

# Eastern Municipal Water Dist.

## Surcharge Program

Eastern Municipal Water District (EMWD) is located in Riverside County, California. EMWD provides water to approximately 530,000 people, in addition to deliveries to eight local water agencies and municipalities. As of the 2000 census, the median household income in Riverside County was \$42,887, which is lower than the statewide median of \$47,493.<sup>1</sup>

### UTILITY DEMOGRAPHICS

As of 2004, EMWD maintained 111,122 connections, 97% of which were residential. Of their total connections, 106,728 were single family residential, 1,129 were multifamily residential, 1,425 were commercial, 119 were industrial, 1,018 were irrigation, and 703 were dedicated landscape meters.

EMWD's service area includes Moreno Valley, Temecula, Perris, San Jacinto, Hemet and parts of Murietta. The total service area is 555 square miles. EMWD's average per capita water use was 151 gallons per capita per day (gpcd) as of 2004.

WATER BUDGET SURCHARGE	
<b>Surcharge Amount:</b>	<b>Up to \$500</b>
<b>Eligible Customers:</b>	<b>Landscape meters</b>
<b>Customers Analyzed:</b>	<b>Landscape meters</b>
<b>Program Years:</b>	<b>1992-present</b>
<b>Years Analyzed:</b>	<b>2001-2002</b>

### UTILITY RATE STRUCTURE AND PRICES

EMWD has a flat rate structure, though rates vary according to area. As of January 2005, the daily service demand charge was \$0.253 for the entire service area, which includes zero gallons of water. As of 2004, the charge per hundred cubic feet (ccf) of water varies from \$0.90 per ccf to \$1.62 per ccf (\$1.20 per 1,000 gallons to \$2.17 per 1,000 gallons). The current commercial rate is \$1.51 per ccf (\$2.01 per 1,000 gallons).

### CURRENT CAPACITY AND WATER SOURCES

EMWD's primary source of water, approximately 80%, is imported water purchased through the Metropolitan Water District of Southern California (MWDSC), which is pumped from the Colorado River and Northern California. The other 20% is drawn from local groundwater wells mostly located in the Hemet and San Jacinto areas. EMWD has a current storage capacity of 176 million gallons.

### FUTURE PLANS TO MEET DEMAND

The population within Eastern Municipal Water District's service area is growing at a rate of 11.6%. The utility intends to meet future water demands within the service area by utilizing its current capacity and sources, expanding the wastewater recycling system, as well as continuing conservation and reuse programs.

<sup>1</sup> US Census Bureau. QuickFacts.

## **SURCHARGE PROGRAM - DESCRIPTION**

The surcharges being analyzed are part of EMWD's Water Budget Program, established in January of 1992. The program is an effort to limit the irrigation water use of large landscapes. All new public and private landscapes of 3,000 square feet or more must have a dedicated landscape meter and are automatically a part of the water budget program. EMWD provides the owner with both a target water budget and an annual maximum allowable water budget (AMAWB) to be used in the scheduling of the irrigation system.

### **OTHER EMWD CONSERVATION PROGRAMS**

**Toilet Rebate Program, May 1997-present**  
**Toilet Giveaway Program, 1992-1997**  
**Washing Machine Rebate Program, February 2001-present**  
**Indoor/Outdoor Audits, 1993-present**  
**Public Education, 1992-present**  
**Irrigation System Replacement, March 1996**  
Installation of landscape moisture sensors on designated landscape meters having difficulty meeting water budgets.  
**Pressurized Water Broom Rebate Program, 2004-present**  
\$100 rebate on the purchase of a pressurized water broom.  
**X-Ray Film Processor Rebate Program, 2003-present**  
\$2000 rebate on X-ray film processor recycling system.  
**Cooling Tower Program, 2003-present**  
\$500 rebate on cooling tower conductivity controller.  
**Pre-Rinse Sprayer Rebate Program, 2003-present**  
\$50 rebate on pre-rinse sprayers for restaurants.  
**Water Conservation Ordinances, 1992-present**

The AMAWB is the upper limit of water use for the entire landscaped area per irrigation meter. The AMAWB is determined by the reference evapotranspiration (ET<sub>o</sub>), which refers to the quantity of water that is evaporated from surfaces and transpired by plants during a specific time.

If the customer uses more than their AMAWB they are issued a "non-compliance" surcharge, which ranges from \$100 to \$500 based upon the percentage of excess water use. Every

month EMWD monitors and reports to the owner their monthly target, usage, adjustments, ET<sub>o</sub> in inches, monthly ET<sub>o</sub> in billing units, the AMAWB, and any non-compliance surcharges that will be charged.

## **METHODOLOGY**

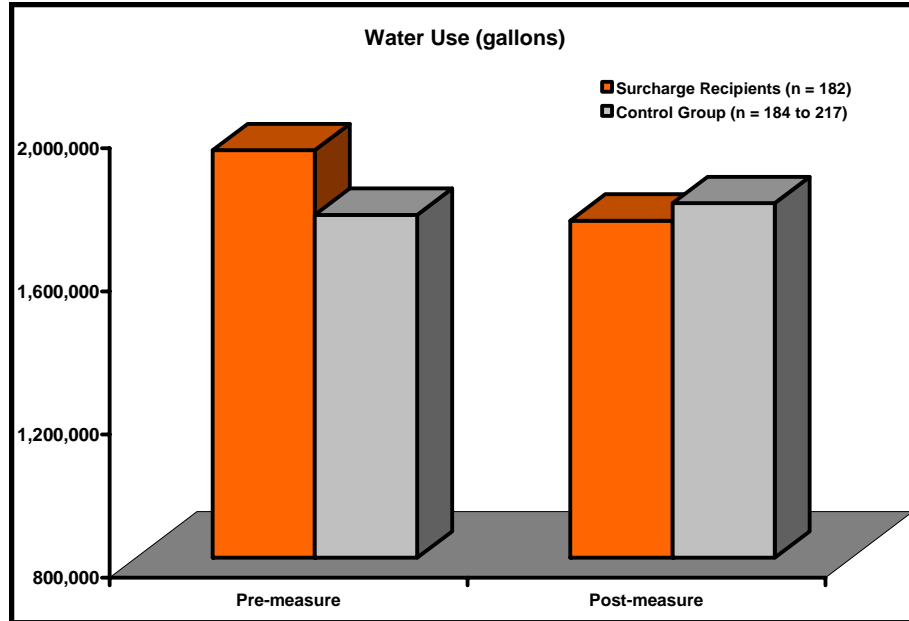
*Please see the General Methodology for the specific procedures and techniques used for all ECoBA analyses.*

The analysis includes customers that received a surcharge for exceeding their water budget at least once between January 2001 and December 2002. The water savings were calculated and a cost benefit analysis was performed for this time period. The findings refer to this two year period only, not to the ongoing program. The lifespan of the effect of the surcharges was assumed to be five years.

All quantified costs and benefits have been discounted to the first year of the analysis (2001) and inflated to 2004 dollars. The discount rate used for this analysis was 5.4%. The Consumer Price Index values

used in this analysis were the 2004 value of 188.9 and the 2001 value of 177.1.

The population studied for this analysis was comprised of participants who received surcharges from January 2001 to December 2002. There were 96 usable participants out of 98 total participants in 2001, and 86 out of 93 in 2002, for a total of 182 usable participants out of 191. Five percent, or 9, of the possible participants were unusable because there was incomplete consumption data for the period of analysis.



EMWD customers participating in the water budget program, excluding those charged with a surcharge for exceeding the water budget, were used as the control group. The control group for the 2001 surcharges consisted of 184 customers. The control group for the 2002 surcharges consisted of 217 customers. The average pre-measure water use of the participants (1,939,190 gallons) was higher than that of the control group (1,758,526 gallons).

## ASSUMPTIONS

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

The lifespan of a surcharge is 5 years; which was used as the period of analysis

Assumed EMWD spent \$300,000 per year total on water conservation labor costs, 60% of which was due to Water Budget Program, 10% of which was due to enforcement of the Water Budget program (\$18,000 per year).

Assumed the variable water rate for commercial customers was \$1.46 per ccf in 2002, \$1.46 per ccf in 2003, \$1.47 per ccf in 2004, and \$1.51 per ccf in 2005 and beyond.

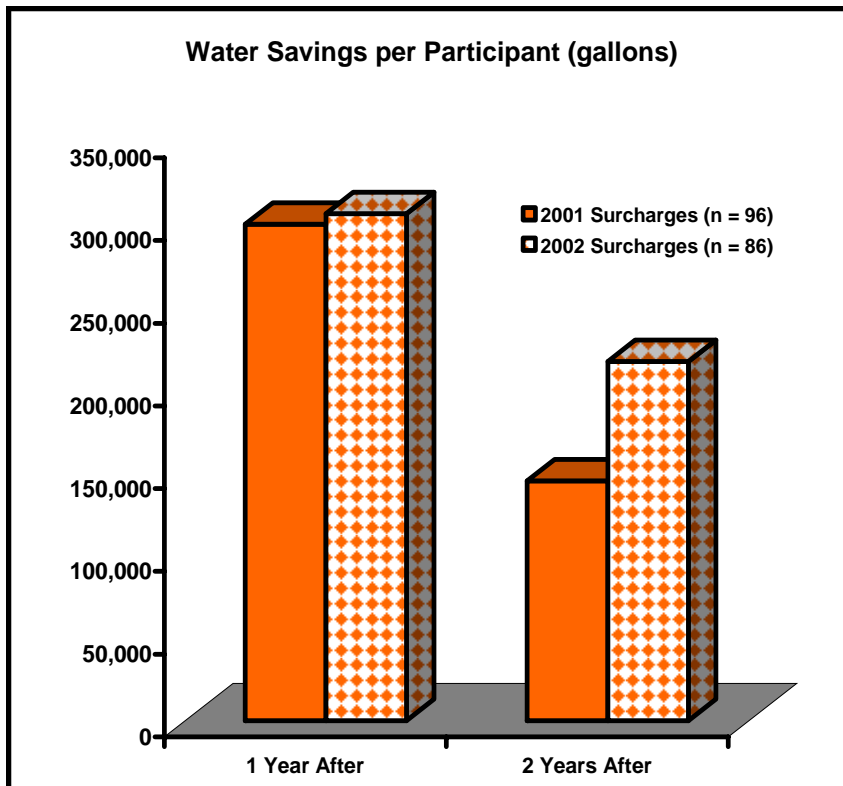
The discount rate used in this analysis was 5.4%.

The CPI values that were used in this analysis were the 2004 value of 188.9 and the 2001 value of 177.1.

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

## RESULTS - WATER SAVINGS

In the first year after the 2001 surcharges, the water savings amounted to 28,821,467 gallons, or 300,224 gallons per participant per year (gppy) (17.0% of pre-measure water use). The second year after, the water savings amounted to 13,919,048 gallons, or 144,990 gppy (8.2% of pre-measure water use). The average water savings per year was 21,370,257 gallons, or 222,607 gppy (12.6% of pre-measure water use). **The total water savings over the five year assumed lifespan of the surcharges was 106,851,285 gallons (327.9 AF), or 1,113,034 gallons per participant.**



The first year after the 2002 surcharges, there was a water savings of 26,362,743 gallons, or 306,544 gppy (14.4% of pre-measure water use). The second year after, the water savings amounted to 18,677,857 gallons, or 217,184 gppy (10.2% of pre-measure water use). The average savings per year was 22,520,300 gallons, or 261,864 gppy (12.3% of pre-measure water use). The total savings over the five year assumed lifespan was 112,601,500 gallons (345.6 AF), or 1,309,320 gallons per participant.

The total savings for the two years studied was 55,184,209 gallons, or 303,210 gppy (15.6% of pre-measure water use) during the first year after and 32,596,904 gallons, or 179,104 gppy (9.2% of pre-measure water use) during the second year after. The average savings per year was 43,890,557 gallons, or 241,157 gppy (12.4% of pre-measure water use). The total savings over the five year assumed lifespan was 219,452,785 gallons (673.5 AF), or 1,205,785 gallons per participant.

During the two years prior to being charged with the surcharges, participants' water use was 116.5% of the control group's use, on average. During the two years after, their water use was 102.4% of the control group's use, on average. The participants' water use decreased by 10.2% from pre-measure to post-measure, whereas the control group's use increased by 1.8%. **The resulting overall water savings attributed to this program was 12.0%.**

## RESULTS - COST BENEFIT ANALYSIS

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

### **2001 SURCHARGES**

- ◆ The quantified cost to the utility was \$19,199 (\$200 per participant), which includes the cost of labor.
- ◆ The quantified benefit to the utility was \$35,412 (\$369 per participant), which includes income from the surcharges.
- ◆ The quantified cost to the participants was \$35,412 (\$369 per participant), which includes the cost of the surcharges.
- ◆ The quantified benefit to the participants was \$194,678 (\$2,028 per participant), which includes the water bill savings.

2001 Quantified Costs and Benefits							
Utility				Participants			
Costs		Benefits		Costs		Benefits	
Labor	\$19,199	Surcharges	\$35,412	Surcharges	\$35,412	Water Bill Savings	\$194,678
<b>Total</b>	<b>\$19,199</b>	<b>Total</b>	<b>\$35,412</b>	<b>Total</b>	<b>\$35,412</b>	<b>Total</b>	<b>\$194,678</b>

### UTILITY PERSPECTIVE - 2001

Results of cost benefit analysis show a net benefit (net present value) of \$16,213 from the utility perspective. This is a net benefit of \$169 per participant. The quantified costs to the utility were less than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$59.**

### PARTICIPANT PERSPECTIVE- 2001

Results of cost benefit analysis show a net benefit (net present value) of \$159,266 from the participant perspective. This is a net benefit of \$1,659 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 \$108.**

### OVERALL PERSPECTIVE - 2001

Results of cost benefit analysis show a net benefit (net present value) of \$175,479 from an overall perspective. This is a net benefit of \$1,828 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 \$167.**

### **2002 SURCHARGES**

- ◆ The quantified cost to the utility was \$16,011 (\$186 per participant), which includes the cost of labor.
- ◆ The quantified benefit to the utility was \$30,157 (\$351 per participant), which includes income from the surcharges.
- ◆ The quantified cost to the participants was \$30,157 (\$351 per participant), which includes the cost of the surcharges.
- ◆ The quantified benefit to the participants was \$195,519 (\$2,273 per participant), which includes the water bill savings.

2002 Quantified Costs and Benefits							
Utility				Participants			
Costs		Benefits		Costs		Benefits	
Labor	\$16,011	Surcharges	\$30,157	Surcharges	\$30,157	Water Bill Savings	\$195,519
Total	\$16,011	Total	\$30,157	Total	\$30,157	Total	\$195,519

**UTILITY PERSPECTIVE - 2002**

Results of cost benefit analysis show a net benefit (net present value) of \$14,146 from the utility perspective. This is a net benefit of \$164 per participant. The quantified costs to the utility were less than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$46.**

**PARTICIPANT PERSPECTIVE - 2002**

Results of cost benefit analysis show a net benefit (net present value) of \$165,362 from the participant perspective. This is a net benefit of \$1,932 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 \$87.**

**OVERALL PERSPECTIVE - 2002**

Results of cost benefit analysis show a net benefit (net present value) of \$179,508 from an overall perspective. This is a net benefit of \$2,087 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 \$134.**

**ALL YEARS**

- ◆ The quantified cost to the utility was \$35,210 (\$193 per participant), which includes the cost of labor.
- ◆ The quantified benefit to the utility was \$65,569 (\$360 per participant), which includes income from the surcharges.
- ◆ The quantified cost to the participants was \$65,569 (\$360 per participant), which includes the cost of the surcharges.
- ◆ The quantified benefit to the participants was \$390,197 (\$2,144 per participant), which includes the water bill savings.

ALL YEARS Quantified Costs and Benefits							
Utility				Participants			
Costs		Benefits		Costs		Benefits	
Labor	\$35,210	Surcharges	\$65,569	Surcharges	\$65,569	Water Bill Savings	\$390,197
Total	\$35,210	Total	\$65,569	Total	\$65,569	Total	\$390,197

### **UTILITY PERSPECTIVE - ALL YEARS**

Results of cost benefit analysis show a net benefit (net present value) of \$30,359 from the utility perspective. This is a net benefit of \$353 per participant. The quantified costs to the utility were less than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$52.**

### **PARTICIPANT PERSPECTIVE - ALL YEARS**

Results of cost benefit analysis show a net benefit (net present value) of \$324,628 from the participant perspective. This is a net benefit of \$3,775 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 \$97.**

### **OVERALL PERSPECTIVE - ALL YEARS**

Results of cost benefit analysis show a net benefit (net present value) of \$354,987 from an overall perspective. This is a net benefit of \$4,128 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 \$150.**

#### **UNQUANTIFIED COSTS AND BENEFITS**

##### **Costs**

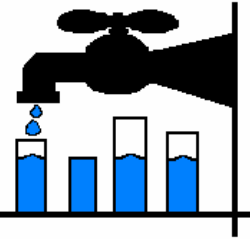
- There were no unquantified costs.

##### **Benefits**

- Financial savings on sewer bills for participants.
- Avoided cost of acquisition and distribution of water saved.
- Environmental benefits of reduced water use.
- Increased public awareness about water conservation.
- Water saved for future municipal use.
- Reduced groundwater depletion and surface water use.

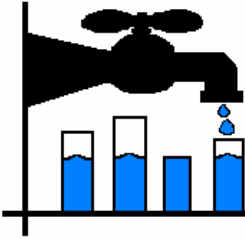
# Eastern Municipal Water Dist.

## Surcharge Program



<b>2001</b>		<b>Results of Cost Benefit Analysis-Lifespan (5 Years)</b>		
	UTILITY	PARTICIPANT	OVERALL	
<u><i>Present Value Costs</i></u>				
Costs to Utility	19,199	NA	19,199	
Costs to Participants	NA	35,412	35,412	
Costs to Others	NA	NA	0	
<b>Total Costs</b>	<b>\$19,199</b>	<b>\$35,412</b>	<b>\$54,611</b>	
<u><i>Present Value Benefits</i></u>				
<b>Total Water Savings</b>	<b>327.91 AF</b>	<b>327.91 AF</b>	<b>327.91 AF</b>	
Benefits to Utility	35,412	NA	35,412	
Benefits to Participants	NA	194,678	194,678	
Benefits to Others	NA	NA	0	
<b>Total Benefits</b>	<b>\$35,412</b>	<b>\$194,678</b>	<b>\$230,090</b>	
<u><i>Cost Benefit Calculations</i></u>				
<b>Net Present Value (NPV)</b> (Total Benefits - Total Costs)	<b>\$16,213</b>	<b>\$159,266</b>	<b>\$175,479</b>	
<b>Cost Effectiveness Analysis (CEA)</b> (Total Costs ÷ Total Water Savings)	<b>\$59 /AF</b>	<b>\$108 /AF</b>	<b>\$167 /AF</b>	

<b>2002</b>		<b>Results of Cost Benefit Analysis-Lifespan (5 Years)</b>		
	UTILITY	PARTICIPANT	OVERALL	
<u><i>Present Value Costs</i></u>				
Costs to Utility	16,011	NA	16,011	
Costs to Participants	NA	30,157	30,157	
Costs to Others	NA	NA	0	
<b>Total Costs</b>	<b>\$16,011</b>	<b>\$30,157</b>	<b>\$46,168</b>	
<u><i>Present Value Benefits</i></u>				
<b>Total Water Savings</b>	<b>345.56 AF</b>	<b>345.56 AF</b>	<b>345.56 AF</b>	
Benefits to Utility	30,157	NA	30,157	
Benefits to Participants	NA	195,519	195,519	
Benefits to Others	NA	NA	0	
<b>Total Benefits</b>	<b>\$30,157</b>	<b>\$195,519</b>	<b>\$225,676</b>	
<u><i>Cost Benefit Calculations</i></u>				
<b>Net Present Value (NPV)</b> (Total Benefits - Total Costs)	<b>\$14,146</b>	<b>\$165,362</b>	<b>\$179,508</b>	
<b>Cost Effectiveness Analysis (CEA)</b> (Total Costs ÷ Total Water Savings)	<b>\$46 /AF</b>	<b>\$87 /AF</b>	<b>\$134 /AF</b>	



# Eastern Municipal Water Dist.

## Surcharge Program

<b>ALL YEARS</b>	<b>Results of Cost Benefit Analysis-Lifespan (5 Years)</b>		
	UTILITY	PARTICIPANT	OVERALL
<i><u>Present Value Costs</u></i>			
Costs to Utility	35,210	NA	35,210
Costs to Participants	NA	65,569	65,569
Costs to Others	NA	NA	0
<b>Total Costs</b>	<b>\$35,210</b>	<b>\$65,569</b>	<b>\$100,779</b>
<i><u>Present Value Benefits</u></i>			
<b>Total Water Savings</b>	<b>673.47 AF</b>	<b>673.47 AF</b>	<b>673.47 AF</b>
Benefits to Utility	65,569	NA	65,569
Benefits to Participants	NA	390,197	390,197
Benefits to Others	NA	NA	0
<b>Total Benefits</b>	<b>\$65,569</b>	<b>\$390,197</b>	<b>\$455,766</b>
<i><u>Cost Benefit Calculations</u></i>			
<b>Net Present Value (NPV)</b> (Total Benefits - Total Costs)	<b>\$30,359</b>	<b>\$324,628</b>	<b>\$354,987</b>
<b>Cost Effectiveness Analysis (CEA)</b> (Total Costs ÷ Total Water Savings)	<b>\$52 /AF</b>	<b>\$97 /AF</b>	<b>\$150 /AF</b>

