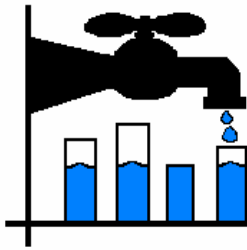




AUDIT CASE NARRATIVES

PAGES

Utility A-1.....	71-80
Utility A-2.....	81-86
Utility A-3.....	87-92
Utility A-4.....	93-102



Contra Costa Water District

Residential Audit Program

Contra Costa Water District (CCWD) is a retail and wholesale water provider serving communities in northern, central, and eastern Contra Costa County, CA. CCWD provides water directly to 230,000 people, and indirectly to another 220,000 people through other local utilities. As of the 2000 Census, the 1999 median household income in Contra Costa County was \$63,675, which is higher than the statewide median of \$47,493.¹

UTILITY DEMOGRAPHICS

As of 2004, CCWD had 59,080 connections, 88.5% of which were residential. Of their total connections, 52,313 were single family residential, 2,482 were multifamily residential, 2,707 were commercial, 6 were industrial, 218 were institutional, 1,282 were irrigation, 72 were raw water customers. CCWD also provides wholesale water to the cities of Antioch, Bay Point (Cal Cities Water), Oakley (Diablo Water District), Pittsburg, and Martinez.

CCWD's retail service area includes Concord, Clayton, Clyde, Pacheco, Port Costa, and parts of Martinez, Pleasant Hill, and Walnut Creek.

The total service area is 214.26 square miles. The total amount of treated water use in 2004 was 38,314 acre-feet. Based on the estimated population of 230,000 people, the average per capita water use was 149 gallons per capita per day as of 2004.

SINGLE FAMILY AUDIT PROGRAM	
Type of Program:	Audit
Indoor or Outdoor:	Both
Eligible Customers:	SF
Customers Analyzed:	SF
Program Years:	1991-present
Years Analyzed:	1999, 2000, 2001

UTILITY RATE STRUCTURE AND PRICES

CCWD has a uniform rate structure. The 2004 daily service demand charges are \$0.55 per day (\$16.50 per month) for 5/8" meters, which includes zero gallons of water. The charge per hundred cubic feet (ccf) of water is \$2.16 per ccf (\$2.89 per 1,000 gallons). There is also a variable energy surcharge, which ranges from \$0.07 per ccf to \$0.51 per ccf (\$0.10 to \$0.68 per 1,000 gallons), depending on the elevation of the customer's dwelling.

CURRENT CAPACITY AND WATER SOURCES

CCWD's primary source of water is its Central Valley Project (CVP) contract for 195,000 acre-feet per year. CCWD receives its water from the Sacramento-San Joaquin Delta. Water is pumped from the Delta into the Contra Costa Canal, where it is transported to the Bollman Water Treatment Plant and then into the distribution system. The plant is able to treat up to 75 million gallons of water per day.

¹ US Census Bureau. QuickFacts.

FUTURE PLANS TO MEET DEMAND

The population within CCWD's service area grew by 37% between 1985 and 2001, during which time overall water use decreased by 3%. Water conservation, water transfers, and water reuse are the main components of the CCWD's future plans to meet demand.

OTHER CCWD CONSERVATION PROGRAMS

Public education, *1980-present*
Multifamily Indoor Audits, *1990-present*
Large Landscape Audits, *1990-present*
Showerhead/Aerator Replacement, *1990-present*
ICI Indoor Audits, *1991-present*
Toilet Replacement Program, *1994-present*
ICI Equipment & Irrigation Upgrade Rebates, *1994-present*
Green Business Program, *2000-present*
Large Landscape Water Budgets, *2000-present*
Washing Machine Rebates, *2001-present*
Pre-rinse Spray Nozzle Rebates, *2003-present*

AUDIT PROGRAM— DESCRIPTION

CCWD's Single Family Residential Audit Program is an indoor and outdoor audit program initiated in 1991. During the indoor portion of the survey, the surveyor checks for leaks, tests flow volumes, and provides any necessary devices. During the outdoor portion, the surveyor checks the irrigation system, conducts precipitation

tests on stations, programs a monthly irrigation schedule into the controller, and teaches the customer how to operate the system.

The audit takes about 1 to 1½ hours. CCWD targets high summer water users for this program, however, about 30% of the audits performed are referrals from the Customer Service Department, and are not necessarily high water users.

The program has evolved significantly over time. From 1991 to 1994 the emphasis was on toilets and other indoor areas, with only a quick look outside. Between 1994 and 1999 the emphasis shifted to outdoor areas, and in 2000 the indoor component of the audit was reduced to 15 minutes and the landscape and irrigation became the focus of the survey. Marketing strategies were also changed in 2000 to more closely target high water using customers.

METHODOLOGY

Please see the General Methodology for the specific procedures and techniques used for all ECoBA analyses.

The analysis includes only single family households that were surveyed during the years 1999, 2000, and 2001. The water savings were calculated and a cost benefit analysis was performed for the years 1999, 2000, and 2001. The findings refer to these three years only, not to the ongoing program. The lifespan of the audits, which is used as the period of analysis, was assumed to be five years.

All quantified costs and benefits have been discounted to the first year of the analysis (1999) and inflated to 2004 dollars. The discount rate used in this analysis was 4.8%. The CPI values that were used in this analysis were the 2004 value of 188.9 and the 1999 value of 166.6.

286 usable participants out of 899 total participants in 1999, 376 out of 568 in 2000, and 379 out of 496 in 2001, for a total of 1,041 usable participants out of 1,963. Forty-seven percent, or 922, of the possible participants were unusable because they moved during the period of the analysis.

1999 audits: average water savings/year	2.8AF
2000 audits: average water savings/year	13.0AF
2001 audits: average water savings/year	24.0AF

The utility was able to refine its audit protocol, showing a marked increased in water savings and greater efficiency in use of their fiscal resources each successive year.

All CCWD single family residential households that were not participants in this analysis were used as the control group. However, the average pre-measure water use of the participants (174,895 gallons) was higher than that of the weighted annual pre-measure average of the control group (120,330 gallons). This is most likely due to the fact that the program was designed to target high-water using customers.

- For 1999 audits, the control group consisted of 50,087 households in 1997, 50,340 in 1998, 50,696 in 1999, 51,061 in 2000, and 51,249 in 2001.
- For 2000 audits, the control group consisted of 50,250 households in 1998, 50,606 in 1999, 50,971 in 2000, 51,159 in 2001, and 51,476 in 2002.
- For 2001 audits, the control group consisted of 50,603 households in 1999, 50,968 in 2000, 51,156 in 2001, 51,473 in 2002, and 51,829 in 2003.

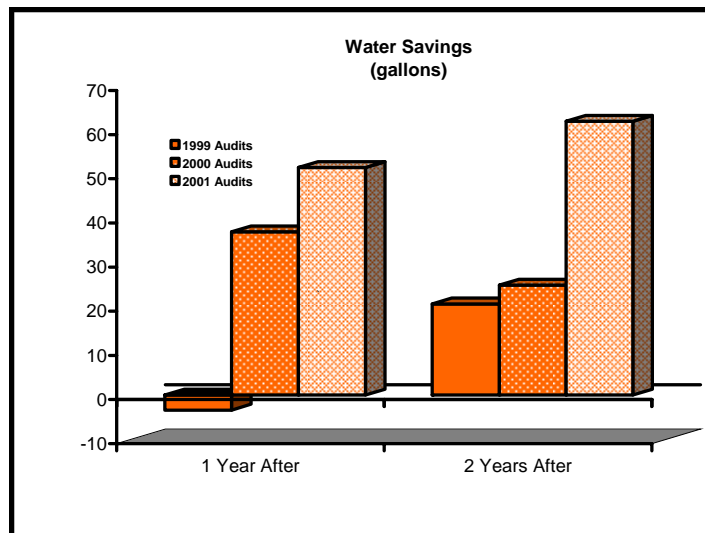
ASSUMPTIONS

Please see the General Assumptions for the specific conditions and rules underlying all ECoBA analyses.

The number of single family connections used in the analysis (to form the control group) is from December of the year in question.

The discount rate used in this analysis was 4.8%.

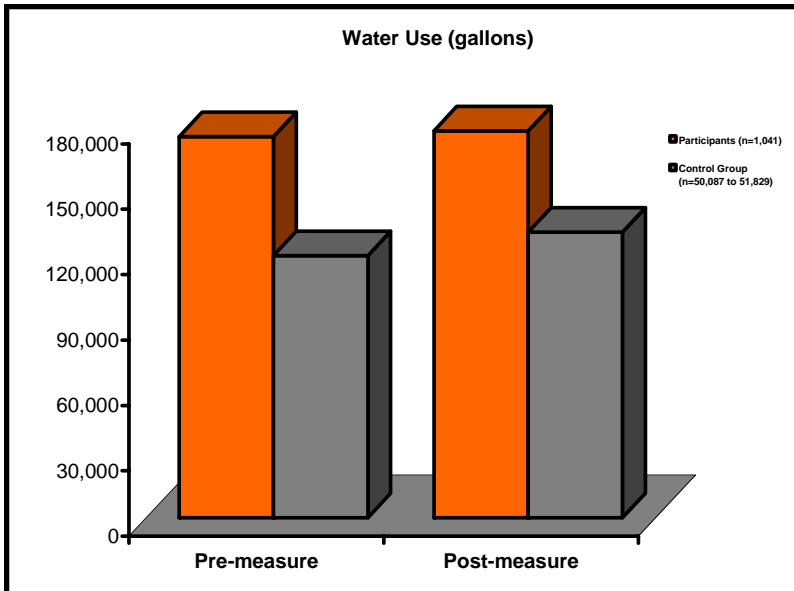
The CPI values that were used in this analysis were the 2004 value of 188.9 and the 1999 value of 166.6.



The price of water used in determining the benefits to customers from reduced water bills is the variable portion of the utility's price of water. \$2.63/1,000 gallons in 2000, \$2.69/1,000 gallons in 2001, \$2.75/1,000 gallons in 2002, \$2.81/1,000 gallons in 2003, \$2.89/1,000 gallons in 2004 and the balance of the lifespan.

RESULTS—WATER SAVINGS

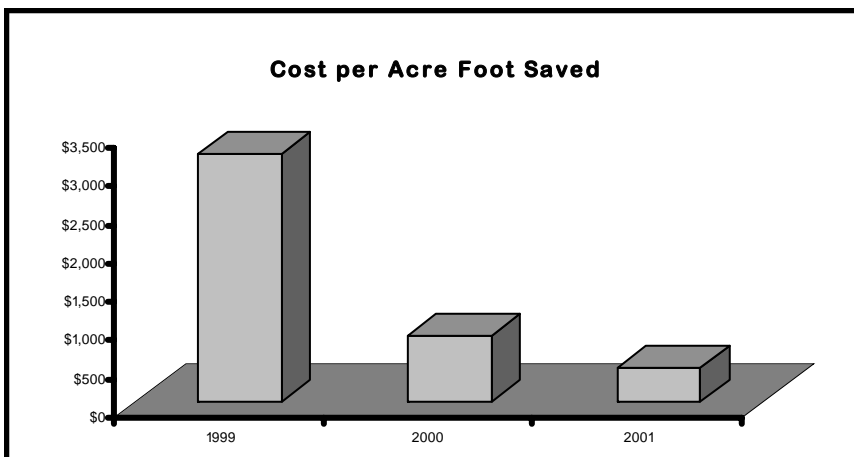
In the first year after the 1999 audits, no water savings occurred. There was an increase in participant water use, relative to control group water



use, of 351,076 gallons, or 1,228 gallons per participant per year (gppy) (0.7% of pre-measure water use). The second year after the audits, the water savings was 2,157,103 gallons, or 7,542 gppy (4.3% of pre-measure water use). The average savings per year was 903,013 gallons (2.8 AF), or 3,157 gppy (1.8% of pre-measure water use).² The total savings over the five year assumed lifespan of the audits was 4,515,067 gallons (13.9 AF), or 15,787 gallons per participant.

The first year after the 2000 audits, water savings amounted to 5,077,989 gallons, or 13,505 gppy (8.8% of pre-measure water use). The second year, water savings was 3,423,908 gallons, or 9,106 gppy (5.9% of pre-measure water use). The average savings per year was 4,250,948 gallons (13.0 AF), or 11,306 gppy (7.4% of pre-measure water use). The total savings over the five year assumed lifespan was 21,254,742 gallons (65.2 AF), or 56,529 gallons per participant.

The first year after the 2001 audits, water savings amounted to 7,132,709 gallons, or 18,820 gppy (9.6% of pre-measure water use).



A-1

² This value approximates the water savings per audit, but not perfectly. Of the 1,041 participants, 59 received more than one audit. Most of the successive audits were follow-up to the first.

The second year after, water savings amounted to 8,579,938 gallons, or 22,638 gppy (11.5% of pre-measure water use). The average savings per year was 7,856,323 gallons (24.1 AF), or 20,729 gppy (10.5% of pre-measure water use). The total savings over the five year assumed lifespan was 39,281,617 gallons (120.6 AF), or 103,645 gallons per participant.

Total water savings for the three years studied amounted to 11,859,622 gallons, or 11,393 gppy (6.5% of weighted pre-measure water use) during the first year after and 14,160,948 gallons, or 13,603 gppy (7.8% of weighted pre-measure water use) during the second year after the audits. **The total water savings over the five year assumed lifespan of the audits was 65,051,426 gallons (199.6 AF), or 62,489 gallons per participant.**

During the two years before participating in the audit program, participants' water use was 145.0% of the control group's use, on average. During the two years after participating in the audit program, their water use was 136.0% of the control group's use, on average. The participants' water use increased by 1.6% from pre-measure to post-measure, whereas the control group's use increased by 9.0%. **The resulting overall water savings attributed to this program was 7.4%.**

1999 Quantified Costs and Benefits					
Utility				Participants	
Costs		Benefits		Costs	Benefits
Materials	\$6,846	Not Quantified	Not Quantified	Water Bill Savings	\$12,839
Labor	\$38,914			Total	\$12,839
Total	\$45,400				

RESULTS—COST BENEFIT ANALYSIS

Costs and benefits listed below represent the entire lifespan of the program (five years).

1999 AUDITS

- ◆ The quantified cost to the utility was \$45,400, including materials (\$6,486), and labor (\$38,914). This translates to a cost of \$159 per participant: \$23 for materials, \$136 for labor.
- ◆ The quantified benefit to the utility was \$0. This is a benefit of \$14 per participant.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$12,839. This includes water bill savings, \$12,839. This is a benefit of \$45 per participant.

UTILITY PERSPECTIVE - 1999

Results of the cost benefit analysis show a net benefit (net present value) of -\$45,400 from the utility perspective. This is a net benefit of -\$159 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$3,276.**

PARTICIPANT PERSPECTIVE - 1999

Results of the cost benefit analysis show a net benefit (net present value) of \$12,839 from the participant perspective. This is a net benefit of \$45 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0 as there were no costs to the participants.**

OVERALL PERSPECTIVE - 1999

Results of cost benefit analysis show a net benefit (net present value) of -\$32,560 from an overall perspective. This is a net benefit of -\$114 per participant. The quantified costs to the participants and utility were greater than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from an overall perspective was \$3,276.**

2000 AUDITS

- ◆ The quantified cost to the utility was \$59,952. This includes the cost of materials, \$8,136, and the cost of labor, \$48,816. This is a cost of \$152 per participant, including \$22 for materials and \$130 for labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$59,284. This includes water bill savings, \$59,284. This is a benefit of \$158 per participant.

2000 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Materials	\$8,136	Not Quantified	Not Quantified	Water Bill Savings	\$59,284
Labor	\$48,816			Total	\$59,284
Total	\$56,952				

UTILITY PERSPECTIVE - 2000

Results of the cost benefit analysis show a net benefit (net present value) of -\$59,952 from the utility perspective. This is a net benefit of -\$151 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$873.**

PARTICIPANT PERSPECTIVE - 2000

Results of the cost benefit analysis show a net benefit (net present value) of \$59,284 from the participant perspective. This is a net benefit of \$158 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0 as there were no costs to the participants.**

OVERALL PERSPECTIVE - 2000

Results of cost benefit analysis show a net benefit (net present value) of \$2,332 from an overall perspective. This is a net benefit of \$6 per participant. The quantified costs to the participants and utility were less than the quantified benefits to the participants and utility. **The cost per**

2001 AUDITS

- ◆ The quantified cost to the utility was \$54,777. This includes the cost of materials, \$7,825, and the cost of labor, \$46,952. This is a cost of \$145 per participant, including \$21 for materials and \$124 for labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$105,744. This includes water bill savings, \$105,744. This is a benefit of \$279 per participant.

UTILITY PERSPECTIVE - 2001

Results of the cost benefit analysis show a net benefit (net present value) of -\$54,777 from the utility perspective. This is a net benefit of \$145 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$454.**

PARTICIPANT PERSPECTIVE - 2001

Results of the cost benefit analysis show a net benefit (net present value) of \$105,744 from the participant perspective. This is a net benefit of \$279 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0 as there were no costs to the participants.**

OVERALL PERSPECTIVE - 2001

Results of cost benefit analysis show a net benefit (net present value) of \$50,966 from an overall perspective. This is a net benefit of \$134 per participant. The quantified costs to the participants and utility were less than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from an overall perspective was \$454.**

2001 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Materials	\$7,825	Not Quantified	Not Quantified	Water Bill Savings	\$105,744
Labor	\$46,952			Total	\$105,744
Total	\$54,777				

ALL YEARS - COMBINED ANALYSIS

- The quantified cost to the utility was \$157,129. This includes the cost of materials, \$22,447, and the cost of labor, \$134,682. This is a cost of \$151 per participant, including \$22 for materials and \$129 for labor.
- The quantified benefit to the utility was \$0.
- The quantified cost to the participants was \$0.
- The quantified benefit to the participants was \$177,805. This includes water bill savings, \$177,805. This is a benefit of \$171 per participant.

ALL YEARS Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Materials	\$22,447	Not Quantified	Not Quantified	Water Bill Savings	\$177,805
Labor	\$134,682			Total	\$177,805
Total	\$157,129				

UTILITY PERSPECTIVE - ALL YEARS

Results of the cost benefit analysis show a net benefit (net present value) of -\$157,129 from the utility perspective. This is a net benefit of -\$151 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$787.**

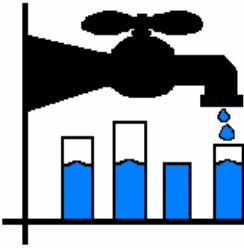
PARTICIPANT PERSPECTIVE - ALL YEARS

Results of the cost benefit analysis show a net benefit (net present value) of \$177,805 from the participant perspective. This is a net benefit of \$171 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0 as there were no costs to the participants.**

UNQUANTIFIED COSTS AND BENEFITS
<p>Costs</p> <ul style="list-style-type: none"> • Customers' time spent during the audit. <p>Benefits</p> <ul style="list-style-type: none"> • Financial savings on sewer bill for participants. • Avoided cost of acquisition and distribution of water saved. • Environmental benefits of reduced water use. • Increased public awareness of the need to conserve water. • Increased customer satisfaction with the utility. • Reinforcing the need to conserve. • Water saved for future utility use. • Customers received new fixtures.

OVERALL PERSPECTIVE - ALL YEARS

Results of the cost benefit analysis show a net benefit (net present value) of \$20,675 from the overall perspective. This is a net benefit of \$20 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the overall perspective was \$787.**



Contra Costa Water District

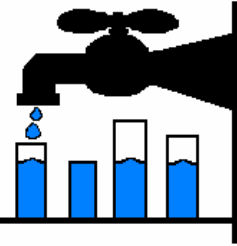
Residential Audit Program

Results of Cost Benefit Analysis-Lifespan (5 Years)		1999	
	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	45,400	NA	45,400
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$45,400	\$0	\$45,400
<u>Present Value Benefits</u>			
Total Water Savings	13.86 AF	13.86 AF	13.86 AF
Total Benefits to Utility	0	NA	0
Total Benefits to Participants	NA	12,839	12,839
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$12,839	\$12,839
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$45,400	\$12,839	-\$32,560
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$3,276 /AF		\$3,276 /AF

Results of Cost Benefit Analysis-Lifespan (5 Years)		2000	
	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	56,952	NA	56,952
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$56,952	\$0	\$56,952
<u>Present Value Benefits</u>			
Total Water Savings	65.23 AF	65.23 AF	65.23 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	59,284	59,284
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$59,284	\$59,284
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$38,482	\$59,284	\$2,332
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$873 /AF		\$873 /AF

Contra Costa Water District

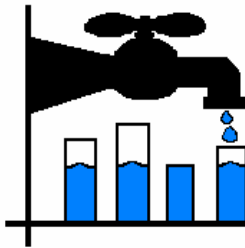
Residential Audit Program



2001		Results of Cost Benefit Analysis-Lifespan (5 Years)		
	UTILITY	PARTICIPANT	OVERALL	
<u>Present Value Costs</u>				
Costs to Utility	54,777	NA	54,777	
Costs to Participants	NA	0	0	
Costs to Others	NA	NA	0	
Total Costs	\$54,777	\$0	\$54,777	
<u>Present Value Benefits</u>				
Total Water Savings	120.55 AF	120.55 AF	120.55 AF	
Benefits to Utility	0	NA	0	
Benefits to Participants	NA	105,744	105,744	
Benefits to Others	NA	NA	0	
Total Benefits	\$0	\$105,743	\$105,744	
<u>Cost-Benefit Calculations</u>				
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$54,777	\$105,743	\$50,966	
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$454 /AF		\$454 /AF	

ALL YEARS		Results of Cost Benefit Analysis-Lifespan (5 Years)		
	UTILITY	PARTICIPANT	OVERALL	
<u>Present Value Costs</u>				
Costs to Utility	157,129	NA	157,129	
Costs to Customers	NA	0	0	
Costs to Others	NA	NA	0	
Total Costs	\$157,129	\$0	\$157,129	
<u>Present Value Benefits</u>				
Total Water Savings	199.64 AF	199.64 AF	199.64 AF	
Benefits to Utility	0	NA	0	
Benefits to Customers	NA	177,805	177,805	
Benefits to Others	NA	NA	0	
Total Benefits	\$0	\$177,805	\$177,805	
<u>Cost Benefit Calculations</u>				
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$102,134	\$177,805	\$20,675	
Cost Effectiveness Analysis (CEA)	\$787 /AF		\$787 /AF	

A-1



Oro Valley Water Utility

Audit Program

Oro Valley Water Utility (OVWU) serves the Town of Oro Valley, which is located in northern Pima County, six miles north of the Tucson city limits. Median household income in Oro Valley was \$67,562¹ as of the 2000 census, which was higher than the statewide average of \$40,558.

UTILITY DEMOGRAPHICS

OVWU provides service to an area of 31.5 square miles encompassing a population of approximately 32,000. As of November 2003, OVWU served 14,247 single family residential connections, 1,096 multifamily residential connections, 205 commercial, 292 industrial, 334 irrigation, and 55 other types of connections. As of 2004, the utility's total water use in gallons per capita per day (gpcd) was 200, and their residential use was 119 gpcd.

AUDIT PROGRAM	
Indoor / Outdoor Eligible Customers:	Both SF
Customers Analyzed:	SF
Program Years:	March 2003 – present
Years Analyzed:	Jan – Dec 2003

UTILITY RATE STRUCTURE AND PRICES

OVWU employs a tiered rate structure. Effective November 2003, the base rate for 5/8" meters, most of the utility's connections, is \$12.30 and does not include any water. Single family residential usage charges are as follows:

Usage	Price
≤10,000 gallons per month	\$1.92 per 1,000 gallons
10,001-25,000 gallons per month	\$2.55 per 1,000 gallons
>25,000 gallons per month	\$3.25 per 1,000 gallons

CURRENT CAPACITY AND WATER SOURCES

The storage capacity was not reported, however, OVWU has a 100 year assured water supply as required by law.

FUTURE PLANS TO MEET DEMAND

The population within OVWU's service area grew 7.2% per year, on average, between 2000 and 2004.² The utility plans to meet future demand with current capacity and sources, as well as by implementing water conservation measures and using reclaimed water. A new groundwater preservation fee is also in place. Starting August 2005, OVWU started using reclaimed water for some turf and golf courses, with plans to move all golf courses to reclaimed water use.

AUDIT PROGRAM - DESCRIPTION

OVWU's audit program is offered free to all of its customers. They provide indoor and outdoor water audits. OVWU advertises the program in newsletters, billings and on their website. Participation is upon

¹ U.S. Census Bureau, CenStats Databases.

² Population Change – 2000 Census to July 1, 2004 Estimate for Arizona, Counties, and Incorporated Places. Arizona Department of Economic Security.

request of the customer, however staff are also trained to assist customers and recommend an audit where necessary. A checklist of questions is used to narrow down the focus of the audit.

METHODOLOGY

Please see the General Methodology for the specific procedures and techniques used for all ECoBA analyses.

The analysis includes single family households that received audits between July and December 2003, and 14 who received audits in May and June 2003. The water savings were calculated and a cost benefit analysis was performed for July through December 2003. Our findings refer to this time period only, not to the ongoing program. The lifespan of the audits, which is used as the period of analysis, was assumed to be five years.

All quantified costs and benefits have been discounted to the first year of the analysis (2003) and inflated to 2004 dollars. The discount rate used in this analysis was 3.6%. The CPI values that were used in this analysis were the 2004 value of 188.9 and the 2003 value of 184.0.

OTHER ORO VALLEY WATER UTILITY CONSERVATION PROGRAMS

Conservation Ordinances, March 2003-present
The OVWU and its commission have also developed a Water Conservation and Use Restriction Ordinance.

Device Giveaway, 2000-present
Residential customers can request free showerheads and aerators.

Since two complete years of pre- and post-measure water use could not be acquired for this analysis, water use data for the participants was acquired from 18 months before the

program and 18 months after the program for all households that were residing there for that full period. The pre-measure period includes January 2002 to June 2003, and the post-measure period includes January 2004 to June 2005.

The population studied for this analysis was comprised of all participants who received audits between May and December 2003. There were 56 usable participants out of a total 81 during the period under analysis. Of the 81 participants, 25 had moved or had incomplete consumption data for the period of analysis.

All OVWU single family residential households that were not participants in this analysis were used as the control group. The number of households in the control group varied, but ranged from 14,369 to 16,099. The average annual pre-measure water use of the participants (176,488 gallons) was higher than that of the control group (121,472 gallons).

ASSUMPTIONS

Please see the General Assumptions for the specific conditions and rules underlying all ECoBA analyses.

The discount rate used in this analysis was 3.6%.

The CPI values that were used in this analysis were the 2004 value of 188.9 and the 2003 value of 184.0.

The price of water used in determining the benefits to customers from the first tier of utility's price of water (\$1.92 per 1,000 gallons in 2004 and \$1.98 per 1,000 gallons in 2005 and beyond).

Participants who had two or more consecutive months of no water use were not included in the study.

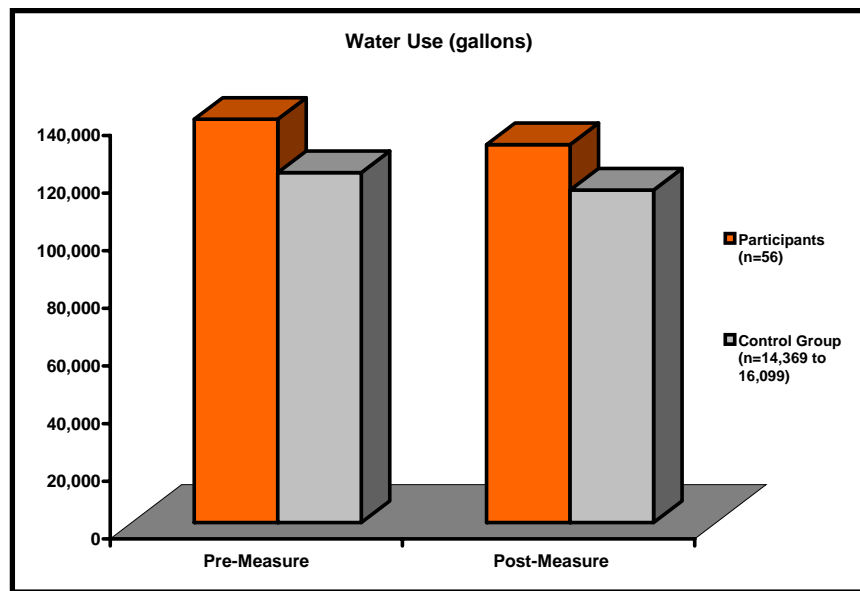
The cost was assumed to be \$55 per audit.

RESULTS - WATER SAVINGS

In the 18 months after receiving the audits, the water savings amounted to 3,065,176 gallons, or 54,735 gallons per participant (20.7% of pre-measure water use). The average savings per year was 2,043,451 gallons, or 36,490 gallons per participant per year (gppy) (20.7% of pre-measure water use). **The total savings over the five year assumed lifespan was 10,217,254 gallons (31.4 AF), or 182,451 gallons per participant.**

During the 18 months before participating in the device giveaway program, the participant group's water use was, on average, 145.3% of the control group's use. During the 18

months after, the participant group's water use was 113.7% of the control group's use, on average. The participant group's water use decreased by 25.7%, whereas the control group's use decreased by 5.0%. **The resulting overall water savings attributed to this program was 20.7%.**



RESULTS - COST BENEFIT ANALYSIS

Costs and benefits listed below represent the entire lifespan of the program (five years).

- ◆ The quantified cost to the utility was \$3,162, which includes the cost of labor (\$56 per participant).
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$18,580 (\$332 per participant). This benefit reflects participant water bills savings.

Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Labor	\$3,162	Not Quantified	Not Quantified	Water bill savings	\$18,580
Total	\$3162			Total	\$18,580

UTILITY PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) of -\$3,162 from the utility perspective over the five year assumed lifespan of the audits. This is a net benefit of -\$56 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$101.**

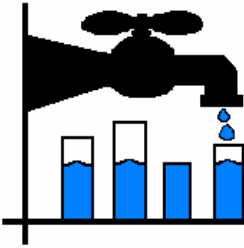
PARTICIPANT PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) of \$18,580 from the perspective of the participant. This is a net benefit of \$332 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0.**

OVERALL PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) of \$15,418 from an overall perspective. This is a net benefit of \$275 per participant. The quantified costs to the participants and utility were less than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from the overall perspective was \$101.**

UNQUANTIFIED COSTS AND BENEFITS
<p>Costs</p> <ul style="list-style-type: none"> • Customers’ time spent during the audit. <p>Benefits</p> <ul style="list-style-type: none"> • Financial savings on sewer bills for participants. • Avoided cost of acquisition and distribution of water saved. • Reduced energy bills for participants. • Environmental benefits of reduced use of water. • Increased public awareness about water conservation. • Reinforces need to conserve water and desirability of conserving. • Improved public relations for the utility.

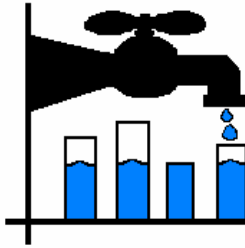


Oro Valley Water Utility

Audit Program

Results of Cost Benefit Analysis-Lifespan (5 Years)

	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	3,162	NA	3,162
Costs to Participants	NA	0	0
Costs to Others (Water CASA)	NA	NA	0
Total Costs	\$3,162	\$0	\$3,162
<u>Present Value Benefits</u>			
Total Water Savings	31.36 AF	31.36 AF	31.36 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	18,580	18,580
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$18,580	\$18,580
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$3,162	18,580\$	\$15,418
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$101 /AF	\$0 /AF	\$101 /AF



City of Peoria Utilities Dept.

Residential Audit Program

The City of Peoria Utilities Department (CPUD) serves the City of Peoria, northwest of Phoenix in Maricopa County, Arizona. As of the 2000 Census, median household income in the City of Peoria was \$52,199, which is higher than the statewide median of \$40,558.¹

UTILITY DEMOGRAPHICS

As of 2004, the City of Peoria Utilities Department had approximately 37,700 connections. Of these connections, 35,522 were single family residential, 590 were multifamily residential, 1,285 were commercial, 320 were irrigation, and 41 were flood irrigation connections.

The City's total service area is 165 square miles. The population of this service area is approximately 125,600. As of 2004, the City of Peoria's gross water use was 7.4 billion gallons with a total utility water use of 188 gallons per capita per day (gpcd).²

SINGLE FAMILY AUDIT PROGRAM	
Type of Program:	Audit
Indoor or Outdoor:	Both
Eligible Customers:	SF
Customers Analyzed:	SF
Program Years:	2002- present
Years Analyzed:	2002

UTILITY RATE STRUCTURE AND PRICES

The City of Peoria uses a base rate that depends on the service line size. As of January 2004, the monthly base rate for residential customers with 5/8"-3/4" meters is \$14.05, which includes 1,000 gallons of water. The volume charges are as follows:

Usage	Price
2,000 - 5,000 gallons	\$1.48 per 1,000 gallons
6,000 - 10,000 gallons	\$2.67 per 1,000 gallons
11,000 - 25,000 gallons	\$3.21 per 1,000 gallons
26,000 + gallons	\$3.82 per 1,000 gallons

CURRENT CAPACITY AND WATER SOURCES

As of 2004, the City of Peoria's water sources were comprised of Central Arizona Project (CAP) water, which originates from the Colorado River, local groundwater and Salt River Project (SRP) water, which comes from the Salt and Verde Rivers. Peoria has joined with the City of Glendale in their Pyramid Peak Water Treatment Plant, which treats Colorado River Water. Peoria operates its own Greenway Water Treatment Plant, which treats Salt and Verde River water.³ The City's maximum production is 69 MGD. Peoria also recharges effluent produced at its Beardsley Road Water Reclamation Facility as well as CAP water at the Agua Fria and Hieroglyphics Recharge Projects. In addition, effluent produced at the Jomax Water Reclamation Facility is directly reused in decorative lakes and for landscape irrigation.

¹ U.S. Census Bureau: American Fact Finder.

² City of Peoria Utilities Department: Water Report 2005

³ City of Peoria Utilities Department: Water Division Quick Facts

FUTURE PLANS TO MEET DEMAND

In the future, the City will fully utilize its SRP and CAP supplies and may utilize the Central Arizona Groundwater Replenishment District (CAGRDR) as a replenishment agent if needed. Peoria's other plans to meet future demands include expanding its use of recovered recharge and direct water reuse, doubling the capacity of its Greenway Water Treatment Plant from 16 MGD to 32 MGD, building an additional CAP water treatment plant, continuing their water conservation efforts, and purchasing additional water supplies.

OTHER PEORIA CONSERVATION PROGRAMS

Xeriscape/Landscape Conversion Rebates, July 2003-present

Conservation Rates, 1990-present

Leak Detection Service for Customers, 1997-present

Public Education, 1997-present

Conservation Ordinances, 1998-present

AUDIT PROGRAM - DESCRIPTION

Since 2002, the City of Peoria has offered an indoor/outdoor audit service to their customers. Upon request, a City employee will investigate leaks, meter accuracy, irrigation system function, and other water use as appropriate. The employee will make recommendations on reducing water use and provide conservation literature. The extent of the audit varies depending on the needs of the customer. The audits in this analysis are regular audits as described above.

In addition, assisted self-audits or partial regular audits are available for both indoor and outdoor water use. The city provides a Complete Guide to Home Water Management to customers who would like to perform a self-audit.

METHODOLOGY

Please see the General Methodology for the specific procedures and techniques used for all ECoBA analyses.

The analysis includes only single family households that participated in the audit program during 2002. The findings refer to this year only, not to the ongoing program. The lifespan of the audits, which is used as the period of this analysis, was assumed to be five years.

All quantified costs and benefits have been discounted to the first year of the analysis (2002) and inflated to 2004 dollars. The discount rate used in this analysis was 4.5%. The CPI values that were used in this analysis were the 2004 value of 188.9 and the 2002 value of 179.9.

The population studied for this analysis was comprised of participants who received an audit during 2002. There were 83 usable participants out of a total of 208. Sixty percent, or 125, of the participants were unusable during this year because there was not complete water consumption data for all years of the analysis.

All City of Peoria single family residential customers that were not participants in this analysis were used as the control group. Participant pre-measure water consumption was 165,416 gallons while control pre-measure water consumption was 130,049 gallons. For the audit program, the control group consisted of 32,038 households in 2000, 33,377 in 2001, 34,144 in 2002, 35,298 in 2003, and 37,832 in 2004.

ASSUMPTIONS

Please see the General Assumptions for the specific conditions and rules underlying all ECoBA analyses.

The number of single family connections used in the analysis (to form the control group) is from December of the year in question.

Assumed \$20/hour in labor at 2.5 hours per audit.

Participant pre-measure water use was 13,274 gallons. Therefore, they fall into the category of 11,000 – 25,000 gallons, with a price per 1,000 gallons of \$3.38 in 2003 and \$3.21 in 2004 and beyond.

Participants who had two or more consecutive months of no water use were not included in the study.

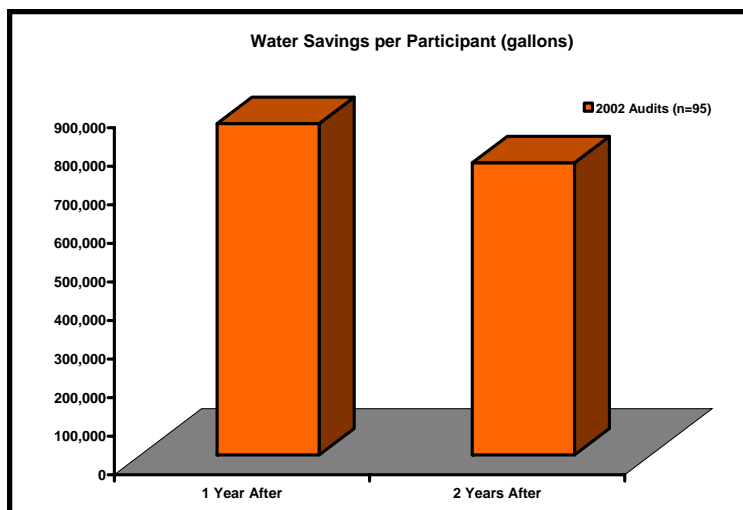
The discount rate used in this analysis was 4.5%.

The CPI values that were used in this analysis were the 2004 value of 188.9 and the 2002 value of 179.9.

RESULTS - WATER SAVINGS

In the first year after the 2002 audit program, water savings amounted to 859,461 gallons, or 10,355 gallons per participant per year (gppy) (6.3% of pre-measure water use). The second year after the audit program, water savings amounted to 757,740 gallons or 9,129 gppy (5.5% of pre-measure water use). The average savings per year was 808,600 gallons (2.5 AF), or 9,742 gppy (5.9% of pre-measure water use). **The total savings over the five year assumed lifespan was 4,043,002 gallons (12.4 AF), or 48,711 gallons per participant.**

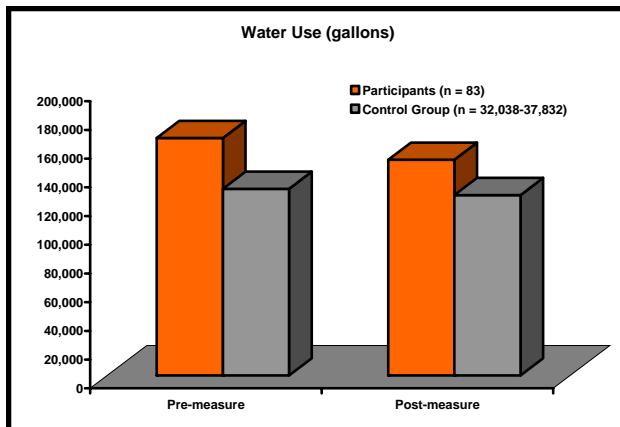
During the two years before participating in the audit program, participants' water use was 127% of the control group's use, on average. During the two years after participating in the program, their water use was 120% of the control group's use, on average. The participants' water use decreased by 9.1% from pre-measure to post-measure, whereas the control group's use decreased by 3.4%. **The resulting overall water savings attributed to this program was 5.7%.**



RESULTS - COST BENEFIT ANALYSIS

Costs and benefits listed below represent the entire lifespan of the program (five years).

- ◆ The quantified cost to the utility was \$4,532. This includes the cost of labor, \$4,358, and materials, \$174. This is a cost of about \$55 per participant, with a cost of \$53 per participant for labor and \$2 for materials.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants due to water bill savings was \$12,119. This is a benefit of \$146 per participant.



UTILITY PERSPECTIVE

Results of the cost-benefit analysis show a net benefit (net present value) of -\$4,532 from the utility perspective. This is a net benefit of -\$55 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$365.**

PARTICIPANT PERSPECTIVE

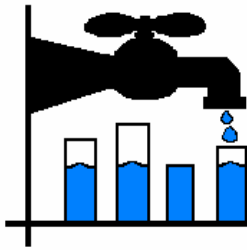
Results of the cost-benefit analysis show a net benefit (net present value) of \$12,119 from the participant perspective.

This is a net benefit of \$146 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0.**

OVERALL PERSPECTIVE

Results of cost-benefit analysis show a net benefit (net present value) of \$7,587 from an overall perspective. This is a net benefit of \$91 per participant. The quantified costs to the participants and utility were less than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from an overall perspective was \$365.**

Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Labor	\$4,358	Not Quantified	Not Quantified	Water Bill Savings	\$12,119
Materials	\$174				Total
Total	\$4,532				



City of Peoria Utilities Dept.

Residential Audit Program

Results of Cost Benefit Analysis-Lifespan (5 Years)

	UTILITY	PARTICIPANT	OVERALL
<i><u>Present Value Costs</u></i>			
Costs to Utility	4,532	NA	4,532
Costs to Customers	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$4,532	\$0	\$4,532
<i><u>Present Value Benefits</u></i>			
Total Water Savings	12.41 AF	12.41 AF	12.41 AF
Benefits to Utility	0	NA	0
Benefits to Customers	NA	12,119	12,119
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$12,119	\$12,119
<i><u>Cost Benefit Calculations</u></i>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$4,532	\$12,119	\$7,587
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$365 /AF		\$365 /AF

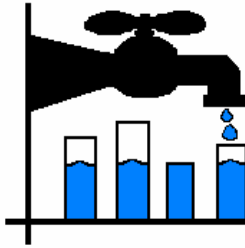
UNQUANTIFIED COSTS AND BENEFITS

Costs

- The customers' time spent with the auditor.

Benefits

- Financial savings on sewer bills for participants.
- Avoided cost of acquisition and distribution of water saved.
- Environmental benefits of reduced use of water.
- Increased public awareness about water conservation.
- Water saved for future municipal use.
- Improved public relations for the utility.
- Utility avoids the cost of developing new water sources.
- Utility avoids the costs of constructing new storage facilities.



Tucson Water Dept. Audit Program

The City of Tucson Water Department serves parts of the community of Tucson and some adjacent areas in Pima County, located in southern Arizona. Median household income in Tucson was \$30,981 as of the 2000 Census.¹

UTILITY DEMOGRAPHICS

As of 2003, the City of Tucson Water Department maintained an average of 205,000 connections. The total service area of the City of Tucson Water Department is 190 square miles. The population of this service area is 690,000. As of 2004, average customer water use in gallons per capita per day (gpcd) was 160.

The City of Tucson Water Department has 181,000 single family residential, 9,700 multifamily residential, 14,000 commercial, and 500 construction connections.

AUDIT PROGRAM	
Indoor or Outdoor:	Both
Eligible Customers:	SF, MF, ICI
Customers Analyzed:	SF
Program Years:	1996-present
Years Analyzed:	1999, 2000, 2001

UTILITY RATE STRUCTURE AND PRICES

The City of Tucson Water Department uses a tiered rate structure. The monthly base rate for service is \$5.35 for single family customers, which includes zero gallons of water. Single family residential usage charges are as follows:

Usage	Price
<16 ccf (<11,967 gal)	\$1.03 per ccf (\$1.38/1,000 gal)
16 - 30.99 ccf (11,968 - 23,187 gal)	\$3.60 per ccf (\$4.81/1,000 gal)
31 - 46 ccf (23,188 - 34,407 gal)	\$5.05 per ccf (\$6.75/1,000 gal)
>46 ccf (>34,408 gal)	\$7.13 per ccf (\$9.53/1,000 gal)

CURRENT CAPACITY AND WATER SOURCES

The City of Tucson Water Department has a storage capacity of 279 million gallons. They currently use groundwater and Central Arizona Project (CAP) water as their water sources, along with reclaimed water for non-potable uses.

FUTURE PLANS TO MEET DEMAND

In the future, the City of Tucson Water Department plans to more fully use CAP water, become more aggressive with conservation programs, expand effluent reclamation facilities, add, expand, or more fully utilize existing facilities, and possibly acquire more water resources through purchase.

AUDIT PROGRAM DESCRIPTION

The Zanjero Program is an audit program first initiated in 1996 and is continuing. During the audit, a City staff person reviews customers' indoor and outdoor water use. The staff person checks interior plumbing fixtures for leaks, and installs low flow showerheads and aerators for the customer. The staff person checks for irrigation leaks, reviews the setting of irrigation timers, and gives the customer tips on

¹ U.S. Census Bureau, American Fact Finder.

plant irrigation. The customer is present at the time of the audit. The audit takes about one to one and one half hours, and is available to all residential and commercial customers. The audit process may vary slightly from customer to customer depending on the specific needs and questions of the customer.

OTHER CITY OF TUCSON CONSERVATION PROGRAMS
Conservation Rates: increasing block rate, 1988-present
Conservation Ordinances, 1984-present, 1991-present

The initial design of the program included marketing the program to high volume users by direct mailings. There was a low

response with this method, so the program was opened to all customers in 1997. Appointments are now made through customer requests and referrals from Customer Service for customers calling in with high water bills.

METHODOLOGY

Please see the General Methodology for the specific procedures and techniques used for all ECoBA analyses.

The analysis includes only single family households that participated in the program during the years 1999 through 2001. The water savings were calculated and a cost benefit analysis was performed for the years 1999, 2000, and 2001. Our findings refer to these three years only, not to the ongoing program. The lifespan of the audits was assumed to be five years.

All quantified costs and benefits have been discounted to the first year of the analysis (1999) and inflated to 2004 dollars. The discount rate used in this analysis was 4.8%. The CPI values that were used in this analysis were the 2004 value of 188.9 and the 1999 value of 166.6.

There were 488 usable participants out of 1,722 total in 1999, 294 out of 1,276 in 2000, and 243 out of 1,076 in 2001, for a total of 1,025 usable participants out of 4,074. Approximately 75 percent of the participants over these three years were unusable because insufficient data was available to perform the analysis.

All City of Tucson Water Department single family residential households were used as the control group in this analysis. The average annual pre-measure water use of the participants (171,887 gallons) was higher than that of the control group (112,465 gallons).

The exact number of households in the control group is unknown, as the utility provided average yearly single family residential water use for the years in question. As a result, the participant data could not be removed from the control group. Despite being unable to remove participants from the control sample, a significant difference in the average water use would be unlikely because the control group is so large (approximately 181,000 households).

ASSUMPTIONS

Please see the General Assumptions for the specific conditions and rules underlying all ECoBA analyses.

The total cost for the program over the three year period of 1999 through 2001 was divided by three for a total cost for each of the three years.

The weighted average could not be used in determining control group pre- and post-measure average water use as the number of participants with which to weight these were not known. The average was used instead.

The utility saves \$122 in variable costs for each AF of water saved.

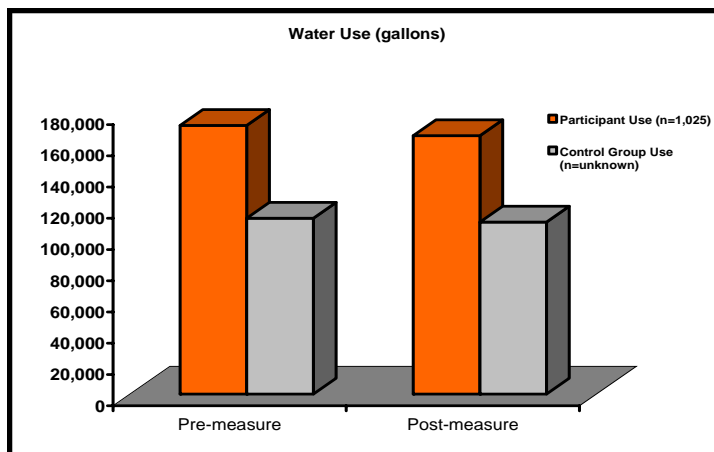
The utility saves \$200 in replenishment avoidance for each AF of water saved.

The value of the water saved was calculated by multiplying the amount of water saved by the price of water (\$4.81 per 1,000 gallons) at the average level of use of the participants (falls into the second tier: 11,968 – 23,187 gallons per month).

Participants who had two or more consecutive months of no water use were included in the study.

The discount rate used in this analysis was 4.8%.

The CPI values that were used in this analysis were the 2004 value of 188.9 and the 1999 value of 166.6.



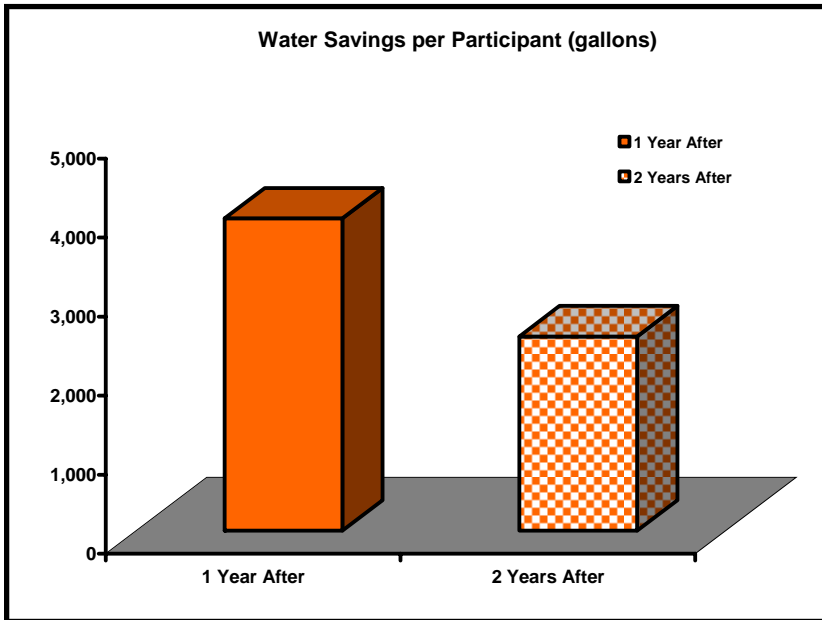
RESULTS - WATER SAVINGS

The first year after the 1999 Zanjero Program, the water savings amounted to 3,810,175 gallons, or 7,808 gppy (5.1% of pre-measure water use). The second year after, the water savings amounted to 869,591 gallons, or 1,782 gppy (1.2% of pre-measure water use). The average savings per year was 2,339,883 gallons, or 4,795 gppy (3.1% of pre-measure water use). **The total savings over the five year assumed lifespan was 11,699,415 gallons (35.9 AF), or 23,974 gallons per participant.**

The first year after the 2000 Zanjero Program, the water savings amounted to 1,251,063 gallons, or 4,255 gppy (2.5% of pre-measure water use). The second year after, the water savings amounted to 563,200 gallons, or 1,916 gppy (1.1% of pre-measure water use). The average savings per year was 907,131 gallons, or 3,085 gppy (1.8% of pre-measure water use). **The total savings over the five year assumed lifespan was 4,535,657 gallons (13.9 AF), or 15,427 gallons per participant.**

The first year after the 2001 Zanjero Program, no water savings

occurred. There was an increase in participant water use, relative to control group water use, of 1,008,906 gallons, or 4,152 gppy (2.4% of pre-measure water use). The second year after, the water savings amounted to 1,089,130 gallons, or 4,482 gppy (2.6% of pre-measure water use). The average savings per year was 40,112 gallons, or 165 gppy (0.1% of pre-measure water use). **The total savings over the five year assumed lifespan was 200,560 gallons (0.6 AF), or 825 gallons per participant.**



Total water savings for the three years studied was 4,052,332 gallons, or 3,953 gppy (2.3% of weighted pre-measure water use) during the first year after and 2,521,921 gallons, or 2,460 gppy (1.4% of weighted pre-measure water use) during the second year after. **The total savings over the five year assumed lifespan was 16,435,632 gallons (50.4 AF), or 16,035 gallons per participant.**

During the two years before participating in the audit program, the participant group's water use was, on average, 159.1% of the control group's use. During the two years after, the participant group's water use was 156.7% of the control group's use, on average. The participant group's water use decreased by 3.8%, whereas the control group's use decreased by 2.1%. **The resulting overall water savings attributed to this program was 1.7%.**

RESULTS - COST BENEFIT ANALYSIS

Costs and benefits listed below represent the entire lifespan of the program (five years).

1999 PROGRAM

- ◆ The quantified cost to the utility was \$46,923 (\$96 per participant). This cost includes capital expenditures and labor, \$46,923.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$55,828 (\$114 per participant). This benefit reflects participant water bill savings, \$55,828.

UTILITY PERSPECTIVE - 1999

Results of cost benefit analysis show a net benefit (net present value) of -\$46,923 from the utility perspective over the five year assumed

1999 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Capital & Labor	\$46,923	Not Quantified	Not Quantified	Water Bill Savings	\$55,828
Total	\$46,923			Total	\$55,828

lifespan. This is a net benefit of -\$96 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$1,307.**

PARTICIPANT PERSPECTIVE - 1999

Results of cost benefit analysis show a net benefit (net present value) of \$55,828 from the participant perspective over the five year assumed lifespan. This is a net benefit of \$114 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0.**

OVERALL PERSPECTIVE - 1999

Results of cost benefit analysis show a net benefit (net present value) of \$8,905 from an overall perspective over the five year assumed lifespan. This is a net benefit of \$18 per participant. The quantified costs to the participants and utility were less than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from an overall perspective was \$1,307.**

2000 PROGRAM

- ◆ The quantified cost to the utility was \$36,405 (\$124 per participant). This cost includes capital expenditures and labor, \$36,405.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$21,357 (\$73 per participant). This benefit reflects participant water bill savings, \$21,357.

UTILITY PERSPECTIVE - 2000

Results of cost benefit analysis show a net benefit (net present value) of -\$36,405 from the utility perspective over the five year assumed lifespan. This is a net benefit of -\$125 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$2,615.**

PARTICIPANT PERSPECTIVE - 2000

Results of cost benefit analysis show a net benefit (net present value) of \$21,357 from the participant perspective over the five year assumed lifespan. This is a net benefit of \$73 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0.**

OVERALL PERSPECTIVE - 2000

Results of cost benefit analysis show a net benefit (net present value) of -\$15,046 from an overall perspective over the five year assumed lifespan. This is a net benefit of -\$51 per participant. The quantified

costs to the participants and utility were greater than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from an overall perspective was \$2,615.**

2001 PROGRAM

- ◆ The quantified cost to the utility was \$34,046 (\$140 per participant). This cost includes capital expenditures and labor, \$34,046.

2000 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Capital & Labor	\$36,405	Not Quantified	Not Quantified	Water Bill Savings	\$21,357
Total	\$36,405			Total	\$21,357

- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$719 (\$3 per participant). This benefit reflects participant water bill savings, \$719.

UTILITY PERSPECTIVE - 2001

Results of cost benefit analysis show a net benefit (net present value) of -\$34,046 from the utility perspective over the five year assumed lifespan. This is a net benefit of -\$140 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility.

2001 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Capital & Labor	\$34,046	Not Quantified	Not Quantified	Water Bill Savings	\$719
Total	\$34,046			Total	\$719

The cost per acre-foot of water saved from the utility perspective was \$55,315.

PARTICIPANT PERSPECTIVE - 2001

Results of cost benefit analysis show a net benefit (net present value) of \$719 from the participant perspective over the five year assumed lifespan. This is a net benefit of \$3 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0.**

OVERALL PERSPECTIVE - 2001

Results of cost benefit analysis show a net benefit (net present value) of -\$33,328 from an overall perspective over the five year assumed lifespan. This is a net benefit of -\$137 per participant. The quantified costs to the participants and utility were less than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from an overall perspective was \$55,315.**

ALL YEARS

- The quantified cost to the utility was \$117,373 (\$115 per participant). This cost includes capital expenditures and labor, \$117,373.
- The quantified benefit to the utility was \$0.
- The quantified cost to the participants was \$0.
- The quantified benefit to the participants was \$84,974 (\$83 per participant). This benefit reflects participant water bill savings, \$84,974.

ALL YEARS Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Capital & Labor	\$117,373	Not Quantified	Not Quantified	Water bill savings	\$84,974
Total	\$117,373			Total	\$84,974

UTILITY PERSPECTIVE - ALL YEARS

Results of cost benefit analysis show a net benefit (net present value) of -\$117,373 from the utility perspective over the five year assumed lifespan. This is a net benefit of -\$115 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$2,327.**

PARTICIPANT PERSPECTIVE - ALL YEARS

Results of cost benefit analysis show a net benefit (net present value) of \$84,974 from the participant perspective over the five year assumed lifespan. This is a net benefit of -\$83 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0.**

OVERALL PERSPECTIVE - ALL YEARS

Results of cost benefit analysis show a net benefit (net present value) of -\$32,398 from an overall perspective over the five year assumed lifespan. This is a net benefit of -\$32 per participant. The quantified costs to the participants and utility were less than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from an overall perspective was \$2,327.**

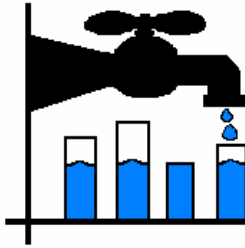
UNQUANTIFIED COSTS AND BENEFITS

Costs

- Landfill disposal of old devices.

Benefits

- Financial savings on sewer bills for participants.
- Avoided costs of acquisition and distribution of water saved.
- Environmental benefits of reduced use of water.
- Increased public awareness about water conservation.
- Improved public relations for the utility.
- Reinforces need to conserve water and desirability of conserving.
- Participants received new water saving devices..



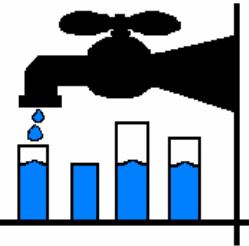
Tucson Water Dept. Audit Program

Results of Cost Benefit Analysis-Lifespan (5 Years)		1999	
	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	46,923	NA	46,923
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$46,923	\$0	\$46,923
<u>Present Value Benefits</u>			
Total Water Savings	35.90 AF	35.90 AF	35.90 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	55,828	55,828
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$55,828	\$55,828
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$46,923	\$55,828	\$8,905
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$1,307 /AF	\$0 /AF	\$1,307 /AF

Results of Cost Benefit Analysis-Lifespan (5 Years)		2000	
	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	36,403	NA	36,403
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$36,403	\$0	\$36,403
<u>Present Value Benefits</u>			
Total Water Savings	13.92 AF	13.92 AF	13.92 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	21,357	21,357
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$21,357	\$21,357
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$36,403	\$21,357	-\$15,046
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$2,615 /AF	\$0 /AF	\$2,615 /AF

Tucson Water Dept.

Audit Program



2001	Results of Cost Benefit Analysis-Lifespan (5 Years)					
	UTILITY		PARTICIPANT		OVERALL	
<u>Present Value Costs</u>						
Costs to Utility	34,046		NA		34,046	
Costs to Participants	NA		0		0	
Costs to Others	NA		NA		0	
Total Costs	\$34,046		\$0		\$34,046	
<u>Present Value Benefits</u>						
Total Water Savings	0.62	AF	0.62	AF	0.62	AF
Benefits to Utility	0		NA		0	
Benefits to Participants	NA		719		719	
Benefits to Others	NA		NA		0	
Total Benefits	\$0		\$719		\$719	
<u>Cost Benefit Calculations</u>						
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$34,046		\$719		-\$33,328	
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$55,315 /AF		\$0 /AF		\$55,315 /AF	

ALL YEARS	Results of Cost Benefit Analysis-Lifespan (5 Years)					
	UTILITY		PARTICIPANT		OVERALL	
<u>Present Value Costs</u>						
Costs to Utility	117,373		NA		117,373	
Costs to Participants	NA		0		0	
Costs to Others	NA		NA		0	
Total Costs	\$117,373		\$0		\$117,373	
<u>Present Value Benefits</u>						
Total Water Savings	50.44	AF	50.44	AF	50.44	AF
Benefits to Utility	0		NA		0	
Benefits to Participants	NA		84,974		84,974	
Benefits to Others	NA		NA		0	
Total Benefits	\$0		\$84,974		\$84,974	
<u>Cost Benefit Calculations</u>						
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$117,373		\$84,974		-\$32,398	
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$2,327 /AF		\$0 /AF		\$2,327 /AF	