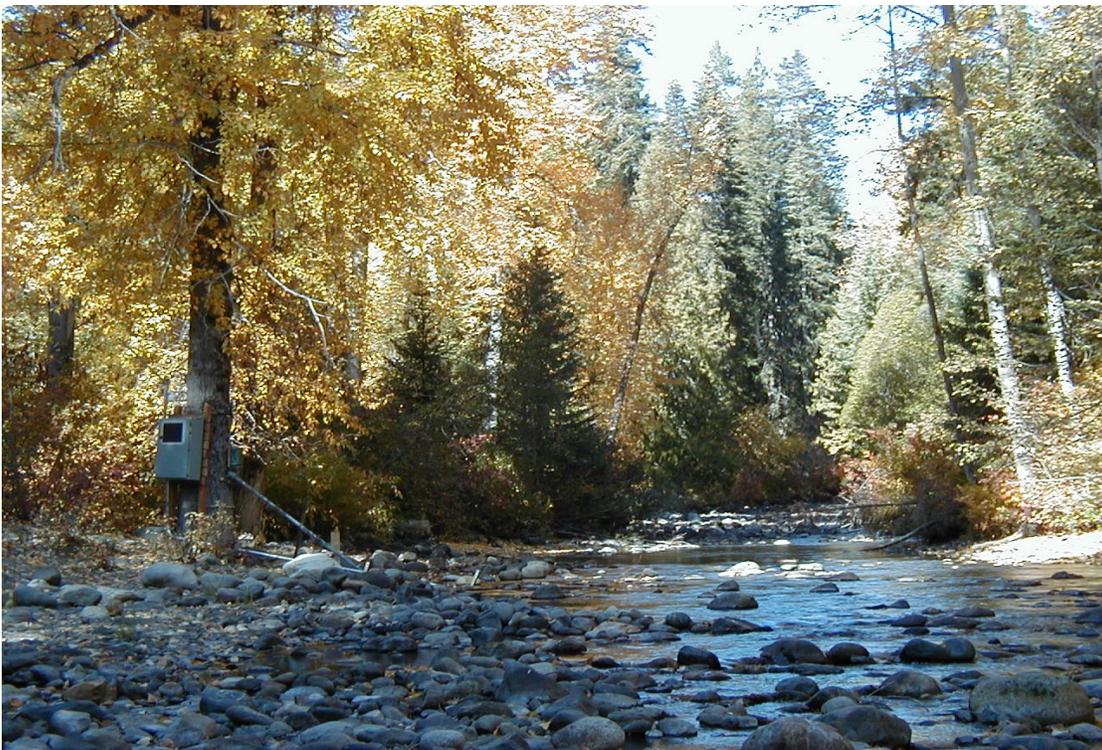




Report to the Legislature

Actions and Progress on Water Use-Efficiency



December 2003

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SUMMARY

Purpose of Report

This report describes actions by the departments of Ecology (Ecology) and Health, Office of Drinking Water (ODW) to implement water conservation and water reuse measures in Washington State (referred to further in this report as “water use efficiency” measures). The report is required under the 2001-03 biennial operating budget.

Advantages and Need for Water Use Efficiency

Water use efficiency is critical to ensuring the long-term sustainability of water supplies. Water use efficiency is becoming increasingly important as water demand rises. Its great promise resides in the idea that increasing knowledge, sophistication, technology and care can save substantial volumes of water and increase the productivity of each unit of water that is used. Water use efficiency can produce a variety of benefits including:

- Increased economic profitability
- Enhanced environmental protection
- Reserve water capacity for future uses
- Save water and wastewater infrastructure costs
- Reduce operating and maintenance costs for treatment of water
- New water development
- Conveyance and distribution.

Barriers to Water Use Efficiency

There are barriers to implementing water use efficiencies. Public policy and funding have favored interventions that serve to increase water use (supply side solutions) over policies and funding that lead to restraining water use (demand side solutions). These policies include the "use-it-or-lose-it" provisions of state water law, publicly subsidized water allocation and management programs as well as subsidies for water supply and treatment infrastructure. Limitations in metering source water, service metering and compliance actions as well as inadequate regulatory authority together have further restrained a move toward water use efficiency. Policy and funding have also favored the disposal of wastewater over the integrated planning for responsible restoration and reuse of our water supplies. More recently, there has been a move to remove some barriers and incorporate more water efficiency incentives and tools into water policy and practices.

Actions and Accomplishments

The following items are actions and accomplishments by the ODW and Ecology, (primarily the department’s water resources and water quality programs) in implementing water efficiency measures:

- **Technical assistance.** Provided assistance to small- and medium-sized water systems and launched a water conservation campaign (ODW).

- **Water metering program.** Implemented a program to meter 80 percent of the water use in 16 fish-critical basins and incorporated metering requirements into other water rights across the state.
- **Agricultural irrigation.** Worked with the Washington Conservation Commission to provide funding for agricultural irrigation efficiencies with saved water going into trust to improve stream flows. Also funded conservation projects through the Referendum 38 program and modified program rules to increase the conservation incentive.
- **Commercial and industrial.** Provided technical assistance to commercial and industrial enterprises (primarily food processors) to reduce water consumption, reduce water treatment volume, reduce costs and improve profitability.
- **Reclaimed water.** Provided technical assistance, funding and support for 17 existing water reclamation facilities and numerous planned projects.
- **Other actions.** These include incorporating water efficiency provisions into adjudication and other legal settlements, reviewing water system plans for conservation opportunities and other actions that promote water use efficiency.

Conclusion

Though still modest in scale and in its infancy, water use efficiency is emerging as an important tool in water management. Its increasing importance is driven by physical limitations surrounding water availability and financial cost pressures for additional supplies. Both the departments of Health and Ecology have increased their level of expertise, funding and actions to support the water efficiency efforts of communities, agriculture and businesses. These initial efforts are producing water savings which also provide environmental and economic benefits.

I. Background - Water Use Efficiency

Purpose of Report

This report describes actions by the departments of Ecology (Ecology) and Health, Office of Drinking Water (ODW) to implement water conservation and water reuse measures in Washington State (referred to further in this report as “water use efficiency” measures). The report is a requirement of the Fiscal Year 2002-03 state operating budget directing the agencies to submit a report to the Governor and appropriate legislative committees. It includes activities and achievements related to water conservation and reuse including technical assistance, reuse project development activities and water conservation achievements during the past four years (Fiscal Years 1999-2003).

Advantage and Need for Water Use Efficiency

There is emerging recognition about the necessity and advantages of increasing water use efficiency. The potential benefit from these advantages varies by project and their unique circumstances but includes:

- **Alternative water source.** Reduces pressure to develop new water sources and obtain new water rights. In effect, water efficiency can serve as a new water source. New water is often not readily available in many areas due to impairment of senior rights, declining aquifers, streams with inadequate flows and limitations on Ecology’s capacity to process new water rights.
- **Future capacity.** Leaves water for other instream or out-of-stream uses. This serves as a form of insurance providing a margin of safety by preserving capacity for future needs, unanticipated opportunities and droughts.
- **Operating/maintenance costs.** Decreases operating and maintenance costs, including lowering electrical power costs by requiring less plant capacity for pumping and treatment of water and wastewater.
- **Capital costs.** Delays, avoids and restrains capital costs to develop, treat and convey additional water sources, supply infrastructure, and reduces needed wastewater treatment capacity. Not only are costs for water supply facilities decreased, significant capital savings can be achieved because of the corresponding decrease in wastewater facility capacity.
- **Water quality benefits.** Can improve water quality and simplify or eliminate the need for water rights and wastewater discharge permits by using high technology alternatives, including closed-loop systems. This helps maintain water quality by reducing wastewater going into streams and keeping water and assimilative capacity in streams. Conversely, efforts at improving water quality can result in substantial water savings.

- **Economic advantage:** Increases business competitive advantage by reducing costs of inputs (e.g. water, its treatment, related plant infrastructure, maintenance, power and wastewater treatment costs, disposal costs and permit related costs).

By leaving water in streams and aquifers for other beneficial uses, the concept of water use efficiency more closely aligns the economic values of minimizing inputs (water and its costs) with the values of protecting the environment. This congruence of economic and environmental values fits with the concept of “sustainability.”

Barriers to Water Use Efficiency

The potential benefits of water use efficiency are often unrealized because of a number of significant barriers:

- **“Use-it- or-lose-it.** Traditional Western water law, including the water code in Washington state, can provide a strong incentive against water use efficiency. This provision of water law is formally termed relinquishment and more informally as “use-it-or lose-it.” In its stripped down form, it means that unless water is used to the full extent that’s been authorized under a right or permit (short of waste), the water reverts back to the public for potential future reallocation. Washington water law contains a dozen exceptions to the relinquishment provisions. Likewise, there are several “sufficient causes” for non-use of water specifically cited, including:
 - Exemptions for municipal water providers. These include a broadened range of water providers covered under the newly enacted municipal legislation.
 - Protection from relinquishment by placing it temporarily in trust under the trust water rights provisions and pulled back out when needed.
 - Other exemptions include drought, military service, legal proceedings, reduced irrigation needs due to varying weather conditions, and several other reasons.

While these provisions offer a variety of protections from the “use -it or-lose it” problem, there is still concern that the remaining relinquishment provisions discourage water use efficiency. Efforts are now underway as part of the Washington State Water Strategy and the 2004 legislative session to remove the remaining disincentives to water use efficiency due to “use-it-or-lose-it” provisions of current water law.

- **Perception of water abundance.** Washington has been viewed as a water-rich state without a need to consider limitations on water supply beyond devising impressive methods of moving water to where and when it was needed. A rainy west side, substantial mountain snow pack that functions as a reservoir and mighty rivers, tributaries and aquifers have richly provided for the needs of a growing state. However in more recent times, as state population and economic activity blossomed, a more complex water picture began to emerge:

- **Moderate to low precipitation.** With slightly under 40 inches of average annual precipitation (Sea-Tac), even the wet west side of the state receives less moisture than other parts of the nation including the East, Southeast and Great Lakes regions of the country. Only a small portion of rain falls during the summer and early fall when it is most needed. On the east side of the state, Yakima’s average annual precipitation is about eight inches (8.18) which puts it in the same range as Albuquerque, New Mexico (8.12) , El Paso, Texas (7.82), and Boise, Idaho (11.71). This region relies heavily on the contribution made by the abundant mountain snow-pack to meet summer and autumn water needs.
- **Threatened fish/water competition.** The threat of extinction of once plentiful fish stocks and their need for sufficient water has served to draw attention to water limitations not only for fish, but also for a host of other water uses, such as growing communities, commercial enterprises and farms.
- **Water shortages.** Dry streams, declining aquifers, deeper wells, growing areas where additional water allocations would impair current users or would require mitigation, highlight physical limitations to water supplies, especially during summer dry spells and droughts.
- **Global warming.** The emerging consensus is that global warming and climate change will disrupt the typical Northwest climate cycle and cause potentially significant negative impacts on the volume of water available for summer and autumn needs.
- **Upside-down economic incentives.** A number of perverse incentives have long been at work in water to neutralize and reverse economic signals that would otherwise provide an economic advantage to the development and adoption of water efficiency alternatives over new water sources:
 - **Virtually free.** Except for a nominal initial application processing fee, the user’s cost of water as a commodity has been practically free. There are no costs to the user for the ongoing public costs of managing the portfolio of water rights (allocation, compliance, adjudication, date, etc.). Instead, they are paid broadly by taxpayers. Under these circumstances and unless other factors are at play (e.g. no water physically available and/or long delays in new water rights processing) it does not make economic sense for a potential water user to pay costs for water efficiency measures or developing and using non-water or low water using technologies. As “new” water has become more difficult to obtain, a market for existing water is developing (including water rights change processing). This is beginning to introduce price signals and economic incentives to water.
 - **Subsidized conveyance and treatment infrastructure.** In contrast to cost of the water itself, the cost of developing a water source, treating it to suit the intended use and conveying it does come at a price that can be quite substantial. These water development and conveyance costs can spur adoption of water efficiency alternatives. However, a long-standing history of subsidized water projects and

expectations for future public subsidies has neutralized this potential water efficiency incentive by spreading the costs of water source development, storage and conveyance beyond those directly benefiting by project. Thus water users are shielded from market signals that would spur substitution for water inputs and restrain water use.

- **Environmental cost not factored in.** The cost to the environment for additional water use is normally not priced or paid thus putting water use efficiency alternatives at a disadvantage (e.g. the value of fish, wildlife, assimilative capacity for waste water, etc.). Currently, there are provisions allowing applicants for new water allocations to cover the costs of mitigating the impairment effects of their additional proposed water use on senior water users, including instream flow limitations. These costs can serve to spur the adoption of water efficiency alternatives. However, this potential economic incentive is neutralized when mitigation costs are subsidized.
- **Rate structure.** Rate structures that are not pegged to volume used, or providing discounts for higher use, may serve to increase water use. This may also drive a need to over-invest in supply capacity and make it financially difficult for a supplier to encourage water use efficiency since it could cause revenues to drop below those needed to support their current fixed costs and capacity.
- **Not metering water use/limited compliance.** Unless water is metered at both the source of water and service connections of water users, it is difficult for water users and others to determine how much water is being used and how to manage water use. This shortcoming is being addressed with a water use metering program focused on source metering in 16 fish-critical basins. See “Water Use Metering” section below. Water rights compliance work to insure water use is in keeping with water right limits, or that users in fact have water rights, is quite limited. This serves as a disincentive to water users to adopt water efficiency measures while increasing the incentive to use water beyond the limits of a water right or do so without a legal right.
- **Supply-side support.** There is a mature and robust water supply industry with expertise, institutional support and financial rewards to increase water supply capacity. Generally the projects are capital intensive, tangible, predictable, can be done at various levels of scale and produce jobs. In contrast, the water efficiency side is in its infancy and there is a low level of awareness, understanding and support. Projects tend to be smaller and require tailored solutions. While they typically require capital expenditures, a number of other “softer” tools come into play. These include adopting new technologies, improving production processes, reconfiguring operational and maintenance practices, changing rate structures, training, outreach, marketing and behavioral changes. The “boutique” quality of these solutions makes them more difficult to package, sell, and build institutional support. But as more sophisticated “water smart” techniques are applied and become better known, support and market share is likely to increase, especially in the face of physical limits to water availability.

In summary, while water use efficiency measures have several inherent economic and environmental advantages, they have been offset by public policy. While existing water law and recent funding have provided some support to water use efficiency, the predominant weight of public policy and funding has been directed towards governmental interventions that increase use of water (supply side solutions) over policies leading to restraining water use (demand side solutions).

Legal Authority

While conservation and water use efficiency is not at the center of water law, there are provisions in law addressing water conservation, waste of water and efficiency:

- Provides general authorization for the Department of Ecology to be engaged in the preservation or conservation of water (RCW 43.27.A.090)
- Directs Ecology to reduce wasteful water practices by those exercising water rights (RCW 90.03.005)
- Makes it a crime against the water code to waste water (RCW.90.03.400)
- Prohibits waste of ground water (RCW 90.44.110)
- Encourages water use efficiency, conservation programs and practices (RCW 90.54.180)
- Encourages the use of reclaimed water (RCW 90.46)
- Addresses the development of local watershed management strategies to increase water supplies through water conservation, reuse and reclamation (RCW 90.82.070(2))

There are other laws including the recently enacted Municipal Water Supply – Efficiency Requirements Act, Chapter 5 Laws of 2003 (Municipal Water Law) that includes requirements for water use efficiency (further information in next section).

Funding

With concern over dwindling fish stocks and the Endangered Species Act, funding was provided to target increases in technical assistance and other actions to promote water use efficiency. The following funding from the state general fund was provided:

Water Use Efficiency Technical Assistance Resources

Activities	FY 99-01		FY 01-03	
	\$s	FTEs	\$s	FTEs
Ecology				
Conservation (Water Resources Program)	797,000	1.9	766,000	2.75
Reclaimed water (Water Quality Program)	342,500	2.0	327,000	2.0
Department of Health, Office of Drinking Water (conservation and reuse)	678,000	3.5	678,000	3.5
Total	\$1,817,500	7.4	\$1,771,000	8.25

In addition to new technical assistance funding, substantial project funding was provided through a number of other efforts described further in this report. These include metering, agricultural irrigation efficiencies, reclaimed water, and technical assistance for commercial and industrial projects.

II. Actions and Accomplishments

Services to Communities and Water Providers - Department of Health

In support of the Governor's Salmon Recovery Strategy, the 1999 Legislature provided funding to the ODW for enhanced public health and fish protection. Specifically, funding was provided "for technical assistance to local governments and special districts on water conservation and reuse."

This funding positioned the ODW to develop a utility focused water use efficiency program that incorporated two complimentary approaches. A direct technical assistance program (supported by new funding) was added to ODW's established program that focuses on water system planning. The details of ODW's conservation planning program can be found in the joint ODW/Ecology publication entitled *Conservation Planning Requirements: Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs* (Health Pub. # 331-008, Ecology Pub. # 94-24).

The following describes the key elements of the direct technical assistance approach:

Targeted Assistance

Three full-time positions were established, one in each of the ODW's three regional offices. The ODW oversees more than 16,000 public water systems to assure they have the capacity to provide safe and reliable drinking water. The technical assistance program was targeted at small and medium sized water systems serving between 100-5000 connections. While ODW also works with larger systems when requested, this group was selected for the following reasons:

- Larger systems generally have the capacity to carry out effective water use efficiency programs without assistance.
- Water systems below 100 connections do not make a significant impact on the resource and face more pressing challenges in meeting safe drinking water requirements.

In 1999, ODW conducted a survey of representatives from the small to medium sized systems to find out how to be more effective in the area of water use efficiency. The results of the survey were used to create ODW's technical assistance program and develop a water use efficiency campaign.

Getting Out in the Field

The most critical piece of ODW's work in water use efficiency was the direct interaction with local governments and water system owners, managers and operators. The ODW has developed a "hands on" approach with system representatives to help them develop effective water use efficiency programs, assess costs and revenue impacts of investing in water use efficiency and evaluate reclaimed water options. They also assist with data collection, demand forecast development and evaluation of conservation oriented rate structures and work with other technical assistance providers primarily in the area of leak detection and repair. Many of the small and medium systems ODW worked with were in the initial stages of water use efficiency program development. Water systems just starting to implement their programs are unable to demonstrate long-term water use reductions. Collection and analysis of water consumption data is critical, especially for these systems. The ODW staff prioritized working with system representatives to help them understand the importance of data collection and identify methods to systematically and consistently document water use.

Water Conservation Campaign

In June of 2000, ODW launched the *Drinking Water: It's Worth Saving* campaign and a brochure, *Options for Success* that highlighted water use efficiency success stories across the state. This was followed with nine technical assistance brochures used for communicating water use efficiency strategies and promoting the value of water and water reclamation. The ODW staff also participated in numerous events to promote water use efficiency including local events sponsored by various water resource interests groups and watershed management workshops.

Future Direction -- New Direction from the Legislature

The 2003 Legislature provided new direction for the ODW's water use efficiency program. The legislature passed the Municipal Water Supply – Efficiency Requirements Act, Chapter 5 Laws of 2003 (Municipal Water Law) that included direction for ODW to adopt utility water use efficiency regulations by December 31, 2005. To fund regulation development the Municipal Water Law establishes a 25-cent per residential connection surcharge on municipal water suppliers. This surcharge expires in 2007. Finally, the 2003 Legislature terminated funding for ODW's water use efficiency technical assistance activities.

The direction from the legislature is clear. The ODW will refocus its activities on a regulatory approach to utility water use efficiency. Water use efficiency staff have been reassigned to assist in regulation development and will ultimately provide the support needed to implement new regulations.

As directed in the Municipal Water Law, ODW will convene a stakeholder advisory committee to assist in development of water use efficiency regulations. Currently ODW is on track to convene that committee in the early part of 2004.

Regulations are to include "...conservation planning requirements, water distribution system leakage standards and water conservation performance reporting requirements..." Regulations must also meet the intent of the legislature as stated in Section 7(1) of the Municipal Water Law

"It is the intent of the legislature that the department establish water use efficiency requirements designed to ensure efficient use of water while maintaining water system financial viability, improving affordability of supplies, and enhancing system reliability."

The combination of ODW's experience working with Ecology and water utilities within the context of the *Conservation Planning Requirements: Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs* (Health Pub. # 331-008, Ecology Pub. # 94-24) and experienced field staff with hands-on experience in direct technical assistance has well positioned ODW to deliver effective water use efficiency regulations. The primary challenge for the department will be securing long-term funding to implement those regulations effectively into the future.

Services to Communities and Water Providers - Department of Ecology

In response to the Governor's Salmon Recovery Strategy, the 1999 Legislature also provided funding to Ecology to provide technical assistance for water conservation and reclaimed water activities.

The new funding allowed the department to hire, train and dedicate staff, primarily engineers, to provide technical assistance to communities and water providers. The early work was conducted in cooperation with the ODW. It involved identifying communities and water providers in "fish-critical" basins that had serious water supply issues. The needs of the communities were analyzed and followed up with technical assistance.

Because of the nature of the problems encountered with the targeted communities, it became apparent that conservation was often not central to solutions. The problems of the initial target communities more often had to do with water rights issues, deferred maintenance, and lack of investment in water infrastructure. Also, it became clear that it would be more productive for Ecology to concentrate primarily on agricultural, industrial, commercial and institutional water users while the ODW focused on drinking water suppliers. Thus, Ecology refocused its water conservation efforts to the following actions:

Water Use Metering

Metering of water use is a fundamental tool of water management and essential to efficient water use. Without source meters, it is very difficult to manage water use without knowing how much water is being used. Service metering allows water users to understand their water use patterns. Together source and service meters help establish a record supporting future use and changes they may want to make to their water rights in the future. It also enables water users to comply with water right provisions. Data drawn from metering records supports local and state water planning and management.

Metering Water Use in 16 Fish-Critical Basins Actions and Accomplishments

Following a lawsuit and settlement order, Ecology worked with water users to develop and implement a rule on water use metering. The goal is to meter 80% of the water used in 16 fish-critical basins. This prioritizes the agency's efforts on working with a small number of the largest water users. Working with a technical assistance group, Ecology developed technical metering and reporting procedures. The results were used to develop a metering rule which was adopted January 2001. Ecology held workshops with water user groups and sent notices to water users. Over 713 administrative orders were issued by December 2002 for 903 water rights, which met the goal of issuing orders to 80% of the estimated total instantaneous quantity (Q_i) of total water diversions/withdrawals within the fish-critical basins.

Water Use Metering - 80 Percent of Water Use in 16 Fish-Critical Basins



Provided Financial Assistance for Metering

Using funding provided by the legislature, Ecology provided over \$3,145,000 in financial assistance of which \$445,000 was spent during fiscal year 2003 as financial assistance to qualified water users to help defray the cost of installing water meters. From June 2002 to June 2003, the metering program negotiated 171 metering cost share contracts in the 16 fish-critical basins and 33 contracts in 19 non-fish-critical basins, covering the installation of a total of 921 meters. Some of the funding was used for meters with telemetering capability to harness the advantages of new technology, increase efficiency and reduce reporting burdens.

One contract was negotiated with Evergreen Rural Water for purchasing meter calibration equipment to provide meter calibration service to rural and small-city water purveyors not able to afford calibration equipment. Eighty-eight percent of cost-share funding contracts are in the 16 fish-critical basins and 12% in non-fish-critical basins. Fifteen (45%) of the contracts in the non-fish-critical basins went to purveyors in basins adjacent to a fish-critical basin, and eighteen (55%) to purveyors not adjacent to a fish-critical basin. Seventeen of the 33 contracts in the non-fish-critical basins went to rural and small city water purveyors.

Cost share metering installation contracts were also negotiated with conservation districts in the Walla Walla, Wenatchee, and upper Yakima River basins. Ecology provided a block of funds to those Conservation Districts for installing source water meters in those areas. This approach was used because the Conservation Districts have a good working relationship with water users in those areas and it allowed more time and capacity to design and install source water meters.

Incorporated Metering Provisions into Water Rights

As a matter of practice, Ecology now includes metering provisions as conditions to approved changes to water rights and new water rights.

Future Direction - Metering

There are number of areas Ecology will pursue to continue progress on water use metering.

- **Reporting.** Ecology is working on a reporting system for source metered water use. The system will allow water users to submit the required source water use information electronically. The goal is to have a system linked to the water rights database, and eventually an external link for extracting data on water use for research, water management, and with the capability of performing calculations and conversions.
- **Outreach.** Ecology will work to increase public exposure of the purpose, need, and benefits of source water metering. This includes working with local watershed planning groups on using source metering for planning and management purposes.
- **Potential expansion.** Ecology will work with the Washington Department of Fish and Wildlife to refine the fish-critical list to see if more basins or sub-basins need to be added for metering, or to add sub-basins within a non-fish-critical WRIA as “fish-critical sub-basins.”
- **Funding.** Ecology will develop an assessment to determine the need for additional cost-share funding to purchase and install source water meters. Additional public funding for source water metering and reporting water use serves the broader public purpose of managing public resources.

Agricultural Irrigation

The agricultural sector is by far the largest water use sector in the state. Efforts in this area of water use can translate into large water savings. Ecology manages two programs that provide funding for activities resulting in more efficient agricultural sector water use.

Irrigation Efficiencies

This is a new effort first funded in Fiscal Year 2002. The \$8.3 million program is administered by Ecology in partnership the Washington State Conservation Commission and local conservation districts. It provides funding for activities that result in water savings that can be captured and put into the trust water program to benefit declining fish stocks. The improvements can be on individual farms or irrigation districts. The maximum grant amount is \$400,000 per project. The cost share amount provided by the project varies depending on benefits to fish. The length of time the saved water remains in the trust is linked to the expected life span of the funded improvements and the proportion of cost share. The eligible cost share also increases for projects deemed particularly beneficial for fish stocks.

Irrigation Efficiency Actions and Accomplishments

The Irrigation Efficiency Program resulted in the following actions and accomplishments:

- **Launched program.** Worked with Conservation Commission partners and stakeholders to develop the new program.
- **Water savings back to streams.** Provided funding for 4 projects during Fiscal Year 2001-03 totaling \$1,432,856 in water savings put into trust water program. Four additional projects are now under contract.
- **Added benefits.** In addition to water savings put into trust, the agreements also include provisions to institute Best Management Practices for water, fish screening and metering of water use.

Referendum 38

This longstanding multi-purpose program was approved as a referendum by voters in 1980. While it originated as a water supply program, it also delivers water savings. It is bond-funded and designed to provide financing to irrigation districts for agricultural water supply facilities, either alone or in combination with fishery, recreational or other beneficial uses of water. Funds are used by irrigation districts to repair or improve existing agricultural water conveyance facilities such as ditches, pipes and other irrigation systems. Before receiving funds for these purposes, a conservation plan is required and the cost for the plan is eligible for funding under the program.

Referendum 38 Actions and Accomplishments

The Referendum 38 Program resulted in the following actions and accomplishments:

- **Increased conservation incentive.** Ecology adopted changes to the program to provide greater incentives for water conservation for this multi-purpose program.
- **Provided project funding:** Managed funding commitments for 20 ongoing projects totaling approximately \$7.0 million dollars. Conservation projects range from developing Comprehensive Water Conservation Plans to lining ditches and using “pump exchange” to allow diversions to be closer to water use thus allowing water to remain in the stream longer.
- **Supported Yakima River Basin Water Enhancement Project (YRBWEP).** Continued work to secure and support \$100,000,000 million in federal authorization for YRBWEP. Congress authorized the program in 1994 to protect fish and wildlife, improve the reliability and efficiency of irrigation supplies and deliver water savings. When federal appropriations are secured, all of the remaining Referendum 38 funding will be required as a 17 percent match. In the meantime, the project requires monitoring and involvement to keep it active and to obtain the funding.

Future Direction - Agricultural Irrigation

- **Referendum 38.** The focus will be to use expanded funding caps and incentives to provide additional conservation benefits. The new caps and incentives will also speed up the use of funds and the completion of projects. Work will also continue on the Yakima Enhancement project.
- **Irrigation efficiencies.** Efforts will focus on further refinements to the new program and securing additional funding so that more projects can be completed.

Commercial and Industrial

Ecology provides services to commercial and industrial water users that result in water savings and improved financial bottom lines. The service is provided through the Technical Resources for Engineering Efficiency Project (TREE) which was created as a way of assisting businesses with environmental improvements that also result in economic gains.

It is a modestly scaled effort now totaling approximately two and one-half staff but spread across a dozen individuals and various programs to supply the necessary expertise. Three to five facilities receive free audits and technical assistance each year. Staff is recruited on a project-by-project basis and varies with each company, depending on its regulatory constraints and the nature of the pollution prevention opportunities. The effort is centered in the Hazardous Waste Program. The TREE project is a way for Ecology engineers to pinpoint exact pollution-prevention opportunities, making the economic benefits clear to the business. While the primary focus of the efforts has been on pollution prevention, these efforts have usually included substantial water savings opportunities. The multi-media approach shows companies the total, interrelated dollar savings of reducing water use, chemical use, solid waste generation, and hazardous waste generation.

Actions and Accomplishments

The TREE Project has resulted in the following actions and accomplishments:

- **Completed projects.** Completed 11 projects that identified a potential 158,822,000 gallons a year in water savings and 35,402,403 million gallons a year in wastewater reductions (since 1999). A significant area of attention and potential water savings has been in the food processing sector.
- **Completed a survey.** Team members completed a survey of those receiving assistance to determine what follow-up actions had been implemented and the savings achieved.

Future Directions

- **Untapped potential.** This project has a large untapped potential. The project could be scaled up to deliver even more environmental and economic benefits. Since many commercial and industrial water users obtain their supplies from municipal water suppliers and have the wastewater treated at municipal treatment plants, efficiencies by these large water users could result in freeing up water capacity and treatment capacity for other uses.

But there are some impediments to a scaled up program beyond funding and dedicating staff with the necessary technical assistance expertise. Even though the return on investment of individual water use efficiency measures can be demonstrated, there are competing activities within firms for the investment and management attention. Unlike the water utility and agricultural irrigation sectors, there is no mechanism to provide funding incentives to finance water efficiency measures. Two potential avenues of incentives should be explored:

- Providing targeted tax incentives.
- Instituting a commercial version of water buy-back program with payments covering the cost of the water efficiency measures.

Under both incentive mechanisms the public purpose would be promoted by retaining water for other uses, including instream uses, freeing up water conveyance and wastewater treatment capacity, and limiting taxpayer and ratepayer expenditures for new conveyance and treatment capacity.

- **Broaden expertise.** The TREE project expects to continue to provide services and draw on a broadened pool of technical expertise from Ecology for providing services.
- **Additional enterprises.** The Tree project is working to recruit additional enterprises to receive services.

Reclaimed Water

Washington implemented the Reclaimed Water Use Act, Chapter 90.46 RCW, in 1992 to help meet the state's growing water demands. As required by the statute, the departments of Ecology (Ecology) and Health (ODW) completed implementation standards and design criteria in 1997. Reclaimed water in the 1992 act was limited to domestic wastewater sources. The statute was expanded in 2001-02 to also include reuse of industrial wastewater. The Reclaimed Water Use Act integrates the way the state manages wastewater as a planned component of total water management. The 'new' water supply produced through adequate and reliable treatment is no longer considered wastewater.

Actions and Accomplishments

In August 1999, Ecology's Water Quality Program (WQP) received two funded positions for reclaimed water. The WQP uses these positions to lead and coordinate the implementation of the overall state program. The WQP has a primary role in program development, policy and technical assistance for both municipal reclaimed water and industrial water reuse projects and proposals. The WQP conducts engineering reviews, operational assistance, permitting and monitoring activities primarily through the coordinated efforts of existing regional engineers, hydrogeologists, permit writers, environmental scientists, and operator outreach specialists. The WQP also provides the primary source of state funding support for reclaimed water projects. The WQP consults with other Ecology water programs including Water Resources, Environmental Assessment and Shorelands, and with other governmental agencies as necessary. The WQP regularly coordinates with ODW specialists on issues related to public health protection.

The funding provided in 1999 to ODW was used primarily for new municipal water use efficiency conservation activities. The ODW continues to provide one full-time position for technical/engineering support for the water reclamation program, and the Environmental Health Division provides policy support from other fund sources as necessary.

With available resources, implementation efforts have focused on the following key areas: 1) project technical assistance - facility planning, design, construction, and permitting; 2) assistance in facility operation and maintenance; 3) internal coordination and staff training; 4) interpretation of standards, design criteria and other guidance 4) outreach, education and information and; 5) developing partnerships.

Project Review and Technical Assistance - Planning, Design and Construction. There are 17 existing water reclamation facilities. Projects range in size from 1,000 gallons to 7 million gallons per day. Under existing statute, all facilities must consider opportunities for water reclamation and reuse as part of their planning efforts. Ecology WQ staff have provided assistance to more than 60 facility proposals.

Capital facilities are major efforts requiring several years to move forward from planning to design and construction. Larger projects may take as long as 10-20 years. Many new projects propose innovative technologies and uses not fully envisioned in the 1997 standards. Existing facilities also need continuing technical support. A high degree of technical knowledge, professional judgment and coordination skills is required to respond to the diversity of this program.

Operation and Maintenance Support. Facility operators and state regulatory personnel noted that several facilities have had difficulty consistently achieving the new standards for unrestricted public contact uses (Class A). Agency staff organized and participated in dialog, site visits and data analysis to resolve these problems. Observations from these efforts confirmed that the constructed reclaimed water treatment facilities required more time and skill to operate than traditional wastewater treatment plants. Design and construction should emphasize ease of operation, especially for small facilities with limited staffing.

On April 30, 2003, Ecology conducted a reclaimed water facilities operators' workshop to identify further operational issues and concerns. The workshop report is on the Ecology water reuse Web site at <http://www.ecy.wa.gov/programs/wq/reclaim/index.html> or available through the agency publications office, publication number 03-10-054. Operators stated that dialog with the state regulatory agencies (Ecology and ODW) was very helpful in understanding the requirements. Ecology is actively pursuing additional opportunities for assistance to facility operators, including an interactive web-based forum.

Internal Coordination and Staff Training. To provide better coordination efforts, Ecology convened an interagency technical water reuse workgroup team. The team includes experts from Ecology's Water Quality and Water Resources programs and ODW. The team is currently writing a chapter for the Ecology permit writer's manual and providing on-going agency staff training. Guidance documents developed by the workgroup are available on the Ecology water reuse Web site, as noted above.

Standards, Design Criteria, Procedures and Guidelines. Existing state resources have focused primarily on program implementation. Ambiguities and gaps have been identified in the 1997 water reclamation and reuse standards through implementation experiences. Updating this information is necessary to continue to be responsive to project requests.

For example:

Existing guidance discusses chlorine disinfection requirements in some detail; however requirements for ultraviolet light disinfection are not specifically discussed.

A costly component in a reuse system is distribution of the water to the place of customer use. The use of irrigation canals, surface waters and ground water as conduits for the reclaimed water (in lieu of constructing new systems of pumps and pipes) are under consideration. Existing guidance does not specifically address these concepts.

Recent rapid advances in technologies such as membrane filtration, emerging concern such as pharmaceuticals and new pathogens also indicate that the standards need to be updated to clarify design, treatment and permit requirements.

Outreach -- Education and Information. Ecology created a Web site to more readily provide assistance. The site provides general information and definitions, engineering guidance for project planning, design and construction, water rights impairment self-assessments, permit writer's guidance, reports and links to additional information. The Web site is accessed at: <http://www.ecy.wa.gov/programs/wq/reclaim/index.html>.

Staff are actively involved in a significant number of professional and technical forums to access and disseminate information.

Developing Partnerships. Ecology with support from ODW proposes to leverage state resources through the development of partnerships with other water reuse efforts. Opportunities for collaborative efforts include working with local governments, businesses and professional organizations, the Washington Water Center, Washington State University Extension Service, neighboring states of Oregon and Idaho, the Water Reuse Association, the National Water Research Institute (NWRI), the Bureau of Reclamation, the U.S. Environmental Protection Agency, the Water Environment Federation and the American Water Works Association. In particular, the NWRI responded positively to Ecology's request for assistance providing Ecology with an independent expert advisory panel. NWRI also cost-shared and facilitated a comprehensive planning workshop held in Washington State on May 30-June 1, 2003. The workshop report is available on Ecology's water reuse Web site or as agency publication number 03-10-061.

Future Direction

Water reuse related activities within Washington State are accelerating. With experience, the strengths and weaknesses in our standards, design criteria and procedures become more apparent. It has been our experience that projects are most successful when water reuse is looked at in a comprehensive manner and included in the earliest stages of project planning.

As envisioned by our legislature, Washington should continue to refine and develop its own standards and design criteria based on our experience. This includes, but is not limited to, new technologies, emerging concerns, operational protocols, and design and validation procedures for UV disinfection systems. Particular attention should focus on effectiveness and affordability for small communities. Research capacity within the state will be necessary to meet these goals.

Ecology and ODW are currently using the input and experience obtained to develop an action plan for continuing program development and implementation. To take full advantage of the opportunities for partnering assistance as well as to implement the strategies identified in the 2003 workshops, Washington State must also be able to provide a level of matching funds. Ecology would use these matching dollars to partially offset the expenses of convening in-state stakeholder committees, consulting outside experts, updating the 1997 state standards and guidance documents and for related activities to promote water reuse within the state.

Other Water Actions and Accomplishments

There have been a number of other actions that have been taken to make progress on water use efficiency:

- **Yakima Water Rights Adjudication.** The settlement agreement with the Sunnyside Valley Irrigation District included provisions for substantial water conservation. The conservation savings are to be implemented through the Yakima River Basin Water Enhancement Project (YRBWEP). The Kennewick Irrigation District Settlement Agreement also contains water efficiency provisions including formulae for allocation of conserved water between instream and out-of-stream uses depending on the proportion of conservation funding supplied by public and private sources.
- **2002 Columbia River Irrigators Association Settlement.** A settlement agreement with the Columbia Rivers Irrigators Association includes a provision to follow state of the art water efficiency practices in exchange for non-interruptible water rights and to transfer the conserved water into trust.
- **Water System Plan Review.** Ecology reviewed the conservation element of water supply plans of selected water systems particularly when the water supplier had a pending water right application for a substantial amount of water. Both Ecology and ODW expect to increase their plan review activities to implement the water efficiency provisions of the new municipal water supply legislation.
- **Addressed Federal Conservation Issues.** Information that was provided resulted in a letter to the federal Environmental Protection Agency (EPA) from the Governor to prevent the roll back of federal water conservation standards for plumbing fixtures. Another letter supported the EPA's initiative to require water efficiency labels for water appliances so consumers could make informed purchases on appliances that create water, energy and dollar savings.
- **Outreach Funding.** Ecology provided a modest amount of funding to a water savings campaign sponsored by Puget Sound area water utilities.

III. Conclusion

Though still modest in scale and in its infancy, water use efficiency is emerging as an important tool in water management. Its increasing importance is driven by physical and cost pressures for additional supplies. Both the departments of Health and Ecology have increased their level of expertise, funding and actions to support local water efficiency efforts of communities, agriculture, and businesses. These initial efforts are producing water savings as well as providing environmental and economic benefits.

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