Restoring Water Conservation Savings to Oregon Rivers: A Review of Oregon's Conserved Water Statute

Report to the National Fish and Wildlife Foundation

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Acronyms & Abbreviations

BPA: Bonneville Power Administration

BOR: Bureau of Reclamation

CBWTP: Columbia Basin Water Transactions Program

DRC: Deschutes River Conservancy

NFWF: National Fish and Wildlife Foundation

OAR: Oregon Administrative Rule

ODFW: Oregon Department of Fish and Wildlife

ORS: Oregon Revised Statute

OWT: Oregon Water Trust

OWEB: Oregon Watershed Enhancement Board

OWRD: Oregon Water Resources Department

POD: point of diversion

USGS: U.S. Geological Survey

Preface

On the 20th anniversary of Oregon's Instream Water Rights Act of 1987 The Nature Conservancy initiated a *Review of Oregon Water Law and Policy*. Phase 1 of the Review will evaluate the relationship between Oregon Water Law and the conservation and protection of freshwater biodiversity. To assist in this effort the Conservancy convened a Steering Committee for this project consisting of representatives from the major non-profits interested in stream flow restoration in Oregon, including Oregon Trout, Oregon Water Trust, Oregon Environmental Council, WaterWatch, the Deschutes River Conservancy and the National Fish and Wildlife Foundation.

This paper is one of a suite of papers produced within the context of the Review. Adell Amos and colleagues from the University of Oregon Law School are contributing a review of statutes and administrative rules developed under the Act. Bruce Aylward of Ecosystem Economics LLC is contributing three short issues papers that examine achievements and issues in the implementation of water market tools provided for under the Act. This is the first paper in that series; the other papers will cover instream leases and transfers, and water markets for instream flows.

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1. Introduction

Like most water users, freshwater biodiversity relies on water being available at the place and time it is required and in the quantity and quality required – in order to support and regulate ecosystem health and function. From an ecological standpoint then, instream flow problems arise when the location, timing and quantity of flows are altered or when the quality of the water is altered. In Oregon, as in many states in the western US, the history of water resources development is replete with efforts to satisfy domestic, industrial, power, agricultural and flood security needs through the allocation of rights to use water and the subsequent alteration of the natural hydrological cycle. In particular the damming, diversion and storage of water from rivers, streams and creeks has often dewatered Oregon waterways.

Over time, the decline of salmon populations, as well as resident fisheries, led to increased awareness that the over-allocation of Oregon streams and rivers was inconsistent with good environmental stewardship. The environmental, social, spiritual and economic values associated with healthy riparian ecosystems and aquatic biodiversity were eventually recognized in policy and legal reform aimed at restoring water to streams and rivers. In 1987 the Oregon legislature passed Oregon's Instream Water Act (the Act), which recognized that state water policy should be aimed at meeting both human uses and those of freshwater ecosystems. The Act converted all existing minimum stream flows (which were established by administrative rule) into instream water rights, equivalent to traditional out of stream appropriations. These new instream rights dated from 1955 at the earliest, which made them junior to most existing water rights.

Under the Act, however, instream rights were made equivalent to traditional appropriations meaning that traditional water rights could be acquired and transferred to instream uses. Thus, rather than re-regulate existing water rights allocations, Oregon chose to allow the reallocation of water to instream use through trading between willing sellers and buyers. By allowing the creation of senior instream water rights from existing out-of-stream rights, the state sought to transform the economic potential of instream flow into a tangible financial demand; thereby altering the incentives facing existing water users and creating a market for instream water rights. With such a market opportunity in place, public and private donors responded with funding to acquire water rights for the purposes of riparian and aquatic ecosystem restoration. The resulting instream flow market in Oregon is an early, and interesting, example of a market for ecosystem services.

In this paper one component of Oregon's reform movement is examined in detail. The Act includes an explicit effort to tap water conservation as a means to assist the state in its efforts to provide for current and future water uses, but in particular to assist collaborative efforts to restore stream flow. This conserved water provision was retooled in the early 1990's to focus on reallocation of water saved through conservation measures and to this day remains unique in its treatment of conserved water in the American West. This paper examines how well the program has succeeded in its aims and makes an effort to compile the lessons learned in program implementation as well as the outstanding issues remaining. In so doing the paper draws on the available literature, data on conserved water projects and interviews with key personnel involved in implementation of the program.

The paper begins with background and history on the conserved water program, including a review of views on the current status of the program, obtained from the literature. The implementation of the program is then reviewed, followed by a discussion of issues and lessons learned. Conclusions on the utility and applicability of the program as a tool in the prior appropriation tool chest are provided at the end of the paper.

2. Conserved Water

2.1 Instream Flows and Water Conservation

Consistent with the prior appropriation doctrine, water rights in Oregon were allocated on a first come, first served basis (see Amos 1997 for a full review of Oregon water law with respect to instream issues). Those water users early in line – who receive water even during dry times – are called "senior" users. "Junior" users are those whose rights are interruptible, that is when seniors call for their water the juniors are regulated off the system as supplies dictate. In rural Oregon the primary and most senior surface water use is typically irrigation. As such, cooperative efforts at voluntary stream flow restoration rely heavily on working with irrigation water right holders.

Surface water diverted for irrigation is "used" in a variety of ways, which can largely be segregated into two categories: 1) the consumptive use of water in which water is evapotranspired or otherwise removed from the basin's water cycle and 2) the seepage of water into the ground where it recharges aquifers and may discharge again to surface water further downstream. In Oregon, the second category, specifically seepage from canals, ditches, ponds and tailwater, as well as the seepage associated with the application of water to farm ground is a significant component of water diverted under irrigation water rights. Seepage losses of 50% or more of the water are not unusual for irrigation districts that deliver water through lengthy systems of open canals and ditches. In the Deschutes Basin, for example, legal decrees allocated water rights that include allowances for loss during transmission of from 35% to 65%. The application of water to ground then results in additional seepage. In the Deschutes, many district water rights allocated based on flood irrigation practices were therefore in the 9 to 10 acre-feet per acre at the point of diversion for an end use of approximately 2 acre-feet per acre of consumptive use. In other words, 80% of the right goes to seepage and 20% to consumptive use.

In considering the many ways that existing water rights may be changed to instream use a primary distinction is which category of use is affected, specifically whether the change affects consumptive use or whether it simply results in increased efficiency with which water is managed so as to require a lower diversion amount. Thus, there are two general types of action that can lead to lower water use and lower diversions – reductions in consumptive use and changes in water management. This is a simplification, as any change in how water is routed through a system and, in particular, any change in the efficiency with which it is transported, distributed and applied will likely have some impact on evaporation. For example, enclosing an open ditch in a pipe has the primary effect of limiting the seepage of water into the ground. However, there will also be a secondary effect of reducing evaporation from the water surface in the ditch. Thus, in reality most on-the-ground projects will affect both consumptive use and seepage, even if their primary intent and impact is, for example, to improve water use efficiency and reduce seepage.

To further confuse the issue, the term "water conservation" is sometimes used exclusively to refer to actions aimed at reducing seepage and other times refers to actions that reduce consumptive use and seepage. For example, the Bureau of Reclamation often includes fallowing of land and leasing of water as a conservation project, alongside water efficiency projects (Bureau of Reclamation 1997). In practice efforts to improve water management and restore stream flow typically pursue one of a number of actions, which largely break down as reducing seepage or consumptive use (Aylward 2007). The following management improvements may increase the efficiency with which water is supplied to an end use, thereby reducing seepage:

- changing the point of diversions
- changing the water source

- improving transmission efficiency
- improving water distribution and scheduling
- improving on-farm water use efficiency

Actions on the farm that result in reductions in consumptive use, include:

- cutting back on the number of acres irrigated
- changing to low water use crops
- reducing the length of the irrigation season (i.e. the time that plants are irrigated)
- intentionally reducing the amount of water made available for plant growth (deficit irrigation)

All of the actions listed above will typically reduce water lost to seepage and therefore reduce the amount of water that needs to be diverted from surface waters to satisfy a given agricultural need. Even actions to reduce consumptive use may save seepage water because such actions may reduce the amount of water that needs to be delivered through leaky canals and ditches. However, setting aside changes in seepage due to changes in final demand, the discussion below examines the fate of seepage water that is "saved" through changes in water management that lead to great water use efficiencies.

The extent to which any saved water of this nature will lead to additional instream water will depend on a number of factors including:

- the incentives provided to the water user
- whether the reduced use is legally protected instream
- the extent to which water is over-allocated to out-of-stream uses

Where water is saved without regard to conservation incentives it would not be surprising to find that the water is not legally protected instream. If this is the case and the source stream is over-allocated then it is likely that the junior holder of an out-of-stream water right would divert any water made available by the water user engaging in water use efficiency improvements. The saved water would therefore not remain in the stream to support aquatic and riparian function. The result changes however if the stream is not over-allocated. If water is not fully allocated then implicitly there is sufficient water to meet all out-of-stream needs and therefore any saved water will be left instream, irregardless of whether it is protected or not.

Where incentives for water use efficiency are provided to the water user and lead to water savings the agency funding the efficiency improvement may or may not require that the water be protected instream (and the state rules may or may not provide for this). If the water is not required to be protected then the situation is much like that described above – if the stream is over-allocated the water will be diverted and if not the water will remain instream. Finally, if the water is protected instream – either through changing the status of the water right through the state administration process or by virtue of an agreement with water users on the stream (that they will not divert the water that was previously unavailable) then the water will be instream irregardless of the status of the stream as over-allocated or not. Table 1 summarizes these possibilities.

Table 1. Putting Saved Water to Instream Use According to Incentives, Protection and Allocation Level of Stream

Is Water Saved?	Is Water Protected?	Is Source Water Over-Allocated	
		Yes	No
Water Saved due to Incentives for Water Use Efficiency	Saved water protected legally or by contract or cooperation	Saved water will be *instream*	Saved water will be *instream*
	Saved water not protected	Saved water will be diverted	Saved water will be *instream*
Water Saved for other Reason	Saved water not protected	Saved water will be diverted	Saved water will be *instream*

Note: Over time a series of reductions in diversions will lead a system to move from being over-allocated to being under-allocated

The table shows that in the absence of legal action to protect saved water as instream flow there will still be cases and times when water saved through conservation measures will end up producing additional increments of instream flow. Further, the table conveys that in some such cases efficiency improvements will occur and no water will be left instream. Moreover, the table and analysis demonstrate that in over-allocated streams the provision of an incentive that requires protection of stream flow is a necessary and sufficient condition for ensuring that efficiency improvements lead to increases in stream flow. If either the incentive program does not require the saved water to be protected or the water is saved by the water user for other reasons, then the saved water will be diverted. But just as importantly the analysis suggests that if the stream is not over-allocated there is no need for the incentive – any water saved will be left instream. This suggests that a program such as that being examined here will be most applicable to over-allocated hydrologic systems. It also suggests that those interested in restoring stream flow should think carefully as to the exact incremental benefit of investments made in saving water in systems that are not over-allocated.

This analysis is important for a number of reasons. First of all it is important to have a framework that allows an assessment of the additionality of any conservation incentive - whether the incentive is a direct subsidy payment or a market-based program such as the Oregon conserved water program. In other words did the incentive actually result in additional water being instream to support ecological function or would the water have been there anyway? This provides a direct measure of the benefit of the payment or program.

In the real world, streams are often not one or the other, over-allocated or under-allocated. In the Pacific Northwest is not unusual for a stream to be under-allocated for a portion of the season, such as during the period of heavy snow melt in the late spring and early summer, and significantly over-allocated during late summer months. Presumably the advantage of a market-based program over a direct subsidy is that it can realize any cost-savings that such variability provides. In other words, the buyer of instream water or funding agency may design conservation measures that provide for additional protected water only during periods when it is required – as opposed to paying for conservation across the full year.

Taking a forward-looking, cumulative look at conservation measures it should be recognized that every project that saves seepage water – even if not protected instream – brings forward the time that an over-allocated stream will no longer face the threat of being (legally) drained of all its water. This occurs since the cumulative impact of such conservation projects is to continually reduce overall demand for diversions from the stream. If enough conservation is undertaken to ensure that all out-of-stream rights are satisfied from available water, then any additional conservation would lead to "extra" water left instream. Again, this applies in the case where saved water is not protected instream through an administrative change to the water right.

Thus, even if a market-based incentive programs like the conserved water program is available there will be times and reasons where it is not adopted or used. Likewise there will be other circumstances where the program will likely be employed and prove beneficial in terms of instream flow restoration. This is an important qualifier when actual levels of activity under the program are investigated in Section 3.

2.2 Oregon's Conserved Water Program

Statutes and administrative rule associated with Oregon's conserved water program (hereinafter simply the program) are found in ORS 537.455 to 537.500 and OAR 690.18 respectively (and see Amos 2008 for an overview). The objective of the program is to provide incentives for increasing water use efficiency, thereby increasing water availability. In practical terms the program provides a legal mechanism to undertake the "spreading" of water. Normally water users are only allowed to use water within the limits prescribed by the right – to "spread" water to additional lands (in the case of irrigation rights) or to other uses constitutes enlargement of the right. The program is an explicit attempt to act on the economic hypothesis that if efforts to be more efficient in water use are not rewarded, then those who hold water rights will have little incentive to invest in such improvements.

The program provides water right holders that invest in conservation measures with the ability to create new water rights from their existing rights. Water saved can be "spread" to additional (or new) consumptive uses or to non-consumptive uses, including an instream use. The process of creating these new rights is called an "allocation of conserved water." By statute such allocations are the responsibility of the Water Resources Commission but are carried out in practice by the Oregon Water Resources Department (together generalized below as the "state"). Thus, the holder of an irrigation right for a certain number of acres can increase their water use efficiency and then develop a new right to use the saved water on additional acres. Likewise the water right holder could transfer their interest in the saved water to another party who could develop a new irrigation right or other out-of-stream water right. Alternatively the water right holder can ask the state to create a new instream water right with all or a portion of the conserved water. If the water is needed to support instream flows the state will create a new instream water right.

The provisions that govern the program are unique in the Pacific Northwest and the nation. Key definitions (reproduced in full include):

- "'Conservation' means the reduction of the amount of water diverted to satisfy an existing beneficial use achieved either by improving the technology or method for diverting, transporting, applying or recovering the water or by implementing other approved conservation measures" (ORS 537.455 (1))
- "'Conserved water' means that amount of water that results from conservation measures, measured as the difference between:
  - (a) The smaller of the amount stated on the water right or the maximum amount of water that can be diverted using the existing facilities; and
  - (b) The amount of water needed after implementation of conservation measures to meet the beneficial use under the water right certificate." (ORS 537.455(2))

Note that the statute does not limit conserved water to either water that previously went to seepage or to water that was previously used in a consumptive fashion.

The principal provisions of the statute are paraphrased below:

- the application for conserved water must be filed within five years of the date the conservation measures were implemented (ORS 537.465(1)(b))

- when any allocation of conserved water is made, the state will retain at least 25% of the conserved water. If the state determines that this water is necessary to support in-stream flow purposes, the conserved water is converted to an in-stream water right (ORS 537.470(3))
- if more than 25% of the funds used to finance the conservation measures comes from federal or state public sources and is not subject to repayment, the percentage of water allocated to the state is equal to the percentage of public funds used to finance the conservation measures (ORS 537.470(3))
- despite the prior provision, the applicant may always choose to retain up to 25% of the conserved water (for example if the project is 100% funded by the public) (ORS 537.470(3))
- following completing of the allocation of conserved water new certificates are provided for the remaining portion of the originating right a well as new rights covering the allocated water (ORS 537.470(6))
- allocations of conserved water may retain the original priority date of the source water right or be assigned a priority date one minute later (ORS 537.485(1))
- the priority date assigned to the applicant's and state's portion of the allocation must be the same (ORS 537.485(2))
- allocations that are not assigned to the state may be leased to instream use pending a final allocation to another use (ORS 537.490(1)) and shall not be subject to forfeiture if so leased (ORS 537.500(1)).

These provisions address the incentives problem in two major ways. First, they provide an incentive for water right holders that need to expand their use or can market such rights to engage in conservation measures, while still providing for an incremental public benefit in terms of using a portion of the saved water to create new instream rights. Second, the program provides instream buyers with the ability to cost-share on conservation measures and, as a result, dedicate a proportional share of the water saved to a new and permanent instream use. The extent to which the conserved water program has succeeded in motivating conservation measures and allocations of conserved water is assessed in the next section, but first the expectations regarding the program that have appeared in the literature are reviewed.

2.3 Perspectives from the Literature

Honhart (1995) provides a historical backdrop on the current statutes that define the program, charting out deficiencies in the statute as approved in 1987 and the nature of key amendments made by the legislature in 1993. He points out a number of faults in the original language and the revisions made in 1993 as reviewed below.

First, in the original Act conservation was defined as "the reduction of the amount of water consumed or irretrievably lost in the process of satisfying an existing beneficial use" and conserved water as "that amount of water, previously unavailable to subsequent appropriators" (Honhart 1995). In the 1993 amendment conservation is defined as "the reduction of the amount of water diverted to satisfy an existing beneficial use" (ORS 537.455(1)). Conserved water is also re-defined as:

> that amount of water that results from conservation measures, measured as the difference between: (a) The smaller of the amount stated on the water right or the maximum amount of water that can be diverted using the existing facilities; and (b) The amount of water needed after implementation of conservation measures to meet the beneficial use under the water right certificate (ORS 537.455(2)).

If the intent of the 1987 Act was to promote water use efficiency the language was clearly muddled.

Reducing water "consumed" (as under the original language) means reducing the consumptive use (or evapotranspiration) associated with a consumptive use right. Arguably this is not conservation at all but a reduction in consumptive use as pointed out in Section 2.1 above. For example, in an irrigation context, a standard method to reduce consumption would be to reduce the number of acres irrigated under the water right. In the case the ability to transfer a perfected water right to another consumptive use is generally available – and the 1987 Act specifically set forth how such a transfer could be made to instream use. Other ways to reduce consumptive use include reducing the irrigation season, changing crop types and engaging in deficit irrigation. The latter may be a valid way of reducing water use while still engaging in irrigation, but it may be questioned whether it reflects a permanent change in water use. As stated above the statute does not explicitly state that consumptive use under a water right can be conserved, but it does not forbid it either. This issues is taken up again in Seciton 4.

Water irretrievably lost is one component of water savings associated with better water management. In irrigation, irretrievable losses are arguably a small part of the amount of water that seeps into the ground during transmission and application. Seepage that returns downstream to surface waters or that recharges aquifers is clearly available to subsequent appropriators and was therefore explicitly excluded from the program under the 1987 Act. In other words the 1987 language effectively missed the desired objective by mis-defining the type of water savings that conservation measures were to achieve. In contrast the 1993 language makes it clear that any action beyond the point of diversion that increases water use efficiency is a valid conservation measure under statute.

Honhart (1995) also suggests that water users could not be certain in advance as to what percentage of conserved water would be allocated to them. The language did call for 25% of the conserved water to go to the state but left the exact figure to criteria that were to be established by rule stating that "more or less water should be allocated to the state under the criteria established by rule." In its place the 1993 amendment provide specific criteria specifying that at least 25% of the allocation would go to the state, subject to the states portion not being less than the proportionate percentage of public funding used to finance the measures (and not subject to repayment). The new language no doubt provided firmer sideboards on the allocation process but it is fair to say, as discussed in Section 4 below, it did not completely resolve the question of how much conserved water would be approved or allocated to the applicants.

A final limitation noted by Honhart (1995) is that under the original language the statute required the state to reject any proposal that did not meet certain criteria, of which one was that the allocation of conserved water not lead to injury. In other words if there was injury the state must reject the application. The 1993 language accommodates the potential for injury by stating that the allocation of conserved water would equal the conserved water less any water "required to mitigate the effect on other water rights" (ORS 537.470(3)).

Again it is safe to say that while the new language is much clearer it does not necessarily clarify ahead of time for the applicant what allocation will be received at final order. Still, as discussed in the next section, the new language does seem to have stimulated considerable interest in the program. Honhart (1995) notes that prior to the 1993 amendments to the Act only two applications were received under the program and that both were denied. Given the difficulties with the language in the 1987 Act it is not surprising that there were so few applications. With the new language in place, administrative rules were approved in December of 1994 and the first application received in March of 1996 from the Oregon Water Trust.

Honhart (1995) was clearly optimistic about the future of the program stating that the new statute gave water right holders more certainty and control as they evaluated whether or not to proceed with conservation measures and that Oregon's experience could eventually become a model for other western

states. Other perspectives in the literature are not often this positive. Economists from Washington State suggest that the Oregon legislative model might well be the least effective in saving water and promoting economically efficient water allocation (Huffaker and Whittlesey 2000). In related work, others suggest that policies that provide subsidies for conservation are unlikely to provide any real water conservation (Scheierling et al. 2006).

These negative views emerge from a number of concerns and misunderstandings, some real and some imagined. The first misunderstanding is the commonplace idea that water conservation actually increases water availability. This is a real misunderstanding but it does not obviate the potential benefits of the program. From a basin water budget perspective, water conservation increases water availability only when (a) water conservation refers to a reduction in consumptive use and (b) the saved water previously seeped through into the ground and never returned to accessible surface or ground waters. The first case can be ignored as water conservation under the program refers to water use efficiency not reductions in consumptive use. With regard to seepage, where this water subsequently refills aquifers or returns as groundwater discharge to surface waters then it is true that being more efficient in the use of this water does not make more water available to the basin. In these cases, groundwater pumpers and downstream out-of-stream users or instream water rights may already rely on this water. In which case, spreading water saved by conservation measures merely redistributes water from groundwater or downstream users to upstream users. In this regard then these authors are correct to sound a warning. Further, it is worth noting that public programs subsidizing water conservation may actually lead to higher consumptive use under existing water rights depending on a number of variables (Scheierling et al. 2006). In other words water-short junior users that invest in saving water will be able to make more water available to their crops, thereby increasing consumptive use.

While this first misunderstanding is important to identify and correct it does not bear on the case where stream flows are drastically affected by diversions and only recover once the return flow emerges downstream. In that intervening stretch, returning the water generated by water use efficiency improvements will not injure existing users and may have important ecological benefits.

The second misunderstanding on the part of these analysts is to place almost exclusive emphasis on the part of the program directed towards providing for additional out-of-stream, consumptive uses. For example, Scheierling et al. (2006) do not even mention the reallocation of such saved water to instream uses, yet in their concluding remarks they caution that environmental groups wishing to obtain water should – as with municipal water suppliers – focus on purchasing consumptive use rights. Alternatively, if the instream purpose of the program is recognized the writers seem to miss (or misunderstand) the utility of the program in restoring saved water below points of diversion.

For example Huffaker and Whittlesey (2000) dwell on the problem but reach an alternative conclusion from Oregon lawmakers. The authors examine an example in which a series of irrigation water users are spread out along a creek. They correctly point out that if a user in the middle of the creek is provided an incentive to increase their water use efficiency the water "gained" is found instream only from that users point of diversion down to the point of return flow. As the user did not alter their consumptive use, the amount available at the next point of diversion downstream does not change. Indeed diversions, consumptive use and stream flows further downstream are totally unaffected by such a conservation action. It is telling that the authors criticize such an incentive as merely an "intrabasin redistribution of water between instream flow and irrigation return flow rather than the creation of additional water" (Huffaker and Whittlesey 2000:54). In other words the authors assume that the increase in instream flow below the diversion to the point of return flow is of no importance and has no economic value.

This is merely a result of the way Huffaker and Whittlesey have structured their example. They assume that the irrigation rights are located from senior to junior along the stream (i.e. juniors are downstream)

and that the instream water right is senior and only needs to be called at the downstream end of the reach they analyze. Thus, the only conservation investment that creates value is the one that allows the downstream user to pump their full water allocation. The economic burden is on the junior irrigation user as the instream flow is assumed to be senior. An alternative scenario is easy to construct. If the middle user was a large senior user and the instream water right was junior the creek would run low or dry at that point and there would be value in restoring flow from the point of diversion to the point of return flow. Thus, Huffaker and Whittleseys' conclusion that focusing water conservation policy on seepage losses is economically inefficient and ineffectual is questionable.

Interestingly, Huffaker and Whittlesey (2000) go on to recommend California's water conservation statute which – as the authors note – has the exact definition of conservation found in the original language of the 1987 Oregon Act. In other words the authors feel that only water consumed or irretrievably lost is worthy of conserved water status. The authors comment that: "Oregon shifted to a less restrictive, but generally inappropriate, standard of water conservation in a misguided attempt to provide stronger private incentives for voluntary water conservation" (Huffaker and Whittlesey 2000:58). Again, this merely reflects that these authors are not making the connection between the large amounts of water diverted for irrigation purposes and stream flow problems. Rather they are focused on generating truly additional consumptive use water for out-of-stream use. This is revealed by their criticism of environmental groups that supported the revisions to Oregon statutes as laboring under "the mistaken perception that reduced diversion could be equated generally with reduced use" Huffaker and Whittlesey (2000: 58). But what if the groups' objective was stream flow restoration in key reaches rather than a reduction in consumptive use per se? As the companion paper in this series on water markets reveals, over-allocation of water rights and stream flow problems in Oregon are as much a result of seepage loss as consumptive use.

The review of the implementation of the Oregon conserved water program sheds further empirical light on these questions and allows further consideration of what general statements can be made in this regard and to what degree the local context determines the useful water conservation policy.

Apart from the hardnosed economic analyses reviewed above, much of the published literature portrays the conserved water program as of little consequence. The basis for this judgment lies in the level of activity seen under the program or the manner it is applied by OWRD. Observations made include:

- In the first ten years dating from approval of the statute, use of the statue was slow, with only three conserved water applications filed (Koehl 1998)
- the program remains largely unused, including a reference to "lackluster performance" (Boyd 2003)
- changes in the agencies methods for implementing the program have "essentially" eliminated the value of conserved water projects as significant tool for instream flow restoration (Neuman 2004)
- the Oregon program has had relatively few successful examples to date, in part because it is hard to find cases where the new uses will not injure existing water users (Fereday et al. 2004)

Still there are a number of authors who have positive things to say about the program or the general approach of using efficiency improvements to improve stream flows:

- the program has the potential to lead to significant increase in instream flows, but that this will be limited to circumstances where the major goal of the water right holder is enhancing stream flow (Boyd 2003).
- investing in water use efficiency can be an "excellent" way to obtain environmental water (Malloch 2005)

Perhaps the most qualified, yet accurate, statement is made by Benson (1995) who notes that the many approaches to stream flow restoration all hold some promise, but all are subject to their own legal and political difficulties, as well as costs that may be large and difficult to quantify. Some will succeed in certain circumstances and some in others, but given the instream need all approaches merit the chance to work (Benson 1995). With that in mind the next section examines the evidence so for in the case of the conserved water program.

3. Implementation of the Conserved Water Statute

Following on the amendments made to the conserved water program made in 1993 through 2007 a total of 55 applications were submitted to OWRD for conserved water. In this section a review of these applications is conducted in order to examine accomplishments, trends and patterns in the use of this part of the Instream Water Rights Act.

The baseline set of information employed here is the OWRD instream database shared by the Department. In addition the OWRD website was employed to access and download the final orders and certificates associated with each of the applications that has reached the final order stage. These documents were used to provide additional information about each project. Assumptions, interpretations and manipulations of the data used in the analysis are mentioned under the relevant heading below.

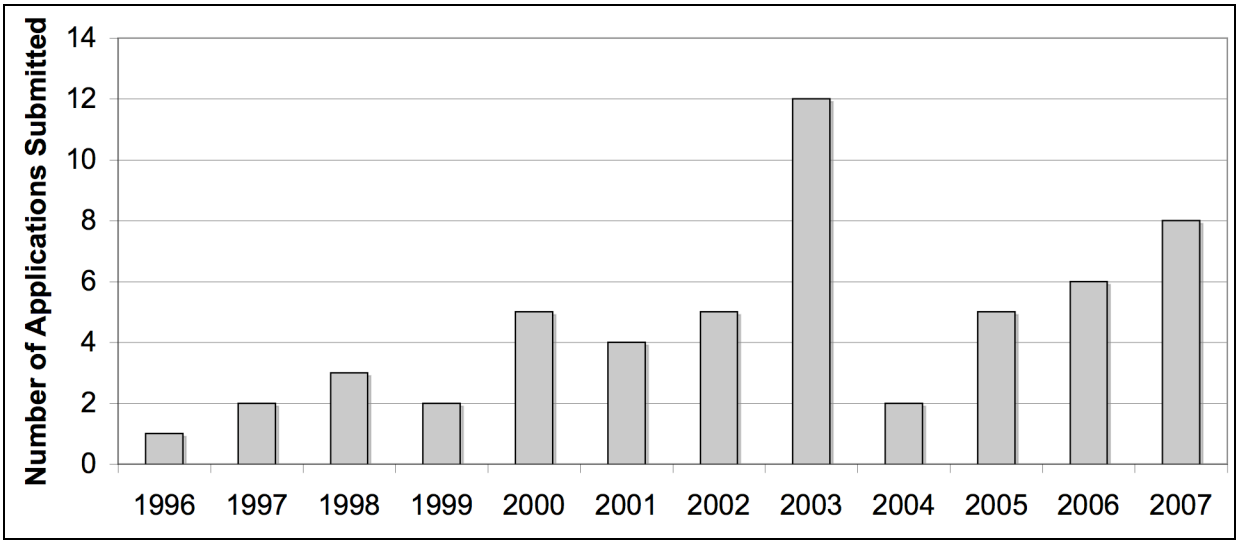
3.1 Program Activity

In this section applications filed from 1993 through the end of calendar year 2007 are used to portray the level of activity under the program. Final orders issued through April 30, 2008 are included in the analysis of results of the program.

3.1.1 To what extent have water users used the program?

Many commentators in the last decade or so have dismissed the conserved water program due to the apparent lack of use of the program. As noted above these opinions may have been based on information from the early to mid-1990s but as evidenced in Figure 1 this is no longer the case. There appears to have been a three to four year lag between the 1993 amendments to the legislation and the first few efforts to try out the program. This should not be surprising as new organizations formed to promote the use of the market-based mechanisms under the Instream Water Act were only in their infancy during this period. For example, the Oregon Water Trust was formed in 1993 and the Deschutes River Conservancy was founded in 1996. The operational capacity of each organization was only created in subsequent years. During the 1996 to 1999 period the number of applications rose gradually. Since 2000 applications have been submitted at an average of almost six applications per year. A spike of activity occurred in 2003 due largely to a surge of activity from the Umatilla Basin (as shown in Table 2) and dropped back to two applications in 2004 but otherwise the program seems to be seeing a continued annual level of use in the range of four to eight applications per year.

Figure 1. Number of Applications by Year of Submittal



Viewed from a basin perspective, the Deschutes is clearly the dominant user of the program with 23 applications submitted. Two of the Deschutes applications were withdrawn and subsequently resubmitted so the total for the Deschutes is actually 21. These two applications are omitted from consideration in the analysis in subsequent sections unless otherwise mentioned (bring the number of applications considered to 53). The Umatilla Basin comes in a close second with 14 applications. Apart from the Rogue with 7 applications, no other basin seems to have seen a steady and continued use of the program.

Table 2. Conserved Water Applications by Basin and by Year of Submittal

Year	Deschutes	Umatilla	Rogue	Hood	Klamath	Umpqua	Willamette	Grande Ronde	John Day	Malheur
1996			1							
1997					1		1			
1998			3							
1999		1					1			
2000	2	1				1		1		
2001		4								
2002	3				1	1				
2003	4	5	1	1					1	
2004	1		1							
2005	4	1								
2006	4	2								
2007	5		1	1						1
Total	23	14	7	2	2	2	2	1	1	1

Note: Two of the Deschutes applications were withdrawn and resubmitted anew; therefore the total number of effective applications in the Deschutes is 21.

3.1.2 How have applicants fared in completing the application process?

By the end of April 2008 a total of 37 applications had been final ordered (see Figure 2). Five of these are not yet finalized, in that their conservation measures are not yet complete or the applicant has

requested more time to finalize the allocation (for example to see if the water savings are confirmed by monitoring). The other 31 are fully certificated rights. Seven applications are on "administrative" hold meaning that the applicant is not pursuing their continued processing. Typically, this is due to another action that is pending before the conserved water application may move forward. Three applications were in active review as of the end of April 2008. Of the remaining applications 1 was denied, 5 have been withdrawn and two were withdrawn and resubmitted (as indicated above). This makes a total of 37 (67%) that have been approved and a total of 45 of the 53 applications (about 87%) that have been either approved or are still in process.

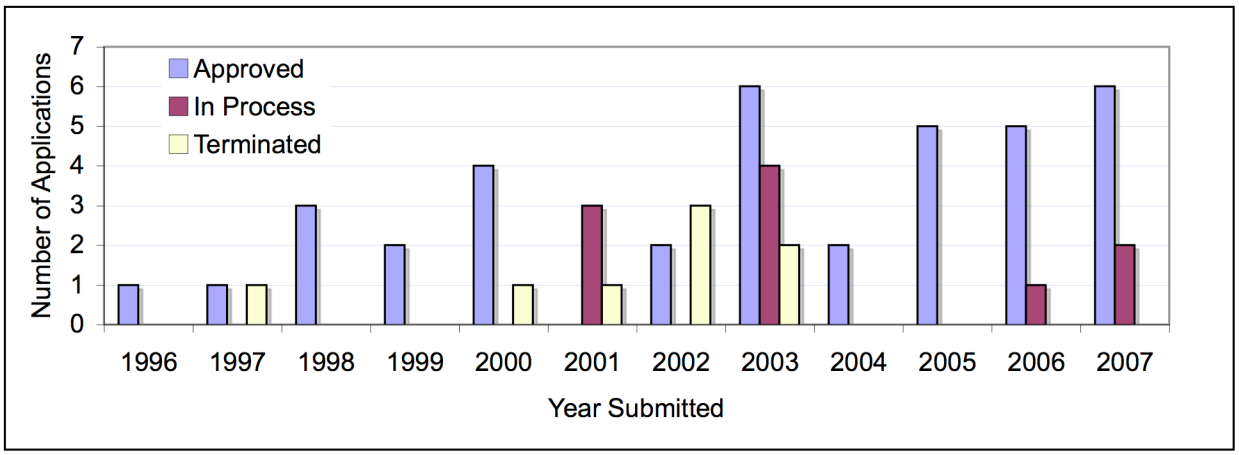
Table 3. Status of Applications by Basin

Status	Deschutes	Umatilla	Rogue	Umpqua	Will-amette	Hood	Klamath	John Day	Malheur	Grande Ronde	Total
Certificated	16	4	6	2	2			1			31
Final Order	3	1	1			1					6
On Hold		7									7
In Process	2								1		3
Denied							1				1
Resubmitted	2										2
Withdrawn		2				1	1			1	5
Total	23	14	7	2	2	2	2	1	1	1	55

Looked at basin-by-basin it is clear that only 6 basins have had successful applications. The Deschutes has fared quite well. As the two withdrawn applications were resubmitted – one of which is the one on hold – the Deschutes has succeeded in obtaining final orders on 19 of 21 applications. The Rogue has had a similar success rate. Progress in the Umatilla is more limited. All seven of the applications on hold are in the Umatilla and, according to OWRD, are largely on hold due to district remapping of water rights that is ongoing (Rice, pers. com. 2007).

Figure 2 presents the status of applications by their year of submittal. A number of the applications on hold were submitted in 2001 and 2003. Once related issues regarding the water rights are resolved they will likely move forward in the process. Of note is that the statute requires conservation measures to be undertaken within the five years prior to submittal of the application. Thus, if the hold up on these applications is due to other activities that are proceeding separately from the conservation measures, it should not be surprising to see some applications held in the queue for such long periods. The five-year look-back date is dated from submission of the application so these delays to do not threaten the projects or lead to risk of forfeiture. To some degree even if such potential delays can be foreseen, there is an urgency and a utility to going ahead with submitting the application. A final observation is that the bulk of the applications that were denied or withdrawn were submitted in the 2000 to 2003 period – with no applications being terminated in this manner since. This may reveal learning as to when, where and how *not to use* the program. However, it is not a positive statement that learning as to when, where and how *to use* the program has occurred, as the failure of initial efforts in the Klamath and the Grande Ronde has not been followed up by further applications.

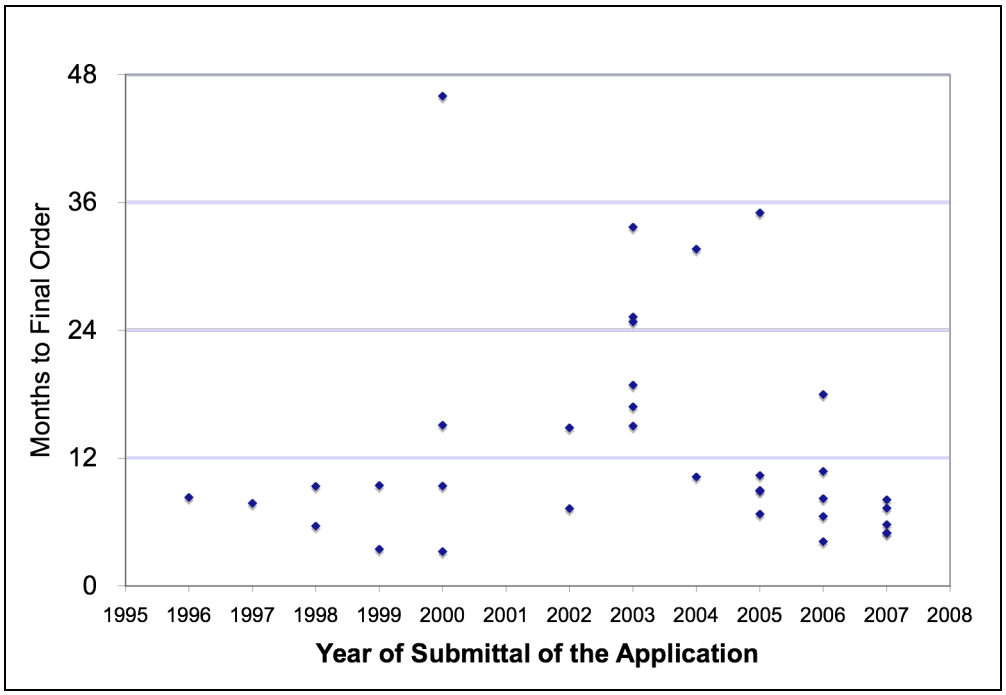
Figure 2. Status of Applications by Year of Submittal



3.1.3 How long does it take?

The implementation of any new regulatory program requires a lag time as learning occurs by those trying to use the program and on the part of agency staff charged with implementing the program. Figure 3 tries to capture this by examining the time taken to process applications, from date of submittal to date of final order. The dataset for this exercise consists of those applications that have made it through to a successful final order and also those that have exited the process unsuccessfully – as these also either have a denial order or a withdrawal date. Of these 42 applications, one was excluded from the analysis due to a calculated processing time of 51 days which suggests a data error – as the entire process cannot be completed in that short of a time even with fast turn-around times on each part of the process.

Figure 3. Processing Time to Final Order



The figure suggests that processing times have varied from less than one year to almost four years (in one case). The time elapsed may be considered as a result of the interaction between OWRD and the applicant, and the learning that occurs. In some cases OWRD data suggest that lengthy delays occur before the application is deemed complete and therefore ready for processing. This often reflects the applicant's lack of familiarity with the application form and what OWRD requires. In other case there are numerous issues raised by OWRD that must be dealt with by the applicant. So some final orders note a number of changes in the application made by the applicant (or the intermediary pursuing the application) along the way to a final order. In some cases, issues are raised regarding the originating water rights which require further assessment by either OWRD or the applicant. For example, on district canal projects the first time a conserved water application is filed for a canal OWRD will investigate whether the district is in fact ready, willing and able to divert the full face value of the water right before proceeding. Thus for example the first project submitted on the Pilot Butte Canal in Central Oregon Irrigation District took 10.4 months to process, whereas the subsequent project took just 6.5 months to final order. As already indicated in the Umatilla case, the application may be held pending the outcome of another process affecting the water right such as a re-mapping of district rights. A number of the applications were also accompanied by a transfer of water rights on the property involved. In such cases, it is typically the slower of the two processes that determines the time to final order as they often must be finalize concurrently. Honhart's (1995) view that water right holders could proceed without "costly engineering studies and legal representation" may indeed have been over-optimistic in hindsight.

Average processing time to final order is 13.1 months. One pattern that may be loosely observed from the whole data set is a slight upside down U-shape. It does appear that there was much more variability in processing time for applications submitted between 2000 and 2004. During this period the average processing time (per submittal year) was on the order of 20 months while in the previous three-year period and the subsequent three-year period average processing times were in the 5 to 9 month range.

A possible explanation for this is that the development of such a program goes through three phases. In the first phase the regulatory agency is as new as the applicant at the process. Eager to show the program is working and not having much experience with the projects and applications the early applications are quickly shepherded through the process, without undue questioning. In the second phase, the agency begins to worry whether it is fully taking into account all the elements needed to ensure that the agency is protected from any risk from the reassignment of rights. The agency typically then revises the application, requiring more information and documentation from the applicant. This subsequently slows the applicant down and leads to more incomplete applications. Once processing begins the agency will typically more fully investigate the application leading to some of the issues listed above. This second phase leads many projects to take significantly longer to complete. In the third phase, the agency gains confidence that it fully understands the requirements and analysis involved and the applicants (and intermediaries) are increasingly trained-up as to agency expectations. In addition, repeat applications from the same areas and from the same water rights greatly lower the investigative burden on the agency. In this third phase, processing times are shortened and the variability should be reduced.

As an indication of how fast the process can work under current agency requirements and in the case of repeat applications on the same water rights, an application for the Swalley Main Canal Piping project (CW-47) received a final order in 4.2 months and the applications for the second and succeeding phases of the McKenzie Piping project (CW-49, CW-50, CW-51) were processed in 5.0 months. Given that back to back 60 day periods are required for public notice and the protest period on the preliminary final order these approval times are about as fast as is possible. OWRD currently sets itself a target of five months to a preliminary final order and eight months to final order (Rice, pers. com. 2008). Given that planning and construction on these conservation projects typically takes two years or longer this is not an undue burden, as long as it is carefully integrated into the project timeline.

3.1.4 For what purposes has the program been used and by whom?

By far the predominant use of the program has been in conjunction with conservation measures undertaken with respect to irrigation water rights. Of the 53 applications only one was derived from another type of water right. In that case a forest products operation conserved water by altering its practices in watering logs. Generally the conservation measures fall into one of two groups. In the first, individual irrigators have undertaken some combination of water efficiency improvements on their lands and at their point of diversion. These include moving the point of diversion downstream, piping ditches, switching to sprinkler or other low water use application technologies. The other type of project is typically the piping of an irrigation district or company canal. For the 40 applications for which such information was available (principally the projects that have a final order) there was an equal division between these two types of projects. Given that the bulk of the applications for which the conservation measure is not currently known are from the Umatilla, where many of the projects are of the on-farm efficiency type, it appears that outside the Deschutes these on-farm projects have been the mainstay of the program. In the Deschutes, on the other hand, canal piping has been the predominant use of the program.

Table 4. Applications and Type of Conservation Measures by Basin

Project Type	Deschutes	Umatilla	Rogue	Hood	Klamath	Umpqua	Willamette	Others	Grand Total
Canal Piping	18	1		1					20
On-Farm Efficiency	3	4	7			1	2	2	19
Industrial Process Efficiency						1			1
Unknown		9		1	2			1	13
Grand Total	21	14	7	2	2	2	2	3	53

Not surprisingly the water right holder involved in the application pretty much coincides with this division between district canal piping and on-farm water efficiency. Irrigation districts have been the water right holders on 23 applications including all 20 of the projects identified as canal piping projects. Individual water right holders appear on 29 of the applications, including all 19 identified as on-farm efficiency projects. In one case of a withdrawn application the type of water right holder was not identified.

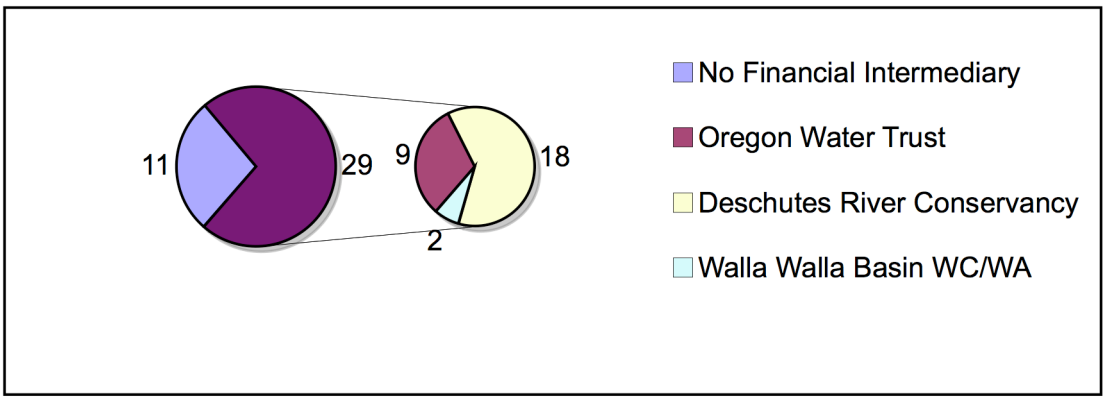
Besides the water right holders, the other key actors in the program are the intermediaries that purchase conserved water or fund the underlying projects (financial intermediaries), intermediaries that prepare and shepherd the applications (application intermediaries) and OWRD, who works with the applicants and their agent (if any) to process the application. Two non-profits, the Oregon Water Trust (OWT) and the Deschutes River Conservancy (DRC) have played an important role in the program by motivating landowners and districts to engage in these projects by offering payments for the purchase of conserved water that is dedicated to instream use. The funds for these purchases come from a number of sources including Reclamation federal funds, Oregon Watershed Enhancement Board state funds, and hydropower mitigation funds from Bonneville Power Administration (through the Columbia Basin Water Transactions Program) and the Pelton-Round Butte partnership between Portland General Electric and the Confederated Tribes of the Warm Springs Reservation (through their Water Fund). OWT and DRC are therefore actively using the window opened by the conserved water statute that allows a water right holder to save water and then in effect sell the right to dedicate it to instream use to a third party. In addition, these organizations typically carry out the application intermediary role as well.

Where there is no financial intermediary it can be said that landowners are taking advantage of the second provision of the conserved water statute. In these cases applicants do not require payment from a financial intermediary, rather they are taking advantage of the ability to capture and spread a share of their conserved water to out-of-stream use. In these cases, then the statute provides the incentive for the landowner to use the program and the task of advocating and planning for the instream component (at 25% or greater of the saved water) is handled directly by OWRD. In such cases the water right holder either hires an agent to be the application intermediary or works directly with staff at OWRD. In such cases, OWRD plays a larger role in the application process effectively becomes the application intermediary by default, helping the landowner through the process.

For the 47 applications completed or in process the breakdown of applications by source of incentive and type of financial intermediaries is provided in Figure 4. Information is available in 40 cases. Fully two-thirds (29) of the applications involve a financial intermediary, at least so far as can be determined from the data. The DRC is the intermediary in 18 cases, OWT in 9 and non-profit watershed groups in the Walla Walla Basin in 2 cases. In 12 of the 18 cases involving the DRC, all of the water has gone to instream use. In the others some portion has gone to another use. In only 1 of the 9 cases that OWT has sponsored has water been allocated to other uses. In other words, in a number of cases the projects are not simply cases of non-profits fully financing instream projects, but more complicated efforts in which irrigation districts (largely) or irrigators are also using the program to meet their needs. Further analysis of the significance of these two sources of incentives emerges below where the quantity of senior water rights put to instream as versus other uses under the program are compared.

In the other third of cases no financial intermediary is apparent and it appears the landowner has undertaken the project of their own initiative, possibly due to the opportunity provided by the program to spread water to new consumptive uses. Of these 11 cases in nine of them the applicants are taking advantage of water-spreading provisions. There are just two cases where there is no evidence of a financial intermediary and 100% of the conserved water is dedicated to instream use. In one case the landowner is supply mitigation for a separate transfer application (CW-52) and in the other the amount of conserved water is just 0.05 cfs. It is therefore safe to say that the program has not led to significant donation of water to instream purpose.

Figure 4. Financial Intermediaries for Engaging in the Conserved Water Program



Notes: The two projects in Walla Walla that appear to have financial intermediaries are sponsored by the Walla Walla Basin Watershed Council and the Walla Walla Watershed Alliance

3.2 Program Outcomes

In this section the 37 applications that have reached the final order stage by April 30th, 2008 are examined in order to understand outcomes achieved so far by the program.

3.2.1 What mitigation has been required prior to allocating conserved water?

The principal outcome of the program is the allocation of conserved water. Such allocations are approved subject to any mitigation required to avoid injury to existing water rights. For the applications that have been final ordered to date OWRD has only twice required a reduction of applied for conserved water in order to mitigate in this fashion. OWRD reports that in the case of some of the withdrawn applications it was the magnitude of the mitigation requirement that led to the withdrawal of applications (Rice pers. com. 2008). The two cases of final orders requiring mitigation are discussed below as they shed light on the circumstances under which the program may or may not be a useful tool in instream flow restoration.

The first case was an OWT application (CW-19) on Little Butte Creek in the Rogue Basin, filed in 2003. The conservation measures involved moving the point of diversion (POD) downstream and undertaking on-farm efficiency measures. OWRD determined that 100% of the conserved water, all of which was to be allocated to instream use, was available down to the new POD. However, OWRD determined that in the reach downstream from the new POD 100% of the water would be needed for mitigation. The allocation was therefore approved only in the reach to the new POD rather than to the mouth of Little Butte Creek as OWT had proposed. The rational was that the floodplain surrounding the creek is composed of alluvial soils and the seepage from irrigation applications "rapidly returns" to the creek and is available to downstream users.

This finding illustrates how the use of the program provides little downstream protection where return flows are immediate and rapid. In this case OWT gained instream flow due to the POD switch and not from the on-farm efficiency measures. Had the on-farm measures not resulted in reduced on-farm demand the irrigator would still have called on the full water right down to the new POD. The utility of the program in such circumstances depends entirely on the length of the reach that requires flow restoration and how the protected reach for the conserved water fits into a larger strategy to restore the dewatered reach. Further the utility of the payment provided to assist with on-farm efficiency rests on the assumption that the landowner would undertake the POD change without the accompanying investment in efficiency improvements.

The second case was an on-farm efficiency project carried out by Eagle Crest Resort in the Deschutes (CW-13). In this case OWRD issued a final order and certificate that makes the amount of water allocated to instream use as opposed to out-of-stream use conditional on whether or not Eagle Crest ultimately decides to use the water out-of-stream. This was done as Eagle Crest called for reserving their share of the water in an instream use pending a final decision on how to use the conserved water. The order calls for 25% of the conserved water to be certificated for instream use and an additional 5% to be certificated to instream use should Eagle Crest end up applying their portion of the water to land. The final order indicates that the project was fully funded by Eagle Crest and therefore the applicant was entitled to 75% of the conserved water. However, the order indicates that Eagle Crest agreed to take just 70% of the conserved water if they used the water for irrigation (of 43.85 acres). This addition to instream flow was imposed by OWRD as a form of mitigation for the potential impacts the out-of-stream use would have.

Indeed, in the final order OWRD states that the consumptive use associated with the new irrigation use could be expected to lower flows in the Lower Deschutes below Lake Billy Chinook by 71 acre-feet or 0.10 cfs. Later in the order it is stated that the benefits of the instream conserved water come in the form

of enhanced stream flow in the Middle Deschutes during the irrigation season. In the Lower Deschutes the order states that there would be benefit during the irrigation season and diminished flows at other times of the year. The order concludes that on net the benefits are positive. Presumably this is as a result of the additional 5% of mitigation water required by OWRD for the instream allocation. This extra 5% actually amounts to about 12 acre-feet. Implicitly then, an extra 12 acre-feet protected in the Middle Deschutes is judged to outweigh a loss in the Lower Deschutes of 71 acre-feet. A further difficulty is that OWRD's statement that the instream allocation benefits the Lower Deschutes may be true but could also be misleading. The basis for many decisions in other conserved water applications, transfers and leases is that return flows from irrigation seepage in Central Oregon appear at Lake Billy Chinook. Thus, there can be no net change in flow benefit from the instream allocation to the Lower Deschutes. If it happens that the prior return flow from seepage would have discharged in a smoothed, year-round fashion then any net benefit from sending all the water down the Deschutes as protected conserved water during the irrigation season would be an additional diminishment of Lower Deschutes flows during other times of the year.

The point of this discussion is to emphasize a fundamental problem with the conserved water statute. Taking water that was seepage and spreading the water to an out-of-stream consumptive use will increase consumptive use under the water right. If there are unmet junior rights downstream then allocating this water to the applicant for consumptive use is likely to injure the junior user (unless the seepage is irretrievably lost to the system as discussed in Section 2). Whether the downstream right is an instream or out-of-stream right is immaterial. In the case from the Rogue cited above, the instream reach was limited to the point of return flow because it might injure other existing out-of-stream uses. In the Eagle Crest case the benefits obtained in the Middle and Lower Deschutes during the irrigation season overwhelmed the diminishment of Lower Deschutes flows at all other times. However, there is an instream water right in the Lower Deschutes and it does go unmet at times, including at times outside the irrigation season. For example from 1975-2004 the instream water right in February was met only 69% of the time. The definition of injury in statute and rule does not contain a caveat regarding when and under what circumstance it can be applied (Amos 2008). If the potential for injury to a junior right exists then the conserved water statute calls for mitigation. It is not clear in the Eagle Crest case how 12 acre-feet of additional seepage water protected to Lake Billy Chinook mitigates for the increase in consumptive use.

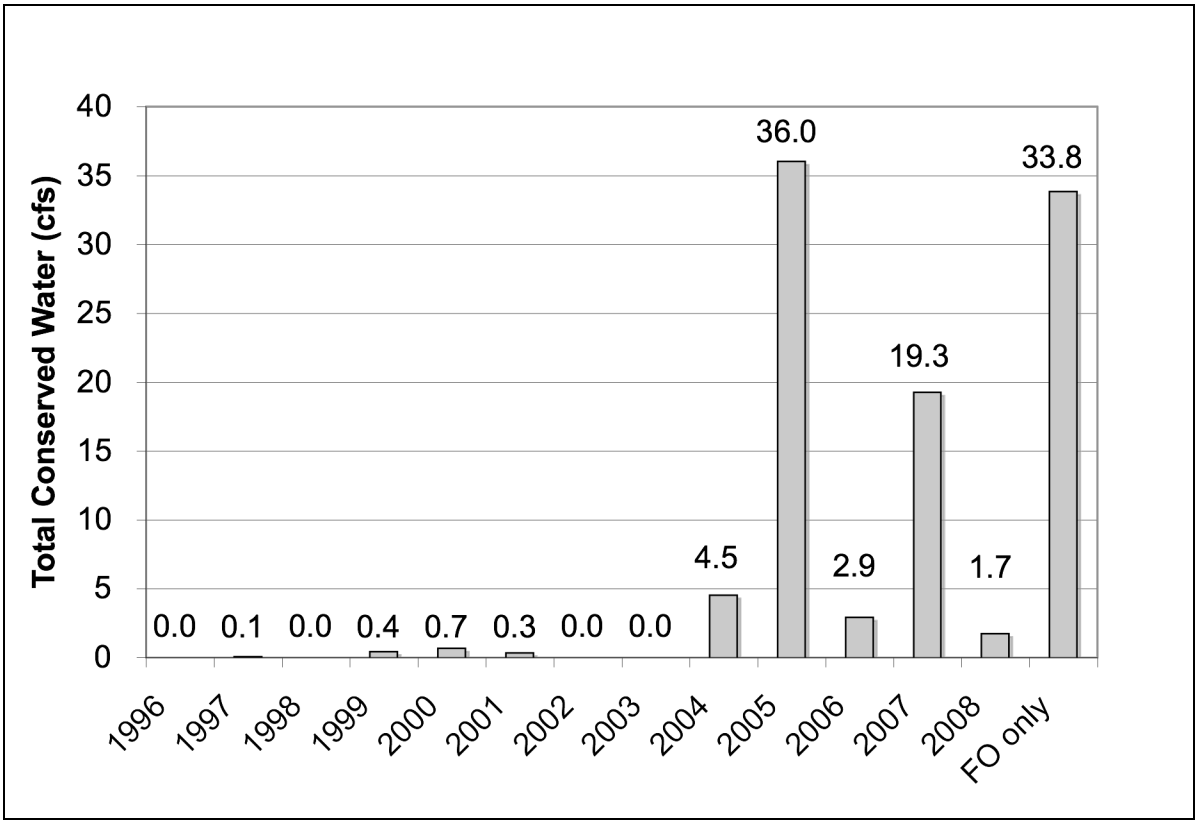
Further confusing the Eagle Crest case is the conditional language in the order. There are only two possible destinations for conserved water: an instream use or an out-of-stream consumptive use. If Eagle Crest opted to put water on new ground then OWRD would certificate an extra 5% of the conserved water to instream use. If Eagle Crest opted not to take this option the water would have gone to instream use anyway. Therefore, there was no need to postpone the certification. Under either case of what Eagle Crest might decide to do with the conserved water that 5% had to end up instream. Thus the conditional language in the final order was not necessary.

3.2.2 How much water has been conserved?

There are a number of ways to quantify how much water the program has conserved. The simplest and therefore first approach is to examine the total amount of conserved water recorded in the final orders and certificates. In Figure 5 the total conserved water under the program is summarized by year that the water was first activated – i.e. the first water year following finalization of the allocation. These totals include allocations for instream and out-of-stream use, i.e. the total amount of new rights created under the program. The figure shows that only relatively small amounts of less than 1 cfs were conserved prior to 2004. Whereas up to 2004 a total of 1.5 cfs was allocated, 96.2 cfs of conserved water has since been final ordered (for a total of 99.8 cfs). Of this water two-thirds has been finalized and the rights certificated. The remaining water rights (the "FO only" bar in Figure 5) have not yet been finalize by the project proponent and, therefore, have not yet been put to their new use (or certificated). Only in the last

few years then has the program begun to yield significant quantities of water. This trend may be growing. The two applications submitted in December of 2007 are for a total of 53 cfs (CW-54, CW-55). If approved, these two applications alone would increase the total amount of conserved water by 50%.

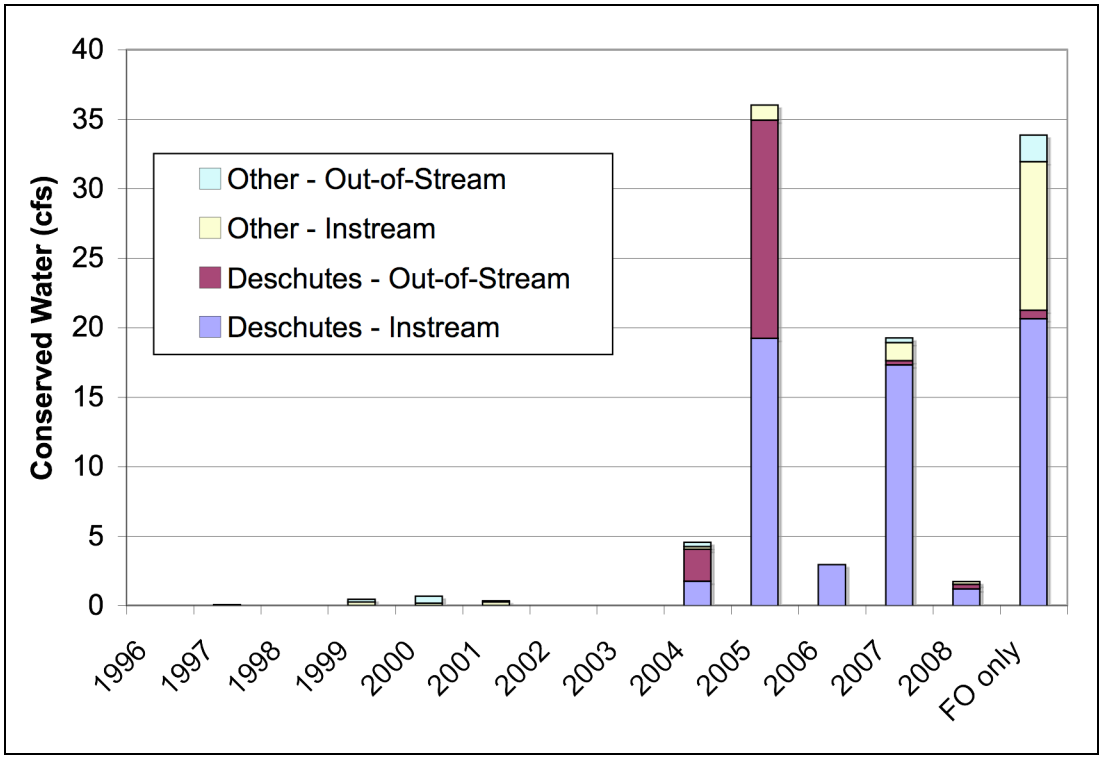
Figure 5. Total Amount of Conserved Water Final Ordered (by Year of Activation)



Notes: The 2008 numbers are for water final ordered and finalized as of 4/30/08; FO only numbers are for conserved water that has been final ordered but not yet finalized (and therefore not yet in use).

A further breakout of the totals by basin and by whether the water is for instream or out-of-stream use is provided in Figure 6. This shows that the bulk of allocations of conserved water in terms of rate of flow have taken place in the Deschutes, 82% and 82.3 cfs to be precise have gone to instream use. In the Deschutes 75% of the conserved water has gone to instream use, largely reflecting the impact of a single large project in the Tumalo Irrigation District (CW-9). The next closest basin is the Umatilla with 11.42 cfs of which 90% has gone to instream use – again largely reflecting the influence of a single large district project that has yet to be finalized (CW-38). Next is the Rogue with 2.5 cfs, 88% of which has gone to instream use. In the Umpqua and the Willamette the order is reversed with 73% of the 1.1 cfs of conserved water going to out-of-stream use. In terms of overall participation, it is worth pointing out that 77% of total conserved water goes to instream use (or 77.2 cfs). Taking the average of water allocated to instream use from each final ordered projects yields a comparable number of 80%. Take out the Tumalo project mentioned above and the percentage going to instream use rises to 90%. The predominant use of the program therefore has been for instream use. The out-of-stream rights created largely reflect a number of small, on-farm efficiency projects that were undertaken principally to spread water to land on or near the originating water rights. The exception would be an application filed in the Malheur in late 2007, which is requesting a 20 cfs out-of-stream allocation for irrigation (CW-55).

Figure 6. Conserved Water by Type and Basin



The DRC has been the principal financial intermediary so far with final orders accounting for 61 cfs (79%) of the instream water. The Walla Walla non-profits are involved in just under 10 cfs and OWT in 3.2 cfs. A final point is the relative contribution of the two main types of conservation measures implemented under the program. For projects final ordered to date canal piping has resulted in 72 cfs of instream flow. This represents 93% of the total allocation to instream flow. On-farm efficiency projects have resulted in 5.4 cfs of instream water rights.

3.2.3 How effective has the program been in providing for new water uses?

There are two primary determining factors in assessing the effectiveness achieved by creating an allocation of conserved water. First is the degree to which the new water right provides reliable access to water and second the utility of delivering water to the use. Each is discussed in turn below.

The first measure of the utility of an allocation of conserved water is the reliability of the water rights created under the program. This involves differentiating between "senior" and "junior" water rights or between "paper" and "wet" water. The distinction is best explained by an example. A water right certificate may grant the holder a right for 5 cfs but if there is only 2 cfs available in the creek the holder will not be able to access all 5 cfs. It is therefore said that the paper right is for 5 cfs because it is just a piece of paper and does not represent a right to "wet" water. If there are two users on the creek and the user with the 5 cfs right has a priority date of 1899 and the other user a priority date of 1900 then the 1899 right has first call on the 2 cfs. The 1899 right is the senior right and the 1900 right is the junior right. As seen here even a senior right can be cut back in times of low water availability. What is of interest here is the degree to which allocations of conserved water are senior and provide wet water. This is difficult to assess as hydrological conditions vary throughout the year and so even junior rights receive water during a portion of the year. For the purposes of this paper two questions are of interest: to what degree is the

instream water senior (or wet) and is there a difference in seniority between rights going to instream and out-of-stream use under the program.

It is not possible to generalize across Oregon basins as to what priority date represents a senior right. In many streams in Oregon the breakpoint between a junior and a senior right will fall somewhere between the 1890 and 1905 periods. However, the water rights involved in the conserved water program come from a small number of tributaries and basins. Based on the author's experience in the Deschutes, discussion with the former director of the Oregon Water Trust, and evidence presented in the final orders themselves all the allocations were parsed for junior and senior rights in order to establish an approximation of the amount of conserved water that is senior – as an indicator of the degree to which the water protected instream is wet water. This is an imprecise effort, but the best that can be achieved at present.

Table 5 reports on the analysis of the seniority of instream conserved water. Overall it appears that roughly three-quarters of the conserved water (measured in rate terms) is senior. As entities acquiring instream flow rights the DRC and the OWT have focused their efforts in the Deschutes and the Rogue respectively. It is interesting to note that the performance of these specialized entities on projects designed to restore flow have tended to produce much higher proportions of senior rights than efforts sponsored by the landowners themselves, such as in the Umatilla, John Day, Umpqua and Willamette. In these basins the proportion of senior rights is between 30 and 50% on average whereas in their target basins the DRC and OWT achieved over a 90% share of senior rights on average. This is not an unexpected result, but it points to the utility of having specialized organizations with an instream purpose engage in the program.

Table 5. Instream Rights and Seniority on Final Orders, by Intermediary and Basin

	Deschutes	Umatilla	Rogue	Hood	Willamette	John Day	Umpqua	Total
Final Orders	19	5	7	1	2	1	2	37
Instream Senior Rights (cfs)	48.6	10.1	2.1	1.1	0.1	0.1	0.0	62
Percent Senior Rights by Sponsoring Entity (average for the n set of final orders								
Landowners (n=11)	100%	16%	100%		55%	39%	31%	54%
DRC (n=18)	89%							89%
OWT (n=9)	46%	100%	92%	100%				89%
Walla Walla (n=2)		87%						87%
Total	88%	61%	95%	100%	55%	39%	31%	79%

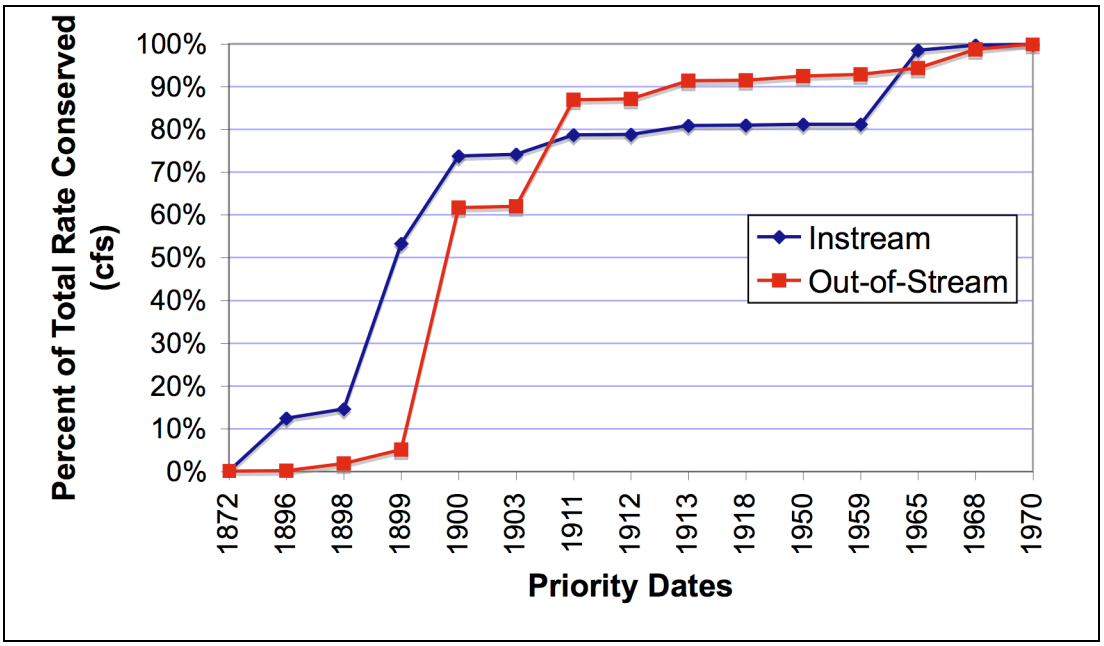
Notes: n refers to the number of final orders in the sample.

To state that the landowner applied for allocations tend to be less senior than those developed by the non-profit conservation organizations may be a little strong given the assumptions inherent in judging seniority across so many tributaries. Further, given the statutory language requiring in- and out-of-stream allocations to take the same priority date it is possible to also ask whether the instream rights created under the program are also more senior than the out-of-stream rights. While any cross-basin analysis has its drawbacks it is at least possible to ask if, generally-speaking, the priority dates on instream and out-of-stream allocations are different.

Using just the data on the 31 certificated allocations both the instream and out-of-stream rates were sorted by priority dates, summed by year of priority and then a cumulative frequency distribution created. The common priority date years where then used to stitch the cumulative frequencies together and plot them on the same graph. The comparison of the results for the two distributions is shown in Figure 7. The

results suggest that there is a difference albeit a modest one. A larger portion of the instream conserved water has an earlier priority date. So, for example over 50% of the allocated rate for instream rights has an 1899 or earlier priority date. Coincidentally the median priority date for all instream rights issued (not adjusting by rate of each right) is also 1899. For out-of-stream allocations only 5% of the rate has an 1899 or earlier priority date. Further, the median priority date for all out-of-stream rights issued is 1912. However, as shown in the figure, 62% of out-of-stream rate has a priority date of 1900 or earlier as compared to 74% for instream rate. Thus, the gap is transitory, but does suggest that instream rights generally have secured earlier priority date certificates than the out-of-stream rights. Examined simply by priority dates (and not factoring in the amount of rate or cfs associated with each application or date) 80% of instream rights are 1913 or earlier, whereas for out-of-stream rights the comparable priority date is 1959 or earlier.

Figure 7. Comparison of Priority Dates for Instream and Out-of-Stream Allocations



A last observation on seniority concerns how applications have used or not the provision to maintain the priority date of the originating right or take a priority date one minute later. In total ten of the instream rights have been diminished in this way. Eight of these were diminished on allocations that were solely for instream purpose (and did not spread water to out-of-stream uses). This occurred then in one-third of the allocations that did not involve any kind of out-of-stream uses. Of the two cases were this occurred on allocations with both instream and out-of-stream rights both right were diminished. According to ORS 537.485(2) the priority date must be the same for the portion allocated to the applicant and that allocated to the state.

The final question with regard to effectiveness is whether the wet water provided actually provides a valuable service. This question is not asked for out-of-stream rights. Any irrigation right is considered a beneficial use in Oregon. This is not necessarily the case with instream rights. While the Act does recognize that instream uses *are* beneficial uses, in practice this means is that they *can be* beneficial uses, under the right circumstances. With an instream rights the utilitarian calculus involves assessment of the extent to which the instream right is available when and where it is needed for the public uses defined in the statute, largely consisting of fish and wildlife habitat, recreation and water quality.

Clearly, it is difficult to assess the degree of public benefit derived from an incremental increase in stream flow for the purposes of fish and wildlife habitat. However, as part of the review of each application OWRD does consider the potential instream benefit in making its final order. Most of the allocations are for instream rights in reaches where Oregon Department of Fish and Wildlife (ODFW) has received (or applied for) an instream water right for fish and wildlife purposes. In these cases the review is straightforward. The ODFW junior instream rights are junior and therefore the new rights are assigned to fill these rights – but with a more senior priority date. To the extent that the new rights created through an allocation of conserved water are senior rights, such instream rights create value by making good on ODFW's determination that instream flows are needed in the reach. In a few cases, particularly those initiated by landowners, ODFW had not applied for or received an instream water right in the applied for reach. In these cases OWRD consulted with ODFW in determining that an instream use was indeed beneficial. Judging the ecological utility of the rights created under the program are beyond the scope of this paper. However, it is important to recall that where these conserved water allocations are developed by the specialized non-profits, these allocations are typically part of larger efforts that involve the leasing and transfer of water rights so as to begin meeting the junior instream flow rights with wet senior water. The need to justify these transactions with funders such as those listed earlier typically ensures that the allocations create value in terms of fish and wildlife habitat.

3.3 Summary of Findings on Program Implementation

A number of conclusions can be drawn regarding the implementation of the conserved water program:

- the program is really not 20 years old, but more like 10 years old
- the program has seen a growing and significant level of interest in terms of applications, particularly since 2000
- OWRD and the non-profit intermediaries involved in preparing and processing transfers have moved successfully through a host of issues involved in processing applications and are now achieving an efficient and timely turn around on allocations of conserved water
- the program has been used more for the purposes of spreading water to instream flow protection than to out-of-stream uses, but there has been activity on both fronts
- the program has resulted in significant and growing allocations of conserved water, particularly as irrigation districts have seen the benefit of the program as a source of finance for piping medium and large-scale delivery systems
- the program has seen significant use in the Deschutes and a minor level of use in the Rogue and Umatilla Basins, otherwise only a smattering of uses in a few other basins are found and many basins have yet to try the program
- specialized non-profit entities oriented towards using the program for the purpose of instream flow restoration have achieved a high proportion of senior rights in their allocations of conserved water
- initial analysis shows that instream rights certificated under the program as a whole have earlier priority dates than the out-of-stream rights
- the Deschutes River Conservancy has been responsible for sponsoring the vast majority of instream water rights created under the program

4. Issues, Concerns and Opportunities

Interviews with OWT, DRC and OWRD were used to supplement the literature and implementation review to ascertain what issues, concerns and opportunities lie ahead for the program. These are pursued at two levels:

- how does on-the-ground implementation match up with administrative regulations, statute and policy and what lessons can be learned from this and where do difference of interpretation and opinion remain between those involved in the program
- what are the day-to day detailed lessons learned through implementation of the program and what details and aspects of the program require further consideration and work

4.1 From Law to Implementation

It is worth stating that the single largest user of the program is extremely enthusiastic. In the view of the Deschutes River Conservancy the ability to move water to a non-consumptive, instream use on a permanent basis is an invaluable aid to instream flow restoration (McCaulou, pers. com 2007). The discussion below should therefore be taken as consideration of ways that the program could be improved or as advice for other states as they examine the Oregon example.

4.1.1 The utility of program provisions

Spreading water to consumptive uses. Over the 14-year history of the program reviewed here, the total of out-of-stream water rights created under the program is 1,196; however, this includes the Tumalo Irrigation District project that served to adjust water rights within the district rather than create new irrigated lands (CW-9). Subtracting these acres from the total reveals that final orders under the program have supported new irrigation rights of 406 acres. Whether or not these lands had previously been irrigated under other rights was not investigated. In any event, it is clear that the use of the program to spread water to new consumptive uses has been insignificant in terms of number of applications and the amount of new rights.

Nor is it at all clear that the use of the program by applicants desiring to spread near the limit of 75% of the saved water to a new use has made any real contributions to ecosystem restoration. Only five projects have maximized the water spread to consumptive use, putting 70 to 75% of the conserved water to a consumptive use. These projects have put between 25 and 30% of the saved water instream, for a total of 1.44 cfs. Meanwhile the instream component of the program has accounted for a total of almost 100 cfs of restored stream flow. In other words not only has the use of the program to spread water to new consumptive uses been extremely limited, but it also has not been a factor in the demonstrated success of the program with respect to the creation of new senior instream water rights. This is worth emphasizing as it was precisely this aspect of the program – and concerns that spreading seepage loss to new consumptive uses would lead to injury – that was criticized in the literature, as reported earlier in this paper. Further it was also this aspect of the program that was highly touted in developing the legislation itself.

Probably, the more important question is whether the incentives provided under the program for landowners to spread water to new consumptive uses makes sense at all. Given the possibility (as discussed in Section 3.2.1 regarding the Eagle Crest example) that the harm to existing agricultural users and instream water rights from spreading water in this manner may outweigh any benefit from 25% applied to instream use raises the question of whether this provision of the Act is good policy. Given the

over-allocation of basins in Oregon it certainly seems that in most of the cases where water has been spread to new uses there has likely been injury to existing water rights. (Conversely in basins where water is available new rights can be obtained for free simply through application, so there is no need for this provision). The analysis and documentation provided in the final order does not typically address this concern. As basins are increasingly closed not just to further surface water appropriations but also groundwater appropriation it may not make sense to continue allowing new consumptive water rights to be issued on the back of saved seepage water.

In sum, the program appears better off simply as a tool for spreading water saved in consumptive, out-of-stream uses to that of non-consumptive instream uses. In particular, exploration of whether the program has applications to large conserved water projects in basins other the Deschutes would be of interest. For states considering how to provide incentives for instream flow restoration legislative design may well wish to include only provisions for spreading saved water to instream use, leaving out the incentive program for spreading water to new out-of-stream uses. As noted above limiting the program to its instream component does not prevent water-short users from partnering with conservation groups to share the saved water from jointly financed projects. In such a case the conservation group simply applies for a new instream water right for its proportionate share of the saved water. The user takes their saved water in the form of a more reliable water right (after the conservation measures).

Minimum of 25% of allocation to the State. The law states that an allocation of conserved water made to the state will be evaluated as to whether the water is necessary to support instream flows and, if not, the water will revert to the public for appropriation by juniors – in other words it will not be certificated as a new right. This provision is not necessary when all or a part of the motive for the project is instream benefit. In such cases, due diligence by the buyer will ensure that the water is needed for instream flow. Where the motive is purely to spread water to a new out-of-stream or consumptive use the provision seems logical in that the applicant must give up 25% of the water and if there is no instream need, then there is no reason for the state to create an instream water right. On the other hand, if there is no unmet instream need it calls into question why the water right holder needs to allocate 25% of the water to the state. Recall that the conserved water comes off the water users certificate. If the objective of the program is to provide every incentive for efficiency it would make more sense to first determine if there is an unmet instream need and, then, if no need exists allow the user to capture 100% of the water in their allocation.

This is not a major practical issues given that many, if not most Oregon streams are over-allocated, that most conserved water projects are undertaken at least in part for instream benefit, and that eliminating the mandatory 25% going to the state would not have any traction with environmental groups. In any event, given the small number of projects that have maximized their out-of-stream allocation and the general lack of reasons to pursue the spreading of water to out-of-stream, consumptive uses this provision of the legislation is of little consequence.

Maximum of 75% of allocation to the State. The law also provides that the applicant should receive at least 25% of the conserved water unless they forgo this by proposing that more than 75% goes to the state. In other words, even if the project is paid for in its entirety by public funds (or if it is funded somewhere between 75% and 100% by public funds), the applicant can still request that they retain 25% of the conserved water. This provision has been used only twice to date. Typically, existing conserved water projects have been funded entirely by public funds they have generally been explicitly for instream purposes. Naturally, the funding agency has required as a condition of the contract with the water right holder that 100% of the water go to instream uses.

One exception was a project in the Rogue funded by the Bureau of Land Management (BLM) on BLM land. The project was funded internally, meaning 100% public funds, but the BLM wanted to spread the

water on the property. However, due to the public funding provision, OWRD allowed BLM to receive only 25% of the water, with the remaining 75% going to instream use (Rice pers. com. 2008). Another exception is the Hudson Bay piping project (CW-38) that was final ordered in April 2008, but is not yet finalized. The final order provides that 8% of the conserved water go to out-of-stream purpose but the final order also states that potentially 100% of the funding for the project would come from public sources that purchase money for ecological restoration. As the purchase of the instream water has yet to be completed, the final allocation of conserved water remains to be seen. In the BLM case it can be argued that applying water to new uses on the property is a public use funded by public monies. In the Hudson Bay case a private party appears to be benefiting from a project that is 100% publicly-funded.

Further, in the case where irrigators have unreliable water rights they always have the option of investing in conservation measures and leaving a portion of water saved out of the conserved water application (or not using the program at all). In such cases the apportioning of water saved and investment made is done prior to the application for conserved water and 100% of the conserved water goes instream and the water users still are able to firm up their supply. In such cases the 75% provision appears largely needless.

The 75% provision may be instrumental where a water right holder has conservation measures funded largely by a government program and that program does not explicitly require saved water to be protected instream. For example, under Farm Bill funding through the USDA Environmental Quality Incentives program (EQIP) program there is no requirement that the water saved by dedicated to an instream use. Rather, no change to the affected water rights is made and the saved water simply goes to the next user in line (which, note in some cases may be an instream water right in Oregon). In this case, if the water right holder wishes to capture and spread some of the saved water to irrigated additional lands then the only way this can be accomplished is through the use of the conserved water program. Note that this incentive to participate for private landowners was one of the premises of the program. However, the fact that there is little evidence of this happening suggests that this combination of events is unlikely: a more than 75% public-funded project with a water right holder who wants to expand to additional acres or other uses – and who is aware of the program. In this regard it is worth noting that even Farm Bill programs like EQIP pay only up to 75% of eligible conservation practices (Scheierling et al. 2006).

In sum, while the maximum 75% allocation to the state may have been a reasonable threshold to apply to a new program, and could serve to motivate participation in the program – in practice it is of little consequence and is largely unnecessary. If a project is 100% publicly-funded and part of the rationale for the funding is environmental, then there is little reason why 100% of the water should not go to instream use.

4.1.2 Treatment of instream conserved water in comparison to out-of-stream rights

Non-profit conservation groups would generally say that out-of-stream water rights are typically not well maintained by users nor carefully monitored and regulated by OWRD – the exception being the larger, well-managed irrigation districts (and particularly Reclamation districts). When a water user enters into change application – whether a lease, transfer or conserved water application it is then, and only then, that bright lights are turned on and the rights are subjected to full scrutiny by OWRD. Generally, this applies to changes to out-of-stream *and* instream use. The question is not then how an existing right is treated versus a change in right, but whether there are differences between how changes to out-of-stream and instream uses are carried out.

A simple example comes from an on-farm efficiency project in the Walla Walla sub-basin of the Umatilla that resulted in water conserved for instream and out-of-stream use (CW-11). Many out-of-stream water rights in the Walla Walla Basin do not have seasons of use specified on their certificates. In the final order on CW-11, OWRD states that the typical season of use for irrigation is mid-March to mid-October. The

new out-of-stream use on the allocation of conserved water does not mention a season of use but includes the following phrase: "All other terms of the original certificate, including those of the decree, shall be included in the certificate." The instream right created under this allocation is however subject to the following order: "The certificate shall provide for the use of flows from April 1 through October 31st and at any other time during which the originating right is being exercised." This example shows how a new instream right is subjected to a limitation of the right – in this case the season of use – that is not applied to the existing right, nor applied to the new out-of-stream right.

The example further illustrates how vague and conditional language can be introduced into a final order and certificate when OWRD tries to provide some flexibility. In this case the phrase "any other time the originating right is being exercised" is unworkable and certainly provides no assurances as to the extent of the water right for instream purposes. If it is typical for irrigators in Walla Walla to turn water on in mid-March – typically prior to snow melt and rising flow levels – this may be a period that instream flows will be in jeopardy and need protection. If this right were senior and subject to the same provisions as the original right it would automatically be called upon and protected instream in early March. However, in this case the final order means that the ability to call on the water depends on whether the originating right is being used. What if the owner of the originating right is on vacation? The difficulty is of course that change applications do provide an opportunity to begin to address past deficiencies in defining the reasonable outer limits of water rights. However, if the intent is to tighten up on water rights administration as rights go through change processes then, in this case, it is unclear why the new out-of-stream right was not subjected to the same language as the originating right.

This is a minor example to demonstrate the type of result that would be necessary to observe to justify the perception by conservation non-profit entities that instream rights are held to a higher standard or are viewed as second class water rights. Amos (2008) takes up this argument in detail with respect to water transfers and finds a number of areas where instream water rights are treated differently than out-of-stream rights (under existing statute). Water transfers and conserved water allocations are authorized under different portions of statute and, therefore, the rules that govern the administration of these two types of changes to water rights are distinct. That said, Amos (2008) conclusions apply pretty much equally to conserved water as they are as much about the status and treatment of instream rights as they are about transfers. To Amos' list should be added the observation raised earlier that whereas any irrigation use is deemed beneficial, this is not the case for instream uses. In order to create a new instream water right – particularly through a change application – the new instream right must meet a series of criteria before passing muster. Any instream use is not judged beneficial, just a specific subset of instream uses. With respect to conserved water this is seen in ORS 537.470(3) which allows the Water Resources Commission to pass on allocating 25% of the conserved water to instream use: "if the water allocated to the state is not necessary to support in-stream flow purposes, it shall revert to the public for appropriation by the next user in priority." Water is treated differently when an out-of-stream use wants to dedicate their portion of the allocation to irrigation. The state does not double-check that the use is in fact beneficial – the fact that the applicant desires to turn water to the use is sufficient.

Thus, there are a number of ways in which the perception of a double standard has emerged. The examples above range from relatively minor and highly specific administrative issues to broader problems of inequitable treatment actually called for by statute. Thus, the perception of inequity has real basis, but may in some cases be attributable to legislation rather than administrative interpretation. Further, it may be fair to say that this perception is fed in large part by the comparison of how existing out-of-stream rights are treated versus new instream rights. It is much harder to find specific cases - particularly for allocations of conserved water – were inequitable results are found for instream versus out-of-stream rights. Over all the treatment of instream rights under the program has been very even-handed. This, of course, does not mean that those using the program have had an easy time with the processing their applications. As noted in Section 3, the time and effort involved in moving projects through the process

has at times been considerable. In part, these delays reflect continued back and forth over how to implement the program and this has often involved issues of detail and documentation; including aspects not explicitly foreseen or specified in legislation. This may make the applicants task more difficult and time-consuming and lead to the perception that conserved water applications have been selected for onerous treatment due to their instream benefits. As always OWRD faces a challenge in determining what level of assurances it must have that an applications meets the requirements laid down by the legislation. The analysis in this paper does suggest that perhaps this phase of the program is largely complete as processing times are coming down and with that presumably the processing costs.

4.1.3 Elimination of partial forfeiture and the incentive to use the conserved water program

In 1997, the Oregon Legislature made important changes to Oregon's forfeiture doctrine. Previously the statute stated that if a water right owner:

> ceases or fails to use all or part of the water appropriated for a period of five successive years, the failure to use shall establish a rebuttable presumption of forfeiture of all *or part* of the water right [emphasis added] (ORS540.610(1))

The language added to ORS 540.610(3) states:

> If the owner of a perfected and developed water right uses less water to accomplish the beneficial use allowed by the right, the right is not subject to forfeiture so long as:
>
> (a) The user has a facility capable of handling the entire rate and duty authorized under the right, and
>
> (b) The user is otherwise ready, willing and able to make full use of the right

A question raised by Koehl (1998) is whether the removal of the risk of partial forfeiture will affect the incentive to use Oregon's conserved water program. The simple answer is no. As Koehl (1998) relates, prior to 1994 the department had not actively pursued enforced the partial forfeiture provision. Therefore, withdrawing the provision would be expected to have little practical impact.

Still, it would seem that were the partial forfeiture statute in place and proactively applied then there would have been much more of an incentive for users to employ the conserved water statute. This is the intuition followed by Koehl (1998) in arguing that removal of partial forfeiture would nullify the incentives for farmers to engage voluntarily in the program. Certainly, in this regard removing partial forfeiture removed a potential "stick" that would have compelled water users into employing the program. A mitigating factor here is the look-back period provided under the program. As one reason senior users may not be using their full water right may be the increased use of water efficient sprinkler systems (in place of flood irrigation) and as this transition often took place in the 1980s, these water rights would not have been eligible for transfer under the program. So the "stick" may not have had the merit expected by Koehl (1998). At the heart of market-based programs is the concept of additionality, i.e. that participation is limited to those that have invested in carrying out an action that they otherwise would not have bothered to undertake. Therefore, the expectation that the having the partial forfeiture statute in place would lead to more participation in the program is actually erroneous.

Had all users with excess diversion capability been allowed to quickly convert this water into new out-of-stream consumptive use rights this would have been a perverse not a positive outcome, for both junior out-of-stream users and instream uses. Further, if undertaken on a large scale this would have had significant impacts on water management in Oregon and, most saliently, on relations between junior and senior users. What would in fact have happened would have been opening up the Pandora's box of

underutilized senior rights. Junior users would normally expect to be subsisting on this unused water. Thus, any effort to broadly threaten seniors with partial forfeiture and engage in subsequent efforts to conserve this water – for example for instream use – would have led to considerable friction and animosity between junior right holders on the one hand, and senior users and conservation interests, on the other.

In other words, the removal of partial forfeiture has probably not had a widespread effect on the use of the program. Whether it has had the intended conservation benefit of reducing the incentive for water users to pile on water so as to ensure they are not subject to partial forfeiture is not analyzed here. Rather the idea behind the program was to provide an incentive for existing users and conservation groups to provide additional financing to undertake additional conservation. This is the "carrot" part of the program, and a key element of the program (Honhart 1995).

In this regard, there is one specific set of circumstances where the new forfeiture provisions have impaired the incentive to participate in the program. The language inserted specified a new standard for maintenance of the full measure of the water right, being that the user is "otherwise ready, willing and able to make full use of the right." Agricultural water users understandably place great importance on their water right certificate. The difficulty comes when over time the need to use the full amount on the right is reduced and economic realities dictate that repairs and maintenance – even the installation of new facilities like fish screens – are sized proportionate to the actual use of water and not the water right per se. This can lead to larger users, particularly irrigation districts, ending up in a situation where they are not in fact able to divert the full measure of their right. In this case, fear of losing the full amount on the water right may lead water users to avoid the program.

Over time OWRD has increased its scrutiny of the so-called "ready, willing and able" provision and now will routinely assess whether a water user meets this condition before proceeding to process a conserved water (or transfer) application. This can, of course, lead to confusion and arbitrary decisions as nowhere is it made clear the point in time at which the user needs to be ready, willing and able. There may also arise questions regarding whether the conditions apply to the rate or volume, or both. The knowledge that OWRD will first resize the water right has therefore led to some cases of water users being unwilling to take part in conservation efforts for fear of a reduction in the face value of their water right. In other cases, irrigation districts have been willing to wade in and go through the process. The difference is probably largely one of being confident that irregardless of OWRD findings that the remaining water right and, indeed, the capacity of the delivery system is sufficient to ensure supply to all water users on the system. In other words, this should not be a major problem for well-informed and managed districts that are comfortable working through water right issues with OWRD.

4.1.4 Using the conserved water program to promote deficit irrigation

The status of the program with respect to the saving of consumptive use versus seepage water is ambivalent. As reviewed in Section 2 the legislation does not limit conserved water to seepage or consumptive use, preferring to define it as the amount of water that the water right holder can, in effect, give up following on the conservation measure. OWRD states that deficit irrigation projects have been approved for conserved water. However, due to the nature of a water right as the sum of the consumptive use and seepage water necessary to generate the beneficial use, whether or not conserved water has come from deficit irrigation cannot be ascertained from applications or final orders.

True deficit irrigation projects involve a reduction in the consumptive use of water. Deficit irrigation emerges from scientific and economic analysis demonstrating that certain crops can be under-irrigated and generate more net farm income. In other words, the dollar savings in terms of water and other inputs saved will exceed the dollar value of reduced crop yield. The percentages involved are usually relatively

small, as large deficits can severely impact crop yield. Thus, unless the water right was reduced to below the amount of water reasonably required for consumptive use it would not be possible to ascertain how much, if any, applied for conserved water represented water formerly going to consumptive use. Where efforts to increase water use efficiency through limiting seepage are also part of an application the difficulty of distinguishing between consumptive and seepage savings only increases. The reason why this might be significant is that consumptive use savings are in fact "new" water. It can be argued that spreading such water to other uses will not lead to injury – as is always possible with the reallocation of seepage water. Thus deficit irrigation really represents a different type of project than traditional water use efficiency projects.

A further problem is that deficit irrigation reflects a change in farming strategy. Such a change can be reversed. Thus, it can be questioned whether savings generated by deficit irrigation would be best realized through a permanent change in the water rights, as with the case of conserved water. The difficulty is that Oregon statute does not enable the leasing of a portion of the duty (volume) associated with a water right. It is necessary to lease all of the water on a portion of irrigated land. Therefore, the interest in pursuing the conserved water statute as a means to reallocate water freed up in this manner. Ultimately, providing an enabling environment for transacting in water saved through deficit irrigation or crop switching may require amendment of existing statute and/or regulation – altering either the conserved water or leasing programs, or adding a new program. It is worth noting that the original language in the Act would have been well-designed to support the reallocation of deficit irrigation savings – except for the permanent status of the change.

4.1.5 A few more issues

One additional question as to the scope and application of the program was identified through conversations with conservation non-profits and review of final orders:

- Why is the 25% that goes instream required to be in the originating reach? Why can't the conserved water be protected in another adjacent reach if the on-the-ground project affects multiple reaches and the water can better serve flows elsewhere without affecting existing rights?

A number of additional small and rather detailed issues surround questions that might benefit from clarification (probably in regulation) under the program:

- Is the 25% allocation to instream use or even the percentage split based on proportion of public financing applied to the rate or duty of conserved water, or both? In cases where the water right is manipulated (or shaped) in going from the originating right to the new rights there is the possibility that the amount of water will not meet the 25% threshold. On CW-3 this in fact happened with the instream allocation ending up at 24.2% of the conserved water when measured in rate terms.
- Where the water rights involved in an allocation of conserved water have a variety of priority dates how are these to be split? On the basis of the agreed upon proportions of instream and out-of-stream rights for each priority date or just for the overall amount of conserved water? For example CW-9 provided different priority dates and amounts to the conserved water splits. In this case it happened as part of a large, negotiated project, but generally it is not clear from the statute how this case should be treated.
- The statute provides for allocations of conserved water to be based on proportion of public funding (when greater than 25%). For projects that are final ordered in advance of construction it is not clear that documentation is sought to confirm these proportions and allocations once the project is completed and the conserved water is finalized. The potential variance in actual project costs and financing suggests that scrutinizing this in detail may be of limited practical value. In most cases the instream component is defined by a contract that includes the financial terms. That the applicants agree to the initial allocation is probably sufficient. In any event, the participants are able to modify

the allocations prior to finalization if significant deviation from expected financing or water savings are observed – although this has yet to occur.

- The rules for the program call for submission of maps, but the content of the maps is not specified leaving this to the discretion of OWRD. These might be maps of the project, maps of the reach, maps of the served lands or some other aspect of the application. Ensuring that this requirement is interpreted in a way that actually informs the process rather than merely imposing an additional information requirement is helpful to all concerned.
- The statute provides for a 5-year look back period for conserved water but is not definitive as to the point in time that should be used to determine when this clock starts with respect to the "implementation" of the conservation measures. Is this when the project is physically initiated or completed? Or when the project begins saving water? For example, for a project that is started in November, 2000 and takes two years to complete does the applicant have until November, 2005 to file or is it November 2007? Or is it five years from when the water is first turned on in the spring of 2003, so until the spring of 2008?

A final issue is raised by multi-year irrigation district conveyance projects financed with the assistance of the DRC. Funding available from conservation funders, such as those available under the Columbia Basin Water Transactions program, typically require a final order and certificate as evidence that a conserved water project is complete and ready for final invoicing. This poses a problem when the on-the-ground project is a multi-year effort and the funders operate on a yearly basis. In particular a project that is segmented into yearly portions may yield small amounts of instream water for each portion. Under current OWRD rules the protection of water downstream through the originating source stream into a receiving stream relies on the water being "measurable" in that receiving stream. Thus, a multi-year project that is broken up into sequential conserved water projects may, as a whole, be "measurable" but, when taken individually, may fail OWRD's test of being measurable. A prospective solution would be to file an application for the full project and then incrementally finalize and certificate each portion of the project. This would eliminate the need to file repeated applications on a multi-phased project, which just consumes additional resources and time. This of course accepts the premise that measurability is a valid test for protecting water in a receiving reach – an issue addressed in the discussion of this topic in the companion paper on leasing and transfers.

4.2 Lessons Learned

4.2.1 Communication and timeliness

In interviews with conservation non-profits and OWRD both agreed that keeping open lines of communication to discuss and resolve problems arising on an application is critical to timeliness. Where expectations regarding how an application will be evaluated have little foundation due to the novelty of a process it has often been the case that the applicant chooses their best interpretation of the data and sends the application to OWRD (perhaps hoping that it will simply be approved as is). Practical experience has shown that in many cases views on the many issues involved in an application – from the trivial to the significant – can often vary between OWRD and the applicant, and that this is particularly so once OWRD is up to speed on program implementation. The lesson learned through the conserved water program is that the "just send it in" approach leads to an unproductive iterative game, where applicant and department go back and forth in pursuit of their objective.

What has proven more effective is to schedule a pre-application meeting or conference call to discuss the particulars of an application and perhaps review a draft application, in order to check expectations on both sides as to what constitutes an acceptable application on both sides. Conducting a preliminary review of applications with OWRD has helped to ensure completeness of applications as well as to provide a forum

for advance discussion of areas where either side is uncertain of how best to proceed. In the case of applications in the Deschutes, the DRC and OWRD have now agreed that an 8-month timeline, if all goes well, is reasonable for conserved water projects. This does not commit OWRD to the timeline but establishes and expectation that DRC can build into its project cycle.

4.2.2 Working with irrigation district water rights

Experience in developing conserved water projects with irrigation districts have led to a number of important lessons learned:

- large conveyance system efficiency improvements have accounted for the major of the water saved under the program
- prior to developing conserved water applications with irrigation districts or large irrigators it is advantageous to first have OWRD review the evidence that the irrigator is ready, willing and able to divert the full face value of the water right – if not this will change the starting point for the conserved water application and the user may be reluctant to reduce their right
- in planning for multiple allocations of conserved water in one district (or on one water right) it is vital to plan these in sequence as each allocation will reduce the originating certificate and hence change the starting amount of water

A final point with regards to irrigation districts illustrates how, despite the existence of statute and rule, there is often enough uncertainty about how a new program should be applied and enough latitude in the regulations to permit the genesis of interpretations that can turn into either dead ends or showstoppers. For example, when potential litigation to stop or modify conserved water applications by district patrons emerged a few years back, OWRD briefly considered requiring all patrons served by a district conveyance that is affected by a conserved water project to be identified on the application. There was also some indication that perhaps all of these users might be required to sign the application. The additional time and resource costs of specifying this on the application and the potential difficulty of obtaining so many signatures could have proven prohibitive. In the end, OWRD decided against the idea. Indeed the requirement that managed districts maintain a district-wide and Board-approved conserved water policy probably helped in this regard. But this example highlights how even once a program is relatively well developed and increasingly seeming to be on a routine footing, there can be new ideas and issues that arise that can prove to be important stumbling blocks. For better or worse, conservation non-profits must remain aware that this can happen and be capable of marshalling a knowledge of statute and regulation in order to work through these as they arise with OWRD.

4.2.3 Best intentions aside

While both applicant and department can be expected to make their best effort, it is inevitable that errors are made in the preparation and processing of applications. Catching these errors can be difficult given the complexity of the applications. The lesson is that these projects are complicated and mistakes can be made and they will be hard to detect even by the proponent and the Department. It is actually a tribute to the capability and diligence of the Department staff and their counterparts that so many projects have been processed and finalized without a greater mistake rate. Of the final orders reviewed for this paper only one had to issue a correcting final order.

Over time the information burden on the applicant has increased. The data reviewed above on processing times suggests that the applicants and department have ironed out a lot of these issues and requirements so that processing proceeds in a relatively timely fashion. Nevertheless, there remain a few issues (as reported in Section 0) to be worked through. More to the point, however, it may be worth asking if the program now really lends itself to use by individual water right holders, particularly those holding

relatively small water rights and who may not have the capacity or interest to respond to the information requirements of an application. Further, the complex nature and amount of information requires implies more resource costs and time in preparation by the applicant and the department. Designing and implementing conservation measures is an expensive task for landowners and districts. Adding to this the cost and difficulty of determining how much water has been saved may be a significant and onerous additional cost. For conservation non-profits the costs involved in finding and developing projects with willing participants, including meetings, negotiations, contracts, engineering, reporting, etc. are considerable. For small projects such costs may be prohibitive.

It is worth at least suggesting that at some point a facilitated discussion on ways to improve the efficiency of the program and lower transaction costs be undertaken. Certainly, it seems that the perception of the program by those familiar with water rights and water management – but not the program per se – is often that it is better avoided due to the costs involved. While this may be a misinterpretation that this paper can help address it is also worth asking whether the program really has any future for individual water right holders or for applications for small amounts of water – given the time and effort required to prepare and process an application. Perhaps for smaller application or for repeat applications there could be a short form developed that would still meet OWRD need for due diligence.

5. Conclusions

Critics of water management in the West often claim that prior appropriation provides no incentive for water users to avoid waste and conserve water. Motivated to inspire water conservation, in 1987 Oregon launched its conserved water statute. Revised several times and with a major redesign in 1994, the conserved water program is probably the most thorough effort to explore incentives for water conservation and instream flows in the West. The most talked about part of the program provides incentives for out-of-stream water users to invest in water use efficiency improvements water and then spread a portion of the saved water to new out-of-stream consumptive uses, as long as the remaining saved water (no less than one quarter of the total saved water) is dedicated to support instream flows. The less talked about part of the program allows the transfer of the saved water to non-consumptive, instream uses with no loss in date of priority.

This paper reviews conserved water applications submitted through 2007 and approved by the end of April of 2008 by the Oregon Water Resources Department. The analysis shows that the majority of approved and certificated rights under the program have been new instream rights derived from large piping project carried out by irrigation districts and the Deschutes River Conservancy in the Deschutes Basin. The innovative, market-based incentive to spread water to new consumptive uses has only infrequently been used and has not resulted in significant spreading of water to new out-of-stream uses or ecological restoration. The most-discussed part of the program has been the least used. This is not to say that the program has not provided indirect incentives for agricultural water users to invest in conservation. The ability of the DRC to capture its proportionate share of investments in piping projects in the form of conserved water and new instream rights has led to innovative cost-sharing arrangements with irrigation districts in the Deschutes. Water-short districts have continued to invest their own funds in water efficiency project alongside those of the DRC when, and as, they see benefits from firming up their own junior water rights. These arrangements have in turn led to enduring partnerships on collaborative, long-term water management in the Deschutes (Aylward and Newton 2006).

Evaluating the Oregon conserved water program leads to the conclusion that creating new instream water rights on the basis of water efficiency improvements has the potential to provide financial incentives for water conservation. However, given that a majority of successful applications have come from one basin

there remains a question of the degree to which this type of mechanism has more widespread applicability. That said, the lack of understanding and support for the Oregon program – in the literature and in practitioner word of mouth – has not helped to spur broader applications of this new water management tool.

In response then to the overarching question of whether the Oregon program is the answer to conserving water under prior appropriation it can only be said at this point that in some places and under certain conditions it can well be. Certainly, it provides a legal mechanism for transferring saved seepage water – which has economic value for instream use, even if it is not a "new" source of water supply. An important caveat is that application of the program for instream purposes will be financially viable only where the reach between diversion point and the point of return flow is one of particular concern with regard to low stream flow and the need for ecological restoration.

As with the developments of other market-based environmental management programs that involve regulation by a government agency, transaction costs remain a significant hurdle. As discussed here these costs are often most significant for the first efforts to apply the statute to a new geographic area or water right. Not surprising then that the program has seen most use in the case of large-scale conservation projects that are implemented with a single water right. The repeated use of the program in multi-year programs of canal and ditch piping in larger irrigation districts in the Deschutes has provided significant instream benefit while minimizing transaction costs. Indeed, as shown strikingly here, the transaction timelines first ballooned and then shrank as OWRD and the DRC worked through and solved the many practical issues involved in applying the program.

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