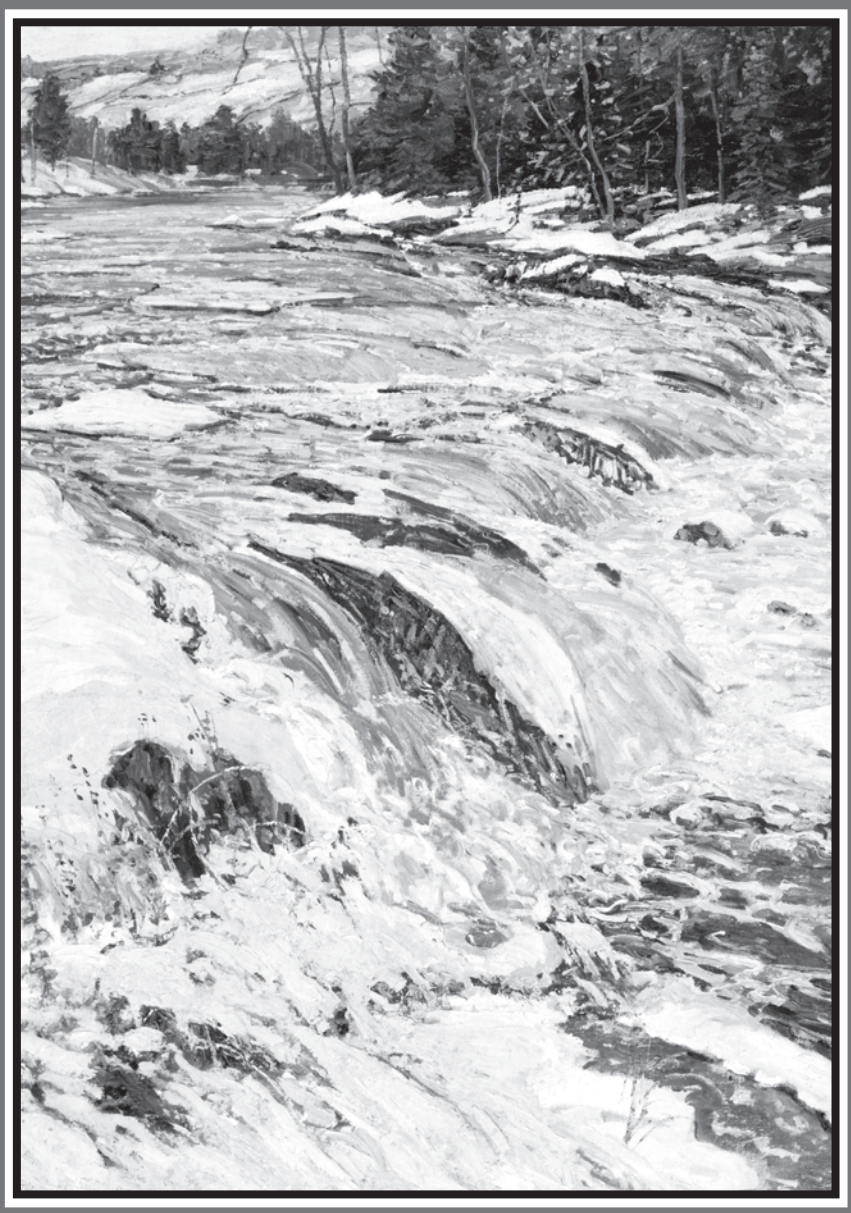
Saving Our Streams

HARNESSING WATER MARKETS



A Practical Guide

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FOREWORD

PERC originally published *Saving Our Streams Through Water Markets: A Practical Guide* by Clay Landry in 1998. The guide provides a comprehensive look at western water markets for environmental flows during 1990 to 1997. For many states, markets for instream flows were in the early stages of development and transactions were few and often cumbersome. Much has changed since then. Some states have adopted or renewed instream flow legislation, new state and private entities have been created for the purpose of improving stream flows and habitat, and federal, state, and private expenditures for instream water rights have increased significantly.

This publication details market activities and legislative changes from 1998 through 2005. Like the earlier guide, this serves as an informative manual for water right holders and all persons and organizations interested in restoring stream flows. It is also intended to help policy makers in the West who are looking for innovative and proven strategies for restoring stream flows.

INTRODUCTION

Litigation and political struggles over water rights in the Klamath basin started anew in 2001, when a federal court ordered irrigation water to farmers in the Klamath River Basin cut off (Meiners and Kosnik 2003) in an attempt to meet the needs of two fish species listed under the Endangered Species Act. After a century of reliance on irrigation water, farmers were angry and suffered financially. Soon after, the National Marine Fisheries Service issued a Biological Opinion in May 2002 that required the Bureau of Reclamation (BOR) to establish a water bank that compensates farmers willing to conserve or forego water use that could then be used to restore instream flows for fish.

"Water marketing can release the creative power of individuals . . . enabling water users to deal with allocation problems specific to their demands and their local environmental constraints." (Anderson and Leal 2001, 90)

Bringing together willing buyers and sellers in a free-market approach to restoring stream flows for environmental purposes is proving to be a successful strategy throughout the West. In one transaction that took place in 2006, the Oregon Water Trust (OWT) and a third-generation ranching family on the Middle Fork of the John Day River entered into what Executive Director Fritz Paulus considers the most significant agreement in the 12-year history of the OWT. For an undisclosed payment from the OWT, ranchers Pat and Hedy Voigt agreed to permanently shorten their irrigation season to leave water instream in late summer when fish

need it most. Beginning July 21 every year, nearly 6.5 million gallons a day that the Voigts would normally have diverted from the middle fork of the John Day River will remain in the river. The increased flows will help to ensure the future of one of the last and largest remaining populations of spring Chinook salmon and summer steelhead in the lower 48 states. "We've had other significant agreements," Paulus said, "but it's the amount of water, the place, and ecological benefit that make this transaction special" (McCune 2006).

This innovative contract is one of many transactions that have occurred since PERC published *Saving Our Streams Through Water Markets: A Practical Guide* in 1998. As population continues to grow in the West, so does the need to remove water from streams to meet increasing consumptive demands. As an alternative to costly and inefficient regulations on water uses, well-defined and exchangeable water rights are proving to be a viable and effective strategy for restoring instream flows for fisheries, wildlife habitat, and aesthetics. Many states, however, have been reluctant to adopt market-based strategies based on clear rules of law. In states with growing water markets, there is room for improvement.

This manual is an update and expansion of the earlier guide to inform practitioners and policy makers of the status of water markets in the West. It begins by providing background on the legal setting of instream flow markets and then details recent market activity in eleven western states. It provides state-by-state practical information for those interested in willing seller/willing buyer transactions, and suggests steps for policy makers who are interested in developing water markets for improved use of this critical resource.

WORKING WITH PRIOR APPROPRIATION

For more than a century, the prior appropriation doctrine[1] has been the underlying principle for water law in western states. A distinct characteristic of the doctrine is that it allocates water use through private property rights. It uses the principle of "first in time, first in right," which means the first person to put water to a beneficial use is granted a right to continue that use without interference from those using it later. Typically, water claims are limited to beneficial uses that require diversions.

When the prior appropriation doctrine was first implemented, most states did not have a system for recording and documenting water rights. Without formal documentation, right holders needed to find ways to verify priority dates. The best evidence of first use was the date the water was physically diverted from the stream. Diversions became an essential requirement for a water right claim; thus, the prior appropriation doctrine rewarded those who were quickest to divert water from rivers and streams.

The development of water rights typically did not include rights for instream uses such as habitat for fish and wildlife, outdoor recreation, and the protection of scenic and aesthetic values and water quality. Over the years, we have come to recognize that in addition to the value

provided by diverting water to grow crops, there are social, economic, and environmental values in increasing instream flows that may be captured in voluntary transactions.

As pressures increased to consider instream flow values during the 1960s and 1970s, some states responded with regulatory approaches, such as minimum stream-flow requirements, and imposed conditions on new appropriations (Anderson 1983; Bolling 1994). Some states tried issuing new water rights for instream flows. But these measures were implemented after much of the available water had already been appropriated by out-of-stream uses. These approaches offer only junior rights with later priority dates that have no effect on established uses. As a result, some states began to look at changing the law to allow for leasing and buying of senior water rights to keep more water instream.

No approach offers as much promise to restoring stream flows as transfers of water through markets. On heavily appropriated streams, acquisition or leasing of senior rights to support instream flows may present the only effective option for protecting flows. Water rights leases or purchases allow flow restoration through voluntary action. Individuals, private organizations, or state and federal agencies interested in protecting instream flows can work with water rights holders who are willing to transfer their water rights to instream use.

Laws and Federal Funds Drive Markets

Each western state has a different experience with water markets. In the Northwest, Oregon became the pioneer in instream flow markets in the late 1980s and remains the most progressive. The state has encouraged the development of markets by passing legislation that

allows parties to participate in the market and buy or lease water rights for instream purposes.

Working with Prior Appropriation

Other states in the Northwest have followed suit. Montana adopted a series of changes to its water laws that facilitate water acquisitions for environmental flows. In 1989, legislation passed permitting the Department of Fish, Wildlife, and Parks (FWP) to lease water on four streams. Legislation passed in 1991, and renewed in 1999, expanded FWP's authority to lease water on streams throughout the state. In 1995, the option to lease water for instream flows was extended to private parties. Then, in 2005, the legislature made permanent the provision that allows an individual, organization, or the government to temporarily lease water for instream flow purposes.

Like Oregon and Montana, Washington has been comparatively successful in adopting legislation and employing markets to restore instream flows. In 1991, the Washington Legislature established the Trust Water Rights program, which allows voluntary water right transfers for instream needs. In 2000, the Washington Department of Ecology (DOE) started a Water Rights Acquisition Program that acquires water rights from willing sellers, primarily for stream flow augmentation to benefit local fisheries. Water law currently prohibits private parties from holding instream flow rights; rather, they must be held in trust by the DOE. Individuals and private groups can purchase water rights and donate them to DOE to be held for instream flows, on an either temporary or permanent basis.

Idaho's approach to markets for environmental flows has been limited, allowing for instream flow leases only through its water banking statutes, which the legislature passed in 1992. To date, only the Idaho Department of Water Resources (IDWR) and the Bureau of Reclamation (BOR) have acquired water for instream flows.

There is a unique combination of government money and flexibility in the laws governing water transactions. For example, Idaho, Montana, Oregon and Washington receive millions of federal dollars for salmon or endangered species conservation. Idaho has received significant federal money for meeting Endangered Species Act (ESA) requirements based on a 1992 biological assessment, requiring the BOR to supply 427,000 acre-feet[2] (af) per year to the Snake River to improve stream flows for salmon. The BOR leases the water through Idaho's water banking system.

In 2000, when the National Marine Fisheries Service issued its Biological Opinion for the operation of dams on the Columbia River, the Bonneville Power Authority (BPA) was required to restore stream flows for endangered species in order to help offset the impact of dams constructed for hydroelectric power generation.[3] The BPA "came up with a novel and effective way of meeting its obligations—it outsourced improvements in instream flows to a number of groups who use markets to supply water. Outsourcing allowed BPA to use a market process to come up with the water it was forced to provide by court order at the least cost and disruption" (Segal 2004, 26).

In 2002, the BPA created the Columbia Basin Water Transactions Program to address declining stream flows and habitat loss in parts of the Northwest. Organizations in Washington, Oregon, Idaho, and western Montana receive funding from the program for instream flow acquisitions and for investments in conservation to preserve and enhance flows for fish and wildlife.[4] The organizations contract with local irrigation districts and landowners to acquire water rights, using long-term and short-term leases, outright purchases, and dry-year options to lease water in certain months. Funds also have been spent to improve irrigation efficiency that can increase the amount of water that remains instream. Since 2003, the program has been involved

in nearly 100 transactions, enhancing instream flows by more than 125,000 af at an adjusted cost (2005) of $6.5 million (National Fish and Wildlife Foundation 2003, 2004, 2005).

Working with Prior Appropriation

Each of the four Northwestern states receives BPA funding, however, each state is unique in who spends the money for instream flows—whether government agencies or private organizations. In contrast, the Rocky Mountain States rely exclusively on state agencies to act in the marketplace. The region has had limited transactions compared to the Pacific Northwest. Conservation groups across the region contend that the public ownership requirement is locking them out of the instream flow market.

In Colorado, there is a robust market for water rights. However, most rights are purchased for urban uses, rather than for environmental flow purposes. Since 1973, the Colorado Water Conservation Board (CWCB) has managed a statewide water acquisition program to preserve and enhance the natural environment, but few funds have been appropriated for the acquisition of water for instream flows. In 2005, Colorado enacted legislation allowing agricultural water rights to be temporarily donated to CWCB for instream use without having to go through a water court, which is the usual transfer process. This law is expected to make the process of getting water instream more efficient.

Similar to Colorado, only state agencies in Utah—the Division of Wildlife Resources and the Division of Parks and Recreation—have the authority to purchase and hold instream flow rights. These agencies have very limited funding. Trout Unlimited (TU) has been an active participant in pushing for legislation that would give private entities the ability to participate in restoring instream flows in Utah. Although proposed bills have failed to pass, the most recent that would have

permitted private groups such as TU to lease water for instream flows for up to 10 years, failed to pass the House by only a narrow margin after receiving unanimous approval from the Senate.

SAVING OUR STREAMS: HARNESSING WATER MARKETS

Wyoming remains the exception in the West when it comes to restoring instream flows through markets. Like Colorado, Utah, Oregon, and Washington, instream flow rights can only be held by the state. But in Wyoming there are no provisions allowing the state or any private entity to lease or buy water rights for instream flows, which limits the state's acquisitions to gifts or voluntary transfers from private water right holders. To date, no water right holder has been willing to donate their rights to the state.

In the Southwest, federal and state agencies are the primary acquirers of water for instream flows, and much of this activity has been to meet interstate or ESA obligations. Changes in legislation that would facilitate broader participation in water markets for environmental flows have been slow to occur.

In 1994 Arizona's Water Protection Fund was established to protect and restore riparian habitat, including funding for improving instream flows. However, almost all of the funding has been directed toward habitat restoration efforts rather than acquisitions to restore instream flows.

In New Mexico, the BOR and state agencies have spent nearly $25 million purchasing land and water rights to improve stream flows for endangered species and to reduce interstate dewatering. A law passed in 2005 created a state Strategic Water Reserve that will allow the state to purchase, lease, or accept donated water rights to help endangered species.

Water market activity for environmental flows in Nevada has been limited to purchases of water rights and land to comply with a 1996 lawsuit settlement in favor of the Pyramid Lake Paiute Tribe against the United States and the cities of Reno and Sparks, Nevada. Over an unspecified period, $24 million is to be spent to improve water quality and instream flows in the Truckee River from the Reno/Sparks area to Pyramid Lake.

Working with Prior Appropriation

In California, the water laws are complex. Although any public or private entity can hold or transfer existing water rights for instream flow purposes, the process can be costly and confusing. Like New Mexico and Utah, California does not allow new appropriations for instream flows—only transfers, temporary or permanent, of existing rights are permitted. Market activity has been primarily limited to short-term lease agreements funded by state and federal agencies. Nevertheless, acquisitions for instream flows have been significant over the past 15 years.

WHO IS ACQUIRING WATER AND AT WHAT PRICE?

Since 1998, the markets for instream flow water rights have grown in most Western states. More than $300 million (adjusted for inflation[5]) have been spent on leases and purchases of water for instream, which is nearly four times the amount spent by private entities and government agencies between 1990 and 1997 (Landry 1998). Total acquisitions of water, whether by lease, purchase or donation, have been on an upward trend as well (see Figure 1, p. 11). Since 1998, nearly six million acre-feet of water has been acquired for instream use, almost two-and-a-half times the amount acquired between 1990 and 1997.

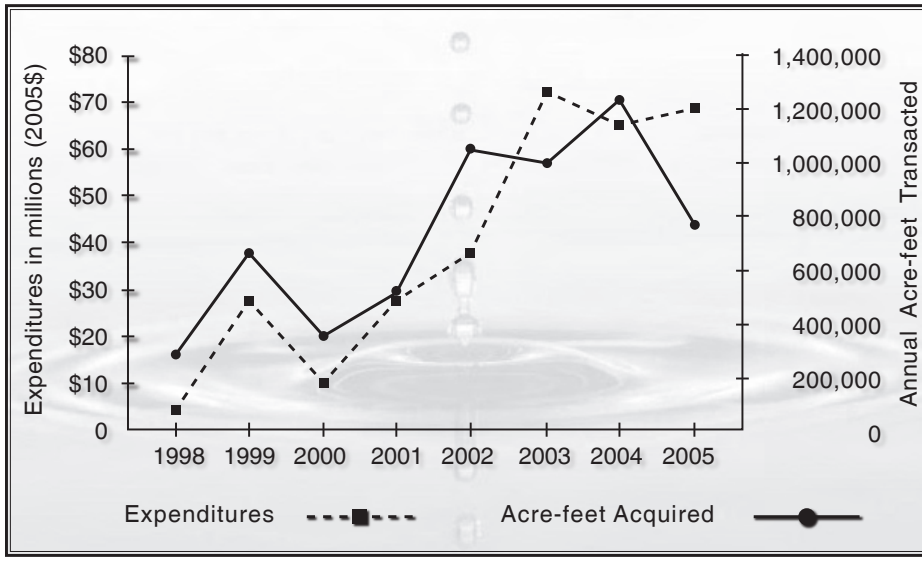
Between 1998 and 2005, instream flow transactions occurred in all western states except Wyoming; the federal government accounted for about half of all expenditures and nearly 60 percent of the total quantity acquired during this time (see Table 1, p. 12). Most of the federal government's acquisition responsibilities have been delegated to the BOR and the BPA. Like the 1990 to 1997 period, much of the activity in instream acquisitions is driven by efforts to restore flows for endangered species. The BOR has ongoing water acquisition programs in Washington, Idaho, Oregon, and California. The BPA has programs in those states and in Montana.

Most water has been acquired through leases, rather than purchases, and both the quantity of water and the total amount spent on leases far exceeded what has been spent to permanently acquire water (see Table 1, p. 12). Between 1998 and 2005, more than four million af were restored to instream flows through leasing, compared to less than 700,000 af through purchases. A similar amount of water was added through donations, primarily in Oregon through the OWT and the Water Resources Department.

Who Is Acquiring Water and at What Price?

Large scale acquisitions by The Nature Conservancy (TNC) and the Bureau of Reclamation help to explain the significant jump in market activity in 1999 (see Figure 1). Combined, nearly 400,000 af were restored to streams to improve flows that year. Market activity

Figure 1:
Acquisitions of Water (1998–2005)



increased markedly between 2000 and 2003. The number of transactions more than tripled to more than 200 in 2003, driven primarily by acquisitions by the OWT, DOE, and Deschutes River Conservancy (DRC). In 2002, the Oregon Water Resources Department received a donation of up to 579,000 af per year—more than doubling af acquisitions for that year. The increased instream flows will benefit aquatic ecosystems and recreational stream use.

Although total expenditures in 2005 remained steady, the amount of water acquired dropped noticeably. The average cost of water per af increased in 2005 primarily due to more purchases, which tend to cost more than leases. The number of leases decreased significantly in 2005.

Table 1:
Market Activity by Aquisition Method (1998–2005)

Expenditures	Federal	State	Private	Total
Lease	$121,254,143	$97,349,912	$3,299,879	$221,903,934
Purchase	30,165,426	36,686,597	17,912,401	84,764,424
Total	$151,419,569	$134,036,509	$21,212,280	$306,668,358
Quantity				
Lease (af)	3,038,169	1,078,049	282,345	4,398,563
Purchase (af)	367,567	86,710	219,401	673,678
Donation (af)	10,000	615,864	58,526	684,390
Total (af)	3,415,736	1,780,623	560,272	5,756,631

State Activity

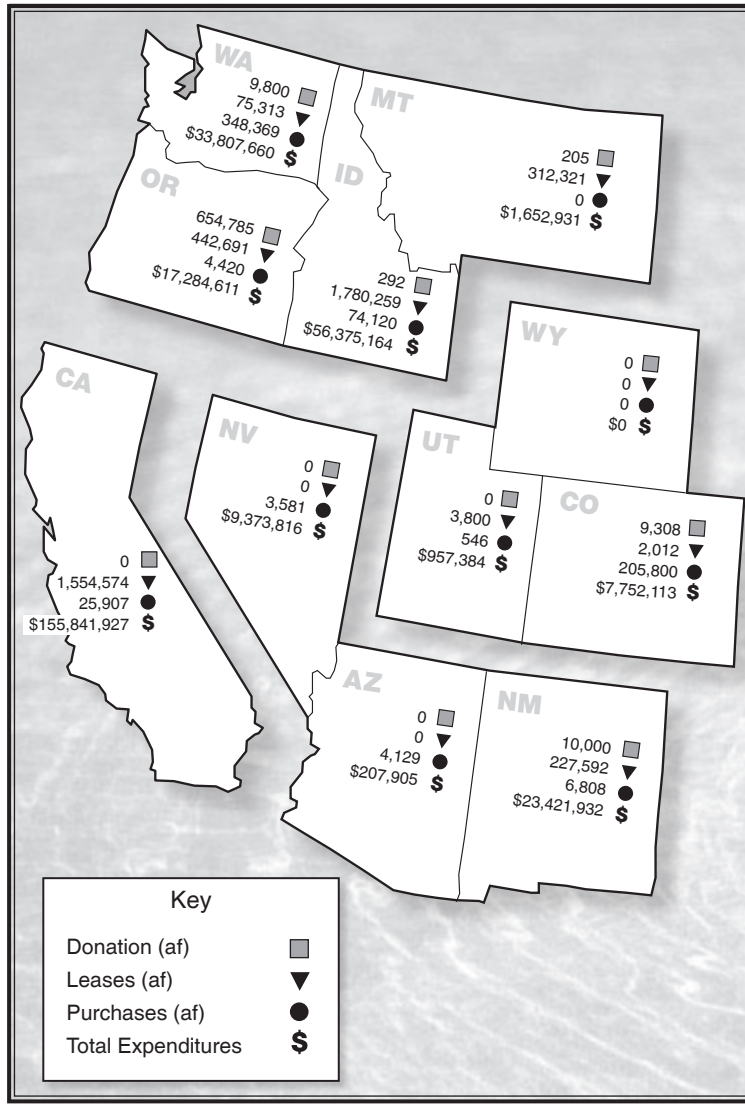
Who Is Acquiring Water and at What Price?

Market activity for instream flows in the western states varied widely in expenditures, method of acquisition (see Figure 2, p. 14), and participants, whether federal or state agencies or private entities. Less than 7 percent of all transactions since 1998 were funded by private parties while federal and state agencies funded an estimated 49 and 44 percent, respectively. Although market activity was fueled primarily by federal and state monies, private organizations made nearly double the number of transactions of federal and state agencies combined.

California, by far, leads the West in expenditures for environmental flows.[6] Between 1998 and 2005, the BOR and California Department of Water Resources spent nearly $156 million for more than 1.5 million af of water. Much of this water was transferred to the state's Environmental Water Account—a component of the CALFED Bay-Delta Program designed to protect native delta fish species while maintaining water reliability. Since 2001, the California Department of Water Resources has spent between $75 and $329 per af to buy water that was transferred to the Environmental Water Account.

Like California, transactions in New Mexico and Idaho were limited to expenditures by federal and state agencies. Between 1998 and 2005, Idaho acquired more than 1.8 million af of water primarily through temporary leases—leading the West in quantity acquired. More than 95 percent of the water restored instream was acquired by the BOR to meet ESA requirements for salmon flows on the Snake River. The IDWR added another 17,000 af between 2003 and 2005, costing more than $380,000. In New Mexico, nearly 250,000 af of water was put instream for fisheries through leases by the BOR and conservation efforts by the Pecos Valley Artesian Conservancy District.

Figure 2:
Western U.S. Water Acquisitions (1998–2005)



Regions as referenced in the text: Northwest (WA, MT, OR, ID); California (CA); Southwest (NV, AZ, NM); Rockies (WY, UT, CO).
No transactions have occurred in WY.

Similar to California, Idaho, and New Mexico, Oregon and Washington received federal funds for instream flows. In Oregon, federal expenditures topped $15 million, restoring nearly 230,000 af to streams in a series of short-term leases. In Washington, much of the more than $30 million in federal dollars was used for outright purchases of water rights and land to increase instream flows as part of the state's Yakima River Basin Water Conservation Program.

Who Is Acquiring Water and at What Price?

State-initiated transactions in Oregon were limited primarily to donations, while in Washington the DOE played an active role in acquiring water for environmental purposes as part of the state's Water Acquisition Program. Under this program, 80 temporary or permanent transfers were obtained between 2000 and 2003, which left 9,304 af of water per year instream (Lovrich et al. 2004). During 2001, which was Washington's second worst drought in history, the DOE was able to lease water rights from 21 farmers to keep water instream (Adelsman 2003). However, while the program had $5.5 million in state and federal funds in July 2003, by 2004 the DOE had spent less than $2 million for water rights. The program has had difficulty finding sellers, and approximately 50 to 80 percent of potential buyers who are interested in the program do not meet its acquisition criteria[7] (Lovrich et al. 2004). The Columbia Basin Water Transaction Program, operating throughout the Northwest, has had similar problems finding willing sellers.[8]

Between 1998 and 2005, private organizations were active participants in acquisitions of instream flows in only five western states. Private expenditures were highest in Colorado and Nevada, although there were fewer than 25 transactions total in those states. In 1999, TNC in Colorado purchased land with approximately 205,000 af of water rights that will help preserve and restore wetlands and instream flows at an inflation adjusted cost of more than $7.5 million—more than 98 percent of Colorado's total private expenditures.

In Nevada, all private transactions were made by Great Basin Land and Water, a group devoted to enhancing the ecological, scenic, historical, and recreational values of land and water in the Great Basin. Under the 1996 Truckee River Water Quality Settlement Agreement, parties are obligated to spend $24 million to purchase water rights to be transferred to the Pyramid Lake Paiute Tribe to augment stream flows for wildlife purposes. The Trust uses a fund financed by the Department of the Interior, Washoe County, and the cities of Reno and Sparks, Nevada, to buy water under the agreement. To date, the Trust has spent more than $9 million for more than 4,000 af of water, with some of the funds spent on land to be resold.

Montana, Oregon, and Washington were the most active states in terms of private entity transactions. More than 500 transactions have occurred in these states since 1998. In Oregon, the DRC and the OWT spent more than $2 million on instream flow leases and water purchases, adding at least 200,000 af to local streams. OWT has worked in cooperation with more than 200 landowners in 96 projects, in which 20 percent of the water is protected under long-term agreements (more than 10 years). About half of the projects involved water that had been donated.[9] In Montana, TU and Montana Water Trust (MWT) acquired more than 57,000 af through lease agreements and donations, spending just over $1.3 million in the past five years. Montana FWP was the other active acquirer of water for instream flows. As part of its water leasing program, FWP has spent more than $260,000 to restore nearly 200,000 af of water to instream flows since 1999. Much of this water was acquired through long-term leases, ensuring that water will remain instream for 5 to 30 years.

Like the water trusts in Montana and Oregon, the Washington Water Trust (WWT) has played a vital role in acquiring water for instream flows. Since 1999, through a number of purchases, leases, and

donations, WWT has added more than 18,000 af of water back into streams, at a cost of nearly $1.5 million.

Who Is Acquiring Water and at What Price?

Market activity in Arizona, Utah, and Wyoming has been light to nonexistent. Only state agencies in Arizona and Utah have made acquisitions for instream flows. In 1999, Pinal County, Arizona, spent more than $200,000 to purchase water rights that restored 4,129 af per year. The purchased water was used to restore flows for fish populations and improve riparian habitat. In Utah, state agencies bought and leased water rights for instream flows to protect endangered species and to aid in the recovery of native fish species. The acquisitions cost less than $1 million and restored 3,800 af in the short term and more than 500 af per year in perpetuity. As mentioned, Wyoming has had no transactions for environmental flows.

The Price of Water

Prices for water vary widely depending on the priority date of the water right, supply and demand, and the length of time for which the water is acquired. As shown in Table 2 (p. 18), lease rates between 1998 and 2005 ranged from 28 cents to $329 per af. In 2001, the California Department of Water Resources paid the highest lease price of $329.30 per af for a one-year, 20,000-af lease for the Environmental Water Account to augment flows for fish protection. In 2005, the OWT restored more than 13,000 af for instream flows as part of a two-year lease agreement for $0.28 an af per year.

Short-term leases less than five years account for most market transactions and average slightly more than $42 per af per year. Leases longer than five years averaged less than $20 per af per year. There were several very long-term (at least 20 years) leases in Washington, Idaho,

Montana, and Colorado to restore instream flows with prices per af averaging less than $12.

Outright water right purchases for instream flows averaged more than four-and-a-half times the cost of leasing water per af. Like leases, purchase prices varied widely from less than $2 to more than $3,000 an af (see Table 2).[10] The most and least expensive transactions occurred in Washington. In 2003, the BOR acquired rights to restore 260,000 af per year to instream flows at a cost of nearly $7.5 million or an adjusted cost of $1.72 per af. In 2000, the Department of Fish and Wildlife acquired land and water rights to protect seven af per year of water in an upland habitat at an adjusted cost of over $3,000 per af.

A common argument against private ownership of instream flows is that it will result in speculative buyers using instream flow rights as a

Table 2:
Market Price and Quantity Summary (1998–2005)

	Average	Minimum	Maximum	Transactions
Purchase Price ($/af) (2005$)	$181.00	$1.72	$3,488.30	76
Lease Price ($/af) (2005$)	$39.93	$0.28	$329.30	848
Purchase Quantity (af/year)	8,870	0.56	260,000	76
Lease Quantity (af/year)	5,107	3.00	330,801	848

way to claim and hold water at little cost only to sell it later for a large profit (Gillilan and Brown 1997). Some argue that speculators will force out current water users, mostly irrigators, through high prices (McKinney 1991). The only slight increases in inflation-adjusted lease and purchase prices for water over the last two decades may be a good indication that widespread speculation in the instream flow sector has not been a factor. Moreover, the biggest players in the market are federal and state agencies and private non-profit organizations, none of which are likely to engage in market speculation.

Who Is Acquiring Water and at What Price?

A MARKET FOR INSTREAM FLOWS

While some states have floundered in using instream flow markets, others have flourished. The creation of state water trusts, private organizations, and new federal and state programs have fueled instream flow transactions. Nearly three decades worth of experience with transactions provides guidance for those interested in restoring instream flows through markets. However, even with increased market activity, there is room for improvement in the laws and regulations governing instream flows, especially in those states where markets have been restrained by political, legal, and even social barriers.

Who Are the Buyers?

The federal and state governments are by far the largest participants in the market, responsible for nearly 90 percent of all expenditures. The BOR has played an important role in California, Idaho, Washington, Oregon, and New Mexico to meet instream flow requirements for endangered species. In California and Idaho, the state agencies charged with managing water, the California Department of Water Resources and the Idaho DWR, respectively, acquire water for instream purposes primarily through short-term leases. Similarly, in New Mexico, Utah, and Colorado, only state agencies have a statutory mechanism that al-

lows them to lease or purchase instream flows. The state of Washington, through the DOE, also acquires significant instream flow rights as part of its water acquisition program.

A Market for Instream Flows

Since 1998, private groups have spent comparatively less than state and federal agencies for instream flows; however, private expenditures and the number of transactions continue to increase. Colorado, Montana, and Washington have private water trusts that were formed following the success of the OWT. In addition to the water trusts, TU has played an important role in efforts to restore stream flows and conserving vital habitat for fisheries in Colorado, Idaho, Montana, and Utah. TU also works cooperatively with state policy makers to draft legislation that facilitates water transactions for instream flows.

In 1996, the DRC in Oregon was created due to "the growing need for a consensus building organization, specifically designed to address concerns about water quantity and quality in the Deschutes River Basin."[11] The DRC is a non-profit corporation that brings together state, federal, tribal, and local government representatives with private stakeholders to carry out basin-wide ecosystem restoration projects, including the acquisition of instream flow rights. In a partnership with local irrigation districts, the DRC helped form the Central Oregon Water Bank. By bringing together willing buyers and sellers, it has helped to restore stream flows while benefiting local irrigation districts.

Finding Willing Sellers

When markets were first developing, connecting willing buyers with willing sellers was often a challenging task. In the early 1990s, OWT would cold call farmers and ranchers, offering to buy water rights to restore locally dewatered streams. Similarly, the BOR in Washington conducted

a telephone campaign to find sellers of water for the Yakima River Basin (Landry 1998, 9). Others would hold public meetings to educate landowners about existing acquisition programs. Increasingly, states and local water districts are providing posting services and bulletin boards to bring together willing buyers and sellers of water rights.

Private conservation groups often maintain close relationships with local landowners, soil and water conservation districts, local and regional watermasters, state fish and wildlife biologists, tribal biologists, and other state, regional, and federal agencies. For groups like OWT, working cooperatively with conservation districts (CD) is proving to be a successful strategy for restoring stream flows in critical areas. For example, in Grant County, Oregon, the local conservation district has partnered with OWT to assist in the development of a project that would allow an irrigator to exchange his current irrigation water right from a tributary that dries up and loses connectivity every year for an irrigation right from the John Day River. As a result, increased flows on the tributary would provide access to miles of summer habitat for juvenile anadromous and resident fish species. "We have had a really good partnership with OWT," said Ken Delano, Grant County soil and water conservation district manager for the past 18 years.[12]

Local CDs work with landowners on an ongoing basis, implementing programs to conserve, protect and develop natural resources, including improvements to instream flows that enhance the effectiveness of stream and habitat restoration efforts. Often CDs share a common goal with groups or agencies looking to acquire water for streams. Familiar with local water supply and water right holders, CDs can be an excellent source for locating potential water right sellers.

With the success of OWT, water trusts have been created in Montana, Colorado, and Washington; Idaho Rivers United is currently

trying to create a state water trust in Idaho. Key aspects of the water trust approach include:

> "1) A clearly articulated prioritization process and/or criteria to identify candidate streams; 2) involvement of board members and others from all facets of the water community; and 3) the application of a 'market-based' approach to acquiring water rights through lease, purchase, or donation only with willing parties." (Charney 2005, 47)

The MWT has had success by providing landowners with flexibility to manage their water rights for instream use while ensuring that such rights are protected. It "develop[s] voluntary, cooperative agreements to compensate landowners for leaving water instream."[13] By actively developing relationships with local communities and landowners in areas targeted for restoration, MWT has been successful in restoring stream flows in critical areas throughout the state.

The WWT locates willing sellers and donors by working cooperatively with farmers, ranchers, irrigation districts, tribes, and public agencies throughout the state. Through water right purchases, leases, and donations from willing water right holders, the trust improves water quality and restores instream flows for critical fish and wildlife habitat. WWT also provides the necessary tools to help owners understand the extent and validity of their water rights and guide them through the change-of-use process that can encourage water conservation and ultimately increase stream flows.

The Biggest Ecological Bang for the Buck

Where and how should the money be spent? For instance, should money be spent to increase flows in large rivers such as the Columbia, Snake, and Colorado? Or should the money be spent on protecting habitat in local streams and tributaries? The answers largely depend on the budget for acquiring instream flows. In practice, the federal government spends millions of dollars throughout the West on large rivers, while private entities generally focus on smaller streams and their tributaries.

Since 1994, the OWT has typically concentrated acquisition efforts on smaller streams where even a small amount of water restored to stream flows can provide significant ecological benefits. However, in 2005, it took a new approach by going after a "bigger bang" project.[14] The Lostine River in northeast Oregon provides critical spawning habitat for coho and spring Chinook salmon. In recent years low stream flows in late summer and early fall have impeded fish migration and adversely impacted populations, contributing to record low fish counts. In a cooperative effort between OWT and 115 ranchers and farmers, adequate streamflows will be maintained to give salmon unimpeded access to spawning grounds high in the Wallowa Mountains. In 2005, more than 800 salmon returned to the Lostine to spawn (Oregon Water Trust 2005). Landowners were compensated for entering into short-term agreements that would ensure adequate stream flows throughout the year. Since then, OWT has been working with landowners and other groups to come up with a more permanent solution to preserve instream flows in the Lostine.

The DRC in Oregon focuses on projects in the Deschutes River Basin, from its tributary headwaters to the Columbia River. The DRC has funded on-farm water conservation, canal piping and lining, point of diversion switches, dam removal, and other projects. The DRC has specific criteria for the projects it funds. For example, the project must

result in on-the-ground water quality/quantity improvements, increased instream flows, and must be monitored for five years.[15]

A Market for Instream Flows

"By the 1990s, almost every stream in the state [Washington] had Chinook, steelhead, or bull trout listed as threatened or endangered under the Endangered Species Act, and federal scientists had identified low stream flows as a 'limiting factor' in salmon recovery. Conflicts over instream versus out-of-stream had reached an all-time high."[16] The WWT provides a market-based solution to low stream flows, concentrating efforts on small streams, where keeping a small amount of water instream can have a significant impact. Restored flows in small streams and tributaries can provide connectivity for fish migration and spawning while maintaining critical riparian habitat for vegetation and wildlife.

In Montana, both TU and MWT work to restore flows on the more than 4,000 miles of streams that are either chronically or periodically dewatered. With funding limits for instream flows, efforts are focused on smaller streams where critical fish habitat is threatened. The MWT has multiple agreements with landowners to lease water "where even a little water makes a big difference for the spawning, rearing, and migration of native fish species" (Montana Water Trust 2005). Similarly, TU entered into an agreement in 2004 with local irrigators to restore just 0.50 cubic feet per second (cfs) to Wasson Creek in western Montana (a tributary of the Blackfoot River). Historically, the lower reaches of Wasson Creek were dewatered for irrigation, isolating pure-strain populations of westslope cutthroat trout. Since the agreement took effect and due to restoration efforts, there has been a significant increase in cutthroat populations.

The Colorado Water Trust works closely with the CWCB, the state's only entity authorized to hold instream flow rights. In addition to looking for water rights to purchase, lease, or accept as donations, the CWT also uses conservation easements to keep land in agriculture. According to

CWT, "the Trust promotes the continued agricultural use of water rights when it will preserve or maintain wetlands, wildlife habitat, open space amenities and other conservation values." The most important criterion of the CWT is whether the water acquisition would "benefit 'water short,' ecologically significant, water-dependent natural environment."[17]

Determining Fair Market Value

Determining and negotiating fair market value for water transactions can be difficult. Each water right is unique in what is written on the certificate and the surface water it represents—no two streams are alike. Often, pricing information on transactions is unavailable or unrecorded, leaving potential buyers and sellers without data to assess the market. As water markets evolve in the West, however, the increasing numbers of transactions and availability of pricing information is helping to reduce uncertainty and the costs of determining water values. Escalating interest in price information is driving the development of new and creative ways to estimate prices.

One way to determine fair market value is to hire a professional who can appraise water rights. However, unlike appraisers of real estate, there are no licensing or professional training requirements for water rights appraisers. Online services such as the WaterBank, which acts as a brokerage and investment-banking house for water rights, can help in some cases. Its website helps connect buyers and sellers of water rights.[18]

WestWater Research provides an appraisal service for water rights, noting that "the value of water varies widely according to location and use, among other factors." Five factors are considered when valuing water rights: transferability, which is affected by the physical and legal attributes of the water right; water availability; water quality; water quantity;

and the characteristics of the water rights. Factors such as priority date, annual quantities, instantaneous flow rates, and current use also affect prices.[19] The priority date is especially important because, under the prior appropriation doctrine, any water right that is junior can be shut off by a more senior water right. Buying or leasing a junior right may cost less, but it may not guarantee the buyer water.

The MWT provides information on its website that assists landowners in determining market value.[20] It discusses four common methods:

- *Sales Comparison Method*—A comparison of the subject water right with similar water rights that have been leased or sold. While this approach is relatively straightforward, the lack of sufficient sales data for comparable water rights may preclude this method for most transactions.

- *Land Price Differential Method*—This compares the value of agricultural land with water rights to land without water rights and is a useful addition to the sales comparison approach in regions where leasing of water rights is relatively uncommon. The difference in value between irrigated and non-irrigated land represents the incremental value attributable to the water rights.

- *Income Capitalization Method*—This method estimates the agricultural value of the water in its current use by determining the contribution of irrigation water to net revenue from agricultural production. It provides a reliable method for determining foregone agriculture revenues resulting from production losses that occur when the available water supply is reduced. This provides an accurate reflection of on-farm conditions by considering the physical characteristics of the land, irrigation

application system, and crop yields under irrigated and non-irrigated conditions.

~ *Replacement Cost Method*—This is a determination of the cost users are willing to pay to develop new water supplies, such as a well. In an efficiently operating market, the price of a surface water right will not exceed the cost of drilling and operating a well, assuming that groundwater is available and of comparable quality. Thus, a water right's value may be limited by the costs of obtaining water from an alternative source.

In its 2005 lease on the Lostine River in Oregon, OWT used the income capitalization method to determine the value of the 15 cfs left instream by the irrigators. OWT hired an expert to provide a crop budget analysis of what the irrigators would lose by not having water late in the season when the fish needed it. This information detailing the cost of the foregone crops was shared with the irrigators who negotiated a deal based on this approach.

Another method is to offer a standing price and wait for willing sellers. The BOR employs this strategy to buy storage water in Idaho. It has a standing offer of $150 per af for stored water that will be reliably delivered (Rigby 1997). Local water banks in Washington and the Deschutes Water Exchange leasing program use a similar approach (Clifford, Landry, and Larsen-Hayden 2004). Similarly, local bulletin boards and websites provide posting services that can help connect sellers with buyers.

Idaho's water banking system consists of a State Bank, a Tribal Bank, and five localized rental pools. Lease prices in the State Bank are determined by the Idaho Water Resource Board; however, the prices are only suggested and not fixed. Separately appointed committees in each rental pool annually get together to determine lease prices which are typically

fixed based on location of use and predicted water supply for that year. Decreased water supplies during drought years and water from productive regions tend to drive up prices. Unlike the State Bank and the rental pools, the Tribal Bank lease prices are determined by market forces, allowing prices to fluctuate with annual supply and demand for water.

Know What You Are Buying or Selling

Water rights and water laws are complex, leading to difficulties and confusion even among savvy buyers and sellers. As a result, most buyers perform a legal evaluation before purchasing a water right. Similarly, sellers need to be familiar with their vested water rights and the process and procedures of transferring rights

Oregon is a paper transfer state, meaning the seller can transfer what is written on his water right, providing there is no damage to other rights holders who depend on return flows. Washington, Colorado, and Montana base the determination of the quantity of a water right on historic use, so the seller can only transfer what he has used historically, again subject to a damage preclusion. Therefore, it is important to verify what portion of the water right can be transferred. States such as Washington also require comprehensive onsite flow measurements and legal searches to verify transferable amounts.

Sellers need to gather specific information about their rights. This includes: the seller's water right claims or certificates, a map of their water rights, historical use verification, measurements of water usage, and information about possible impacts on third parties. A buyer needs this information when performing due diligence; the seller needs to know this information before negotiations or involvement of the state agency that administers water rights.

Lastly, a seller needs to know the local market. Just because water sold for thousands of dollars an af in California, does not mean that a farmer in eastern Washington can expect similar prices. A seller needs to contact a local water trust, a company like WestWater, the BOR (if active in that region), and neighbors to see what has been happening in the local market. Once a seller gathers the information outlined here, then it is time to seek a buyer. A buyer could be a state agency, the federal government, or a private group, such as a water trust, depending on the laws regarding water sales and leasing in the respective state.

Buyers need to conduct legal, on-site, and market due diligence. First, a buyer should ask the seller for copies of water rights claims or certificates. Then, like the seller, a buyer needs to understand the legal requirements regarding water purchases or leases in the state where the transaction occurs. Sometimes, it may be necessary to hire an attorney to be sure of the legal process and requirements.

Once the buyer is comfortable that the water right is good on paper and available for lease or sale, then the buyer needs an on-site inspection to see:

- The water right diversion point;
- The place where the water is applied to beneficial use;
- The type of equipment used for irrigation.

In addition, the buyer should inspect all documentation that would quantify and demonstrate water use. Such information includes:

- Water meter usage records;
- Project or district assessment fees;
- Historical crop harvest records;
- Power bills.

Lastly, the buyer should go through a process similar to the seller, to determine the local market values for water. Buyers may also contact their local conservation districts, state water trusts or conservation groups, local governments, or state agencies for assistance in finding willing sellers.

The Change of Use Process

Most states have a formal approval process to change an existing water right to an instream flow right, although in some states this process can be inefficient and impede local markets. Some critics expressed disdain for the change of use process, which, in Washington, used to take more than six years and sometimes ended up in the relinquishment of part of the water right.

Even though the process can be arduous at times, increasing market interest by individuals, private groups, and state and federal agencies creates incentives for changes that reduce costs and improve transaction efficiencies. Most advocates of instream flow transfers believe that progress can be made to streamline changes to water use. And indeed, improvements have been made, largely due to help from a growing number of organizations that help to facilitate the process.

Typically when a water right is changed from one use to another, such as from an irrigation use to an instream-flow use, the change is reviewed by a state agency. In Arizona and Idaho, applications for change of use must be filed with the state's department of water resources. In Nevada, New Mexico and Utah, applications are handled by the state engineer. In Oregon, change of use applications must be approved by the Water Resources Department. California's water use changes must be approved by the State Water Board. And in Washington all applications are filed with the Department of Ecology. Colorado is unique in that it is the

only western state that does not use a state agency in the adjudication or change of use process; rather all applications must go through an appropriate water court.

Washington law requires that every change to an instream flow use go through a long, risky transfer process. Consequently, many farmers in Washington have been reluctant to take advantage of the state's water acquisition program. One assessment of the program noted that, "many [farmers] are concerned that they stand to lose far more than they might gain, with relinquishment of water rights being their primary fear. Since water is seen as the 'life-blood' of agriculture in the state, relinquishment or loss of water is seen as a direct threat to their ability to farm" (Lovrich et al. 2004,14). Despite the risky process, transactions have occurred and the DOE is striving to make the process more efficient.

The change of use process in Washington involves filing an "Application to Enter a Water Right into the Trust Water Right Program" with the DOE. Then, the DOE must provide public notice to other water users of the potential change in use. Next, the DOE does an "extent and validity" analysis, which quantifies the water right, limiting the water right to the quantity of water that has been used in the last five years. During the quantification process the DOE may determine that a portion of the water right has been relinquished, meaning, because of voluntary non-use of water, the water right holder may lose a portion of their water right. It is this risk that often deters water right holders from willingly entering into the change of use or transfer process—whether for instream or other uses.

An example of innovative change in the transfer process is legislation passed by Colorado in 2005 which allows agricultural water rights to be donated to an instream use on a temporary basis without having to go through the water court process. Bypassing the water court in these circumstances should alleviate concern from some agricultural

producers about the change of use process negatively impacting their water rights.

Purchase, Lease, or Donation

Determining which acquisition option is best depends on many circumstances. The sellers' needs vary depending on whether they want cash, help constructing conservation projects, or are willing to donate to the stream and receive tax benefits. Water rights leases provide flexibility, purchases offer permanency, and donations may provide tax relief.

Purchases of water rights can provide a permanent solution to restoring environmental flows to streams. However, conservation groups and federal and state agencies often find it difficult to overcome many of the barriers that inhibit outright purchases of water for instream use. Purchased rights are comparatively more expensive than short-term contracts, generally limiting transactions to well-funded state or federal agencies. Transaction costs for purchases or permanent transfer of water rights to instream use can be much higher than temporary or short-term contracts and may take years to complete. And finally, many water right holders throughout the West are reluctant to sell their consumptive rights because of "concern about what the neighbors would think, to implacable antipathy to the concept" (Malloch 2005, 9). Legislative changes and increasing confidence and experience in water marketing should improve the efficiency of purchase transactions and reduce the associated costs.

Many of the barriers to instream flow purchases can be overcome through lease agreements which temporarily convert water to instream use. At the end of the lease term, the water rights automatically convert back to their previous use, or often the lease can be renewed. There are a number of leasing options—both short and long term—that offer flexibil-

ity to willing buyers and sellers while effectively restoring stream flows. The most popular are short-term leases—typically annual/seasonal—that compensate water right holders for temporary use of their water. In many states landowners can lease a portion of their water right for instream flows, creating a financial incentive for practices that conserve water. Some conservationists are still concerned that leases are only short-term fixes to a long-term problem. Yet, in states that permit leasing, it has proven to be a successful strategy for keeping water instream. Many sellers seem to be more comfortable with leasing rather than outright sales. By leasing, water right holders have a chance to experiment with water markets without relinquishing their rights, while acquirers build important relationships that may lead to longer term contracts and improved stream flows.

Water marketers and policy makers have developed innovative ways of maintaining adequate stream flows during critical periods such as drought years and late in the season when instream flows are often lowest. Dry-year options are lease agreements that become active only during drought years. In years of adequate precipitation and stream flows, water use is at the discretion of the water right holder, but left instream during low-flow years. A split-season lease allows a water right holder to use a portion of their right for consumptive uses—typically early in the season for irrigation—while leaving the remaining portion instream in late summer and fall when fish and wildlife need it most.

Donations are a viable and low-cost way to obtain water. There are costs associated with donations, usually in the form of legal and transfer fees, though these costs are often paid by organizations receiving the water rights. Various factors motivate water rights holders to donate rights for instream use (Barkley 1997), including potential tax benefits. Colorado relies almost exclusively on donations for instream flows and nearly half of OWT transactions involve donations.

A STATE-BY-STATE REVIEW

Arizona

In 1941, the Arizona legislature broadened the definition of beneficial use to include "wildlife, including fish," and in 1962 added "recreation"; however, it was not clear until a 1976 court ruling that water could be appropriated for instream uses (*McClellan v. Jantzen 1976*). In 1978, the Arizona Department of Water Resources (ADWR) granted TNC a permit to that allowed water to be left instream for beneficial use (the first in the state) on Ramsey & O'Donnell Creeks (The Nature Conservancy 2006). In 1986, an instream flow task force was organized to assist the ADWR in developing application guidelines for water right holders interested in appropriating water for the benefit of stream flows. Since then there has been little effort to encourage greater participation by private entities or facilitate the development of viable markets for instream flows.

Arizona's definition of an instream flow right is a "surface water right that remains in-situ or 'in-stream,' is not physically diverted or consumptively used, and is for maintaining the flow of water necessary to preserve wildlife, including fish and/or recreation" (Arizona Department of Water Resources 2005). The appropriation process for a new instream

flow water right involves a series of administrative steps. An applicant must first apply for a permit to appropriate public water for instream flow purposes. Once the application is approved the applicant must provide one year of stream flow measurement data before the ADWR issues a permit. The permit holder then has four years to demonstrate that the water left instream is put to a beneficial use consistent with the terms of the permit. Only then does the ADWR issue a certificate of water right. The new appropriated water right has a priority date that reflects the date of the application and is senior (superior) to any surface rights issued at a later date and junior to all with an earlier priority date (Arizona Department of Water Resources 2005).

Arizona law provides for a hierarchy of uses if there are two or more pending applications to appropriate water and the water supply is not sufficient for all applications (Covell 1998). Instream flow use for wildlife and recreation ranks fourth behind domestic water use, irrigation and stock watering, and power and mining.[21]

Anyone can apply for a new appropriation right for instream flows; however, private entities may not purchase or lease water rights for instream purposes. Pursuant to Arizona law, a "water right may be transferred to the state or its political subdivisions for use for recreational and wildlife purposes, including fish, without losing the priority date."[22] However, there are strong provisions precluding severing the water from the land.[23] One strategy that is showing some promise is the acquisition and fallowing of irrigated lands where water withdrawals or groundwater pumping has impacted stream flows. TNC has purchased approximately 40 percent of the agricultural lands in the lower San Pedro sub-basin. The lands are then fallowed and placed in conservation easements that restrict future development and water use of the lands before being resold (Boyd 2003).

In 1994, Arizona established the Arizona Water Protection Fund, a state grant program that provides funds for river and stream restoration projects including water right acquisitions. The distribution of funds is authorized by statute, which provides "an annual source of funds for the development and implementation of measures to protect water of sufficient quality and quantity to maintain, enhance and restore rivers and streams and associated riparian habitats, including fish and wildlife resources that are dependent on these important habitats consistent with existing water law and water rights."[24]

Any person, entity, state or federal agency, or a political subdivision may submit a grant requesting these funds for the improvement of rivers and riparian habitat throughout the state. Through fiscal year 2005, the Fund awarded 161 grants, providing about $30 million for the benefit of more than 1,326 miles of rivers and streams throughout Arizona (Arizona Water Protection Fund 2004–2005). Although most of the funds have been used for riparian restoration, watershed improvements and applied research, the Fund, in 1999, provided nearly $150,000 to purchase 3,500 af to maintain water levels for wildlife (*Water Strategist* 1999).

California

Like New Mexico and Utah, California does not allow new appropriations for instream flows. However, in 1991, California modified its water code to allow for water right holders to change the use of their water right to instream purposes.[25] Rights may be bought or leased by other entities thus permitting the market exchange of instream flows rights. The statute was again amended in 1999 to allow "any person entitled to the use of water, whether based on an appropriative, a riparian, or other right" to file a petition for a change "for the purposes of

preserving or enhancing wetlands habitat, fish and wildlife resources, or recreation" with the State Water Resources Control Board.[26]

The change process allowing for instream flows does not include water that is mandated to be left instream due to federal, state or local regulatory requirements governing water quantity, water quality, instream flows, fish and wildlife, wetlands, recreation or other instream beneficial uses.[27] Only a few petitions for change under the instream flow statute have been approved. Even though this statute has not been used that often, the state and federal government both have devised mechanisms that allow them to use market transactions to keep water instream.

The state and federal governments have realized that the cost to develop federal reclamation projects, such as the Central Valley Project (CVP), which has cost $43.6 billion since it began in the 1930s, is much more expensive than the cost to relocate water from other uses (Neuman 2004). "A California water district compared cost estimates of $1,800 to $2,700 an acre-foot for desalinization and $1,300 an acre-foot for recycling against estimates of $300 an acre-foot for water banking and less than $300 an acre-foot for long-term water transfers," explained Professor Janet C. Neuman, a past president of the OWT (Neuman 2004, 448).

In 1992, Congress passed the Central Valley Project Improvement Act (CVPIA), which modified the priorities for managing water in the CVP to include fish and wildlife protection, restoration, and enhancement as project purposes having equal authority with agricultural, municipal or industrial uses (U.S. Department of Interior 2003). To meet the needs of CVPIA, the U. S. Department of Interior developed a water acquisition program as a joint project with the BOR and the U.S. Fish and Wildlife Service. This program is funded by the Central Valley Project

Restoration Fund and by federal energy and water appropriations.

In addition to the CVPIA, there are is also the water acquisition program operated by CALFED[28], the Environmental Water Account (EWA), and the state's proposed drought planning program. EWA provides a water accounting and budgeting system that allows the state and federal fishery agencies to protect fish flows. This program helps the federal agencies meet incidental take provisions required by the ESA and provides a system to meet flow needs without shutting down agricultural and other uses of water. The EWA's first year of operation was 2001. Public funds are used to finance the program in which EWA pays to obtain short-term transfers of water.

A workgroup that prepared a report for the California State Water Resources Control Board stated that there was concern over the loss of agricultural lands due to transferring the water to other uses via market exchanges:

> Indeed, the basic provision of water for agricultural purposes at subsidized rates is a reflection of the high social value placed on agricultural water in our society. The purpose of these dedications may be compromised if the water does not stay with the intended use. Farmlands, such as rice lands in the Sacramento Valley and Delta corn lands, support large populations of wildlife and waterfowl. Some of these farmlands are otherwise protected and some are not. If owners of these lands are encouraged to sell their water, these environmental benefits may be lost (Water Transfer Workgroup 2002, 6–7).

In the past, some land was fallowed due to water transfers to urban use in the southern part of the state.[29] However, this caused some concern

from those in agriculture and this type of transfer may not occur again for some time due to the political fallout.[30]

Irrespective of California's comparatively complicated water laws and mechanisms for restoring instream flows, its state and federal water acquisitions have led the West in total expenditures since 1998. For example, in 2003, the Department of Water Resources restored 214,000 af of water to the Bay-Delta ecosystem for the long-term survival of fish. The transaction required agreements with four separate water agencies at a cost of more than $32 million—the most expensive transaction to take place in the West.

Colorado

In 1973, the Colorado Legislature passed a statute allowing the state to appropriate water for instream flows.[31] This legislation did not go as far as some had hoped, because there had been much political turmoil surrounding the expansion of the definition of "beneficial use" to include instream flows (Covell 1998). Then in 1986, the legislature vested exclusive authority to the Colorado Water Conservation Board (CWCB) to appropriate or acquire water for instream flow purchases.[32] This authority is limited to the amount of water necessary to "preserve the natural environment to a reasonable degree."[33] In practice, the CWCB has acquired water not only for cold and warm water fisheries, but to maintain wetland habitat for waterfowl, protection of unique species of frogs and salamanders, and even protect unique hydrologic and geologic features (Merriman and Janicki 2005).

The CWCB may buy, lease, or receive a water right by bequest or donation for instream flow purposes, so long as the instream flow does not require the removal of existing infrastructure or negatively impact another water right.[34] Existing water rights must go through

the state's transfer proceeding prior to being used as instream flows.[35] Like most other states that recognize instream flows as a beneficial use, rights transferred or changed to instream flows maintain their priority date.

In 2002, the legislature passed a law that expanded the CWCB's authority to acquire water not only for the maintenance of minimum stream flows necessary to "preserve the natural environment to a reasonable degree" but also "to improve the natural environment" as the Board deems appropriate.[36] This legislation set the stage for a 2005 court ruling (*City of Central v. Colorado Water Conservation Board 2005*) confirming CWCB's ability to protect its instream flow rights against more junior rights that involved diversions for consumptive uses. Prior to this case there was some uncertainty as to whether a consumptive right was equal to a non-consumptive (instream) right.

In 2005, the legislature passed a statute that allows agricultural water rights to be loaned to the CWCB on a temporary basis (not to exceed 120 days per year) for use as instream flows pursuant to a decreed instream flow water right held by the CWCB.[37] Pursuant to this legislation, the CWCB does not have to go through the water court transfer approval process that is required for other transfers.[38]

The CWCB has never received or sought much money—either through appropriation or donation—to purchase water rights, which typically cost between $3,000 and $20,000 per af depending on whether the water right is only available in the summer or is available year round.[39] Therefore, instream flow purchases have not kept up with the purchases of water for municipal use. In the next ten years, according to Tom Cech, director of the Central Colorado Water Conservancy District, municipalities will spend up to $5 billion to acquire water rights from agriculture in order to meet the increasing need for urban

water rights as population growth continues.[40] The CWCB is working to make some state money available for purchases or leases of water for instream flows and has been actively working with TU to find more willing donors.[41]

The state applies a historical use measurement to limit the amount of water that can be transferred. This means that if a farmer had a decreed right for 8 cfs but his historical use was only 5 cfs, then only 5 cfs could be transferred or sold. This process is one way that Colorado protects junior and downstream users from any injury caused by water transactions.

Unintentionally, Colorado cities and water districts have actually increased instream flows in many stream segments due to their purchase of upstream irrigation water rights for downstream municipal use. The opposite also happens when farmers on the plains sell their water to be diverted upstream for a municipality, which results in less instream flow.

Due to the fact that the state has to hold ownership of instream water rights, "a true market for instream flows for all practical purposes has been outlawed in Colorado," according to J. Craig Green, P.E.[42] He said the state should allow individuals or organizations to own instream flow rights because "a system based on protecting private property rights is better able to deal with the diversity and complexity of competing water rights than any mandate that would make new instream flows suddenly senior to existing water rights."[43] Even though private entities cannot hold instream water rights they can acquire consumptive rights and donate them to the CWCB for instream rights.

In 2001, the CWT was formed to meet the increasing demand of Coloradans to acquire water for the conservation of Colorado's

natural heritage. The CWT completed its first donation to the CWCB in 2005, restoring nearly 800 af/yr of water to the Boulder Creek and Blue Rivers in Summit County (*Water Strategist* 2005). Since 1973, there have been 21 donations and leases to the CWCB for instream flows in Colorado. "The lack of donations is due to the fact that most water users do not want to donate their water rights to a state agency," said Melinda Kassen of Trout Unlimited.[44] Trout Unlimited has been active in Colorado since 1998, it has defeated water diversion and storage projects that would diminish river flows, and has helped to pass several pieces of legislation expanding the state instream flow program.

Idaho

In 1978 the Idaho Legislature passed legislation to recognize instream flows as a beneficial use.[45] Idaho law allows the Idaho Water Resources Board (IWRB) to file applications for minimum flows to protect fish and wildlife habitat.[46] An individual, association, county, or state or federal agency may also request that the IWRB consider filing an application to appropriate a new water right for minimum flows.[47] Before an application is sent to the legislature for approval, the IWRB must determine that a) the proposed minimum stream flows will not adversely affect current water right holders; b) flows are in the public, as opposed to private, interest; c) the flows are necessary for the preservation of fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, navigation, transportation, or water quality of the stream; and d) that the proposed minimum flows can be maintained over time.[48]

These minimum stream flow settings can only be held by the IWRB and are given a priority date equal to the initial application

date, which means these rights are junior rights to existing beneficial uses of the stream with earlier priority dates.[49] The process to set minimum stream flows is a mechanism to create a new water right; however, the law does not allow other water rights to be transferred to meet minimum flow requirements.

In addition to state recognition of minimum stream flows, the state's water banking statutes permit the BOR to lease up to 487,000 af annually in the Snake River.[50] Since 1993, the BOR has been compensating water right holders for leased water (through the state water banks) to augment flows for salmon. The legislature also allows the Water Resources Board, which operates the water bank, to appoint local committees that can facilitate the rental of stored water.[51] The law also allows water users neighboring where the water is being leased from to petition the lease to the director of the Department of Water Resources.

Currently, Idaho, unlike its neighbors of Oregon, Washington and Montana, does not allow for instream flow purchases except in the water banking program. Idaho Rivers United is interested in developing and passing legislation in the future that would allow transfers to instream flow uses without the loss of the priority date.[52] The director of the Idaho Water Project explained that even though irrigation was extremely important to the economic lifeblood of Idaho and the state had been reluctant to follow the other states in water markets for instream flows, "Idaho is rapidly becoming a test state for innovative water deals that ultimately help protect fish and wildlife." [53] A couple of examples to illustrate these innovative water deals include:

- While water transactions within the state's water banking system have been primarily limited to agricultural transac-

tions, leases to augment flows for salmon and steelhead in the lower Snake River have occurred in recent years. In 2001, the state extended the rental pool and water bank concepts to the Lemhi River in the Upper Salmon River basin to provide more fish-friendly flows.

- The Nez Perce Snake River Basin Adjudication Settlement Agreement, which was formally approved by both federal and state legislation in 2005, provides flow augmentation and extended the Lemhi River model to other important salmon, steelhead, and resident trout streams in the Salmon and Clearwater River drainages.

On the Henry's Fork and South Fork of the Snake, irrigators have voluntarily agreed to modify flows from dams to protect the rivers' fisheries, and irrigators on the Henry's Fork are signatories to a formal drought response plan to protect the fishery. TU opened its Idaho Water Office in 2003, and since that time, it has focused on both water policy and on-the-ground activities. "Working directly and collaboratively with landowners and federal and state resource agencies to develop and implement stream flow restoration strategies is an important part of the TU Idaho water program."[54] Even with TU's efforts, more than 40 transactions in Idaho all have been by the state or federal government and Idaho still does not allow private groups to use the market to increase instream flows.

Montana

Montana first passed legislation in 1969 that allowed the Montana Fish and Game Commission (renamed the Montana Fish Wildlife & Parks Commission in 1991) to appropriate instream flows to preserve

fish and wildlife habitat on a limited number of trout streams.[55] The Montana Water Use Act of 1973 extended state and federal authorization to reserve water for instream uses on any stream throughout the state.[56] This law allows the state, any political subdivision or agency of the state, or a federal agency to apply to the Department of Natural Resources and Conservation (DNRC) to acquire a water reservation to maintain an instream flow.[57]

To date, more than 360 instream flow reservations have been established in Montana.[58] After an application for an instream flow right reservation is filed, the DNRC processes it the same way as applications for consumptive uses.[59] The applicant must establish the amount of water needed, the need for the reservation, and the purpose of the reservation, as well as establishing that the reservation is in the public interest.[60] If an instream flow reservation is granted, it is subject to review every ten years.[61] The DNRC review may result in modification or elimination if the DNRC determines that the original purpose or need for the reservation is no longer being met.[62]

In addition to the statutory system allowing the reservation or temporary appropriation of an instream flow, Montana has developed a statutory system to allow water leasing. In 1989, the legislature passed a pilot leasing program that allowed the Montana Department of Fish, Wildlife & Parks to lease water rights on four streams.[63] Between 1989 and 1999, the Department completed ten leases of water rights for instream flows. In 1999, the program was renewed for an additional ten years.[64]

Conservation groups started seeking changes to the water code in the early 1990s. Initially, there was opposition from those who believed such legislation would weaken water rights. In 1995, the conservation and agricultural communities worked together to "develop

a private leasing option that was workable for both interests" (Trout Unlimited 2005). Consequently, the legislature passed a law that allows private groups or individuals to lease water for instream needs.[65] In 2005, legislation made permanent the ability for an individual, an organization, or the government to temporarily lease water rights for instream flows.[66]

In addition to the water reservation and water leasing program, Montana law also allows water right holders, who employ conservation methods and have more water than is necessary to meet consumptive use, to donate or lease the salvaged water for instream use.[67]

The Montana Water Trust was formed in 2001 with the mission of working cooperartively with farmers, ranchers, and other landowners to develop incentive-based agreements that benefit landowners, stream flows, and communities. Currently, MWT has "18 agreements that restore 63 cubic feet/second—over 43 million gallons of water per day—to rivers and streams in seven of Montana's watersheds."[68] "In each case, irrigators have protected their water rights from abandonment, kept ownership of their water rights, and also put water back into streams," according to TU (Trout Unlimited 2005, 15). Like MWT, TU has been cultivating relationships with landowners and key leaders in Montana's agricultural and water management communities since 1998 to help restore stream flows in critical habitat throughout the state.

The executive director of the MWT, John Ferguson, said he predicts that Montana's leasing program will grow as more people see the possibility for a win-win solution to the water issue. He stated, "[t]hese projects are successful for one reason: people see restoration as a value rather than a mandate" (*Land & Water* 2005).

Nevada

Nevada has been slow to recognize instream flow as a beneficial use. There has been no action by the legislature on this issue. However, in 1988 the courts found a common law right to an instream water right for recreational use (*State v. Morros 1988*). Also, the Nevada Attorney General released an opinion contending that Nevada law permits legal protection for instream flows for recreation, fish and wildlife, or ecological purposes.[69] Although the Attorney General opined in favor of instream flows, there is no legal recognition of an instream flow water right in the statutes. No portion of the code outlines the process to establish an instream flow water right. Therefore, in Nevada an instream flow right is a common law right because it evolved in case law and not through statutory law.

Consequently, since the law in Nevada is evolving through limited common law cases, there is not as much certainty for a market as in other states where the legislature have specifically addressed and established instream flow rights. A Nevada Natural Resources Status Report states that, "[r]elatively few water rights, however, have been acquired for instream uses. Ironically, urban population growth and economic growth appears to correspond with heightened public interest in improving instream water supplies" (Nevada Natural Resources 2002).

Even though there are no statutes approving instream flow markets, a market for such rights first surfaced in 1990 when TNC spent $1.5 million to purchase water for the Stillwater Refuge. Then in the late 1990s, the U.S. Fish and Wildlife Service took over the responsibility of purchasing water for the refuge. Additionally, after a settlement agreement to reach water quality standards for the Truckee River in 1996, parties to the settlement have been obligated to pay $24 million for water rights to be transferred to augment stream flows for wildlife purposes.

The Status Report states, "[m]ost of the water planning and acquisition activity has occurred in the Truckee and Carson River basins to improve water quality, stream flow conditions, fisheries at Pyramid Lake, and wetlands in Lahontan Valley. Water rights have been acquired for some state wildlife management areas" (Nevada Natural Resources 2002). Water transactions for instream flows have been limited to acquisitions by the Great Basin Land and Water Trust to meet the settlement agreements to restore water quality in the Truckee River.

New Mexico

Similar to Nevada, New Mexico has been slow to adopt legislation that would facilitate a market for instream flows. In the late1990s New Mexico passed legislation that allowed water banking; however, that law sunsetted in 2005, which effectively repealed it. In 2005, legislation created and funded a Strategic Water Reserve[70] that allows the New Mexico Interstate Stream Commission to lease or purchase water rights, and to accept donations of water rights, to help endangered species and their habitat, as well as to assist the state and water users in complying with interstate stream compacts and court decrees. Although the state does not legislatively recognize instream flows as a beneficial use,[71] water acquisitions have occurred that improve stream flows for fish and wildlife habitat.

Even though the legislature has not acted, pursuant to the State Engineer's broad authority to issue permits for water rights that are consistent with the "public welfare," the New Mexico Attorney General issued an opinion concluding that the State Engineer can protect instream flows for "recreational, fish or wildlife, or ecological purposes."[72] The opinion is carefully reasoned and addresses the ability to transfer a current consumptive water right to an instream flow use.[73] It outlines the Attorney

General's belief that a court would recognize that an instream flow is a beneficial use of water although there is no case law or statute that settles the issue.[74] Hence, except for Strategic Water Reserve, an instream flow right would be derived from the common law—similar to Nevada.

To date, no existing water rights have been transferred to instream flow use. Some temporary and emergency permits were granted for fish and wildlife purposes related to the Endangered Species Act and interstate compact issues. These permits account for the estimated 20 transactions that have occurred since 1998. Also, one commentator stated, "the senior water rights that would be the most effective candidates for change to instream flow uses may simply be too costly to devote to such uses, given the fully-appropriated status of New Mexico's rivers and streams" (Covell 1998).

Oregon

Oregon first passed instream flow legislation in 1955 that allowed the state, through an administrative process, to set minimum flows to protect salmon during spawning season. Then, in 1987, the Oregon Legislature passed a law that allowed individuals or organizations to purchase, lease, or receive as a gift any instream flow rights that are then held in trust by Oregon Water Resources Department.[75] Also, the Oregon Department of Fish and Wildlife, Department of Environmental Quality, and State Parks and Recreation Department can all apply for a new appropriation of water rights for instream flow purposes, which are then held in trust by the Oregon Water Resources Department.[76]

Oregon is different than the other western states because it allows the transfer of paper water (the amount of water listed on the certificate) instead of focusing on a measurement of historic use, as Colorado does,

or on the measurement of the amount of water put to beneficial use, as in Washington. Allowing the transfer of paper water, instead of the state heavily scrutinizing transfers to determine the amount of available water, has likely contributed to Oregon's success in restoring instream flows. The state still determines whether the transfer will negatively impact other water rights holders, as do the other states.

The success of Oregon's water markets is evidenced by the accomplishments of the state's private conservation groups including Oregon Water Trust and Deschutes River Conservancy. Since 1994, OWT has protected close to 53,000 af for instream, benefiting nearly 900 miles of streams. These projects represent cooperation with more than 200 landowners (Oregon Water Trust 2006). A rancher in Oregon said he decided to work with OWT because, "I give OWT a lot of credit. They came to us with an attitude of wanting to help and they displayed a great deal of respect for agriculture" (Oreogn Water Trust 2005, 1).

Former president of OWT, Janet C. Neuman, explains that OWT has developed a niche market:

> Realtors say that the most important thing about real estate is "location, location, location." Because water and water rights are a species of real property, transactions involving water rights take place in highly localized and individualized markets. The impacts of water markets vary widely from place to place and case to case, depending on a variety of factors, including the identity of the buyers and sellers, the purpose and scope of the transactions, and the specific geographic location. (Neuman 2004, 434)

After more than ten years and the longest running program, Neuman stated that, from her experience, the benefits of acquiring water in

the market to restore instream flows outweigh the negatives. The minuses have included a more focused opposition to instream flow leasing in the political arena, some failed litigation, and administrative actions to stop instream flow transactions. "Water marketing is here to stay, as one of many tools of the trade for accomplishing current and future water management goals," (Neuman 2004, 484). At one time, private groups such as OWT argued that ownership of the water rights was essential to the success of their efforts; however, private groups have been very active in Oregon and seem to no longer view lack of ownership as a critical factor for successful markets for instream flows.

Since 1996, the DRC has played a pivotal role in Oregon's markets for instream flows. Working with a diverse group of state, federal, tribal, and private entities, the DRC conducts habitat restoration and monitoring projects, implements water conservation strategies, and purchases and leases water rights for instream flows. In addition, it participates in two of the state's water banks that help to bring willing buyers and sellers together and improve flows for the environment.

Utah

Utah first passed legislation in 1986 allowing the Utah Division of Water Resources (UDWR) and the Utah Division of Parks and Recreation (UDPR) to file for a change of perfected water right to an instream flow use.[76] Utah law does not allow anyone to appropriate a new water right for instream flows. To acquire the rights, the UDWR or the UDPR can purchase or lease the water right, so long as funds are specifically appropriated by the legislature for water rights purchases.[78] The agencies can also receive water rights through donations. Since the law was passed more than twenty years ago, the statute has had little value as the UDWR only holds several instream flow rights on streams while the UDPR holds

no instream flow rights (Hawkes 2006). There were only two transactions in Utah for instream flows between 1998 and 2005.

A representative of Trout Unlimited stated, "[w]e need a system that recognizes the economic and non-economic benefits of water left in streams, and that provides voluntary, free-market mechanisms to protect these uses" (Hawkes 2006, 2). Working with water lawyers and water users around the state, TU has prepared draft legislation that would allow private non-profit groups as well as political subdivisions of the state to purchase or lease water for instream flows. The legislature passed a bill in 2006 that authorizes a legislative water issues task force that "shall review and may make recommendations" on instream flows, which is listed as the task force's number one agenda issue (Hawkes 2006, 4).

As TU continues to work with landowners and policy makers to improve stream flows in the West, some in the agricultural community are not necessarily in agreement with efforts to change the law. According to Randy Parker of the Utah Farm Bureau, since Utah is the second most arid state in the country, its citizens are not likely to put more water in the stream for Las Vegas, which is downstream.[79] He explained that those in agriculture in Utah are fighting to hold on to water until it is converted to municipal or industrial uses. The big issue in the 2006 legislature for agricultural water rights was an attempt to limit city governments from being able to take water rights through eminent domain outside of the city's boundaries.[80]

Washington

Washington State was first mandated by legislation to protect instream flows in the 1960s; however, it was not until the 1990s that the state adopted a market approach for protecting stream flows. In

1991, the legislature passed the Trust Water Rights statute that allows water rights holders to dedicate water that they have saved by installing more efficient irrigation systems to instream use.[81] This law also allows the state to acquire instream flow rights by purchase, lease or gift.[82] In addition to using the market, a statute passed in 1971 mandates the Department of Ecology (DOE) to set base or minimum instream flows for every river in the state to protect fish and wildlife, recreation, and navigation.[83]

In 2000, the DOE started a Water Acquisition Program that is a "voluntary, incentive-based program designed to encourage water right holders in Washington State to sell, lease or donate some or all of their water rights to increase instream flows for the purpose of salmon restoration"(Lovrich et al. 2004, ii). During its first three years, the program completed 80 temporary and permanent transfers of water rights representing 9,304 af of water per year; however, the DOE had trouble spending its $5.5 million in allocated funds, as it could only find willing sellers for less than $2 million dollars of purchases (Lovrich et al. 2004).

Like Oregon, Idaho and California, many streams in Washington have ESA-listed species. The Washington Water Trust (WWT) was created in 1998 to "provide a positive, cooperative solution to Washington's depleted streams."[84] The WWT focuses its acquisition efforts in the areas where there are listed fish and documented low flow problems due to irrigation diversions.

Washington is a state that "really scrubs" the water right during the water rights transfer process and does not allow the transfer of paper water as in Oregon. The DOE, which has dual roles of administering water rights and protecting water quality, will not transfer a water right until it is satisfied that the amount of water being

transferred is no more than a farmer uses for beneficial use, has not been forfeited or abandoned, and results in no injury to junior water rights holders.

John Stuhlmiller of the Washington State Farm Bureau (WSFB) said the real conflict in Washington is that some cities are trying to purchase or acquire agricultural water and retire the irrigated lands. Although WSFB members believe that a water right is a freely tradable property right—they want to see that agriculture continues without the drying up of agricultural lands.[85] Increasingly, private organizations like WWT are working cooperatively with local ranchers and farmers to find ways to restore stream flows without sacrificing agricultural production.

Wyoming

Wyoming reformed its law in 1986 to recognize instream flows for establishing or maintaining new or existing fisheries as a beneficial water use with a mechanism that allows the state to appropriate new instream flows.[86] The law provides that "[n]o person other than the state of Wyoming shall own any instream flow water right."[87] Under this law, the Wyoming Game and Fish Department is responsible for identifying priority streams, performing studies, and making flow recommendations to the Water Development Commission, which in turn applies to the State Engineer's Office for an instream flow right. This process has been used very little to set instream flows.

The law does not allow the state to buy or lease water rights from private parties for instream flow purposes. However, it allows the state to acquire water rights for instream flows "by transfer or gift."[88] If the state were to receive a gift or donation, the water rights would

have to go through the normal change of use (transfer) proceeding, as well as a requirement for the Game & Fish Commission to file a petition to change the use to an instream flow.[89]

SAVING OUR STREAMS: HARNESSING WATER MARKETS

In 2000, the city of Pinedale voted unanimously to transfer up to 4,800 af of storage water to instream flows in Pine Creek, which runs through town. The water would have been released during certain times of the year to enhance flows for local trout; however, the state engineer denied the request, citing state law that requires instream flow rights to be held by the state, not an individual or municipality (Benson 2006).

In the last several legislatures, bills were introduced that would amend the law making it easier to leave water instream for fish and recreation. The first, Senate File 51, would allow the state to acquire temporary water rights for instream flows. The second, House Bill 84, would permit any water right holder to donate their water rights to the state temporarily for the benefit of fish or recreation. So far no legislation has passed that would allow more flexibility in the state's approach to instream flow protection, so there have been no instream flow transactions in Wyoming.

CONCLUSION

With stream flows in decline throughout the West, there is increasing need to find viable and effective means to preserve instream flows for fish and wildlife habitat while maintaining a productive agricultural sector. Traditionally the solution was to impose regulations or limits on water use; however, this was typically at the expense of private property rights and to the detriment of agricultural production or fishery habitat, as seen in the early 2000s in the Klamath Basin. As an alternative, the voluntary buying, selling and leasing of water rights through markets is proving to be a successful and efficient strategy for restoring stream flows, especially in the Northwest.

Montana, Oregon, and Washington have adopted changes that facilitate the private and public exchange of water rights for instream flows. Since 1998, more than 1,000 transactions have been initiated by federal, state, and private entities in the region, restoring nearly two million af to instream flows. California and Idaho had fewer than 90 transactions, but restored more than 3.4 million af to local streams and rivers. In these two states, however, the transactions were limited to purchases by state and federal agencies and were primarily directed to meet specific stream flow levels for endangered species. Although other states in the Rocky Mountain and Southwest regions have been reluctant to ease restrictions on water right transfers, burgeoning markets and widespread success stories

throughout much of the Northwest seems to be inspiring change. Some states are proposing legislation that would facilitate the market exchange of water rights for instream and other environmental flows by strengthening and better defining property rights to water while creating incentives for trade. As legislative reform occurs, access to markets should improve, allowing more private entities to participate. The result will be improved stream flows for fish and wildlife habitat throughout the West.

The success of and growing interest in water markets demonstrates that resources can be devoted to environmental goods such as restoring instream flows. The value of increasing stream flows is high enough to attract funds to create a market. People are willing to pay for water, and others are willing to sell. The informatioin provided in this manual is drawn from the experiences of on-the-ground market entrepreneurs and should encourage others to take the steps necessary to protect streams through water market transfers.

NOTES

1 This section was taken from Landry (1998).

2 An acre-foot is the volume of water required to cover one acre of land to a depth of one foot—equal to 325,851 gallons of water.

3 The biological opinion governing the management of the Columbia River for power generation has been modified several times since 1992.

4 The ten organizations that receive funds are the Bonneville Environmental Foundation, the Deschutes Resources Conservancy, the Idaho Department of Water Resources, the Montana Water Trust, the Oregon Water Resources Department, the Oregon Water Trust, Trout Unlimited, the Washington Department of Ecology, the Washington Water Trust, and the Walla Walla Watershed Alliance.

5 All transaction price data have been adjusted to reflect constant 2005 dollars. The data used throughout this publication were compiled from a large number of resources, and although comprehensive, the dataset is unlikely complete. In some cases agencies and organizations did not record transactions or the data lacked sufficient detail to be included in this dataset. In other cases, transactions may have been brokered by agencies or organizations that choose not to disclose such data. All figures, tables, and discussion in this publication are based on data, which are believed to be accurate and provide excellent representation of the current state of water markets for environmental flows in the West.

6 Although California's expenditures on environmental flows far exceed all other states, so too does its gross domestic product which is greater than all other states combined.

7 The DOE lists its minimum criteria in: *Washington Water Acquisition Program: Finding Water to Restore Streams.* March 2003, Pub. No. 03-11-005. The minimum criteria are: sufficient documentation on the water right to allow DOE to make a tentative "extent and validity determination," (e.g., has the water right been put to beneficial use in the past five years to avoid relinquishment); the water right has an early priority date and can be protected from other water withdrawals in order to be able to provide increased flows for salmon; and, the acquisition would provide both short and long-term benefits in achieving stream flow requirements for fish. In addition to the minimum criteria, the DOE has preference criteria: the acquisition would provide other benefits such as a decrease in temperature; the acquisition has a broad level of support among interested parties; the water right is reasonably priced with the context of the local market; the acquisition can be accomplished within a reasonable time period; the acquisition can be accomplished with partial funding from other sources; and, the acquisition can be done with minimal administrative costs.

8 Andrew Purkey, Program Director, Columbia Basin Water Transactions Program. Personal conversation with author, September 20, 2006.

9 Kim Schonek, Monitoring Coordinator/ Project Manager, Oregon Water Trust. Telephone conversation with author, September 25, 2006.

10 To better reflect the actual value of water over time for purchases, the inflation adjusted prices per af have been discounted at a rate of 6 percent. Therefore the price on a per af basis of an outright purchase reflects the value of adding a certain amount of water instream in perpetuity. For example a $100 transaction that restores 10 af of water

per year in perpetuity would have a nominal value of $10 per af and a discounted value of roughly $6 per af. All per af prices reflect the discounted cost of water unless otherwise noted.

11 Deschutes River Conservancy. Online: www.deschutesriver.org/About_Us/History/default.aspx (cited April 2006).

12 Ken Delano, District Manager, Grant Soil and Water Conservation District. Telephone conversation with author, April 2007.

13 Montana Water Trust. Online: www.montanawatertrust.org/about/benefits.html (cited December 2006).

14 Fritz Paulus, Executive Director, Oregon Water Trust. Telephone conversation with author, August 4, 2006.

15 Deschutes River Conservancy. Online: www.deschutesriver.org/About_Us/History/default.aspx (cited April 2006).

16 Washington Water Trust. Online: www.thewatertrust.org/whatwedo/wwd_tools.html (cited June 2006).

17 Colorado Water Trust. Online: www.coloradowatertrust.org/guidelines.html (cited July 2006).

18 See www.waterbank.com.

19 WestWater Research. Online: www.waterexchange.com/market_research/valuewater (cited February 2006).

20 Montana Water Trust. Services/Determining Fair Market Value. Online: www.montanawatertrust.org/services/valuation.html (cited January 2007).

21 Arizona Revised Statutes § 45-157(B).

22 Arizona Statutes § 45-172.

23 Arizona Statutes § 45-172.

24 Arizona Statutes § 45-2101.

25 California Water Code § 1707.

26 California Water Code § 1707(a)(1).

27 California Water Code § 1707(c)(1).

28 The CALFED Bay-Delta Program is a unique combination of 25 state and federal agencies that came together with a mission to improve

water supplies in California and the health of the San Francisco Bay/Sacramento-San Joaquin Delta.

29 Jack King, Manager of National Affairs Division, California Farm Bureau. Telephone conversation with author, February 1, 2006.

30 Jack King, Manager of National Affairs Division, California Farm Bureau. Telephone conversation with author, February 11, 2006.

31 Act of April 23, 1973, ch. 442, 1973 Colo. Sess. Laws 97.

32 Colo. Rev. Stat. § 37-92-102(3).

33 Colo. Rev. Stat. § 37-92-102(3).

34 Colo. Rev. Stat. § 37-92-102(3).

35 Colo. Rev. Stat. § 37-92-102(3).

36 S.B. 02-156 amendment to Colorado Rev. Stat. § 37-92-102(3).

37 Colo. Rev. Stat. § 37-83-105.

38 Colo. Rev. Stat. § 37-83-105(2)(VI).

39 J. Craig Green, P.E., Senior Fellow, Independence Institute. Telephone conversation with author, February 10, 2006..

40 Tom Cech, Director, Central Colorado Water Conservancy District, presentation at Workshop, "Are Water Conflicts Inevitable? *Agriculture vs. Urban Colorado*, December 1, 2006, in Denver, Colorado.

41 Dan Merriman, Chief of Stream and Lake Protection Section, Colorado Water Conservation Board. Telephone conversation with author, October 19, 2006.

42 J. Craig Green, P.E., Senior Fellow, Independence Institute. Telephone conversation with author, February 10, 2006.

43 J. Craig Green, P.E., Senior Fellow, Independence Institute. Telephone conversation with author, February 10, 2006.

44 Melinda Kassen, Managing Director, Trout Unlimited's Western Water Project. Telephone conversation with author, April 11, 2006.

45 Idaho Stat. § 42-1501.

46 Idaho Stat. § 42-1501 & 1503.

47 Idaho Stat. § 42-1504.
48 Idaho Stat. § 42-1503.
49 Idaho Stat. § 42-1505.
50 Idaho Stat. § 42-1763(b).
51 Idaho Stat. § 42-1765.
52 Kevin Lewis, Conservation Director, Idaho Rivers United. Telephone conversation with author, March 8, 2006.
53 Kim Goodman, Director, Idaho Water Project, Trout Unlimited, Email communication with author, April 11, 2006.
54 Trout Unlimited. Western Water Project/ Idaho Water project. Arlington, VA: Trout Unlimited. Online: www.tu.org/site/pp.asp?c=7dJEKTNuFmG&b=275425 (cited June 2006).
55 Act of March 13, 1969, ch. 345, 1969 Mont. Laws 879-81.
56 Ch. 452, 1973 Mont. Laws.
57 Mont. Code Ann. § 85-2-316.
58 Information provided by the Montana Department of Fish, Wildlife, & Parks in a Summary of Instream Water Rights, January 2005.
59 Mont. Code Ann. § 85-2-316(3).
60 Mont. Code Ann. § 85-2-316(4)(a).
61 Mont. Code Ann. § 85-2-316(10).
62 Mont. Code Ann. § 85-2-316(10).
63 Mont. Code Ann. § 85-2-436.
64 Ch. 123, 1999 Mont. Laws.
65 Mont. Code § 85-2-402.
66 Sec. 6, Ch. 85, 2005 Mont. Laws.
67 Mont. Code Ann. §85-2-419.
68 Montana Water Trust. Online: www.montanawatertrust.org/projects/index.html (cited April 2007).
69 Nevada Attorney General Opinion 98-01 at 1 (1998).
70 House Bill 195, 2005 New Mexico.
71 New Mexico Stat. Ann. § 72-1-2.

72 New Mexico Attorney General Opinion 98-01 at 1 (March 27, 1998).

73 New Mexico Attorney General Opinion 98-01 at 1 (March 27, 1998).

74 New Mexico Attorney General Opinion 98-01 at 1 (March 27, 1998).

75 Senate Bill 140, The Instream Water Rights Act (1987).

76 Senate Bill 140, The Instream Water Rights Act (1987).

77 Utah Code § 73-3-3(11)(a).

78 Utah Code § 73-3-3.

79 Randy Parker, Chief Executive Officer, Utah Farm Bureau. Telephone conversation with author, February 10, 2006.

80 Randy Parker, Chief Executive Officer, Utah Farm Bureau. Telephone conversation with author, February 10, 2006.

81 Revised Code of Washington § 90.42.005.

82 Revised Code of Washington § 90.42.005(d).

83 Revised Code of Washington § 90.22.010.

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86 Wyo. Stat. § 41-3-1001(a).

87 Wyo. Stat. § 41-3-1002(e).

88 Wyo. Stat. § 41-3-1007(a).

89 Wyo. Stat. § 41-3-1007.

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APPENDIX: ORGANIZATIONS & AGENCIES

Organizations and public agencies in this appendix are using a variety of market approaches to acquire water rights for the protection of instream flows. This appendix is intended to be a resource that provides contacts who can answer questions and assist efforts to acquire water rights. This list is not complete, and PERC would welcome information about other organizations working in this area.

Private Organizations

Columbia Basin Water Transactions Program
806 SW Broadway, Ste. 750 Telephone: (503) 417-8700
Portland, OR 97205 Fax: (503) 417-8787
www.cbwtp.org

The Columbia Basin Water Transactions Program was started in 2002. Its mission is to support innovative, voluntary, grassroots water transactions that improve flows to tributary streams and rivers in the Columbia River basin. The Program uses permanent acquisitions, leases, investments in efficiency and other incentive-based approaches. Additionally, the Program financially supports Program partners in Oregon, Washington, Idaho, and Montana to assist landowners who wish to restore instream flows.

Deschutes River Conservancy

700 NW Hill Street
Bend, OR 97701
www.deschutesrc.org

Telephone: (541) 382-4077
Fax: (541) 382-4078

The Deschutes River Conservancy (DRC) was started in 1996 and was Oregon's first not-for-profit organization to bring together state, federal, tribal, and local government representatives with private landowners to restore and enhance ecosystems throughout the Deschutes basin. The DRC's mission is to restore streamflow and improve water quality through water conservation, purchasing and leasing water for instream use and habitat restoration, and monitoring projects. DRC also works towards a market-driven approach to restore stream flows and habitat.

Environmental Defense

257 Park Avenue South
New York, NY 10010
www.environmentaldefense.org

Telephone: (212) 505-2100
Fax: (212) 505-2375

Environmental Defense is a leading national, non-profit, research and advocacy organization with more than 500,000 members nationwide. Environmental Defense's staff includes scientists, economists, engineers, and attorneys who seek practical solutions to a broad range of environmental and public health problems. Environmental Defense has been a pioneer in the development of water markets and the acquisition of instream flows in the western United States since the 1970s. In 1996, with the help of local irrigation districts and the Confederated Tribes of Warm Springs, Environmental Defense founded the Deschutes River Conservancy.

Klamath Basin Rangeland Trust

340 A Street, Ste. 302
Ashland, OR 97520
www.kbrt.org

Telephone: (541) 488-4822
Fax: (541) 482-3153

The Klamath Basin Rangeland Trust works to restore and conserve the quality and quantity of water in Oregon's Wood River Valley and the upper Klamath Basin to enhance the natural ecosystem and supply needed water for downstream agriculture, ranching, and native fish and wildlife populations. The Trust helps to restore stream flows and riparian habitat by matching landowners willing to lease or sell land and or water rights to state and federal funds.

Montana Trout Unlimited

PO Box 7186
Missoula, MT 59807
www.montanatu.org

Telephone: (406) 543-0054
Fax: (406) 543-6080

Montana Trout Unlimited (TU) is a membership organization with a mission to conserve, enhance, and restore cold-water fish and their habitats. This work involves advocacy or education on behalf of clean water, instream flows, healthy habitat and naturally functioning watersheds and floodplains. Montana TU has a long history of promoting improved stream flows for cold-water fish, including supporting and helping create legislation that allows private landowners to lease consumptive water rights to public agencies and private interests for instream uses. It has also been instrumental in establishing arrangements that allow Montana's Department of Fish, Wildlife and Parks to purchase stored water from storage facilities for instream flows.

Montana Water Trust

140 S. 4th Street West, Unit 1
Missoula, MT 59801
www.montanawatertrust.org

Telephone: (406) 721-0476
Fax: (406) 721-3021

The Montana Water Trust is a private, non-profit organization that works cooperatively with farmers, ranchers, and other landowners to develop incentive-based agreements that benefit landowners, streamflows, and communities. Founded in 2001, Montana Water Trust believes in protecting landowners' rights to use water (including for instream use), and providing them with secure, alternative sources of income to maximize the value of their property.

Natural Heritage Institute

100 Pine Street, Ste. 1550
San Francisco, CA 94111
www.n-h-i.org

Telephone: (415) 693-3000
Fax: (415) 693-3178

Natural Heritage Institute is a non-profit natural resources law and consulting firm based in San Francisco. It works to foster conservation and sustainable use of the world's limited stock of natural resources by improving the laws that govern natural resources and the institutions that manage them. Founded in 1989 by a group of experienced conservation lawyers and scientists who foresaw the need for a new tool kit for the next generation of environmental problem-solving, its core mission is to restore and protect the natural functions that support water-dependent ecosystems and the services they provide to sustain and enrich human life. The Natural Heritage Institute acts as both a representative of environmental interests and a counselor to the ultimate custodians and regulators of water resource assets.

The Nature Conservancy
4245 North Fairfax Drive, Ste. 100 Telephone: (800) 628-6860
Arlington, VA 22203
www.nature.org

The mission of The Nature Conservancy is to preserve plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and water they need to survive. To date the Conservancy and its members have been responsible for the protection of more than 5.5 million acres in 50 states and Canada. It has helped like-minded partner organizations to preserve millions of acres in Latin America and the Caribbean. While some Conservancy-acquired areas are transferred for management to other conservation groups, both public and private, the Conservancy owns more than 1,300 preserves, the largest private system of nature sanctuaries in the world.

Oregon Water Trust
522 SW Fifth Avenue, Ste. 825 Telephone: (503) 226-9055
Portland, OR 97204 Fax: (503) 226-3480
www.owt.org

The Oregon Water Trust is a non-profit, private group established in 1993 that uses a market-based approach to help maintain and restore surface water flows in the rivers and streams of Oregon. The Oregon Water Trust works cooperatively with willing water users to acquire part or all of existing out-of-stream water rights. The Oregon Water Trust works closely with community leaders, local watershed councils, government agencies, and a range of public interest groups to prioritize and implement its efforts. The Oregon Water Trust is funded through grants and donations and is governed by a nine-member board of directors that reflects the diversity of water interests in Oregon.

Trout Unlimited
1300 North 17th Street, Ste. 500 Telephone: (800) 834-2419
Arlington, VA 22209
www.tu.org

Trout Unlimited's mission is to conserve, protect and restore North America's cold water fisheries and their watersheds. Trout Unlimited started the Western Water Project in 1998 with the goal of working at the state level on water management issues. There are three basic principles underlying Trout Unlimited's Western Water Project: healthy rivers are essential to sustainable western landscapes; restoring a river can result in stronger local communities in addition to stronger aquatic environments; and, to provide a focal point through Trout Unlimited to promote instream flows and the benefits to the western way of life. Trout Unlimited has placed staff in Colorado, Idaho, Montana, Utah, and Wyoming with the goal forming alliances with non-traditional allies, including irrigators, landowners, water suppliers, and state agencies.

Washington Water Trust
810 Third Avenue, Ste. 180 Telephone: (206) 675-1585
Seattle, WA 98104 Fax: (206) 749-9274
www.thewatertrust.org

The Washington Water Trust is a private, non-profit organization established in 1998 to restore instream flows in Washington's rivers and streams by acquiring existing water rights and converting them to instream use. Washington Water Trust's focus is on market-based approaches, involving transfers from willing sellers or donors. The goal is to protect and improve water quality, fisheries, recreation, and other public values related to instream flows.

WestWater Research, LLC
280 N. 8th Street, Ste. 205
Boise, ID 83702
www.waterexchange.com
Telephone: (208) 433-0256
Fax: (208) 433-5596

WestWater Research specializes in water asset sales and acquisitions, water resource economics, water right and asset appraisals, and project finance services. It provides a comprehensive set of services for valuing, marketing, and acquiring water assets to the financial industry, energy and water supply industry, municipalities, and real estate and property development sector. The WestWater Research team has an extensive background in water marketing, regulatory policy, and water-asset valuationand specializes in high-valued water transactions. It has advised on more than $500 million in water transactions throughout the United States.

Public Organizations

Arizona Water Protection Fund
3550 N. Central Avenue
Phoenix, AZ 85012
www.awpf.state.az.us
Telephone: (602) 771-8528

In 1994 the Arizona legislature created a Water Protection Fund administered by the Arizona Department of Water Resources and the State Land Commissioner. The Fund is earmarked for supporting projects that will enhance riparian areas including the restoration of the state's rivers and streams and associated fish and wildlife habitats. Although much of the funding is directed toward restoration and enhancement of riparian habitat, the Fund may also acquire water rights for improving stream flows.

CALFED-Bay Delta Program Environmental Water Account
901 P. Street, Room 314
Sacramento, CA 95814
calwater.ca.gov
Telephone: (916) 651-7054
Fax: (916) 651-7059

The Environmental Water Account program is a State-Federal cooperation management program to benefit the Bay-Delta ecosystem and the long-term survival of fish species. Its focus is to resolve conflict between fisheries and water diversion at the Delta export pumps. Water for the Environmental Water Account program is acquired through purchases, changes in Delta operations, borrowing or leasing agreements, transfers using Delta conveyance, and water banking.

Central Valley Project Improvement Act (CVPIA) and Acquisition Program

U.S. Bureau of Reclamation, Mid-Pacific Region
Federal Office Building
2800 Cottage Way — Telephone: (916) 978-5000
Sacramento CA 95825 — Fax: (916) 978-5599
www.usbr.gov/mp

In 1992, U.S. Congress passed the Central Valley Project Improvement Act—modifying how water resources would be managed in the Central Valley, a major link in California's water supply network. A major feature of the Central Valley Project Improvement Act is that it requires acquisition of water for protecting, restoring, and enhancing fish and wildlife populations. The Bureau of Reclamation and the U.S. Fish & Wildlife Service are in charge of water acquisitions.

Colorado Water Conservation Board

1313 Sherman Street, Room 721 — Telephone: (303) 866-3441
Denver, CO 80203 — Fax: (303) 866-4474
www.cwcb.state.co.us

The Colorado Water Conservation Board was created in 1937 for the purpose of aiding in the protection and development of the waters of the state. The agency is responsible for water project planning and finance, stream and lake protection, flood hazard identification and mitigation, weather modification, river restoration, water conservation and drought planning, water information, and water supply protection. The Stream and Lake Protection Section manages and administers the state's Instream Flow Program and is responsible for the appropriation, acquisition, and protection of instream flow and natural lake level water rights to preserve and improve the natural environment to a reasonable degree.

Idaho Water Supply Bank and Rental Pools

Idaho Dept. of Water Resources & Water Resource Board
322 E. Front Street, PO Box 83720 Telephone: (208) 287-4800
Boise, Idaho 83720 Fax: (208) 287-6700
www.idwr.idaho.gov

The Idaho Water Resource Board manages the operation of Idaho's Water Supply Bank. The purposes of the Bank are to encourage the highest beneficial use of water; provide a source of adequate water supplies to benefit new and supplemental water uses; and to provide a source of funding for improving water user facilities and efficiencies. Amendments to the banking statutes in 1992 provided temporary and limited authority to the US Bureau of Reclamation to lease water from the rental pools for flow augmentation on the Snake and Lemhi rivers.

Montana Dept. of Fish, Wildlife & Parks

1420 E 6th Ave., PO Box 200701 Telephone: (406) 444-2535
Helena, MT 59620 Fax: (406) 444-4952
www.fwp.mt.gov

Beginning in 1989 as a pilot program, the Montana Department of Fish, Wildlife & Parks (FWP) Leasing Program leases water rights from willing individuals for the purpose of maintaining and enhancing stream flows for wildlife and fisheries. The program was renewed and expanded in 1999, increasing the number and term period of leases. There is strong support to further FWP's authority to permit permanent leasing of water rights as well as enabling it to permanently dedicate water rights in fee simple to instream flows.

Nevada Department of Wildlife
Headquarters, Western Region
1100 Valley Road Telephone: (775) 688-1500
Reno, NV 89512
www.ndow.org

The Nevada Department of Wildlife (NDOW) works to ensure that wildlife habitats are productive and in good ecological health including the vitality of Nevada's fish in its streams, rivers, lakes and reservoirs. It supports the acquisition of water rights from willing sellers as opportunities arise. State wildlife management areas managed by the NDOW contain wetland acreage and reservoirs for which surface and ground water rights have been obtained. Through its Landowner Incentive Program it provides technical and financial support for private landowners for habitat protection and restoration.

State of Nevada
Nevada Division of State Lands
Dept. of Conservation and Natural Resources
901 S. Stewart Street, Ste. 5003 Telephone: (775) 684-2720
Carson City, NV 89701 Fax: (775) 684-2721
www.lands.nv.gov

The state of Nevada, through the Division of State Lands and Division of Water Resources, buys water rights for the use of fish and wildlife, habitat protection, and parks and recreation. The division purchases water rights throughout the state from willing sellers. The division works in partnership with other state and federal agencies, organizations, corporations, and individuals to acquire water to meet the environmental and recreational needs of the state.

Washington Dept. of Ecology Water Acquisition Program
PO Box 47600 Telephone: (360) 407-6000
Olympia, WA 98504
www.ecy.wa.gov

Beginning in 1989, the state legislature passed several key provisions allowing the Department of Ecology to acquire water rights on a voluntary basis and hold that water in trust as a way to increase stream flows for fish or provide water for irrigation, municipal, and other beneficial uses. The Department of Ecology Water Acquisition Program continues to acquire water in the Dungeness, Methow, Walla Walla, and Yakima basins through short and long-term leases, purchases, donations, and in agreements with federal and other state agencies.

U.S. Bureau of Reclamation
Pacific Northwest Regional Office
1150 North Curtis Road, Ste. 100 Telephone: (208) 378-5012
Boise, Idaho 83706 Fax: (208) 378-5019
www.usbr.gov

Throughout the Northwest the Bureau of Reclamation is involved in numerous anadromous fish initiatives, from cooperative watershed planning to the design and installation of fish passage devices, to actively leasing and purchasing water rights for instream flows and meeting endangered species needs. Regional staff consult with the National Oceanic and Atmospheric Administration Fisheries and the US Fish and Wildlife Service to ensure that project operations and other activities do not jeopardize threatened and endangered species or their critical habitats. The bureau also works with Deschutes River Conservancy to support restoration projects in central Oregon's Deschutes River basin.

THE PERC LEGACY

PERC was started in 1980 by a handful of economists who asked this question: "If markets can produce bread and cars, why can't they produce environmental quality?" Since its founding, PERC has moved from being a voice in the wilderness (both literally and figuratively) to holding a prominent place on the environmental policy stage.

Research and policy analysis will remain a cornerstone of PERC's agenda. Current topics of research include public land management, water marketing, timber, endangered species, fisheries preservation, conservation easements, environmental entrepreneurship, and land-use issues.

In addition, outreach efforts continue to broaden with publications, conferences, and briefings. Educational programs and fellowships are offered for students, journalists, academics, professionals, and entrepreneurs.

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Notes