APPENDIX 7

APPENDIX 7-1

Project 1: City of Lompoc, Lompoc Valley Leak Detection and Repair Project

- Leak Detection Benefits
- Lompoc Urban Water Management Plan

Analysis of
Fluid Conservation System's Leak Detection Technology

Phase III Report
Head to Head Evaluation
Active versus Passive
Leak Detection Methods

Final

July 2007

Prepared for

Albuquerque Bernalillo County
Water Utility Authority

Prepared by

NEW MEXICO
ENVIRONMENTAL
FINANCE CENTER

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6.1 Introduction

Leak detection is performed by numerous communities for various reasons. In the Phase 2 Report, a survey of other communities using passive leak detection was completed. There were seven responses to the survey and seven reasons for using leak detection technologies. Ultimately, the goals of the Authority will help determine which type(s) of leak detection are most appropriate and/or cost effective.

6.2 Advantages to and Goals of Implementing a Leak Detection Program

There are many benefits of leak detection and repair, including:

- Save water, reducing production, therefore reducing production costs
- Save energy, pump less water, use less energy
- Defer capital costs, don't need to drill a new well, due to water savings
- Reduce operation and maintenance, operate a system at lower capacity
- Reduce overtime, decrease emergency repairs
- Reduce outage time, repair smaller leaks earlier
- Improve public relations, fewer complaints, reduced administrative costs
- Reduced property damage, reduced risk for lawsuits
- Reduced insurance and legal fees

Understanding the numerous advantages is only the first step. Deciding what should be accomplished with the leak detection program is the second. The types of goals that can be established for the implementation of a leak detection program include:

- Reduce water loss to the lowest level possible
- Reduce water loss to economic level of leakage
- Use leak detection on critical infrastructure
- Use leak detection on most leak prone portions of the system
- Use leak detection as a screening tool for determining troubled areas
- Use leak detection to reduce summer peak for repairs
- Use leak detection as a component of the overall asset management program
- Use leak detection to help determine replacement priority in a given area

It is critically important that the Authority establish goals for its leak detection program prior to deciding which method, if any, of leak detection to employ. As stated previously, the methods are not the same, will not provide the same results, and will require different types and amounts of resources. Which method to use is not a simple economic decision. Depending on how the system is used, either approach can be cheaper or more expensive than the other. The goal may involve water resource decisions, social, or environmental decisions or economic concerns.

City Of Lompoc

2005 Urban Water Management Plan

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EXECUTIVE SUMMARY

California Water Code Division 6, Part 2.6, Urban Water Management Planning Section 10610 (et seq.) describes the requirements for the Urban Water Management Plan (UWMP). All urban water suppliers providing water for municipal purposes either directly or indirectly to more than 3,000 customers, or supplying more than 3,000 acre-feet of water annually, must prepare an UWMP and update it at least every five years.

The City of Lompoc prepared an UWMP in 1985 and subsequent five years including the 2005 Plan. The 2005 Plan must be completed by December 31, 2005.

The City of Lompoc's 2005 UWMP is a comprehensive planning document, independent of previous UWMPs. The Plan includes: a history of the City of Lompoc; demographic information; transfer and exchange opportunities; water demand and conservation information; water supply sources; water reliability planning; water use provisions; supply and demand comparison provisions; water Demand Management Measures (DMM); a water shortage contingency plan; a water recycling plan; water quality impacts on reliability; and water service reliability.

Appendix A provides a glossary for terms in this UWMP.

Appendix B provides the City of Lompoc Static Well levels.

Appendix C is a list of the people who participated in the Development of the UWMP.

Appendix D provides the adopting Resolution for the UWMP and the 50% water shortage contingency plan for the City of Lompoc.

Appendix E provides the Water Conservation Ordinances and Resolutions for the City of Lompoc.

Appendix F provides a list of references used to develop the UWMP.

Appendix G is a list of the Endnotes for the UWMP.

Lompoc citizens had an opportunity to review and comment on the UWMP at the December 6, 2005, Lompoc City Council meeting.

The 2025 population estimate for **Tables 2** and **3** is based on historic population growth rate, and is not currently adopted in the General Plan.

The USP population is a significant subset of the City's total population. It comprises the largest group-quarter population in the City and one of the largest in Santa Barbara County. Although the prison facilities are located within the City, they are relatively self-sufficient because they do not rely on the City for municipal services, such as water, wastewater, electric and solid waste. The City's population, with and without the prison, is therefore provided in **Tables 2** and **3** of this report.

Table 2 - City Population – Current and Projected – (including US Federal Prison Group Quarters)

	2005	2010	2015	2020	2025
Service Area Population	**42,320**	**44,988**	**52,903**	**52,903**	**54,173**

Table 3 - City Population Current and Projected - (excluding US Federal Prison Group Quarters Population)

	2005	2010	2015	2020	2025
Service Area Population	**38,974**	**41,389**	**49,025**	**49,025**	**50,202**

Population Age Distribution

Examining the age distribution of the population is helpful in assessing the demand for different housing types. For example, an older population might require smaller housing units, which are easier to maintain and which accommodate one or two persons per household. A younger population requires a wider variety of housing unit types. These housing types may include large units for couples with children which can accommodate three or more persons per household or smaller units more suitable for young childless couples and single unrelated adults which can accommodate three persons or less per household.

The median age of City of Lompoc residents is approximately 32 years. Approximately 30% (12,310) of the City residents are 17 years or less and approximately 9% (3,856) are 65 years or more. Nearly 65% (26,176) of the City's population is under 40 years and approximately 19.5% of the population is 22 to 34 years of age.

The overall youthfulness of the community and large proportion of the population aged 22 to 34 indicates a need for affordable family housing units which can accommodate three or more individuals and affordable family housing units for single adults. City residents aged 17 or under typically reside in housing units with their parents or guardians. Residents aged 22 to 34 typically earn less than older members of the work force and are creating new households, starting families and having children. In 1990 females between the ages of 20 and 34 accounted for approximately 78% of the annual births within Santa Barbara County. This trend continued into 1995 decreasing only slightly to approximately 74% of the annual births. In 1995 births by females

Table 5 - Current and Planned Sources of Water Available – AFY

Water Supply Sources	2005	2010	2015	2020	2025
City of Lompoc Well Pumpage Groundwater	5523	6053	6343	6648	6966
5% Water Plant Processes	-276	-303	-317	-332	-348
Groundwater to City	5247	5750	6026	6316	6648
Surface Water – Frick Springs	12	12	12	12	12
Recycled Water	5	5	6	5	5
Totals	5264	5767	6044	6333	6635

Section 2
Step Two: Water Sources (cont.) - Groundwater

Law
Water Code Section 10631

(b) If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five

APPENDIX 7-2

Project 2: City of Santa Maria, Untreated Water Landscape Irrigation Project

- City of Santa Maria Urban Water Management Plan
- Department of Water Resources *SWP Delivery Reliability Report 2009*

Final Report

2005 Urban Water Management Plan – City of Santa Maria

Prepared for

City of Santa Maria

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April 2007

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Final Report

2005 Urban Water Management Plan – City of Santa Maria

Submitted to

City of Santa Maria

April 2007

CH2MHILL

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B PUBLIC HEARING NOTICE AND MEETING MINUTES

C PUBLIC COMMENTS ON THE DRAFT UWMP

D ECONOMIC ANALYSIS OF SELECTED DEMAND MANAGEMENT MEASURES

E COUNCIL ANNUAL REPORTS FOR DEMAND MANAGEMENT MEASURES

F SANTA MARIA VALLEY GROUNDWATER BASIN STIPULATION

G CITY OF SANTA MARIA 2004 WATER QUALITY REPORT

treated wastewater at the City's WWTP is an indirect use of recycled water which, in effect, improves the overall reliability of the City's groundwater supplies.

It should be noted that the water supply available to the City is much greater than the supply needed to meet the projected demand. A detailed description of the available supply to the City is presented in the Reliability section below.

Table 3-1
Current and Planned Water Supplies for City of Santa Maria

Source	2005	2010	2015	2020	2025	2030
Purchased Water from SWP	13,706	13,706	13,706	13,706	13,706	13,706
Groundwater(2)	12,795	12,795	12,795	12,795	12,795	12,795
Twitchell Yield/Commingled Groundwater(3)	14,300	14,300	14,300	14,300	14,300	14,300
Return Flows from SWP Water(4)	8,909	8,909	8,909	8,909	8,909	8,909
Recycled Water	0	0	0	0	0	0
Total(5)	49,710	49,710	49,710	49,710	49,710	49,710

Notes
1. Unit of measure: ac-ft/yr
2. Groundwater supplies are based on appropriative rights in Santa Maria Groundwater Basin as defined in the Stipulation. Pursuant to the Court's Phase 5 Tentative Decision, the City has been assigned 5,100 ac-ft/yr of prescriptive rights.
3. Further details can be found in Exhibit F of the Stipulation.
4. Pursuant to the Stipulation, the City is entitled to recapture 65% of its SWP use in the Basin.
5. See Reliability section for details on these supplies.
6. Table format based on DWR Guidance Document Table 4.

The City's water supply is projected to remain relatively constant from 2005 to 2030 to meet the associated projected water demands, with the majority of this demand being met by imported surface water. The City is expected to have an available supply in excess of the projected demands through 2030. Water demand projections are documented in Chapter 4. Details of the imported water, return flows, Twitchell Yield, and native groundwater supplies are presented in the following section followed by a discussion of the reliability of all sources of water supply.

Imported Water

Santa Maria has a Water Supply Agreement with CCWA for 17,280 ac-ft/yr of Table A imported SWP water. Pursuant to this Stipulation, Santa Maria agreed to import and use within the Basin no less than 10,000 ac-ft/yr of available SWP water, or the full amount of available SWP water if the amount available is less than 10,000 ac-ft in a given year. Both GSWC and Guadalupe will import and use all their available SWP water within the Basin.

SWP water originates within the Feather River watershed, is captured in Lake Oroville, and flows via the Sacramento-San Joaquin Delta, the California Aqueduct and the Coastal Branch Extension into CCWA's treatment and conveyance facilities.

Table 4-4
Additional Water Uses and Loses

Water Use Type	2000	2005	2010	2015	2020	2025	2030
Other Water Uses	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unaccounted-for System Losses	1,480	1,171	1,276	1,396	1,461	1,566	1,670
Total	1,480	1,171	1,276	1,396	1,461	1,566	1,670

Notes
1. This table is based on the DWR Guidebook Table 14.
2. Based on calendar year.
3. Unaccounted-for water includes system losses due to leaks, reservoir overflows, and inaccurate meters, as well as water used in operations.
4. Unit of measure: ac-ft/yr

Total Water Demand

As mentioned above, other water uses, as well as any water lost during conveyance, must be added to the customer demand in order to project the City's water demand. In addition to the City's sales to other agencies, unaccounted-for water must be incorporated to the total water demand (refer to the section above for a definition of unaccounted-for water). Table 4-5 summarizes the projections of water sales to other agencies, demand within the City, unaccounted-for water, and total water demand through the year 2030. The projected water sales in the remainder of the analysis, including Table 4-5 represent the total demand of the population-based projections and sales to other agencies.

The water demand projections below do not include any reduction due to future implementation of DMM. More information regarding the status of demand reduction measures is available in Chapter 5.

Table 4-5
Projected Water Sales, Unaccounted-for System Losses, and Total Water Demand

Year	Projected Water Sales[4]	Unaccounted-for System Losses	Total Water Demand
2000[2]	14,232	1,480	15,712
2005	16,658	1,171	17,829
2010	17,853	1,276	19,129
2015	19,211	1,396	20,607
2020	20,273	1,461	21,734
2025	21,697	1,566	23,263
2030	23,110	1,670	24,780

Notes
1. This table is based on the DWR Guidebook Table 15.
2. Based on calendar year.
3. Unit of measure: ac-ft/yr
4. Projected Water Sales includes total demands within the City of Santa Maria and sales to other agencies

Table 9-12
Summary of Projected Water Supply Changes Due to Water Quality Issues

Water Source	2005	2010	2015	2020	2025	2030
Well 5AS	0	0	0	0	0	0
Well 6S	0	0	0	0	0	0
Well 7S	0	0	0	0	0	0
Well 8S	0	0	0	0	0	0
Well 9S	0	0	0	0	0	0
Well 10S	0	0	0	0	0	0
Well 11S	0	0	0	0	0	0
Well 12S	0	0	0	0	0	0
Well 13S	0	0	0	0	0	0
Well 14S	0	0	0	0	0	0

Distribution System Water Quality

The City has implemented a number of monitoring programs to ensure that the water quality remains within acceptable ranges. The water quality parameters that are monitored, pursuant to plans approved by the Department of Health Services, include general physical parameters, presence of coliform bacteria, disinfectant and disinfection by-product levels, and corrosivity of the water by monitoring lead and copper levels at customers' water taps. All monitoring parameters and levels currently meet drinking water standards. The ability to continue to meet these standards is not expected to change in the foreseeable future.

In addition to the monitoring programs, the City has implemented a number of operational programs that are designed to maintain water quality within acceptable criteria. The system actively flushes its distribution system on a routine basis as a means to remove built up sediment within the mains as well as to ensure that aged water is removed from the system. The system also has an active backflow and cross connection prevention program in place to reduce the risk of backflow conditions from a service connection into the distribution system. Also, security measures are in place to protect the distribution system from tampering by unauthorized personnel. All of these programs are designed to assist with maintaining the water quality within the distribution system and provide some of the tools needed to respond to a water quality emergency.

Emerging Water Quality Issues

In 2000, there was significant interest in the detection and possible health effects of chromium 6 in drinking water supplies throughout the state. In 2001, the Office of Environmental Health Hazard Assessment (OEHHA) withdrew their previously established Public Health Goal (risk assessment level) of 2.5 μg/L for total chromium. The current MCL enforced by CDHS is 50 μg/L for total chromium, and OEHHA is in the process of

	A	B	C	D	E	F	G	H	I
1	The State Water Project Delivery Reliability Report 2009								
2	Santa Barbara County FC&WCD								
3	**SWP Table A Deliveries for 2009 Study**					**Probability Curve**			
4	**Year**	**Delivery w/o Article 56 Carryover (taf)**	**Article 56 Carryover (taf)**	**Total Table A Delivery (taf)**	**Percent of Maximum Table A (45.5 taf)**	**Year**	**SWP Total Table A Delivery (taf)**	**Exceedence Frequency (%)**	**Percent of Maximum Table A (45.5 taf)**
5	1922	22.5	0.0	22.5	50%	1938	43.0	0%	95%
6	1923	26.8	10.9	37.7	83%	1998	42.4	1%	93%
7	1924	8.4	0.4	8.8	19%	1939	41.0	2%	90%
8	1925	21.0	0.0	21.0	46%	1952	40.7	4%	90%
9	1926	23.0	0.0	23.0	51%	1983	40.5	5%	89%
10	1927	23.5	0.0	23.5	52%	2003	39.4	6%	87%
11	1928	26.6	11.4	38.0	84%	1997	38.5	7%	85%
12	1929	12.8	0.0	12.8	28%	1953	38.3	9%	84%
13	1930	17.6	0.0	17.6	39%	2000	38.3	10%	84%
14	1931	13.7	0.0	13.7	30%	1996	38.2	11%	84%
15	1932	17.2	0.0	17.2	38%	1928	38.0	12%	84%
16	1933	17.6	0.0	17.6	39%	1923	37.7	14%	83%
17	1934	13.6	0.0	13.6	30%	1942	37.5	15%	82%
18	1935	22.9	0.0	22.9	50%	1999	37.3	16%	82%
19	1936	24.6	7.7	32.3	71%	1974	37.1	17%	81%
20	1937	27.2	4.7	31.9	70%	1966	36.9	19%	81%
21	1938	30.6	12.3	43.0	95%	1959	36.9	20%	81%
22	1939	26.2	14.8	41.0	90%	1968	36.9	21%	81%
23	1940	26.0	1.7	27.7	61%	1979	36.8	22%	81%
24	1941	26.9	2.1	28.9	64%	1971	36.6	23%	81%
25	1942	24.5	13.0	37.5	82%	1964	36.5	25%	80%
26	1943	24.4	11.9	36.2	80%	1943	36.2	26%	80%
27	1944	21.6	11.8	33.4	73%	1970	36.0	27%	79%
28	1945	22.9	0.0	22.9	50%	1976	36.0	28%	79%
29	1946	22.4	11.1	33.4	74%	1981	35.7	30%	78%
30	1947	25.1	8.6	33.7	74%	1980	34.9	31%	77%
31	1948	25.2	3.8	29.0	64%	1975	34.9	32%	77%
32	1949	26.8	0.0	26.8	59%	1957	34.7	33%	76%
33	1950	24.3	0.4	24.7	54%	1985	34.6	35%	76%
34	1951	23.6	0.0	23.6	52%	1969	33.9	36%	75%
35	1952	29.3	11.4	40.7	90%	1947	33.7	37%	74%
36	1953	24.2	14.2	38.3	84%	1984	33.6	38%	74%
37	1954	25.7	5.5	31.2	69%	1946	33.4	40%	74%
38	1955	23.0	0.0	23.0	51%	1944	33.4	41%	73%
39	1956	26.8	0.0	26.8	59%	1994	33.0	42%	73%
40	1957	21.7	13.0	34.7	76%	1986	32.9	43%	72%
41	1958	30.7	0.0	30.7	67%	1936	32.3	44%	71%

	A	B	C	D	E	F	G	H	I
3	SWP Table A Deliveries for 2009 Study					Probability Curve			
4	Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (45.5 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (45.5 taf)
42	1959	22.0	14.8	36.9	81%	1937	31.9	46%	70%
43	1960	24.5	0.0	24.5	54%	1962	31.3	47%	69%
44	1961	23.6	0.0	23.6	52%	1954	31.2	48%	69%
45	1962	24.8	6.5	31.3	69%	1982	30.7	49%	67%
46	1963	22.4	0.0	22.4	49%	1958	30.7	51%	67%
47	1964	25.6	10.8	36.5	80%	1948	29.0	52%	64%
48	1965	22.8	2.8	25.6	56%	1941	28.9	53%	64%
49	1966	25.9	11.1	36.9	81%	1987	28.3	54%	62%
50	1967	24.4	2.3	26.7	59%	1995	28.2	56%	62%
51	1968	25.0	11.8	36.9	81%	1940	27.7	57%	61%
52	1969	30.7	3.3	33.9	75%	1978	27.2	58%	60%
53	1970	23.6	12.4	36.0	79%	1956	26.8	59%	59%
54	1971	25.2	11.5	36.6	81%	1949	26.8	60%	59%
55	1972	26.7	0.0	26.7	59%	1967	26.7	62%	59%
56	1973	21.5	0.0	21.5	47%	1972	26.7	63%	59%
57	1974	26.7	10.4	37.1	81%	1965	25.6	64%	56%
58	1975	22.0	12.9	34.9	77%	1950	24.7	65%	54%
59	1976	25.4	10.6	36.0	79%	1960	24.5	67%	54%
60	1977	2.5	0.0	2.5	6%	1993	24.4	68%	54%
61	1978	27.2	0.0	27.2	60%	1951	23.6	69%	52%
62	1979	23.7	13.1	36.8	81%	1961	23.6	70%	52%
63	1980	28.0	6.9	34.9	77%	1927	23.5	72%	52%
64	1981	22.1	13.6	35.7	78%	1955	23.0	73%	51%
65	1982	30.7	0.0	30.7	67%	1926	23.0	74%	51%
66	1983	30.7	9.8	40.5	89%	1945	22.9	75%	50%
67	1984	23.7	9.9	33.6	74%	1935	22.9	77%	50%
68	1985	23.1	11.5	34.6	76%	2002	22.8	78%	50%
69	1986	26.6	6.3	32.9	72%	1922	22.5	79%	50%
70	1987	17.2	11.1	28.3	62%	1963	22.4	80%	49%
71	1988	9.8	0.0	9.8	21%	1973	21.5	81%	47%
72	1989	21.3	0.0	21.3	47%	1989	21.3	83%	47%
73	1990	9.4	10.3	19.7	43%	1925	21.0	84%	46%
74	1991	12.3	0.0	12.3	27%	1990	19.7	85%	43%
75	1992	11.8	0.0	11.8	26%	1933	17.6	86%	39%
76	1993	24.4	0.0	24.4	54%	1930	17.6	88%	39%
77	1994	21.2	11.8	33.0	73%	1932	17.2	89%	38%
78	1995	28.2	0.0	28.2	62%	2001	15.0	90%	33%
79	1996	24.5	13.6	38.2	84%	1931	13.7	91%	30%
80	1997	26.6	11.9	38.5	85%	1934	13.6	93%	30%
81	1998	29.6	12.9	42.4	93%	1929	12.8	94%	28%

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3	**SWP Table A Deliveries for 2009 Study**					**Probability Curve**			
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82	1999	23.5	13.8	37.3	82%	1991	12.3	95%	27%
83	2000	26.9	11.4	38.3	84%	1992	11.8	96%	26%
84	2001	15.0	0.0	15.0	33%	1988	9.8	98%	21%
85	2002	22.8	0.0	22.8	50%	1924	8.8	99%	19%
86	2003	28.4	11.1	39.4	87%	1977	2.5	100%	6%
87									
88	Average	23.0	5.7	28.7	63%		28.7		63%
89	Maximum	30.7	14.8	43.0	95%		43.0		95%
90	Minimum	2.5	0.0	2.5	6%		2.5		6%

APPENDIX 7-3

Project 3: City of Santa Maria, LeakWatch Project

- Water Use Efficiency Comprehensive Evaluation
- City of Santa Maria Urban Water Management Plan
- Department of Water Resources *SWP Delivery Reliability Report 2009*

PUBLIC REVIEW DRAFT

Water Use Efficiency Comprehensive Evaluation

CALFED Bay-Delta Program Water Use Efficiency Element

March 2006

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EXECUTIVE SUMMARY

BACKGROUND

In the summer of 2000, federal, state and stakeholder representatives negotiating the CALFED Bay-Delta Program Record of Decision struggled to resolve differences over the Water Use Efficiency (WUE) Program Element. Some saw WUE as the cornerstone of CALFED's water management strategy. Others saw WUE as important, but not an initiative to be funded with more than $1 billion in state and federal funds.

Finally, negotiators reached a compromise: Provide unprecedented funding for WUE, but require an extensive evaluation to assess the program's effectiveness. This report—known as the Comprehensive Evaluation—represents a Public Review Draft of the evaluation called for in the August 2000 Record of Decision (ROD). A final version is slated for Spring 2006.

APPROACH

The Comprehensive Evaluation is structured to assess the potential of each of WUE's four main components—agricultural water conservation, urban water conservation, recycling and desalination—to contribute to CALFED goals and objectives. The analysis has two main parts: a "look forward" that seeks to determine the potential of water use efficiency actions statewide given different levels of investment and policies, and a "look back" that assesses progress to-date.

The analysis, conducted by California Bay-Delta staff and consultants with input from CALFED Agencies and stakeholders, is intended primarily to help policymakers target future investments in the WUE Element and develop appropriate assurances. Additionally, the projections generated by the Comprehensive Evaluation are expected to—and already do—feed into other studies, such as the California Water Plan Update.

FINDINGS

The ROD viewed WUE investments as a cost-effective way to accelerate the implementation of conservation and recycling actions statewide. (Desalination was incorporated into the program at a later date.) More specifically, the ROD suggested that, with extensive federal, state and local investment, WUE might be able to generate between 1.0 to 1.3 million acre-feet in the first seven years of the program.

In reviewing this report, readers need to be aware that the Comprehensive Evaluation was constrained by significant data limitations. For example, there is no comprehensive data related to locally funded actions within the agricultural, desalination and recycling components; only on the urban side is there an extensive database that collects voluntarily reported savings associated with local WUE actions. Similarly, expected benefits associated with grant-funded projects reflect local agency proposed savings; the figures do not represent observed savings. This data gap represents a serious challenge to agencies and stakeholder communities committed to developing a well informed water management strategy. Still, there are important findings to be considered. The Comprehensive Evaluation suggests the following cross-cutting findings:

- Projections strongly support the position that aggressive investment in water use efficiency actions can result in significant reductions in applied water use over the next 25 years. Depending on the level of investment and other policies, the analysis projects savings of 1.4 to 3.2 million acre-feet by 2030: 180,000 to 1.1 million acre-feet for the agricultural sector; and 1.2 million to 2.1 million acre-feet from urban. Additionally, there is very large potential from both desalination and recycling.

- There is solid demand at the local level for state and federal water use efficiency grants. Over the past four years, 235 grants totaling $305 million have been

STAGE 1 WATER SAVINGS: PROJECTED VS. EXPECTED

		ROD Projections	Comp Evaluation Modeling	Expected Savings	Projected Yearly Average Cost per AF of Savings[1]
Agricultural[2]	Lower Bound	260,000 AF	180,000 AF	50,000 AF	$28/AF for in-stream savings; $350/AF for supply reliability savings[3]
	Upper Bound	350,000 AF	250,000 AF	50,000 AF	
Urban	Lower Bound	520,000 AF	267,000 AF	101,000 AF	$160 to $340/AF
	Upper Bound	680,000 AF	356,000 AF	142,000 AF	
Recycling	Lower Bound	225,000 AF	Not Modeled	387,000 AF	$800/AF
	Upper Bound	310,000 AF	Not Modeled	510,000 AF	
Desalination	Lower Bound Upper Bound	Not Modeled	Not Modeled	20,000 AF (no range)	$957 per AF, on average; range from $430 to $1,387

1. Figures based on recent grant-funded projects.
2. The Agricultural WUE figures include the savings and costs associated with both recoverable and irrecoverable savings.
3. The range of per-acre foot average costs associated with ag savings was between $5/AF and $112 for in-stream savings, and $28 to $515 for water supply reliability savings.

awarded across all four components. The demand for grant funding has repeatedly outstripped the available funds. In the urban sector alone, funding requests from urban water suppliers have exceeded available state/federal funds by a roughly eight-to-one ratio; agricultural requests were double the available funding.

- An analysis of WUE savings over the first seven years (Stage 1) offers a mixed picture. (See table above.) Agricultural and urban WUE show the potential to generate substantial water savings at average costs ranging from $28 to $340 per acre-foot, but the overall savings are likely to fall far short of both ROD and Comprehensive Evaluation projections due to three main factors: (1) agricultural and urban grant funding for WUE actions is 80% lower than projected in the ROD; (2) key agricultural and urban assurances actions anticipated in the ROD are not yet implemented; and, (3) local WUE actions are either below projected levels or there is insufficient data to measure progress. Recycling is anticipated to exceed ROD projections, but the cost—$800 per acre-foot on average—is significantly higher than savings generated through agricultural or urban water use efficiency actions. Savings generated through desalination, also expensive relative to demand management options, averaged $957 per acre-foot.

- Although grant-funded water savings account for only a small percentage of total savings potential, they leverage significant additional local investment, act as an investment catalyst, help to promote regional partnerships and joint ventures, and increase the geographic base of implementation.

- Implementing agencies have not collected sufficient project-level baseline data or observed project cost and performance data. Therefore, an understanding of progress toward meeting ecosystem restoration, water quality and water supply reliability objectives is not possible. In addition, the lack of project- and program-level data severely limits the use of adaptive management for program improvement.

In addition to these overarching findings, there are several sector-specific findings important to highlight.

AGRICULTURAL WATER USE EFFICIENCY

- Through 2004, the agricultural Proposal Solicitation Package (PSP) grant program funded 60 grants to pursue targeted benefits, research, and education projects. Almost $18 million in grant funding was awarded by the state; locals contributed $9.5 million. Applicant-reported annual benefits are approximately 40,000 acre-feet for in-stream flow and timing and more than 10,000 acre-feet for water supply. Benefits are expected to last from 3 to 50 years.

- Approximately 3% of the in-stream flow and timing (ecosystem restoration) benefits identified in the quantifiable objectives are expected through grant funded activity. Approximately 3% of the water quantity (water supply reliability) benefits identified in the quantifiable objectives are expected through grant funded activity.

- State and federal funds for agricultural WUE grants through Stage 1 are expected to be about 10% of funding amounts identified in the ROD. The amount of agricultural WUE occurring at the local level is not known.

- Realization of agricultural WUE potential depends on locals implementing cost-effective actions. However there is no comprehensive reporting of water conservation benefits available from state or federal water management plans and, therefore, the extent of non-CALFED-funded WUE is not known. There are no centralized data repositories to assess progress at the farm level.

- The average cost per acre-foot of savings appears to be within the range expected by the ROD. Costs for providing the in-stream flow benefits ranged from $5 to $200 per acre-foot. Costs for water supply reliability benefits ranged even more widely. One funded project provided reductions in recoverable flows at a cost of $28 per acre-foot. Projects that reduced irrecoverable losses ranged in cost from $230 to $515 per acre-foot.

- Significant funding was provided under other non-CALFED programs that potentially met CALFED WUE objectives. Almost $80 million was provided by other state and federal programs for grants and technical assistance related to agricultural water use efficiency. Local agencies and growers provided another $168 million in cost-sharing under these programs.

URBAN WATER USE EFFICIENCY

- Through 2004, the urban PSP grant program has funded 122 urban conservation implementation, research, and education projects. $50.5 million in grant funding has been awarded over this period. Urban conservation projects funded by the PSP process account for between 16% to 19% of total expected water savings through the first four years of Stage 1. The other 81% to 84% of expected savings are a result of unassisted local implementation. Grant funded projects have expected annual water savings of about 37,000 acre-feet. Total urban water savings from grants and unassisted local implementation through Stage 1 are expected to range between 101,000 to 142,000 acre-feet.

- State and federal funds for urban grants through Stage 1 are expected to be about 23% of funding amounts set forth in the ROD. Comprehensive Evaluation results suggest that had the urban PSP program received full Stage 1 funding, grant-funded savings alone could have generated as much as 125,000 acre-feet of water savings by the end of Stage 1.

- Had local water suppliers also pursued all locally cost-effective conservation measures per the ROD, total urban sector savings by the end of Stage 1 could have ranged between 267,000 to 356,000 acre-feet—about two and a half times what is likely to be realized.

- The Comprehensive Evaluation also highlights the important role played by efficiency codes. Once in place, these codes provide an automatic and on-going source of water savings to the state at minimal costs. Codes related to toilet, showerhead, and washer efficiency, as well as codes that require metering customer water connections, account for 46% to 84% of the anticipated savings in the projections of long-term water savings potential.

- The impact of the Urban Memorandum of Understanding (MOU) is varied. On the one hand, more than 190 urban water suppliers—representing two-thirds of all Californians—have now signed the Urban MOU and annual water savings tied to implementation of urban Best Management Practices (BMPs) have increased by 15% to 20% annually since 1991. Still, the impact of the MOU has varied considerably by region and rates of compliance for most BMPs remains low. BMP data strongly suggest the MOU process is not working as intended and its impact on urban water use remains well below its full potential.

- The ROD called on CALFED Agencies to implement a process to certify water supplier compliance with the Urban MOU by the end of 2002. It further stated that access to CALFED Agency grant funding should be conditional on compliance with the Urban MOU once the certification process was in place. To date, these ROD provisions concerning Urban MOU compliance have not been implemented.

- While unit costs for many funded projects have been higher than anticipated by the ROD, on average the cost per acre-foot of expected water savings has ranged between $160 to $340 per acre-foot. The average unit cost of savings for the urban PSP program is within the expected cost range of $150 to $450 per acre-foot cited in the ROD. The evaluation raises questions regarding the efficacy of funding many small- to medium-scale projects with high unit costs versus funding fewer, larger projects with greater opportunities for economies of scale.

RECYCLING AND DESALINATION

- Any assessment of recycling and desalination potential is greatly constrained by significant data limitations. While stakeholder listings of likely projects suggest strong potential, it is important to recognize that these projections

assume continued funding through Proposition 50 and local project sponsorship. It is also important to keep in mind that the listings are not definitive and some of the projects may be speculative in nature. None of the data is observed or verified.

- Near-term benefits from recycling are proposed to range from 387,000 to 513,000 acre-feet. This is almost double the low end of the Stage 1 estimates, a fact that may be tied to higher-than-expected funding levels. Desalination projects are expected to generate 20,000 acre-feet. (These are projects to come online as a result of Proposition 50 Funding only.)

- The Comprehensive Evaluation's projection of recycling and desalination potential strongly supports the position that aggressive investment can result in significant water supply benefits through 2030. A list of potential and existing recycling projects identified by stakeholders suggests there are 730 projects throughout the state, with 565 projects reporting a potential yield of more than 3 million acre-feet. The desalination list suggests there are 174 potential and existing projects throughout the state with a reported yield of more than 1.6 million acre-feet.

RECOMMENDATIONS

The analysis and associated findings and considerations suggest that agencies responsible for the WUE Program may want to consider changes in the way the program is implemented. Below are specific recommendations that the consultant Team believes merit serious consideration. Any final approach is best considered as part of a dialogue that brings the affected stakeholder community to the table in a transparent series of discussions. The recommendations—described in greater detail at the end of the Overarching Section—fall into four main categories:

PROGRAM STRUCTURE/ASSURANCES

The Comprehensive Evaluation suggests program implementers should consider three specific recommendations related to program structure and assurances. They are: (1) assess the viability of the grant-driven WUE approach given expected state and federal fiscal constraints; (2) determine whether to implement a process to certify compliance with the Urban MOU; and, (3) revisit the effectiveness of the quantifiable objectives approach and associated assurances.

MONITORING PERFORMANCE

Data gaps and limited program assessments greatly handicap effective program implementation. To remove this important barrier, WUE Program implementers are encouraged to consider the following: (1) develop and track specific performance measures for the WUE Program; (2) where fiscally feasible, move forward with the broadly supported package of administrative and legislative water use measurement actions; (3) improve collection of data on locally funded actions; and, (4) revise the grant process to more closely monitor, verify and track results.

FINANCIAL ASSISTANCE PROGRAM

A review of WUE financial assistance programs suggests that there is insufficient information to determine the extent to which current grant and loan programs are supporting WUE Program objectives. Based on the Comprehensive Evaluation findings, implementation agencies are encouraged to (1) revisit grant program structure and protocols, and (2) determine the need, efficacy and structure of urban and agricultural loan programs.

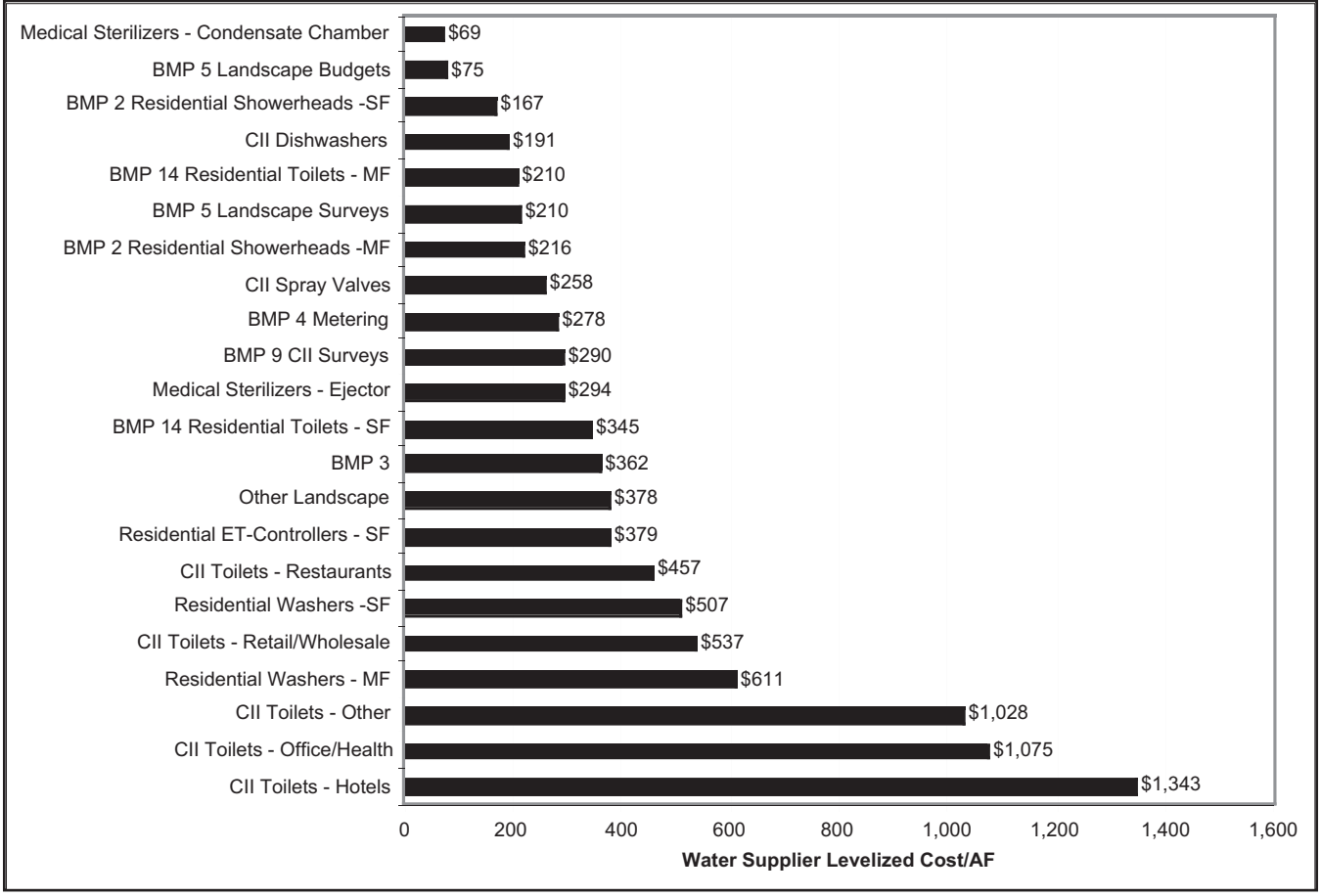
TECHNICAL ASSISTANCE AND RESEARCH

The Comprehensive Evaluation suggests that both technical assistance and research efforts to-date have consisted of a patchwork of initiatives. Agency implementers are encouraged to consider the following recommendations related to these important tasks: (1) evaluate WUE research funded activities to-date, identify research priorities for the next program stage, and establish protocols to disseminate research findings and (2) conduct a market assessment to determine the appropriate structure and scope of technical assistance programs and develop a strategic plan for implementation.

NEXT STEPS

Interested stakeholders are invited to review the accompanying Public Review Draft and submit any comments to the California Bay-Delta Authority for its consideration as it continues discussions related to this important topic. Staff will consider comments received and amend the final version, as appropriate. To the extent public comments reflect substantially differing perspectives or staff does not believe the comments warrant further revisions to the document, the final version of the Comprehensive Evaluation also will include an appendix summarizing the range of feedback and its rationale for not incorporating substantive suggestions.

FIGURE 2D1 WATER SUPPLIER LEVELIZED COST/AF OF WATER SAVINGS BY CONSERVATION MEASURE



the Comprehensive Review.

To implement this methodology, the Comprehensive Review compiled data on representative capital, financial incentive, and annual administrative and operational costs for each conservation measure included in the models. These data are summarized in this appendix.

BMP 1—RESIDENTIAL SURVEYS

The Comprehensive Review assumed an average cost to the utility of $125 per single-family residential survey. This total cost includes costs for field labor, equipment, and program administration. Multi-family surveys were assumed to have an average cost to the utility of $330 per survey. This is the average cost to survey a multi-family complex with six units. The source for the estimates was CUWA (2001) *California Urban Water Conservation Potential*.

BMP 2—RESIDENTIAL PLUMBING DEVICES OTHER THAN TOILETS

The Comprehensive Review assumed an average cost to the utility of $12 per installed plumbing device retrofit kit. This cost covers the cost of equipment, distribution, and administration. It assumes that 55% of kits are actually installed by homeowners. The source for the estimates was CUWA (2001) *California Urban Water Conservation Potential*.

BMP 3—WATER SYSTEM LEAK DETECTION AND SYSTEM AUDITS

The Comprehensive Review assumed an average cost to the utility of $1,656 per acre-foot of system water loss reduction. The estimate is based on information contained in CUWA (2001) *California Urban Water Conservation Potential*.

BMP 4—METERING

The Comprehensive Review assumed an average meter installation cost of $600/meter. Annual meter reading costs were assumed to be $4/year. Meters were assumed to have a useful life of 10 years. The Comprehensive Review based its cost estimates on information compiled by the CALFED Water Use Efficiency Program's work on appropriate water measurement.

BMP 5—LANDSCAPE SURVEYS

The Comprehensive Review assumed an average cost per large landscape survey of $500, which includes both field

Final Report

2005 Urban Water Management Plan – City of Santa Maria

Prepared for

City of Santa Maria

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Santa Maria, CA 93454

April 2007

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2005 Urban Water Management Plan – City of Santa Maria

Submitted to

City of Santa Maria

April 2007

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D ECONOMIC ANALYSIS OF SELECTED DEMAND MANAGEMENT MEASURES

E COUNCIL ANNUAL REPORTS FOR DEMAND MANAGEMENT MEASURES

F SANTA MARIA VALLEY GROUNDWATER BASIN STIPULATION

G CITY OF SANTA MARIA 2004 WATER QUALITY REPORT

treated wastewater at the City's WWTP is an indirect use of recycled water which, in effect, improves the overall reliability of the City's groundwater supplies.

It should be noted that the water supply available to the City is much greater than the supply needed to meet the projected demand. A detailed description of the available supply to the City is presented in the Reliability section below.

Table 3-1
Current and Planned Water Supplies for City of Santa Maria

Source	2005	2010	2015	2020	2025	2030
Purchased Water from SWP	13,706	13,706	13,706	13,706	13,706	13,706
Groundwater(2)	12,795	12,795	12,795	12,795	12,795	12,795
Twitchell Yield/Commingled Groundwater(3)	14,300	14,300	14,300	14,300	14,300	14,300
Return Flows from SWP Water(4)	8,909	8,909	8,909	8,909	8,909	8,909
Recycled Water	0	0	0	0	0	0
Total(5)	49,710	49,710	49,710	49,710	49,710	49,710

Notes
1. Unit of measure: ac-ft/yr
2. Groundwater supplies are based on appropriative rights in Santa Maria Groundwater Basin as defined in the Stipulation. Pursuant to the Court's Phase 5 Tentative Decision, the City has been assigned 5,100 ac-ft/yr of prescriptive rights.
3. Further details can be found in Exhibit F of the Stipulation.
4. Pursuant to the Stipulation, the City is entitled to recapture 65% of its SWP use in the Basin.
5. See Reliability section for details on these supplies.
6. Table format based on DWR Guidance Document Table 4.

The City's water supply is projected to remain relatively constant from 2005 to 2030 to meet the associated projected water demands, with the majority of this demand being met by imported surface water. The City is expected to have an available supply in excess of the projected demands through 2030. Water demand projections are documented in Chapter 4. Details of the imported water, return flows, Twitchell Yield, and native groundwater supplies are presented in the following section followed by a discussion of the reliability of all sources of water supply.

Imported Water

Santa Maria has a Water Supply Agreement with CCWA for 17,280 ac-ft/yr of Table A imported SWP water. Pursuant to this Stipulation, Santa Maria agreed to import and use within the Basin no less than 10,000 ac-ft/yr of available SWP water, or the full amount of available SWP water if the amount available is less than 10,000 ac-ft in a given year. Both GSWC and Guadalupe will import and use all their available SWP water within the Basin.

SWP water originates within the Feather River watershed, is captured in Lake Oroville, and flows via the Sacramento-San Joaquin Delta, the California Aqueduct and the Coastal Branch Extension into CCWA's treatment and conveyance facilities.

Table 4-4
Additional Water Uses and Loses

Water Use Type	2000	2005	2010	2015	2020	2025	2030
Other Water Uses	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unaccounted-for System Losses	1,480	1,171	1,276	1,396	1,461	1,566	1,670
Total	1,480	1,171	1,276	1,396	1,461	1,566	1,670

Notes
1. This table is based on the DWR Guidebook Table 14.
2. Based on calendar year.
3. Unaccounted-for water includes system losses due to leaks, reservoir overflows, and inaccurate meters, as well as water used in operations.
4. Unit of measure: ac-ft/yr

Total Water Demand

As mentioned above, other water uses, as well as any water lost during conveyance, must be added to the customer demand in order to project the City's water demand. In addition to the City's sales to other agencies, unaccounted-for water must be incorporated to the total water demand (refer to the section above for a definition of unaccounted-for water). Table 4-5 summarizes the projections of water sales to other agencies, demand within the City, unaccounted-for water, and total water demand through the year 2030. The projected water sales in the remainder of the analysis, including Table 4-5 represent the total demand of the population-based projections and sales to other agencies.

The water demand projections below do not include any reduction due to future implementation of DMM. More information regarding the status of demand reduction measures is available in Chapter 5.

Table 4-5
Projected Water Sales, Unaccounted-for System Losses, and Total Water Demand

Year	Projected Water Sales[4]	Unaccounted-for System Losses	Total Water Demand
2000[2]	14,232	1,480	15,712
2005	16,658	1,171	17,829
2010	17,853	1,276	19,129
2015	19,211	1,396	20,607
2020	20,273	1,461	21,734
2025	21,697	1,566	23,263
2030	23,110	1,670	24,780

Notes
1. This table is based on the DWR Guidebook Table 15.
2. Based on calendar year.
3. Unit of measure: ac-ft/yr
4. Projected Water Sales includes total demands within the City of Santa Maria and sales to other agencies

	A	B	C	D	E	F	G	H	I
1	The State Water Project Delivery Reliability Report 2009								
2	Santa Barbara County FC&WCD								
3	**SWP Table A Deliveries for 2009 Study**					**Probability Curve**			
4	**Year**	**Delivery w/o Article 56 Carryover (taf)**	**Article 56 Carryover (taf)**	**Total Table A Delivery (taf)**	**Percent of Maximum Table A (45.5 taf)**	**Year**	**SWP Total Table A Delivery (taf)**	**Exceedence Frequency (%)**	**Percent of Maximum Table A (45.5 taf)**
5	1922	22.5	0.0	22.5	50%	1938	43.0	0%	95%
6	1923	26.8	10.9	37.7	83%	1998	42.4	1%	93%
7	1924	8.4	0.4	8.8	19%	1939	41.0	2%	90%
8	1925	21.0	0.0	21.0	46%	1952	40.7	4%	90%
9	1926	23.0	0.0	23.0	51%	1983	40.5	5%	89%
10	1927	23.5	0.0	23.5	52%	2003	39.4	6%	87%
11	1928	26.6	11.4	38.0	84%	1997	38.5	7%	85%
12	1929	12.8	0.0	12.8	28%	1953	38.3	9%	84%
13	1930	17.6	0.0	17.6	39%	2000	38.3	10%	84%
14	1931	13.7	0.0	13.7	30%	1996	38.2	11%	84%
15	1932	17.2	0.0	17.2	38%	1928	38.0	12%	84%
16	1933	17.6	0.0	17.6	39%	1923	37.7	14%	83%
17	1934	13.6	0.0	13.6	30%	1942	37.5	15%	82%
18	1935	22.9	0.0	22.9	50%	1999	37.3	16%	82%
19	1936	24.6	7.7	32.3	71%	1974	37.1	17%	81%
20	1937	27.2	4.7	31.9	70%	1966	36.9	19%	81%
21	1938	30.6	12.3	43.0	95%	1959	36.9	20%	81%
22	1939	26.2	14.8	41.0	90%	1968	36.9	21%	81%
23	1940	26.0	1.7	27.7	61%	1979	36.8	22%	81%
24	1941	26.9	2.1	28.9	64%	1971	36.6	23%	81%
25	1942	24.5	13.0	37.5	82%	1964	36.5	25%	80%
26	1943	24.4	11.9	36.2	80%	1943	36.2	26%	80%
27	1944	21.6	11.8	33.4	73%	1970	36.0	27%	79%
28	1945	22.9	0.0	22.9	50%	1976	36.0	28%	79%
29	1946	22.4	11.1	33.4	74%	1981	35.7	30%	78%
30	1947	25.1	8.6	33.7	74%	1980	34.9	31%	77%
31	1948	25.2	3.8	29.0	64%	1975	34.9	32%	77%
32	1949	26.8	0.0	26.8	59%	1957	34.7	33%	76%
33	1950	24.3	0.4	24.7	54%	1985	34.6	35%	76%
34	1951	23.6	0.0	23.6	52%	1969	33.9	36%	75%
35	1952	29.3	11.4	40.7	90%	1947	33.7	37%	74%
36	1953	24.2	14.2	38.3	84%	1984	33.6	38%	74%
37	1954	25.7	5.5	31.2	69%	1946	33.4	40%	74%
38	1955	23.0	0.0	23.0	51%	1944	33.4	41%	73%
39	1956	26.8	0.0	26.8	59%	1994	33.0	42%	73%
40	1957	21.7	13.0	34.7	76%	1986	32.9	43%	72%
41	1958	30.7	0.0	30.7	67%	1936	32.3	44%	71%

	A	B	C	D	E	F	G	H	I
3	SWP Table A Deliveries for 2009 Study					Probability Curve			
4	Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (45.5 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (45.5 taf)
42	1959	22.0	14.8	36.9	81%	1937	31.9	46%	70%
43	1960	24.5	0.0	24.5	54%	1962	31.3	47%	69%
44	1961	23.6	0.0	23.6	52%	1954	31.2	48%	69%
45	1962	24.8	6.5	31.3	69%	1982	30.7	49%	67%
46	1963	22.4	0.0	22.4	49%	1958	30.7	51%	67%
47	1964	25.6	10.8	36.5	80%	1948	29.0	52%	64%
48	1965	22.8	2.8	25.6	56%	1941	28.9	53%	64%
49	1966	25.9	11.1	36.9	81%	1987	28.3	54%	62%
50	1967	24.4	2.3	26.7	59%	1995	28.2	56%	62%
51	1968	25.0	11.8	36.9	81%	1940	27.7	57%	61%
52	1969	30.7	3.3	33.9	75%	1978	27.2	58%	60%
53	1970	23.6	12.4	36.0	79%	1956	26.8	59%	59%
54	1971	25.2	11.5	36.6	81%	1949	26.8	60%	59%
55	1972	26.7	0.0	26.7	59%	1967	26.7	62%	59%
56	1973	21.5	0.0	21.5	47%	1972	26.7	63%	59%
57	1974	26.7	10.4	37.1	81%	1965	25.6	64%	56%
58	1975	22.0	12.9	34.9	77%	1950	24.7	65%	54%
59	1976	25.4	10.6	36.0	79%	1960	24.5	67%	54%
60	1977	2.5	0.0	2.5	6%	1993	24.4	68%	54%
61	1978	27.2	0.0	27.2	60%	1951	23.6	69%	52%
62	1979	23.7	13.1	36.8	81%	1961	23.6	70%	52%
63	1980	28.0	6.9	34.9	77%	1927	23.5	72%	52%
64	1981	22.1	13.6	35.7	78%	1955	23.0	73%	51%
65	1982	30.7	0.0	30.7	67%	1926	23.0	74%	51%
66	1983	30.7	9.8	40.5	89%	1945	22.9	75%	50%
67	1984	23.7	9.9	33.6	74%	1935	22.9	77%	50%
68	1985	23.1	11.5	34.6	76%	2002	22.8	78%	50%
69	1986	26.6	6.3	32.9	72%	1922	22.5	79%	50%
70	1987	17.2	11.1	28.3	62%	1963	22.4	80%	49%
71	1988	9.8	0.0	9.8	21%	1973	21.5	81%	47%
72	1989	21.3	0.0	21.3	47%	1989	21.3	83%	47%
73	1990	9.4	10.3	19.7	43%	1925	21.0	84%	46%
74	1991	12.3	0.0	12.3	27%	1990	19.7	85%	43%
75	1992	11.8	0.0	11.8	26%	1933	17.6	86%	39%
76	1993	24.4	0.0	24.4	54%	1930	17.6	88%	39%
77	1994	21.2	11.8	33.0	73%	1932	17.2	89%	38%
78	1995	28.2	0.0	28.2	62%	2001	15.0	90%	33%
79	1996	24.5	13.6	38.2	84%	1931	13.7	91%	30%
80	1997	26.6	11.9	38.5	85%	1934	13.6	93%	30%
81	1998	29.6	12.9	42.4	93%	1929	12.8	94%	28%

	A	B	C	D	E	F	G	H	I
3	**SWP Table A Deliveries for 2009 Study**					**Probability Curve**			
4	**Year**	**Delivery w/o Article 56 Carryover (taf)**	**Article 56 Carryover (taf)**	**Total Table A Delivery (taf)**	**Percent of Maximum Table A (45.5 taf)**	**Year**	**SWP Total Table A Delivery (taf)**	**Exceedence Frequency (%)**	**Percent of Maximum Table A (45.5 taf)**
82	1999	23.5	13.8	37.3	82%	1991	12.3	95%	27%
83	2000	26.9	11.4	38.3	84%	1992	11.8	96%	26%
84	2001	15.0	0.0	15.0	33%	1988	9.8	98%	21%
85	2002	22.8	0.0	22.8	50%	1924	8.8	99%	19%
86	2003	28.4	11.1	39.4	87%	1977	2.5	100%	6%
87									
88	Average	23.0	5.7	28.7	63%		28.7		63%
89	Maximum	30.7	14.8	43.0	95%		43.0		95%
90	Minimum	2.5	0.0	2.5	6%		2.5		6%

APPENDIX 7-4

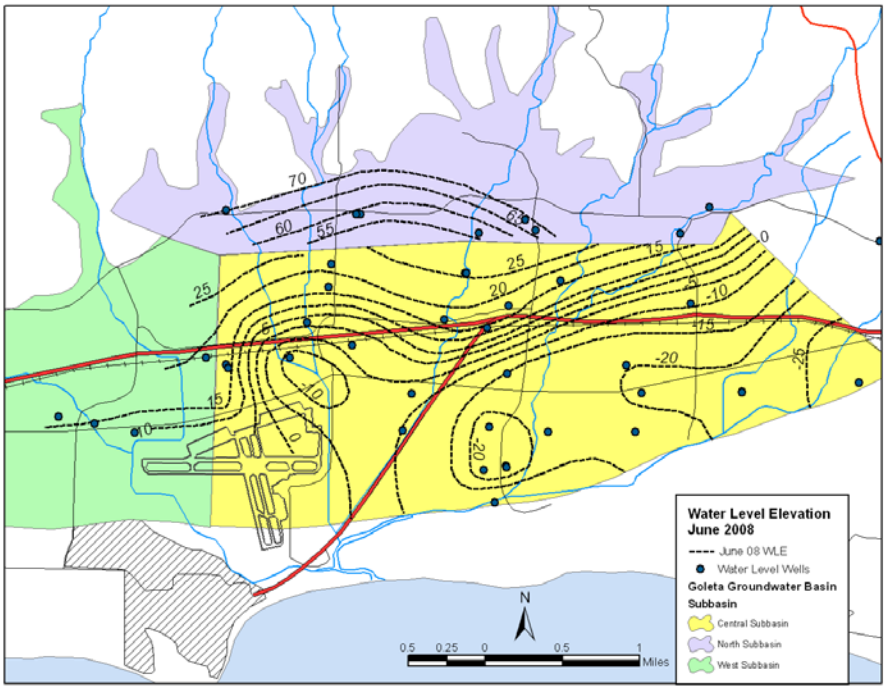
Project 4: City of Goleta,
San Jose Creek Capacity Improvement and Fish Passage Project

- Goleta Water District Groundwater Report

Groundwater Management Plan

Goleta Groundwater Basin

Final



Prepared for

Goleta Water District

La Cumbre Mutual Water Company

By
Steven Bachman, PhD

May 11, 2010

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3 Groundwater Quality and Pumping

3.1 Groundwater Quality

Groundwater quality considerations in basin management generally involve several aspects of water quality: 1) existing poor-quality water in parts of the basin that must be prevented from spreading across the basin (e.g., areas of saline water or high nitrates), 2) potential degradation of basin water by poor-quality water being pulled in from areas outside the aquifers (e.g., intrusion of seawater or high salts being pulled from surrounding sediments), and 3) overlying sources of contamination that could leak into the aquifers (e.g., leaking underground tanks). The Goleta Groundwater Basin has aspects of all three of these considerations.

Groundwater in the Goleta Groundwater Basin is of a calcium bicarbonate nature (DWR, 2009). Water quality is similar in nature to other coastal groundwater basins, where groundwater commonly flows through geologically-young marine sediments and becomes relatively mineralized. Chloride is an issue in some of the coastal basins, especially when there is a connection with the ocean and seawater intrusion can occur.

3.1.1 Historical Groundwater Quality

In early reports, water quality was considered fair in the Central subbasin, although chloride concentrations were somewhat elevated in portions of the West and North subbasins (up to about 200 mg/L) (Upson, 1951). Although below the drinking water standard, irrigation water with chloride at that concentration can harm salt-sensitive crops.

During the historical period 1980 to 2000 for which there are significant data on groundwater quality, chloride concentrations in the Central subbasin were generally less than the approximate 150 mg/L level that could affect salt-sensitive crops and well below the drinking water standard of 500 mg/L (Figure 3-1). However, portions of the North and West subbasins had chloride concentrations above the drinking water standard. Historical nitrate levels were significantly below the drinking water standard except in three wells (Figure 3-2); this is surprising, given the rural agricultural heritage of the basin (agricultural fertilizers, concentrations of ranch animals, and septic systems are the largest sources of nitrate in many basins). Both sulfate and total dissolved solids (TDS) were above the secondary drinking water standards in many wells in the North and West subbasins (Figure 3-3, Figure 3-4).

Iron and manganese have historically been a problem in the basin, with most wells in all subbasins having a maximum recorded concentration above the secondary drinking water standards (Figure 3-5, Figure 3-6).

APPENDIX 7-5

Project 5: Central Coast Water Authority,
Water Supply Reliability and Infrastructure Improvement Project

- Bradbury Reservoir Operations

REPORT OF

MODIFIED STORM OPERATIONS

BRADBURY DAM, CACHUMA PROJECT

SANTA BARBARA COUNTY, CALIFORNIA

Prepared by
Santa Barbara County
Public Works Department
Water Agency

December 29, 1998

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Significant flow events at Solvang and Los Laureles Gages, Santa Ynez River (Storms Which Produced flows Exceeding 20,000 cfs)

YEAR	DATE	LOS LAURELES (above Cachuma)	SOLVANG (Below Cachuma)
1966	December 6	x	
1969	January 21	x	
1969	January 25-26	x	x
1969	February 24-25	x	x
1978	February 10	x	
1978	March 4	x	x
1983	March 1-2	x	x
1992	February 12	x	
1995	January 10	x	x
1995	January 24-25	x	
1995	March 11	x	
1998	February 1-2	x	x
1998	February 6-7	x	
1998	February 23-24	x	x

APPENDIX 7-6

Project 6: Goleta Sanitary District, Wastewater Treatment Plant Upgrade

This project does not require an appendix to this attachment.

APPENDIX 7-7

Project 7: City of Guadalupe, Recycled Water Feasibility Study

This project does not require an appendix to this attachment.