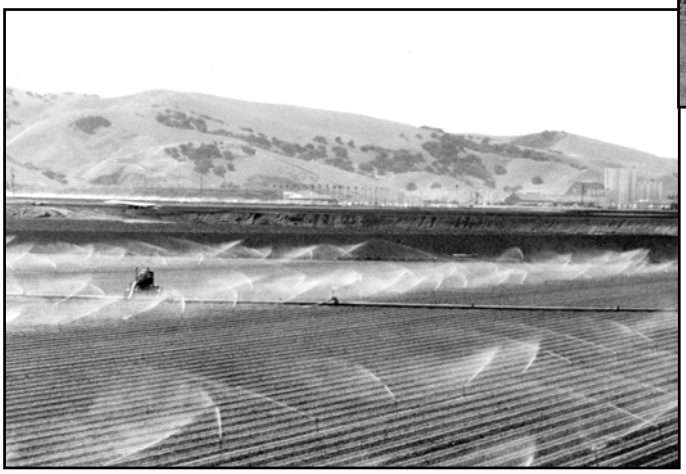

1999 Ground Water Extraction Summary Report

Published by
Monterey County Water Resources Agency

October 2004

Revised
August 2005

Table of Contents

List of Tables

List of Figures

Overview of the Extraction Reporting Program

History of the 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 3 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.

1999 Ground Water Extraction Summary Report
The purpose of this report is to summarize the data collected in February 2000 from the following annual reporting programs: Ground Water Extraction Reporting, Agricultural and Urban Water Conservation Plans, and Water and Land Use Information. The *agricultural* data from the ground water extraction reporting program covers the water reporting year of **November 1, 1998, through October 31, 1999**; the *urban* data covers **calendar year 1999**. The agricultural and urban water conservation plans adopted for 2000 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 nine percent (9%) of the wells in the Salinas Valley for the 1998-1999 (1999) water reporting year. Agricultural and Urban Water Conservation Plan submittals for 1999 were short by sixteen percent (16%) and twenty-seven percent (27%), 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.

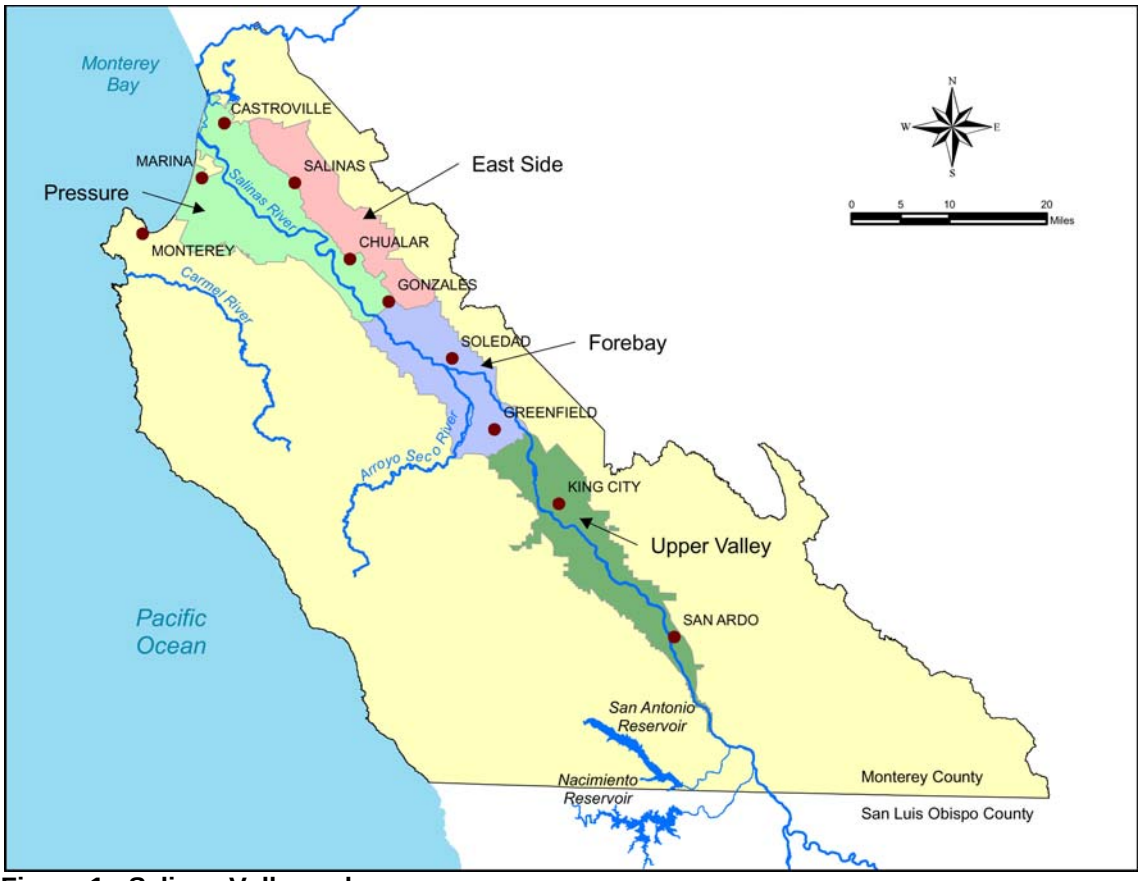

Figure 1: Salinas Valley subareas

Summary of Methods Used for Extraction Reporting

The distribution of methods used for extraction reporting for the 1998-1999 water reporting year is shown in Table 1; a percentage distribution by volume is shown in Figure 2.

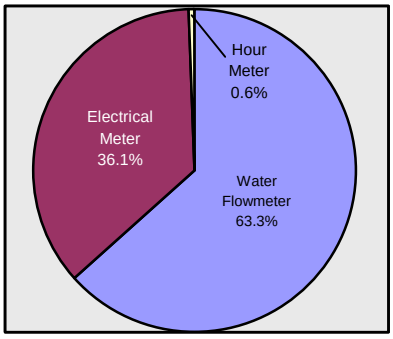

Figure 2: Percentage by volume of methods used for extraction reporting.

Table 1. Total extraction data by reporting method

Reporting Method	*Acre-Feet per Reporting Method*	*Wells per Reporting Method*
Water Flowmeter	319,257	1,154
Electrical Meter	182,119	463
Hour Meter	3,191	8
Total	**504,567**	**1,625**
Average ('95-'99)	**523,511**	**1,757**

Ground Water Extraction Data Summary

Total Extraction Data by Subarea and Type of Use

The total ground water extractions from Zones 2, 2A and 2B for the 1998-1999 (1999) water reporting year are summarized by hydrologic subarea and (1) type of use (agricultural and urban) in Table 2 and (2) percentage in Figure 3.

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

Subarea	*Agricultural Pumping (acre-feet)*	*Urban Pumping (acre-feet)*	*Total Pumping (acre-feet)*
Pressure	97,910	20,963	118,873
East Side	79,562	8,955	88,517
Forebay	136,169	6,359	142,528
Upper Valley	150,367	4,282	154,649
Total	**464,008**	**40,559**	**504,567**

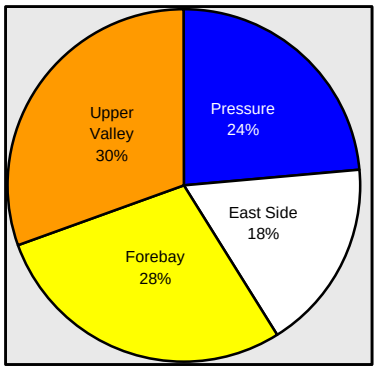

Figure 3: Percentage of total extractions by subarea

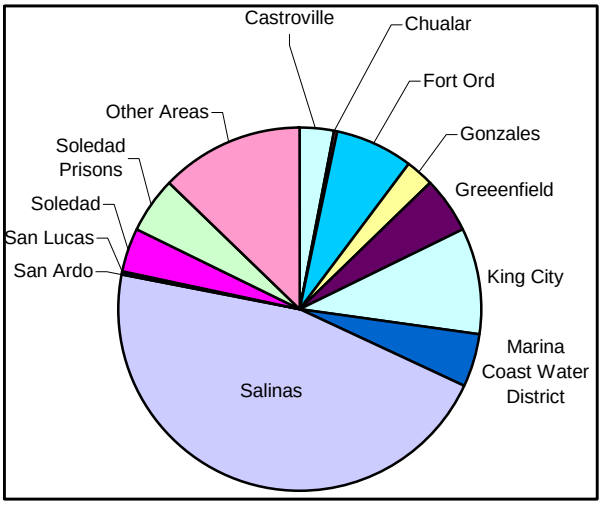

Figure 4: Percentage representation of urban extraction by city or area

Urban Extraction Data by City or Area

The total ground water extractions attributed to urban (residential, commercial/institutional, industrial, and governmental) pumping for the 1999 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 1999.

Table 3. Urban extraction data by city or area

City or Area	*Urban Pumping (acre-feet)*	*Percentage of Total*
Castroville	1,226	3.0%
Chualar	142	0.3%
Fort Ord	2,826	6.1%
Gonzales	1,007	2.4%
Greenfield	1,984	4.8%
King City	3,847	9.3%
Marina Coast Water District	1,898	4.6%
Salinas	18,705	45.3%
San Ardo	122	0.3%
San Lucas	N/A	0%
Soledad	1,578	3.8%
Soledad Prisons	2,086	5.0%
Other Areas	5,138	15.0%
Total	**40,559**	**100%**

Agricultural Water Conservation Plans

The Agricultural Water Conservation Plans include net irrigated acreage, irrigation method, and crop category. This information reflects the changing trends toward more efficient irrigation methods in the Salinas Valley. Tables 4, 5, 6, and 7 show the distribution of irrigation methods by crop type for 1993, 1998, 1999, and 2000 respectively.

Table 4. 1993 net acreage distribution of irrigation methods by crop type

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[2]								N/A
Total	**3,227**	**86,435**	**34,449**	**20,295**	**3,925**	**25,080**	**199**	**173,610**

Table 5. 1998 net acreage distribution of irrigation methods by crop type

1998	*Furrow*	*Sprinkler & Furrow*	*Hand Move Sprinklers*	*Solid Set Sprinklers*	*Linear Move*	*Drip*	*Other*[1]	*Total*
Vegetables	1,739	73.876	28,581	4,795	2,748	11,589	228	123,556
Field Crops	304	630	618	262	39	4	0	1,857
Berries	0	0	0	0	0	3,237	0	3,237
Grapes	10	2,174	0	4,528	0	26,879	0	33,591
Tree Crops	0	0	65	209	0	1,710	0	1,984
Forage	18	5	439	172	0	102	225	961
Unirrigated[2]								N/A
Total	**2,071**	**76,685**	**29,703**	**9,966**	**2,787**	**43,521**	**453**	**165,186**

Table 6. 1999 net acreage distribution of irrigation methods by crop type

1999	*Furrow*	*Sprinkler & Furrow*	*Hand Move Sprinklers*	*Solid Set Sprinklers*	*Linear Move*	*Drip*	*Other*[1]	*Total*
Vegetables	1,595	73,848	20,017	5,301	2,836	13,640	1,167	118,404
Field Crops	346	968	694	455	36	0	95	2,594
Berries	0	0	250	0	0	2,592	0	2,842
Grapes	12	0	0	5,631	0	29,488	74	35,205
Tree Crops	0	0	0	482	0	4,444	10	4,936
Forage	37	141	0	215	0	0	699	1,092
Unirrigated[2]								N/A
Total	**1,990**	**74,957**	**20,961**	**12,084**	**2,872**	**50,164**	**2,045**	**165,073**

Table 7. 2000 net acreage distribution of irrigation methods by crop type

2000	*Furrow*	*Sprinkler & Furrow*	*Hand Move Sprinklers*	*Solid Set Sprinklers*	*Linear Move*	*Drip*	*Other*[1]	*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[2]								604
Total	**1,865**	**68,425**	**23,053**	**9,861**	**2,288**	**51,840**	**1,517**	**159,453**

[1] "Other" may include different combinations of irrigation systems

[2] The 1999 reporting year is the first time "Unirrigated" is used in the Agricultural Water Conservation Plan. It includes Net Acreage dry farmed or put into either 12-month or summer fallow.

Agricultural Water Conservation Plans

For the past ten years, Salinas Valley growers have submitted Agricultural Water Conservation Plans to the Agency. Table 8 shows the number of acres, by year, on which selected "Best Management Practices," or water conservation measures, have been implemented.

Table 8. Agricultural "Best Management Practices" implemented from 1991 through 2000

Best Management Practices	*1991 Acres*	*1992 Acres*	*1993 Acres*	*1994 Acres*	*1995 Acres*	*1996 Acres*	*1997 Acres*	*1998 Acres*	*1999 Acres*	*2000 Acres*
12 Months Set Aside	4,705	4,810	6,586	6,096	5,064	3,123	3,508	2,058	1,332	1,396
Summer Fallow/ Other Fallow	1,480	6,546	5,953	4,081	6,486	6,208	2,241	2,277	3,657	3,511
Flowmeters	31,702	26,404	39,206	127,971	122,054	126,031	122,475	132,225	124,963	127,454
Time Clock/ Pressure Switch	131,237	131,237	142,162	134,985	121,645	137,297	135,954	137,414	130,863	130,298
Soil Moisture Sensors	39,549	39,549	51,348	43,883	43,188	51,428	56,936	58,854	62,357	58,975
Pre-Irrigation Reduction	92,865	112,290	117,899	108,454	104,937	99,429	104,203	101,649	89,454	93,733
Reduced Sprinkler Spacing	64,613	72,226	81,736	74,409	75,451	78,925	78,142	81,856	75,884	74,245
Sprinkler Improvements	70,035	97,233	104,160	107,626	102,053	116,809	110,523	108,507	98,409	95,356
Off-Wind Irrigation	100,274	109,050	115,984	101,765	94,810	113,381	111,076	102,873	102,433	101,828
Leakage Reduction	96,672	109,589	117,455	112,135	110,973	119,727	125,334	120,006	114,882	106,917
Micro Irrigation System	18,120	22,952	24,408	25,506	29,307	37,991	42,367	40,893	48,562	55,292
Surge Flow Irrigation	9,334	18,230	22,588	37,866	15,202	19,772	20,507	16,192	18,468	15,796
Tailwater Return System	20,357	25,034	21,020	20,994	15,101	22,707	21,121	22,803	23,597	23,773
Land Leveling/ Grading	55,186	60,563	59,413	58,963	57,749	64,164	65,143	57,625	58,679	61,001

Note: Since different practices may be applied to the same acreage, "total acreage" would not be a meaningful figure.

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 for the 1998-1999 water reporting year. The data used for Table 9 represent a subset of the totals shown in Table 2; only wells with complete reports of extraction data (Flowmeter Method only), acreage, and crop type were used in the calculation.

In the Upper Valley subarea, the 1999 reported acreage ratio of vineyards to vegetables was disproportionate based on the ratio generated from an Agency land use survey in 1997 of all subareas. Because the reported land use does not correlate with the surveyed land use, there was concern that the reported ratio of vineyards to vegetables would skew the acre-feet/acre calculation toward vineyards. Vineyards have lower irrigation water application requirements than vegetables. For this reason, the unit water pumped by crop type was weighted for each subarea.

Table 9. Reported unit agricultural water pumped by subarea

Subarea	*Pressure*	*East Side*	*Forebay*	*Upper Valley*	*Overall Average*
Unit Water Pumped (acre-feet/acre)	**2.25**	**2.45**	**2.44**	**3.08**	**2.55**

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

Nutrient Management Measures

Contact Monterey County Water Resources Agency's Water Quality staff at (831) 755-4860.

Urban Water Conservation Plans

This is the fifth year of data collection for the Urban Water Conservation Plan program. Table 10 shows the implementation of "Best Management Practices" – for 1996, 1997, 1998, 1999, and 2000 – 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 1996 through 2000

Best Management Practices	*1996*	*1997*	*1998*	*1999*	*2000*
Provide speakers to community groups and media	21%	52%	56%	63%	43%
Use paid and public service advertising	42%	51%	55%	63%	43%
Provide conservation information in bill inserts	56%	90%	66%	58%	48%
Provide individual historical water use information on water bills	82%	85%	62%	54%	50%
Coordinate with other entities in regional efforts to promote water conservation practices	30%	82%	64%	88%	51%
Work with school districts to provide educational materials and instructional assistance	51%	52%	44%	26%	43%
Implement requirements that all new connections be metered and billed by volume of use	66%	91%	92%	89%	93%
Establish a program to retrofit any existing unmetered connections and bill by volume of use	38%	62%	80%	59%	58%
Offer free interior and exterior water audits to identify water conservation opportunities	35%	35%	40%	18%	8%
Provide incentives to achieve water conservation by way of free conservation fixtures (showerheads, hose end timers) and/or conservation "adjustments" to water bills	50%	50%	51%	34%	39%
Enforcement and support of water conserving plumbing fixture standards, including requirement for ultra low flush toilets in all new construction	35%	35%	38%	43%	13%
Support of State/Federal legislation prohibiting sale of toilets using more than 1.6 gallons per flush	74%	76%	72%	61%	64%
Program to retrofit existing toilets to reduce flush volume (with displacement devices)	52%	82%	91%	50%	48%
Program to encourage replacement of existing toilets with ultra low flush (through rebates, incentives, etc.)	20%	20%	46%	48%	39%
Provide guidelines, information, and/or incentives for installation of more efficient landscapes and water-saving practices	86%	94%	94%	81%	51%
Encourage local nurseries to promote use of low water use plants	52%	56%	64%	50%	45%
Develop and implement landscape water conservation ordinances pursuant to the "Water Conservation in Landscaping Act"	3%	3%	21%	49%	41%
Identify and contact top industrial, commercial, and/or institutional customers directly; offer and encourage water audits to identify conservation opportunities	3%	3%	3%	3%	6%
Review proposed water uses for new commercial and industrial water service, and make recommendations for improving efficiency before completion of building permit process	4%	27%	47%	26%	45%
Complete an audit of water distribution system at least every three years as prescribed by AWWA	22%	55%	76%	60%	52%
Perform distribution system leak detection and repair whenever the audit reveals that it would be cost effective	66%	93%	93%	89%	56%
Advise customers when it appears possible that leaks exist on customer's side of water meter	68%	68%	93%	90%	93%
Identify irrigators of large landscapes (3 acres or more) and offer landscape audits to determine conservation opportunities	11%	33%	36%	16%	32%
Provide conservation training, information, and incentives necessary to encourage use of conservation practices	51%	51%	36%	16%	32%
Encourage and promote the elimination of non-conserving pricing and adoption of conservation pricing policies	24%	24%	52%	56%	56%
Implementation of conservation pricing policies	24%	25%	52%	54%	54%
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	53%	78%	91%	82%	41%
Implement and/or support programs for the treatment and reuse of industrial waste water / storm water / waste water	48%	48%	44%	56%	45%

(This page left blank intentionally)

Monterey County
Board of Supervisors

Fernando Armenta	District #1
Louis Calcagno, Chair	District #2
W.B. "Butch" Lindley	District #3
Edith Johnsen	District #4
Dave Potter	District #5

Monterey County Water Resources Agency
Board of Directors

Mary Mecartney	District #1
Warren Church	District #2
Timothy M. Handley	District #3
Paul E. Martin	District #4
Leo Poppoff	District #5
Stephen P. Collins	Grower-Shipper Vegetable Association
Richard Morgantini, Chair	Farm Bureau
Roy Alsop, Jr., Vice Chair	Agricultural Advisory Committee
Richard Ortiz	Mayor Select Committee

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
Germán Criollo, Senior Hydrologist
Jess Barreras, Hydrologist
Melanie Vincent, 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 • Fax (831) 424-7935

Visit our Web site at:
www.mcwra.co.monterey.ca.us


MONTEREY COUNTY WATER RESOURCES AGENCY
1947