

MARINA COAST WATER DISTRICT
2010 URBAN WATER MANAGEMENT PLAN



Prepared by

Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

June 2011

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Board of Directors

William Lee, President
Dan Burns, Vice-President
Howard Gustafson
Kenneth K. Nishi
Jan Shriner

Prepared by

Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS
3239 IMJIN ROAD, SUITE 129
MARINA, CA 93933



June 2011

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Table i. Acronyms Used in this Report

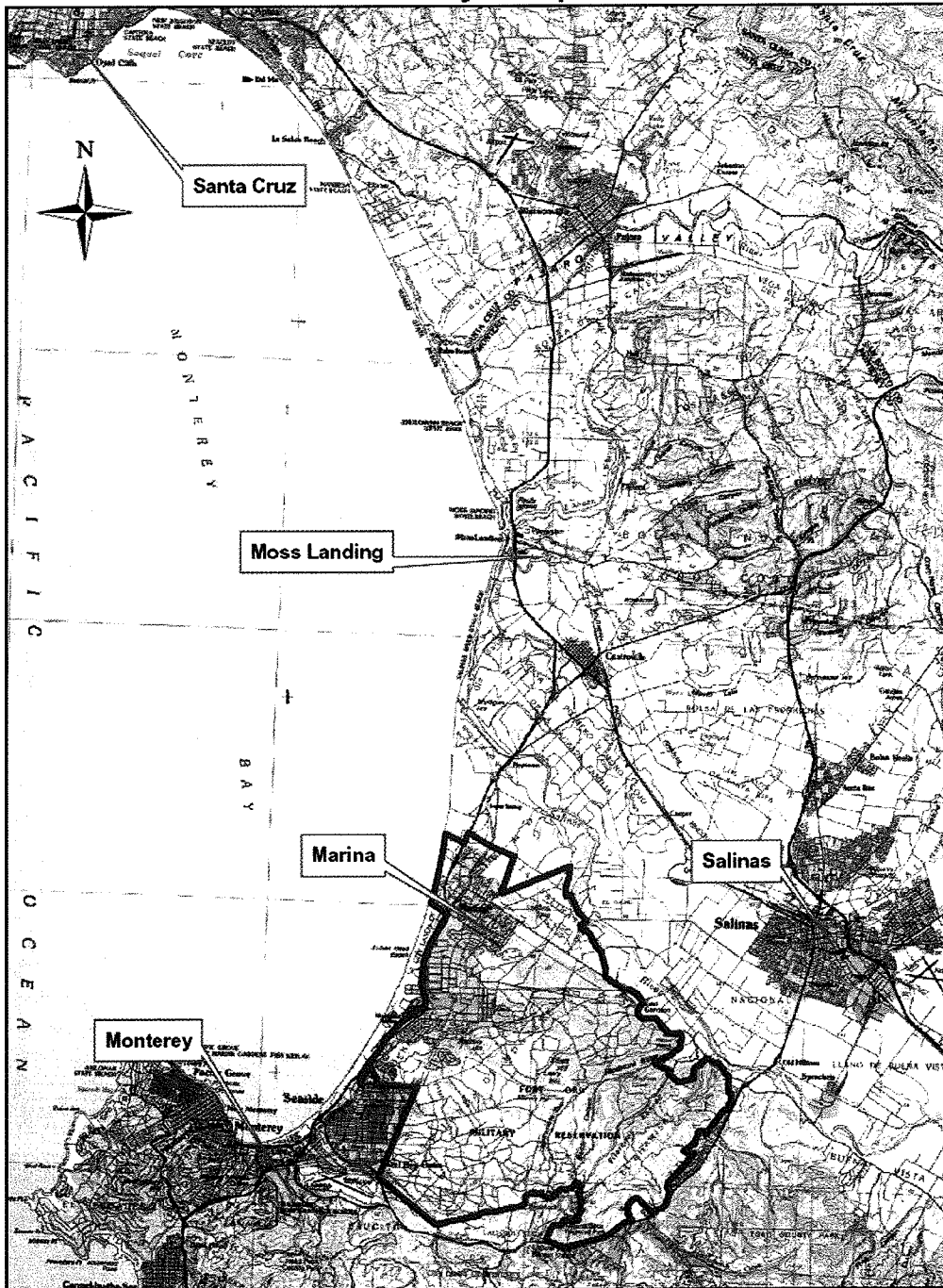
Acronym	Description
afy, ac-ft/yr	Acre-feet/year
ccf, hcf	Hundred cubic feet
gpd	Gallons per day
gpcd	Gallons per capita day, or gallons per person per day
mgd	Million gallons per day
BMP	Best management practice
CAW, CalAm	California American Water Company
CDPH	California Department of Public Health
CSUMB	California State University – Monterey Bay
DMM	Demand management measure
DWR	California Department of Water Resources
FORA	Fort Ord Reuse Authority
LAFCO	Local Agency Formation Commission
MCWD, District	Marina Coast Water District
MCWRA	Monterey County Water Resources Agency
MPWMD	Monterey Peninsula Water Management District
MRWPCA	Monterey Regional Water Pollution Control Agency
OMC	Ord Military Community
POM	Presidio of Monterey
SB	California Senate Bill
SRDP	Salinas River Diversion Project
SVWP	Salinas Valley Water Project
SVGB	Salinas Valley Groundwater Basin
UCMBEST	University of California Monterey Bay Education, Science and Technology Center
UWMP	Urban Water Management Plan

Table ii. Units of Measure Used in this Report

Unit	Equals
1 acre-foot	= 43,560 cubic feet = 325,851 gallons
1 cubic foot	= 7.48 gallons
1 CCF	= 100 cubic feet = 748 gallons
1 MGD	= 1,000,000 gallons/day = 1,120 acre-feet / year

Figure 2.1 MCWD Vicinity Map

Marina Coast Water District Vicinity Map



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Legend

— MCWD SERVICE AREA

Figure 2.2 MCWD Service Areas

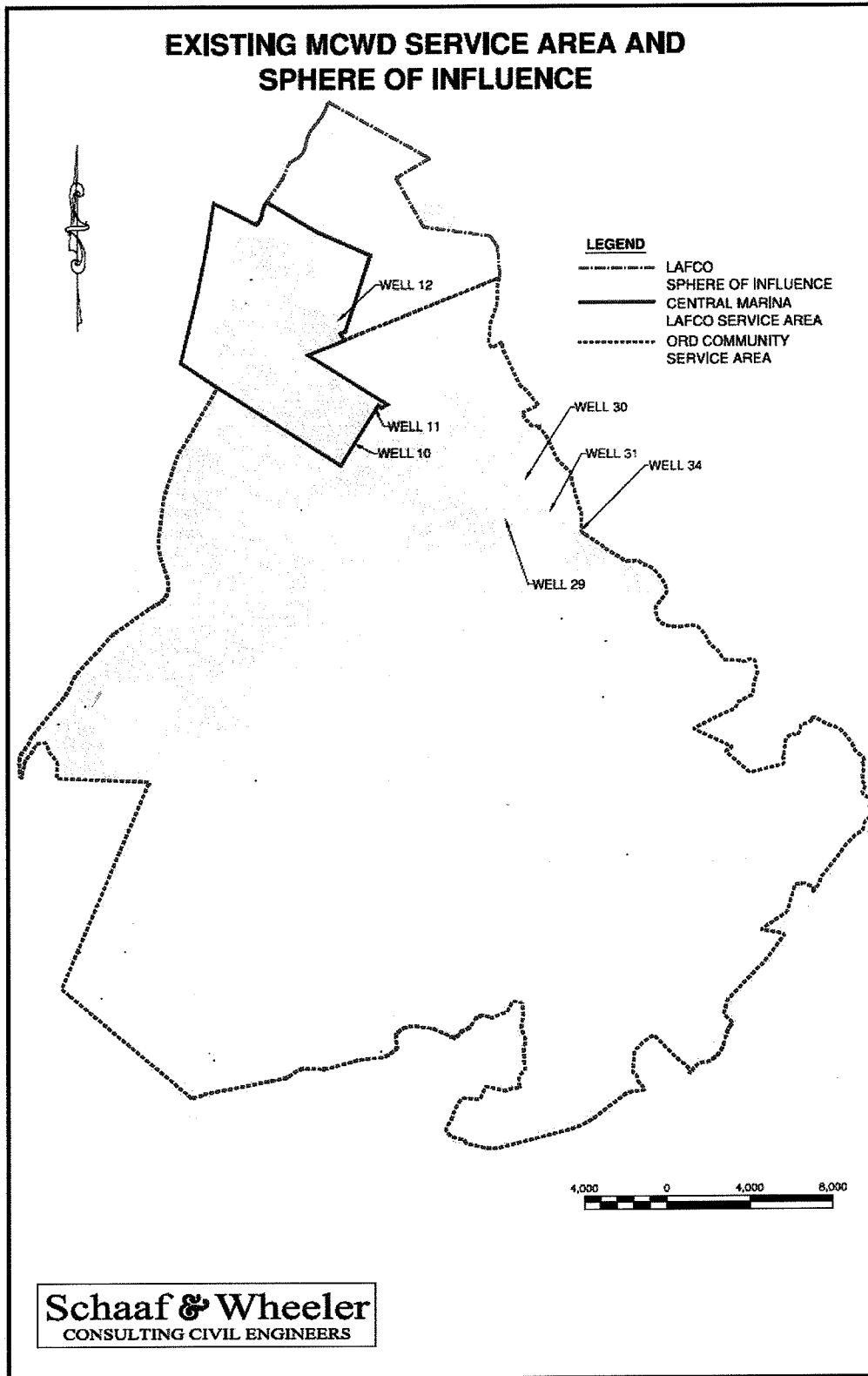


Table 3.7 Lower Income Housing Demands (afy)

	Jurisdiction	Existing*	2010	2015	2020	2025	2030
Ord	CSUMB		0	0	0	0	0
	Del Rey Oaks		0	24	24	24	24
	City of Monterey		0	0	0	0	0
	County of Monterey		0	43	80	80	80
	UCMBEST		0	3	14	26	26
	City of Seaside	9	9	27	30	74	134
	U.S. Army		0	0	0	0	0
	State Parks and Rec.		0	0	0	0	0
	Marina Ord Comm.	102	102	285	415	559	699
	Marina Sphere		0	0	0	0	0
Marina	Armstrong Ranch		0	0	48	55	55
	RMC Lonestar		0	0	0	0	0
	Marina Central	65	65	85	105	119	133
Subtotal - Ord		111	111	383	563	763	963
Subtotal - Marina		65	65	85	153	174	188
Total		176	176	469	716	937	1,151

*Existing demands estimated at 0.25 AFY/EDU

3.4 Water Conservation Baseline and Targets

The Water Conservation Act of 2009 (SBx7-7) requires each retail urban water supplier to establish baseline daily per capita water demand and water conservation targets, as outlined in California's 20x2020 Water Conservation Plan. The plan establishes a statewide goal of reducing average per capita water demand by twenty percent by the year 2020. The State estimated the average statewide demand for 2005 at 192 gallons per capita day (gpcd), with a statewide conservation target of 154 gpcd in 2020. An interim statewide target of 173 gpcd (ten percent reduction) by the year 2015 was also established. In the 20x2020 Plan, regional baselines and targets were also established.

The Marina Coast Water District is in the Central Coast Hydrologic Region. The regional baseline water demand was estimated to be 154 gpcd, the lowest in the state. The regional conservation targets are 139 gpcd by the year 2015, and 123 gpcd by the year 2020.

The Department of Water Resources (DWR) published detailed methodologies as to how baselines and targets are to be calculated. Baseline per capita water demands are calculated as a ten-year average water consumption rate for a period ending not earlier than December 31, 2004 and not later than December 31, 2010. This is calculated as gross annual water demand divided by average annual population. Water suppliers may choose any consecutive ten-year period within the allowable window, corresponding to calendar years, fiscal years or other standard reporting intervals. Once established, the baseline demand must be used for compliance

reporting in 2015 and 2020, and the same reporting year (calendar, fiscal, etc.) must be used. If the system-wide average water demand is 100 gpcd or less, the water supplier is not required to achieve additional conservation savings.

Historic water demand for MCWD is shown in Table 3.8. Annual population values were estimated using estimates from the California Department of Finance, as detailed in Appendix E. As can be seen, MCWD's average water demand has been at or below the regional 2020 target of 123 gpcd since 2009. The 10-year averages ending in 2004 and 2005 were not considered in selecting a baseline period, due to the large population changes in the mid-1990's when Fort Ord closed. Of the remaining periods, MCWD selected the period ending December 31, 2008, for calculating the baseline water demand, which is 133.3 gpcd. This period includes years with and without construction activity in the Ord Community, and is considered a more representative median than the lower value in later years.

Per Section 10608.20 of the Water Code, there are four methodologies available for calculating compliance targets, as listed below. A more detailed discussion of the methods and analysis are included at Appendix E.

- Method 1: Eighty percent of the water supplier's baseline per capita water use.
- Method 2: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and commercial, industrial, and institutional uses.
- Method 3: Ninety-five percent of the applicable state hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Water Conservation Plan.
- Method 4: An approach developed by DWR and reported to the Legislature by December 31, 2010. The proposed method uses conservation Best Management Practices (BMP) as prescribed by the California Urban Water Conservation Council (CUWCC). This method is similar to Method 2, but requires more detailed information on current water uses.

Table 3.8 Per Capita Water Demands

Year	Central Marina			Ord Community			System-Wide		
	Marina Pop.	Annual Water Use (MG)	Daily Per Capita (gals)	Ord Pop.	Annual Water Use (MG)	Daily Per Capita (gals)	Daily Per Capita (gals)	10-year Average (gpcd)	5-year Average (gpcd)
1995	16,685	657.6	108	5,000	913.0	500	198		
1996	16,465	690.5	115	7,796	811.4	285	170		
1997	16,586	699.6	116	10,593	838.7	217	155		
1998	17,128	606.1	97	11,119	679.7	167	125		
1999	17,331	730.4	115	11,327	780.6	189	144		
2000	17,574	749.4	117	16,239	772.7	130	123		
2001	17,715	744.6	115	11,701	726.0	170	137		
2002	17,781	751.5	116	11,867	696.2	161	134		
2003	17,805	712.1	110	11,808	698.7	162	131		
2004	17,876	737.0	113	11,757	789.5	184	141	145.8	
2005	17,672	715.1	111	11,805	649.6	151	127	138.6	
2006	17,509	582.1	91	11,645	817.5	192	132	134.8	
2007	17,493	528.6	83	11,572	958.3	227	140	133.3	134.0
2008	17,706	597.4	92	11,827	739.3	171	124	133.3	132.7
2009	17,852	639.2	98	11,891	676.5	156	121	130.9	128.7
2010	18,057	568.1	86	12,043	778.5	177	123	130.9	127.9

* Annual population values based upon CA Dept. of Finance estimates.

Water suppliers may select any of the four methods to calculate compliance water demand targets. They must also calculate the maximum allowable target, and select the lower of the two. The alternate maximum method consists of calculating a five-year average water consumption rate for a period ending not earlier than December 31, 2007 and not later than December 31, 2010. The 2020 conservation target must be less than or equal to 95% of the 5-year base daily per capita usage. MCWD selected the period ending December 31, 2008, for its 5-year baseline period, as reflected in Table 3.9.

Water demands within the District are already significantly below the state and regional averages due to aggressive water conservation practices. Therefore, MCWD has elected to use Method 3, which is a goal of 5% below the regional target. As seen in Table 3.9, the maximum allowable target is greater than the Method 3 target, so the Method 3 target may be used. The interim (2015) target is the average of the 10-year baseline and the 2020 target.

Table 3.9 District Baseline and Targets

Description	Year	Amount
Baseline Water Demand	2008	133 gpcd
Maximum Target (95% of 5-year baseline)	2020	126 gpcd
Method 3 Target (95% of Regional Target)	2020	117 gpcd
Interim Target	2015	125 gpcd

3.5 Plan for Meeting Urban Conservation Targets

Table 3.10 shows the total projected water demands for the District, the projected population and the resulting per capita water demands. The average demand per person increases in the future due to the projected non-residential development. Population projections are based upon the projected housing developments and the associated persons per unit in the respective specific plans. Where specific plans do not exist, the average persons per unit for the City or census tract were used. Population tables are included in Appendix C.

Table 3.10 Projected Per Capita Water Demands

	2010	2015	2020	2025	2030
Projected Demand (AFY)	4,553	6,913	9,895	11,136	12,214
Projected Recycled Water (AFY)*	0	780	1,359	2,514	2,960
Net Potable Demand (AFY)	4,553	6,133	8,536	8,622	9,254
Projected Population	32,184	43,371	57,718	64,361	69,887
Projected demand per person (gpcd)	126.3	126.2	132.0	119.6	118.2
Water Use Targets (gpcd)	0	125	117	117	117
Projected Target Exceedance (gpcd)	0	1.2	15.0	2.6	1.2

*Based on 2006 Basis of Design Report, includes Project Phase 2

To reduce per capita demands below the compliance targets, the District has four strategies, in addition to the on-going water conservation efforts:

- First, MCWD is implementing an urban recycled water project for landscape irrigation.
- Second, the design standards for new construction exceed the State's plumbing code requirements.
- Third, the remaining non-metered customers will be metered and have a financial incentive to reduce water use.
- Finally, the phased redevelopment of the Ord Community will include the replacement of a significant amount of water distribution system that is over 50-years old. These replacements should reduce system water losses but are not reflected in this table.

As seen in the bottom line of Table 3.10, Projected Target Exceedance, these measures will come close to achieving the conservation targets, but additional effort will be required. A portion of the Projected Target Exceedance may be realized through pipeline loss reduction (the demand projections include a provision for 348 afy of loss, while the actual loss in 2009 was under 100

afy). Also, the projection of predominantly non-residential development in the 2015-2020 time period causes per capita demands to peak in 2020, but the actual development schedules may differ. MCWD will monitor annual water demand, and adjust incentive programs as needed to meet the conservation targets.

The use of recycled water to serve non-potable demands is a conservation measure recognized in the 20x2020 State Conservation Plan. As detailed in Section 4, MCWD included recycled water in the Regional Urban Water Augmentation Program, completed the project design and CEQA documents in 2007, and has only deferred implementation due to the economic slow-down which has delayed redevelopment of the Ord Community. As shown in Table 3.10, the project is expected to provide 780 afy in 2015, and increase by phases to 2,960 afy in 2030.

MCWD has adopted design guidelines and standards that exceed the state plumbing code requirements for water conserving fixtures, codified in Section 3.36 of the District Ordinances. New residential development is required to include high-efficiency toilets, hot-water recirculation systems, and when provided, clothes washers must meet high efficiency standards. Non-residential development must include waterless urinals and HET or dual-flush toilets. All landscapes over 2,500 square-feet are separately metered and must meet the requirements of the State's model water-efficient landscape ordinance.

In 2010, CSUMB installed water meters in the final section of their faculty and student housing area such that no unmetered water accounts remain within CSUMB's jurisdiction. MCWD has seen a reduction in water demand in this area, now that the occupants are billed directly for their water use.

The final jurisdiction on Fort Ord with non-metered accounts is the Ord Military Community. The Army is removing and replacing their older housing areas by phases, and when complete, all housing units will be metered. The POM garrison staff is investigating the cost benefit of installing meters in some existing areas, due to the cost savings they would realize.

5.5 Water Shortage Contingency Plan

To prepare a water supplier for the event of a water shortage, including a drought or an emergency shortage, the Act requires an UWMP to include a Water Shortage Contingency Plan (WSCP). The WSCP needs to include the following specific elements:

- Actions to be undertaken by the water supplier to prepare for, and implement during, a catastrophic interruption of water suppliers (e.g., a regional power outage, an earthquake, or other disaster).
- Stages of action, including up to a 50-percent supply reduction, and an outline of specific supply conditions at each stage.
- Additional, mandatory provisions against specific water use practices during water shortages (e.g., street cleaning).
- Consumption reduction methods in the most restrictive (drought) stages for up to a 50 percent reduction in demand.
- Penalties or charges for excessive use, where applicable.
- An analysis of the impacts of each of the actions and conditions described in the WSCP on the revenues and expenditures of the urban water supplier and proposed measures to overcome those impacts.
- A draft water shortage contingency resolution or ordinance.
- Description of a mechanism for determining actual water use reductions pursuant to the WSCP.

The District Board of Directors adopted an updated Water Shortage Contingency Plan on June 14, 2011, in Resolution No. 2011-46. The updated WSCP adds specific restrictions on water use that may be implemented at the time of a water shortage. Stages of action and triggers were not changed from the previously adopted WSCP. The Resolution and WSCP are included in Appendix F. Article 3.36.050 of MCWD Code of Ordinances allows for enforcement of the WSCP.

5.5.1 Actions in the Event of a Catastrophic Interruption

MCWD developed and adopted an Emergency Response Plan (ERP) in 2007 for emergency and disaster occurrences with guidelines and agreements for cooperative efforts with other State and local agencies, as required by the State Department of Public Health. The ERP contains actions MCWD would initiate in the event of a catastrophic reduction in its water supply. Article 2.09, Local Emergency, of the District Code of Ordinances details the procedure for declaring an emergency and the procedures authorized for immediate response. MCWD conducts periodic table-top exercises with the emergency response offices of the jurisdictions it serves, and annual reviews of its emergency response plan.

5.5.2 Stages of Action, Mandatory Provisions, Reduction Methods

The District's Water Shortage Contingency Plan includes stages of action, mandatory provisions, and consumption reduction methods. Because the Salinas Valley Groundwater Basin supply is not drought susceptible, the triggers for the Stages of Action listed in Table 5.1 reflect mechanical failures and/or water quality concerns, which are more likely to impact MCWD. The mandatory provisions and consumption reduction methods for each stage are detailed in the Water Shortage Contingency Plan at Appendix F.

Table 5.1 Water Shortage Contingency Plan - Stages of Action

Stage No.	Water Supply Conditions			% Shortage
	System Malfunction	Exceed Chloride Standard?	VOC Standards	
1	10% shortage	Not threatened	Not exceeded w/blending	0 - 10
2	10% - 25% shortage	May be threatened	Not exceeded w/blending	10 - 25
3	25% - 35% shortage	Expected	Not exceeded w/blending <u>or</u> remaining capacity reduced by up to 25%	25 - 35
4	35% - 50% shortage	Expected	Not exceeded w/blending <u>or</u> remaining capacity reduced by up to 35%	35 - 50
5	>50% shortage	Expected	Not exceeded w/blending <u>or</u> remaining capacity reduced by up to 50%	>50

5.5.3 Penalties or Charges for Excessive Use

Article 3.36.050 of District Code of Ordinances provides for a system of notices and fees for violations. Article 3.36.060 also allows for recovery of costs incurred abating a violation. Violation of provisions of the WSCP shall be enforced under these parts of the MCWD Code.

Table 5.2 summarizes the penalties and charges detailed in Article 3.36.050. The Code does not currently include more stringent penalties or charges for higher stages of a water shortage, but the Board of Directors may consider additional penalties if an extended shortage should occur. Section 4 of the WSCP includes procedures for making appeals to the Board for relaxation of water use restrictions.

Table 5.2 Water Shortage Contingency – Penalties and Charges

Penalties or Charges	Stage When Penalty Takes Effect
<i>Penalty for excess use:</i> Written notice, date for correction	Applicable to all stages (i.e., not stage-specific)
<i>Charge for excess use:</i> \$100 administrative fee for 1 st notice; \$200 for 2 nd notice; \$500 for each additional violation within one (1) year.	
<i>Other:</i> Costs of abatement	
<i>Other:</i> Costs of enforcement	
<i>Other:</i> Civil penalty of 50% of abatement and enforcement costs.	

5.5.4 Revenue and Expenditure Impacts

Enforcement of the Water Shortage Contingency Plan is assumed to be covered by enhanced revenues from application of excess use charges and penalties. District reserves may be used temporarily should revenues remain below expectations. MCWD's rate structure is based upon adopted rate ranges and allows for modification of rates on short notice within those ranges. MCWD retains the ability to modify rates to meet all legitimate District needs. Revenue impacts from water sales losses are estimated as follows, based upon Tier 2 rates of \$2.35/hcf in Central Marina and \$2.86/hcf in the Ord Community, and recognizing approximately 10% of MCWD's customers are not metered as of 2010.

Table 5.3 Potential Revenue Impacts of Implementation of WSCP

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Assumed Reduction	10 percent	20 percent	30 percent	40 percent	50 percent
Water Sales Loss	\$ 454,664	\$ 909,329	\$1,363,993	\$ 1,818,658	\$ 2,273,322
Revenue Source: Pumping savings at \$135/af	\$ 53,569	\$ 107,138	\$ 160,707	\$ 214,276	\$ 267,845
Net Revenue Reduction	\$ 401,095	\$ 802,191	\$1,203,286	\$ 1,604,382	\$ 2,005,477
Percent of Total Annual Water System Revenue	5%	11%	16%	21%	27%

* Table based on FY2009-2010 water sales, \$7,501,854 for 3,970 acre-feet

5.5.5 Mechanism to Determine Actual Water Use Reductions – Monitoring Procedures

Implementing the WSCP is intended to reduce water use to levels specified by stage. Crucial to the implementation is determining how effective any enacted measures are in actually reducing water use.

The WSCP includes increasingly frequent reporting of water usage, based on daily O&M recording of production figures, to the MCWD Board per increasingly severe stages. The

monitoring, reporting, and subsequent analyses are meant to determine the extent of water use reductions. Furthermore, the WSCP includes provisions for the MCWD Board to alter WSCP actions at each stage (i.e., tighten restrictions) if usage reduction targets are not being met. Essentially, a feedback loop of monitoring, reporting, and action will be used to effectively implement the WSCP.

5.6 Drought Planning

As discussed in Section 5.1, the Salinas Valley Groundwater Basin is managed by MCWRA so as not to be susceptible to drought. However, the District is pursuing two sources of new water supply that are not drought susceptible: desalination of seawater-intruded groundwater and urban use of recycled water. Both of these projects are discussed in Section 4.

Section 6 - Conservation and Demand Management Measures

6.1 Introduction

Water conservation is defined as any action taken to reduce water consumption or loss of available supply for use, such as leaks in the production and delivery system prior to the customer's meter. Demand management refers to a subset of conservation methods a water supplier may undertake to reduce demand on the water system. The Urban Water Management Planning Act requires a description of 14 specified conservation and demand management measures that are described in the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU), known as the Best Management Practices or BMPs. For those measures not being currently implemented or planned for implementation, an evaluation of those measures and a comparison against expanded or additional water supplies must be made. Preference in the act is given to those measures offering lower incremental costs than expanded or additional supplies. The act also requires that economic and non-economic factors, including environmental, social, health, customer impact and technological, be considered in the evaluation. However no specific guidance on evaluation methodology is given.

6.2 Summary of Measures Currently Under Implementation

MCWD signed the California Urban Water Conservation Council (CUWCC) MOU in 1991 and began implementing water conservation and demand management practices as part of its overall integrated water management program. Table 6.1 summarizes MCWD's water conservation program and the status of implementation of each demand management measure (DMM). MCWD's 2009-2010 CUWCC BMP Report is currently being prepared and will be available at the CUWCC website, www.cuwcc.org, once the on-line reporting system is updated.

6.3 Description and Status of Demand Management Measures

The Urban Water Management Planning Act under California Water Code Section 10631 (f)(1) requires a description of a water supplier's water demand management measures that are being implemented or are scheduled for implementation. It also requires an evaluation of water demand management measures specified in the act that are not currently being implemented or scheduled for implementation. As noted above, preference is given to implementing measures that offer lower incremental costs than expanded or additional water supplies.

MCWD is continually seeking to improve its conservation program and features that are cost-effective or otherwise are a wise investment in resource management. The District completed its Urban Water Conservation Feasibility Study in 2004, and has been implementing the recommendations by phases. In 2005, The District added a Water Conservation Specialist position to the staff, which greatly increased the capacity for customer assistance.

Table 6.1 Summary of DMM Implementation

Demand Management Measure	Implementation Status		
	Currently Implemented	Planned Actions	Recommendation
DMM 1 – Water Survey Programs for Residential Water Customers	Yes	MCWD will contact highest users	
DMM 2 – Residential Plumbing Retrofits	Yes		Link to DMMs 1, 3, 13 & 14; expand public awareness
DMM 3 – System Water Audits, Leak Detection, Repair	Yes	Automatic meter reading adds real-time leak monitoring	Continue annual audits.
DMM 4 – Metering with Commodity Rates	Yes		Review annually
DMM 5 – Large Landscape Conservation	Yes	Advertise ET controller program	Review annually
DMM 6- High-Efficiency Washing Machine Financial Incentives	Yes		Review annually
DMM 7 – Public Information	Yes		Address under-represented communities
DMM 8 – School Education	Yes		
DMM 9 – Commercial Industrial and Institutional Water Conservation	Yes	Increased outreach	Setting up water use budgets for customers
DMM 10 – Wholesale Agency Assistance (not applicable to District)	N/A		
DMM 11 – Conservation Pricing	Yes		Review annually
DMM 12 – Conservation Staff	Yes		
DMM 13 – Water Waste Prohibition	Yes		Expand public information
DMM 14 – Residential Ultra Low Flow Toilet Replacement	Yes		Set up database to track HET/ULFT replacements

6.3.1 DMM 1 - Water Survey Programs for Single-Family and Multi-Family Residential Customers.

Program Description: These programs generally involve sending a qualified water auditor to customer locations to audit water use. The survey includes both indoor and outdoor components. The indoor component includes checks for leaks, including toilets, faucets and meters; checking showerhead, toilet, aerator flow rates and offering/suggesting replacement of high-flow devices. The outdoor survey includes checks of the irrigation system and control timers, and review or development of a customer's irrigation schedule. MCWD requires a survey to be conducted upon transfer of property ownership. MCWD also provides residential customer surveys on an "as-requested" basis, in addition to directly contacting the highest residential users and offering a survey. Any customer who is concerned about high water bills can request an on-site survey.

Economic and Non-economic Factors: Surveys of this type have become common among agencies with demand management programs. Research on cost-effectiveness has shown that the long-term savings from these programs is lower than originally anticipated. Savings achieved

through these measures decay over time due to equipment failure, failure of the customer to consistently follow recommendations, and customer turnover. Savings decay rates average about 15 percent per year. Single-family surveys can be expected to initially save 15 gallons per day (gpd) per survey and multi-family about 6.5 gpd. Surveys are estimated to cost \$125 for a single-family residence and \$330 per multi-family residences covering an average of 10 units per survey (\$33/unit).²⁴ Agencies generally target high use accounts for surveys and, while customers who feel their water use is unexplainably high often opt for surveys, many customers are reluctant to avail themselves of a survey.

Cost-Benefit Analysis Results: A cost-benefit analysis is not required for the DMMs MCWD is implementing.

Recommendation, Implementation and Schedule: This program is operating at steady-state, and will continue with current staffing levels. MCWD will continue contacting residences with above average water use, as identified. When redevelopment resumes and the number of customer accounts increases, MCWD should reevaluate its conservation staffing levels.

Measures of Performance: In 2010, MCWD conducted 404 surveys for single-family residential customers and 40 surveys for multi-family residential customers.

6.3.2 DMM 2 - Residential Plumbing Retrofit

Program Description: Single and multi-family residences constructed prior to 1992 are to be identified and retrofitted with high-efficiency water fixtures, such as showerheads, faucets and toilets, if needed. The DMM also recommends an ordinance requiring low-flow fixtures in new construction and retrofits, which MCWD has included in Article 3.36 of their Code of Ordinances.

MCWD currently provides low-flow showerheads and installation assistance. An ordinance that requires low-flow showerheads in both new and retrofit construction was enacted in 1993. MCWD requires all residences to be retrofitted upon resale, with MCWD providing inspection for this requirement.

Article 3.36 of MCWD Code of Ordinances requires the installation of hot-water recirculation systems or point-of-use water heaters for new construction and renovation, which is an additional water saving measure not required in the State Plumbing Code.

Economic and Non-economic Factors: Offering or installing retrofit kits to pre-1992 homes has been a common program among water agencies with active conservation programs. Issues that must be considered are relatively high natural replacement levels for fixtures such as showerheads, and recognition that replacements heads already meet the federal 2.5 gpm

²⁴ California Urban Water Agencies Annual Report, 2000.

standard. All other factors being equal, retrofit programs, which reduce demands, are environmentally preferable over development of additional supplies or delivery of more water.

Cost-Benefit Analysis Results: Not required as this program is being implemented.

Recommendation, Implementation and Schedule: MCWD will continue to implement this DMM by associating it with other DMMs, particularly DMMs 1, 3, 13 and 14. This would reduce costs and increase participation. Increased outreach to expand public awareness of the program is also recommended.

Measures of Performance: In 2010, MCWD distributed 116 low-flow shower heads and 100 faucet aerators to single-family residential customers, and distributed 30 low-flow shower heads and 50 faucet aerators to multi-family residential customers.

6.3.3 DMM 3 - System Water Audits, Leak Detection and Repair

Program Description: The DMM requires conducting annual audits of the water distribution system to detect and correct any abnormalities, including leaks, faulty meters and unauthorized water users. A prescreening audit that covers metered water sales, other verifiable uses and total supply to the distribution system is used to determine the need for a full-scale audit. A full-scale audit is indicated if the uses divided by the supply is less than 0.9 (indicating a greater than 10 percent loss rate). In addition to the audits, water suppliers should notify the customer when it is believed that the leak may exist on the customer's side of the meter, and help the customer find and fix the leak. MCWD performs an annual prescreening system audit and responds to leaks or known trouble spots to make repairs and replacements as needed. A feature of the recently installed Automatic Meter Reading (AMR) equipment is that each AMR meter will identify if water is used for continuous periods in excess of two hours. Once alerted, District staff contact the customer and inform them of the possible leak.

Economic and Non-economic Factors: Prescreening audits comparing gross system production vs. sales is an accepted industry practice generally done on an annual basis. If results from this prescreening note excessive unaccounted water then a more detailed audit focusing on loss possibilities (system leakage, under-metering, illegal connections, fire flow water, and system flushing, etc.) is conducted. No significant social, environmental or technological factors are relevant for this activity.

Cost-Benefit Analysis Results: Not required as this program is being implemented.

Recommendation, Implementation and Schedule: MCWD audits both service areas annually. AMR meters are being installed throughout MCWD in a phased program, and required for all new customers.

Measures of Performance: In 2010, MCWD identified and repaired ten leaks in the distribution system.

6.3.4 DMM 4 - Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

Program Description: This DMM requires metering of all water services. Currently, the Marina service area is fully metered. The Ord Community is not yet fully metered. CSUMB completed its metering retrofits in 2009. The Ord Military Community is replacing housing units in phases, and installing meters in all new units. 1,201 units of Army housing are still on flat-rate billing. Water conservation is also promoted through a tiered pricing system. Based on a water use budget, customers know the amount of water use required by their property. MCWD has a three-tiered pricing system in the Central Marina and Ord Community service areas.

Economic and Non-economic Factors: Meters are now required as a matter of state law and urban water providers such as the MCWD have until January of 2025 to be fully metered. Based on the pace of redevelopment and MCWD's capital improvement plans, MCWD expects to have metering completed well prior to this date.

Cost Benefit Analysis Results: Not required as this program is being implemented.

Recommendation, Implementation and Schedule: MCWD is coordinating with the Ord Military Community to identify opportunities to install meters in the existing housing areas. The water rate tiers and prices are reviewed annually during the budget review and approval process.

Measures of Performance: Over the past five years, over 1400 non-metered units have been converted to metered accounts. All metered accounts are billed on a volume basis.

6.3.5 DMM 5 - Large Landscape Conservation Programs and Incentives

Program Description: The purpose of this DMM is to provide a customer with a determination of how much water should be used to irrigate the land appropriately while maintaining conservation practices. The DMM is oriented toward three groups of customers who irrigate landscapes: those with dedicated irrigation meters, those with meters who serve a mix of irrigation and non-landscape uses, and new accounts with irrigation use. MCWD has a landscape specialist on staff who conducts site reviews and assistance visits with property owners/property managers. MCWD has adopted the Model Water Efficient Landscape Ordinance, and requires formal review and approval of all landscapes of 2,500 square-feet or larger.

MCWD has several programs for landscapes, including rebates for evapo-transpiration controllers, turf removal, moisture sensors, rain shut-off switches and drip irrigation systems. MCWD has two demonstration gardens with native drought-tolerant species, one in each service area.

Economic and Non-economic Factors: The general public often views large landscapes as water conservation targets. Generally, however, and especially where dedicated irrigation meters exist, large landscapes are more efficiently managed than landscapes that are part of a mixed use setting. Large landscapes usually benefit from professional management and the owner's

recognition of a direct correlation between the water bill and irrigation practices, which creates a financial incentive for conservation. Opportunity exists to improve irrigation efficiency. The California Irrigation Management Information System (CIMIS) operated by the California Department of Water Resources provides real-time evapo-transpiration (ET) and other climatic data available on the Internet to help manage irrigation demands. CIMIS data can be combined with water budgets for each landscape to allow irrigation managers to apply only the amount of water needed. Newer irrigation controllers can either be programmed to modify irrigation schedules based on programmable ET factors, or query CIMIS stations for real-time data and be linked to soil moisture sensors and rain shut-off devices that can precisely provide only the amount of irrigation needed. These devices are now required per MCWD's design guidelines, and have been shown to produce from 25-45 percent in landscape water savings over traditional irrigation timers, which are often not reset to follow annual climate changes.²⁵ Savings also accrue from the system's ability to automatically shut off irrigation zones when lines or sprinkler heads break or when there is significant rain. Such systems can also provide commercial or institutional customers with tremendous labor savings as they do not require human intervention to reset irrigation schedules to follow climate patterns or adjust for variations in precipitation. Savings can also accrue from lower fertilizer cost as off site runoff can be eliminated.

Cost-Benefit Analysis Results: Not required as this program is being implemented.

Recommendation, Implementation and Schedule: MCWD incentive programs should be reviewed annually as part of the budget review and approval process. As the Ord Community is redeveloped, MCWD should evaluate the staffing levels for assistance site visit.

Measures of Performance: In 2010, MCWD conducted 14 large landscape surveys, and paid incentive rebates for the installation of 73 irrigation control devices.

6.3.6 DMM 6 - High-Efficiency Washing Machine Rebate Programs

Program Description: Customers are provided with incentives to replace old washing machines with newer, more efficient models. MCWD provides a \$125 rebate to customers. The program is very successful, averaging 120 conversions each year. MCWD requires all new residential construction to include high efficiency washing machines in each unit, when washers are provided.

Economic and Non-economic Factors: The incremental cost of high efficiency washers (front loading, horizontal axis) has been about \$600 per unit over that of traditional, top load models. Cost differentials are coming down over time. Typical customers can save from \$50 to \$100 per year in energy, water and waste water costs. Water savings range from 14 gallons per day in

²⁵ California Urban Water Conservation Council, July 2003.

small single-family households up to over 100 gallons per day per unit in multi-family housing applications.²⁶

Cost-Benefit Analysis Results: Not required as this DMM is under implementation.

Recommendation, Implementation and Schedule: MCWD should review this rebate program annually during the budget review and approval process.

Measures of Performance: In 2010, MCWD paid incentive rebates for 167 high efficiency clothes washer installations.

6.3.7 DMM 7 - Public Information Programs

Program Description: MCWD provides water conservation information to the public through a wide variety of public outreach tools: information booths at conferences, fairs and community events; flyers, newsletters and billing inserts; video; website; and printed material to the media. MCWD has also partnered with the Water Awareness Committee of Monterey, California American Water Company and the Monterey Peninsula Water Management District to develop and distribute outreach material.

Economic and Non-economic Factors: This DMM cannot be reduced to quantitative terms but is considered an essential complement to other DMM measures and developing a water conservation consciousness and ethic among urban water users such that it is considered an essential practice.

Cost-Benefit Analysis Results: Not applicable.

Recommendation, Implementation and Schedule: The public information program could be expanded through outreach to under-represented communities and by providing current program information in the major languages found within MCWD.

Measures of Performance: In 2010, MCWD published 5 newsletters, 3 bill inserts, 6 landscape media items and had 4 media contacts. Additionally, MCWD co-hosted the Water Awareness Committee Training Seminar for smart irrigation controllers and sponsored booths at 3 events.

6.3.8 DMM 8 - School Education Programs

Program Description: This DMM is intended to promote water conservation within the local schools. MCWD has a part-time education consultant that assists in the development of the educational programs. Presentations and information – which include program handouts, Internet links and classroom activities – are provided directly to teachers for their use in the classroom. The program has been fully implemented in Marina and the Ord Community Service area, with 100% coverage of grades K to 3. A water-art program provides instruction in the importance of water conservation to all fourth grade classes in the service areas.

²⁶ California Urban Water Conservation Council, 2003.

Economic and Non-economic Factors: Like public information programs, school education programs are viewed as a basic element of a comprehensive urban conservation program.

Cost-Benefit Analysis Results: Not applicable.

Recommendation, Implementation and Schedule: Additional activities could be incorporated into the program. An example would be the establishment of an organic garden/outdoor classroom to teach students effective water management strategies as well as environmentally sound horticultural practices. The MCWD is developing water conserving gardens which can provide a venue for such instruction.

Measures of Performance: In 2010, MCWD reached 1,408 students with classroom presentations, 2,100 students through large group assemblies, and 40 students through field trips.

6.3.9 DMM 9 - Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

Program Description: Under this DMM, conservation programs are to be tailored to the needs of CII customers' indoor and outdoor water uses. CII accounts often use water in ways and amounts substantially different than residential users. A water use survey is conducted and the customer is provided with an evaluation of water using apparatus and processes and recommended efficiency measures, expected payback period and available agency incentives. These customers are contacted within a year of the survey to discuss water use and water saving improvements based on the recommendations of the survey. All of MCWD rebate programs (toilet, landscape, clothes washer) are available to commercial as well as residential customers.

Economic and Non-economic Factors: Commercial and industrial audits in other regions have found most of the savings opportunity in the replacement of high flow toilets, as these toilets receive relatively high usage rates. The literature reveals that surveys for this sector have resulted in about 1.27 AF of savings per year against an average cost of \$1,200 per survey.

Cost-Benefit Analysis Results: Based upon the averages above and avoided costs for new supply to MCWD, typical CII surveys would have a benefit cost ratio of just over 5 to 1, assuming savings decay over a five year span.

Recommendation, Implementation and Schedule: MCWD is working to expand this program to its full potential. MCWD is performing site surveys of CII accounts and setting up water use budgets for the customers. CSUMB has used this service for assistance managing many of their large landscapes and facilities. CII accounts are eligible for District programs/rebates relating to plumbing retrofits and ultra-low flow toilet (ULFT) replacements. However, the low number of CII accounts limits estimates of District water savings.

Measures of Performance: In 2010, MCWD conducted one survey with a commercial customer and paid 7 incentive rebates to commercial customers.

6.3.10 DMM 10 – Wholesale Agency Assistance

Program Description: Assistance relationships between regional wholesale agencies and intermediate wholesale agencies as well as between wholesale agencies and retail agencies. This DMM does not currently apply to MCWD. When the Regional Desalination Project is constructed, MCWD may be considered a wholesale water supplier to the California American Water Company (CAW), although the project is being constructed jointly among three agencies. California American Water is currently a larger water supplier than MCWD with its own water conservation programs, and publishes an Urban Water Management Plan for its Monterey service area. It is not anticipated that MCWD will need to provide assistance to CAW, although the two agencies will continue to work together as part of the Water Awareness Committee of Monterey.

6.3.11 DMM 11 - Conservation Pricing

Program Description: Water conservation is encouraged through a pricing system that rewards customers who use less water with financial incentives, while high water users are charged a higher rate. MCWD is implementing this DMM through its two and three-tiered pricing system.

Economic and Non-economic Factors: Conservation pricing is often cited as a way to use market mechanisms to provide incentives for conservation. Water consumption, however, has a relatively inelastic demand relative to price, meaning as unit prices go up, unit demand does not correspond in a 1:1 linear fashion. This is due to a variety of factors. Only a portion of water use for a residence can be considered discretionary, generally a portion of landscape irrigation, excess showering periods and the like. At the point discretionary use has been wrung out of the system due to marginal costs of water, another rate tier is unlikely to reap much conservation savings. Additionally, California's Proposition 218 requires water rates to be developed on a cost of service basis. In other words, the top tier of the water rate must have a reasonable relationship to the avoided cost of service for marginal supply. Since MCWD is contemplating relatively expensive marginal supplies to meet new demands, meeting this test is not a concern at this point.

Cost-Benefit Analysis Results: Not required as this DMM is under implementation.

Recommendation, Implementation and Schedule: The pricing tiers and rates are reevaluated annually as part of MCWD budget review and approval process.

6.3.12 DMM 12 - Conservation Coordinator

Program Description: A water agency employee is assigned responsibility for oversight and implementation of water conservation practices. MCWD's water conservation coordinator works closely with local, regional and state boards to implement the DMMs that are effective for the community as well as the neighboring water districts to foster an effective working relationship

and provide continuity among the programs. MCWD also has a water conservation specialist, who conducts site surveys and assistance visits.

Economic and Non-economic Factors: Not applicable.

Cost-Benefit Analysis Results: Not required as this DMM is under implementation.

Recommendation, Implementation and Schedule: MCWD should review the staffing levels as the Ord community is redeveloped and the number of customers increases.

Measures of Performance: In 2010, MCWD employed a full-time water conservation coordinator and a full-time water conservation specialist.

6.3.13 DMM 13 - Water Waste Prohibition

Program Description: In 1993 MCWD enacted an ordinance addressing water waste and establishing limitations on how and when watering/irrigation can occur, and how water can be used outside. This section of MCWD Code was updated in 2004 and 2005 to add additional restrictions and incorporate the Model Water Efficient Landscape Ordinance.

Economic and Non-economic Factors: Not applicable.

Cost-Benefit Analysis Results: Not required as this DMM is under implementation.

Recommendation, Implementation and Schedule: MCWD should review and update this section of the District Code as new information becomes available from the State and the California Urban Water Conservation Council.

6.3.14 DMM 14 - Residential Ultra-Low Flow Toilet Replacement Programs

Program Description: MCWD's toilet replacement program offers a \$125 rebate for each toilet replaced with a high efficiency toilet. Over 3,000 toilets have been replaced under the program. Under the MCWD water waste ordinance, a residence must be completely retrofitted with ultra low flow toilets (ULFTs) at the time of sale, and all new construction must install high efficiency toilets (HET) (1.28 gpf or dual flush). This program includes CII customers.

Economic and Non-economic Factors: Toilet replacement programs have generally been the most successful of demand management measures statewide. A number of issues exist, however. Program cost-effectiveness varies by program design. Retrofits on resale ordinances are very inexpensive from MCWD's perspective as costs are shifted to the home buyers/sellers. This ordinance tends to be very unpopular with the real estate community and home sellers, however, as it can impede a sale due to timing and often requires replacing floor coverings around the toilet. Direct distribution programs have the highest cost-effectiveness but don't necessarily reach all potential customers. Rebate programs are generally effective but have a higher incidence of "free ridership" where some customers would be replacing a toilet anyway and receive the rebate. Regardless, savings for these programs have been shown to be 35-45 gallon

per replacement per day. Higher savings are found in higher density housing and commercial/industrial settings. Savings also persist as toilet life is generally about 25 years.

Given that the revised plumbing code allows for only 1.6 gal/flush toilet models to be purchased, it should be recognized that natural turnover in the range of 3-4 percent per year will eventually replace all of the older, high water use models. HET incentive programs accelerate these savings and can help defer or eliminate other capital investment needs.

Cost-Benefit Analysis Results: Not required as this DMM is under implementation.

Recommendation, Implementation and Schedule: MCWD currently tracks this rebate program in a spreadsheet. If the customer service billing database is upgraded, consider tracking this and other rebate programs by address in that database.

Measures of Performance: In 2010, MCWD paid incentive rebates for 84 high-efficiency toilets to single-family residential customers and for 38 high-efficiency toilets to multi-family residential customers.

6.4 Funding and Legal Authority

MCWD is committed to funding all cost-effective conservation programs. Additionally, MCWD will assess non-economic issues in addressing its conservation program, such as direct and indirect environmental and economic effects of conservation on entities other than MCWD and its customers. As a county water district, MCWD has the legal authority to implement conservation programs of its choosing.

6.5 Existing Conservation Savings, Savings Measurement, and Effects on Ability to Further Reduce Demand

MCWD has been active in promoting conservation and taking action to assure its implementation. Review of per capita demands for water indicates these efforts and resulting behavior of MCWD customers is having an effect. Per capita demand rates have been on a nearly consistent decline from an average of 144 gpcd in 1999 to 123 gpcd in 2010. Based upon an estimated population of 30,100, annual water savings are about 708 ac-ft.

The MCWD will continue to track per capita demand rates to assess overall savings, in addition to comparing water consumption of new residential development against households which have been retrofitted with conservation devices and unretrofitted households. The District will continually reassess rebate programs to address saturation rates and emerging technologies.

Conservation reductions have come primarily from improvements in water use technologies (low flow devices, irrigation controllers, etc.) and some from behavioral changes driven by increasing water rates and public education programs. These long-term savings reduce the ability of the MCWD to call upon water use reductions if necessary due to curtailment of supply from groundwater. This is known as demand hardening. Since long term improvements in efficiency have been effected, additional short-term savings would be harder to produce and would

necessarily come from cutbacks in use that could have more pronounced economic and aesthetic effects, especially if shortages were pronounced.

MCWD recognizes this vulnerability and is committed to acquiring additional supplies to insulate the community from such effect. In addition to ensuring that potable supplies remain reliable, MCWD is pursuing the use of recycled water for urban landscape irrigation. This is a recognized BMP for reducing potable water demand.