

2001 Ground Water Extraction Summary Report



Monterey County Water Resources Agency

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Overview of the Ground Water Extraction Reporting Program

History of the Ground Water Extraction 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 and service connections. Ordinance No. 3717, which replaced Ordinance No. 3663, was adopted in October 1993; it modified certain other requirements in the old ordinance but kept the ground water extraction reporting requirements in place for wells with a discharge pipe having an inside diameter of at least three inches.

Monterey County Water Resources Agency (Agency) has collected ground water extraction data from well operators for water reporting years beginning November 1 and ending October 31, starting with the 1992-1993 water-reporting year. The information received from the over 300 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, 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. Developed as the urban counterpart of the agricultural water conservation plans, this program provides an overview of per capita water use and the best management practices being implemented by urban water users as conservation measures.

2001 Ground Water Extraction Summary Report

The purpose of this report is to summarize the data collected in February 2002 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 water-reporting year of **November 1, 2000, through October 31, 2001**; the *urban* data covers **calendar year 2001**. The agricultural and urban water conservation plans adopted for 2002 are also summarized. With this information, this report is intended to present a snapshot of current water pumping within the Salinas Valley, including agricultural and urban water conservation improvements that are being implemented to reduce total water pumping. It is not the purpose of this report to thoroughly analyze the factors that contribute to increases or decreases in pumping.

Explanation of Reporting Methods

The ground water extraction reporting program allows water users to report water well extractions by one of three different measuring methods: water flowmeter, electrical meter, or hour meter (timer) data. The Agency requires regular pump efficiency testing to ensure the accuracy of the data reported. The summary of ground water extractions presented in this report is compiled from data generated from all three reporting methods.

Disclaimer Regarding Quality of Data

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 affect the calculations, it is understood that no reporting method is 100 percent accurate.

The Agency did not receive ground water extraction reports from approximately eighteen percent (18%) of the wells in the Salinas Valley for the 2000-2001 (2001) water-reporting year. Agricultural and Urban Water Conservation Plan submittals for 2002 were short by twenty-five percent (25%) and forty percent (40%), respectively.

Notes Regarding Data 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 Agency has designated subareas of the Salinas Valley Ground Water Basin whose boundaries are drawn where discernible changes occur in the hydrogeologic conditions. These boundaries are shown in Figure 1.

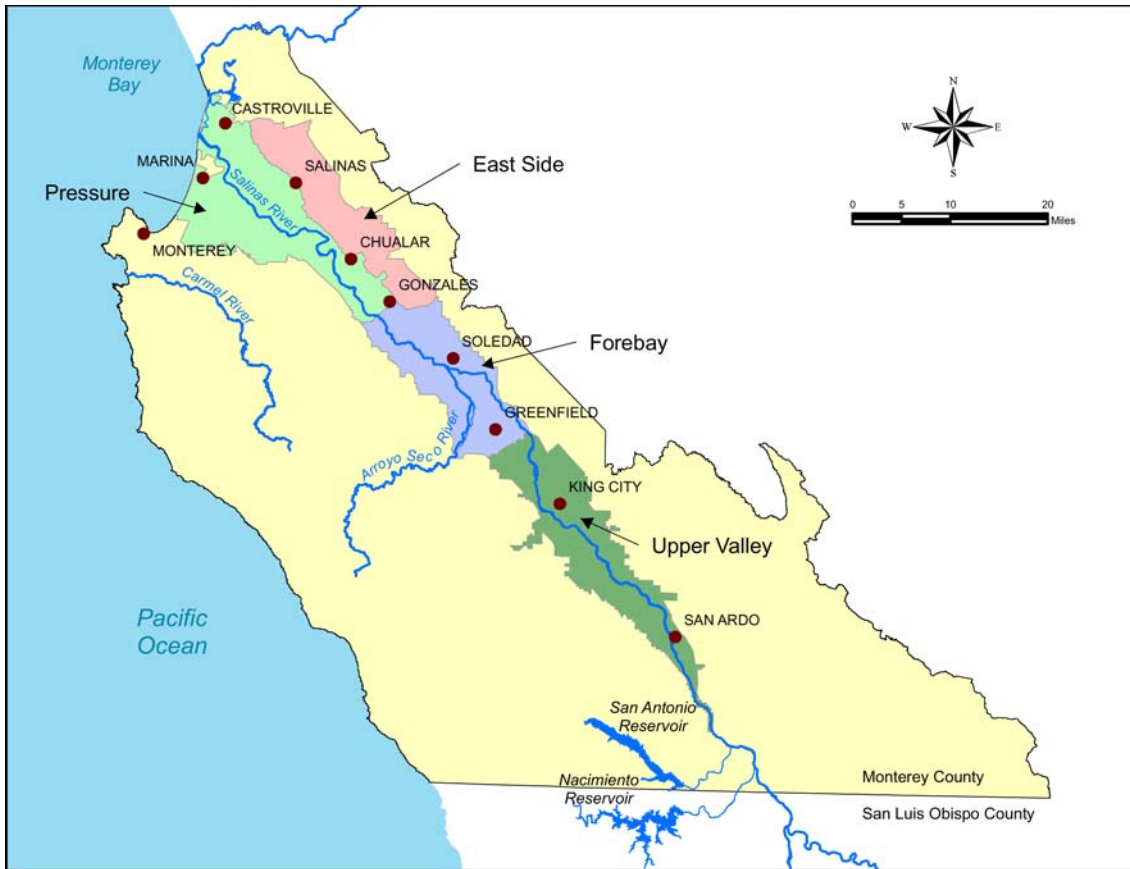


Figure 1: Salinas Valley subareas

Summary of Methods Used for Extraction Reporting

The distribution of methods used for extraction reporting for the 2001 water-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-Foot per Reporting Method</i>	<i>Wells per Reporting Method</i>
Water Flowmeter	284,882	1,015
Electrical Meter	151,148	393
Hour Meter	5,246	11
Total	441,276	1,419
Average ('95-'01)	504,965	1,727

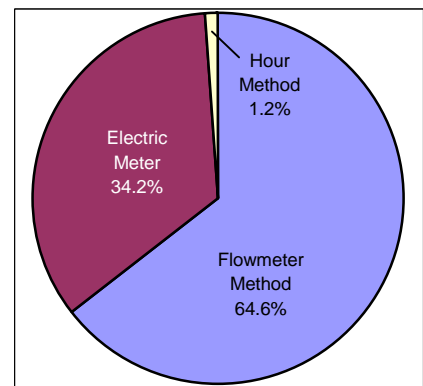


Figure 2: Percentage by volume of methods used for extraction reporting

Ground Water Extraction Data Summary (continued)

Total Extraction Data by Subarea and Type of Use

The total ground water extractions from Zones 2, 2A and 2B for the 2001 water-reporting year are summarized by hydrologic subarea, type of use (agricultural and urban in Table 2) and percentage of use (Figure 3).

Table 2. Total extraction data by 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	88,168	20,524	108,692
East Side	73,272	8,000	81,272
Forebay	134,571	5,175	139,746
Upper Valley	107,572	3,995	111,567
Total	403,583	37,693	441,276

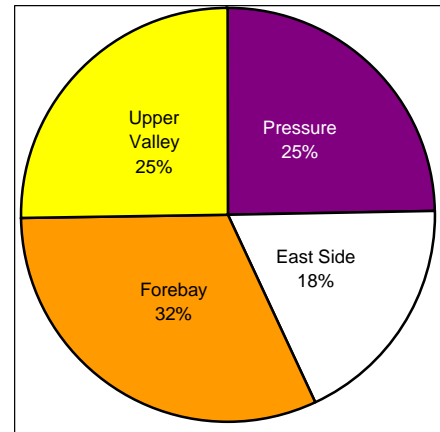


Figure 3: Percentage of total extractions by subarea

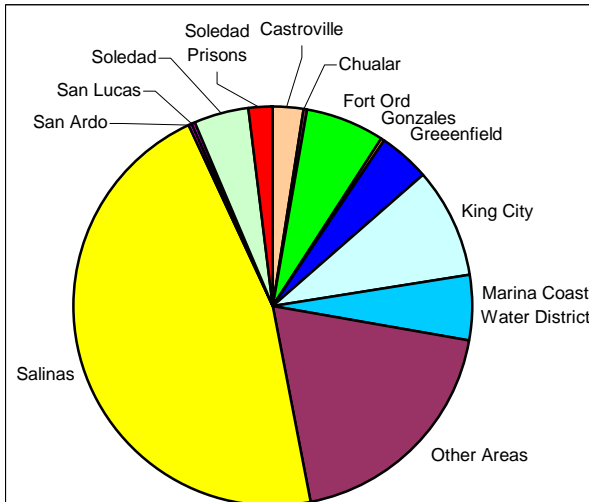


Figure 4: Percentage representation of urban extraction by city or area

Urban Extraction Data by City or Area

The total ground water extractions attributed to urban (residential, commercial/institutional, industrial, and governmental) pumping for the 2001 water-reporting year are summarized by city or area in Table 3. Figure 4 is a graphic representation of each city or area's percentage of the total urban pumping for 2001.

Table 3. Urban extraction data by city or area

<i>City or Area</i>	<i>Urban Pumping (acre-feet)</i>	<i>Percentage of Total</i>
Castroville	975	2.6%
Chualar	150	0.4%
Fort Ord	2,490	6.6%
Gonzales	101	0.3%
Greenfield	1,635	4.3%
King City	3,513	9.3%
Marina Coast Water District	2,174	5.8%
Other Areas	5,612	14.9%
Salinas	18,283	48.5%
San Ardo	128	0.3%
San Lucas	101	0.3%
Soledad	1,774	4.7%
Soledad Prisons	758	2.0%
Total	37,693	100.0%

Agricultural Water Conservation Plans

The Agricultural Water Conservation Plans include net irrigated acreage, irrigation method, and crop category. This information 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, 2000, 2001 and 2002 respectively.

Table 4. 1993 - net acre distribution of irrigation methods by crop type based on N/A¹ % companies reported

1993	Furrow	Sprinkler & Furrow	Hand Move Sprinklers	Solid Set Sprinklers	Linear Move	Drip	Other ²	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. 2000 - net acre distribution of irrigation methods by crop type based on 84% companies reported

2000	Furrow	Sprinkler & Furrow	Hand Move Sprinklers	Solid Set Sprinklers	Linear Move	Drip	Other ²	Total
Vegetables	1,423	66,971	21,955	5,171	2,249	17,428	868	116,065
Field Crops	305	522	605	313	39	620	62	2,466
Berries	100	0	0	0	0	2,692	0	2,792
Grapes	10	912	0	3,903	0	30,115	528	35,468
Tree Crops	0	0	0	267	0	985	0	1,252
Forage	27	20	493	207	0	0	59	806
Unirrigated								604
Total	1,865	68,425	23,053	9,861	2,288	51,840	1,517	159,453

Table 6. 2001 - net acre distribution of irrigation methods by crop type based on 72% companies reported

2001	Furrow	Sprinkler & Furrow	Hand Move Sprinklers	Solid Set Sprinklers	Linear Move	Drip	Other ²	Total
Vegetables	2,286	59,529	17,488	5,994	1,920	17,112	1,792	106,120
Field Crops	551	490	671	247	0	356	126	2,441
Berries	1	0	66	1,298	0	8,883	0	10,248
Grapes	11	0	0	2,600	0	28,005	919	31,536
Tree Crops	1	0	51	370	0	946	0	1,368
Forage	0	27	122	212	7	0	920	1,288
Unirrigated								991
Total	2,850	60,046	18,398	10,720	1,927	55,302	3,758	153,992

Table 7. 2002 - net acre distribution of irrigation methods by crop type based on 75% companies reported

2002	Furrow	Sprinkler & Furrow	Hand Move Sprinklers	Solid Set Sprinklers	Linear Move	Drip	Other ²	Total
Vegetables	1,141	53,688	18,458	4,625	1,878	13,251	3,200	96,241
Field Crops	32	670	612	386	0	0	0	1,700
Berries	0	0	54	54	127	2,746	0	2,981
Grapes	8	0	820	2,761	0	27,970	195	31,753
Tree Crops	0	0	280	64	0	333	0	678
Forage	27	44	649	207	0	0	14	941
Unirrigated								2,948
Total	1,208	54,402	20,873	8,097	2,005	44,300	3,409	137,242

¹ "N/A" - 1993 % companies reported are unavailable

² "Other" may include an irrigation system not listed here or a different combination of systems

NOTE: Percent companies reported varies from year to year

Agricultural Water Conservation Plans

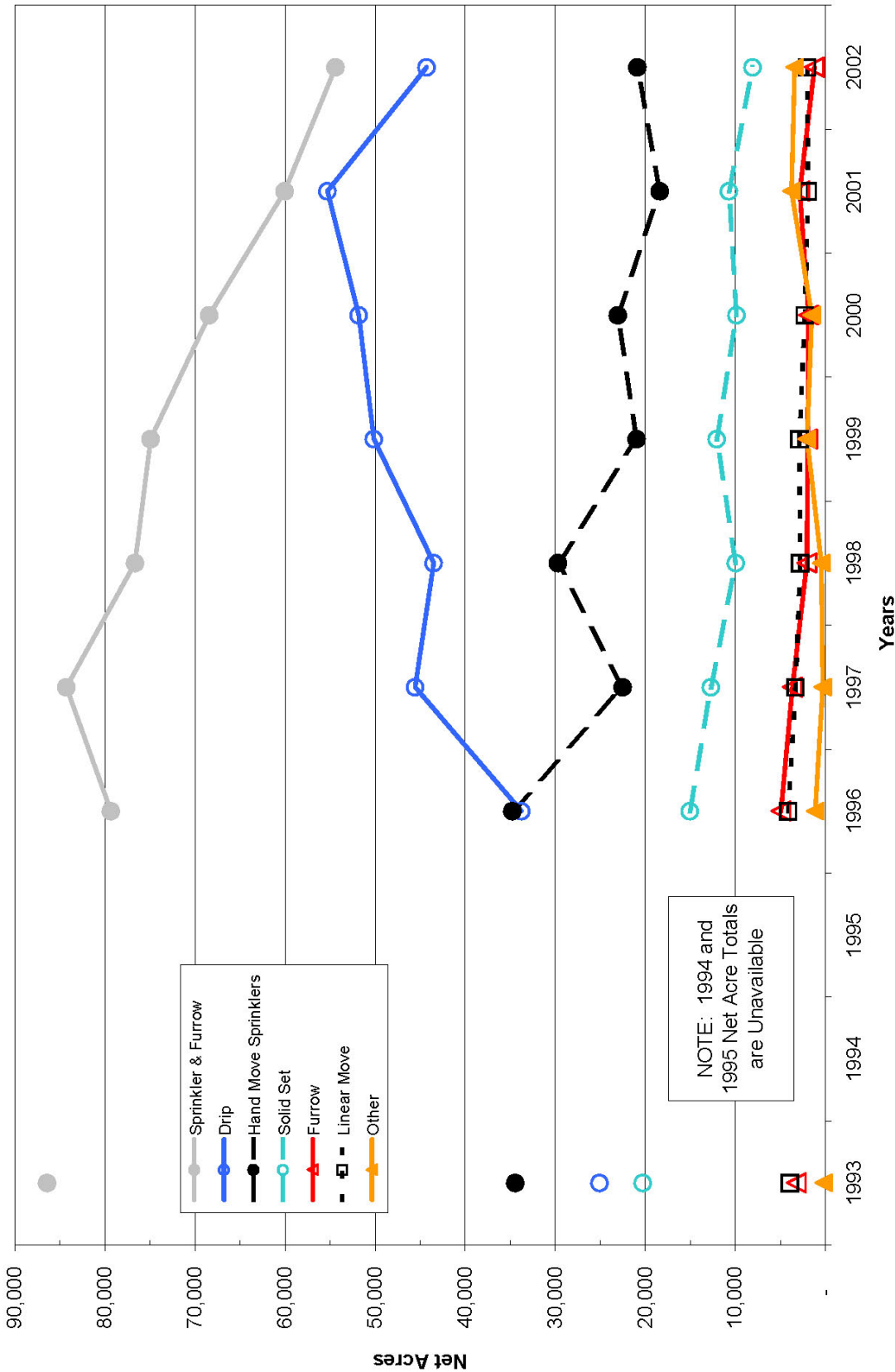


Figure 5. Types of irrigation methods used in the Salinas Valley based on companies reported

NOTE: Reported net acres vary from year to year

Agricultural Water Conservation Plans

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

Table 8. Agricultural “Best Management Practices” implemented from 1994 through 2002

<i>Best Management Practices (BMP)</i>	<i>Net Acres¹</i>								
	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>
12 Months Set Aside	6,096	5,064	3,123	3,508	2,058	1,332	1,396	2,363	3,940
Summer Fallow	4,081	6,486	6,208	2,241	2,277	3,657	3,511	1,532	2,652
Flowmeters	127,971	122,054	126,031	122,475	132,225	124,963	127,454	125,624	106,739
Time Clock/Pressure Switch	134,985	121,645	137,297	135,954	137,414	130,863	130,298	124,427	116,062
Soil Moisture Sensors	43,883	43,188	51,428	56,936	58,854	62,357	58,975	56,148	45,927
Pre-Irrigation Reduction	108,454	104,937	99,429	104,203	101,649	89,454	93,733	82,791	80,501
Reduced Sprinkler Spacing	74,409	75,451	78,925	78,142	81,856	75,884	74,245	68,963	61,607
Sprinkler Improvements	107,626	102,053	116,809	110,523	108,507	98,409	95,356	89,505	85,302
Off-Wind Irrigation	101,765	94,810	113,381	111,076	102,873	102,433	101,828	93,387	91,706
Leakage Reduction	112,135	110,973	119,727	125,334	120,006	114,882	106,917	95,304	95,217
Micro Irrigation System	25,506	29,307	37,991	42,367	40,893	48,562	55,292	55,261	44,078
Surge Flow Irrigation	37,866	15,202	19,772	20,507	16,192	18,468	15,796	10,677	7,084
Tailwater Return System	20,994	15,101	22,707	21,121	22,803	23,597	23,773	26,236	25,263
Land Leveling/Grading	58,963	57,749	64,164	65,143	57,625	58,679	61,001	54,319	56,361

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

Water and Land Use Form

Summary of Reported Unit Agricultural Water Pumped by Subarea

Table 9 presents the average unit agricultural water pumped (acre-feet/acre) by subarea, calculated using the reported acreage and water pumped from the 2000-2001 Water and Land Use Form. The data accounts for all crop types reported, including nurseries, and all reporting methods: Flowmeter, Electric Meter and Hour Meter.

Table 9. Reported unit agricultural water pumped by subarea

<i>Subarea</i>	<i>Pressure</i>	<i>East Side</i>	<i>Forebay</i>	<i>Upper Valley</i>	<i>Overall Average</i>
Unit Water Pumped (acre-feet/acre)	2.1	2.2	2.1	2.6	2.3

Changing weather patterns and variable soil 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 vary depending on economic demand.

NOTE: Table 9 data should not be compared to the 1995 through 1998 Summary Reports because this table contains a larger data set; comparison to previous data could cause inaccurate conclusions.

Urban Water Conservation Plans

Since 1996, the Agency has been collecting data for the Urban Water Conservation Plan program. Table 10 shows the implementation of “Best Management Practices,” 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 the “large” water systems (200 or more customer connections), not all apply to the “small” water systems (between 15 and 199 customer connections). The practices that apply *only* to the large systems are printed in **bold** below.

Table 10. Urban “Best Management Practices” implemented from 1998 through 2002.

Best Management Practices	1998	1999	2000	2001	2002
Provide speakers to community groups and media	56%	63%	43%	65%	94%
Use paid and public service advertising	55%	63%	43%	63%	90%
Provide conservation information in bill inserts	66%	58%	48%	88%	82%
Provide individual historical water use information on water bills	62%	54%	50%	69%	84%
Coordinate with other entities in regional efforts to promote water conservation practices	64%	88%	51%	91%	84%
Work with school districts to provide educational materials and instructional assistance	44%	26%	43%	72%	94%
Implement requirements that all new connections be metered and billed by volume of use	92%	89%	93%	93%	91%
Establish a program to retrofit any existing unmetered connections and bill by volume of use	80%	59%	58%	92%	55%
Offer free interior and exterior water audits to identify water conservation opportunities	40%	18%	8%	81%	55%
Provide incentives to achieve water conservation by way of free conservation fixtures (showerheads, hose end timers) and/or conservation “adjustments” to water bills	51%	34%	39%	65%	89%
Enforcement and support of water conserving plumbing fixture standards, including requirement for ultra low flush toilets in all new construction	38%	43%	13%	70%	95%
Support of State/Federal legislation prohibiting sale of toilets using more than 1.6 gallons per flush	72%	61%	64%	90%	85%
Program to retrofit existing toilets to reduce flush volume (with displacement devices)	91%	50%	48%	64%	45%
Program to encourage replacement of existing toilets with ultra low flush (through rebates, incentives, etc.)	46%	48%	39%	65%	87%
Provide guidelines, information, and/or incentives for installation of more efficient landscapes and water-saving practices	94%	81%	51%	67%	64%
Encourage local nurseries to promote use of low water use plants	64%	50%	45%	84%	82%
Develop and implement landscape water conservation ordinances pursuant to the “Water Conservation in Landscaping Act”	21%	49%	41%	44%	65%
Identify and contact top industrial, commercial, and/or institutional customers directly; offer and encourage water audits to identify conservation opportunities	3%	3%	6%	30%	56%
Review proposed water uses for new commercial and industrial water service, and make recommendations for improving efficiency before completion of building permit process	47%	26%	45%	45%	69%
Complete an audit of water distribution system at least every three years as prescribed by AWWA	76%	60%	52%	70%	57%
Perform distribution system leak detection and repair whenever the audit reveals that it would be cost effective	93%	89%	56%	94%	90%
Advise customers when it appears possible that leaks exist on customer’s side of water meter	93%	90%	93%	93%	91%
Identify irrigators of large landscapes (3 acres or more) and offer landscape audits to determine conservation opportunities	36%	16%	32%	47%	60%
Provide conservation training, information, and incentives necessary to encourage use of conservation practices	36%	16%	32%	83%	56%
Encourage and promote the elimination of non-conserving pricing and adoption of conservation pricing policies	52%	56%	56%	30%	87%
Implementation of conservation pricing policies	52%	54%	54%	30%	62%
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	91%	82%	41%	94%	86%
Implement and/or support programs for the treatment and reuse of industrial waste water / storm water / waste water	44%	56%	45%	34%	63%

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