

2006 Ground Water Summary Report



Monterey County Water Resources Agency

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Overview of the Ground Water Reporting Program

History of the Ground Water Reporting Program

In February 1993, the Monterey County Board of Supervisors adopted Ordinance No. 3663 that required water suppliers within Zones 2, 2A, and 2B to report water-use information for ground water extraction facilities (wells) and service connections. Monterey County Ordinance No. 3717, which replaced Ordinance No. 3663 and was adopted in October 1993, modified certain other requirements in the previous ordinance while keeping the ground water extraction reporting requirements in place for wells with a discharge pipe having an inside diameter of at least three inches.

The Monterey County Water Resources Agency (Agency) has collected ground water extraction data from well operators, for the period beginning November 1 and ending October 31, starting with the 1992-1993 reporting year. Information received from the 300 plus well operators in the above-referenced zones of the Salinas Valley is compiled by the Ground Water Extraction Management System (GEMS) portion of the Water Resources Agency Information Management System (WRAIMS), a relational database maintained by the Agency. The intent of the ground water extraction reporting program is to measure and document the amount of ground water extracted from Zones 2, 2A, and 2B of the Salinas Valley Ground Water Basin each year.

Since 1991, the Agency has required the annual submittal of Agricultural Water Conservation Plans (Ordinance 3851), which outline the best management practices that are adopted each year by growers in the Salinas Valley. In 1996, an ordinance was passed that requires the filing of Urban Water Conservation Plans (Ordinance 3886). Developed as the urban counterpart of the agricultural water conservation plans, this program provides an overview of the best management practices being implemented by urban water purveyors as conservation measures.

2006 Ground Water Summary Report

The purpose of this report is to summarize the data submitted by well operators in February 2007 from the following annual reporting programs: ***Ground Water Extraction Reporting (agricultural and urban), Water Conservation Plans (agricultural and urban), and Water and Land Use Information (agricultural)***. The *agricultural* data from the ground water extraction reporting program covers the reporting year of **November 1, 2005, through October 31, 2006**; the *urban* data covers **calendar year 2006**. The agricultural and urban water conservation plans adopted for 2007 are also summarized. This report is intended to present a synopsis of current water extraction within the Salinas Valley, including agricultural and urban water conservation improvements that are being implemented to reduce the total amount of water pumped. It is not the purpose of this report to thoroughly analyze the factors that contribute to increases or decreases in pumping.

Reporting Methods

The Ground Water Conservation and Extraction Program allows well operators to report water extractions by one of three different measuring methods: Water Flowmeter, Electrical Meter, or Hour Meter (timer). Ordinance 3717 requires annual pump efficiency tests for each well to ensure the accuracy of the data reported. The summary of ground water extractions presented in this report is compiled from data generated by all three reporting methods.

Disclaimer

While the Agency has made every effort to ensure the accuracy of the data presented in this report, it should be noted that the data is submitted by the individual reporting parties and is not verified by Agency staff. In addition, since so many factors can affect the calculations, it is understood that no reporting method is 100 percent accurate. The Agency maintains strict quality assurance in the compilation, standardization, and entry of the data received.

The Agency received Ground Water Extraction Reports from approximately ninety-six percent (96%) of the 1775 wells in the Salinas Valley for the 2006 reporting year. Agricultural and Urban Water Conservation Plan submittals for 2007 were ninety-four percent (94%) and ninety-four percent (94%), respectively.

Reporting Format

Ground water extraction data is presented in this report by measurement in acre-feet. One acre-foot is equal to 325,851 gallons.

Ground Water Extraction Data Summary

The Salinas Valley Ground Water Basin is divided into four hydrologic subareas whose boundaries are derived from discernible changes in the hydrogeologic conditions of the underground aquifers. Figure 1 (below) illustrates the Agency-designated Zones of the Salinas Valley in relation to the hydrologic subareas.

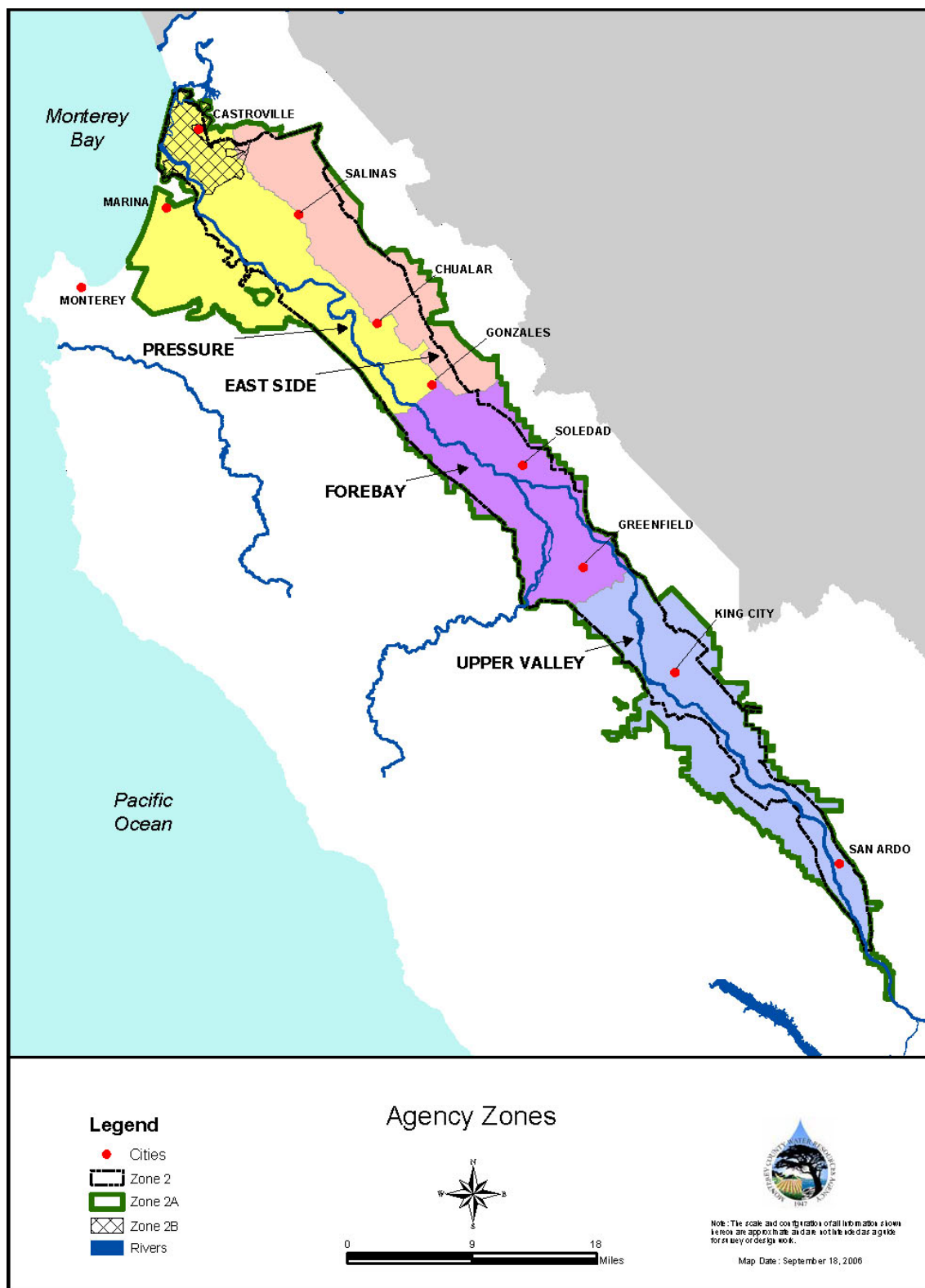


Figure 1. Agency Zones and hydrologic subareas of the Salinas Valley Ground Water Basin

Ground Water Extraction Data Summary (continued)

Summary of Methods Used for Extraction Reporting

The distribution of methods used for ground water extraction reporting (agricultural and urban) for the 2006 reporting year is shown in Table 1; a percentage distribution by volume is shown in Figure 2.

Table 1. Total extraction data by reporting method

<i>Reporting Method</i>	<i>Acre-Feet per Reporting Method</i>	<i>Wells per Reporting Method</i>
Water Flowmeter	334,640	1,241
Electrical Meter	123,580	446
Hour Meter	13,020	23
Total (2006)	471,240	1,710
Average ('96-'06)	497,192	1,665

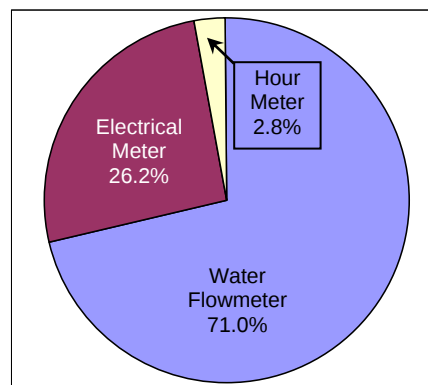


Figure 2. Percentage distribution by volume of methods used for extraction reporting

Total Extraction Data by Hydrologic Subarea and Type of Use

The total ground water extractions for the 2006 reporting year are summarized by hydrologic subarea, type of use (agricultural and urban) in Table 2), and percentage (Figure 3).

Table 2. Total extraction data by hydrologic subarea and type of use

<i>Subarea</i>	<i>Agricultural Pumping (acre-feet)</i>	<i>Urban Pumping (acre-feet)</i>	<i>Total Pumping (acre-feet)</i>
Pressure	91,836	20,695	112,531
East Side	80,652	14,515	95,167
Forebay	130,249	9,822	140,071
Upper Valley	118,897	4,574	123,471
Total	421,634	49,606	471,240

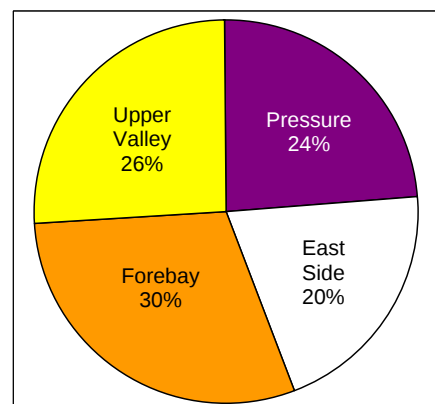


Figure 3. Percentage of total extractions by hydrologic subarea

Urban Extraction Data by City or Area

The total ground water extractions attributed to urban (residential, commercial/institutional, industrial, and governmental) pumping for the 2006 reporting year are summarized by city or area in Table 3. Figure 4 shows how the total urban pumping for 2006 is divided among each city or area.

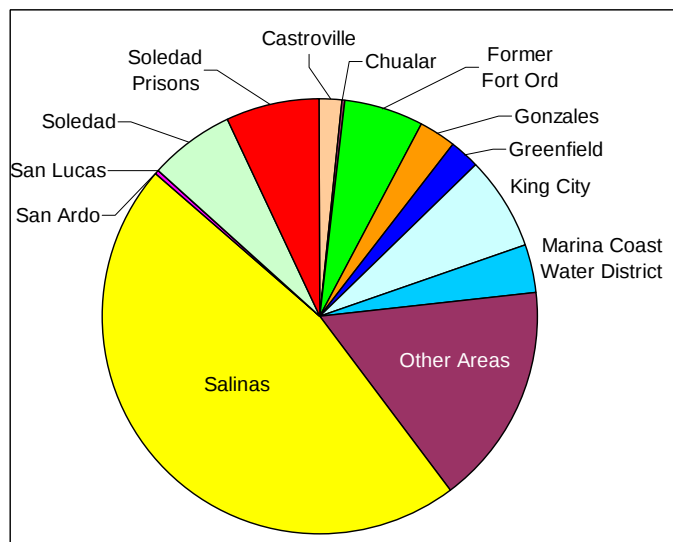


Figure 4. Distribution of urban extraction by city or area

Table 3. Urban extraction data by city or area

<i>City or Area</i>	<i>Urban Pumping (AF)</i>	<i>Percentage of Total</i>
Castroville	834	1.7%
Chualar	116	0.2%
Former Fort Ord	2,890	5.8%
Gonzales	1,431	2.9%
Greenfield	1,053	2.1%
King City	3,453	7.0%
Marina Coast WD	1,861	3.8%
Other Areas	8,016	16.2%
Salinas	23,135	46.6%
San Ardo	138	0.3%
San Lucas	66	0.1%
Soledad	3,122	6.3%
Soledad Prisons	3,491	7.0%
Total	49,606	100.0%

Agricultural Water Conservation Plans

The Agricultural Water Conservation Plans include net irrigated acreage, irrigation method, and crop category. This information is forecasted and indicates what the grower plans to do in the upcoming year. It reflects the changing trends in irrigation methods in the Salinas Valley. Tables 4, 5, 6, and 7 show the distribution of irrigation methods by crop type for 1993, 2005, 2006, and 2007, respectively. Figure 5 (on the following page) illustrates the irrigation method trends from 1993 to 2007.

Table 4. 1993 - net acre distribution of irrigation methods by crop type based on 94% companies reported

1993	Furrow	Sprinkler & Furrow	Hand Move Sprinklers	Solid Set Sprinklers	Linear Move	Drip	Other ¹	Total
Vegetables	2,349	84,060	30,764	6,607	3,827	3,682	0	131,289
Field Crops	575	2,173	2,236	90	50	48	0	5,172
Berries	1	0	0	0	0	4,158	0	4,159
Grapes	261	0	0	13,347	0	15,976	0	29,584
Tree Crops	0	0	122	251	0	1,216	10	1,599
Forage	41	202	1,327	0	48	0	189	1,807
Unirrigated								N/A
Total	3,227	86,435	34,449	20,295	3,925	25,080	199	173,610

Table 5. 2005 - net acre distribution of irrigation methods by crop type based on 90% companies reported

2005	Furrow	Sprinkler & Furrow	Hand Move Sprinklers	Solid Set Sprinklers	Linear Move	Drip	Other ¹	Total
Vegetables	704	42,783	26,540	9,396	1,383	35,850	355	117,011
Field Crops	225	367	377	547	0	0	115	1,631
Berries	0	4	0	0	0	4,662	0	4,666
Grapes	8	0	0	1,970	0	31,999	0	33,977
Tree Crops	0	0	2,338	441	0	3,252	0	6,031
Forage	18	40	214	15	0	0	7	294
Unirrigated								4,381
Total	955	43,194	29,469	12,369	1,383	75,763	477	167,991

Table 6. 2006 - net acre distribution of irrigation methods by crop type based on 97% companies reported

2006	Furrow	Sprinkler & Furrow	Hand Move Sprinklers	Solid Set Sprinklers	Linear Move	Drip	Other ¹	Total
Vegetables	590	42,577	27,873	9,553	1,640	37,368	732	120,333
Field Crops	156	447	270	85	0	206	78	1,242
Berries	0	0	0	0	0	5,312	0	5,312
Grapes	0	0	0	1,947	0	35,229	0	37,176
Tree Crops	0	0	2,338	441	0	3,042	0	5,821
Forage	0	0	362	15	0	0	97	474
Other Type ²	18	0	64	554	0	222	68	926
Unirrigated								3,254
Total	764	43,024	30,907	12,595	1,640	81,379	975	174,538

Table 7. 2007 - net acre distribution of irrigation methods by crop type based on 94% companies reported

2007	Furrow	Sprinkler & Furrow	Hand Move Sprinklers	Solid Set Sprinklers	Linear Move	Drip	Other ¹	Total
Vegetables	1,043	31,097	23,516	11,017	1,941	52,644	13	121,271
Field Crops	41	277	311	0	0	1,585	78	2,292
Berries	0	0	0	0	0	4,647	0	4,647
Grapes	0	0	0	990	0	33,559	0	34,549
Tree Crops	0	0	2,262	441	0	2,898	0	5,601
Forage	0	45	135	0	0	0	100	280
Other Type ²	18	0	0	512	0	382	174	1,086
Unirrigated								1,501
Total	1,102	31,419	26,224	12,960	1,941	95,715	365	171,227

¹ "Other" may include an irrigation system not listed here or a different combination of systems

² "Other Type" are for other crop types not included, i.e. cactus, flower bulbs, etc.

NOTE: Percentage companies reported varies from year to year

Agricultural Water Conservation Plans (continued)

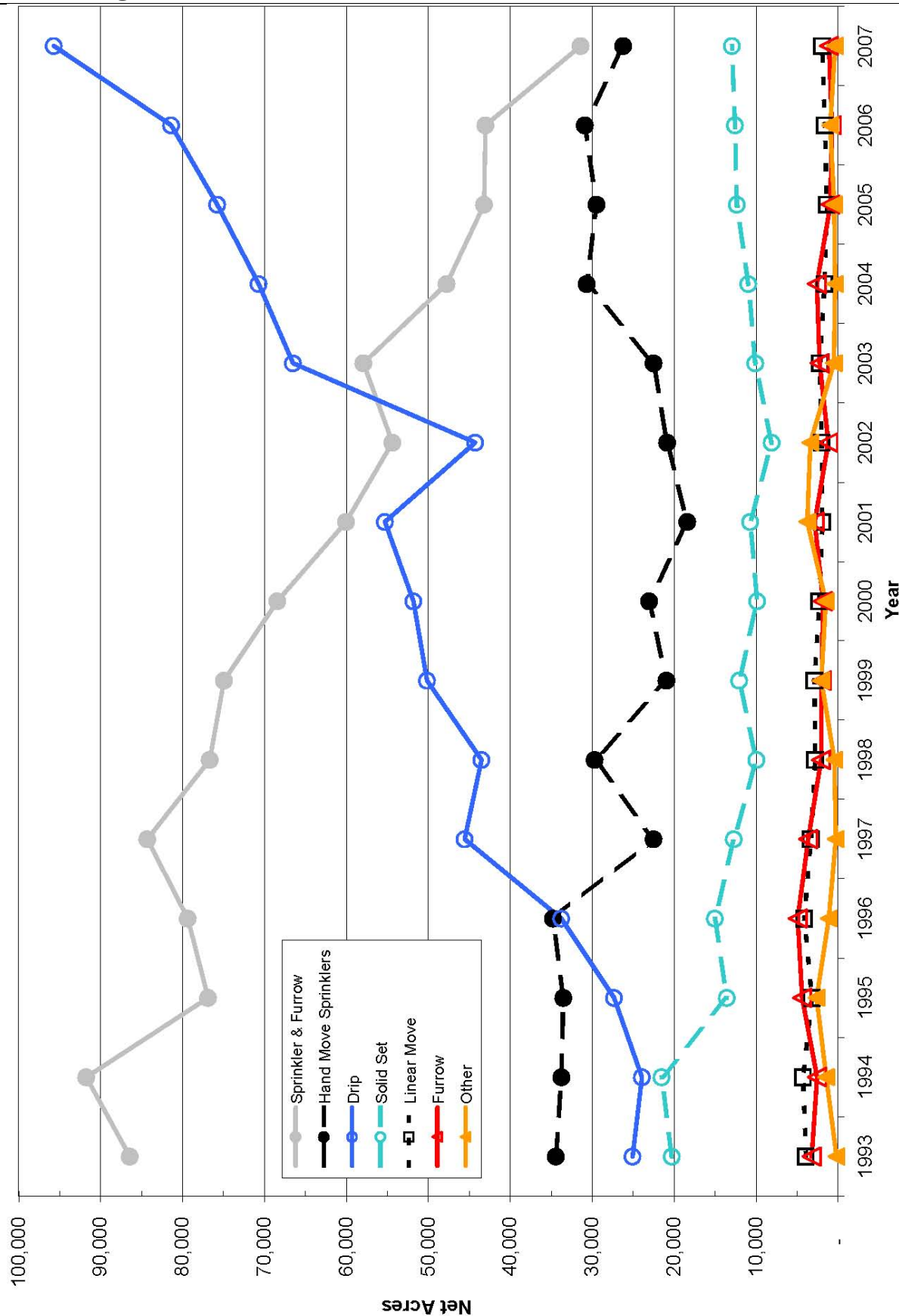


Figure 5. Types of irrigation methods used in the Salinas Valley based on companies reported

NOTE: Reported net acres vary from year to year

Agricultural Water Conservation Plans (continued)

Since 1991, Salinas Valley growers have submitted Agricultural Water Conservation Plans to the Agency. Table 8 shows the number of net acres, by year, for selected Best Management Practices (BMPs) or water conservation measures which have been implemented over the past eight years.

Table 8. Agricultural Best Management Practices implemented from 2000 through 2007

Best Management Practices	Net Acres ¹							
	2000	2001	2002	2003	2004	2005	2006	2007
12 Months Set Aside	1,396	2,363	3,940	2,742	6,012	3,337	2,557	2,282
Summer Fallow	3,511	1,532	2,652	2,278	2,025	2,535	5,797	464
Water Flowmeters	127,454	125,624	106,739	124,342	133,349	131,711	133,148	137,701
Time Clock/Pressure Switch	130,298	124,427	116,062	133,405	140,167	138,707	142,184	148,993
Soil Moisture Sensors	58,975	56,148	45,927	50,460	49,328	48,824	50,130	53,269
Pre-Irrigation Reduction	93,733	82,791	80,501	90,878	93,094	88,576	96,082	102,103
Reduced Sprinkler Spacing	74,245	68,963	61,607	76,691	82,292	81,068	87,159	85,105
Sprinkler Improvements	95,356	89,505	85,302	110,194	102,041	105,544	102,642	105,491
Off-Wind Irrigation	101,828	93,387	91,706	111,278	111,862	117,254	113,867	112,952
Leakage Reduction	106,917	95,304	95,217	121,890	118,125	115,117	116,662	117,655
Micro Irrigation System	55,292	55,261	44,078	58,742	62,796	68,861	74,829	77,107
Surge Flow Irrigation	15,796	10,677	7,084	8,538	6,708	7,180	7,117	4,551
Tailwater Return System	23,773	26,236	25,263	23,914	27,653	23,097	23,968	14,410
Land Leveling/Grading	61,001	54,319	56,361	69,420	71,682	69,673	71,873	73,993

¹ Due to unique crop rotations, it is difficult to account for each BMP used on total Crop Acres; therefore Net Acres were used.

Note: For Urban Water Conservation Plan information, see page 10.

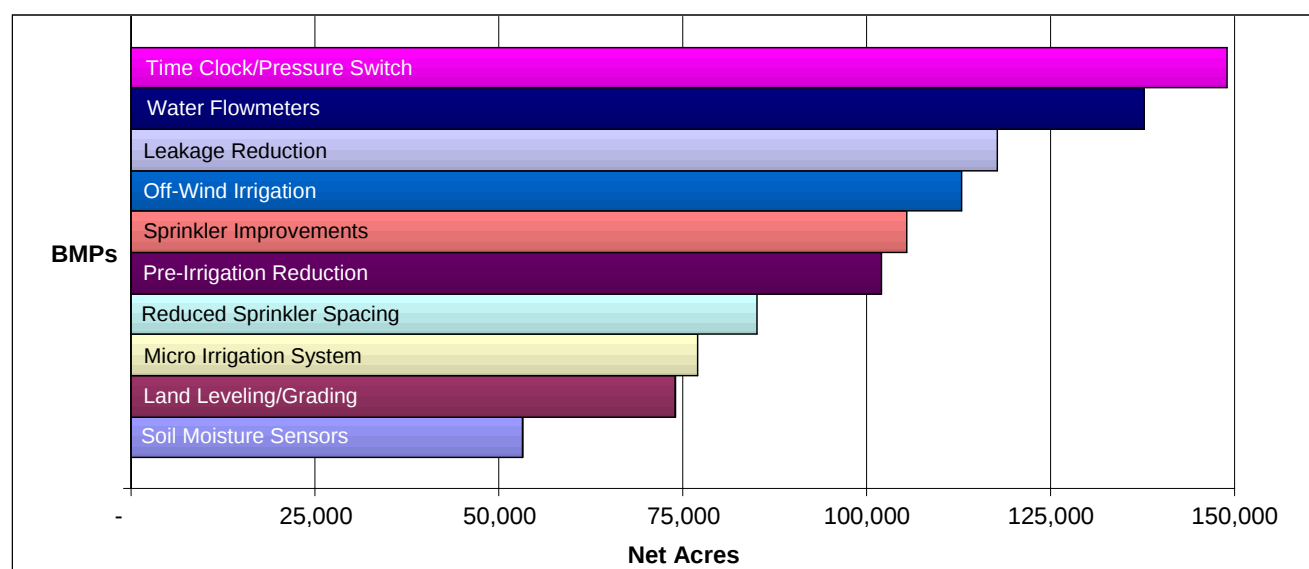


Figure 6. Top ten Best Management Practices forecasted for 2007 by reported net acres

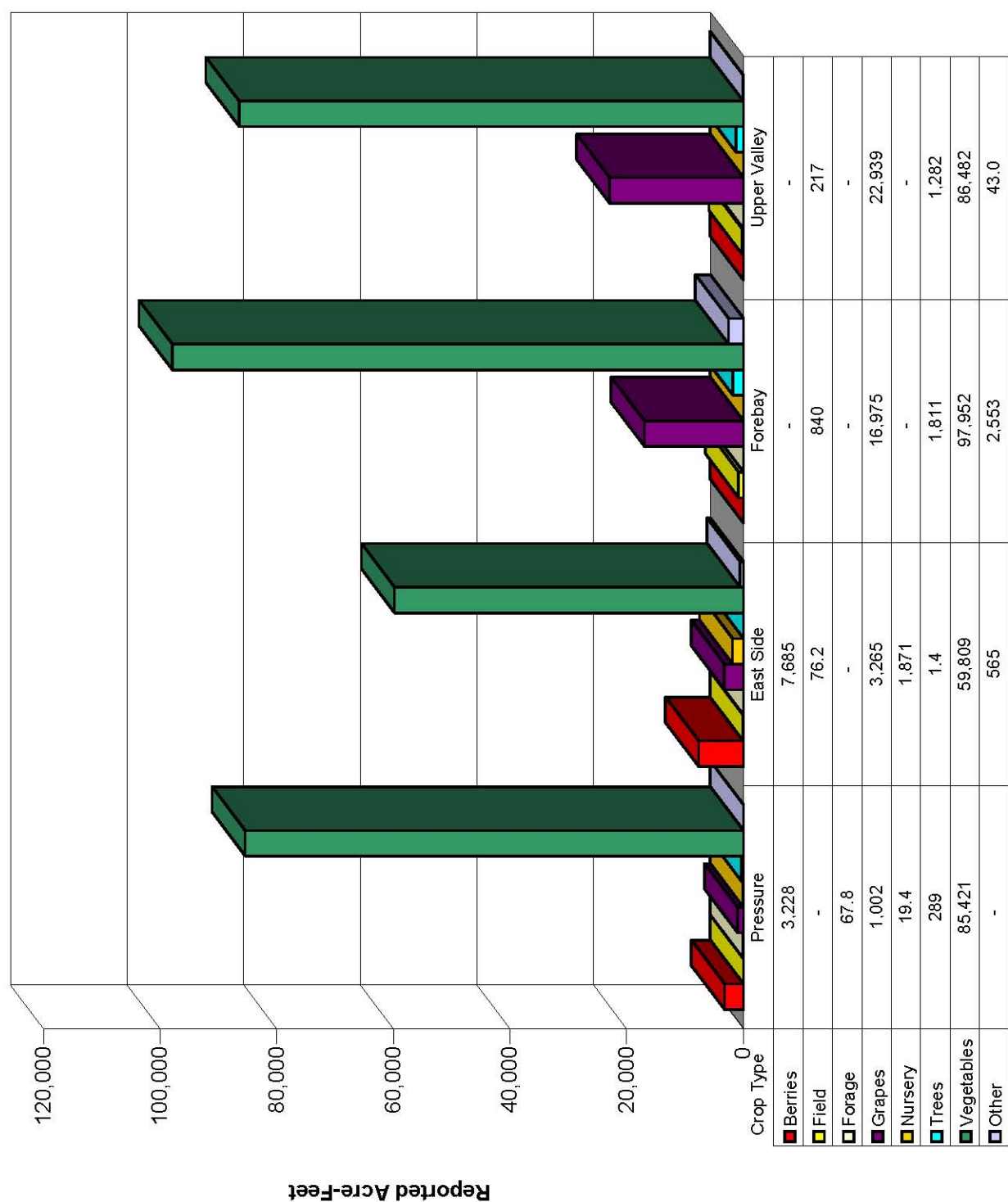
Water and Land Use Form

Agricultural Water Pumped

The following three figures present the agricultural water pumped (Fig. 7), irrigated net acres (Fig. 8), and amount of water pumped per acre (Fig. 9) by hydrologic subarea and crop type. The data was compiled using the reported acreage and water pumped from the 2006 Water and Land Use Form. The data accounts for all crop types reported and all reporting methods: Water Flowmeter, Electrical Meter, and Hour Meter.

Changing weather patterns, variable soils, and crop types affect the amount of water needed for efficient irrigation. Even during a normal rain year, pumping rates will vary from one area to another and crop types will vary depending on economic demand.

Water and Land Use Form (continued)



Hydrologic Subarea

Figure 7. 2006 reported acre-feet by crop type & hydrologic subarea

Water and Land Use Form (continued)

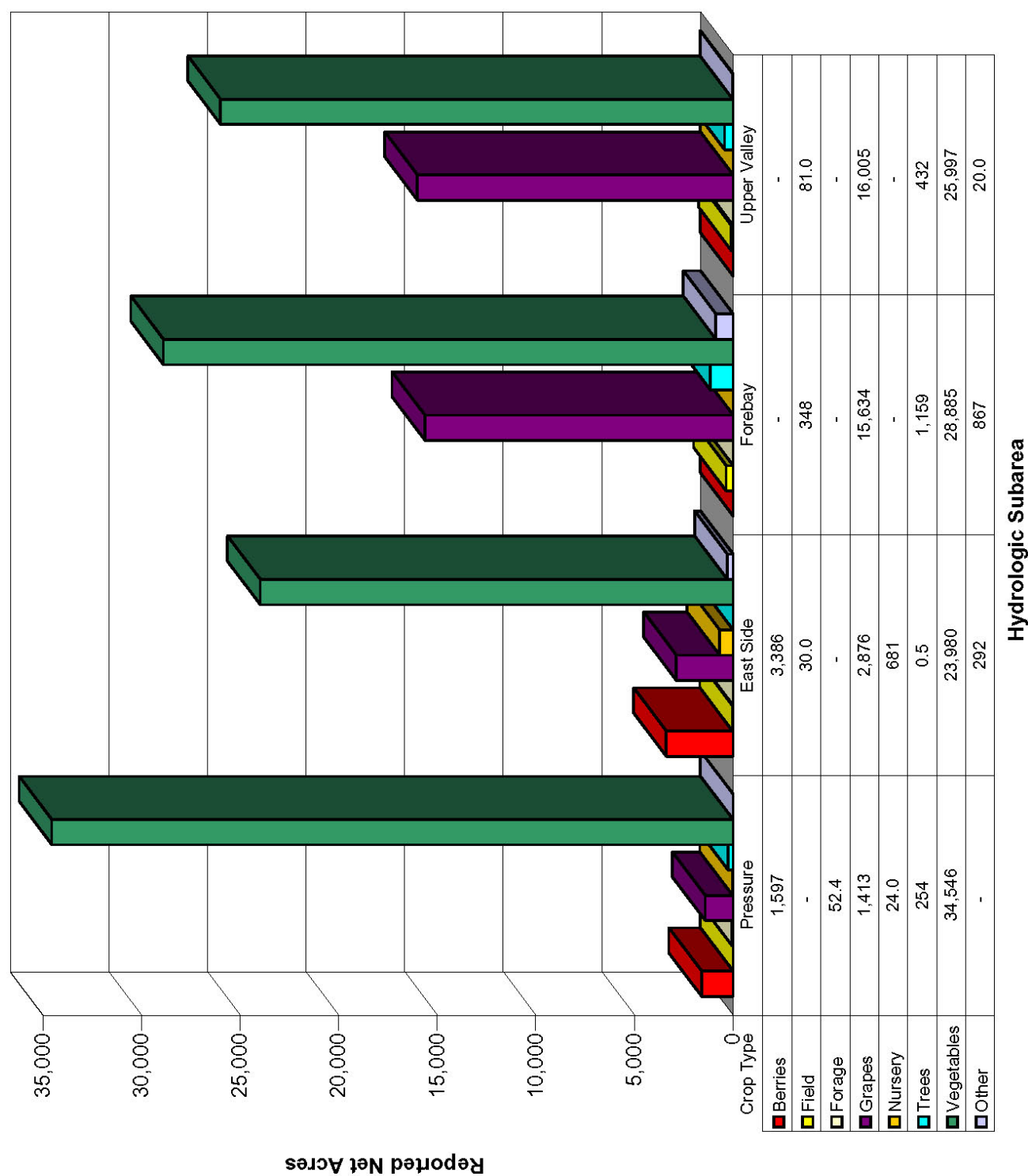


Figure 8. 2006 reported net acres by crop type & hydrologic subarea

Water and Land Use Form (continued)

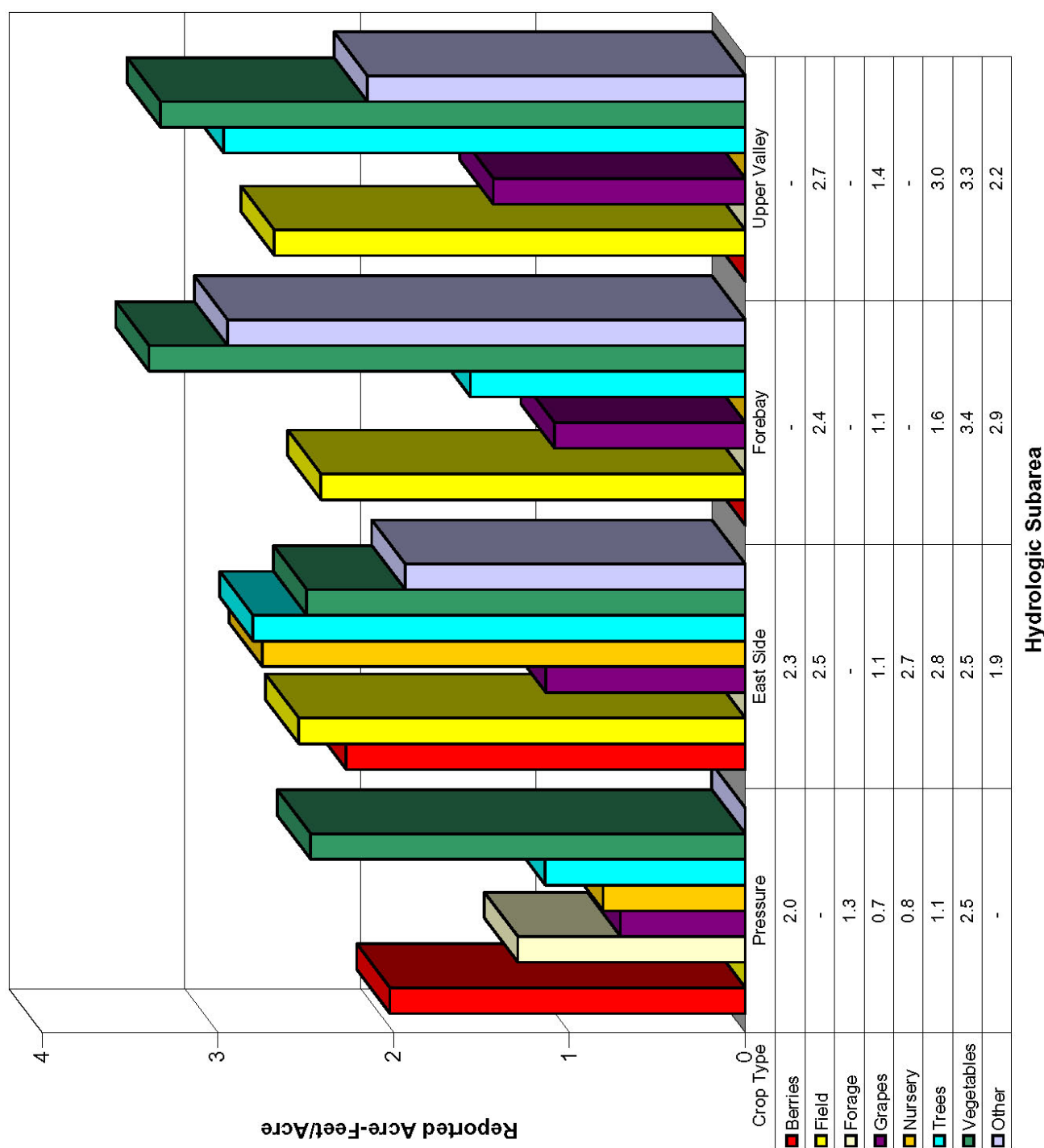


Figure 9. 2006 reported acre-feet/acre by crop type & hydrologic subarea

Urban Water Conservation Plans

Since 1996, the Agency has been collecting data for the Urban Water Conservation Plan program. Table 9 shows the implementation of “Best Management Practices” (water conservation measures) for the past five years, as a percentage of total acreage reported. It is important to note that, while all of the listed practices apply to “large” water systems (200 or more customer connections), not all apply to “small” water systems (between 15 and 199 customer connections). The practices that apply *only* to large systems are printed in **bold** below.

Table 9. Urban Best Management Practices implemented from 2003 through 2007

Best Management Practices	2003	2004	2005	2006	2007
Provide speakers to community groups and media	77%	71%	42%	70%	67%
Use paid and public service advertising	77%	74%	45%	70%	67%
Provide conservation information in bill inserts	56%	65%	52%	76%	54%
Provide individual historical water use information on water bills	88%	77%	72%	81%	80%
Coordinate with other entities in regional efforts to promote water conservation practices	85%	91%	68%	92%	82%
Work with school districts to provide educational materials and instructional assistance	54%	33%	46%	72%	68%
Implement requirements that all new connections be metered and billed by volume of use	90%	95%	76%	93%	81%
Establish a program to retrofit any existing unmetered connections and bill by volume of use	69%	49%	45%	57%	54%
Offer free interior and exterior water audits to identify water conservation opportunities	75%	58%	96%	92%	100%
Provide incentives to achieve water conservation by way of free conservation fixtures (showerheads, hose end timers) and/or conservation “adjustments” to water bills	73%	35%	70%	68%	61%
Enforcement and support of water conserving plumbing fixture standards, including requirement for ultra low flush toilets in all new construction	95%	95%	94%	94%	100%
Support of State/Federal legislation prohibiting sale of toilets using more than 1.6 gallons per flush	89%	96%	95%	90%	88%
Program to retrofit existing toilets to reduce flush volume (with displacement devices)	42%	56%	54%	62%	41%
Program to encourage replacement of existing toilets with ultra low flush (through rebates, incentives, etc.)	71%	71%	33%	71%	67%
Provide guidelines, information, and/or incentives for installation of more efficient landscapes and water-saving practices	87%	93%	86%	83%	63%
Encourage local nurseries to promote use of low water use plants	39%	3%	53%	59%	35%
Develop and implement landscape water conservation ordinances pursuant to the “Water Conservation in Landscaping Act”	56%	51%	36%	35%	11%
Identify and contact top industrial, commercial, and/or institutional customers directly; offer and encourage water audits to identify conservation opportunities	53%	4%	67%	68%	59%
Review proposed water uses for new commercial and industrial water service, and make recommendations for improving efficiency before completion of building permit process	80%	10%	73%	73%	62%
Complete an audit of water distribution system at least every three years as prescribed by American Water Works Association	20%	76%	58%	64%	36%
Perform distribution system leak detection and repair whenever the audit reveals that it would be cost effective	21%	77%	60%	71%	47%
Advise customers when it appears possible that leaks exist on customer’s side of water meter	93%	96%	94%	94%	84%
Identify irrigators of large landscapes (3 acres or more) and offer landscape audits to determine conservation opportunities	52%	4%	29%	30%	8%
Provide conservation training, information, and incentives necessary to encourage use of conservation practices	55%	8%	34%	32%	61%
Encourage and promote the elimination of non-conserving pricing and adoption of conservation pricing policies	43%	20%	24%	30%	30%
Implementation of conservation pricing policies	43%	21%	26%	29%	30%
Enact and enforce measures prohibiting water waste as specified in Agency Ordinance No. 3932 or as subsequently amended, and encourage the efficient use of water	71%	83%	51%	46%	33%
Implement and/or support programs for the treatment and reuse of industrial waste water / storm water / waste water	42%	37%	40%	40%	26%

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**Monterey County
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**Monterey County Water Resources Agency
Executive Management**

Curtis V. Weeks, General Manager
William L. Phillips, Deputy General Manager
Robert Johnson, Chief of Water Resources Planning and Management

Summary Report Team

Kathleen Thomasberg, Program Manager II
Jess Barreras, Hydrologist
Carla James, Water Resources Technician
Tamara Voss, Water Resources Technician
Teresa Campa, Engineering Aide II

For more information, contact:

Monterey County Water Resources Agency
893 Blanco Circle, Salinas

Mailing address:
P.O. Box 930, Salinas, CA 93902-0930

831.755.4860
831.424.7935 (fax)

www.mcwra.co.monterey.ca.us

