for better overall water system operations.
Drought	MULTI-YEAR WATER STORAGE Most of the western United States has been experiencing several years of drought, highlighting the
Drought	need for multi-year storage. Droughts are often experienced in the East as well, and the short-term
	impacts of these Eastern droughts can be heightened by high population densities. The total length of
	time of Eastern droughts, however, tends to be shorter than the severe, sustained droughts of the western United States. Consequently, western water managers need to plan for multi-year droughts. Several
	western ASR facilities have already been developed to provide multi-year storage in case of prolonged
	periods of drought. When water is to be stored for more than one year in an ASR facility, permitting requirements for
Permit Issues	ASR systems may reduce the amount of stored water that can be recovered. These permitting require-
	ments are typically based upon site conditions and expected losses to the aquifer during storage. For
	example, the Jordan Valley Water Conservancy District site in Utah expects 10% losses per year of storage due to aquifer gradient towards the Great Salt Lake. In the same state, however, the Brigham City
	pilot site is not expected to have any losses due to differences in gradient and other storage aquifer
	characteristics, and the amount of water being permitted for withdrawal is not reduced over time. GROUNDWATER RESOURCES MANAGEMENT (WATER LEVELS AND WATER QUALITY)
Pagional	Several Western states have integrated ASR into regional efforts to manage groundwater levels and
Regional Efforts	quality. Maintaining water levels by offsetting pumping with recharge (as opposed to continually mining
	nonrenewable groundwater resources), allows water users to reduce well interference and pumping costs, as well as prevent aquifer dewatering, land subsidence, and other impacts from stresses to groundwater
	resources from withdrawals. Arizona has an aggressive groundwater resources management program and
	uses ASR as part of an effort to recover groundwater levels in a stressed aquifer. As part of this program, ASR systems in Arizona are required to leave 5% of the recharged water in the aquifer. ASR has also
	been used to prevent potable groundwater from being affected by saline water or contaminant plumes.
	Some California ASR facilities have been specially located to help prevent seawater intrusion. An ASR
	facility in Wichita, Kansas is also being designed to control movement of a saline plume. EMERGENCY WATER SUPPLIES
Emergency Planning	ASR systems have been developed to provide water supplies when surface water storage facilities or
Talling	treatment plants are impacted by catastrophic events. For example, Walla Walla, Washington, uses ASR
	as a means of protection from forest fires. Recent catastrophic forest fires in the West during the current

ASR	drought have caused water stored in surface reservoirs to become unusable due to increased sedimenta- tion from post-fire erosion. ASR systems have also been cited as a means of providing back-up storage of water supplies if there are impacts to treatment plants, surface water storage and distribution systems from earthquakes, power disruptions ("brownouts") and terrorist attacks. INSTREAM HABITAT
Species	Managing water resources to meet species recovery program requirements, particularly for endan-
Recovery	gered species, is a major concern for water managers in the West. In Oregon and Washington, ASR systems have been developed to reduce stresses on surface water flows and stream habitat during low flow periods by enabling water users to recover stored water "in lieu" of using surface water rights. One ASR system, in Walla Walla, Washington, includes a voluntary experimental project to address the species recovery effort for the endangered steelhead salmon. This project involves taking cooler water that had been stored in the aquifer and placing it directly into Mill Creek during low flow periods, when fish normally would be adversely impacted by high stream temperatures.
	WATER REUSE/TREATED EFFLUENT
Reclaimed Water	During recent water planning efforts in several western states, there has been a call for increased water conservation and efficient use of water supplies, including use of reclaimed water (see Lichty, TWR #4). While in some cases, prior appropriation water law may require water users to return unused effluent to the stream for use by downstream water right holders, there are other cases (particularly with regard to water from transbasin diversions) in which a water user is allowed to employ reused water to such an extent that no return flow results (i.e. water is used "to extinction"). Water reuse has been increasing. and is likely to continue to increase as acquisition of additional raw water supplies becomes more difficult, treatment technologies improve, and costs for treatment of effluent decreases. Arizona, in particular, has used treated effluent in a number of ASR systems (e.g., Sun Lake City and Fountain Hills Sanitary District) to store reclaimed water for golf course irrigation. New Mexico has recently developed a regulatory program for ASR using treated effluent, and several municipalities are exploring the option of using treated effluent ASR systems developed in Oregon to date, there is an Oregon statute governing the quality of water used in ASR systems. The purpose of the regulations is to protect the aquifer system for the highest beneficial use, generally as a drinking water supply. Oregon's ASR regulations require that stored water quality possess no more than 50% of the maximum contami-
"Injury"	nant levels (MCLs) for all drinking water standards, as an additional level of conservatism to insure that the highest beneficial use is protected. If treated effluent meets such standards, and the "injury" standard can be met, it is possible that treated effluent ASR systems could be used in Oregon, although specific water quality standards to be required in an ASR permit are determined on a site-by-site basis. The direct human consumption of reclaimed water, however treated or used, is generally prohibited in Oregon. INDUSTRIAL USES The West has pioneered the use of ASR for industrial applications. Micron Technology in Boise,
Temperature	Idaho, has an ASR system which has been operational since 2001. Micron uses ASR to store surface
&	water for a large semiconductor manufacturing operation. The facility owner/operator cites the benefits
Quality	of ASR as a method for ensuring more consistent water temperature and water quality than is typically found when using surface water supplies. Industries that need cooling water can also use ASR to provide a water supply with lower initial temperature than surface water, and realize increased cooling system efficiency and savings. After that cooling water has been used, exchanges can then be developed with agricultural water users, who may prefer warmer water for use on some crops. This industrial application of ASR is currently being explored in Oregon. PRODUCED WATER
"CBM"	In some western states (e.g. Wyoming and Colorado), there has been increased c oal b ed m ethane (CBM) extraction activity (see Darin, TWR #3). Water that is produced during CBM extraction is often of a higher quality than is typically produced during extraction of other energy resources, such as oil. There has been interest in capturing this "produced" water" for treatment and storage in aquifers for water supplies using ASR technology. In Colorado, current statutes do not allow the development of a water right based on such produced water — although there have been recent attempts in the state legislature to address this situation. Wyoming recently passed a statute allowing water rights to be developed for produced water, recognizing that the availability of these water supplies is contingent upon production activities. The Wyoming Water Development Commission and City of Gillette have explored the feasibility of developing an ASR system using water produced during CBM extraction. The site investi-
	gation found that the areas that produced sufficient quantities of water for a pilot study involved water that would require more treatment than was economically feasible. The areas that produced water of

	sufficient quality for an economically feasible pilot test did not produce a sufficient quantity of water to	
ASR	merit further site investigation. At other CBM sites, however, ASR could be an effective means of storing produced water for later use — particularly if concerns regarding water quality and treatment can	
	be addressed — and further exploration of this concept is likely.	
	INTERSTATE COMPACT ISSUES (ESPECIALLY THE COLORADO RIVER COMPACT)	
Colorado	Another concern facing water managers in the West is the need to meet Interstate Compact require-	
River Compact	ments. Compact agreements, river adjudications, or other interstate agreements may allocate a specific	
River compact	quantity of water to each state, require a specific quantity or flow rate from an upstream state to a down-	
	stream state, or both. In particular, the Colorado River Compact allocates a specific quantity of water to	
	each of the states within the river basin, and requires the Upper Basin States to allow a minimum of 7.5 million acre feet (on average over any 10 year period) to flow to the Lower Basin states, as measured at	
	Lee's Ferry, Arizona. Nevada and Arizona have used and encouraged development of ASR as a means of	
	capturing their state allocations of Colorado River water without having to develop more extensive	
	surface water storage facilities. During the current drought, Upper Basin states have raised the concern	
	that they are still required to release the same quantity of water to Lower Basin states, including Nevada	
	and Arizona, although these states also have access to stored water from previous years, so that the	
	impacts of the current drought may not have been as severe on these Lower Basin states. There may be further exploration of the use of ASR throughout the Colorado River Basin as a means of capturing the	
	Compact allocations within each of the seven basin states (i.e. Wyoming, Colorado, New Mexico, Utah,	
	Nevada, Arizona, and California).	
Thursday	A Brief History of ASR Development in the West	
Three Stages	The history of ASR development in the western United States can be broken down into three stages:	
	Post-War US Geological Survey (USGS) Studies and the California Water Plan; the US Bureau of Reclamation (BOR) Groundwater Demonstration Program; and the Era of Western ASR Regulations.	
	Post-War USGS Studies and the California Water Plan	
	Some of the earliest efforts to use artificial recharge to conserve or enhance groundwater storage	
War Planning	occurred in California during the 1930s (Weeks, 2002). Interest in groundwater recharge using wells	
0	specifically to store water supplies increased after World War II. This effort was tied in part to concerns	
	raised during wartime regarding potential attacks on water supply facilities. The USGS was involved with a number of early wall/reacharge investigations with Watern attacks including: Walls Walls	
	with a number of early well/recharge investigations with Western cities, including: Walla Walla, Washington (Price 1961); Salem, Oregon (Foxworthy 1970); Portland, Oregon (Brown 1963); and Amarillo,	
	Texas (Moulder and Frazor 1957). Price (1961) noted that the use of untreated surface water with high	
	suspended solids (2 mg/L total suspended solids (TSS)) resulted in significantly degraded well efficien-	
	cies. Walla Walla, Salem, and Portland have all since developed operational ASR facilities using basaltic	
Einch ACD	aquifers in the same vicinity as these early well recharge experiments.	
First ASR	The first successful and longest continually operational ASR facility in the United States was developed in Wildwood, New Jersey, which has been operational since 1968. In the West, at about the	
	same time, the California Water Plan was passed with significant plans for underground storage of water,	
	to be imported from Northern California to Southern California through artificial recharge. Sites were	
	subsequently developed in California in the 1970s. The earliest use of ASR was at the Goleta Water	
	District, operational since 1978. Other early pioneers in ASR in California include sites operated by the	
	City of Oxnard and City of Camarillo, both of which began operations in the late 1970s. Over the years, California has developed several local or regional approaches to managing and regulating its groundwater	
	resources, including: water districts and local water agencies; adjudication of groundwater withdrawals	
	following a lawsuit; groundwater management districts created by legislation; voluntary Groundwater	
	Management Plans created by local agencies under a 1992 statute ("AB 3030" plans); and local ordi-	
	nances. Where none of these mechanisms are in place, groundwater use in California is governed by the	
	"correlative rights" legal doctrine, which essentially allows landowners the right to withdraw groundwater from beneath their property. In many instances, ASR facilities in California have been developed as part	
Chausar	of these more regional efforts to manage groundwater resources.	
Storage	California, New Jersey, and Florida (which also developed sites during the 1970s) continued to be	
Saltwater	the only states with operational ASR facilities through the mid-1980s. In all three states, ASR was used	
Intrusion	primarily as a form of water storage, but the ASR facilities themselves were often developed as tools to	
	manage groundwater in aquifers that were experiencing declining water levels and saltwater intrusion. The BOR GROUNDWATER DEMONSTRATION PROGRAM	
BOR Project	More widespread use of ASR in the West was spurred by BOR's High Plains States Groundwater	
,	Demonstration Project. This program was begun in response to concerns regarding falling groundwater	
	levels in the High Plains (also known as the Ogallala) Aquifer, and to calls for additional water supplies	

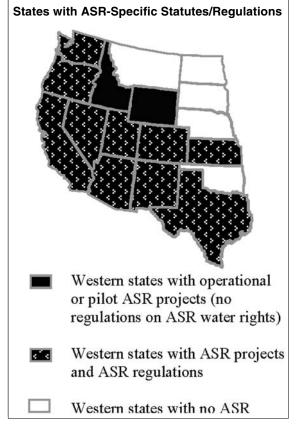
On-Going

Operations

	and water management following droughts in the late 1970s and early 1980s. The High Plains State
ASR	Groundwater Demonstration Program Act was passed in 1983 with amendments added to include
	consideration of projects from all of the 17 Western states in the contiguous US that fall under the
BOR Purview	purview of BOR programs, rather than being limited to those states overlying the High Plains Aquifer.
Groundwater	Fourteen projects received federal funding under this partnership program, out of 42 original proposed
Gibuiluwalei	projects. In selecting the projects to be included in this program, BOR considered not only physical
	aspects of the sites, but also economic, institutional, and legal factors, to ensure that there was a sponsor
	that could meet cost-sharing requirements and that funding and project development would not be
	delayed by legal or regulatory impediments.
Approaches	A wide range of aquifer recharge approaches were used at the different sites participating in the
rippiouenes	BOR program. These included: land use management; surface infiltration; injection wells; and ASR.
	Some of the projects were intended for general groundwater replenishment, with no consideration of later
	recovery and uses of the recharged water. Other projects recharged aquifers intended primarily for
	municipal, industrial, or agricultural uses. Four of the 14 BOR Demonstration projects were developed
	specifically as ASR projects, namely: Seattle Water Department's Highline Wellfield (WA), Willows
	Water District (CO), City of Wichita's Equus Beds project (KS), and the Salt Lake City Water Conser-
	vancy District (UT) — which later became the Jordan Valley Water Conservancy District. The BOR
	project provided seed funding for these demonstration projects. Federal matching funds for these projects
	were provided starting in 1985, with final funding for report completion provided in 1999.
	All of the BOR Groundwater Recharge Demonstration Program sites that used ASR technology have
	proceeded towards becoming fully operational after the federal funding ended, except for the Willows
	We the District and been in grandy operational district mer have been bed of the merger second for an inter-

proceeded towards becoming fully operational after the federal funding ended, except for the Willows Water District project in Colorado. This water district may have had other management or financial difficulties, unrelated to the ASR facility, contributing to its ending the use of ASR technology. Within Colorado, however, the Centennial Water and Sanitation District, which (like the Willows Water District) also overlies the Denver Basin Aquifers, used the information on the aquifers and injection practices from the Willows project to develop their own ASR system, using available surface water supplies as source water. Centennial has operated their ASR facilities since 1985. Willows Water District has since sold its facilities to the East Cherry Creek Water District, which is currently exploring the use of ASR to store newly acquired surface water rights.

Seattle Water Department and Jordan Valley Water Conservancy District have both used ASR as an integral part of their water supplies for more than a decade a decade although, due to delays in the



development of the Washington ASR rules and in the permitting process, Seattle is still operating its Highline ASR wellfield under a "pilot" permit.. The Equus Beds (KS) project has been a functional pilot facility for many years, but full operation and further development of this ASR project for the City of Wichita has been delayed by permitting concerns. A fifth BOR demonstration program site, sponsored by the El Paso Water Utilities (TX), which recharged the Hueco Bolson aquifer using treated effluent, has since begun to add an ASR component to the existing recharge operations. A sixth BOR demonstration program site, sponsored by Washoe County (NV), which used injection wells to recover falling groundwater levels in the northern suburbs of Reno, is also exploring adding ASR technology for storage of water supplies to serve the same region.

THE ERA OF WESTERN ASR REGULATIONS

The ASR sites developed through the BOR Groundwater Demonstration Program were an important step in establishing ASR as an acceptable water management practice in the West. One set of factors evaluated by BOR at each of the Groundwater Demonstration Program sites was the legal and regulatory requirements for each project, including whether the institutional mechanisms were in place to: allow these projects to move forward legally; recognize the right to use the stored water at ASR sites; and toensure protection of the aquifers. In some states, the lack of legal or regulatory mechanisms to address issues related to ASR permitting was a hurdle that needed to be overcome before these demonstration projects could be completed. In the past 20 years, several Western states have developed laws or rules specifically addressing aspects of ASR. The report published by the AWWA in 2002 from a nationwide survey and analysis of ASR facilities and associated regulatory programs (completed by the author) includes profiles of the regulatory ap-

ASR	proaches, plus citation operational or pilot A In some cases fu
Pilot Systems	a "pilot system" perm sponse to legislative d
Water Rights Integration	facilities was delayed development activity following the develop each have had more th process of developing been clarified by new a specific regulatory p Water Plan provided p development of ASR To integrate ASF states developed new recharge, aquifer stora could be obtained. St ASR systems, and any discussed below). Of has operating ASR sy pilot or operational A some aspect of ASR p
Adverse Impacts	of water rights for AS the availability of wat can be recovered and Statutes and regu tors demonstrate that This includes measure ing to groundwater-su aquifers (prevent grou correlative rights for g water rights system),
Accounting	beyond the system ow installing wells reaching withdrawn by other we Another water rigo operator has other grow water withdrawn from
Multiple Water Rights	water first. Other stat that well, and only co has been exceeded for water that has been tro under that state's wate In some states, at them use of the source later, and possibly a th water right for operati expanding the definiti formation where wate storage and recovery p Washington must obta existing rights and em applications under rev
Many Regulations	final operating permit Regulation of AS wide array of regulati water regulations stem

proaches, plus citations of laws and regulations used in each of the 20 states throughout the country with operational or pilot ASR projects as of 2001.

In some cases fully operational ASR systems, using recovered water for water supply, function under a "pilot system" permit while agencies sort out their new regulatory programs or develop rules in response to legislative directives. In some states including Arizona and Oregon, development of ASR facilities was delayed while new regulatory programs were being established. More aggressive ASR development activity generally occurs following establishment of regulatory programs, and especially following the development of the first permitted site in each state. Arizona, Oregon, and Washington each have had more than a half-dozen ASR sites in operational or pilot stages. Washington is still in the process of developing a final operating permit for its first ASR site, although the permitting process has been clarified by new ASR permitting rules. California, which also has multiple ASR sites, does not have a specific regulatory program on ASR permitting, although, as noted earlier, the passage of the California Water Plan provided potential supplies for use in ASR systems and implicit encouragement of the development of ASR sites.

To integrate ASR into existing water rights law under the prior appropriation doctrine, most western states developed new laws or rules to recognize ASR or aspects of ASR operations (such as groundwater recharge, aquifer storage, or extraction of recharged water) as a "beneficial use" for which a water right could be obtained. States have also identified the process by which water rights could be obtained for ASR systems, and any conditions under which those water rights would be granted or restricted (further discussed below). Of the 12 Western states with operating or pilot ASR systems, all except Idaho (which has operating ASR systems) and Wyoming (where am ASR feasibility study has been completed but no pilot or operational ASR facilities currently exist) have statutes or regulations specifically addressing some aspect of ASR permitting and use (Shrier 2002). Clarification of the establishment and protection of water rights for ASR system operations is an important step for Western ASR facilities, both to ensure the availability of water to place into storage and to ensure that, once the water is placed in an aquifer, it can be recovered and protected from withdrawal by other water users.

Statutes and regulations on ASR and water rights typically require that ASR system owners/operators demonstrate that the operations of their system will not adversely impact other water rights holders. This includes measures restricting the rate at which stored water can be withdrawn and measures pertaining to groundwater-surface water interactions for systems developed in unconfined or semi-confined aquifers (prevent groundwater from entering surface waters). Some states, including Texas, which uses correlative rights for groundwater (rather than including groundwater within their prior appropriation water rights system), require placement of the ASR well so that the storage "bubble" will not extend beyond the system owner's property boundary. Because the property owner can prevent others from installing wells reaching the storage bubble, this requirement helps to protect the stored water from being withdrawn by other water users.

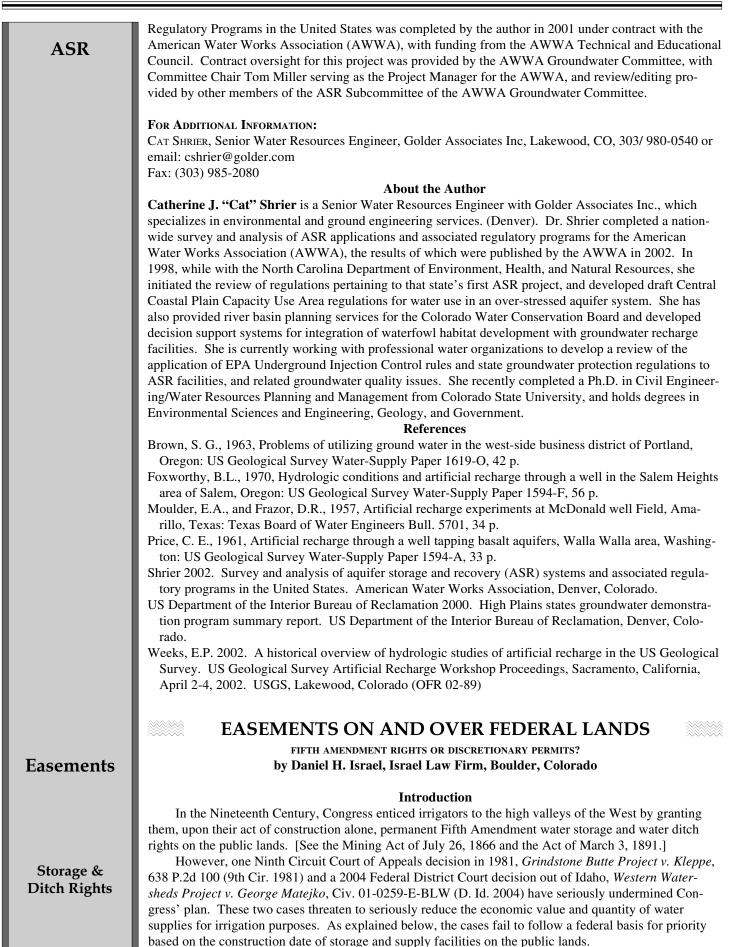
Another water rights consideration is the accounting of water use in cases where the system owner/ operator has other groundwater rights for the ASR well or wellfield. Some states require that the first water withdrawn from an ASR well (the treated, stored water) be accounted for as a withdrawal of stored water first. Other states, such as Colorado, count the first withdrawals towards the existing water right for that well, and only consider stored water to be withdrawn when the existing groundwater withdrawal right has been exceeded for that well. Consequently, the ASR system owner/operator can benefit from using water that has been treated during non-peak periods while benefiting from continued underground storage under that state's water accounting.

In some states, an ASR facility may be required to acquire two or three water rights: one allowing them use of the source water injected into the ASR well, a second allowing them to withdraw that water later, and possibly a third water right for storage. Both Kansas and Washington require more than one water right for operation of an ASR well. In 2000, the Washington state legislature passed a statute expanding the definition of "reservoir" to include "any naturally occurring underground geological formation where water is collected and stored for subsequent use as part of an underground artificial storage and recovery project." (RCW 90.03.370). Consequently, ASR system owners/operators in Washington must obtain a reservoir permit for their system which addresses matters such as impacts on existing rights and environmental benefits. Unfortunately, there is already a backlog of reservoir permit applications under review, which has resulted in further delay of the development of Washington's first final operating permit.

Regulation of ASR facilities has added complexity due to the fact that ASR facilities are subject to a wide array of regulations, including not only water rights, but also groundwater protection and drinking water regulations stemming from federal, state, and local programs. Prior to the development of ASR

	rules or statutes and improved understanding of ASR technology in many states, ASR facility owners/	
ASR	operators have had to pursue water rights, water quality, and drinking water permits separately, with little	
	or no coordination among agencies and potentially with contradictory requirements. Many Western	
UIC Program	states have identified conjunctive use of water resources, and particularly ASR, as a means of increasing water storage and maximizing the beneficial and efficient use of water supplies during water resource	
OICTIOgram	planning or drought planning processes. At the same time, states have recognized the importance of	
	protecting groundwater resources. ASR facilities are regulated as Class V wells under the US Environ-	
	mental Protection Agency's (EPA's) underground injection control (UIC) program. The UIC program	
	may be implemented directly by EPA regional offices or by state agencies delegated administrative	
Streamlined	authority ("primacy") to implement UIC rules. States may also impose additional groundwater protection	
Permitting	regulations beyond those required by the UIC program.	
Termitting	In order to promote safe use of ASR with greater regulatory certainty and efficiency, at least three	
	states (Arizona, Oregon, and Washington) passed statutes or rules designed to streamline the permitting	
	process. Five other states (Colorado, Kansas, Nevada, New Mexico, and Utah) passed statutes or rules	
	specifically addressing the water rights aspects of ASR permitting. Colorado's Denver Basin Extraction Rules only address withdrawal of stored water from the Denver Basin aquifers. Texas, which does not	
	apply water rights to groundwater, has a statute specifically addressing the groundwater protection/	
Specific	underground injection control aspects of aquifer storage wells (30 TAC 331.181-331.186). [See	
Programs	Frownfelter, <i>TWR</i> #1 regarding the "Rule of Capture."]	
Tiograms	In at least two states (Arizona and New Mexico), separate regulatory programs have been developed	
	specifically to address ASR systems that use treated effluent. In both states, these treated effluent ASR	
	programs are regulated under the state's water quality agency, rather than the state's water resources	
	agency, which oversees raw water ASR system permitting. Arizona has developed at least two ASR	
	facilities using treated effluent for golf course irrigation. New Mexico's regulatory programs regarding	
	ASR are relatively new, and there is still only one ASR pilot project in New Mexico (Alamogordo); however, several municipalities have contacted the state agencies about possible ASR system develop-	
	ment, either using raw water or treated effluent. Permit programs for raw water ASR and treated effluent	
	ASR projects are governed by separate agencies in New Mexico. Texas allows the use of treated effluent	
	in ASR systems, and El Paso Utilities, which has been using well recharge with treated effluent for more	
	than a decade, is developing an ASR component to their system.	
Acceptance		
-	Conclusions and the Future of ASR in the West	
	The BOR Groundwater Demonstration Project sites helped to establish acceptance of and comfort with ASR as a viable means of water management in the West. Legislative and regulatory changes	
	established the institutional mechanisms and regulatory certainty to enable water users to go forward with	
Expanding Use	ASR projects. Improved hydraulic technology has led to increasing ability to inject water into and	
	withdraw water from deeper and tighter aquifers. During the past 10 years, the number of western ASR	
"Conjunctive"	sites has increased rapidly, particularly in the Pacific Northwest.	
Management	Several western state water agencies have encouraged "conjunctive management of water resources"	
	in general, and ASR in particular, as a method for managing scarce water supplies in arid and semiarid	
	regions and in response to increasing water demands from population growth and other uses (e.g. habitat	
	and recreation). There has been rising interest from water users in the development of ASR in the West as a means of meeting these increasing water demands and ensuring efficient use of existing water	
Water Quality	as a means of meeting these increasing water demands and ensuring efficient use of existing water resources.	
Issues	At the same time, a number of water quality issues have been raised, primarily in eastern states,	
	regarding possible risks associated with interactions between source waters and native waters or aquifer	
	matrix materials during injection, such as from arsenic mobilization. The author is currently working	
	with organizations of groundwater protection agency personnel, water users, and ASR experts to develop	
Creative	a review of literature on groundwater quality impacts and regulatory approaches that have developed	
Applications	related to groundwater protection through ASR system permitting programs.	
	New, creative applications for non-potable ASR systems continue to be explored, including various	
	industrial and agricultural uses and applications to provide habitat benefits. Overall, there are increasing opportunities for ASR use in the West as a means of storing water supplies for new demands, including	
	both potable and non-potable uses.	
	ACKNOWLEDGMENTS: The author would like to thank: Chris Pitre, Associate, Water Resources, Golder	
	Associates Inc., for his review and input on ASR history in the Pacific Northwest; Patty Kamysz, Golder Associates Inc., for her editorial review; and Phil Brown, Senior Hydrogeologist, Golder Associates, Inc.,	

for his review and input on Oregon standards. The Survey and Analysis of ASR Practices and Associated



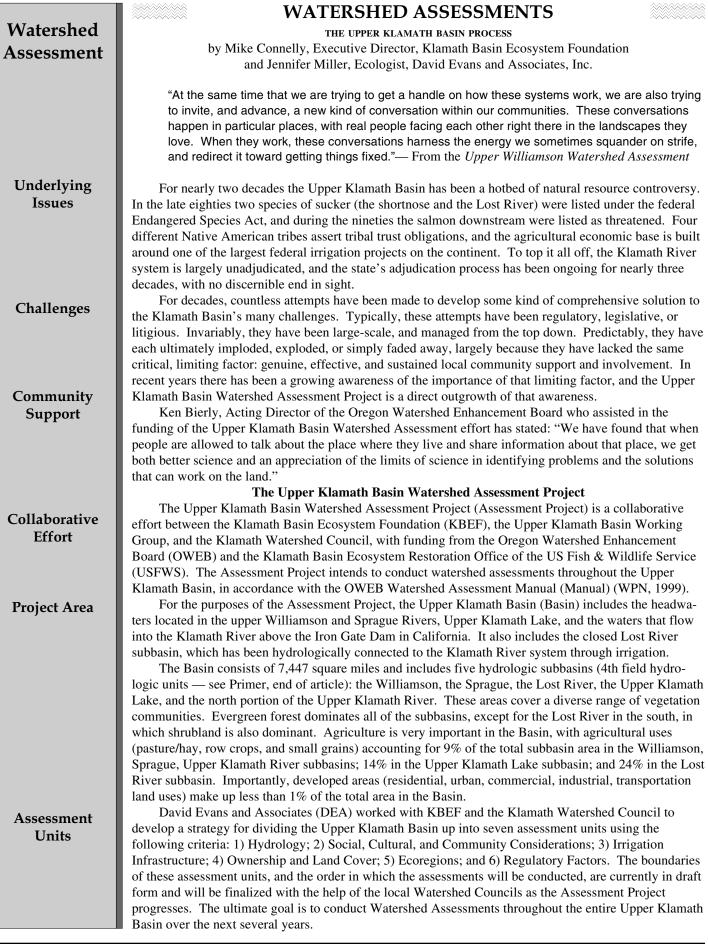
Easements Pre-1910 Rights	In order to protect themselves against possible federal encroachment on their existing rights, irrigators would be advised to inventory their reservoirs and ditches on the public lands. They need to understand what options they have for securing these increasingly valuable assets. If their facilities predate 1901, they likely have a strong legal argument which should be asserted in a "quiet title action" against the United States to maintain their water supply facilities on the public lands as Fifth Amendment-protected real property rights. As such, these rights can not be regulated, abused, or modified by modern day environmental restrictions If irrigators in the West fail to protect these valuable assets, their ability to fully utilize their State protected water rights will inevitably be undermined. Thirty years of history is clear. If not stopped, the federal bureaucracy and environmentalists will continue to re-write Nineteenth Century federal water facility laws to the detriment of state water rights.
Act of 1891	Legal Precedence for Easements on Federal Land The preferred authority for reservoirs and canals is the Act of March 3, 1891 (43 U.S.C. § 946). THAT STATUTE PROVIDES: The right of way through the public lands and reservations of the United States is hereby granted to any canal ditch company, irrigation or drainage district formed for the purpose of irrigation or drainage, and duly organized under the laws of any Stateto the extent of the ground occupied by the water of any reservoir and of any canals and laterals, and fifty feet on each side of the marginal limits thereof
Construction Created Easement	Construction of a dam or water supply ditch on then un-surveyed public lands itself gives rise to an 1891 easement. [<i>Roth v. United States</i> , Case No.0244MLBE (D.Mt. 2003). See also <i>Bijou Irrigation Dist. v. Empire Club</i> , 804 P.2d 175 (Colo. 1991) and <i>Overland Ditch and Reservoir Co. v. USA</i> , Civ. No. 96N797 (D. Colo 1996)(un-published) which relied upon by the District Court in <i>Roth</i> .] A permanent easement, once established by the construction of a dam or ditch, may be forfeited if state law does not grant a corresponding right to store water. [<i>Kern River Co. v. United States</i> , 257 US 147 (1921)] Similarly, an easement may be forfeited to the extent the construction of the impoundment does not occur. [<i>United States v. Tujunga Water & Power Co.</i> , 48 F.2d 689 (9th Cir. 1931)] Permission to construct a reservoir or canal under the March 3, 1891 Act on surveyed lands required the submission of a map and approval by the Secretary. On un-surveyed public lands — which is the case for nearly all early twentieth century high elevation dams and canals — the submission of a map operates to put third parties on notice. But, as noted above, in those common circumstances it is construction of the facilities that
FLPMA Termination	secures the vested property right. [Roth at 22-24] In analyzing these Nineteenth Century precedents it is important to keep in mind that Congress, in the Federal Land Policy and Management Act (FLPMA) of 1976, terminated the prospective use of any and all pre-1976 right of way authorities. Congress in FLPMA made it very clear that no new facilities on the public lands could rely, <i>after</i> 1976, on the older statutes. At the same time, Congress grandfathered-in any and all real property interests created under the earlier statutes that were in existence as of 1976. FLMPA also offered water users the unappealing option of revocable permits under its auspices. As noted in <i>Matejko</i> (Memorandum Decision and Order at 4), FLPMA "provided that a holder could consent to termination and a re-issuance under the terms of FLPMA. 43 U.S.C. §1769(a)." Thus, irrigators should be very cautious about entering into federal permits that concern any of their rights for
Easement Limits	 storage or conveyance (ditches) of their water rights. Grindstone Butte Project v. Kleppe, 638 P.2d 100 (9th Cir. 1981) is an Idaho case involving a 48 inch pipeline and an irrigation canal across BLM lands, which strangely were both limited to a term of fifty years. This limitation was placed on the system notwithstanding the fact that they were issued under the Act of March 3, 1891, which authorizes only permanent Fifth Amendment protected easements. The Ninth Circuit, citing United States v. Sierra Land & Water Co. v. Ickes, 84 F.2d 228 (DC Cir. 1936), concluded that in the absence of prior construction, the Secretary reserved the right to approve an application and could impose environmental conditions upon the facilities and the water supply. The court never addressed how the Act of March 3, 1891 could be the foundation for a right of way that
Right to Regulate	lapsed in fifty years. More troubling is the Ninth Circuit's additional finding that the right to regulate an 1891 easement also existed as a result of Congress' subsequent enactment of the Act of February 15, 1901. This Act provides an independent authority for power lines, telephone lines, reservoirs and canals across the public lands and expressly states that any such right of way could be terminated and "shall not be held to confer anyeasementin, to or over any public land" [43 U.S.C. § 959]

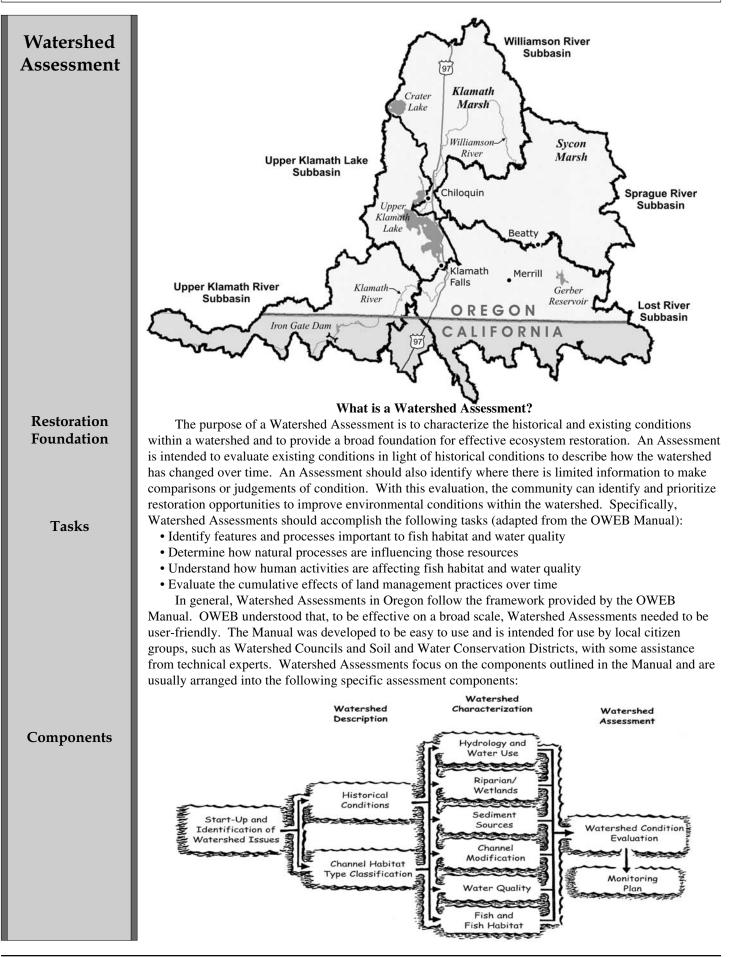
The Water Report

Easements	The Act of 1901 did not repeal the 1891 Act. Rather, it created a new and different federal access and occupancy right — one that was defeasible (changeable/revocable). The court in <i>Grindstone</i> simply misread these two independent statutes. It erroneously held that an entity which had secured an easement under the Act of March 3, 1891 would, as a matter of federal law, have those rights subordinated once
<i>Okanogan</i> ESA Limits	 Congress granted broad regulatory discretion to the United States in the 1901 Act. [638 F.2d at 103] Within the last year the Ninth Circuit properly construed the 1901 Act to reserve to the United States sufficient discretion with respect to the operation of water supply ditches on the public lands constructed <i>subsequent</i> to the 1901 Act, to permit the United States Forest Service (USFS) to restrict flows under the authority of the Endangered Species Act. [<i>County of Okanogan.v. National Marine Fisheries Service</i>, 347 F.3d 1081, 1085 (9th Cir. 2003)]
Matejko	In 2004, the federal district court in Idaho repeated and brought forward the (arguably erroneous) 23 year-old ruling in <i>Grindstone. Western Watersheds Project v. George Matejko</i> , Civ. 01-02590E-BLW (D. Id. 2004) required the court to determine whether water supply ditches constructed on public lands under the Mining Act of July 26, 1866 (43 U.S.C. §661) were subject to the authority of the United States to limit water diversions in the ditches under the federal Endangered Species Act. First, the Idaho federal
Mining Act of 1866	court noted that the US Supreme Court held in <i>Utah Power Co. v. United States</i> , 243 US 389, 405 (1916) that water supply ditches built prior to the Act of February 15, 1901 became upon construction a valid protected real property interest, while those built after 1901 had to comply with discretionary permits authorized in the 1901 Act. Second, the Idaho court "assumed" the water supply ditches in question were obtained under the 1866 Act. Third, the court in <i>Matejko</i> then carried forward the (arguably erroneous) analysis of the Ninth Circuit in <i>Grindstone</i> . The <i>Matejko</i> court also cited with approval <i>Hymp v. Kleepe</i> , 406 F.Supp. 214 (D.Colo. 1976) and noted that in that case "the court held that the Act of 1901 authorized the BLM to impose conditions on right-of-way created under the Act of 1866." (<i>Memorandum Decision</i>
Property Rights	<i>and Order</i> , page 4). Thus, the Idaho federal district court took away the very Fifth Amendment protected property rights,
v.	which the courts (except for Grindstone) had declared to have been granted in praesenti (upon construc-
ESA	tion), and subjugated them to the supervisory powers of the United States granted in the 1901 Act. Hence — as was the case in <i>Grindstone — Matejko</i> ruled that the 1901 Act's discretion was imposed on 1866 Act ditches so as to require the federal Bureau of Land Management to modify, if necessary, water flows required under the Endangered Species Act. [For a copy of <i>Matejko</i> , go to www.westernwatersheds.org/
	news_media/newsmedia.html and click on the link for "March 29, 2004" news in the left hand column.] The error in <i>Grindstone</i> and in <i>Matejko</i> is the same. Their analysis — that a vested easement granted either under the 1866 Act or the 1891 Act is superseded and therefore diminished by the 1901 Act — is
Supercedes?	contrary to the common law. Moreover, it is contrary to the holding in <i>Utah Power, supra</i> . While <i>Utah Power</i> analyzed superceding authorities starting with the 1866 Act and including the 1901 Act, the US Supreme Court in that case was careful to make it clear that "supercedes" means that <i>subsequent</i> to the 1901 Act, newly constructed rights of way on the public lands will be analyzed and governed under the terms of that new regime.
	The <i>Utah Power</i> ruling is far different from the rulings in <i>Grindstone</i> and <i>Matejko</i> with regard to what "supercedes" means. In these latter two cases, "supercedes" means that pre-1901 vested rights of way — no matter what their date of construction or vesting — are by operation of law immediately diminished by authority granted to the United States to regulate facilities constructed on the public lands <i>after</i> 1901.
"Quiet Title"	Conclusion Irrigators who utilize canals or reservoirs on public lands need to reach back and, if possible, establish their property rights under the 1866 Act and preferably under the 1891 Act. This can be done through a quiet title action brought under 28 U.S.C. §2409(a). Secondly, those irrigators who have 1866 and /or 1891 real property rights must vigorously fight any effort by the United States under the National Environmental Protection Act (NEPA), the Endangered Species Act, the Federal Land Policy and Management Act or any other federal regulatory act to diminish their vested rights. Your water rights will only grow more valuable with the passage of time. In your author's opinion, <i>Grindstone</i> and <i>Matejko</i> are flat out wrong and must be overruled.
	For ADDITIONAL INFORMATION: Dan Israel, Israel Law Firm, Boulder, Colorado, 303/ 246-9027 or email: adamatronics@aol.com Daniel H. Israel is a reservoir law expert with thirty years experience in appropriated state water rights, Indian water rights, Bureau of Reclamation law, USFS law, environmental law, and the transfer of reservoirs from federal to private ownership.

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The Water Report

Watershed Assessment

Data Assessment

Restoration Scenarios

Local Commitment

Outreach Goals

The Manual focuses on fish habitat and water quality, but Watershed Assessments can be adjusted to address other conditions such as likelihood of catastrophic fire, or other issues of interest. Although the tendency is to look only at the downslope aquatic and riparian resources, depending on the issues at hand, the assessment team may need to look uphill to find answers to some of the important questions.

At the end of each technical chapter there are sections that: 1) describe the information gaps that were discovered during the data gathering, as well as recommendations for how to fill those gaps; 2) the restoration opportunities that could benefit the watershed based upon a consideration of the existing data; and 3) an overall confidence evaluation that considers the number of resources available for that technical issue, the quality of the available resources, and whether the information in those resources was consistent or not. Depending upon the amount of information available for a particular watershed, the results of a Watershed Assessment may include suggestions for additional information gathering or research that can help to refine the restoration needs of the watershed.

The information provided in each of the technical chapters is then woven together and summarized at the end of the Watershed Assessment, describing the recommendations and data gaps and the potential restoration scenarios that could benefit the watershed. These restoration scenarios can then be used by the Watershed Council and the people that call the watershed their home to evaluate, to prioritize, and eventually to implement the restoration opportunities.

The Importance of Community Involvement

John Wesley Powell, geologist and scientist, said that a watershed is:

"...that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community."

We've come to understand that even with healthy, sincere, and dedicated local communities we can do serious damage to natural systems if we don't know how they work. And on the other hand, a flawless technical understanding of the functioning of natural systems is largely useless without the deep – and usually quite nontechnical – commitment of the folks who live and work within particular landscapes.

An effective Watershed Assessment must be the product of the local community, directly involving the people who make important decisions on a day-to-day basis that affect the health of the watershed. In order for a Watershed Assessment to lead to successful watershed enhancement, the people who live and work in the local community should share a conviction that, on a fundamental level, this is *their* Assessment. For this reason, special attention should be paid throughout the process to establishing and maintaining consistent and broad-based community involvement in all aspects of the assessment.

"Our experience with local communities identifying their local issues and solutions has been incredibly positive. People care about where they live and how they affect the land," Ken Bierly said when talking about Watershed Assessments completed in Oregon using the OWEB Manual.

At the beginning of the Upper Klamath Basin Assessment Project, a public outreach strategy and framework were developed to guide the outreach efforts for all of the Assessments. The primary goals for the public outreach efforts were to:

• Inform people about the way Watershed Assessments work.

- Gather input, solicit guidance, and ensure direct and sustained participation.
- Help build a strong sense of stewardship toward the landscape, the habitats, and the various communities in the Upper Klamath Basin as a whole.

These outreach efforts were designed to be iterative, encouraging public comment on outreach techniques and their effectiveness. While the outreach goals will remain consistent throughout each Watershed Assessment within the Basin, the techniques are intended to be adapted to the specific needs within each of the assessment areas.



Watershed Assessment Draft Done

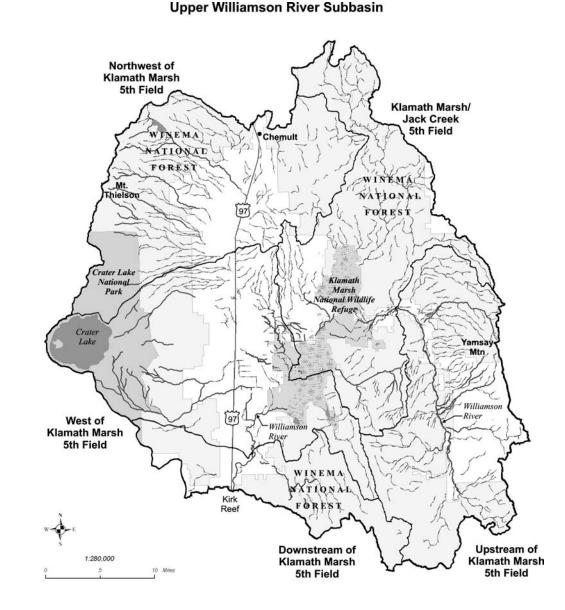
Area Attributes

Pilot Assessment - The Upper Williamson River Watershed Assessment

DEA recently completed a draft of the Upper Williamson River Watershed Assessment (Assessment), the pilot assessment in the Upper Klamath Basin Assessment Project. [The draft document is currently on the KBEF website at www.kbef.org.] The Assessment was prepared by DEA and their subconsultants (Ed Salminen and Graham Matthews and Associates) for KBEF, the Upper Williamson River Catchment Group (i.e., Watershed Council), and the people that live and work in the upper Williamson River subbasin.

The Upper Williamson River Subbasin

The upper Williamson River subbasin is located in south central Oregon along the eastern flank of the southern Cascades, just north of Upper Klamath Lake. It falls almost entirely in Klamath County, with just a sliver along the east edge of the subbasin occurring within Lake County. It is the northernmost subbasin within the Upper Klamath Basin. The area covered by the Assessment was defined as the area contributing to the Williamson River, upstream of Kirk Reef, a natural basalt feature along the mainstem that has been thought to control upstream water levels.



Although the Williamson River subbasin extends from the headwaters of the Williamson River to the mouth at the Williamson River Delta, Kirk Reef was designated as the southern boundary of the Assessment area because it demarcates changes in water sources, hydrologic trends, and patterns of land use and ownership. Kirk Reef also serves as the southern boundary for the Upper Williamson Catchment Group.

WatershedThe Assessment area is approximately 1,300 square miles, ranging in elevation f4,500 feet at Kirk Reef to 9,182 feet at the summit of Mount Thielsen along the north		
	west boundary of	
Assessment the Assessment area. In addition to the horseshoe-shaped Williamson River, notable subbasin include the Winema National Forest, Crater Lake National Park and the Kla		
National Wildlife Refuge.		
Sparse No matter where you live in the upper Williamson subbasin, you have to drive p		
Population your groceries. Aside from the small town of Chemult (population approximately 30	_	
Highway 97 at the north edge of the study area, there are no population centers within town of Chiloquin is located about 10 miles south of the study area, while Klamath Fa		
population center of the region, is located about 60 miles south.		
Federal Lands The assessment area includes five 5th-field watersheds, which average 265 acres the area is primarily federal. The US Forest Service (USES) holds approximately 609	-	
Federal Lands the area is primarily federal. The US Forest Service (USFS) holds approximately 60% owns roughly 5%, and the National Park Service owns about 7%. Large private time		
ranches account for almost 30% of the area. Evergreen forest (in various conditions)	blankets most of the	
uplands, while emergent wetland (also in various conditions) dominates the center of		
form of the Klamath Marsh. Pasture and hay ranches line the remaining lowlands, ale Williamson River.	ong the banks of the	
Surface Water The Williamson River is the predominant surface water feature within the subba	sin. The source of	
the Williamson River is a lovely little spring located in the southeast corner of the sub		
which is a favorite of fly fishers because of the healthy redband trout population and s continues to pick up flow from springs along the base of Yamsay Mountain as it wind	-	
Once the river discharges into the Klamath Marsh, the channel is no longer defined, b	•	
just south of the marsh. Because of the marsh influence, the Williamson River can al	most be thought of	
as two distinct rivers, one above and one below the marsh. There are approximately 259 miles of perennial stream and 979 miles of non-per	rennial stream within	
the subbasin. The majority of the streams are non-perennial because of the unique ge	ology of the area	
(rich with Mt. Mazama pumice), and do not have a surface connection to the William		
it was not practical to provide an analysis of all waterways within the study area, key identified based upon their flow, fish distribution, and the amount of available inform		
Data Collection		
Existing Data The first phase of any Watershed Assessment is a thorough scouring of all know	n resources to	
collect existing information on the watershed. For the upper Williamson River subba		
data were collected from over 20 agencies and organizations. Primary sources of info the US Geologic Survey, USFS, the Bureau of Reclamation, USFWS, The Nature Co		
Institute of Technology, Timber Resource Services and, importantly, long-time reside	ents of the area.	
Because of the size of the upper Williamson River subbasin, GIS was a valuable the Assessment. GIS provides the opportunity to analyze a variety of datasets in cond		
GIS the Assessment. GIS provides the opportunity to analyze a variety of datasets in concord opportunity to evaluate "cause and effect" relationships among a variety of mapped e	-	
large scale. As is usually the case, the GIS data acquired were of various scales and s	spatial reference	
systems. Each dataset was evaluated to determine spatial and content accuracy, appro and spatial registration. In many cases, data was re-projected from its native coordina	-	
standard coordinate system to make it easier to use in conjunction with other datasets		
Bringing the Community Together		
A primary goal, as well as a benefit, of a Watershed Assessment is the opportuni	ity to bring the	
community together. In the case of the upper Williamson River subbasin, the Catchm	•	
already been working together for a number of years, planting willows, putting up will fencing cows out of the river. But it seems the community outreach efforts associated	-	
Outreach Assessment brought more people to the table and, we think, expanded the conversation		
Framework The outreach framework that we had put together for the Upper Klamath Basin A	-	
provided us with a number of tools that we could use for the upper Williamson Asses and a brief description of how each was used, are provided below.	sment. These tools,	
SMALL, INTIMATE MEETINGS AND ONE-ON-ONE INTERVIEWS WITH COMMUNITY. The Upper Wi		
Group meets regularly throughout the year. The meetings were used as an opportun	-	
information about the Assessment process, to learn about the issues that are signific that live and work in the subbasin, and to take informative field trips to different pa		
These meetings and field trips were always very well attended (probably because or		

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The Water Report

Watershed Assessment	We found the field trip to be the most effective outreach tool. The people that live and work in the subbasin are all busy, hard-working people, so it's easy to understand why they never really took casual drives around the neighborhood or got together to "do lunch." But there were some very powerful conversations when we were able to gather a diverse group of ranchers, foresters, biologists and tribal members on the banks of the Williamson River to talk about work, life, and restoration in the subbasin.
Initial Meeting	In addition to the Catchment Group meetings, several interviews were held with long-time residents of the subbasin in order to gain a better perspective on the history and changes in the area. "KICK-OFF" MEETING. A kick-off meeting was held to educate people about Watershed Assessments in general, and specifically, the Upper Klamath Basin Watershed Assessment Project, and to encourage their participation. This meeting also introduced the public to the groups coordinating and conducting the Watershed Assessment and helped to build the general Assessment mailing list. The meeting was
Guide to Process	well attended by people from all over the Upper Klamath Basin. In addition to the "kick-off" meeting, a workshop was held during the Upper Klamath Basin Water- shed Conference. This workshop was also intended to educate people about the Assessment and to encourage their participation in the process. To engage attendees in the Assessment process, they were asked to respond to two questions: 1) What concerns you most about this particular process? and 2) If this assessment could turn out the way you want, what would it look like? The responses to these
Web Presence	 questions were then used to illustrate particular community concerns and to help guide the Assessment process. In addition to answering the two questions, the audience was enlisted to draft a list of issues particular to the upper Williamson River subbasin, which also helped to guide the Assessment process. PROGRESS REPORTS. KBEF provided Assessment updates within its regular, seasonal newsletter. WEB PAGE. A web page was developed with the intent of making current Assessment information easily accessible to people with computer access. The web page includes links to the Upper Klamath Basin Working Group, the Oregon Watershed Enhancement Board, and the Klamath Watershed Council. [see website: www.kbef.org/assessment/index.shtml] INFORMATION PAMPHLET. At the beginning of the Assessment process, a pamphlet was prepared to educate
Mailings	 people about the intent of the Assessment and how to get involved. The pamphlet was mailed out to individuals living and/or working in the Upper Klamath Basin and was handed out at meetings early on in the Assessment process. MAILING LIST. A mailing list was prepared that included existing members of the Upper Williamson Catchment Group, as well as all owners of property within 200 feet of a stream in the upper Williamson subbasin. Mailings were used for notification of upcoming Catchment Group meetings as well as other important meetings. The mailing list was updated as needed to include other interested individuals. Next Steps
Draft	The Draft of the Watershed Assessment was issued in August 2004 and is currently being widely
Circulating	circulated for review and comment. Once all of the comments have been received (hopefully by the end
Circulating	of October), the Assessment will be revised accordingly. In addition to the technical chapters, the
Prioritizing	Assessment will list the restoration opportunities that are suggested as a result of the technical assess- ment, as well as a discussion of the effectiveness of past restoration efforts. It will then be up to the Upper Williamson Catchment Group to prioritize the restoration opportunities according to the following set of factors that were decided upon at a recent Catchment Group meeting: • Issues addressed by the restoration effort – making sure they get the most "bang for the buck" • Location within the subbasin – would prefer to start work at the top of the subbasin
Restoration Plan	 Local experience – what has worked or not in the past Opportunity – willingness of the landowners The prioritized list of restoration opportunities can then evolve into a Restoration Action Plan. With the Watershed Assessment and Action Plan in their back pocket, the Catchment Group will have the tools they need to approach funding entities for support of their efforts.
Options	Some examples of initiatives or restoration efforts that may result from a Watershed Assessment (not specific to the upper Williamson River) include: • Communication between landowners to time irrigation efforts to maintain instream flows • Identification and ranking of fish passage barriers
	Restoration of riparian vegetation along critical stretches
	Road management to minimize sediment contributions
	• Extend protections for properly functioning riparian or upland areas
	Restoration and conservation efforts have been going on in the upper Williamson River for quite some time now. So the list of actions will depend, in part, on what we know to have worked, or not, in
	the past. Ultimately, the list of actions will depend on the willingness of landowners to participate.

The Water Report

Summary – Getting the Word Out

Watershed Assessment Pilot Process

The impact of strong community involvement in a sound Watershed Assessment can have dramatic impacts on the land and the people. For the Upper Klamath Basin, the importance of a successful Assessment in the upper Williamson cannot be overstated. It will set the stage for the Assessments throughout the Basin and will help people decide whether they should welcome the process in their area, or turn their back on it. People in other parts of the Basin are watching very carefully to see how the upper Williamson responds to this process. Does it throw people off their land? Does it take away their water? How bad does it hurt?

Ask those questions of the people in the upper Williamson River subbasin. I think they'd agree that the Assessment brought people closer to the land by teaching them more about it, it didn't take their water away, and it didn't hurt at all (in fact, people seemed to be enjoying themselves at times). Admittedly, we were lucky in the upper Williamson. We were able to build on the foundation of good relationships and restoration successes laid by the Upper Williamson Catchment Group. Other assessment areas will undoubtedly be more challenging from a community involvement perspective. But the assessment process is a good thing, and KBEF and the Klamath Watershed Council are excited to get the good word out to the other parts of the Basin.

Natural systems are infinitely complex, and constantly changing. Likewise, culture and communities are infinitely complex and ever-changing. When we acknowledge that these two complex systems are inextricably intertwined with each other, it becomes clear that "understanding" is a relative term, and that "fixing things" is not something we do once and then we're done with it. The goal of a Watershed Assessment is not some form of ecological "perfection." The goal is to keep our communities healthy while respecting, openly and honestly, the water, the land, and the other lives we depend on. The challenge is to hone the skills we possess for working with the land, and to learn the hard lessons that come from working against it. The challenge we face, in short, is to find a way to live that will last. A Watershed Assessment is only a success if it helps to make that happen.

FOR ADDITIONAL INFORMATION:

MIKE CONNELLY, Executive Director, Klamath Basin Ecosystem Foundation, 541/850-1717 or email connelly@kbef.org

JENNIFER MILLER, Ecologist, David Evans and Associates, Inc., 503/ 499-0576 or email: jdho@deainc.com website: A draft of the Upper Williamson River Watershed Assessment, as well as additional information on the Klamath Basin Ecosystem Foundation, can be found at www.kbef.org

A Primer on Hydrologic Units

The US Geological Survey (USGS) has assigned Hydrologic Unit Codes (HUCs) to watersheds of varying sizes. For example, the entire Columbia River Basin is considered a 1st field hydrologic unit (HUC = 17), also known as a "region." The Klamath River Basin is a 3rd field hydrologic unit (HUC = 180102) or "accounting unit," while its subbasins, such as the Williamson River (HUC = 18010201) and the Sprague River (HUC = 18010202) are considered 4th field hydrologic units or "cataloging units." Within the Upper Williamson Subbasin there are five 5th field hydrologic units (Upstream of Klamath Marsh [18020101], Klamath Marsh/Jack Creek [1801020102], Northwest of Klamath Marsh [1801020103], West of Klamath Marsh [1801020104] and Downstream of Klamath Marsh [1801020105]).

Assessment Goal

The Water Report WATER BRIEFS

9TH CIRCUIT HOLDING ON DAMS: WATER QUALITY STANDARDS

WA/OR

The 9th Circuit Court of Appeals in a 2-to-1 decision on October 4 held that the US Army Corps of Engineers' (Corps) operation of four federal dams complied with state water quality standards required by the Clean Water Act (CWA). The court found that the Corps reasonably concluded that water temperature exceedences were due to the federal dams' existence, as opposed to the Corps' operations of the dams, and deferred to the federal agency's judgment. Ice Harbor, Lower Monumental, Little Goose and Lower Granite Dams are located on the lower Snake River in Eastern Washington. Although the decision was focused on the operations of these federal dams, it will likely impact other situations involving water quality standards and dam operations (private and federal).

The State of Washington has argued since 1994 that the dams violate the Clean Water Act by causing temperatures to exceed that state's water temperature standards. The National Wildlife Federation (NWF), joined by other environmental groups and the Nez Perce Tribe of Idaho, sued and alleged that the Corps violated the Administrative Procedures Act (APA) because the Corps' 2001 Record of Decision (ROD) did not properly address their obligation to comply with Washington's water quality standards for temperature (required by the CWA's incorporation of state water quality law).

The 9th Circuit's ruling turned largely on the standard of review, but did deal with the issue of removal of the dams. "Under the APA, we may set aside agency action only if it was 'arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.' *Wilderness Soc'y v. United States Fish & Wildlife Serv.*, 353 F.3d 1051, 1059 (9th Cir. 2003) (en banc). The standard is a narrow one, and we may not substitute our judgment for that of the agency. *Envtl. Def. Ctr., Inc. v. EPA*, 344 F.3d 832, 858 n.36 (9th Cir. 2003)." *National Wildlife Federation*, Slip. Op. at 14214.

Presented with highly technical issues, the 9th Circuit's decision relied on the rule of deference to the agency decisionmaker: "Where scientific and technical expertise is necessarily involved in agency decision-making, especially in the context of prediction (here, of how various methods of dam operations would affect water temperatures), the Supreme Court has held that a reviewing court must be highly deferential to the judgment of the agency. *Baltimore Gas and Elec. Co. v. Natural Res. Def. Council, Inc.*, 462 US 87, 103 (1983). We adhere to the Court's instruction and conclude that the Corps was not arbitrary and capricious, and did not act contrary to law, in this regard." *Id.* at 14221.

The 9th Circuit also addressed an agency email and attachments relied on by NWF as evidence that the Corps could have taken additional steps to decrease water temperature on the lower Snake River. The court rejected the email as evidence on the basis that it "was preliminary and not the official view of any agency. *Cruz v. Brock*, 778 F.2d 62, 64 (1st Cir. 1985)." The court explained its rationale further on this issue: "It would be inappropriate to fault the Corps for not adopting operational changes to the lower Snake River dams, where the changes had not been formally proposed to the Corps or even finalized by those making the recommendations. This document was,by its own terms, a "brainstorm." *Id.* at 14222.

A fascinating and important aspect of this decision is the discussion of how the court should deal with two competing federal statutes – CWA's directive requiring compliance with state water standards and the River Harbor Act's directive that the dams be built in the first instance. The court held: "We thus adhere to the maxim that 'when two statutes are capable of coexistence, it is the duty of the courts . . . to regard each as effective.' *Radzanower v. Touche Ross & Co.*, 426 US 148, 155 (1976) (quoting *Morton v. Mancari*, 417 US 535, 551 (1974)). Applying this reasoning, a more sensible interpretation of the CWA is that discretionary operations of the dams, consistent with the statutory regime established by Congress, should comply with state water law standards. Where the Corps has concluded reasonably that the sole cause of the temperature exceedences is the existence of the dams and not any discretionary method of operating the dams, we do not interpret the compliance provision of the CWA as requiring that the dams authorized by Congress be removed." Id. at 14229.

Ultimately, the standard of review played a huge role in the decision. "We are presented with a technical issue that requires scientific expertise. Our judicial role is not to second-guess the decisions of the agency, but to determine whether, on the administrative record, the agency's actions were arbitrary and capricious, an abuse of discretion, or contrary to law. Because the Corps's conclusions in the 2001 ROD were supported by the administrative record, we conclude that the Corps's conclusion that its operations of the dams on the lower Snake River, as opposed to the existence of the dams themselves, did not contribute to temperature exceedences was not arbitrary and capricious." *Id.* at 14232.

Judge McKeown filed a strong dissent in the case. "Once the majority frames this case as a choice between compliance with the Clean Water Act ("CWA") and tearing down the dams along the Snake and Columbia Rivers, the question answers itself. The trouble is that this formulation misstates the actual legal issue: whether evidence in the record supports the United States Army Corps of Engineers' ("Corps") decision that the sole cause of temperature exceedences is the existence—and not operation—of the dams, and that, therefore, the Corps bears no obligation to comply with the CWA.

Even talking about removal of the dams is a lightning rod that we need not strike. Compliance with the CWA and the continued presence of the dams are not mutually exclusive options. But, in an effort to sidestep the CWA, the Corps hides behind removal of the dams and simply defaults on the real issue—compliance with water quality standards. Because the record is devoid of evidence addressing operational alternatives aimed at CWA compliance, the Corps' decision does not comply with the Administrative Procedure Act ("APA"). I respectfully dissent because, in my view, the Corps' failure to tackle the CWA issue head-on requires remand." *Id.* at 14233.

For info: The case can be viewed at: http://caselaw.lp.findlaw.com/data2/circs/9th/0335235p.pdf

The Water Report WATER BRIEFS

NOAA FISHERIES

2004 REPORT TO CONGRESS

NOAA Fisheries has released a report to Congress describing 3,200 salmon projects undertaken since 2000. About half of the projects were related to restoring and protecting salmon habitat. The funding for these projects, about \$436 million to date, comes from the federal Pacific Coastal Salmon Recovery Fund, administered by NOAA Fisheries. Funds are distributed to West Coast Indian tribes and the states of Washington, Oregon, California, Alaska, and starting this year, Idaho.

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The 58-page "2004 Report to Congress," written by NOAA Fisheries, is filled with maps, charts and graphs, and is useful to anyone involved in salmon recovery. It has 16 pages of maps and more than a dozen short, colorful sidebars that describe completed or ongoing projects. **For info:** The report may be downloaded at www.nwr.noaa.gov/pcsrf/ index.htm.

DELISTING CRITERIA CA/OR NOAA DRAFT FOR COHO

NOAA Fisheries has released a public review draft of the Oregon Coast Coho Salmon Historical Population Report, which was prepared by a committee of the Oregon and Northern California Coast Technical Recovery Team. The Oregon and Northern California Coast Technical Recovery Team was created by NOAA Fisheries to develop technical delisting criteria and guidance for salmon recovery planning on the Oregon and Northern California coasts. A copy of the draft report can be downloaded at www.hwfsc.hoaa.gov/trt/ trt_oregonNcal.htm#docs. Comments on the draft report are due by November 15, 2004 and can be sent via e-mail to: Heather.Stout@noaa.gov, or via hard copy to Northwest Fisheries Science Center (Attn: Heather Stout), 2032 SE OSU Drive, Newport, OR 97365.

For info: Heather Stout, 541/867-0290, email: Heather.Stout@noaa.gov.

FERC HYDROPOWER RULE US COMMENTS SOUGHT

The National Marine Fisheries Service (NMFS) published a proposed rule entitled "Procedures for Review of Mandatory Fishway Prescriptions Developed by the Department of Commerce in the Context of Federal Energy Regulatory Commission's Hydropower Licensing" in the Federal Register on 9/9/04 (50 FR 54615). NMFS proposed a public review process for mandatory fishway prescriptions developed pursuant to its authority under the Federal Power Act, for inclusion in hydropower licenses issued by the Federal Energy Regulatory Commission (FERC). NMFS said the proposed rule is intended to supercede and codify NMFS' existing 2001 policy governing review of its prescriptions, to solicit public comments on how the process has worked during the trial period of implementation and to determine whether any further revision is warranted on the Department's preliminary prescriptions. The public review process will enable the public to comment on the Department's preliminary prescriptions and to provide information to assist the Department in considering any needed modifications of prescriptions to be included in FERC's final license.

Electric utilities must consult with Department of the Interior through the US Fish and Wildlife Service, the National Park Service, the Bureau of Land Management, and the Bureau of Indian Affairs when seeking new operating licenses, or renewing existing licenses, for their hydroelectric dams. During these negotiations, agency field staff assess the environmental, recreational, and cultural consequences of the hydro project and identify steps to ensure that other public needs from the river are met. River conservation and recreational stakeholders have equal access to all major decision-making processes.

Environmental groups have raised the specter that the new departmental rule will establish a one-sided administrative appeals process that is a stark departure from prior federal law and policy. Those groups maintain that the new rule provides electric utilities exclusive rights to appeal environmental

and recreational requirements at hydropower dams and thus provides hydroelectric dam owners with direct access to upper echelons of the Interior Department — but not other interested parties such as states, tribes, conservationists, anglers, boaters, local governments, and irrigators. The groups called on the Interior Department to either drop, or substantially modify, the proposal, warning that in its current form it will intimidate fish biologists and field experts and politicize resource decisions affecting thousands of miles of rivers over the next ten years.

The public can comment on the Department's preliminary prescriptions and to provide information to assist the Department in considering any needed modifications of prescriptions to be included in FERC's final license. Close of Comment: November 8, 2004. Written comments may be submitted by email to: NMFS.MCRP@noaa.gov (subject line identifier: RIN 0648-AS55), website: www.regulations.gov, or mail to Thomas Bigford, Chief, Habitat Protection Division, Office of Habitat Conservation, NMFS, 1315 East-West Highway, Silver Spring, MD 20910. Include in the subject line the name, date and Federal Register citation (50 FR 54615) of this document. For info: Melanie Harris at NOAA Fisheries, 301/713-4300 x154 or email: Melanie.Harris@noaa.gov; Andrew Fahlund, American Rivers, 202/347-7550

GW REPLENISHMENT CA \$487 MILLION SYSTEM

On September 21, the Orange County Water District (OCWD) and Orange County Sanitation District (OCSD) held an official groundbreaking ceremony for the new \$487 million Groundwater Replenishment (GWR) System water purification project. The GWR System, a state-of-the-art water purification project, takes highly treated sewer water that is currently released into the ocean and purifies it using the same

The Water Report WATER BRIEFS

technologies that purify baby food, fruit juices, medicines and bottled water. The GWR System will create a new supply of extremely high-quality water for use in an expanded seawater intrusion barrier and to augment groundwater supplies for north and central Orange County residents. When the project's Advanced Water Purification Facility is complete in 2007, it will produce 70 million gallons of purified water per day, enough water to provide for 144,000 families annually. Phase One of the GWR System is online and sending five million gallons a day of purified water to the county's seawater intrusion barrier that keeps the ocean out of the underground aquifer.

The Interim Water Purification plant's water will be blended each day with about 13 million gallons of imported water. By mid-July, an additional five million gallons of imported water will be added. In addition, one million gallons of deep well water will be injected to maintain the seawater barrier. The seawater barrier is a series of injection wells that build an underground mound of water along the coast, higher than sea level, to keep salt water out of the fresh water groundwater basin.

The GWR System is touted for its ability to improve water quality and drought mitigation, save energy by eliminating costs to import water from northern California, delay the need for an additional ocean outfall, and reduce the amount of wastewater sent to the ocean. Because it reduces the need for imported water from northern California, the project will also lessen the strain on the ecosystem of the San Francisco-San Joaquin Bay Delta. The project will represent a major contribution to satisfying the demands on OCWD's water resources, expected to grow from 505,000 acre-feet per year to 605,000 AF/year by 2020. More than half of the area's water supply for 23 northern and central Orange County communities is drawn from groundwater aquifers, with the remainder imported from the Colorado River and California's State Water Project. For more information on the Groundwater

Replenishment System go to: www.gwrsystem.com For info: Rebecca Long, OCWD, 714/ 378-3362, website: www.ocwd.com/ _html_pr/_pr04/pr04_0921gwrs.htm.

BULL TROUT WA/ID/OR CRITICAL HABITAT

Responding to a court order, the US Fish and Wildlife Service (FWS) announced on September 22 it is designating approximately 1,748 miles of streams and 61,235 acres of lakes in the Columbia and Klamath River basins of Oregon, Washington, and Idaho as critical habitat for the bull trout under the Endangered Species Act. The designations are broken down as follows: Oregon: 706 miles of streams and 33,939 acres of lakes and marshes. These lakes and marshes are in the Klamath River basin; Washington: 737 miles of streams in the Columbia River basin: Idaho: 306 miles of streams and 27.296 acres of lakes in the Columbia River basin.

Critical habitat refers to specific geographic areas that are essential for the conservation of a threatened or endangered species and which may require special management considerations. A designation does not set up a preserve or refuge. Federal agencies must ensure that any activity they fund, carry out or authorize is not likely to destroy or adversely modify a protected species' critical habitat.

FWS originally proposed designating approximately 18,450 stream miles and approximately 532,700 acres of lakes and reservoirs as critical habitat for the bull trout in November 2002. The final designation provides credit for ongoing conservation and management efforts for bull trout that remove the need to designate as much area. "As a result of the extensive public comment we received on our proposed designation, the Service found there were many areas that already had conservation efforts in place and did not need to be designated," said Dave Allen, regional director of the FWS Pacific Region. "In other areas, the Service found that the social and economic cost of a designation outweighed the conservation benefit."

FWS justified its drastic cuts by

providing the following examples in its press release. FWS determined that the State of Washington's Forest Practices Act provided conservation benefits for the bull trout in Washington that are far superior to the benefits provided by a critical habitat designation. FWS also noted the Federal Columbia River Power System has spent \$3.3 billion on restoration of salmon habitat in the river system over the past 20 years, most of which also benefited bull trout, and that conservation efforts by 11 federal agencies that manage portions of the river basin provide protection for the bull trout's habitat. Montana has an ambitious conservation plan to recover the species to a point where it can provide a sport fishery and Idaho has entered into an agreement with the Department of the Interior to protect habitat in the Snake River Basin, FWS pointed out.

Meanwhile, the groups who successfully sued to have the bull trout listed under the Endangered Species Act claimed the Bush Administration acted on behalf of corporate contributors and conservative Western governors by dramatically slashing critical habitat designations for the threatened bull trout by more than 90%. Alliance for the Wild Rockies (AWR) and Friends of the Wild Swan conservation organizations blasted the final designations for the Columbia and Klamath River basins, saying they violate the law and are the latest slap in the face of sportsmen across America.

By slashing the proposed designations by approximately 90%, the government has ignored its own scientists and legal findings, according to AWR. The groups first petitioned the government for bull trout listing in October of 1992, finally prevailing in court some seven years later.

Maps, fact sheets, photographs and other materials relating to the FWS announcement may be found on the Pacific Region's Bull Trout Website at http://species.fws.gov/ bulltrout.

For info: Jeff Fleming, FWS, 202/ 208-5634; Michael Garrity, AWR, 406/459-5936, website: www.wildrockiesalliance.org

The Water Report CALENDAR

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October 18-20

Water Information Management Systems Workshop, Western States Water Council, Sun Valley, Sun Valley Resort, For info: WSWC, 801/561.5300, website: www.westgov.org/wswc/ meetings.html

October 18-20

Agriculture and Water Quality in the Pacific Northwest **Conference & Idaho Connections Ground Water Technical** Workshop, Boise, Grove Convention Center. RE: Agricultural and Water Issues in Idaho, Oregon, and Washington. Speakers Include Senator Mike Crapo; Idaho State Department of Agriculture Director Patrick Takasugi; and the nominated EPA Assistant Administrator Ann Klee. Two Concurrent Water Quality Workshops. For info: Gary Bahr, Idaho State Department of Agriculture, 208/ 332-8597 or email: gbahr@agri.state.id.us or website: www.agwaterqualitynw.org

October 19-20 WA

Environmental Conference Washington, Seattle, Washington State Convention & Trade Center, 800 Convention Place, RE: Emerging Environmental & Policy Issues, Sponsors: Northwest Environmental Business Council & Association of Washington Business. For info: Amy Johnson, 800/ 521-9325, website: www.ecwashington.org

October 19-20 OK 2004 Governor's Water Conference: Oklahoma Water: A Quality of Life, Oklahoma City, Cox Convention. For info: Oklahoma Water Resources Board, 405/ 530-8800, website:

www.owrb.state.ok.us/about/ contact/contactus.php

October 21CAState Water Resources ControlBoard (Cal EPA), Sacramento,1001 I Street (Coastal HearingRoom), 10am. For info: DebbieIrvin, Clerk, 916/ 341-5600, email:dirvin@swrcb.ca.gov, website:www.swrcb.ca.gov/wksmtgs/schedule.html

October 21-22

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Desalinization – Managing Concentrate in the Desert, El Paso, Sponsor EPWU, Greater El Paso Chamber, Council of Engineering. For info: Paula Apodaca, email: papodaca@EPWU.org

October 21-22

Oregon Environmental Quality Commission (EQC) Meeting, Tillamook, Exact Time/Location TBA. Includes Meeting with Oregon Board of Forestry. For info: Mikell O'Mealy, DEQ, Office of the Director, 503/ 229-5301

October 21-22 OR **Oregon Water Resources Commission Meeting, Ontario,** Four Rivers Cultural Center and Museum, Collins Gallery, 676 SW 5th Avenue, RE: Malheur and Owyhee Basins Water Management, 2003 Field Regulating/ Enforcement Activities, Exempt Ground Water Use, District Transfer Rules, Cancellations and Allocation of Conserved Water Rules, Water Right Transfer Rules, Malheur Wildlife Refuge, Instream Leasing Program. For info: Cindy Smith, OWRD, 503/ 986-0876, website:www.wrd.state.or.us

October 21-22

"The Mighty Columbia: Where's the Power?" Seminar, Seattle, The Westin, RE: Development Of Electric Power System in the Columbia River Basin, Fish Issues, Legal, Financial, Public Interest. For info: The Seminar Group, 800/ 574-4852, website: www.theseminargroup.net/ 04rivwa/agenda.htm

October 22

Determining Federal Wetlands Jurisdiction Seminar, San Francisco, UC Berkely Extension. For info: UCB, 510/ 642-4151

October 24-27ORPacific Northwest Clean WaterAssociation (PNCWA) 2004Water Conference, Seaside, Forinfo: website: www.pncwa.org

October 25-26

Utah Water Law, Salt Lake City, Little America Hotel.. For info: CLE International, 800/ 873-7130, website: www.cle.com October 25-26 WA Wetlands In Washington: LSI Annual Conference, Seattle, RE: Wetlands Regulation, Isolated Wetlands - Post SWANCC, Tribal and Environmental Perspectives, Permit Defense; Corps Permitting and the Shellfish Industry; "Hit List" for Enforcement; Mitigation Banking; Critical Areas, and BAS. For info: Law Seminars International, Karen Fox, 206/ 567-4490 or 800/ 854-8009; website: www.clenews.comLSI/04/ 04wetwa.htm.

October 26-29 WA Fifth Annual Northwest Salmonid Recovery Conference, Seattle, Mountaineers Conference Center, 300 Third Avenue W, 8:30am-5pm All Three Days. For info: Erick McWayne, Northwest Environmental Training Center, 206/ 762-1976

October 27-29NMWestern States Water CouncilFall Meeting, 146th CouncilMeeting, Santa Ana Pueblo,Hyatt Regency Tamaya Resort &Spa, 1300 Tuyuna Trail, For info:WSWC, 801/ 561.5300, websitewww.westgov.org/wswc/meetings.html

October 27-29 CA Water Quality Conference,

Ontario, Sponsored by East Valley Water District and the Water Education Foundation. For info: www.eastvalley.org/ Water%20Quality%20Conference/ home-wtr-quality-confinfo.htm

WA

October 28

"The Impact of Climate Change on Pacific Northwest Water Resources" 2004 Annual Conference: American Water Resources Association, Seattle, Seattle Art Museum, 8:30am-5pm, RE: Cause of Climate Change, Impact to Pacific Northwest's Water Resources. For info: Jacque Klug, 425/ 649-7230, website: www.wa-awra.org

October 28-29 CA California Water Law, San Diego, For info: 800/873-7130 or website: www.cle.com

October 28-29 D.C. Clean Water Act: Law and Regulation, ALI-ABA, Washington, DC, Hilton Embassy Row. For info: 800/ 253-6397 or website: www.ali-aba.org

November 1-3 WA Watershed Planning: Approaches, Challenges, and Strategies for Success, Symposium, Stevenson, Skamania Lodge. The North Pacific International Chapter of the American Fisheries Society and the Sustainable Fisheries Foundation Presentation. Ecosystem-Based Watershed Plans; Overcoming Barriers; More. and move toward ecosystem-based watershed management. For info: Sustainable Fisheries Foundation, 250/729-9625

November 1-5ORPacific Fisheries ManagementCouncil Meeting, Portland,Embassy Suites Hotel PortlandAirport, 7900 NE 82nd Avenue,RE: Management of CoastalPelagic Species, Groundfish,Habitat, Highly Migratory Species,Marine Protected Areas, PacificHalibut, and Salmon. Forinfo:Kerry Aden, 866/ 806-7204,website: www.pcouncil.org/events/2004/pfmc1104.html

November 3NMNew Mexico Water Trust BoardMeeting, Albuquerque, CapitolRoom 309, 1:00 pm. For info:Chrissy Salazar (Meeting Coordinator), 505/ 984-1454, email:csalazar@nmfa.net

November 4-5OROregon Water Law – 13thAnnual Conference, Portland,Sponsored by The Seminar Group,RE: Legislative Directions,Klamath Basin, Strategies forTomorrow, Deschutes Basin,Municipalities, HydropowerRelicensing, ESA, & ContestedCases.For info: The Seminar Group, 206/463-4400 or 800/ 574-4852,website:www.theseminargroup.net/

November 8-12AZEnvironmental Health & SafetyChemistry Bootcamp, ScottsdaleFor info: ABS Consulting, 800-769-1199 or website:absconsulting.com/gi

CALENDAR -

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November 8-9 WA Dam Removal: Lessons Learned, Vancouver, Heathman Lodge, Sponsored by The Environmental & Water Resources Institute of ASCE, RE: Various Aspects of Dam Removal, Communication Across Disciplinary Boundaries, Permitting, Economic Impacts, Biological Impacts, Social/Cultural Impacts, Aesthetics/Recreation, and Geomorphologic/Hydrologic Impacts. For info: Katie Gorscak, 703/295-6371, or website: www.ewrinstitute.org/ damremoval04/washington/ wa_register.cfm

November 9-12CAAnnual Conference of theNational Water ResourcesAssociation, San Diego, Hotel delCoronado.. For info: Kris Polly,703/524-1544, email:kpolly@nwra.org,website: www.nwra.org

November 11-13NMRangeNet 2004 Conference,Albuquerque, Hosted by ForestGuardians of Santa Fe, RE: GrazingPermit Buy-Out Legislation,Keynote Speaker CongressmanRaul Grijalva of Arizona. For info:Forest Guardianswebsite:www.fguardians.org/events/event-rangenet_11-04.htm.

November 12OROregon Fish & Wildlife Commission Meeting, Salem, 8 am. Forinfo: Director's Office, 800-720-6339, website: www.dfw.state.or.us

November 15-16DCToxic Substances Control Act(TSCA) Compliance Course,Washington DC. Regulating theManufacture, Distribution & Use ofChemicals. For info: ABSConsulting, 800-769-1199 orwebsite: absconsulting.com/gi

November 16-17OR16th Annual Northwest Environmental Conference & Tradeshow,Portland, Jantzen BeachDoubleTree Hotel. For Government, Industrial, Agricultural,Business and Others. For info:Conference-EWE ME, 244-4294x202; Tradeshow-Cara Bergeson,NEBC, 503/ 227-6361. Website:www.nwec.org

November 16-18IDNorthwest Power and Conserva-
tion Council Meeting, Coeur
d'Alene. For info: NPPC, 800/ 452-
5161, email:info@nwcouncil.org,
website: www.nwppc.org/

November 16-19AZTransboundary Waters Management Symposium, Tucson,
Sponsored by U. of Arizona'sCenter for Sustainability of semi-
Arid Hydrology and Riparian Areas
(SAHRA), RE: Transboundary
Issues of National, State, Tribal and
Other Borders. For info: Rannie Fox
(SAHRA), 520/ 626-6974, email:
rannie@sahra.arizona.edu, website:
www.sahra.arizona.edu/twm/

November 17-19 OR "Growing Healthy Watersheds" OWEB 8th Biennial Conference, Ashland, Windmill Inn, RE: Growing Organizations, Fundraising, Growing Communities, Planning for Watersheds, Restoration. For info: Oregon Watershed Enhancement Board. For info: Bonnie King, 503/ 986-0181, or website: www.oweb.state.or.us/

November 18CAState Water Resources ControlBoard (Cal EPA), Sacramento,1001 I Street (Coastal HearingRoom), 10am. For info: DebbieIrvin, Clerk, 916/ 341-5600, email:dirvin@swrcb.ca.gov, website:www.swrcb.ca.gov/wksmtgs/schedule.html

November 18-19ID21st Annual Water Law andResource Issues Seminar, Boise,Doubletree Riverside, Sponsored byIdaho Water Users Association, RE:Storage, Time for Solutions, ModelRuns, BiOp for Salmon, UAA's,Eco-Based System Management,Prior Appropriation in Idaho, ESALitigation, Nez Perce Settlement,Cutthroat and ESA, Wilderness,Wild & Scenic Rivers, Ethics. Forinfo: IWUA, 208/ 344-6690,website: www.iwua.org

November 18-19

Texas Groundwater 2004: Towards Sustainability, Austin. For info: website: www.txstate.edu/ iiswr/groundwater2004/index.html

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November 19 Colorado Ground Water

Commission Meeting, Denver, 1313 Sherman Street, Rm. 318. For info: Marta Ahrens, 303/ 866-3581, email marta.ahrens@state.co.us, website: http://water.state.co.us/ cgwc/

CO

Nov 30-Dec 3CA"California's Water Workout:Who Will Do the Heavy Lifting?"ACWA Fall Conference &Exhibition, Palm Springs,Wyndam Hotel and ConventionCenter, RE: Water Quality,Attorney, Finance, Groundwaterand Small Agencies Tracks. Forinfo: Ellie Meek, 888/ 666-2292,email: elliem@acwnet.com,website: http://acwanet.com/events/futureconf.asp

December 1NMNew Mexico Water Trust BoardMeeting, Albuquerque, CapitolRoom 309, 1:00 pm. For info:Chrissy Salazar (Meeting Coordina-
tor), 505/ 984-1454, email:csalazar@nmfa.net

December 1-3CAFall Conference and Exhibition,
Association of California Water
Agencies, Palm Springs,
Wyndham Hotel. For info: ACWA,
Ellie Meek, 888/ 666-2292, email:
elliem@acwanet.com

December 2-3IDIdaho Water Resources Board,Boise. For info: IWRB, 208/ 327-7880



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