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IDAHO PUBLIC
UTILITIES COMMISSION

Chas. F. McDevitt
Dean J. (Joe) Miller

December 1, 2006

Via Hand Delivery

Jean Jewell, Secretary
Idaho Public Utilities Commission
472 W. Washington St.
Boise, Idaho 83720

Re: UWI-W-06-05

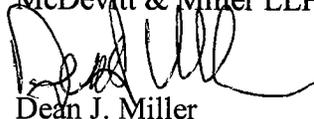
Dear Ms. Jewell:

Enclosed for filing in the above matter please find the original and seven (7) copies of an Application and Request for Modified Procedure, Direct Testimony of Gregory Wyatt, and United Water Idaho's Conservation Plan regarding the above referenced matter.

An additional copy of the documents and this letter is included for return to me with your file stamp thereon.

Very Truly Yours,

McDevitt & Miller LLP



Dean J. Miller

DJM/hh
Attach.

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BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION OF)
UNITED WATER IDAHO INC., FOR)
APPROVAL OF ITS WATER)
CONSERVATION PLAN AND FOR)
APPROVAL OF A WATER CONSERVATION)
SURCHARGE AND REQUEST FOR)
MODIFIED PROCEDURE)

CASE NO. UWI-W-06- 05
APPLICATION and REQUEST FOR
MODIFIED PROCEDURE

COMES NOW, United Water Idaho Inc., (“United Water”) and applies to the Commission for an Order approving the Conservation Plan (“Conservation Plan”) filed herewith and for an Order approving a Water Conservation Surcharge (“Surcharge”) as proposed herein and in support thereof respectfully shows as follows, to wit:

The Conservation Plan

I.

In Case No. UWI-W-04-04, Order No. 29871 (September 20, 2005), the Commission directed United Water to prepare and file with the Commission an updated Conservation Plan. Originally, the Conservation Plan was to be filed by April 1, 2006. Subsequently, in Order No. 29934, the Commission extended the filing deadline to December 1, 2006.

II.

Filed herewith is the Conservation Plan prepared for United Water by the consulting firm of Maddaus Water Management in compliance with Order Nos. 29871 and 29934.

III.

As explained in the Conservation Plan, Maddaus Water Management, in consultation with United Water Idaho and interested stakeholders, evaluated ninety one (91) potential conservation measures. Seventeen (17) measures were selected for further study and were evaluated using a Water Demand Management Least Cost Planning Decision Support System. This analysis produced a list of seven (7) conservation measures that were found to be cost effective.

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IV.

The conservation measures recommended by the Plan, including maintaining the current conservation effort, and their estimated annual cost are as follows:

Conservation Measure	Measure Description	Average Cost Per Year (\$)	Start Year
Continue Current Program	Continue current outreach and educational programs.	\$124,200	2006
Additional Xeriscape demonstration gardens	Develop additional demonstration garden(s) displaying living examples of low water-using gardens and landscaping. United Water Idaho would create and manage the gardens and provide signs and brochures to educate those people visiting the garden(s).	\$17,400	2008-2009
Continue/Expand WELs	Continue and expand the Water Efficient Landscaping (WELs) program to greatly increase the number of participants. Incentives could include landscape and drip system vouchers.	\$11,200	2007-2008
Residential school education programs	United Water Idaho would sponsor school conservation programs with workbooks and presentations; teaching materials and other educational tools to teach the students the importance of conserving water.	\$6,700	2007-2008
Rain-sensor (shut off device) retrofit on irrigation controllers	United Water Idaho pays for a rain sensor giveaway or voucher, and homeowner pays for the optional installation (\$35).	\$35,600	2008-2009
Trigger shut-off valves and hose timers	United Water Idaho would offer a voucher, or otherwise provide to the customer at no cost, hose timers and shut-off valves. This would enable homeowners to use water outdoors more efficiently.	\$6,900	2007-2008
Award program for water savings by businesses	United Water Idaho would sponsor an annual awards program for businesses that significantly reduce water use. They would receive a plaque, presented at a lunch with the mayor.	\$1,300	2008-2009
Restaurant low flow spray rinse nozzles	Provide free installation of 1.6 gpm spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens.	\$40,900	2008-2009
TOTAL		\$244,200	

V.

As explained in the Direct Testimony of Gregory P. Wyatt, filed herewith, United Water agrees with these recommendations and proposes to implement them, upon approval by the Commission.

Conservation Surcharge

VI.

As further explained in the Direct Testimony of Gregory P. Wyatt, United Water requests approval of a Conservation Surcharge of 0.33% on amounts billed under United Water's Tariff Schedule 1, General Metered Service, to recover the cost of implementing the conservation measures described above. If approved, United Water will file amended tariff sheets for review and approval incorporating the Surcharge.

Request for Modified Procedure

United Water does not believe a hearing is required to consider this matter and, pursuant to IPUCRP 201 *et. seq.* requests it be processed under Modified Procedure. If, however, a hearing is determined to be necessary United Water stands ready for immediate hearing, based on the Direct Testimony of Gregory P. Wyatt.

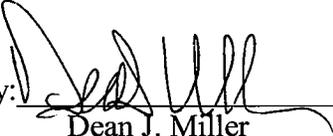
WHEREFORE, United Water respectfully requests of the Commission as follows:

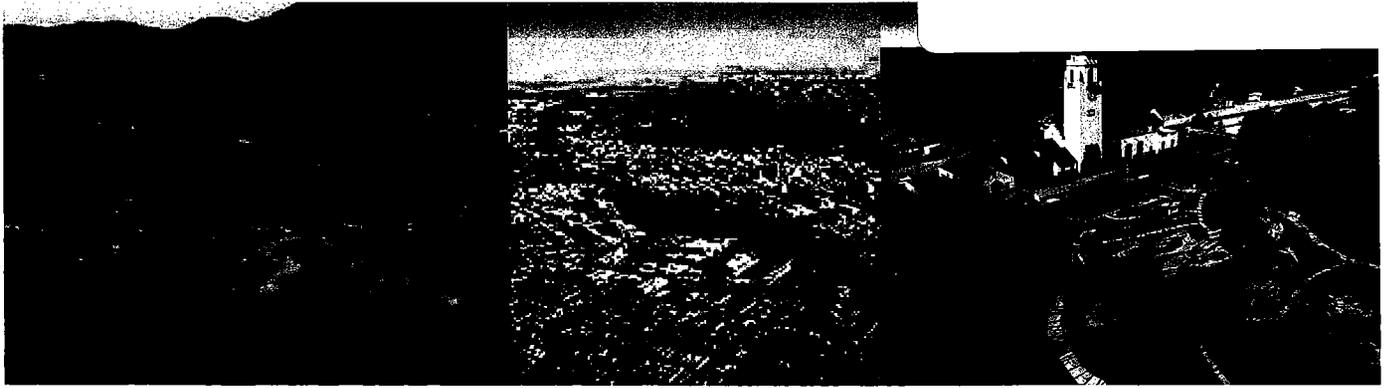
1. That the Commission determine that this matter may be processed under Modified Procedure;
2. That the Commission approve the recommended conservation measures as set forth herein and authorize United Water to implement them;

3. That the Commission approve a Conservation Surcharge in the amount of 0.33% on amounts billed under United Water's Tariff Schedule 1, General Metered Service.

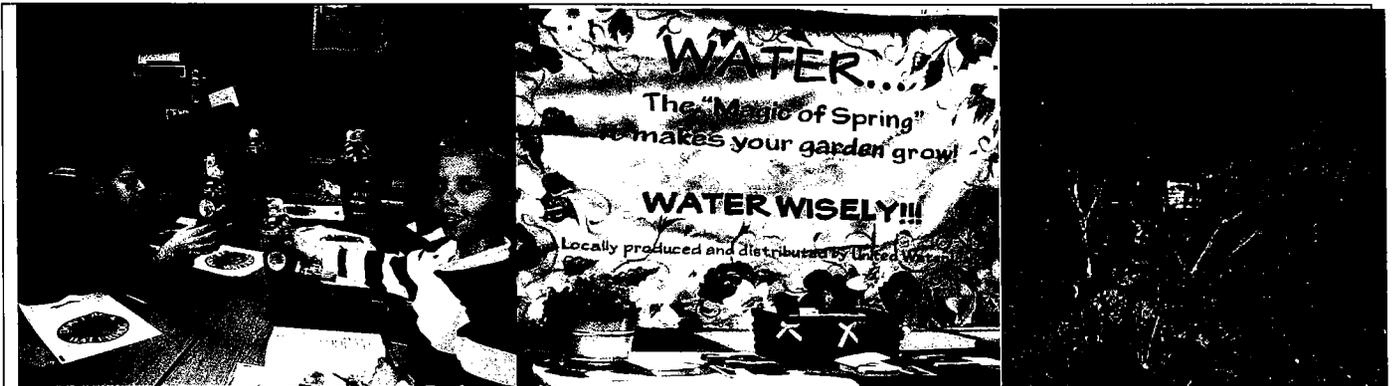
DATED this 1st day of December, 2006

UNITED WATER IDAHO INC.

By: 
Dean J. Miller
Attorney for Applicant



United Water Idaho Water Conservation Plan



November 2006

Prepared By:
Maddaus Water Management
For
United Water Idaho



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United Water Idaho
2006 Water Conservation Plan
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SECTION 1: Introduction and Summary

1.1 Purpose of Plan

The purpose for the 2006 Water Conservation Plan is to provide a planning document for United Water Idaho (UWID) for the next ten years to guide water conservation measures within the service area.

This Water Conservation Plan has been prepared to review historical efforts since the original 1993 United Water Idaho Water Conservation Plan and to provide a new recommended plan based on a cost-effectiveness analysis of water conservation measures.

Specifically, the Water Conservation Plan provides an assessment of UWID's water efficiency program, analyzes 17 conservation measures, leading to a recommended plan.

1.2 Scope of Plan

The 2006 Water Conservation Plan includes the following elements:

Characterize Water Use Patterns

The first phase of this project required the collection of data on demographics, historical water use, and future water use forecasts to be used in the conservation analysis. Once the data was collected, the historical water use patterns were analyzed to identify trends specific to United Water Idaho.

Conservation Measure Screening

Maddaus Water Management compiled a list of potential supply side and demand side water conservation measures that may be applicable to United Water Idaho. A large list including 91 potential conservation measures was developed. This list of measures was then screened by a stakeholder group using five criteria into a short-list of 17 appropriate measures for detailed evaluation.

Benefit and Cost Analysis of Conservation Measures

The list of 17 short-listed measures was analyzed using the Water Demand Management Least Cost Planning Decision Support System (DSS) Model. This model allowed careful analysis of each measure based on market penetration, costs to the customer and utility, and unit water savings. The best measures were combined into four programs for further analysis.

Recommended Conservation Plan

Based on the results of the benefit cost analysis of these programs, a comprehensive water conservation program was developed. This program is summarized in detail in this report including strategies for funding such a program.

Water Conservation Plan – Section 1

1.3 Background – 1993 Water Conservation Plan

United Water Idaho started its water conservation program in the early-1990's. The content of the program was based on the following recommendations provided in the Montgomery Watson 1993 Water Conservation Plan:

- Public information and school education
- Residential home water audits
- Plumbing code
- Management of unaccounted-for water (water loss)

Since the plan, United Water Idaho has successfully implemented a public information and school education program, conducted a number of residential home water audits, and locally supported the implementation of the plumbing code. The management of unaccounted for water has been addressed in the past ten years, and was not included as a measure for further analysis in this 2006 Water Conservation Plan.

1.4 Plan Development and Public Participation

During the preparation of the water conservation plan, Maddaus Water Management coordinated information and held meetings with the following parties: United Water Idaho, Idaho Rivers United and the Idaho Public Utilities Commission.

1.5 Economic Evaluation of Conservation Options

Based on a conservation measure analysis, Maddaus Water Management recommends implementing a program that includes 7 of the 17 measures evaluated for cost-effectiveness. These measures were selected from a list of over 90 potential measures. The results of the analysis along with those selected measures for implementation are presented below in Table 1-1 and further described in Table 1-2.

Water Conservation Plan – Section 1

Table 1-1 Conservation Measure Evaluation Results

	Conservation Measure	Water Utility Benefit - Cost Ratio	Cost of Savings per Unit Volume (\$/MG)	Included in Recommended Plan
1	Additional Xeriscape demonstration gardens	1.46	\$115.52	X
2	Continue/Expand WELs	1.79	\$105.98	X
3	Residential school education programs	0.42	\$424.18	X
4	Rain-sensor (shut off device) retrofit on irrigation controllers	0.96	\$213.22	X
5	Residential water surveys	0.18	\$1,016.93	
6a	Smart Irrigation Controller Rebates Single Family	0.13	\$1,240.45	
6b	Smart Irrigation Controller Rebates Multi Family, Commercial	0.26	\$600.16	
7	Trigger shut-off valves and hose timers	1.10	\$233.98	X
8	New home efficiency award programs	0.18	\$819.08	
9	Landscape rebate program	0.13	\$1,572.15	
10	Rebates for 6/3 dual flush or 4-liter toilets	0.08	\$1,223.95	
11	Award program for water savings by businesses	1.01	\$113.92	X
12	Commercial toilet replacement	0.10	\$1,116.09	
13	Rebates for replacing high use commercial urinals with 0.5 gal/flush urinals	0.06	\$1,824.55	
14	Replace inefficient water using equipment	0.03	\$2,897.56	
15	Restaurant low flow spray rinse nozzles	0.85	\$127.73	X
16	Landscape water budgets	0.38	\$113.92	
17	Financial incentives, rebates for irrigation upgrades	0.33	\$1,116.09	

Water Conservation Plan – Section 1

1.6 Summary of Recommended Plan

A detailed description and additional information on the recommended plan is provided in Sections 7 of this report.

Table 1-2 Recommended Plan Summary

Conservation Measure	Measure Description	Average Cost Per Year (\$)	Start Year
Continue Current Program	Continue current outreach and educational programs.	\$124,200	2006
Additional Xeriscape demonstration gardens	Develop additional demonstration garden(s) displaying living examples of low water-using gardens and landscaping. United Water Idaho would create and manage the gardens and provide signs and brochures to educate those people visiting the garden(s).	\$17,400	2008-2009
Continue/Expand WELs	Continue and expand the Water Efficient Landscaping (WELs) program to greatly increase the number of participants. Incentives could include landscape and drip system vouchers.	\$11,200	2007-2008
Residential school education programs	United Water Idaho would sponsor school conservation programs with workbooks and presentations; teaching materials and other educational tools to teach the students the importance of conserving water.	\$6,700	2007-2008
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Trigger shut-off valves and hose timers	United Water Idaho would offer a voucher, or otherwise provide to the customer at no cost, hose timers and shut-off valves. This would enable homeowners to use water outdoors more efficiently.	\$6,900	2007-2008
Award program for water savings by businesses	United Water Idaho would sponsor an annual awards program for businesses that significantly reduce water use. They would receive a plaque, presented at a lunch with the mayor.	\$1,300	2008-2009
Restaurant low flow spray rinse nozzles	Provide free installation of 1.6 gpm spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens.	\$40,900	2008-2009
TOTAL		\$244,200	

Water Conservation Plan – Section 1

In summary the recommended plan when fully implemented should:

- Save United Water Idaho 0.71 mgd by the year 2030
- Provide these water savings in a cost-effective manner (program benefit-cost ratio is 1.10)

The benefits from the recommended plan include (but are not limited to) the following:

- Reduce peak water demands
- Enhance environmental benefits by leaving more water in the Boise River and groundwater aquifers.
- Save energy and system operation costs

In order to implement the recommended plan United Water Idaho will need to:

- Fund a program with an average budget of \$244,200 per year for the first five years
- Finance the program through surcharges, partnerships, grants and/or water rate increases.
- Provide additional staffing and materials
- Monitor and evaluate performance
- Adjust the plan on an annual basis based on review of program successes and challenges

Water Conservation Plan – Section 1

SECTION 2: Study Area Characteristics

2.1 History of the Water System

United Water Idaho provides water service to about 225,000 people in the 150-square mile area incorporating Boise and surrounding communities. United Water Idaho is the successor to Idaho's first incorporated water system -- the Artesian Water and Land Development Improvement Company founded in 1890. The first water supply in Boise ran from Hulls Gulch, down Eighth Street, to the Eastman Hotel. It consisted of two artesian wells, two and one half miles of water mains, one reservoir, and one service level.

Today United Water Idaho uses a combination of surface water and groundwater. United Water Idaho serves its customers with approximately 77 percent ground water supplied from 90 wells located throughout the Boise area. The remaining 23 percent of water is supplied from the Boise River through two surface water treatment plants (Marden Water Treatment Plant and Columbia Water Treatment Plant). There currently is a total of 1,100` miles of water mains and 10 pressure levels. United Water Idaho currently has 91 employees.

Surface water from the Boise River is treated at the Marden Plant using upflow clarification and direct filtration processes to remove particulate matter, followed by disinfection with chlorine to destroy any harmful bacteria. In addition, they adjust pH to reduce the corrosivity of the water and decrease the possibility of dissolving metals from household plumbing. The Columbia Treatment Plant uses state-of-the art membrane filtration technology with disinfectant added to the finished water.

2.2 Description of the Service Area

Climate

Boise is situated in a wide river valley at the foot of the Rocky Mountains. The Boise River runs out of a canyon to the south and through the center of the city, joining the Snake River about 40 miles to the northwest. The Boise area has a moderate continental climate characterized by hot, dry summers and moderately cold and wet winters. The semi-arid climate is tempered year-round by air from the Pacific Ocean. Summers are dry with hot periods that may last more than a few weeks. Winter storms produce much of the yearly precipitation; cold spells are common, but warm Chinook winds (moist air from the Pacific) bring periods of mild weather.

The majority of precipitation in the valley falls in the winter and spring. The mountains to the north of the city receive large accumulations of snow in the winter, which then melts in the spring and early summer to supply the majority of stream flow in the Boise River and its tributaries. Humidity is generally low and moderate winds are a frequent occurrence.

Elevation: 2,842 feet above sea level

Average Temperatures: January, 29.9° F; August, 72.2° F; annual average (mean): 50.9° F

Average Annual Precipitation: 12.11 inches of rain, 20.9 inches of snow

Water Conservation Plan – Section 2

*Data is for 1940 to 2005 as per Boise Airport Weather Service Office. www.wrh.noaa.gov/boi/

Customers

Since 1988 the number of metered customers in the UWID service area has increased at an annual average rate of nearly 3.6 percent. In total, counting customers added with the acquisition of other service areas, the UWID service area customer count increased by 36,983 during the 1988 to mid-2006 period as shown in Table 2-1. The majority of those new customers, 32,812 or 88.7 percent, are residential. In mid-2006 residential customers accounted for 89.4 percent of the total customers in the UWID service area.

Table 2-1 United Water Idaho Historical Customer Summary

Year	Number of Customers ^a			Total ^d	Growth Rate (%)
	Residential ^b	Commercial ^c	Municipal		
1988	38,078	4,114	79	42,271	2.27
1989	38,143	5,199	63	43,405	2.68
1990	40,064	5,519	69	45,652	5.18
1991	41,356	5,745	89	47,190	3.37
1992	42,825	5,900	65	48,790	3.39
1993	44,372	6,148	102	50,622	3.75
1994	46,041	6,403	102	52,546	3.80
1995	47,078	6,588	46	53,712	2.22
1996	48,455	6,697	36	55,188	2.75
1997	50,028	6,799	32	56,859	3.03
1998	51,177	7,024	123	58,324	2.58
1999 ^e	57,638	7,343	50	65,031	11.50
2000	59,950	7,420	45	67,415	3.67
2001	61,715	7,566	124	69,405	2.95
2002	62,767	7,852	126	70,745	1.93
2003	64,948	7,906	125	72,979	3.16
2004	66,971	8,098	125	75,194	3.04
2005	69,243	8,154	125	77,522	3.10
Mid-2006	70,891	8,237	126	79,254	2.23
1987-2005 Annual Average Compound Rate of Growth					3.58

a. Year-end number of customers per UWID year end reports

b. Single family residential customers

c. Includes multi-family residential customers

d. Does not include private fire services

e. Includes the acquisitions of South County Water, Barber Water, and Warm Springs

Source: 2006 United Water Idaho Master Plan Chapter 3 and UWID annual sales reports.

Water Conservation Plan – Section 2

2.3 Current and Projected Water Supply

United Water Idaho has never experienced a water shortage. Based on this information, a lack of water supply does not appear to be driving a factor for this Water Conservation Plan Update. Table 2-2 and Table 2-3 provide an overview of the current water supply and water usage for UWID. Note that the total water delivered and the use per customer has been declining significantly as presented in Table 2-3.

Table 2-2 United Water Idaho Source of Supply

Supply	Description
Delivery capacity	97 million gallons per day
Water treatment plants	2 with a combined capacity of 24.3 million gallons per day
Operating wells	90
Average well pumping rate	560 gallons per minute
Average well depth	550 feet
Deepest well	1,120 feet

Table 2-3 Water Usage 2000 to 2005

	2000	2001	2002	2003	2004	2005
Water delivered, Billion Gallons	16.1	16.0	15.7	15.7	15.5	14.8
Average daily usage , MGD	44.3	43.8	43.0	43.0	43.0	40.5
Average Use per Customer, gal/day	657.1	631.0	607.8	589.2	571.8	522.4
Peak usage, MGD	83.0	83.0	90.6	93.0	93.0	91.0
Minimum day usage, MGD	18.0	18.6	17.6	18.0	20.0	17.0

2.4 Demographic Forecasts

The following information was obtained from the 2006 United Water Idaho Master Plan. It was out of the scope of this project to develop new demographic forecasts for United Water Idaho. Instead, population projections were provided to Maddaus Water Management by United Water Idaho from the Master Plan as shown in Table 2-4.

According to the 2006 United Water Idaho Master Plan: "The Economic and Demographic projections for the Boise Metro area represent a look into the likely future economic and demographic conditions that United Water Idaho must prepare for and plan to serve. These projections include a forecast of the local area economy (employment and personal income), as well as forecasts of the future demographic conditions (population, households and persons per household) that the company is likely to face.

Water Conservation Plan – Section 2

These economic and demographic concepts are important because they have a significant affect upon the area's water usage and the rate of increase in water usage. Historical and projected demographics for Ada County are continuously tracked by the Community Planning Association of Southwest Idaho (COMPASS) with input from local real estate developers and agents, community planners, the Cities of Boise, Eagle, Garden City, Kuna and Meridian, Ada County government, Boise State University, Idaho Power and others from other local taxing districts. Because of this breadth of input the information available from COMPASS is believed to be very reliable in terms of it's insight into the potential future spatial distribution of population, households, and employment in Ada County. However, since COMPASS only officially updates its economic and demographic projections once every five years, the forecasts can be dated and not reflective of the most recent economic events and current economic outlook for Ada County and the Boise area.

In order to overcome this shortcoming United Water Idaho retained the services of John Church, a well known Idaho economist and principal of the consulting firm Idaho Economics, to provide up-to-date and detailed projections of future population, households, and employment for the United Water Idaho service area. It is John Church's economic forecasts of Ada and Canyon Counties that COMPASS uses as a basis for its periodic economic and demographic forecasts."

Table 2-4 UWID Population and Household Growth Projections (2000-30)

Total Service Area	2000	2005	2010	2015	2020	2025	2030
Total Population	205,833	228,258	248,868	270,331	300,211	335,941	373,067
Annual Average % Change	---	2.1%	1.7%	1.7%	2.1%	2.3%	2.1%
Total Households	80,832	91,804	100,710	108,731	121,265	137,311	154,973
Annual Average % Change	---	2.6%	1.9%	1.5%	2.2%	2.5%	2.4%

Source: 2006 United Water Idaho Master Plan, Section 3 Table 3-3.

Data based on Idaho Economics projections of population and households within service area boundaries.

SECTION 3: Analysis of Historical and Projected Water Demand

For this Water Conservation Plan historical and projected demand forecasts were provided by United Water Idaho from the 2006 United Water Idaho Water Master Plan. These projections were developed by Idaho Economics using econometric forecasting methods using historical water use characteristics for UWID in conjunction with water demand forecasting. This section presents the historical and projected water use for the study area.

3.1 Historical Water Use

This section provides an evaluation of UWID water production and sales from 1997 through 2005 and information on historical water use characteristics and relative growth over the years. This section also presents a description of these characteristics, including water use patterns, unmetered water, and water consumption and peaking factors.

Description of Available Data

United Water Idaho maintains several information databases that characterize water production and use. Idaho Economics used the following UWID sources to develop historical water demand and water use patterns:

- Daily production reports
- Daily production SCADA print-outs
- Annual and monthly sales reports
- Annual and monthly production reports
- Archived production and consumption Supervisory Control and Data Acquisition (SCADA) data for 2003 and 2004
- Engineering database spreadsheets

The data used to characterize the UWID historical water requirements does not include water use and production in the miscellaneous or small areas that are served by UWID around its core service area. These smaller areas for which water sales and production statistics were not utilized in the forecast of the UWID core service area are in the residential subdivision developments of: Island Woods, Warm Springs Mesa, Coventry, Danskin, Belmont, and Floating Feather. Forecasted water use in these smaller service areas are, in this analysis, considered to be similar to the overall water use characteristics within the core service area of the UWID system.

Water Conservation Plan – Section 3

3.2 Analysis of Water Use by Customer Group

Historical Water Consumption

The total water consumption within the UWID core service area includes actual water sales, found in United Water Idaho's monthly and year-end sales reports, and its reports of unmetered water use, which is determined from the Company's monthly and annual production records, less water sales.

Water Sales Water sales in the UWID system vary year to year due to changes in the weather, changes in the number of metered connections (customers), and changes in the water use characteristics of those customers served.

Figure 3-1 shows that water sales for the combined commercial and residential sectors increased approximately 10 percent, from 12,560 million gallons in 1997 to 13,885 million gallons in 2005. The increase in 1999 is due mostly to the addition of approximately 4,000 customers from the South County Water Company. Figure 3-2 and 3-3 show further detail on a use per account and also monthly basis. From these figures it can be seen that annual use per account has been decreasing since 2001. The decrease in commercial account usage from 2001 to 2002 was caused by the large decline in use by one of UWID's biggest customers and relatively high growth in number of accounts in 2002.

Alternate Irrigation System One reason the water sales have decreased over the past four years, despite increased connections is the extensive use of "alternate irrigation" in new development. Since the Ada County and Boise City Ordinances adopted in the mid-1990s, all new subdivisions built in areas where formerly irrigation water for agriculture was distributed, the developer is required to provide a second distribution system of untreated surface water for irrigation of lawns and landscaping. Each new home in these developments has a connection to this underground, pressurized system. Water is sold to the customer by Nampa-Meridian Irrigation District and other districts on a flat rate, such as \$60/year for unlimited irrigation water. In these areas UWID's water is only being used for potable, indoor, uses. In some areas, existing developments are being retrofitted with this type of system. This is leading to 69 percent of new connections to UWID's system having access to this water and using significantly less water, tempering the growth in demand.

Water Conservation Plan – Section 3

Figure 3-1 Annual Water Sales (1997-2005) by Customer Category

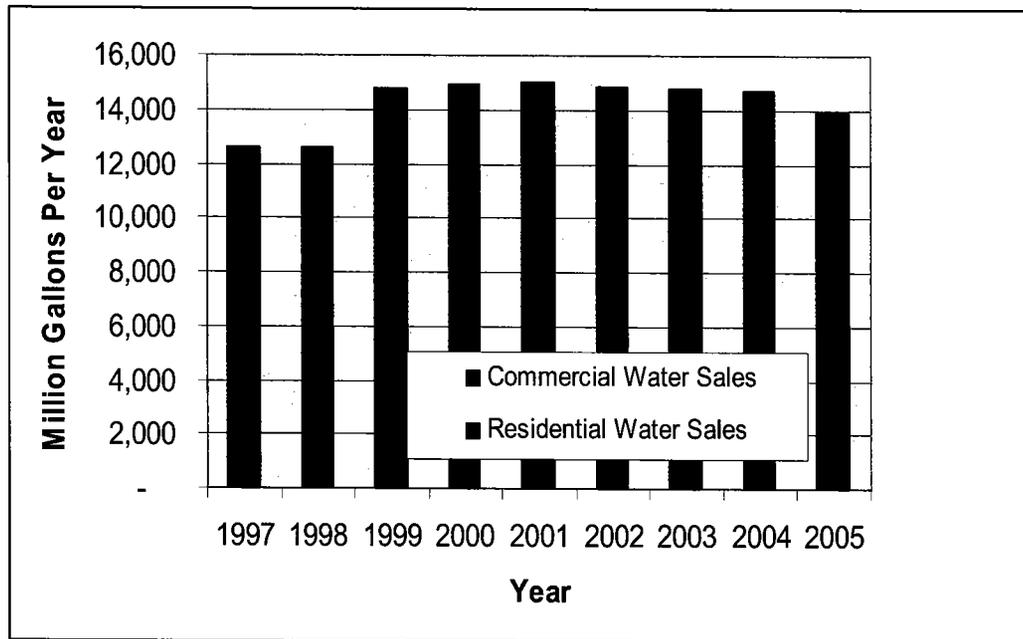
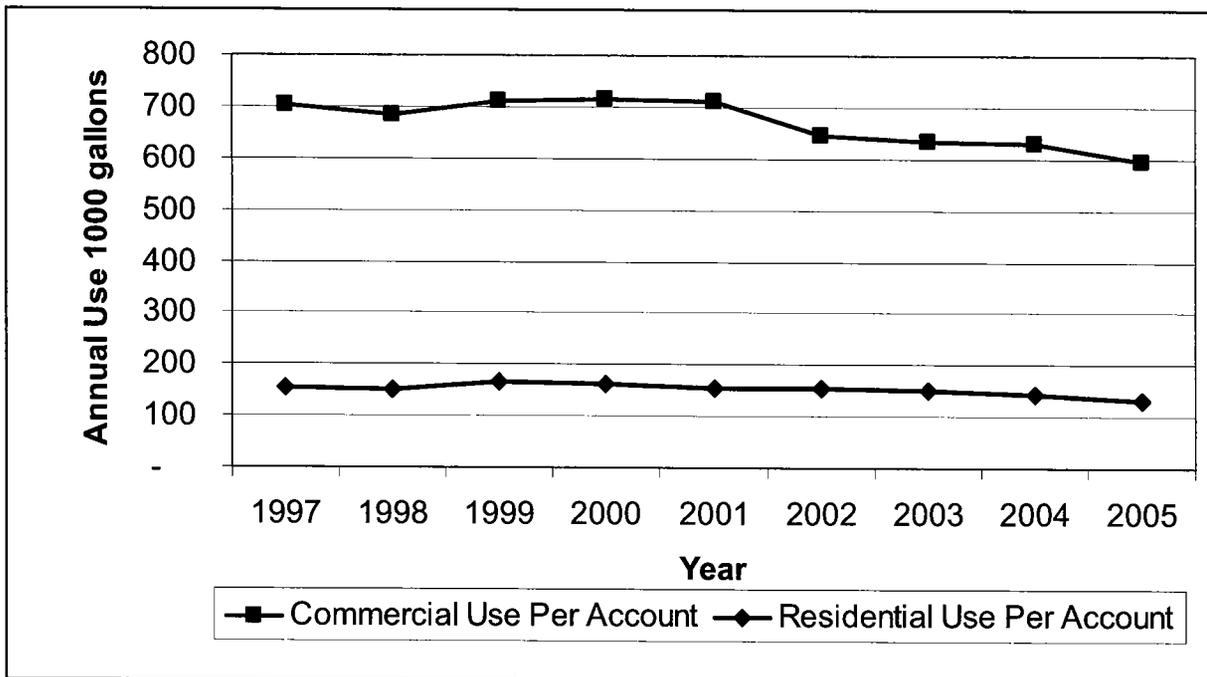


Figure 3-2 Annual Water Use (1997-2005) per Account



Water Conservation Plan – Section 3

Figure 3-3 Billed Water Use 2005

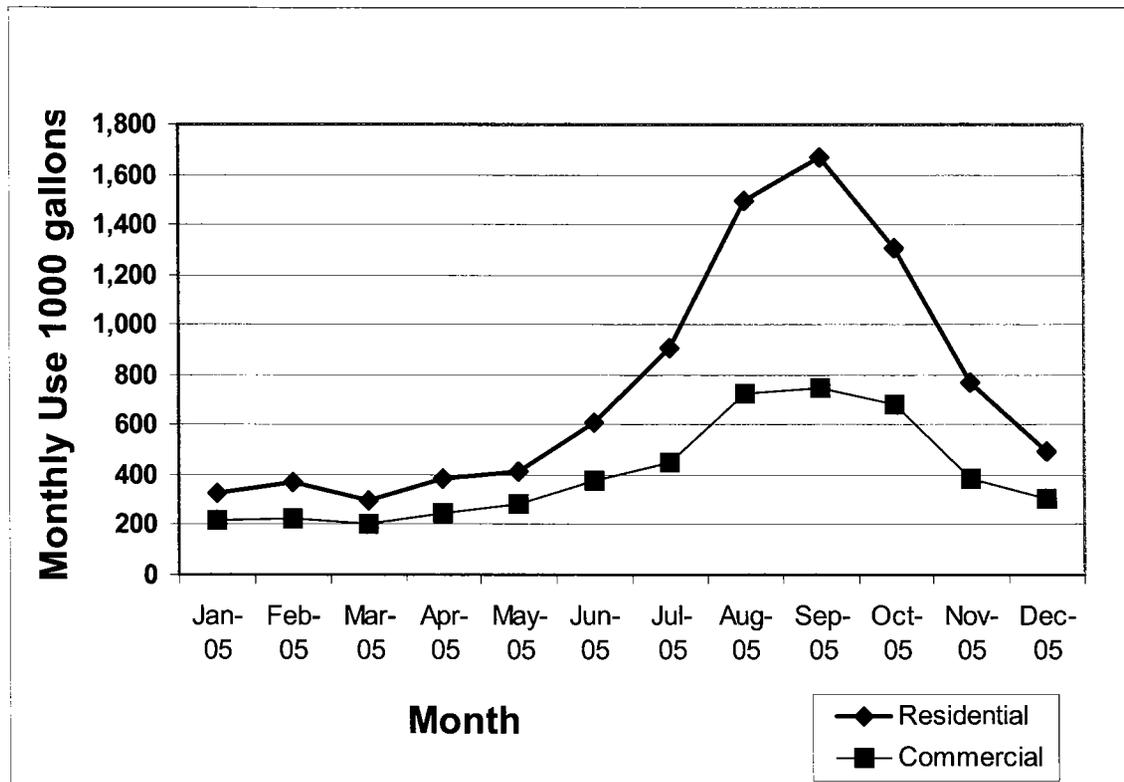
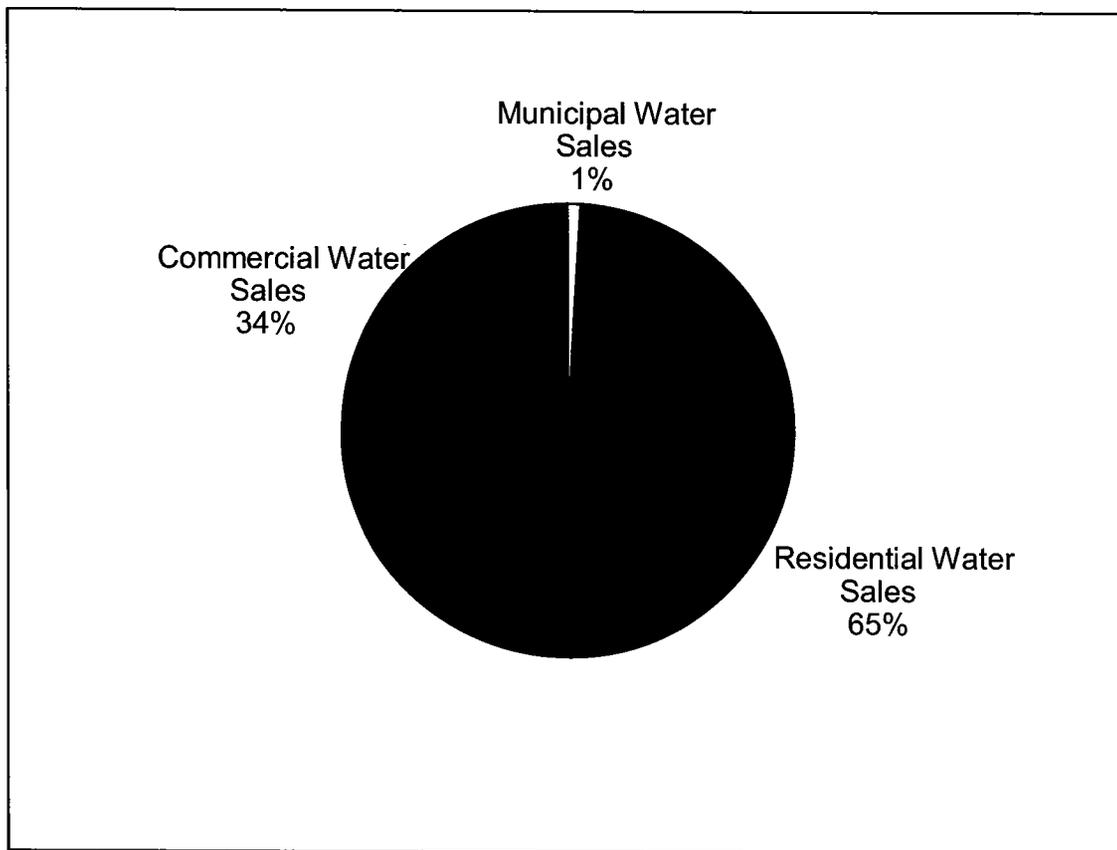


Figure 3-4 shows the proportion of water sold to residential, commercial and municipal customers in 2005. Approximately 65 percent of United Water Idaho’s water sold in 2005 was sold to residential customers; 34 percent to commercial customers; and 1 percent to municipal customers. The proportion of total water sales sold to UWID commercial customers had increased steadily from about 30.6 percent of the total in 1987 to about 37.9 percent in 1998, however, the acquisition in 1999 of the South County Water Company service area with it’s higher than average concentration of residential customers brought the commercial sector’s share of total water sales down to 35.0 percent in 1999. Since 1999 the commercial customer class has maintained that relatively constant share. Water sales to the UWID Municipal class of customers, water used for city parks and governmental facilities, has remained relatively constant at approximately 1 percent of total water sales.

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Figure 3-4 Relative Water Sales in 2005



Unmetered Water Unmetered water is water that is not registered at metered connections and consists of two components: water that is not sold, but records are maintained as to the volume of this water, and water that is not sold for which no records are maintained as to its volume. The portion of unsold water for which volumetric records are maintained includes water used for the flushing or flow testing of fire hydrants, water used by the Company for plant maintenance and the flushing of filters at the treatment plants. The unaccounted-for water for which volumetric records are not maintained can include water used for pipeline flushing where the volumes used are unrecorded, water system leaks in mains and water services, unauthorized water use from hydrants, and water meter inaccuracies.

The volume of unmetered water is estimated in UWID system by a comparison of the Company's water production records with its water sales records throughout the system. Table 3-1 shows that UWID's total volume of unmetered water averaged only 5.61 percent of total water production for the years 1997 through 2005. This is an improvement over previous historical values when unmetered water averaged only 8.34 percent of total water production for the years 1987 through 1996. This percentage is low when compared to other water systems. Nationally, unaccounted-for water (only one component of unmetered water) represents about 15 percent of total water production. UWID's capability to achieve and maintain a low level of unaccounted for water is due to the success of its existing and ongoing programs to replace old water pipelines and change out residential meters. These

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programs should allow UWID to minimize the volumes of unaccounted-for water as a percentage of the Company's total water production.

Table 3-1 UWID Unmetered Water, Production and Sales (1997-2005)

Year	Water Production ^(a) (MG)	Water Sales ^(b) (MG)	Unmetered Water ^(c) (MG)	(% of Production)
1997	13,834	12,850	984	7.11%
1998	13,390	12,662	728	5.44%
1999	15,756	14,908	848	5.38%
2000	16,075	15,052	1,023	6.36%
2001	15,959	15,112	847	5.31%
2002	15,868	15,015	853	5.38%
2003	15,710	14,898	812	5.17%
2004	15,544	14,764	780	5.02%
2005	14,779	13,990	789	5.33%
		'97 – '05 Avg.:	851	5.61%

(a) Data per UWID engineering database.

(b) Data per UWID annual sales reports.

(c) Difference between annual water production and annual water sales.

3.3 Summary of Historical and Projected Demand, Without Conservation with and Without the Plumbing Code

Detailed water demand projections at the end use level were developed out to the year 2030 using the Least Cost Planning Water Demand Management Decision Support System (DSS) model. This model incorporates information from the:

- 2006 United Water Idaho Water Master Plan for 2005-2010.
- 2000 Census data.
- Data provided by UWID staff including estimates for value of water saved, historical water use, source of supply capital improvement schedule through 2025, past conservation efforts, and water system facilities.
- COMPASS Demographics forecast (for reference purposes only).

National Plumbing Code

National law requires that for new construction after January 1, 1992 only fixtures meeting the following standards can be installed in new buildings:

- Toilet – 1.6 gal/flush maximum

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- Urinals – 1.0 gal/flush maximum
- Showerhead and Faucets – 2.5 gal/min at 80 psi

Replacement of fixtures in existing buildings is governed by the Federal Energy Policy Act that requires only devices with the specified level of efficiency (shown above) can be sold after January 1, 1994 for residential use and January 1, 1997 for commercial toilets. This law governs natural replacement.

In summary, only efficient models can be legally sold by manufacturers to be placed in new structures or used as replacement parts for existing fixtures. The net result of the plumbing code is that new buildings will be more efficient than old ones and old inefficient fixtures will slowly be replaced with new more efficient models. The national plumbing code is an important piece of legislation and carefully taken into consideration when analyzing the overall water efficiency of a service area.

In addition to the plumbing code the US Department of Energy regulates appliances such as clothes washers. Regulations to make these appliances more energy efficient has driven manufactures to dramatically reduce the amount of water these efficient machines use. Generally horizontal axis washing machines use 30-50 percent less water than conventional models (which are still sold). Maddaus Water Management (MWM) forecasts a gradual transition to efficient clothes washers so that by 2020 this will be the only type of machines sold. Given that machines last about 15 years eventually all machines in the Boise area will be of this type.

Demand Forecasts without the Plumbing Code

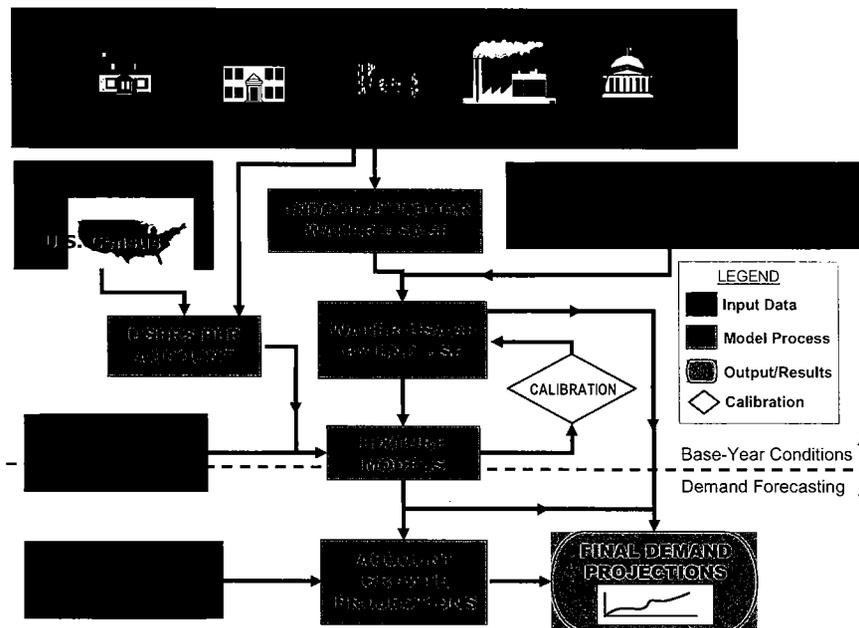
As mentioned previously, MWM matched the demand projections generated by John Church, Idaho Economics in the UWID Water Master Plan. The projection created by John Church was equated to our “without the plumbing/appliance code” projection.

Demand Forecasts with the Plumbing Code

We then used the DSS model as outlined by the Figure 3-3 to generate an additional projection “with the plumbing code” to take into account the plumbing fixture changes and appliance changes that are taking place since the enactment of the 1992 Energy Act. It is important to generate a demand projection “with the plumbing code” to currently determine the level of efficient fixtures in the service area. For example, the “with the plumbing code” demand takes into account all of the toilets that have been changed from high flush volumes to the more efficient 1.6 gallons per flush model. In addition new homes built since 1992 have these low flow fixtures in them and are added into the housing mix in the model. This is a very important step that is taken to make sure that any water conservation measures undertaken by UWID that overlap with the effects of the plumbing code are properly accounted for. Figure 3-5 below describes how the above listed items are incorporated into the flow of information in the DSS Model.

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Figure 3-5 DSS Model Overview



Key Assumptions for the Model

The one page table shown in Table 3-2 shows the key assumptions used in the model. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and finally the percent of unaccounted for water.

- **Base Year** - This is the starting year for the analysis. For this project, a base year of 2005 was selected as an appropriate starting point as it was the most current year with data available. The necessary data for the base year was provided in the 2006 UWID Water Master Plan, and matches the projected value for 2005.
- **Indoor/outdoor water use** - This is the amount of water per account split into the percent that is used indoors. The corresponding remaining percent of water is used outdoors.
- **Consumption by customer class** - This shows the annual amount of water used for an entire calendar year, broken down by customer class (Single Family, Multi Family, Commercial, Public & Other)
- **Unaccounted for water (UFW)** - The difference between the amount of water produced and the amount of water that was billed. For UWID a value of 4.2 percent was used for future UFW planning purposes in addition to the water for hydrants and other water uses as identified in the Water Master Plan Chapter 4, Table 4-6.
- **Water Produced** - This is the total amount of potable water produced by UWID.

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- Peak day factor - The ratio of water produced on the maximum day of the year to that produced on the average day. A value of 2.1 is used for this analysis as found by analyzing the data in the UWID Water Master Plan Chapter 4, page 4-13.

Graph of Projected Demands

Figure 3-6 shows the projection at five-year increments. The graph shows projections for demand with and without the plumbing code through 2030. These demands closely match those in the UWID Water Master Plan “Annual Total Water Production” shown in Chapter 4, Table 4-6.

Table of Water Demand Projections

Table 3-3 presents the water demands projection which includes the following:

1. The water demand projections are based on the future population projections.
2. The water demands in 2030 without plumbing code are the same as in the 2006 Water Master Plan.
3. Projections were made *with and without* the plumbing codes.
4. Projections shown in the below table are for potable water only.

The plumbing codes and appliance standards will reduce 2030 demands 3.27 MGD or 2.3 percent. We include these savings in the overall savings projected for UWID. Further reductions in demand due to conservation measures are calculated from an end use version of the demands “with plumbing code”.

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Table 3-2 List of Baseline Demand Projection Assumptions for DSS Model

Parameter	Model Input Value, Assumptions, and References
Base Year	2005
Peak Day Factor	2.1 from 2006 UWID Water Master Plan
Unaccounted for Water, % of Water Production	UFW 4.2%, constant over time, 2006 UWID Water Master Plan
Population Projection, 2005 to 2030	2006 UWID Water Master Plan page 3-10 Table 3-3
Number of Water Accounts for Base Year	2006 UWID Water Master Plan page 4-13 Table 4-6
Distribution of Water Use Among Categories	Data from UWID
Indoor/Outdoor Water Use Split by Category, % of Total	Estimated from Billing Data
Residential End Uses, %	AWWARF Report "Residential End Uses of Water" 1999
Non-Residential End Uses, %	Professional judgment and AWWARF Report "Commercial and Institutional End Uses of Water" 1999
Residential Fixture Efficiency Current Installation Rates	Census 2000, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Reference "High Efficiency Plumbing Fixtures - Toilets and Urinals" Koeller & Company July 23, 2005. Reference Consortium for Efficient Energy (www.cee1.org)
Water Savings for Fixtures, gal/capita/day	AWWARF Report "Residential End Uses of Water" 1999
Non-Residential Fixture Efficiency Current Installation Rates	Census 2000, assume commercial establishments built at same rate as housing, plus natural replacement
Residential Frequency of Use Data, Toilets, Showers, Washers, Uses/user/day	Falls within ranges in AWWARF Report "Residential End Uses of Water" 1999
Non-Residential Frequency of Use Data, Toilets and Urinals, Uses/user/day	Estimated based using AWWARF Report "Commercial and Institutional End Uses of Water" 1999
Natural Replacement Rate of Fixtures	Residential Toilets 3% (newer toilets), 4% (older toilets) Commercial Toilets 4% Residential Showers 4% Residential Clothes washers 6.7% A 4% replacement rate corresponds to 25 year life of a new fixture based on data published in "High Efficiency Plumbing Fixtures - Toilets and Urinals" Koeller & Company July 23, 2005. A 4% replacement rate is also the California Urban Water Conservation Council recommended value. A 6.67% replacement rate corresponds to 15 year washer life based on "Bern Clothes Washer Study, Final Report:", Energy Division, Oak Ridge National Laboratory, for U.S. Department of Energy, March 1998, Internet address: www.energystar.gov
Future Residential, Non-Residential Water Use	Based on Projected Population Growth

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Figure 3-6 Baseline Peak Day Water Use Projections for UWID Potable System

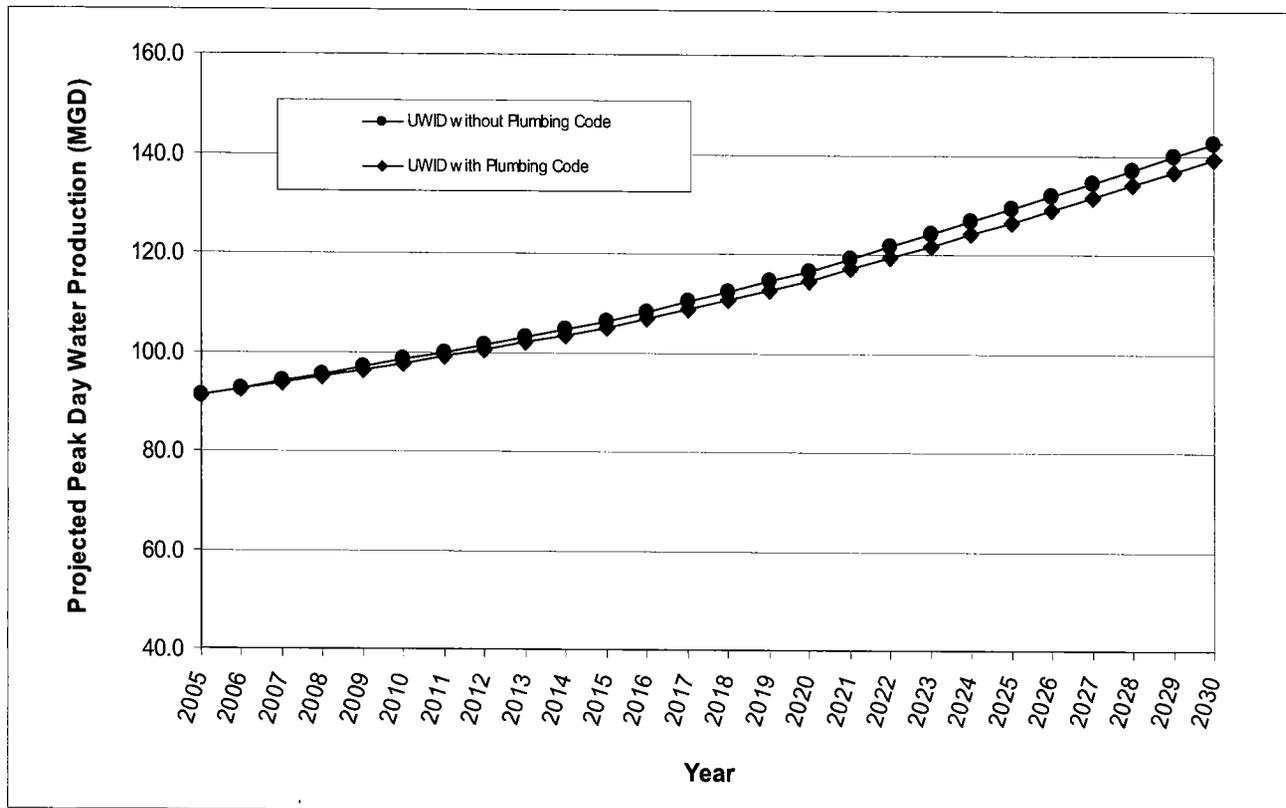


Table 3-3 Baseline Water Use Projections for United Water Idaho Potable System

Data Source for Projection		Plumbing Code	Water Production, Peak Day (MGD)*					
Residential	Non-Residential		2005	2010	2015	2020	2025	2030
2006 UWID Water Master Plan	2006 UWID Water Master Plan	Not Included	91.09	99.94	106.13	116.62	129.17	142.42
2006 UWID Water Master Plan	2006 UWID Water Master Plan	Included	91.09	97.76	104.82	114.63	126.52	139.20

*Total Water use is potable only. Does not include alternate irrigation system water use. Peak to Day Ratio is 2.1 (Also known as Peaking Factor). Demand without plumbing code; closely match demands in UWID Water Master Plan.

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SECTION 4: Current Water Conservation Program

This section describes United Water Idaho's historical and current water conservation efforts. The historical efforts covered in this section start with the first water conservation plan issued in 1993 and cover until 2004. Beginning in 2004 a media campaign was added. A qualitative evaluation of effectiveness is presented in terms of scope and budget expenditures.



4.1 Historical Measures Implemented by United Water Idaho (1993-2004)

United Water Idaho started its water conservation program in the late-1980's. After 1993 the content of the program was based on the following recommendations provided in the Montgomery Watson 1993 Water Conservation Plan:

- Public information and school education
- Residential home water audits
- Plumbing code
- Management of unaccounted-for water (water loss)

Plumbing code

This element was basically a passive program that involved supporting the 1992 Energy Policy Act relating to water fixture requirements on faucets, showers and toilets. As City and County governments had responsibility for implementation through the building code process and sale of fixtures, there was little that United Water Idaho needed to do at the time. This element was successfully implemented.

Management of Unaccounted-For-Water (Water Loss)

At the time of the report unaccounted-for water was running at about 10 percent of water production. The recommendation was to continue managing and attempting to reduce water losses through the following actions:

- Metering all services
- Meter testing and replacement
- Conduct monthly water audits
- Leak detection and repair - survey system every three years or as needed to find and repair leaks
- System rehabilitation - replace old mains and other equipment that is inefficient

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Since 1993 UWID has actively managed the unaccounted-for water. By 2005 the percentage water that was unaccounted for dropped to 4.2 percent. This part of the 1993 plan was successfully implemented using techniques such as those listed above.

Residential Home Water Audit

The 1993 plan called for audits that were patterned after cost-effective audits that were being done at the time in California and other states. The intent was to focus on three areas of water use:

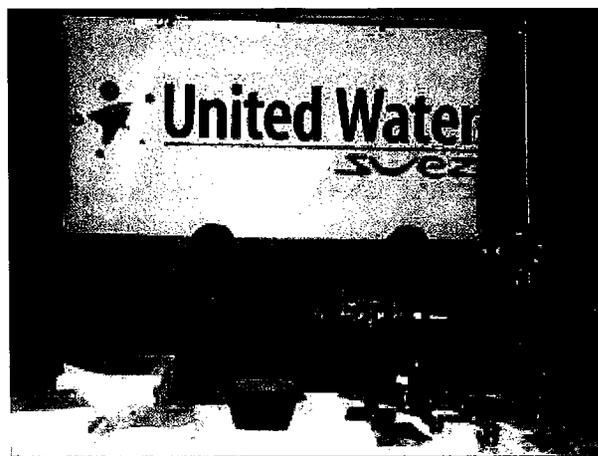
1. Indoor water use efficiency (suggest improvements in toilets, showers, faucets)
2. Reduction of leaks (check the entire house at the meter and specifically the toilets for leaks)
3. Outdoor water use through conduct of a brief irrigation audit, provide an irrigation schedule, and advise the customer on the benefits of low water use landscaping.

MWM reviewed the current water audit procedures and forms being used as recently as 2005. It is apparent that the focus of the home audit was primarily on irrigation system efficiency. The techniques appropriate for large landscapes and taught by the Irrigation Association (IA) were adopted for home landscapes. This included purchase of measuring equipment and calculation of the distribution system uniformity, as well as development of an irrigation schedule. Between 1994 and 2001 over 2,500 audits were completed. By 2004 the demand for these audits had been satisfied and the requests have fallen to near zero in 2006.

It is recommended that UWID provide audits to service area residents only upon request. The main objective of this approach would focus toward providing customer service. By having a program available upon request, allows UWID the ability to respond to those customers who call and are concerned about a high water bill. Residential home audits should not be promoted because residential audits were not cost-effective in our analysis of conservation measures discussed later in this report.

Public Information and School Education

The 1993 Plan recommended a robust program, budgeted at about \$100,000 per year. The program that has evolved over the past ten years is now very effective and this part of the last plan continues to be successfully implemented. A more thorough explanation of the specific elements in the current program is presented in the next section.



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4.2 Recent Conservation Activities Implemented by United Water Idaho

Over time, UWID has expanded the public information and school education activities to be a very active, multi-faceted program. Below, the measures are described in more detail with a budget for the direct cost of the activities. Costs exclude labor.

Media: summer conservation campaign

For many years, UWID has promoted summer water use conservation through a media campaign that has included television time and newspaper ads. Since 2004, UWID has partnered with KIVI Channel 6 and the Journal Broadcast Group. This partnership has produced a 14-week commercial series, sponsorship of the extended weather forecast, water tips, trivia and production numbers and conservation tips during radio weather.

Approximate Cost- \$25,000 for KIVI partnership

Idaho Rivers United

United Water has partnered with Idaho Rivers United (IRU), a local water conservation group. This relationship has produced ads in the local newspaper and a commercial on the local Fox Station promoting water conservation. IRU has also displayed UWID's Conservation Guide at various community events such as the Hyde Park Street Fair.

Approximate Cost- \$5,000 for newspaper and television advertisements

Annual Conservation Guide

In 2005, UWID introduced the Annual Conservation Guide. This guide focuses on a central theme, offers conservation tips and customer service information. The annual guide is inserted in the local newspaper at the beginning of the summer. A new theme is featured in every edition. The past two themes have been Water Efficient Landscaping and The Aquifer.

Approximate Cost- \$16,000

Bill Inserts

For many years UWID has sent out bill inserts explaining summer rates and offering water conservation tips.

Approximate Cost- \$4,000

Water Saver Kits

UWID offers indoor and outdoor water saver kits to customers. The indoor kits include aerators, toilet tank bags and shower heads. The outdoor kits contain hose timers, moisture probes and sprinkler gages.

Approximate Cost- \$2300 for 150 outdoor and 250 indoor

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Earth Day

UWID has teamed up with the city of Boise to celebrate Earth Day. During most years, a booth has been set up with material that encourages water conservation. The booth is staffed by UWID volunteers.

Approximate Cost- \$500 for booth material

Trade Shows

Over the years, UWID has participated in various trade shows such as the Idaho Remodeling Show and the Boise Flower and Garden Show.

Approximate Cost- \$650-\$725 each show varies on their entrance fee

Booth Set-up

UWID participates in booth set up at various events such as local neighborhood association "Night Out". Literature and handouts are geared toward the season or event.

Approximate Cost- \$200/yr for printing and booth materials

Adult Education

Since the 1993 conservation plan, UWID has developed a well-rounded adult education program. The biggest element of the adult education program is the Water Efficient Landscaping Series (WELs). This series is a 7-week program teaching the principles of xeric landscaping.

UWID has partnered many times with the Idaho Botanical Garden to present a one night workshops on watering wisely.

UWID has also been involved in various water conservation presentations at places such as the Foothills Learning Center or for groups such as the Golden Gardeners Club.

Approximate Costs- \$3,700 for WELs; \$200 for Idaho Botanical Garden ads

School Education

UWID has a well developed school education program. There are many components of the school education program.

The Business Education Exchange introduces teachers to United Water and gives the company the opportunity to explain to teachers the skills and training their students need to work in the water field.

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The incredible edible aquifer is a science experiment taken into the classrooms and other events demonstrating how the aquifer works and how humans can pollute and drain the aquifer.

Water Awareness Week is a state-wide program that annually creates 6th-grade curriculum on a water topic. The program is divided into regional committees. The Region 3 committee (to which UWID belongs) meets once a month and once a year puts together curriculum packets and sends to area teachers. UWID provides financial sponsorship and the Outreach/Education Coordinator is now co-chair of the regional committee.

The Idaho Water Education Foundation is a group that oversees Water Awareness state funds and finds ways (through curriculum or teacher camps) to promote general, non-partisan water education throughout the state. UWID provides financial sponsorship and sits on the committee.

UWID takes groups on a tour of the Marden Water Treatment Plant.

There is a new Xeriscape demonstration garden at the UWID main operations office. The garden showcases over 60 varieties of drought tolerant plants that work well in the Boise area. There is a corresponding brochure that explains each garden plant in detail. Wise water workshops have been created around the garden and will continue to be offered free to the public.

The UWID number for conservation is listed in the local telephone directory and many calls are received looking for conservation advice.

Approximate Costs- \$120/yr for Business Education Exchange, \$1,000+ for Water Awareness Week, \$1,000 for Idaho Education Foundation, \$16,000+ for Xeriscape demonstration garden

A budget summary of the 2006 Conservation program is shown in Table 4-1.

Need for Monthly Billing to Maximize Impact It is clear that the majority of the programs are oriented towards reducing peak summer water use. This is appropriate as it is the peak demand that drives the system capacity expansion. One difficulty with the current system is that the public outreach occurs in the summer but the customer may not see a direct connection to his/her actions and his/her water bill, since the water meters are only read every two months. The high bills will arrive in late summer and fall, after the peak has passed and the summer outreach program is finished. In other words the public outreach and water billing are out of phase. A much more logical approach would be to switch to monthly billing so that the connection between conservation actions and reduced water bills can be made by customers.

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Table 4-1 2006 Public Information and School Program Budget

Item	Budget, \$
Water Saver Kits- 1 yr supply, customer's and United Water Cares Program	2,000.00
Landscape Classes- ads, miscellaneous	4,000.00
Conservation Newspaper Insert	16,000.00
Summer Rate Ads	1,200.00
Project Water Education for Teachers (WET)	850.00
Water Awareness Week Sponsorship	1,000.00
Idaho Water Ed Foundation Sponsorship	1,000.00
Summer Media Campaign	25,000.00
WELs Speaker gifts	200.00
Spring Home and Garden Show	650.00
Summer Rates Bill Stuffer	4,000.00
Conservation - Winter Freeze Ads	4,000.00
Subtotal	60,640.00
Staff time w/overhead	64,300.00
Total	124,200.00

4.3 Evaluation of Effectiveness of Recent Measures Implemented by UWID

MWM conducted a qualitative review of UWID's current program as quantitative data was not available to measure water conservation savings from past efforts. Such an analysis can be a very involved process requiring collection of customer data by surveys and other methods and then using statistical methods to identify water use reductions by customers who participated in one or more UWID programs.

Conservation Program Scope

The UWID conservation program is, by design, primarily oriented towards public and school education. UWID does not have rebate, retrofit, or audit programs, although residential audits are provided upon request. In our review of what other water utilities in the United States are doing to conserve water, it was discovered the vast majority of utilities do not have a conservation program. Active conservation programs are mainly found in the west, southwest and southeast, where water supplies are often limited. UWID's supplies are currently not limited but UWID does recognize the importance of being a good resource steward and they have implemented a conservation program.

In MWM's review of other existing water conservation programs around the United States, it was found that at a minimum an agency with a conservation program will provide a public education program. The "larger" utilities, where water supply is an issue, tend to also have other programs such as rebate programs, audit programs, restrictions, sometimes tiered rates, and so forth. A 2004 survey of 31 utilities in 14 different states conducted by MWM for Jordan Valley Water Conservancy District in Utah found that the average number of programs being implemented was 8, with public education/school education being one of those always offered. Table 4-2 shows the results of this survey.

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One note on the conservation portion of the UWID web site is that the education programs offered to customers are not routinely posted. The UWID web site could be made a more effective communication tool for the current conservation program. Plans are currently underway to upgrade the site.

Table 4-2 Wholesaler and Retailer Water Conservation Programs (2004)

State	Name of Agency	Agency Type	Number of Programs Offered
Arizona	City of Phoenix	Retailer	4
Arizona	City of Tucson	Retailer	7
California	Alameda County Zone 7	Wholesaler	7
California	Alameda County Water District	Retailer	10
California	Santa Clara Valley Water District	Wholesaler	13
California	Metropolitan Water District	Wholesaler	10
California	East Bay Municipal Utility District	Retailer	12
California	San Francisco Public Utilities Commission	Wholesaler	3
California	Contra Costa Water District	Retailer	17
California	San Diego Water Authority	Wholesaler	14
California	Orange County Water District	Wholesaler	13
California	Regional Water Authority (Sacramento)	Authority	0 (just starting)
California	Sonoma County Water Agency	Wholesaler	0 (provide \$)
Colorado	Colorado Springs	Retailer	18
Colorado	Denver Water Department	Wholesaler	0 (drought)
Florida	Miami Dade County Water District	Retailer	3
Florida	Tampa Bay Water District	Wholesaler	4 (limited by law)
Idaho	United Water Idaho	Retailer	3
Mass.	Massachusetts Water Resource Authority	Wholesaler	3
Nevada	Southern Nevada Water Agency (SWNA)	Wholesaler	13 (drought)
New Mexico	City of Albuquerque	Retailer	12
North Carolina	Orange County Water / Sewer District	Wholesaler	3 (2002 drought)
Oregon	Portland Water Bureau	Wholesaler	10
Texas	City of Austin Water Utility	Retailer	16
Texas	City of El Paso	Retailer	6

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State	Name of Agency	Agency Type	Number of Programs Offered
Texas	San Antonio Water System	Retailer	10
Texas	City of Houston Water Conservation Branch	Retailer	5
Utah	Salt Lake City Department of Public Utilities	Wholesaler	2
Utah	Jordan Valley Water Conservancy District	Wholesaler	6
Virginia	Newport News Water Works	Retailer	6
Washington	Seattle Public Utilities	Wholesaler	19

Current Conservation Program Water Savings and Costs

Water savings from public education programs are difficult to quantify and there is little, if any, published statistics or quantitative data. Typically when MWM evaluates a public education or school education program, water savings are estimated to be about 0-5 percent of single family customer billed water use. A lower water savings value is used when an agency has many active conservation programs to avoid double counting of water savings. For example, one does not want to count water savings from public education, school education, residential water audits, residential toilet programs, residential washer rebate programs without taking into account that they are all addressed to the same residential customers. A value at the high end of the range is used if public education is the only active program. For UWID, the range for 2005 water usage levels would be 0 to 1.4 million gallons per day (mgd) estimated water savings. A mid-range savings estimate would be 2 percent savings of single family residential customer water use or about 0.5 mgd.



Typically MWM estimates a comprehensive public education program costs approximately \$2 per single family customer per year. For UWID, this estimate equates to approximately \$140,000 per year (based on 70,000 single family accounts in 2004). In 2006, UWID is spending about \$124,000 per year or approximately \$1.78 per customer. In summary, MWM finds that UWID's conservation program is cost-efficient from the budget standpoint. Therefore UWID's program budget for 2006 appears to be reasonable, given their current stated goals and objectives. Expansion of UWID's water conservation program beyond public and school education is considered in subsequent sections of this report.

SECTION 5: Alternative Water Conservation Measures

This section describes a review of alternate water conservation measures that may be appropriate for the region and the screening of these measures to a short-list of measures for detailed evaluation (benefit-cost analysis). This section includes a description of how the selection process was conducted and the final list of 17 measures to be evaluated in the DSS model for cost effectiveness. The screening was conducted during a full day meeting at the United Water Idaho office on May 9, 2006. The following agencies/companies participated in the screening process: United Water Idaho, Idaho Rivers United, Idaho Public Utilities Commission and Maddaus Water Management.

To complete this process, Maddaus Water Management compiled a list of potential demand management measures for qualitative evaluation (screening). This list includes 91 potential conservation measures in the typical customer categories of:

- Single Family Residential
- Multi-family Residential
- Commercial, Industrial, Institutional
- Water Utility (United Water Idaho), City/County

5.1 Water Efficient Technologies Current Available

As part of this task the available water efficient fittings and fixtures (together with other devices) have been researched and evaluated for cost, and possible water conservation value. Table 5-1 provides a summary of devices. Demand reductions shown are preliminary and subject to change. Actual savings vary with household size, current devices or technology in use, portion of water used in the garden etc.

Table 5-1 Summary of Water Efficient Devices

Device Description	*Flow Rating	Estimated Cost (\$ per unit)			Device Life* (yrs)	End Use Reduction		Status
		Supply	Install	*Annual		gal/cap/day	%	
Bathroom								
New Showerhead	2.5 gpm	10-35	By user		5-10		21 ^a	Required for New
Shower Flow Restrictor	2.5 gpm	5	By user		10		21 ^a	Voluntary
Faucet Aerator	2.5 gpm	3	By user		5	0.3 ^c		Required for New
Toilets								
6-Liter Toilets	1.6 gal/flush	65-250+	100-200		20-30		52 ^a	Required for New
New Ballcock and Flapper Valve for	NA	10	25			5+		Voluntary

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Device Description	*Flow Rating	Estimated Cost (\$ per unit)			Device Life* (yrs)	End Use Reduction		Status
		Supply	Install	*Annual		gal/cap/day	%	
Leak Repair								
Early Closure Device	0.5-1.0 gal/flush	5	15		5	2-4		Voluntary
Water Displacement Device	0.5-0.7 gal/flush	2	10		5	2-3 ⁴		Voluntary
Dual Flush or 4L Toilets	3 – 6 liter/flush	300	100-200		20-30		63	Voluntary
Composting Toilets	0 gal	2,000	500	200	20+	20.1 ^a		Voluntary
Kitchen								
Faucet Aerator	2.5 gpm	3	by user		5	0.3 ^c		Required for New
Insulate Hot Water Pipes	NA	25/100 ft.	by user		10	2 ^d		Voluntary
Efficient Dishwasher	5.5 gal/load	500-800	200		10-15	0.5 ^e		Voluntary
Laundry								
Faucet Aerator	2.5 gpm	5-10	by user		5	0.3 ^c		Required for New
Horizontal Axis Washing Machine	20 gal/load	600-1000	100		15-20		35 ^a	Voluntary
General Household								
Pressure Reducer	<80 psi	90	200-400		20+	3-6 ^d		Regulated
Submeters on Apartment Units	NA	50	200	varies	20+		15 ^f	Voluntary
Household Leak Repair	NA	varies	varies		5 +/-	5.0 ^a		Voluntary
Graywater Systems	NA	100-2,000	200-500		10-20	10-50		Regulated
Public Education	NA			~1-2/ person	1		1-5 ^d	Voluntary
Landscape Irrigation								
Drip Systems	NA	15 for 20 plants	by user		10	Varies ^g		Voluntary
Micro-Spray Systems	NA	25 for 20 sq.ft.	by user		10	Varies ^g		Voluntary
Hose Timers	NA	10-40	by user		5-10	Varies ^g		Voluntary
Rain Sensor	NA	30	100		10		5-10	Voluntary
Trigger Shut Off Valves on Hoses	NA	3-8	by user		5-10	Varies ^g		Voluntary
Irrigation System Moisture Sensors	NA	30/valve	100		10	Varies ^g		Voluntary
ET Irrigation Controllers	NA	200-500	100-300		10-15		15-25 ^h	Voluntary
Native Plants	NA	Varies	Varies		5-20		15	Voluntary
Mulch	NA	1/sq. ft.	by user		5	Varies ^g		Voluntary
Synthetic Turf	NA	\$3.50/sq uare	\$3.50/s uare		10-15		95	Voluntary

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Device Description	*Flow Rating	Estimated Cost (\$ per unit)			Device Life* (yrs)	End Use Reduction		Status
		Supply	Install	*Annual		gal/cap/day	%	
		foot	foot					
General Commercial (Other than above measures)								
1.0 gal/flush Urinals	1 gal/flush	500	100-400		20+	3 ⁱ		Required for New
0.5 gal/flush Urinals	0.5 gal/flush	500	100-400		20+	4.5 ⁱ		Voluntary
Waterless Urinals	0 gal/flush	500	100-400	50-100 ^h	20+	3 ^j		Voluntary
Infrared Sensor Flush Controlled Urinal	1 gal/flush	700	100-400		20+	1 ^k		Voluntary
Infrared Sensor Faucet	2.5 gpm	400	200		20+	0.3 ^c		Voluntary
Restaurant Low Flow Spray Nozzles	1.6 gpm	50	120		10-15		50 ^l	Voluntary
X-Ray Water Recycling Units	NA	2,400	100	1,300	10-15		95 ^m	Voluntary
6-Liter (Commercial) Toilets	1.6 gal/flush	300-450	100-200		20+	5.7 ⁿ		Required for New
Commercial Laundry Recycling Systems	NA	100,000 and up	include d		20+		65 ^o	Voluntary

Notes: *Denotes *Where Applicable*, water used may vary depending upon water pressure and maintenance.

^a Nelson, J.O., "Household End Uses of Water", posted on www.waterwiser.org, 1999

^b Based on retrofit to the equivalent of a new low flow showerhead (see note 1 above)

^c Total savings if installed on kitchen and bathroom sinks, based on note 1 above

^d Maddaus, W.O. "Water Conservation", American Water Works Association, 1987.

^e Based on Mayer, P.W., et al "Residential End Uses of Water, American Water Works Association Research Foundation", 1999, and an assumed water savings of an efficient machine of 5 gallons per load.

^f Dietemann, A. "Sub-Metering: The Next Big Frontier?" Seattle Public Utility, Conserve99 (AWWA), February 1999, Orlando Florida.

^g Depends on amount of water used outside and interaction with other outdoor measures

^h Berg, J.O. et al "Residential Weather-Based Irrigation Scheduling: Evidence from the Irvine "ET Controller" Study, June 2001, Irvine Ranch Water District, California.

ⁱ Compared to 2.0 gal/flush urinals using three flushes per employee per day

^j Compared to 1.0 gal/flush urinals using three flushes per employee per day

^k Assuming elimination of one extra 1.0 gal flush per employee per day

^l Personal Communication with John Koeller, Plumbing Consultant, June 2002.

^m Koeller, J., "X-Ray Film Processors" in The Water Logue, Vol 1, No. 7, California Urban Water Conservation Council, December, 2001.

ⁿ Compared to 3.5 gal/flush toilets using three flushes per employee per day

^o Personal Communication with Randall Jones, Wastewater Resources, Inc., Scottsdale, Arizona, February 2000.

5.2 List of Potential Conservation Measures

Table 5-2, *Potential Conservation Measures for United Water Idaho*, lists the potential conservation measures that may be appropriate for this region. The table includes devices or programs (e.g., such as a new dual flush toilet, that would save water if installed by a water retailer, contractor, or customer) that can be used to achieve water conservation, methods

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through which the device or program will be implemented, what distribution method, or mechanism, can be used to activate the device or program.

A screening process was undertaken to reduce the number of measures to a more manageable number and to eliminate those measures that are not as well suited to the United Water Idaho service area as other potential measures. The result of this process reduced the measures to be evaluated to a final list of 17 measures. The practical side of the matter is that a well run conservation program can only focus on 5-10 measures at a time and so it is necessary to set priorities.

The list of 91 new measures in Table 5-2 was drawn from Maddaus Water Management's general experience and review of what other water agencies with conservation programs are currently implementing. Where the measure is a California Best Management Practice (BMP) or a State of Arizona recommended Reasonable Conservation measure (RCM), it is so noted in the measure description. It was intended that the list in Table 5-2 be *New Measures*, not yet implemented or being considered for implementation. It was intended that all measures could apply in general to the study area. New Measures that survived the screening process were evaluated separately. The evaluation (water savings analysis and benefit-cost analysis with the DSS Model) was specific to the water use characteristics, economies of scale, demographics, and other factors that are unique to the United Water Idaho area.

5.3 Measure Screening Process

Each potential measure was screened based on four qualitative criteria (below), scored on a scale of 1 to 5, with 5 being the most acceptable, and 20 being the maximum possible number of points for all criteria. Measures with low scores were eliminated from further consideration, while those with high scores passed into the next evaluation phase (cost-effectiveness analysis using the DSS Model). The screening was completed by representatives of United Water Idaho, Idaho Rivers United, Idaho Public Utilities Commission, in a full day meeting at the United Water Idaho office on May 9, 2006 facilitated by Maddaus Water Management. To reduce the list to a more manageable number, it was determined that a score of 17 or more was necessary to pass. Resulting scores reached by consensus are recorded in Table 5-3, the final decision whether the measure received a Yes/No pass was also recorded and shown in Table 5-2. This screening process eliminated about half of the measures.

Qualitative Criteria

- *Technology/Market Maturity* – Is the necessary technology available commercially and supported by the local service industry? E.g., a device may be screened out if it is not yet commercially available in the region.
- *Service Area Match* - Is the technology appropriate for the area's climate, building stock, or lifestyle? E.g., promoting Xeriscape gardens for multifamily or commercial

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sites may not be appropriate where water use analysis indicates little outdoor irrigation.

- *Customer Acceptance/Equity* - Are customers willing to implement measures? If not, the market penetration rates (and thus the water savings) would be too low to be significant. Measures should also be equitable (i.e. one category of customers should not benefit while another pays the costs without receiving benefits). Customer acceptance may be based on:
 - Convenience;
 - Economics;
 - Perceived fairness; or
 - Aesthetics
- *Legal Authority Existing or Possible* - Does United Water Idaho have the legal authority to implement the measure, or can they expect they could be granted the authority or could they expect a political entity such as City of Boise or Ada County would enforce the measure if asked.

5.4 Results of Conservation Measure Screening

Final List of Measures Selected for Evaluation in the DSS Model

After it was determined which measures passed the qualitative screen, the next step was to consolidate the measures into a single list showing the targeted customer categories. In this step measures were combined when it was believed a water utility would manage the measures together as one program. For example a toilet rebate program could be qualitatively evaluated separately for single family, multi family and commercial customers and then for those sectors that pass, say multifamily and commercial, they could be combined into one measure. This consolidation step reduced the list of acceptable measures shown in Table 5-2 with a “Yes” from 30 down to 17 new measures. In the DSS model the costs, savings and benefits will be calculated separately for each sector and then added together for all sectors targeted by each measure. Results were tabulated separately for each measure. See Section 6 for the results of the economic evaluation.

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Table 5-2 Potential Water Conservation Measures for United Water Idaho

Device or Program	Measure		Score/Pass
	Distribution Method & Incentive	Description	Yes or No?
Single Family Residential – Indoor			
Existing Accounts			
1. Low flow showerhead distribution	Water Utility provide	Modeled after California BMP 2 and Arizona RCM, utility would distribute water conservation retrofit kits, with high quality showerheads to homes in older neighborhoods, until the saturation of such devices reaches 75% installed low flow.	No 14
2. Residential water surveys	Water Utility provide	Modeled after California BMP 1 and Arizona RCM the United Water Idaho's water survey program would be expanded to include and audit of indoor water using fixtures and appliances (toilets, showerheads, faucets, clothes washers).	No 16
3. Clothes washer rebates	Water Utility- rebate	Modeled after California BMP 6 and Arizona RCM, utility, possibly with an energy company partner, would provide a rebate for the purchase of an efficient clothes washer until such time as they are required to be sold in stores.	No 15
4. ULF toilet rebates	Water Utility- rebate	Modeled after California BMP 14 utility would provide a rebate for replacement of an existing high volume toilet with a 1.6 gal/flush toilet. Alternative toilet give-away programs could be sponsored.	No 14
5. Rebates for 6/3 dual flush or 4-liter toilets	Water Utility- rebate	Provide a rebate or voucher for the retrofit of a 6/3 dual flush, 4-liter or equivalent very low water use toilet. Rebate amounts would reflect the incremental purchase cost and would be in the range of \$50 to \$100 per toilet replaced.	Yes 17
6. Home leak detection and repair	Water Utility -promote	Use Leak detection equipment to determine whether and where leaks are occurring on the premises. The Water Utility would then provide a plumber to the customer to repair leaks for free.	No 16
7. Reestablish school education programs	Water Utility –sponsor	The Water Utility would sponsor school conservation programs with workbooks and presentations; teaching materials and other educational tools to teach the students the importance of conserving water.	Yes 20
New Homes			
8. Require high efficiency clothes washing machines	City/County-requirement	The Water Utility would educate its customers through bill collection brochures, displays at points of purchase, the media, on the latest clothes washer water conserving technology. Building departments would be responsible to ensure that an efficient washer was installed before new home occupancy.	No 12
9. Insulate hot water piping	City/County-requirement	Change building codes as necessary to require installation of hot water pipe insulation on new residences.	No 11
10. Rebates for 6/3 dual flush or 4-liter toilets	Water Utility -rebate	Water Utility offers a coupon or rebate to replace an existing toilet with a 6/3 dual flush toilet	No 16
11. Require 6/3 dual flush or 4-liter toilets in	City/County-requirement	Building departments would be responsible to ensure that a 6/3 dual flush or 4-liter toilet was installed before	No

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Device or Program	Distribution Method & Incentive	Measure	
		Description	Score/Pass Yes or No?
new homes		new home occupancy.	11
Single Family Residential – Outdoor			
Existing Homes			
12. Continue/Expand WELs	Water Utility provide	Continue and expand the WELs program to draw up to twice the number of participants. Incentives could include landscape and drip system vouchers.	Yes 19
13. Residential water surveys	Water Utility provide	Modeled after California BMP 1, possibly redesign former United Water Idaho Program and reinitiate to offer free irrigation system evaluations to high water use customers.	Yes 18
14. Landscape rebate program	Water Utility -rebate	Modeled after Arizona RCM, Las Vegas and other programs Utility would provide a rebate of \$ 0.25 to \$1.00 per square-foot of existing irrigated turf removed and replaced with hardscape or approved low water use plant material, irrigated by new efficient irrigation system.	Yes 19
15. Rebates for rain sensor/shut-offs on automatic systems	Water Utility -rebate	Modeled after Arizona RCM, rebate the installation of these devices with automatic irrigation systems. The Water Utility and/or building department would inspect irrigation systems and fine those that do not have a rain shut-off device installed.	Yes 18
16. ET ^a controller rebates	Water Utility - rebate	Use the latest state of the art irrigation controllers. These controllers have on-site temperature sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly (preferably daily) as the weather changes. Water Utility would provide a rebate for the controller.	Yes 17
17. Additional Xeriscape demonstration gardens	Water Utility provide	Donate a portion of public land to create a demonstration garden displaying living examples of low water-using gardens and landscaping. The Water Utility would provide signs and brochures to educate those people visiting the garden.	Yes 18
18. Xeriscape education and staff training at retail garden/irrigation supply houses	Water Utility provide	Water Utility would sponsor training for staff of stores where plants and irrigation equipment is sold. The purpose would be to educate sales people about the benefits of native (low water use) plants, efficiently irrigated.	Yes 15
19. Homeowner irrigation classes	Water Utility provide	Water Utility would provide classes at stores where irrigation equipment is sold or other suitable venues. Instruction would be on selection and installation of efficient equipment (drip irrigation, smart controllers, low volume sprinklers, etc.). Proper plant selection would be covered.	Yes 15
20. Trigger shut-off valves and hose timers	Water Utility provide free	Water Utility would offer a voucher, or otherwise provide to the customer at no cost, hose timers and shut-off valves. This would enable homeowners to use water outdoors more efficiently.	Yes 20

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New Homes			
21. ET Controller Rebates	<i>Water Utility -rebate</i>	Use the latest state of the art irrigation controllers. These controllers have on-site temperature sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly (preferably daily) as the weather changes. Water Utility would provide a rebate for the controller.	Yes 17
22. New home efficiency rating system	<i>City / County requires of developers</i>	Do not provide a water meter, under this measure, without the homeowner/contractor having installed demand management plumbing and landscaping fixtures. Each conservation device would be worth a certain number of points, as decided by the Water Utility. An ordinance would be implemented requiring that each new residence have conservation devices meeting a certain minimum number of points, prior to occupancy.	No 14
23. Require model homes be landscaped with low water use landscaping	<i>City/County-requirement</i>	Modeled after Arizona RCM, enforce a regulation that specifies that at least half of the model homes in a subdivision be landscaped according to Xeriscape principals. Information on Xeriscape would be given to new homebuyers.	No 11
24. New home efficiency award programs	<i>Water Utility – promote with developers</i>	Provide annual awards to developers that are “Green Builders” and offer homes for sale that meet certain criteria. This could be combined with energy efficient homes.	Yes 17
25. Promote water efficient plantings at new homes	<i>Water Utility- promote</i>	Provide information for planting water-efficient landscaping, including avoiding strip turf sections that are difficult to water-efficiently and using native plants that do not require supplemental watering. Information would be provided in brochures with the water bill, or mailed. Informational displays at Provider offices and nurseries could also be provided.	No 14
26. Prohibit HOA or CC&R conditions that mandate use of turf	<i>City/County-requirement</i>	New developments would be prohibited from requiring water intensive landscaping in front yard including cool season grasses.	No 15
27. Landscape requirements for new homes (turf limitations, regulations)	<i>City/County-requirement</i>	Require the use of low-water-using or native plants for landscaping purposes. Proof of compliance would be necessary to obtain a water connection on all new residential projects. Non-compliers would face a surcharge on their water bill until they complied.	No 8
28. Rebates for rain sensor/shut-offs on automatic systems	<i>Water Utility -rebate</i>	Water Utility would provide a rebate for the installation of rain sensors with automatic irrigation systems in new construction. The Water Utility or building department would inspect irrigation accounts (or randomly inspect large summer volume users) and fine those that do not have a rain shut-off device installed.	Yes 18
29. Developer financed off-site conservation projects	<i>Water Utility – requirement</i>	Water Utility would require developers of new homes to contribute money to the water conservation program to help generate the water needed to supply their project.	No 6
Multi-Family Residential – Indoor			
Existing Accounts			
30. Residential water surveys	<i>Water Utility provide</i>	Modeled after California BMP 1 and Arizona RCM the United Water Idaho’s water survey program would be expanded to include and audit of multifamily dwelling indoor water using fixtures and appliances (toilets.	Yes 17

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		showerheads, faucets, clothes washers).	
31. ULF toilet rebates	<i>Water Utility</i> - rebate	Modeled after California BMP 14 utility would provide a rebate for replacement of an existing high volume toilet with a 1.6 gal/flush toilet. Alternative toilet give-away programs could be sponsored.	No 15
32. Offer incentives for replacement of clothes washers in coin-operated laundries	<i>Water Utility</i> -rebate	Apartment managers would be offered incentives to retrofit or use efficient clothes washers. The rebate would either go to the manager or the washing machine leasing company.	No 16
33. Incentives for retrofitting sub-metering	<i>Water Utility</i> -rebate	Rescind any regulations that prohibit sub-metering of multi-family buildings. Sub-metering would be encouraged through water audits and direct mail promotions, and possibly incentives to building owners.	No 14
34. Regulations on sub-metering procedures (to protect tenant)	<i>Water Utility</i> – requirement	Provide regulations on how tenants can be metered and billed for water service to ensure equity.	No 10
35. Rebates for 6/3 dual flush or 4-liter toilets	<i>Water Utility</i> - rebate	Provide a rebate or voucher for the retrofit of a 6/3 dual flush, 4-liter or equivalent very low water use toilet. Rebate amounts would reflect the incremental purchase cost and would be in the range of \$50 to \$100 per toilet replaced.	No 16
New Development			
36. Rebates for 6/3 dual flush or 4-liter toilets	<i>Water Utility</i> - rebate	Provide a rebate or voucher for the retrofit of a 6/3 dual flush, 4-liter or equivalent very low water use toilet. Rebate amounts would reflect the incremental purchase cost and would be in the range of \$50 to \$100 per toilet replaced.	No 16
37. Require sub-metering multifamily units	<i>City/County</i> -requirement	Require all new multi-family units to provide sub-meters on individual units. To help reduce financial impacts on tenant's regulations would be adopted that specify acceptable methods of metering and billing.	No 12
38. Rebates for efficient clothes washers (such as horizontal axis)	<i>Water Utility</i> -rebate	New apartment complexes over a certain size would be eligible to receive a rebate to provide a common laundry room equipped with efficient washing machines.	No 14
39. Require 6/3 dual flush or 4-liter toilets in new units	<i>City/County</i> -requirement	Building departments would be responsible to ensure that a 6/3 dual flush or 4-liter toilet was installed before new unit occupancy.	No 11
Multi-Family Residential – Outdoor			
Existing Accounts			
40. Residential water surveys	<i>Water Utility</i> provide	Modeled after California BMP 1, possibly redesign former United Water Idaho Program and reinstate to offer free irrigation system evaluations to high water use customers multifamily apartment complexes.	Yes 17
41. ET ^a controller rebates	<i>Water Utility</i> - rebate	Use the latest state of the art irrigation controllers. These controllers have on-site temperature sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly (preferably daily) as the weather changes. Water Utility would provide a rebate for the controller.	Yes 17
42. Rebate rain sensors on existing irrigation controllers	<i>Water Utility</i> - rebate	Modeled after Arizona RCM, Water Utility would provide a voucher, rebate or free rain sensors to building owners with automatic irrigation systems.	Yes 18

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New Development			
43. ET ^a controller rebates	<i>Water Utility</i> rebate	Use the latest state of the art irrigation controllers. These controllers have on-site temperature sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly (preferably daily) as the weather changes. Water Utility would provide a rebate for the controller.	Yes 17
44. Rebates for rain sensor/shut-offs on automatic irrigation systems	<i>Water Utility</i> rebate	Provide rebates for the installation of rain sensors with automatic irrigation systems in new construction.	Yes 18
45. New home efficiency rating system	<i>City/County</i> -requirement of developers	Do not provide a water meter, under this measure, without the contractor having installed demand management plumbing and landscaping fixtures. Each conservation device would be worth a certain number of points, as decided by the Water Utility. An ordinance would be implemented requiring that each new building have conservation devices meeting a certain minimum number of points, prior to occupancy.	No 14
46. New home award programs	<i>Water Utility</i> – promote with developers	Provide annual awards to developers that are “Green Builders” and offer apartments for rent for condominiums for sale that meet certain criteria. This could be combined with energy efficient homes.	Yes 17
47. Enforce landscape requirements for new landscaping systems (turf limitations, regulations)	<i>Water Utility Funds</i>	Enforce existing requirements on use of low-water-using or native plants for landscaping purposes. Proof of compliance would be necessary to obtain a water connection on all new residential projects. Non-compliers would face a surcharge on their water bill until they complied.	No 8
48. Require efficient irrigation system design standards	<i>City/County</i> -requirement	Require installation of irrigation systems that are efficient and installed by trained/certified contractors. Model after Cary North Carolina’s program.	No 7
49. Developer financed off-site development conservation projects	<i>Water Utility</i> -promote with private companies	Water Utility would require developers of new homes to contribute money to the water conservation program to help generate the water needed to supply their project.	No 6
Commercial/Industrial/Institutional – Indoor			
Existing Accounts			
50. Commercial water audits	<i>Water Utility</i> provide	Modeled after California BMP 9 and Arizona RCM, targeted high water using accounts would be offered a free water audit by a trained auditor would provide the business with a site-specific list of cost-effective ways to save water.	No 14
51. Commercial toilet replacement	<i>Water Utility</i> –rebate	Modeled after California BMP 9 and Arizona RCM, businesses with high water use toilets (restaurants, grocery stores, etc.) would be offered a rebate for a ULF or high efficiency toilet.	Yes 17
52. Rebates for replacing high use commercial urinals with 0.5 gal/flush urinals	<i>Water Utility</i> –rebate	Selectively provide rebates to businesses to convert to efficient urinals only where urinals are subject to high use, such as restaurants, theaters, stadiums etc.	Yes 17
53. Require 1.6 gal flush toilets to be installed at the time of sale	<i>City/ County</i> - requirement at time of sale	Work with the real estate industry to require a certificate of compliance be submitted to the Water Utility that verifies that a plumber has inspected the property and efficient fixtures where either already there or were installed at the time of sale, before close of escrow.	No 9

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		(Model after City of Los Angeles and San Diego).	
54. Offer incentives for replacement or lease of clothes washers in coin-operated laundries	<i>Water Utility</i> - rebate	Laundromat managers would be offered incentives to retrofit or use efficient clothes washers. The rebate would either go to the manager or the washing machine leasing company.	Yes 15
55. Require car washes to recycle water	<i>City/ County</i> – requirement	Pass a regulation that required all existing drive-through car washes install equipment to recycle water by a certain date.	No 8
56. Offer rebates for meters on cooling towers	<i>Water Utility</i> –rebate	Offer a rebate to buildings that install submeters to measure the make-up and bleed-off water of the facility cooling towers. Provide educational brochures and a phone contact of a knowledgeable person to provide conservation information.	No 15
57. Cooling tower regulations	<i>Water Utility</i> requirement	Prohibit discharge of cooling tower blow down unless the TDS of the water is at least a certain level (that would ensure 5-10 cycles of concentration). Model regulations after the State of Arizona.	No 5
58. Restaurant low flow spray rinse nozzles	<i>Water Utility</i> provide free	Provide free installation of 1.6 gpm spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens.	Yes 19
59. Focused water audits for hotels/motels	<i>Water Utility</i> - provide free	Provide free water audits to hotels and motels. Standardize on the types of services offered to reduce costs. Included would be bathrooms, kitchens, ice machines, cooling towers, landscaping, and irrigation systems and schedules.	No 15
60. Hotel retrofit (w/financial assistance)	<i>Water Utility</i> -rebate	Following a free water audit offer the hotel a rebate for equipment identified that would save water. Provide a rebate schedule for certain efficient equipment such as air-cooled ice machines so hotels could apply without an audit.	No 14
61. Manager and employee education program	<i>Water Utility</i> -provide	Conduct a workshop for high water use account managers explaining the latest water conserving - plumbing fixtures and describing the water savings that could be achieved through implementation.	No 14
62. Award program for water savings by businesses	<i>Water Utility</i> –sponsor	Providers would sponsor an annual awards program for businesses that significantly reduce water use. They would receive a plaque, presented at a lunch with the mayor.	Yes 17
63. Capacity buy-back for process improvements	<i>Water Utility</i> -rebate	Set-up a low interest loan or grant program to buy back capacity from large users who install water efficient equipment. The customer would propose a project (possibly as the result of a water audit) and the Water Utility would estimate the water savings and calculate a rebate based on their avoided costs for new capacity. Customer would receive an upfront payment upon signing a contract to install the equipment.	No 16
64. Rebates for X-Ray recycling units or digital X-ray machines	<i>Water Utility</i> -provide	Conduct a brief audit of x-ray machines to identify machines where the process water could be recycled. Offer rebates for water-recycling equipment or for new digital X-ray machines.	No 15
65. Replace inefficient water using equipment	<i>Water Utility</i> -rebate	Provide a rebate for a standard list of water efficient equipment. Included would be icemakers, efficient dishwashers, cooling towers to replace once through	Yes 17

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		cooling, irrigation controllers, and certain process equipment.	
New Accounts			
66. Require car washes to recycle water	City/County-requirement	Pass a regulation that required all new drive-through car washes to recycle water, in order to get a water meter.	No 11
67. Require efficient (such as horizontal axis) clothes washers	City/County-requirement	Efficient machine clothes washers would be required in all coin-operated Laundromats and common laundry rooms. The machine would have to meet a certain water efficiency level as rated by the Consortium on Energy Efficiency, Inc.	No 11
68. Rebates for waterless urinals	Water Utility -rebate	Encourage commercial accounts to retrofit existing public restrooms with waterless urinals. Provide educational brochures presented with water bills, rebates and coupons.	No 5
69. Promotion and/or rebates for laundry recycle systems at commercial laundries	Water Utility -rebate	Either during an audit or through educational brochures presented with the water bill provides information on recycling water use in laundries. Provide rebates to decrease the payback period.	No 15
70. Self-closing faucets	City/County-requirement	Require non-residential accounts to install automatic (infrared sensor) or manual self-closing faucets for all new customer or high use restrooms.	No 12
71. Require efficient process equipment for selected businesses (restaurants, hotels/motels, office sanitation)	City/County-requirement	Require new facilities to install water efficient equipment in new facilities, such as those listed.	No 12
72. Prohibit once through cooling and non-recycling fountains, other non efficient water features	City/County-requirement	Prohibit certain obvious wastes of water in new facilities, such as those listed.	No 11
73. Require 0.5 gal/flush urinals in new buildings	City/County-requirement	Require that new building be fitted with 0.5 gal/flush urinals rather than the current standard of 1.0-gal/flush models.	No 12
Commercial/Industrial/Institutional – Outdoor			
Existing Accounts			
74. Landscape water budgets	Water Utility- provide free	Modeled after California BMP 5 and Arizona RCM all dedicated irrigation meters would be provided a water budget for their existing landscape showing the expected volume of water required for every month of the season.	Yes 17
75. Large landscape water audits	Water Utility- provide free	Modeled after California BMP 5 all landscapes larger than one acre would be offered a free landscape irrigation audit and provided with a monthly irrigation schedule.	No 13
76. Train landscape managers and workers	Water Utility- provide	Modeled after Arizona RCM utility would sponsor bilingual training for managers and workers in landscape maintenance methods that will save irrigation water.	No 15
77. Rebates for ET irrigation controllers for irrigation accounts	Water Utility -rebate	Provide a rebate for advanced irrigation controllers that have at least a water-budgeting feature and multiple start times and a rain sensor/soil moisture sensor. Rebates could be financed by water rates or a	Yes 17

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		surcharge on water bills for irrigation meters.	
78. Add rain sensors to existing irrigation controllers	<i>Water Utility -rebate</i>	Rebates the installation of rain sensors with automatic irrigation systems on existing accounts by a certain date. The Water Utility would inspect irrigation accounts (or randomly inspect large summer volume users) and fine those that do not have a rain shut-off device installed.	Yes 18
79. Financial incentives for complying with water use budget	<i>Water Utility - requirement</i>	Link a landscape water budget to a rate schedule that penalizes the account holder for exceeding its water budget and rewards them for using less than the budget.	No 14
80. Financial incentives, rebates for irrigation upgrades	<i>Water Utility -rebate</i>	Provide rebates for selected types of irrigation equipment upgrade. Model after EBMUD or Contra Costa Water District, California.	Yes 18
81. Provide rebates for synthetic turf installation	<i>Water Utility -rebate</i>	Provide rebates of partial cost for removing existing irrigated turf and replacing it with synthetic turf. Rebate would cover a portion of material cost and be capped at a fixed amount.	No 15
New Accounts			
82. Require rain sensor/shut-offs on automatic systems	<i>Water Utility –rebate</i>	Require the installation of rain sensors with automatic irrigation systems in new construction. The Water Utility or building department would inspect irrigation accounts (or randomly inspect large summer volume users) and fine those that do not have a rain shut-off device installed.	No 14
83. Require dedicated irrigation meters	<i>Water Utility - requirement</i>	Require that new accounts that plan a substantial amount of irrigated landscape have dedicated landscape meter and be charged on a separate rate schedule that recognizes the high peak demand placed on the system by irrigators.	No 12
84. ET ^a controllers rebates	<i>Water Utility –rebate</i>	Provide rebate for the new sites fitted with state of the art irrigation commercial controllers that automatically adjust for changes in the weather.	Yes 17
85. Enforce landscape requirements for new landscaping systems (turf limitations, regulations)	<i>Water Utility Funds</i>	Modeled after Arizona RCM and former California BMP, enforce a requirement for landscaping of new nonresidential properties to use only native or water conserving species. Provide personnel to inspect those affected by the ordinance and ensure effective implementation.	No 11
86. Require efficient irrigation system design standards	<i>City/County- requirement</i>	Require installation of irrigation systems that are efficient and installed by trained/certified contractors. Model after Cary North Carolina's program.	No 7
87. Financial incentives for complying with water use budget	<i>Water Utility - requirement</i>	Link a landscape water budget to a rate schedule that penalizes the account holder for exceeding its water budget and rewards them for using less than the budget.	No 14
Water Utility / City – Indoor			
88. Installation of waterless urinals, dual flush toilets	<i>Water Utility -provide</i>	Water Utility would selectively retrofit public restrooms with state of the art plumbing fixtures such as waterless urinals and dual flush toilets.	No 13
89. Water Utility / City Department water reduction goals	<i>Water Utility -provide</i>	Water Utility / City would provide water use reduction goals for metered City and County accounts. Assistance in the form of audits and employee education would be offered.	No 9
Water Utility / City – Outdoor			

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90. Public swimming pool water audits	<i>Water Utility</i> -provide	Water Utility / City would provide water audits of public swimming pools and showers in changing rooms. Proper pool maintenance would be taught to operators.	No 15
91. ET ^a controllers rebates	<i>Water Utility</i> –rebate	Provide rebates for existing sites fitted with state of the art irrigating commercial controllers that automatically adjust for changes in the weather. Applies to school play fields, parks, sports fields, golf courses, etc.	No 16

Note: ^a ET = Evapotranspiration, which is the amount of water required by plants for healthy growth; ET Controllers automatically compensate for changing weather

Table 5-3 Results of Screening Potential Conservation Measures

MEASURE		CRITERIA					PASS	
DEVICE OR PROGRAM	DISTRIBUTION METHOD & INCENTIVE	Technology Market Maturity	Service Area Match	Customer Acceptance Equity	Legal Authority Existing or Possible	TOTAL	Score Yes or No	
Single Family Residential – Indoor								
Existing Accounts								
1. Low flow showerhead distribution	<i>Water Utility</i> provide	5	1	3	5	14	No	
2. Residential water surveys	<i>Water Utility</i> provide	5	3	3	5	16	No	
3. Clothes washer rebates	<i>Water Utility</i> - rebate	5	3	2	5	15	No	
4. ULF toilet rebates	<i>Water Utility</i> - rebate	5	2	2	5	14	No	
5. Rebates for 6/3 dual flush or 4-liter toilets	<i>Water Utility</i> rebate	3	5	4	5	17	Yes	
6. Home leak detection and repair	<i>Water Utility</i> promote	5	4	2	5	16	No	
7. Reestablish school education programs	<i>Water Utility</i> sponsor	5	5	5	5	20	Yes	
New Homes								
8. Require high efficiency clothes washing machines	<i>City/County</i> requirement	5	3	2	2	12	No	
9. Insulate hot water piping	<i>City/County</i> requirement	5	1	5	0	11	No	
10. Rebates for 6/3 dual flush or 4-liter toilets	<i>Water Utility</i> rebate	3	4	4	5	16	No	

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MEASURE		CRITERIA				PASS	
DEVICE OR PROGRAM	DISTRIBUTION METHOD & INCENTIVE	Technology Market Maturity	Service Area Match	Customer Acceptance Equity	Legal Authority Existing or Possible	TOTAL	Score Yes or No
11. Require 6/3 dual flush or 4-liter toilets for new homes	City/County requirement	3	4	2	2	11	No
Single Family Residential – Outdoor							
Existing Homes							
12. Continue/Expand WELs	Water Utility provide	5	5	4	5	19	Yes
13. Residential water surveys	Water Utility provide	5	5	3	5	18	Yes
14. Landscape rebate program	Water Utility -rebate	5	5	4	5	19	Yes
15. Rebates for rain sensor/shut-offs on automatic systems	Water Utility rebate	5	4	4	5	18	Yes
16. ET controller rebates	Water Utility rebate	3	5	4	5	17	Yes
17. Additional Xeriscape demonstration gardens	Water Utility provide	5	5	3	5	18	Yes
18. Xeriscape education and staff training at retail garden/irrigation supply houses	Water Utility provide	5	4	1	5	15	No
19. Homeowner irrigation classes	Water Utility provide	5	3	2	5	15	No
20. Trigger shut-off valves and hose timers	Water Utility provide free	5	5	5	5	20	Yes
New Homes							
21. ET Controller Rebate	Water Utility rebate	3	5	4	5	17	Yes
22. New home efficiency rating	City/County requires of developers	5	5	2	2	14	No
23. Require model homes be landscaped with low water use landscaping	City/County requirement	5	2	2	2	11	No
24. New home efficiency award programs	Water Utility promote with developers	5	5	2	5	17	Yes
25. Promote water efficient plantings at new homes	Water Utility promote	5	2	2	5	14	No
26. Prohibit HOA or CC&R conditions that mandate use of turf	City/County-requirement	5	4	3	3	15	No

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MEASURE		CRITERIA				PASS	
DEVICE OR PROGRAM	DISTRIBUTION METHOD & INCENTIVE	Technology Market Maturity	Service Area Match	Customer Acceptance Equity	Legal Authority Existing or Possible	TOTAL	Score Yes or No
27. Landscape requirements for new homes (turf limitations/regulations)	City/County requirement	5	1	1	1	8	No
28. Rebates for rain sensor/shut-offs on automatic systems	Water Utility rebate	5	4	4	5	18	Yes
29. Developer financed off-site conservation projects	Water Utility requirement	3	2	1	0	6	No
Multi-Family Residential – Indoor							
Existing Accounts							
30. Residential water surveys	Water Utility provide	5	4	3	5	17	Yes
31. ULF toilet rebates	Water Utility- rebate	5	2	4	5	16	No
32. Offer incentives for replacement of clothes washers in coin-operated laundries	Water Utility rebate	5	4	2	5	16	No
33. Incentives for retrofitting sub-metering	Water Utility rebate	5	3	1	5	14	No
34. Regulations on sub-metering procedures (to protect tenant)	Water Utility requirement	4	3	1	2	10	No
35. Rebates for 6/3 dual flush or 4-liter toilets	Water Utility rebate	3	4	4	5	16	No
New Development							
36. Rebates for 6/3 dual flush or 4-liter toilets	Water Utility rebate	3	4	4	5	16	No
37. Require sub-metering multifamily units	City/County requirement	4	3	2	3	12	No
38. Rebate efficient clothes washers (such as horizontal axis)	Water Utility rebate	5	2	2	5	14	No
39. Require 6/3 dual flush or 4-liter toilets for new homes	City/County requirement	3	4	2	2	11	No

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MEASURE		CRITERIA					PASS
DEVICE OR PROGRAM	DISTRIBUTION METHOD & INCENTIVE	Technology Market Maturity	Service Area Match	Customer Acceptance Equity	Legal Authority Existing or Possible	TOTAL	Score Yes or No
Multi-Family Residential – Outdoor							
Existing Accounts							
40. Residential water surveys	<i>Water Utility</i> provide	4	5	3	5	17	Yes
41. ET controller rebates	<i>Water Utility</i> rebate	3	5	4	5	17	Yes
42. Rebate rain-sensors on existing controllers	<i>Water Utility</i> rebate	5	4	4	5	18	Yes
New Development							
43. ET controller rebates	<i>Water Utility</i> rebate	3	5	4	5	17	Yes
44. Rebates for rain sensor/shut-offs on automatic irrigation systems	<i>Water Utility</i> rebate	5	4	4	5	18	Yes
45. New home efficiency rating system	<i>City/County</i> requirement of developers	5	2	2	2	14	No
46. New home efficiency award program	<i>Water Utility</i> promote with developers	5	5	2	5	17	Yes
47. Enforce landscape requirements for new landscaping systems (turf limitations/regulations)	<i>Water Utility Funds</i>	5	1	1	1	8	No
48. Require efficient irrigation system design standards	<i>City/County</i> requirement	2	2	2	1	7	No
49. Developer financed off-site development conservation projects	<i>Water Utility</i> promote with private companies	3	2	1	0	6	No
Commercial/Industrial/Institutional – Indoor							
Existing Accounts							
50. Commercial water audits	<i>Water Utility</i> provide	3	3	3	5	14	No
51. Commercial toilet replacement	<i>Water Utility</i> –rebate	5	4	3	5	17	Yes
52. Rebates for replacing high use commercial urinals with 0.5 gal/flush	<i>Water Utility</i> rebate	5	4	3	5	17	Yes

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MEASURE		CRITERIA				PASS	
DEVICE OR PROGRAM	DISTRIBUTION METHOD & INCENTIVE	Technology Market Maturity	Service Area Match	Customer Acceptance Equity	Legal Authority Existing or Possible	TOTAL	Score Yes or No
53. Require 1.6 gal/flush toilet to be installed at the time of sale	City/County requirement at time of sale	5	4	0	0	9	No
54. Offer incentives for replacement or lease of clothes washers in coin-operated laundries	Water Utility rebate	4	4	2	5	15	No
55. Require car washes to recycle water	City/County requirement	5	3	0	0	8	No
56. Offer rebates for meters on cooling towers	Water Utility rebate	5	2	3	5	15	No
57. Cooling tower regulations	Water Utility requirement	4	1	0	0	5	No
58. Restaurant low flow spray rinse nozzles	Water Utility provide free	5	4	5	5	19	Yes
59. Focused water audits for hotels/motels	Water Utility provide free	4	3	3	5	15	No
60. Hotel retrofit (w/financial assistance)	Water Utility rebate	3	2	4	5	14	No
61. Manager and employee education program	Water Utility provide	4	2	3	5	14	No
62. Award program for water savings by businesses	Water Utility sponsor	5	4	3	5	17	Yes
63. Capacity buy-back for process improvements	Water Utility rebate	4	4	3	5	16	No
64. Rebates for X-Ray recycling units or digital X-ray machines	Water Utility provide	5	2	3	5	15	No
65. Replace inefficient water using equipment	Water Utility rebate	5	4	3	5	17	Yes
New Accounts							
66. Require car washes to recycle water	City/County requirement	4	3	2	2	11	No
67. Require efficient (such as horizontal axis) clothes washers	City/County requirement	5	2	2	2	11	No
68. Rebates for waterless urinals	Water Utility rebate	0	0	0	5	5	No

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MEASURE		CRITERIA					PASS	
DEVICE OR PROGRAM	DISTRIBUTION METHOD & INCENTIVE	Technology Market Maturity	Service Area Match	Customer Acceptance Equity	Legal Authority Existing or Possible	TOTAL	Score Yes or No	
69. Promotion and/or rebates for laundry recycle systems at commercial laundries	<i>Water Utility</i> rebate	5	2	3	5	15	No	
70. Self-closing faucets	<i>City/County</i> requirement	5	3	2	2	12	No	
71. Require efficient process equipment for selected businesses (restaurants, hotels/motels, office sanitation)	<i>City/County</i> requirement	5	3	2	2	12	No	
72. Prohibit once through cooling and non-recycling fountains, other non efficient water features	<i>City/County</i> requirement	5	2	2	2	11	No	
73. Require 0.5 gal/flush urinals in new buildings	<i>City/County</i> requirement	4	4	2	2	12	No	
Commercial/Industrial/Institutional Outdoor –								
Existing Accounts								
74. Landscape water budgets	<i>Water Utility</i> - provide free	5	3	4	5	17	Yes	
75. Large landscape water audits	<i>Water Utility</i> - provide free	3	2	3	5	13	No	
76. Train landscape managers and workers	<i>Water Utility</i> - provide	5	2	3	5	15	No	
77. Rebates for ET irrigation controllers for irrigation accounts	<i>Water Utility</i> rebate	4	4	4	5	17	Yes	
78. Add rain-sensor retrofits on existing controllers	<i>Water Utility</i> rebate	5	4	4	5	18	Yes	
79. Financial incentives for water use complying with budget	<i>Water Utility</i> requirement	2	3	4	5	14	No	
80. Financial incentives, rebates for irrigation upgrades	<i>Water Utility</i> rebate	5	4	4	5	18	Yes	

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MEASURE		CRITERIA				PASS	
DEVICE OR PROGRAM	DISTRIBUTION METHOD & INCENTIVE	Technology Market Maturity	Service Area Match	Customer Acceptance Equity	Legal Authority Existing or Possible	TOTAL	Score Yes or No
81. Provide rebates for synthetic turf installation	<i>Water Utility</i> -rebate	4	3	3	5	15	No
New Accounts							
82. Require rain sensor/shut-offs on automatic systems	<i>City/County</i> requirement	5	4	2	3	14	No
83. Require dedicated irrigation meters	<i>Water Utility</i> requirement	5	1	2	3	12	No
84. ET controller rebates	<i>Water Utility</i> rebate	3	5	4	5	17	Yes
85. Enforce landscape requirements for new landscaping systems (turf limitations/regulations)	<i>Water Utility Funds</i>	5	4	1	1	11	No
86. Require efficient irrigation system design standards	<i>City/County</i> requirement	2	2	2	1	7	No
87. Financial incentives for complying with water use budget	<i>Water Utility</i> requirement	2	3	4	5	14	No
<i>Water Utility / City – Indoor</i>							
88. Installation of waterless urinals, dual flush toilets	<i>Water Utility</i> provide	3	3	2	5	13	No
89. Water Utility / City Department water reduction goals	<i>Water Utility</i> provide	3	2	1	3	9	No
<i>Water Utility / City – Outdoor and System</i>							
90. Public swimming pool water audits	<i>Water Utility</i> provide	5	2	3	5	15	No
91. ET controller	<i>Water Utility</i> provide	4	4	4	4	16	No

SECTION 6: Evaluation of Long Term Water Conservation Measures

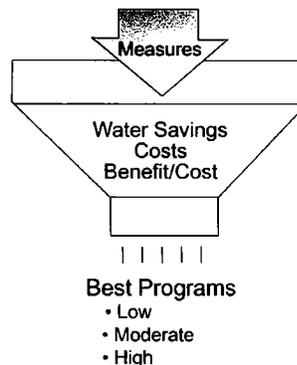
This section presents an overview of the conservation evaluation process which has been completed for the United Water Idaho service area. The 17 measures selected for analysis were screened from a total of 91 measures based on ranking and rating of the following four criteria: technology/market maturity, service area match, customer acceptance/equity, and legal authority existing or possible.

Once selected for analysis, the conservation measures were analyzed using the Least Cost Planning Water Demand Management Decision Support System (DSS) Model. These conservation measures were then organized into four programs showing future activity levels and associated cost for UWID. The intent of this memorandum is to present an unbiased assessment of the conservation potential and its relative cost-effectiveness for UWID's consideration. No recommendations were made at this stage. After review and comments by UWID a recommended plan and funding mechanism was developed and is presented in Section 7.

6.1 Overview of Evaluation Methodology (DSS Model)

During the evaluation process, water savings were estimated and costs for the measures were developed. Benefits and costs were compared in a formal present value analysis and conclusions were drawn about which measures produce cost-effective water savings. This process can be thought of as an economic screening process, shown in Figure 6-1. Packaging the best measures into alternative programs is how we are helping you to consider what level of conservation is appropriate for UWID.

Figure 6-1 Evaluation Process



Benefit-cost analysis has been used by many water agencies to evaluate and help select water conservation measures best suited to local conditions. This analysis requires a locale-specific set of data, such as historical water consumption patterns by customer class, population projections, age of housing stock, and prior conservation efforts.

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The following eight steps were used to implement the methodology:

1. Develop baseline water use projections with and without the national plumbing code. Projections cover each key customer category and are broken down into indoor end uses and outdoor end uses. Note the plumbing code refers to savings from the 1992 Energy Act. The baseline water use projections (demand projections) for this project were matched to the 2006 UWID Water Master Plan forecasts created by John Church, Idaho Economics, found in the report Chapter 4 Page 4-13. The projections used in the DSS Model are shown in Section 5.
2. Estimate the affected population (or number of accounts) for each conservation measure by dividing the measure's projected population (or accounts) that implements the measure by the total service area population (accounts). This factor is called the market penetration or installation rate.
3. Estimate total annual average and peak day water savings. The water savings are computed by multiplying unit water savings, per measure, by the market penetration or installation rate, and then multiplying by the number of units in a particular service area (such as dwelling units) targeted by a particular measure.
4. Identify benefits to United Water Idaho including potential reduced water costs (capital improvements and variable water production costs).
5. Quantify total benefits for each year in the planning period by multiplying average annual water savings by the computed value of the benefits.
6. Determine initial and annual costs to implement the measures based upon pilot projects, local experience, and the costs of goods, services, and labor in the community. This is multiplied by the number of units participating each year and then added to overall administration and promotion costs to arrive at a total measure cost, which may be spread over a number of years.
7. Compare benefits and costs of measures by computing the present value of costs and benefits over the planning period.
8. Compile and compare alternative packages containing appropriate measures (for example, benefit-cost ratios greater than 1.0 and significant water savings).

6.2 Estimated Water Savings

Data necessary to forecast water savings of measures include specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to ten years after the start of implementation, for example, depending upon the implementation schedule.

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6.3 Value of Saved Water and Cost of Measures

Perspectives on Benefits and Costs

The determination of the economic feasibility of water conservation programs depends on comparing the costs of the programs to the benefits provided. The analysis was performed using the DSS model. The DSS model calculates savings at the end-use level; for example, the model determines the amount of water a toilet rebate program saves in daily toilet use for each single family account. For this evaluation benefits are based on the average "system wide" variable operation cost of \$103.80 per million gallons plus the reduced (present value) cost due to a delay in building of capacity related capital improvement projects. The following list is a sample of the capital improvement projects included in the model spread over the period 2007 to 2025:

- 7 New Wells
- 5 New ASRs
- 6 New Membrane Skids for Columbia WTP
- Marden WTP Expansion

UWID provided the exact trigger points for added capacity and these were input into the model along with the costs of the capacity increment. The model was allowed to adjust the timing of when these would be needed in order to satisfy peak demands. The total capital improvement projects expenditures amount to over \$36 million. If water conservation is successful in reducing demand then there can be some delay in portions of the current capital improvement project schedule. This is a conservation benefit.

Present value analysis is used to discount costs and benefits to the base year. From this analysis benefit-cost ratios of each measure are computed. When measures are put together in programs the interactions are accounted for by multiplying water use reduction factors together at the end use level. A water use reduction factor is 1.0 minus the water savings, expressed as a decimal. This avoids double counting when more than one measure acts to reduce the same end use of water.

Benefit-cost analysis can be performed from several different perspectives, based on who is affected. For planning water conservation programs for utilities, the perspectives most commonly used for benefit-cost analyses include the utility and the community. The "utility" benefit-cost analysis is based on the benefits and costs to the water provider. The "community" benefit-cost analysis includes the utility benefits and costs together with account owner/customer benefits and costs. These include customer energy benefits and costs of implementing the measure, beyond what the utility pays.

The utility perspective offers two advantages for this analysis. First, it considers only the program costs that will be directly borne by the utility. This enables the utility to fairly compare potential investments for saving and supplying water. Second, because revenue shifts are treated as transfer payments, the analysis is not complicated with uncertainties associated with long-term rate projections and retail rate design assumptions. Because it is

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the water provider's role in developing a conservation plan that is paramount in this study, the utility perspective was primarily used to evaluate elements of the plan.

No evaluation perspectives are without shortcomings. The principal weakness of the utility perspective is that it does not count the benefits accrued or costs incurred outside of the utility. Therefore another perspective is also used – the community perspective. The community perspective is defined to include the utility costs and benefits and the customer costs and benefits. Costs incurred by customers striving to save water while participating in conservation programs are considered, and are the benefits received in terms of reduced energy bills (from water heating costs). Other factors external to the utility, such as environmental effects, are not included in the benefit-cost analysis. Because these external factors are often difficult to quantify, they are frequently excluded from economic analyses, including this one.

Although quantifying these benefits is beyond the scope of the present study, it goes without saying that reducing water diversions from the Boise River and the groundwater aquifer (because water conservation programs are implemented) has downstream benefits that increase in proportion to the amount of water savings.

Present Value Parameters

The time value of money is explicitly considered. The value of all future costs and benefits is discounted to 2005 (the base year) at the real interest rate of 3.5%. The DSS model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.6%) by the assumed rate of inflation (3%). Cash flows discounted in this manner are herein referred to as "Present Value" sums.

Assumptions about Costs

Costs were determined for each of the measures based on industry knowledge and past experience and data provided by UWID. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of materials that will be used in marketing the measure. Measure costs were estimated for each year between 2007 and 2030. Costs were spread over the time period depending on the length of the implementation period for the measure.

Lost revenue due to reduced water sales is not included as a cost because the conservation measures evaluated herein generally take effect over a span of time that is sufficient to enable timely rate adjustments, if necessary, to meet fixed cost obligations.

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6.4 Comparison of Conservation Measures

Table 6-1 provides a short description of the 17 measures evaluated in the DSS Model. The savings from the components of each measure are additive.

Table 6-1 Description of Measures Evaluated in the DSS Model

Measure Number	Measure	Target Customer Category	Short Description
1	Additional Xeriscape demonstration gardens	Existing Customers RSF	Develop additional demonstration garden(s) displaying living examples of low water-using gardens and landscaping. United Water Idaho would create and manage the gardens and provide signs and brochures to educate those people visiting the garden(s).
2	Continue & Expand WELs	Existing Customers RSF	Continue and expand the Water Efficient Landscaping (WELs) program to greatly increase the number of participants. Incentives could include landscape and drip system vouchers.
3	Residential school education programs	Existing Customers RSF	United Water Idaho would sponsor school conservation programs with workbooks and presentations; teaching materials and other educational tools to teach the students the importance of conserving water.
4	Rain-sensor (shut off device) retrofit on irrigation controllers	Existing Customers RSF	United Water Idaho pays for a rain sensor giveaway or voucher, and homeowner pays for the optional installation (\$35).
5	Residential water surveys	Existing Customers RSF	Modeled after California BMP 1, possibly redesign former United Water Idaho Program and reinstate to offer free irrigation system evaluations to high water use customers. Simplify audit procedure to hold costs down.
6a	Smart Irrigation Controller Rebates	Existing Customers RSF	Use the latest state of the art irrigation controllers for single family homes. These controllers have on-site temperature sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly (preferably daily) as the weather changes. United Water Idaho would provide a rebate for the controller.
6b	Smart Irrigation Controller Rebates	Existing Customers RMF, COM	Use the latest state of the art irrigation controllers for multifamily and commercial customers. These controllers have on-site temperature sensors or rely on a signal from a central weather station that modifies irrigation times at

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Measure Number	Measure	Target Customer Category	Short Description
			least weekly (preferably daily) as the weather changes. United Water Idaho would provide a rebate for the controller.
7	Trigger shut-off valves and hose timers	SF Existing	United Water Idaho would offer a voucher or otherwise provide to the customer at no cost hose timers and shut-off valves. This would enable homeowners to use water outdoors more efficiently.
8	New home efficiency award programs	New SF, New MF	Provide annual awards to developers that are "Green Builders" and offer homes/condominiums for sale and/or apartments for rent that meet certain criteria. This could be combined with energy efficient homes.
9	Landscape rebate program	SF Existing	Modeled after Arizona RCM, Las Vegas and other programs, UWID would provide a rebate of \$ 0.25 to \$1.00 per square-foot of existing irrigated turf removed and replaced with hard cape or approved low water use plant material, irrigated by new efficient irrigation system.
10	Rebates for 6/3 dual flush or 4-liter toilets (also known as high efficiency toilet HET)	SF Existing	Provide a rebate or voucher for the retrofit of a 6/3 dual flush, 4-liter or equivalent very low water use toilet. Rebate amounts would reflect the incremental purchase cost and would be in the range of \$50 to \$100 per toilet replaced.
11	Award program for water savings by businesses	Existing CII	United Water Idaho would sponsor an annual awards program for businesses that significantly reduce water use. They would receive a plaque, presented at a lunch with the mayor.
12	Commercial toilet replacement	Existing CII	Modeled after California BMP 9 and Arizona RCM, businesses with high water use toilets (restaurants, grocery stores, etc.) would be offered a rebate for a ULF or high efficiency toilet (HET)
13	Rebates for replacing high use commercial urinals with 0.5 gal/flush urinals	Existing CII	Selectively provide rebates to businesses to convert to efficient urinals only where urinals are subject to high use, such as restaurants, theaters, stadiums etc.
14	Replace inefficient water using equipment	Existing CII	Provide a rebate for a standard list of water efficient equipment. Included would be icemakers, efficient dishwashers, cooling towers to replace once through cooling, irrigation controllers, and certain process equipment.

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Measure Number	Measure	Target Customer Category	Short Description
15	Restaurant low flow spray rinse nozzles	Existing CII	Provide free installation of 1.6 gpm spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens.
16	Landscape water budgets	Existing CII	Modeled after California BMP 5 and Arizona RCM all dedicated irrigation meters would be provided a water budget for their existing landscape showing the expected volume of water required for every month of the season. Renew every ten years. Target larger sites so water savings are two times average.
17	Financial incentives, rebates for irrigation upgrades	Existing CII	Provide rebates for selected types of irrigation equipment upgrade. Model after EBMUD or Contra Costa Water District, California programs.

Notes:

- RSF = Residential Single Family
- RMF = Residential Multi Family
- COM = Commercial
- CII = Commercial/Industrial/Institutional
- New SF = New Single Family
- BMP = Best Management Practice
- ULF = Ultra Low Flow
- RCM = Reasonable Conservation Measure
- EBMUD= East Bay Municipal Water District

For a detailed description of California BMPs see <http://www.cuwcc.org/memorandum.lasso>
 For an overview of Arizona Reasonable Conservation Measures see Phoenix Conservation Plan <http://phoenix.gov/WATER/waterpln.html>

Table 6-2 and 6-3 present results of conservation measure evaluation going forward from 2006. This table presents how much water the measures would save, how much they would cost and what the benefit-cost ratios are *if the measures were run on a stand-alone basis, i.e. without interaction or overlap from other measures that might address the same end use(s)*. Water savings shown are averaged over the 25-year analysis period and may be higher or lower in a particular year. Other key statistics are the cost of water saved in dollars per million gallons (\$/MG), and the benefit-cost ratios. Benefits and costs are defined below:

- *Utility benefits and costs:* those benefits and costs that the utility would receive or spend.
- *Community benefits and costs:* community benefits equal utility benefits plus customer energy (cost to heat water) benefits. Community costs include utility and customer costs to implement measures.
- *Water Benefits:* based on the 2005 average annual variable operating cost of water and a deferral of the planned capital improvement projects through 2025. The present value of this deferral in capital is the major benefit from water conservation programs.

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- *Costs for the utility:* include measure set-up, annual administration, and payment of rebates or purchase of devices or services as specified in the measure design.
- *Customer costs:* include costs of implementing the measure and maintaining its effectiveness over the life of the measure.
- *30-year average water savings:* this is the sum of all individual annual water savings divided by the 30 year analysis period. This provides the average water savings for the 30 years. It is useful in comparing the relative water savings of the various measures.
- *First 5-year utility cost* is the total money needed by UWID to sponsor the program for the first 5 years. Included would be the cost of incentives, contracts, materials and utility staff. Annual costs may be approximated by dividing the numbers by five.

**Table 6-2 Residential Conservation Measure Costs and Savings
Individual Measure Analysis**

Conservation Measure	Water Utility Benefit-Cost Ratio	Total Community Benefit-Cost Ratio	"30-year" Average Water Savings (MGD)	Cost of Savings per Unit Volume (\$/MG)	First 5-Year Utility Cost* (\$)
1 Additional Xeriscape demonstration gardens	1.46	0.12	0.0801	\$115.52	\$87,000
2 Continue/Expand WELs	1.79	0.08	0.1448	\$105.98	\$56,203
3 Residential school education programs	0.42	1.05	0.0246	\$424.18	\$33,722
4 Rain-sensor (shut off device) retrofit on irrigation controllers	0.96	0.40	0.1286	\$213.22	\$178,120
5 Residential water surveys	0.18	0.38	0.0639	\$1,016.93	\$209,850
6a Smart Irrigation Controller Rebates Single Family	0.13	0.10	0.1177	\$1,240.45	\$699,556
6b Smart Irrigation Controller Rebates Multi Family, Commercial	0.26	0.23	0.1197	\$600.16	\$368,271
7 Trigger shut-off valves and hose timers	1.10	1.10	0.0238	\$233.98	\$34,490
8 New home efficiency award programs	0.18	0.02	0.0721	\$819.08	\$173,786
9 Landscape rebate program	0.13	0.07	0.1283	\$1,572.15	\$2,713,319
10 Rebates for 6/3 dual flush or 4-liter toilets	0.08	0.05	0.2889	\$1,223.95	\$2,626,514

*First five years is normally 2008-2012 except for measure 6 assumed to begin in 2010 and measure 10 assumed to begin in 2009

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Table 6-3 Commercial Conservation Measure Costs and Savings
Individual Measure Analysis

	Conservation Measure	Water Utility Benefit-Cost Ratio	Total Community Benefit-Cost Ratio	“30-year” Average Water Savings (MGD)	Cost of Savings per Unit Volume (\$/MG)	First 5-Year Utility Cost (\$)
11	Award program for water savings by businesses	1.01	0.08	0.0165	\$113.92	\$6,697
12	Commercial toilet replacement	0.10	0.04	0.1449	\$1,116.09	\$1,292,815
13	Rebates for replacing high use commercial urinals with 0.5 gal/flush urinals	0.06	0.02	0.0133	\$1,824.55	\$169,499
14	Replace inefficient water using equipment	0.03	0.49	0.0084	\$2,897.56	\$111,512
15	Restaurant low flow spray rinse nozzles	0.85	49.96	0.1191	\$127.73	\$204,514
16	Landscape water budgets	0.38	0.27	0.0714	\$498.07	\$118,374
17	Financial incentives, rebates for irrigation upgrades	0.33	0.18	0.0681	\$598.01	\$284,496

From Table 6-2, Table 6-3 the following observations can be made:

- The most cost-effective and highest water savings measure is to continue to expand the WELs program.
- Replacing inefficient commercial equipment has the lowest benefit-cost ratio which is less than one, indicating it is not cost-effective.

NOTE: Individual measure water savings are not additive due to measure overlap. Savings are aggregated at the program level (see below).

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6.5 Results of Conservation Program Analysis

Comparison of Measures

Table 6-4 provides a summary of which measures make up each of the options packages, programs A, B, C and D, which are the four packages designed to illustrate an increasing level of water savings for UWID.

These programs are not intended to be rigid programs but rather to demonstrate the range in saving that could be generated if selected measures were run together. In this step we account for the overlap in water savings (and benefits) and estimate combined savings and benefits from programs or packages of measures.

Selection criteria for the measures in each option package included the following, by program: Measure with B/C less than 0.10 were not placed in any program because although the measure could save significant water, the cost of the saved water was excessive (more than \$1,500/MG). Thus measures 9, 10, 13, and 14 were not used in any program. Four alternative programs that save progressively more water are defined below.

Program A

Program A includes a modest step up from current efforts. It includes measures that expand on your current program to a total of 4 measures. Each individual measure has a benefit cost ratio of more than 1.0 (i.e., benefits exceed costs).

Program B

Program B was designed to be the middle ground and consists of measures with individual measure benefit-cost ratio of more than 0.40, and is able to save more water than Program A. Program B includes Program A measures, plus additional measures for a total of 7 measures.

Program C

Program C includes a few additional conservation measures to those in Program B (individual measures all have benefit-cost ratios more than 0.25). It includes Program A measures, Program B measures, plus additional measures for a total of 10 measures.

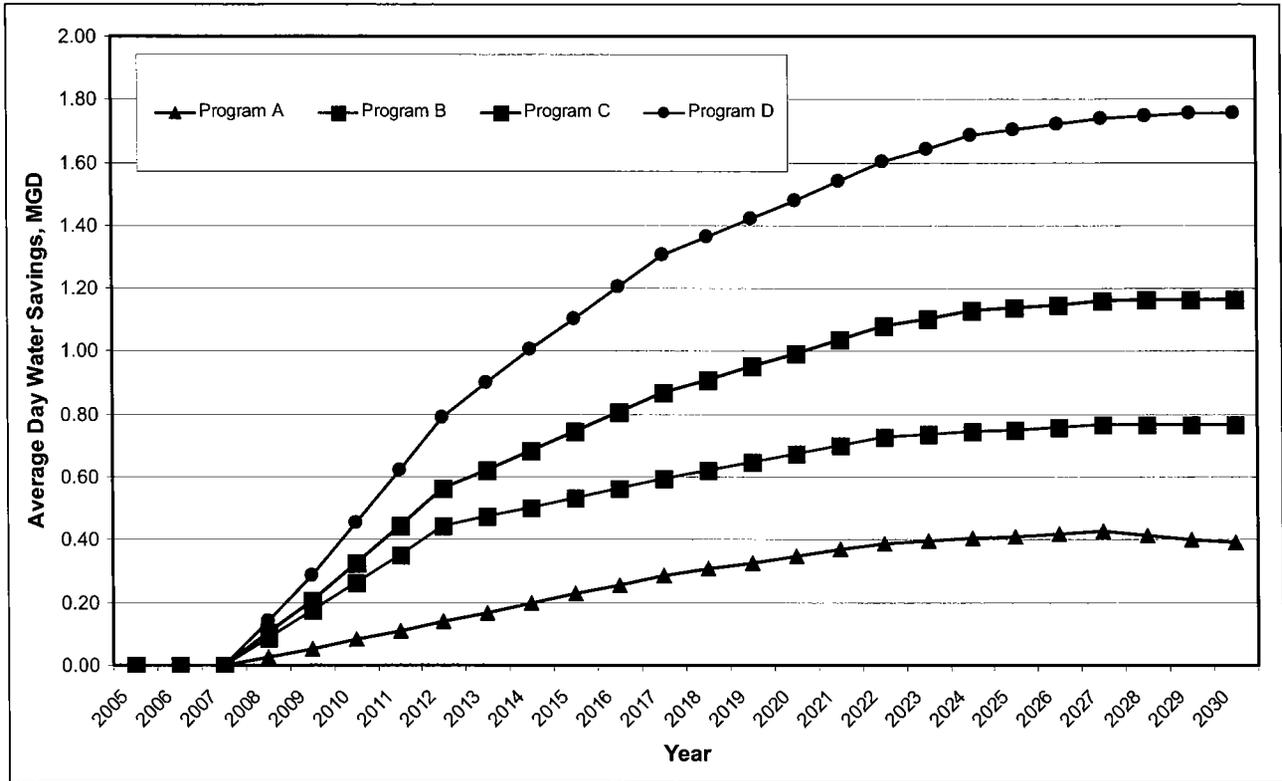
Program D

Program D includes, in our opinion, a maximum practical limit of measures for conservation program managers to handle at one time (a total of 14 measures) It includes Program A measures, Program B measures, Program C plus a few additional measures that are less cost-effective (individual measure benefit-cost ratio more than 0.10).

Figure 6-2 shows annual water savings for each of these programs for the year 2005 to 2030.

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Figure 6-2 Program A, B, C, D Conservation Measure Programs
Annual Water Conservation Savings



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Table 6-4 Conservation Measure Selected for Programs

Description of Conservation Activity	Corresponding Measure Number	Program A	Program B	Program C	Program D
Additional Xeriscape demonstration gardens	1	X	X	X	X
Continue/Expand WELs	2	X	X	X	X
Residential school education programs	3		X	X	X
Rain-sensor (shut off device) retrofit on irrigation controllers	4		X	X	X
Residential water surveys	5				X
Smart Irrigation Controller Rebates Single Family	6a				X
Smart Irrigation Controller Rebates Multi Family and Commercial	6b			X	X
Trigger shut-off valves and hose timers	7	X	X	X	X
New home efficiency award programs	8				X
Landscape rebate program	9				
Rebates for 6/3 dual flush or 4-liter toilets	10				
Award program for water savings by businesses	11	X	X	X	X
Commercial toilet replacement	12				X
Rebates for replacing high use commercial urinals with 0.5 gal/flush urinals	13				
Replace inefficient water using equipment	14				
Restaurant low flow spray rinse nozzles	15		X	X	X
Landscape water budgets	16			X	X
Financial incentives, rebates for irrigation upgrades	17			X	X
TOTAL NUMBER OF MEASURES		4	7	10	14

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Table 6-5 presents key evaluation statistics compiled from the DSS model. Assuming all measures are successfully implemented, projected water savings for 2015 and 2030 in million gallons per day (MGD) are shown, as are the costs of achieving this reduction.

These savings are in addition to water savings from continuing the current conservation program and the futures savings from the plumbing/appliance codes.

The costs are expressed three ways. Total present value over the 30-year period, the money UWID would need to budget in the first five years to get the program underway, and the cost of water saved.

The water savings are expressed as a percentage of the projected 2030 demand. The last column indicates the percentage of the new water demand for 2030 that each program could fill.

Figure 6-3 is a figure showing how marginal returns change as more money is spent to achieve water savings. For example, if the cost versus saving curve is starting to decline after Program B, this means that the added cost of going to Program C from B and then to Program D will save less water per unit expenditure. In other words there are diminishing returns when the curve starts to flatten out. It is clear that the point of diminishing marginal returns is met at the point represented by Program B. This is confirmed by the benefit-cost ratios of Programs C and D which are less than 1.0.

Section 7 presents the criteria and selection process UWID used to evaluate the four programs from their perspective and the resulting recommended water conservation plan.

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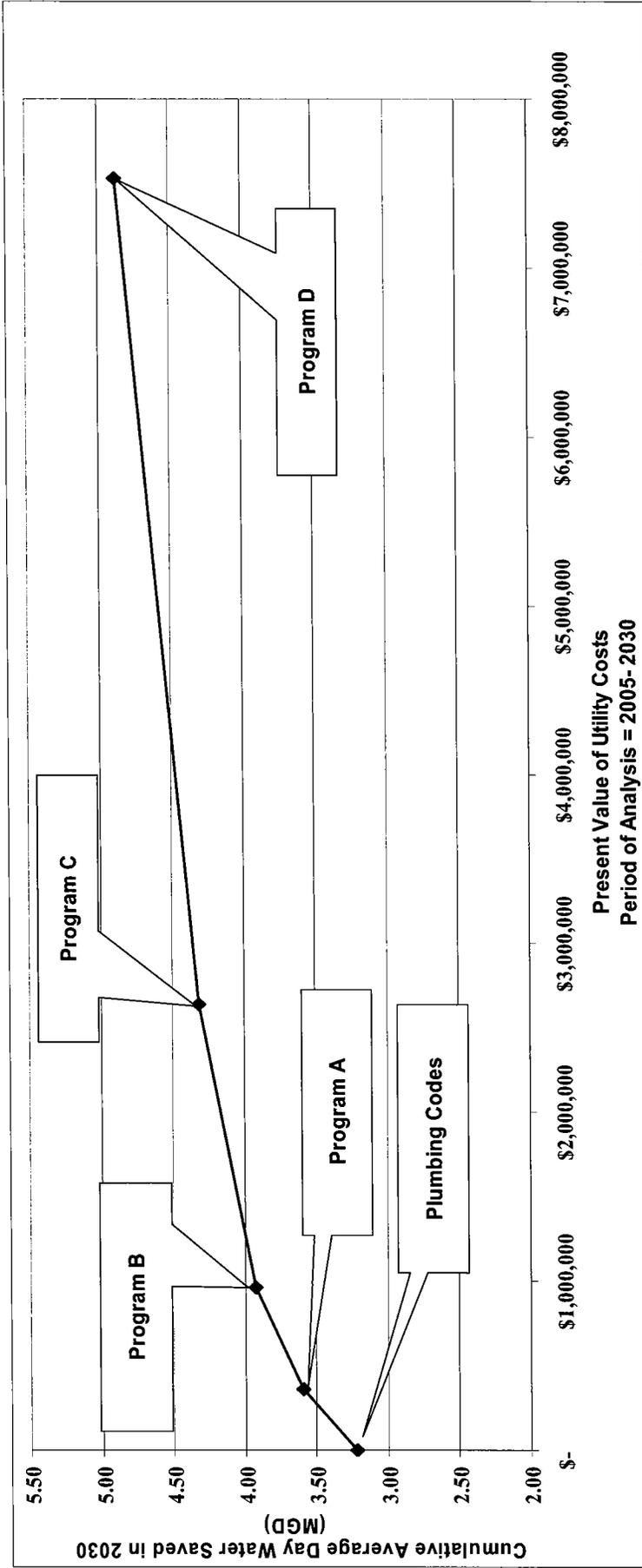
Table 6-5 Program A, B, C, D Conservation Measure Programs - Costs and Average Day Savings

Conservation Program	Water Utility Benefit-Cost Ratio	2015 Water Savings (MGD)	2030 Water Savings (MGD)	2030 Indoor Water Savings (MGD)	2030 Outdoor Water Savings (MGD)	Total Water Savings as a % of Total Production in 2030	Present Value of Water Utility Costs	First Five Year Total Utility Costs	Cost of Water Saved (\$/MG)	% of New Water Needed by 2030*
Program A	1.54	0.26	0.37	0.02	0.35	0.56%	\$362,888	\$ 175,825	\$121	1.7%
Program B	1.10	0.56	0.71	0.17	0.54	1.07%	\$ 963,828	\$ 592,181	\$159	3.3%
Program C	0.61	0.81	1.09	0.17	0.93	1.66%	\$2,641,189	\$1,211,990	\$296	5.0%
Program D	0.30	1.20	1.66	0.36	1.30	2.51%	\$7,530,338	\$3,003,920	\$563	7.6%

Notes:
 Cost of water saved is present value of water utility cost divided by total 30-year water savings.
 *% of water saved refers to UWID 2030 demand with the plumbing code.

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Figure 6-3 Present Value of Utility Costs Versus Cumulative Water Saved in 2030



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Relative Cost-Effectiveness of Programs

UWID's service area has a moderate per capita residential water use. Because of the use of alternate irrigation systems, and the effects of the national plumbing and appliance codes, there are low potential residential water savings in both the indoor and the outdoor sectors. UWID's service area is not a heavy manufacturing sector so the conservation potential in the commercial sector is also relatively low. Nevertheless there are water conservation programs that can be constructed that are cost-effective. Overall conclusions are:

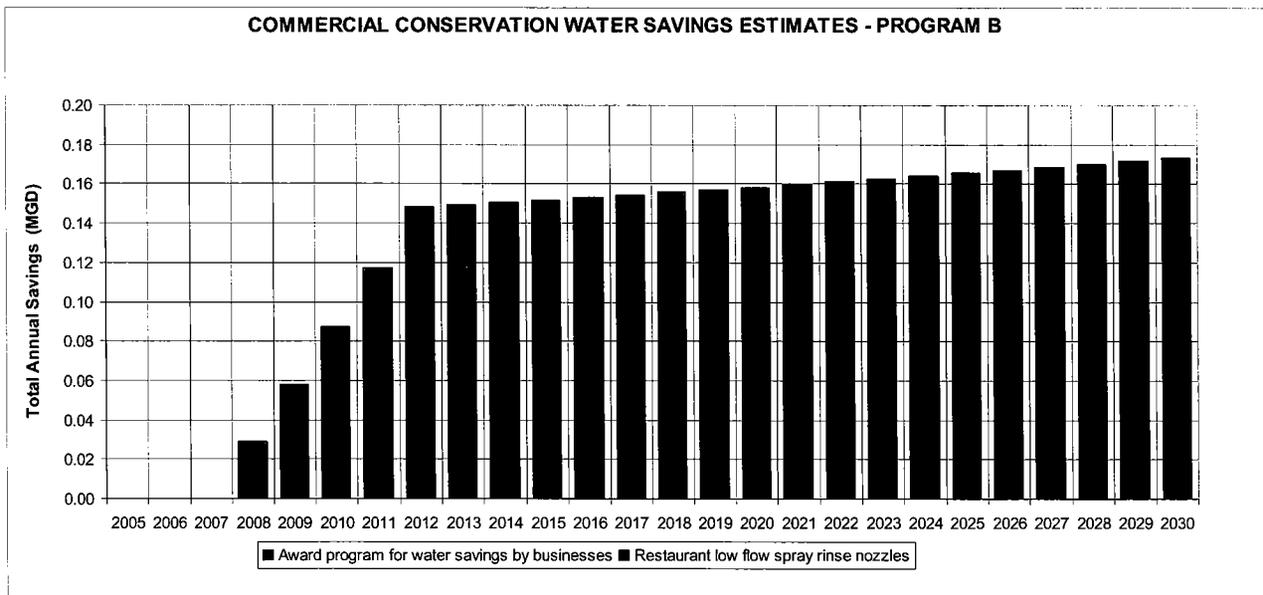
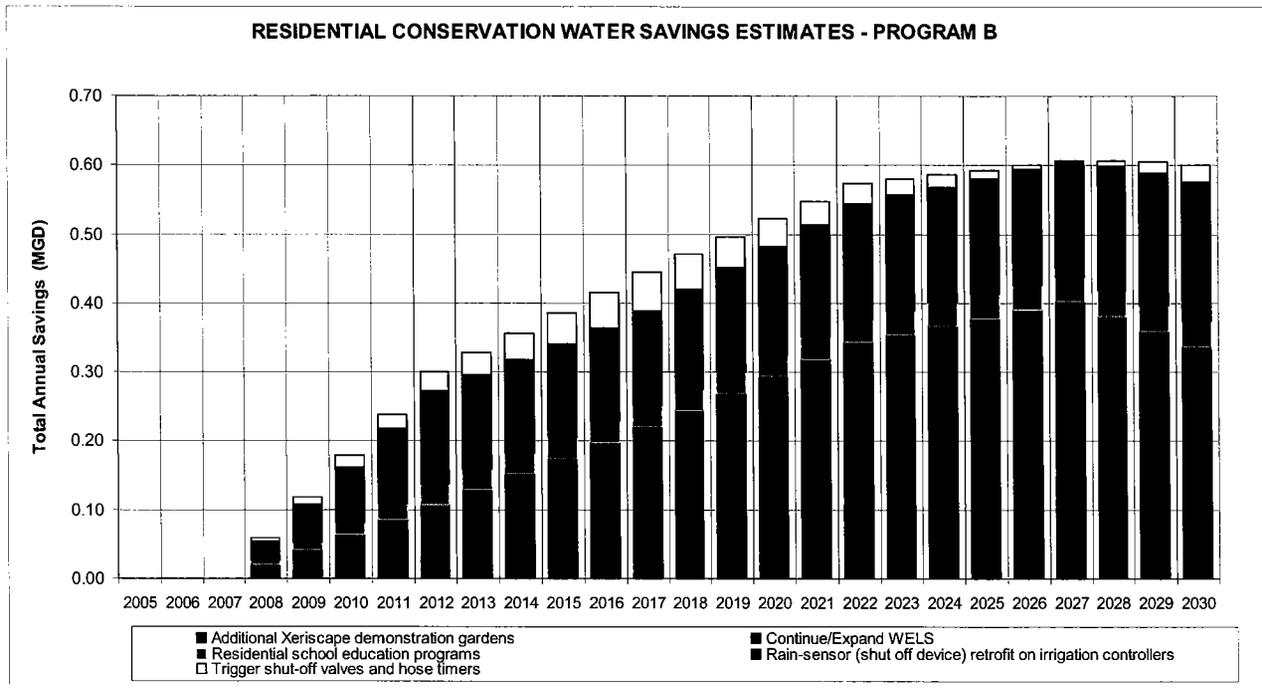
- The value of water saved to UWID is relatively modest so aggressive conservation programs are not-cost-effective.
- Total savings from Program A would be 0.37 MGD or about 0.6 percent in 2030. In other words implementation of conservation programs will reduce water production in 2030 by 0.6 percent. This is in addition to the plumbing code savings of 5 percent in 2030 demands. Continuing the current conservation program is assumed in all programs. The five year cost for Program A from 2008 to 2012 is about \$176,000.
- For Program A, about 96 percent the conservation potential in 2030 is in reducing outdoor use, the rest is indoor use reduction potential.
- Total savings from Program B would be 0.71 MGD or about 1.1 percent in 2030. In other words implementation of conservation programs will reduce water production in 2030 by 1.1 percent. This is in addition to the plumbing code savings of 5 percent in 2030 demands. The five year cost for Program B from 2008 to 2012 is about \$600,000
- Because of the projected relatively high growth rate in new accounts, Program B could make up about 3.3 percent of the total future additional water needed by 2030, with benefit-cost ratio of 1.10 to 1.
- The more aggressive Programs C and D are not cost-effective because the benefit cost ratio of 0.61 and 0.30 respectively is less than 1.0. These programs, if implemented, would provide 5.0 and 7.6 percent respectively of the new water needed.

The following figures provide additional details on Program B by visually displaying the savings and costs for each measure in Program B.

The first two graphs in Figure 6-4 show the total annual water savings per year for each measure that has been placed in Program B. We elected to show this type of graph Program B only because the overall program saves the most water while still being cost-effective. The first graph shows the residential programs, the second graph show the commercial programs that are included in Program B.

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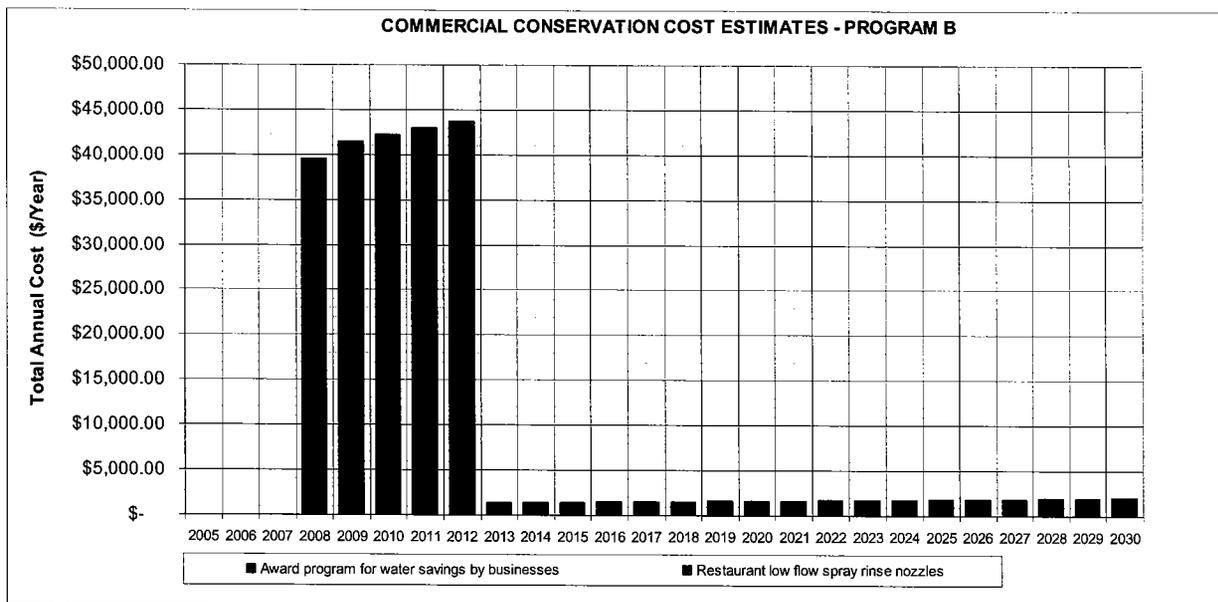
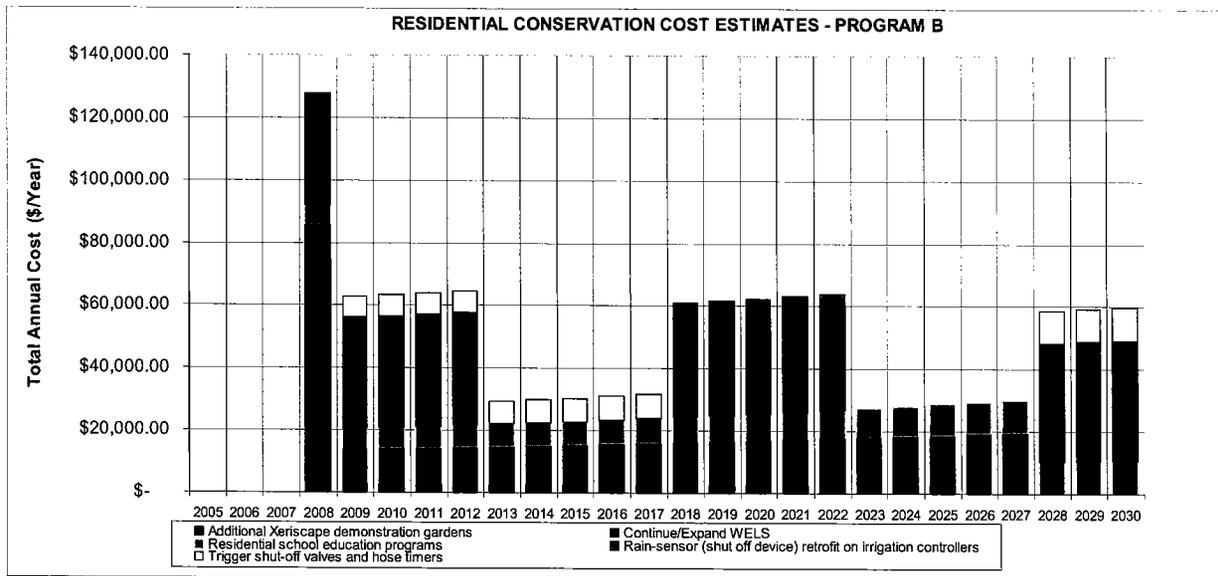
Figure 6-4 Water Savings from Conservation Measures



These next two graphs in Figure 6-5 show the total annual costs per year for each measure that has been placed in Program B. The first graph shows the residential programs, the second graph show the commercial programs that are included in Program B. The variance in cost is because programs are run at different levels for each specific year based on how each measure was designed. The time stream of costs can be certainly smoothed out in the implementation phase.

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Figure 6-5 Costs from Conservation Measures



SECTION 7: Recommended Plan

This section presents an overview of the recommended conservation plan for the United Water Idaho service area. The recommended plan includes several elements: How the plan was selected from the alternatives presented in Section 6; a more detailed description of the components including goals and implementation strategy; the costs and schedule for implementation; the benefits of the plan; financing the plan.

7.1 United Water Idaho's Selection Criteria

United Water Idaho reviewed the economic analysis of alternative programs presented in Section 6. To select the best program (Conservation Plan) for their service area they used the criteria:

- Maximize water savings subject to the constraint that the program must be cost-effective.
- Select a program that was implementable by UWID staff
- Select a program that had partnering opportunities
- Select a plan that would be well received by area residents and businesses

Of the three programs that were presented in Section 6, **Program B** clearly stood out as meeting all of their criteria. Program B had the following attributes:

- Builds on and expands the current conservation program
- Saved twice as much water as Program A
- Was cost-effective, B/C ratio of 1.10
- Offers several new measures that present new partnering opportunities, while maintaining current partnerships.
- Could be managed by existing staff with either contractors or additional staff used to expand activities.

7.2 Recommended Plan: Description, Implementation Strategy, and Goals

The new UWID Water Conservation Plan consists of continuing the current program at the current budget level given in Section 4 and adding 7 new measures. Five of the measures are completely new programs and two are expansions of current programs. The elements of the plan, their planned costs, and implementation period are shown in Table 7-1 and described below. Average annual costs shown in Table 7-1 have not been adjusted to account for inflation. Costs are therefore expected to be slightly higher than shown to account for increased costs over time.



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Continue Current Program

The current program described in Section 4 will continue. The program is a baseline public information program. The specific elements and their respective budgets will change from year to year. The intent of continuing the current program is to always have a robust public information program, serving as the cornerstone of UWID’s conservation program. Normally the types of activities that are expected to be included in this element are:

- Funding a full-time Outreach/Education Coordinator
- Creating and maintaining an effective web site, with conservation information (new element)
- Conducting a summer media campaign
- Participating in relevant community events
- Providing information and water saving kits to customers who request them
- Continuing the baseline school education program
- Funding the WELs classes at least at current levels
- Maintaining the Xeriscape demonstration garden at UWID’s headquarters
- Purchasing various materials and services needed to support the above elements



Table 7-1 Recommended Water Conservation Plan

Element	Total Cost, 30-year Present Value, \$	Implementation Schedule	Average Annual Cost, First Five Years, \$
Continue Current Program	1,453,400	30 years	124,200
Additional Xeriscape Demonstration Gardens	104,800	2 years	17,400
Expand WELs	174,800	30 years	11,200
Residential School Education	118,200	30 years	6,700
Rain Sensor Retrofit	310,500	5 years	35,600
Trigger Shut-off Valves and Hose Timers	63,100	10 years	6,900
Award Program for Businesses	21,300	30 years	1,300
Restaurant Low Flow Spray Rinse Retrofit	172,200	5 years	40,900
Totals	2,418,300		244,200

Goal: Reach at least 90 percent of homeowners over the course of each year.

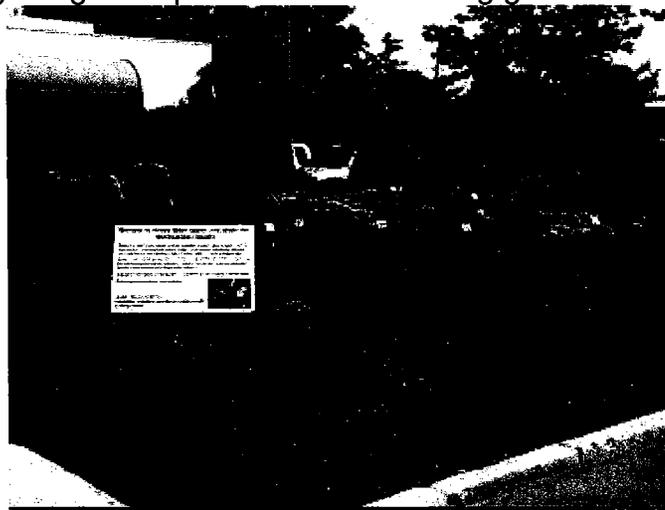
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Additional Xeriscape Demonstration Gardens

UWID would take steps to create more Xeriscape demonstration gardens within the community.

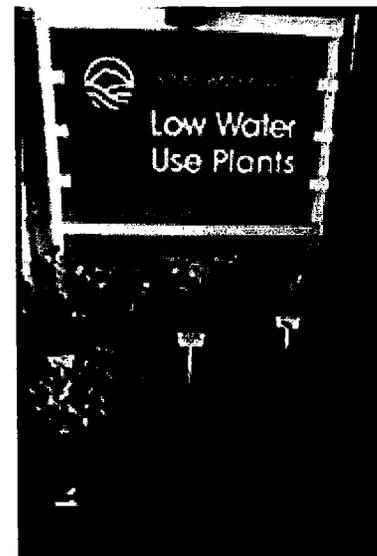
This could take many forms, including:

- In cooperation with other public agencies, dedicate a portion of public land to create a demonstration garden(s) displaying living examples of low water-using gardens and landscaping.
- Purchase land for the same purpose
- Use a portion of UWID owned property for the garden
- Partner with another group, such as Idaho Rivers United (IRU). Their program currently involves (2006) helping property owner re-design their landscapes to conserve water. Grant money (up to \$1,500) goes to the removal of bluegrass and replaces it with native and drought-tolerant plants



and hardscapes. Awards are based on the following criteria

- Estimated, potential water saving (must be 50% to qualify)
- Landscape design that will be attractive and functional and will encourage others to do the same.
- A landowner committed for 50% cost share. In-kind work may qualify as part of the monetary match.
- Community visibility (project must be located so others can readily see it)
- Grant receipts must be willing to assist in publicly showcasing their landscape to show the benefits of reduced water landscaping to the public including signing the project. IRU provides the signage.
- The use of native plants is preferred, but not necessary



United Water Idaho would create and manage any public gardens and provide signs and brochures to educate those people visiting the garden(s). Private gardens would be featured on the new UWID web site and in publications by UWID on water efficient landscaping.

Goal: Influence about 15 percent of the UWID single family customers to take steps to conserve landscape irrigation water over the next 20 years.

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Expand Water Efficient Landscaping Program (WELs)

UWID would take steps to expand the WELs program to increase the number of participants. Maintain the same partnerships as with the current program. Incentives to increase attendance, if required, could include plants and drip system vouchers. UWID's Xeriscape demonstration gardens could be used in the classes. Participants would also be encouraged to avail themselves of the IRU grant program.



Goal: Increase the number of participants to approximately 900 per year. This would reach about one percent of customers per year in 2020.

Residential School Education

United Water Idaho would sponsor additional elementary school conservation programs with workbooks and presentations; teaching materials and other educational tools to teach 4th to 6th grade students the importance of conserving water. The program would have the scale such that all elementary schools in the service area would be covered every three years. This would be in addition to the current activities, such as plant tours and Water Awareness Week.



Goal: Involve approximately 1,500 homes per year through contact with 4-6th grade students.

Rain Sensor Retrofit

United Water Idaho would sponsor a periodic rain sensor giveaway. This could be done at regularly held community events where UWID has a booth or some other role. Homeowners could also receive the device at UWID's office or through the mail. Installation would be funded by the homeowner.



Goal: Distribute approximately 8,000 devices over five years (about ten percent of single family homes)

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Trigger Shut-off Valves and Hose Timers

UWID would offer an incentive to customers such as a voucher on the purchase of a shut-off valve or timer. These devices would also be given away at community events, targeted at customers who water by hand. This program would compliment and be in parallel with the distribution of rain sensors with those who water with an automatic system. In this way all customers, regardless of how they water, would have access to a UWID program that assists with eliminating over watering.



Goal: Reach 10 percent of residential customers over a five year period.

Award Program for Businesses

UWID would sponsor a periodic awards program for businesses that significantly reduce water use. They would receive a plaque, presented at a lunch with the mayor. This could be done every year, every two years, or every three years, depending upon the interest from the business community. If possible UWID would partner with other groups encouraging “green business”. One such program is “Enviroguard”. Others could be the local chapter of the US Green Building Council and the Boise Metro Chamber of Commerce. The idea is not to compete with other community award programs but rather to provide additional mechanisms for business recognition. Generally three businesses would be recognized each time the program is run. A local committee of business representatives would set the criteria and judge the entries.



Goal: Involve three businesses every year or so in the award program.

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Restaurant Low Flow Spray Rinse Retrofit



Provide free installation of 1.6 gpm spray nozzles for the rinse and clean operation in restaurants, other commercial kitchens and grocery stores. This program could be patterned after similar programs in California and Washington. Normally these programs are done by a contractor and done in high volume to reduce costs. The contractor would distribute the nozzles door to door and record data on sites installed and number installed. Payment to contractors is normally per valve installed. Because new valves are required to be low flow, as per the latest Energy Policy Act amendments, this program would target older businesses.



Goal: Install 1,000 valves over five years.

7.3 Implementation Schedule

The plan calls for existing programs to continue. Depending upon the funding and partnerships formed in 2007, the new programs would be divided into two groups and rolled out in 2007 through 2009.

The implementation schedule would involve the following steps:

1. Obtain funding (2007)
2. Form new partnerships (2007)
3. Detailed design of new programs (2007 and 2008)
4. 2007-2008 roll-out Phase I new programs that do not require grants nor new partnerships (3-4 measures)
5. 2008-2009 roll-out Phase II programs (balance of measures, 3-4) that may qualify for a grant or require more time to form partnerships

At this time the projects that would seem to fall into Phase I are:

1. Expand WELs
2. Residential School Education
3. Trigger Shut-off Valves and Hose Timers
4. Rain Sensor Retrofit

This would mean that the following would be in Phase II:

1. Additional Xeriscape Demonstration Gardens
2. Award Program for Business
3. Restaurant Low Flow Spray Nozzle Retrofit

These are only preliminary lists and would depend upon the grant funding opportunities and ease/difficulty of forming new partnerships.

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7.4 Benefits from the Recommended Plan

The benefit cost ratio for the overall plan as shown in Section 6 is 1.10. Any ratio over 1.0 signifies a net benefit from the plan meaning UWID would save both water and money by implementing this plan.

The benefits from the recommended plan include (but are not limited to) the following:

- Reduce peak water demands
- Enhance environmental benefits by leaving more water in the Boise River and groundwater aquifers.
- Save energy and system operation costs
- Save 0.71 million gallons per day by the year 2030.

The recommended plan builds on the good foundation of the current conservation program. It also recognizes the continuation of the plumbing and appliance codes in providing a complete suite of programs for Boise residents.

7.5 Financing the Recommended Plan

There are multiple options for UWID to fund the recommended conservation programs including conservation program surcharge, partnerships, grants, and water rates. As shown in Table 7-2, there are different options for each of the specific recommended conservation measures. In addition to the table, further descriptions and details of each type of funding are provided in the following section. The following section provides a brief overview and suggestions for each alternative funding strategy.

Table 7-2 Funding Opportunities for Water Conservation Programs

Program	Possible Grant Opportunities	Possible Partnerships	Water Rates (or Surcharge)
Continue Current Program		Ada County, Idaho Rivers United	X
Additional Xeriscape Demonstration Gardens	Bureau of Reclamation Grant, National Parks Service Land and Water Conservation Fund Grant	Idaho Rivers United, Environmental Groups	X
Expand WELs		Ada County, Idaho Rivers United, Environmental Groups	X
Residential School Education		Ada County, Idaho Rivers United, Environmental Groups	X
Rain Sensor Retrofit	Bureau of Reclamation Grant		X
Trigger Shut-off Valves and Hose Timers		Retail Stores	X
Award Program for Businesses		Boise Chamber of Commerce, Green Buildings	X
Restaurant Low Flow Spray Rinse Retrofit	Bureau of Reclamation Grant	Idaho Power, City of Boise Wastewater Department	X

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Surcharges

UWID will need the money up-front to implement the program. A “water conservation surcharge” could be added to the water bill to raise the money required to carry out the recommended activities. A change to monthly billing would help generate the money closer to the time it is needed. Because of the amount of money proposed for funding the program the surcharge would amount to less than one percent of the total or only a few dollars per year on the average bill. This technique has been used successfully by Idaho Power to fund their demand side management program.

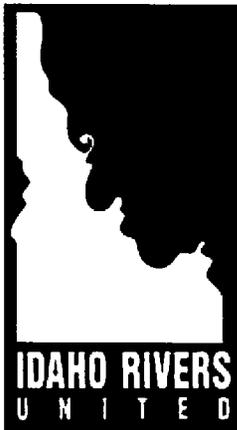
Partnerships

There are multiple opportunities for UWID to form partnerships with a variety of different groups as they begin to implement the recommended plan. Below is a few of the possible partnerships that could be created. Partnerships offer the possibility to:

- Meet program goals for a lower cost to UWID
- Increase participation rates by the additional promotion offered by partners
- Add more brainpower to the design of the program
- Provide UWID with an easier implementation method
- Open doors that might not be easy for UWID because they lack the established relationships partners offer.

In partnering it is important to remember to “get the incentives right”. In other words partnerships need to offer a win-win for both parties that enable each party to meet their goals more easily than by acting alone.

(1) Idaho Rivers United



Idaho Rivers United is a statewide river conservation organization founded in 1990. Idaho Rivers United's mission is to protect, restore and improve the rivers of Idaho and the communities that depend on them. Currently, Idaho Rivers United has over 2,000 members and is funded by a combination of individual, foundation, corporate and government contributions as well as events and merchandise. Idaho Rivers United is a non-profit 501 (c)(3) corporation.

Applicability to UWID: Idaho Rivers United and United Water Idaho currently have a partnering relationship. Both groups share a common interest in maintaining a water efficient service area. Current partnering involves a media campaign promoting water conservation and sharing conservation materials at community events. The media campaign is a series of newspaper ads and a television commercial featuring a past Idaho Governor. In 2006, Idaho Rivers United used UWID's conservation guide as a hand out at the Hyde Park Street Fair and during their Waterwise Gardens of the Treasure Valley Tour. Idaho Rivers United did attend meetings for the preparation of the 2006 United Water Idaho Water Conservation Plan. It is the intention of both parties to continue partnering on conservation programs and events.

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More information is available on the following website: <http://www.idahorivers.org/>

(2) Green Buildings



The US Green Building Council has taken the lead in creating the green building movement in the US. To be certified as a “green building” certain criteria apply. The main factor in certification is energy efficiency. Thus far the water efficiency requirements to be certified are minimal but there are groups working to give more credit for extra water efficiency, beyond normal plumbing code requirements. Nevertheless the building highlighted below did add extra water efficiency features and this is a good example of a worthy candidate for an award from United Water Idaho.

The Banner Bank Building is expected to join the handful of buildings worldwide that have received a Platinum LEED award from U.S. Green Building Council. Gary Christensen, developer of the recently completed Banner Bank Building in downtown Boise, Idaho, expects the project to receive a Platinum Leadership in Energy and Environmental Design (LEED) Award later this month from the U.S. Green Building Council. The 11-story building, with features such as a greywater reclamation system, sunlight reflecting white roof, and computerized lighting system, is aiming for the Council’s highest certification. Only 18 buildings in the world have been awarded a platinum rating thus far. The reclamation system is plumbed to assist with toilet flushing in the building. Rainwater can also be used for toilet flushing. "Christensen said he was able to construct the environmentally friendly Banner Bank Building at 10th and Bannock streets for about \$20 million, which is around the cost of construction for a standard building. 'People talk about it costing more to build a green building, but they are just not pushing more to find the cost savings,' Christensen said."

Source: *The Idaho Statesman*, Jul 12, 2006

More information is available on the following website: <http://www.usgbc.org/>

And at the Idaho local chapter in Boise: <http://www.usgbcidaho.org/>

Applicability to UWID: The local chapter of the US green Building Council might be a partner for UWID’s business award program. Or UWID could piggyback onto the local chapter award program and offer additional awards for those buildings that demonstrate innovative water efficiency. This partnering would be easier than creating their own program that might compete with others.

(3) Boise Metro Chamber of Commerce



Another option for UWID’s business awards program is to partner with the Boise Metro Chamber of Commerce. They offer a Community Service Award that would appear to offer partnering opportunities, see below.

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Community Service Awards

Held in conjunction with the 120th Boise Metro Chamber of Commerce Annual Meeting, February 22, 2006 at the Boise Centre on the Grove.

2006 Distinguished Corporate Stewardship Award Winner: Washington Group International
The goal of the Corporate Stewardship Award is to showcase the most innovative examples of how Boise Chamber member companies "do well and do good" and how good management can deliver a wide variety of economic and social benefits.

A corporate steward is a company that follows the letter and spirit of the law and contributes actively to better the communities and locations in which it operates, promoting progress where economic and social objectives coincide to mutually support each other.

More information is available on the following website:

http://www.boisechamber.org/ec_dev/index.htm

<http://www.boisechamber.org/programs/index.htm>

Applicability to UWID: This is another partnership option for UWID's business awards program.

(4) University of Idaho Extension - Ada County



The University of Idaho Extension staff teaches home gardening/landscape classes and workshops to the ever-increasing suburban populations in the Treasure Valley. To accomplish this task, each year staff trains and supervises 100 to 150 volunteers, including

Master Gardeners, Master Composters and Advanced Master Gardeners, so that programs can be delivered to community groups and organizations, "green" industries and individuals. Staff conducts horticultural trainings for United Water Idaho, Boise City Public Works, Boise Parks Forestry Division, nursery retailers and Idaho Botanical Gardens employees and volunteers. Their Xeriscape programs have lowered per capita domestic water consumption, and their "green" industry employee trainings have resulted in more appropriate pesticide, herbicide and fertilizer recommendations and use by consumers. Last year, volunteers trained or assisted over 8,000 Treasure Valley residents with horticultural concerns. Ada County Master Gardeners and Advanced Master Gardeners contributed over 3,500 hours of volunteer labor towards community horticultural improvement projects. They also conduct clinics, tours and workshops on plant diagnostics, insect/weed/disease identification, pesticide safety and general horticultural science. Local staff are regionally recognized experts in water efficient (xeric) landscaping, and incorporate "low water use" strategies into their landscape design classes and seminars.

More information is available on the following website:

http://www.extension.uidaho.edu/programs_display.asp?county=ada

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Applicability to UWID: UWID already partners with UI Extension on the WELs classes. Other partnerships with UWID's other irrigation reduction programs may be possible. This would include the trigger shut-off valve/hose time and rain sensor retrofit programs aimed at more efficient irrigation, as well as additional Xeriscape demonstration gardens.

(5) City of Boise Sanitary Wastewater Department



The Public Works Department operates and maintains three wastewater treatment plants in its service area.

The West Boise treatment plant is the city's largest, and is currently undergoing expansion to allow processing of over 30 million gallons per day.

Water from the Gowen Field Plant is recycled differently than the water at the two larger, mechanical plants. During the summer, the water from the lagoons is disinfected and then sprayed onto an adjacent field to water a hay crop. In winter, the water is stored in the lagoons for use during the growing season.

Currently UWID is a major donor to the construction of the water education center at the new waste water treatment facility. This current partnership can potentially help lead to future teaming efforts.

More information is available on the following website:

http://www.cityofboise.org/public_works/services/water/sanitary_sewer/index.aspx?id=home

Applicability to UWID: At least one of UWID's new programs will reduce wastewater flows; the Restaurant Low Flow Spray Rinse Retrofit program will reduce flows from restaurant kitchens. This will benefit the wastewater plants by lowering the amount of flow that must be treated day in day out. It is possible that the Wastewater department would partner on this program. To-date they have taken other environmentally friendly steps such as recycling biosolids and methane gas. This might enable them to more easily expand their NPDES permit for added discharge of effluent into the Boise River (to accommodate growth).

(7) Boise Gardening Clubs

There are multiple gardening clubs in and around Boise that are very active with meetings, events, classes and volunteer groups.

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Applicability to UWID: Teaming with one of these gardening clubs could be potentially beneficial to help fund, install, and maintain future Xeriscape demonstration gardens. In addition, these garden clubs and market and promote efficient garden tours.

More information is available on the following websites:

Golden Garden Club of Boise:

<http://www.gardencentral.org/idgardenclubs/bricks/>

Idaho Water Garden and Koi Society (IWG&KS) in Boise, Idaho

<http://www.olympickoiclub.org/schedule.html>

Master Gardeners

<http://extension.ag.uidaho.edu/kootenai/mg.htm>

Idaho Gardener

<http://www.idahogardener.com/?p=112>

United Rivers and Idaho Arid Gardening Alliance

<http://www.idahorivers.org/>

Idaho Water Resources Research Institute Master Gardener Volunteer Program (began in 1973)

<http://www.boise.uidaho.edu/iwri>

Grant Funding

The availability of grants varies year to year, but can be a good opportunity to fund or partially fund water conservation programs. Many agencies have been successful in obtaining funding in recent years, and this is an avenue that UWID should consider exploring. The following is a list of current grants available in 2006 that UWID could possibly follow up on as part of their finance strategy.

(1) Water Challenge Grants: Department of Interior Bureau of Reclamation



The Water 2025 Challenge Grants, administered by Interior's Bureau of Reclamation, provide local water or irrigation districts with matching funds for projects that conserve water, increase water use efficiency or enhance water management at existing water supply projects.

Reclamation is the largest wholesale water supplier and the second largest producer of hydroelectric power in the United States, with operations and facilities in the 17 Western States including Idaho. Its facilities also provide substantial flood control, recreation, and fish and wildlife benefits.

- In FY 2004, Reclamation dedicated \$4 million to the Challenge Grant Program and awarded funds to 19 projects.
- In FY 2005, Reclamation dedicated \$10 million to the Challenge Grant Program for irrigation and water districts and awarded grants for 43 projects.

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• In FY 2006, Interior Secretary Dirk Kempthorne approved \$1.3 million in *Water 2025* Challenge Grants specifically for water conservation projects across the West. The grants helped fund ten projects in seven states. Including the matching contributions of non-federal partners, the selected projects represented a combined investment of more than \$5.6 million in water management improvements.

Funding for FY 2007 is currently uncertain (requires Congress to pass a budget). In the past an RFP has been issued which details the types of projects eligible and the type of entities who can receive grants. More information on the Water 2025 Challenge Grant Program is online at www.usbr.gov/water2025

Applicability to UWID: This grant has typically funded water supply projects, and water efficiency projects that involve hardware. Therefore, it is recommended that UWID explore opportunities for the programs that involve hardware including: Xeriscape Gardens, Rain Sensors, Trigger Shutoff Valves, and Spray Rinse Valves.



(2) National Park Service Land and Water Conservation Fund (LWCF)

In 2005, the National Park Service Land and Water Conservation Fund provided \$98 million in grants to help fund over 596 projects. Since the creation of the fund 41 years ago, the Land and Water Conservation Fund has been involved with funding of over 40,000 projects.



Reflecting the purposes of the LWCF Act, the goals of the Land and Water Conservation Fund State Assistance Program are:

1. Meet state and locally identified public outdoor recreation resources needs to strengthen the health and vitality of the American People.
2. Increase the number of protected state and local outdoor recreation resources and ensure their availability for public use in perpetuity.
3. Encourage sound planning and long-term partnerships to expand the quantity and ensure the quality of needed state and local outdoor recreation resources.

More information is available on the following website: <http://www.nps.gov/lwcf/>

Applicability to UWID: The thought behind including this grant opportunity is in terms of possible future Xeriscape Demonstration Gardens. If UWID could form a partnership with environmental groups or local community gardening groups, or even developers to create new parks in the UWID service area. The idea is to team with other interested groups to build additional community parks. These parks could then include as an added feature a Xeriscape demonstration garden. The benefit to UWID is increased community involvement, generating a Xeriscape Demonstration garden with a large volume of regular users, and the

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possible partnerships and funding opportunities gained by working with other groups. The benefit to the environmental groups and gardening clubs would be additional community parks that would enhance the recreational resources of the Boise area. The tie into the increase of recreational area and parks for public use is the goal of the National Park Service grant. As a partnered team, the community park project would not only have much support, but a wider array of funding opportunities.

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(3) Idaho Department of Water Resources



Currently the Idaho Department of Water Resources is not offering grants, but that does not mean that this situation might change over the next 10 years. It is suggested that UWID continue to monitor the agency to see if they decide to offer grants in the future. Many other states do offer grants through their water agency, so Idaho may decide to incorporate a funding opportunity for agencies in the future or may provide resources that describes other programs that offer grant and funding assistance.

More information is available on the following website: <http://www.idwr.state.id.us/>

Applicability to UWID: Depending on if and what type of grants are offered, UWID might be able to benefit by obtaining program funding.

Water Rates

One final method for UWID to fund their conservation activities is to raise water rates to cover the added expense of the conservation program. In the long-run the programs are cost-effective and will save UWID and its customer's money such that future rate increases can be tempered by the reduction in demand produced by the program. The benefits will continue, in many cases, long after the program has been implemented and participation rate goals met.

The program costs could be included in the base rate. This would eventually generate the money but there would be a large lag time, possibly several years, from expense to revenue recovery. This would require UWID to advance the cost of the programs with no ability to recover those costs until new rates were approved. This would serve as an economic disincentive for UWID to undertake conservation programs.

7.6 Monitoring and Evaluation of the Recommended Plan

It is recommended that as each new program is rolled out that part of the program design be devoted to assessing how well the program is working. For programs where there is uncertainty about how well the program will work, pilot programs are normally run to assess the success rate of the program. Once the measure has proved successful on a small group of participants, it can be expanded to the entire universe of potential participants. Programs that would lend itself to a pilot test are:

- Expand Xeriscape Gardens
- Residential School Education
- Rain Sensor Retrofit

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Full-scale programs represent substantial investments and are multi-year programs. Questions to ask as the program progresses are:

- Are the program participant goals being met? If not, is there an explanation?
- Is the program budget adequate?
- Are there any new partnership opportunities that could involve a mid-course correction?
- If a grant is received should goals be changed?

Measuring water savings is technically challenging and can be expensive. *Consequently no monitoring or evaluation costs have been included in the costs for the plan in this report.* At a minimum it is recommended that UWID keep records of program participants. This is a relatively low cost item. The data to be collected would include at least:

- Name of customer
- Address
- Account number
- Date participated

Research into participation uptake is often done by commissioning a telephone survey of participants and non-participants.

UWID's accounting system should be able to track expenses by program element. Labor costs should be allocated among the active programs.

Partnerships and grant opportunities can be explored on an annual basis by searching the Internet for appropriate web sites of relevant organizations.

The current recommended plan is designed to be carried out over a 5-10 year period. It is recommended that UWID update the plan periodically. This should be done in an annual review of accomplishments and making a plan for the next year's activities and budget requirements. A formal new plan could be issued every five years, or timed to be in sequence with rate increase applications, should that be helpful. If a program element is not working it should be stopped and possibly replaced with a new program that is believed to be better suited to UWID's customers.

Finally, UWID should monitor what other utilities are offering in terms of programs so that they can stay up to date with what is working well nationally. Most of this information can be found by periodically checking other utility web sites. The American Water Works Association offers various ways to obtain information on what is working well nationally through their conferences and committee participation. UWID is currently participating in the Pacific Northwest Section which is to be commended and MWM recommends this local membership and involvement continue. Networking with other professionals in the field will benefit United Water Idaho for new programs that have been proven in other similar locales. An example of such a program is the Spray Rinse program, wherein reports on successful programs have been presented at national AWWA Conferences.