Attachment A

San Jose Municipal Water System

2010 Urban Water Management Plan

Final Draft, May 2011

Prepared for

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TABLE OF CONTENTS

CHAPTER **PAGE**

1 PLAN PREPARATION 1-1
1.1 Introduction 1-1
1.2 Coordination and Public Notification 1-2
1.3 Plan Adoption 1-3
2 SYSTEM DESCRIPTION 2-1
2.1 History 2-1
2.2 Organization Structure 2-1
2.3 Climate 2-2
2.4 Population 2-2
2.5 Demographics 2-3
2.6 Service Area Boundaries 2-3
3 DEMAND 3-1
3.1 History 3-1
3.2 Baseline Water Use 3-2
3.3 Urban Water Use Targets 3-3
3.4 Water Demands and Demand Projections 3-4
3.5 Water Use Reduction Plan 3-6
4 SYSTEM SUPPLIES 4-1
4.1 Sources of Supply 4-1
4.2 SFPUC – Wholesaler (Surface Water) 4-2
4.3 SCVWD – Wholesaler (Surface Water) 4-3
4.4 Groundwater 4-5
4.5 Transfer/Exchange Opportunities 4-8
4.6 DesAlinated Water OppoRTunities 4-9
4.7 Recycled Water 4-9
4.8 Future Water Projects 4-14
5 WATER SUPPLY RELIABILITY & WATER SHORTAGE CONTINGENCY PLANNING 5-1
5.1 Water System Reliability 5-1
5.2 Water Supply Reliability - SFPUC 5-2
5.2.1 Water Shortage Allocation Plan 5-2
5.2.2 Water System Improvement Program 5-3
5.2.3 Interim Supply Limitation 5-4
5.2.4 Interim Supply Allocations 5-4
5.2.5 Environmental Enhancement Surcharge 5-4
5.2.6 Water Conservation Implementation Plan 5-5
5.2.7 Long Term Reliable Water Supply Strategy 5-5
5.3 Water Supply Reliability - SCVWD 5-6
5.4 Factors Affecting Supply 5-8
5.5 Water Shortage Contingency & Drought Planning 5-11
5.6 Water Quality 5-20
6 DEMAND MANAGEMENT MEASURES 6-1
6.1 Background, Implementation and Evaluation 6-1
6.2 Demand Management Measures 6-2

TABLES **PAGE**

Table 1-1: List of Notified Agencies 1-2
Table 1-2: Schedule for Adoption and Submittal 1-3

Table 2-1: Population Projections for SJMWS 2-3
Table 2-2: Proposed 2040 Additional Dwelling Units and Jobs within SJMWS 2-3

Table 3-1: Historical and Present Water Production in SJMWS Service Areas (AFY) 3-1
Table 3-2: Base Water Use Periods 3-2
Table 3-3: Base Daily per Capita Water Use (10-year Range) 3-3
Table 3-4: Base Daily per Capita Water Use (5-year Range) 3-3
Table 3-5: Base Daily per Capita Water Use and Targets 3-4
Table 3-6: Past, Current, and Projected Water Use for SJMWS (AFY) 3-5
Table 3-7: Projected Demand for SJMWS by Service Area (AFY) 3-5
Table 3-8: Additional Water Uses and Losses for SJMWS (AFY) 3-5
Table 3-9: Lower Income Projected Water Use for SJMWS (AFY) 3-6
Table 3-10: Water Demand Projections for Wholesale Water Agencies (AFY) 3-6
Table 3-11: Past, Current, and Projected Water Use for SJMWS 3-6

Table 4-1: Water Supplies – Current and Projected in a Normal Year for SJMWS (AFY) 4-1
Table 4-2: Wholesale Supplies – Existing and Planned Treated Water Sources for SJMWS (AFY) 4-4
Table 4-3: Groundwater – Historical Volume Pumped (AFY) 4-6
Table 4-4: Groundwater – Projected Volume to be Pumped (AFY) 4-7
Table 4-5: Recycled Water – Wastewater Collection and Treatment (AFY) 4-10
Table 4-6: Recycled Water – Potential Future Use (AFY) 4-12
Table 4-7: Recycled Water – 2005 UWMP use projection compared to 2010 actual (AFY) 4-12
Table 4-8: Methods Used to Encourage Recycled Water Use 4-13
Table 4-9: Future Water Supply Projects (AFY) 4-14

Table 5-1: Distribution of Water Based on Level of System-Wide Reduction 5-2
Table 5-2: Basis of Water Year Data 5-12
Table 5-3: Supply Reliability – Historic Conditions (AFY) 5-13
Table 5-4: Supply Reliability – Current Water Sources (AFY) 5-14
Table 5-5: Supply and Demand Comparison – Normal Year (AFY) 5-14
Table 5-6: Supply and Demand Comparison – Single Dry Year (AFY) 5-14
Table 5-7: Supply and Demand Comparison – Multiple Dry Year for 2015 (AFY) 5-15
Table 5-8: Supply and Demand Comparison – Multiple Dry Year for 2020 (AFY) 5-15
Table 5-9: Supply and Demand Comparison – Multiple Dry Year for 2025 (AFY) 5-15
Table 5-10: Supply and Demand Comparison – Multiple Dry Year for 2030 (AFY) 5-16
Table 5-11: Supply and Demand Comparison – Multiple Dry Year for 2035 (AFY) 5-16
Table 5-12: City Resolutions and Ordinances Regarding Water Shortage 5-16
Table 5-13: Water Shortage Contingency – Rationing Stages to Address Shortages 5-17
Table 5-14: Water Shortage Contingency – Mandatory Prohibitions 5-18
Table 5-15: Water Shortage Contingency – Penalties and Charges 5-19
Table 5-16: Financial Impacts 5-19

Table 6-1: SCVWD Total Water Conservation Program Water Savings Goals 6-1
Table 6-2: Residential Plumbing Retrofits Conducted in FY 2009-2010 6-2
Table 6-3: Large Landscape Surveys Conducted during FY 2009-2010 6-5

FIGURES **PAGE**

Figure 2-1: City of San Jose Municipal Water System Boundaries 2-4

Figure 4-1: Santa Clara County Groundwater Basin and SJMWS Groundwater Wells.....4-8
Figure 4-2: SBWR Recycled Water System 4-11

APPENDICES

Appendix A Postings and Notifications for UWMP Preparation
Appendix B Resolution for Adoption of the UWMP
Appendix C City of San Jose Demographic Data
Appendix D Projected Demands Provided to Wholesale Agencies
Appendix E Water Conservation Plan
Appendix F Groundwater Management Plan
Appendix G Water Shortage Contingency Plan and Municipal Code
Appendix H 2009 Declaration of Water Shortage Resolution

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1
Plan Preparation

1.1 INTRODUCTION

The 1983 California Urban Water Management Act (Act), also referred to as Assembly Bill 797, requires all urban water suppliers who directly serve 3,000 or more customers or who provide 3,000 or more acre feet of water per year to prepare an Urban Water Management Plan (Plan). The purpose of the Act is to ensure that water suppliers plan for the long-term conservation and efficient use of the State's limited urban water supplies. The City of San José (City) submitted its first Plan in 1985 in compliance with the Act. Updates to the Plan are required every five years. The City prepared updates to the Plan in 1990, 1995, 2000, and 2005. The normal cycle requires that the Plan be submitted in December of years ending in five and zero. Recent changes in the Plan requirements have necessitated the need for State law to extend the 2010 deadline to July 1, 2011. However, this Plan is referred to as the 2010 Plan to retain consistency with the five-year submittal cycle.

Current Plan requirements incorporate State legislative mandates that have been enacted, in particular Senate Bill (SB) X7-7 Water Conservation Bill of 2009 and Assembly Bill (AB) 1420 Water Demand Management Measures, to ensure 20% water use reduction per capita by 2020. Specific requirements include identifying the base daily per capita water use (baseline), urban water use target, interim water use target, and compliance daily per capita water use.

The 2010 Plan must also include water deliveries and uses; water supply source; efficient water uses; and demand management measures, including implementation strategy and schedule. The California State Department of Water Resources (DWR) has the responsibility for the review and certification process of the Plan pursuant to the Act. A current Plan is required in order to be eligible for a water management grant or loan administered by DWR, the State Water Resources Control Board, or the Delta Stewardship Council.

Many methods are being practiced by the City to maximize water resources while minimizing the need to import supplies. The City has demonstrated its commitment to water conservation with the many programs that have been implemented and by the recognition that water conservation is a permanent and ongoing activity. Through its conservation activities, the City has managed to reduce demand and increase water supply reliability. By supplying the City's customers with water supplies from several different sources, the City achieves greater flexibility to monitor each source and ensure that high quality water is being delivered to customers. Additionally, the reuse of treated wastewater through the South Bay Water Recycling Program has also helped the City to conserve fresh water supplies.

This Plan examines the City's current and projected water supplies, demands, and sources; and discusses the City's conservation efforts and water shortage plan. Chapter 2 provides general information about the City's water system. Within Chapters 3 and 4 are discussions of water supplies and demands, including a supply/demand comparison through the year 2035. Chapter 5 details system reliability and describes the water shortage contingency plan, including the stages of action to be taken during drought years. Chapter 6 describes the City's demand management measures. Collectively, the Plan documents the City's planning efforts involved in ensuring a reliable, high quality, supply of water to the public.

1.2 COORDINATION AND PUBLIC NOTIFICATION

The City has encouraged community participation in its urban water management planning efforts since the first plan was developed in 1985. For this update, preliminary notifications were published in the local newspaper as shown in **Appendix A**. As required by the Water Conservation Bill of 2009, a formal public meeting was held on March 21, 2011 to receive public input on the following:

- Water use targets
- Method for determining the targets
- Economic impacts for SJMWS implementation plan for achieving the targets

Another public meeting is scheduled to allow the public to comment on the draft 2010 UWMP before City Council's approval. Notices for the public meetings were advertised in the local San Jose Mercury News and San Jose Post Record and posted on the City's internet website.

The City coordinated with several local agencies to encourage input and participation in its planning. To maintain a level of plan consistency, the City attended and participated in several meetings between other local retailers hosted by its wholesalers, Santa Clara Valley Water District (SCVWD) and San Francisco Public Utilities Commission (SFPUC). Notification letters were sent to local agencies and other water retailers informing them that the planning efforts were underway, and welcoming any comments or other participation. Coordination between the City and its wholesalers, SCVWD and SFPUC, was maintained throughout the planning process. By consulting with the planning documents completed by the wholesalers, including water supply studies and the Groundwater Management Plans, the City is better able to plan for future water supplies and minimize the need to import water from other regions by creating a realistic, consistent source supply plan. Additionally, as part of the City's General Plan Update process, the City established a forum for public participation, including participation from other water retailers and SCVWD, in which water management and conservation policies and coordination between future land uses and management of the urban water supply was discussed.

A Notice of Preparation of Urban Water Management Plan was sent to the following agencies listed in **Table 1-1**.

Table 1-1: List of Notified Agencies

Agency Name	
ALAMEDA COUNTY WATER DISTRICT	LOS TRANCOS COUNTY WATER DISTRICT
CITY OF HAYWARD	MID-PENINSULA WATER DISTRICT
CITY OF MILPITAS	NORTH COAST COUNTY WATER DISTRICT
CITY OF MOUNTAIN VIEW	SKYLINE COUNTY WATER DISTRICT
CITY OF PALO ALTO	WESTBOROUGH WATER DISTRICT
CITY OF SANTA CLARA	CALIFORNIA WATER SERVICE COMPANY
CITY OF SUNNYVALE	GREAT OAKS WATER COMPANY
PURISSMA HILLS WATER DISTRICT	SAN JOSE WATER COMPANY
CITY OF BRISBANE	CITY OF EAST PALO ALTO
CITY OF BURLINGAME	CITY OF GILROY

Agency Name	
CITY OF DALY CITY	CITY OF MORGAN HILL
TOWN OF HILSBOROUGH	COUNTY OF SANTA CLARA
CITY OF MENLO PARK	SANTA CLARA VALLEY WATER DISTRICT
CITY OF MILLBRAE	SAN FRANCISCO PUBLIC UTILITIES COMMISSION
CITY OF REDWOOD CITY	BAY AREA WATER SUPPLY & CONSERVATION AGENCY
CITY OF SAN BRUNO	
GUADALUPE VALLEY MUNICIPAL IMPROVEMENT DISTRICT	SAN JOSE/SANTA CLARA WATER POLLUTION PLANT
COASTSIDE COUNTY WATER DISTRICT	ESTERO MUNICIPAL IMPROVEMENT DISTRICT

Representative copies of postings and letters are included in **Appendix A**.

1.3 PLAN ADOPTION

A public hearing of the 2010 Plan must take place prior to or on the day of adoption by the City Council. Upon adoption of the Plan by City Council, implementation will take place as identified in the Plan. Submission of the adopted Plan to DWR, the California State Library, and Santa Clara County must take place within 30 days from the date of adoption. The Plan must then be made available to the public within 30 days of submission to DWR. The Plan will be made available via the internet at www.sjmuniwater.com. Below is the schedule for adoption and submittal.

Table 1-2: Schedule for Adoption and Submittal

Action	Completion Date
Public Meeting for Water Use Targets	March 21, 2011
Public Meeting for draft 2010 UWMP	May 23, 2011
Public Hearing and Adoption by City Council	June 7, 2011
Submittal to DWR, the California State Library, and Santa Clara County	July 1, 2011
Available to the public via internet	August 1, 2011

A copy of the resolution adopting the Plan is included in **Appendix B**.

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System Description

2.1 HISTORY

The City was founded in 1777 and incorporated in 1850. The City consists of 179.2 square miles. It is the third largest city in California following Los Angeles and San Diego, and it is the 10th largest city in the US. It is located in Santa Clara County, south of the San Francisco Bay and is the center of a large and expanding metropolitan area commonly known as Silicon Valley. The City is bordered by Santa Cruz Mountains on the west and the Diablo Mountain range on the east. The majority of the City lies in the bay flats with various hills subdividing the valley into smaller areas such as Almaden Valley, Blossom Valley, and Evergreen Valley.

Three water companies provide drinking water to the City: Great Oaks Water Company, San Jose Water Company, and the San Jose Municipal Water System (SJMWS). The first two are private retailers; whereas, SJMWS is operated by the City's Environmental Services Department. This Plan describes the water supply for SJMWS.

SJMWS entered the water business in May 1961 with the purchase of the Evergreen Water Company. The Evergreen system served a 6,000 acre franchise area with several hundred customers. The City was concerned that a safe, adequate and reliable supply of water be assured for new development within this and other areas newly annexed to the City. It was felt that the extension of City services and facilities to these newly annexed areas would greatly encourage their improvement and development. When the City of Alviso was annexed, SJMWS acquired the North San Jose and Alviso areas. The Edenvale service area was established in 1983, and the Coyote Valley service area was established in 1988.

2.2 ORGANIZATION STRUCTURE

The City operates under the Council/Manager form of government, a system that combines the policy leadership of elected officials in the form of a City Council, with the managerial expertise of an appointed City Manager. The Council is the legislative body that represents the community and is empowered by the City Charter to formulate citywide policy. The City Council is comprised of the Mayor, who is elected by the community at-large, and ten council members who are elected by districts. Under the City Charter, the Mayor is responsible for recommending policy, program and budget priorities to the City Council, which in turn approves policy direction for the City. The City Charter limits the Mayor and Council members from serving more than two consecutive terms.

The City Manager is appointed by the Council and serves as the chief administrative officer of the organization. The City Manager is responsible for administration of City affairs, day-to-day operations, and implementation of Council policies.

The City is organized by City Service Areas (CSAs) that best reflect the way the organization delivers services to the residents. A CSA represents the policy-making level for strategic planning, policy setting, and investment decisions in the critical functions the City provides to the community. SJMWS operates under the CSA of Environmental and Utility Services.

2.3 CLIMATE

The City has a semiarid, Mediterranean climate, characterized by warm dry summers and cool winters. Irrigation water demand is often high in the dry summer months and in winter is fulfilled by rainfall. The City averages 300 days of sunshine annually, with temperatures varying from an average of 50 degrees Fahrenheit in January to an average of 70 degrees in July with a mean precipitation of 15.08 inches. In addition to seasonal variation, the area's climate is subject to periodic droughts that impact water supply. An extreme single-year drought occurred in 1976, when annual rainfall amounted to only 7.2 inches, or about one-half of the average rainfall. A severe, prolonged drought occurred in the late 1980s and early 1990s; over a four-year period, where annual rainfall averaged only two-thirds of the annual average. The area has recently been in the midst of another dry period. Precipitation in 2007 was 7.09 inches, less than half of average rainfall and the lowest rainfall in over 50 years. The Desert Research Institute (DRI) reports that 2008 total precipitation for the City was 10.71 inches, or 73 percent of normal. Total precipitation in 2009 was 13.84 inches, slightly below normal. The cumulative precipitation from 2007 to 2009 indicates that the area has been in a multiple-year drought.

2.4 POPULATION

SJMWS currently provides water service to approximately 27,000 metered connections with a population of over 100,000. Population growth in SJMWS service areas is expected to increase in the next 25 years by approximately 65%. Population estimates as shown in **Table 2-1** were calculated using the DWR methodology, Category 2 since SJMWS service area is less than 95% of the city boundaries. Data from the 2000 Census was used in calculating SJMWS's year 2000 service area population. The population from the 2000 Census is available by Census Block, which is a relatively small geographic area smaller than a Census Tract. Census Blocks are available in GIS format and was used in conjunction with existing City service area GIS resources. Census blocks that are within SJMWS service area by 50% or more was used to determine the year 2000 population for SJMWS. The method is to use year 2000 single-family and multi-family connection and census data to develop a ratio of persons per connection for each of these connection types. The number of single-family and multi-family connections for the other years can then be used to scale the population of the respective years from the year 2000 persons per connection type ratio.

In general, as population increases, so does water demand. The population within SJMWS service area is expected to increase due to the proposed development identified within the Preferred Scenario of the draft Envision San Jose 2040 General Plan Update. Analysis of the Preferred Scenario was completed in late 2010, and reflects projected estimates and figures as available through approximately August, 2010. The service area with the greatest increase in population is in North San José, with a projected increase of over 67,000 people. Population is projected at 3.06 residents per dwelling unit, which is consistent with Department of Planning, Building and Code Enforcement's planning assumptions. Population is expected to increase at least five times over existing conditions. The phasing of the General Plan Update development areas was estimated from the City of San José's "Projections of Jobs, Population and Households". The report provides projections of the total population and jobs in the City from 2020 to 2040.

Table 2-1: Population Projections for SJMWS

	2010	2015	2020	2025	2030	2035
SJMWS Service Area[1]	114,974	135,821	147,091	160,303	175,459	189,644

1. Service area population is defined as the population served by the distribution system.

2.5 DEMOGRAPHICS

The City is in the process of updating its General Plan (Envision San Jose 2040). It is anticipated that Envision San Jose 2040 will be adopted by October 2011. The Preferred Scenario of the draft Envision San Jose 2040 General Plan identifies the addition of 120,000 dwelling units and 470,000 new jobs throughout the city limits. The additional housing and employment will have a significant impact within SJMWS service area as shown in **Table 2-2**.

Table 2-2: Proposed 2040 Additional Dwelling Units and Jobs within SJMWS

	Dwelling Units			Number of Jobs By Job Category					
	Total MFD	Total SFD	TOTAL	Industrial	Office	Retail	Restaurant	Institutional	TOTAL
North San Jose/Alviso	21,637	120	**21,757**	15,484	73,377	2,791	310	100	**92,062**
Evergreen	2,832	366	**3,198**	18	15,676	2,512	279	1,491	**19,976**
Edenvale	0	0	**0**	9,000	7,000	0	0	0	**16,000**
Coyote Valley	0	0	**0**	0	50,000	0	0	0	**50,000**
Total	**24,469**	**486**	**24,955**	**24,502**	**146,053**	**5,303**	**589**	**1,591**	**178,038**

Additional demographic information for the entire city can be found in **Appendix C**.

2.6 SERVICE AREA BOUNDARIES

SJMWS services four different areas of the city: North San Jose/Alviso, Evergreen, Edenvale, and Coyote Valley (**Figure 2-1**).

NORTH SAN JOSE/ALVISO

The North San Jose/Alviso service area consists of 5,600 acres and extends from Trimble Road on the south to the Alviso Slough on the north. The area is bordered on the west by the Guadalupe River and on the east by the Coyote Creek. The land use is predominantly industrial, with some residential and commercial.

EVERGREEN

The Evergreen Service Area extends from Highway 101 on the west to the foothills of the Mount Diablo Range on the east. The area is bounded on the north by Tully Road and on the south by

the City limits. The current land use in Evergreen is predominantly residential (94%) and commercial (5%). The service area contains approximately 10,750 acres.

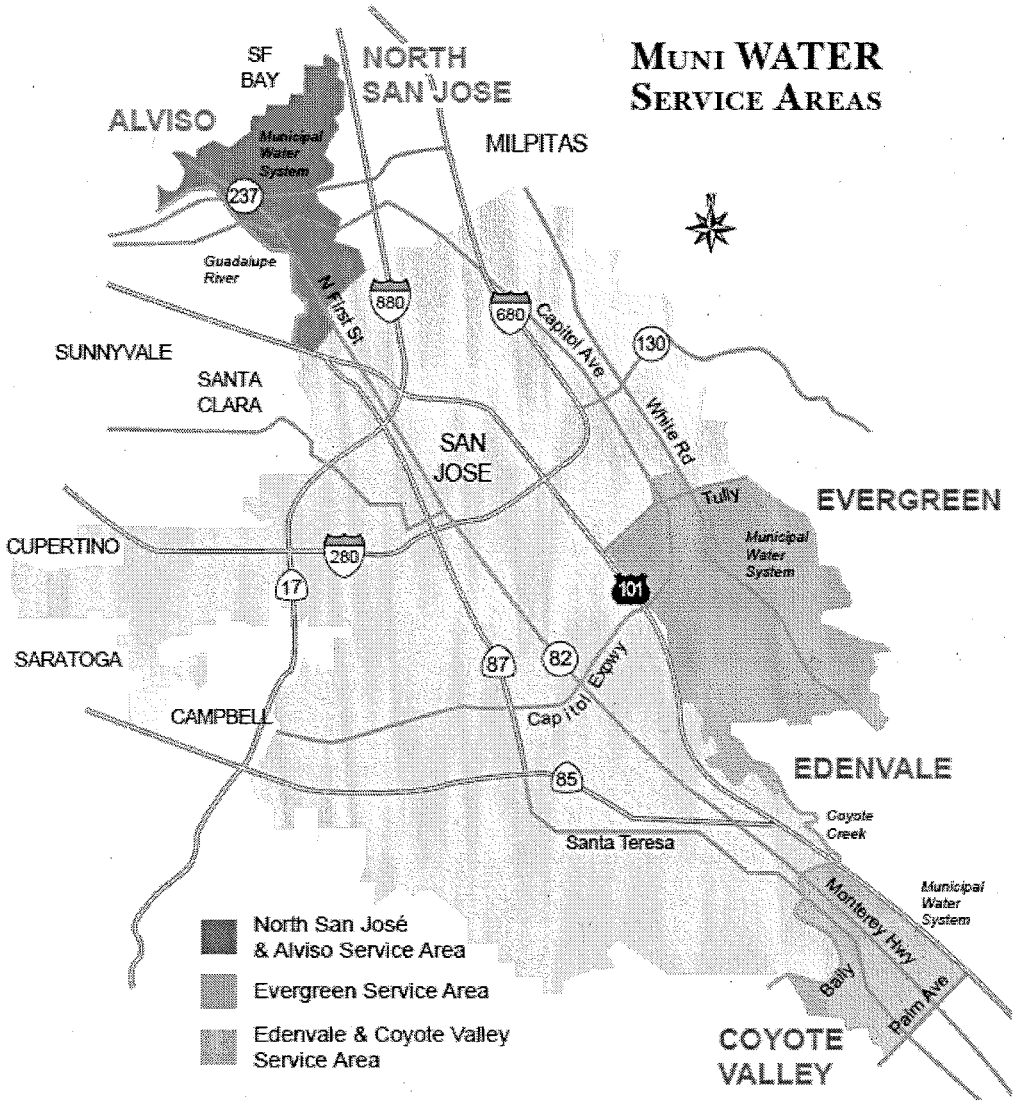
EDENVALE

The Edenvale service area is located east of Coyote Creek and south of Hellyer Avenue. Covering about 700 acres, Edenvale is zoned for industrial and commercial use.

COYOTE VALLEY

The Coyote Valley service area is located west of Highway 101, south of Tulare Hill, and north of Palm Avenue. The area includes approximately 7,500 acres and is currently largely undeveloped (not including 51% as permanent open space lands).

Figure 2-1: City of San Jose Municipal Water System Boundaries



3
Demand

3.1 HISTORY

Water use has climbed steadily from 1978 until 1988, when it began to decline in response to a drought-related water conservation and allocation program. Since 1991, when water usage reached its lowest level in response to enforced drought-related conservation measures, the use of water has been steadily increasing in SJMWS service areas. In 1993, total water usage had recovered from the drought, surpassing the previous high usage year of 1987. Water use in more recent years decreased because of drought, weather, and economic factors. **Table 3-1** reflects the total yearly water use in acre-feet per year (AFY) by SJMWS since 1985.

Table 3-1: Historical and Present Water Production in SJMWS Service Areas (AFY)

Year	SFPUC	SCVWD	Evergreen Wells	NSJ Wells	Edenvale Wells	Coyote Wells	Recycled Water	SJMWS Total[1]
1985	3,255	8,083	810	138	124			**12,410**
1986	3,382	8,535	900	65	102			**12,984**
1987	3,426	8,853	1,133	269	135			**13,816**
1988	2,638	9,244	855	615	157	40		**13,549**
1989	2,649	8,783	82	48	101	41		**11,704**
1990	2,512	9,118	40	540	114	52		**12,376**
1991	1,913	8,280	11	924	99	46		**11,273**
1992	2,443	10,198	11	811	123	57		**13,643**
1993	3,057	10,256	14	517	95	48		**13,987**
1994	3,390	11,237	6	541	98	55		**15,327**
1995	4,139	11,060	40	7	92	59		**15,397**
1996	4,474	11,846	11	117	111	54		**16,613**
1997	4,686	13,795	5	189	112	70		**18,857**
1998	4,539	12,104	6	354	121	52		**17,176**
1999	4,989	13,750	5	0	234	35	916	**19,929**
2000	5,303	14,285	1	0	500	64	1,384	**21,537**
2001	5,207	14,805	2	0	605	74	1,787	**22,480**
2002	5,207	15,275	1	0	577	73	1,720	**22,853**
2003	5,171	15,541	4	0	580	59	1,963	**23,318**
2004	5,300	16,561	0	0	535	61	2,333	**24,790**
2005	4,848	15,384	0	0	563	324	3,066	**24,185**
2006	5,113	15,776	0	0	404	393	3,151	**24,837**
2007	5,358	16,576	0	0	424	373	3,694	**26,425**
2008	5,283	16,217	0	0	409	377	4,225	**26,511**
2009	4,784	14,864	0	0	383	429	3,861	**24,321**
2010	4,592	13,692	0	0	338	329	3,345	**22,296**

1. Discrepancies between the noted water production in **Table 3-1** and water demands in **Chapter 3.4** are due to dissimilar billing cycles.

3.2 BASELINE WATER USE

In accordance with the Water Conservation Bill of 2009, water suppliers must define a 10- or 15-year water use period for use as the basis for calculating the base daily per capita water use in gallons per capita per day (gpcd). This value serves as the baseline for computing required future water use reductions. A 5-year base period is used to calculate the minimum water use reduction requirement.

For recycled water retailers, there is the option to use a base period of up to 15 years. The baseline determination is dependent on recycled water use during 2008 as a percentage of total retail water delivery. If the recycled water use in 2008 was greater than 10% of the total retail water delivery, then the retailer has the option to use a 15-year baseline. While the City is eligible for the 15-year period based on its 2008 recycled water use, connection data (and therefore population estimates) are not available for earlier years. Based on the limited population data, the City has opted to use a 10 year base period.

The 5- and 10-year base period determination is shown in **Table 3-2**. The selected period is representative of long-term water use for the City; water use in more recent years was artificially low because of drought, weather, and economic factors.

Table 3-2: Base Water Use Periods

Parameter	Value
2008 total water deliveries (potable and recycled)	26,511 AFY
2008 total volume of delivered recycled water	4,225 AFY
2008 recycled water as a percent of total deliveries	16%
Year beginning 10-year base period range[1]	1997
Year ending 10-year base period range	2006
Year beginning 5-year base period range	2003
Year ending 5-year base period range	2007

1. While the City is eligible for the 15-year period based on its 2008 recycled water use, connection data (and therefore population estimates) were not available for earlier years. As such, the baseline per capita determination defaults to the 10-year range.

Table 3-3 and **Table 3-4** show the gross water use for each year within the 5- and 10-year base periods as well as the baseline daily per capita water use.

Table 3-3: Base Daily per Capita Water Use (10-year Range)

Year	Service Area Population	Gross Water Use (MGD)	Daily per capita water use (gpcd)
1997	84,971	16.83	198
1998	88,788	15.33	173
1999	94,147	16.97	180
2000	97,504	17.99	185
2001	100,613	18.47	184
2002	103,647	18.68	180
2003	105,440	19.06	181
2004	108,698	20.02	184
2005	113,281	18.85	166
2006	114,230	19.36	169
Base Daily Per Capita Water Use (1997-2006)			**180**

Table 3-4: Base Daily per Capita Water Use (5-year Range)

Year	Service Area Population	Gross Water Use (MGD)	Daily per capita water use (gpcd)
2003	105,440	19.06	181
2004	108,698	20.02	184
2005	113,281	18.85	166
2006	114,230	19.36	169
2007	114,831	20.29	177
Base Daily Per Capita Water Use (2003-2007)			**176**

The base daily per capita water use for 1997-2006 is 180 gpcd as shown on **Table 3-3**. The population estimates were calculated using the DWR methodology and 2000 US Census data. Base daily per capita water use during the 5-year base period was 176 gpcd, as shown on **Table 3-4**. Because the 5-year base daily per capita water use is greater than 100 gpcd, the minimum water use reduction requirement must be calculated to determine whether the City's 2015 and 2020 water use targets exceed the minimum water use reduction requirement (per Section 10608.22 of the Water Code). The 2020 per capita water use target must be less than the minimum water use reduction target of 95% of the 5-year base daily per capita water use.

3.3 URBAN WATER USE TARGETS

Four methods are allowed by Water Conservation Bill of 2009 for calculating the 2015 and 2020 water use targets. Urban Water Use Target Method 1 (80% of 10-Year Base Daily Per Capita Water Use) was used to determine the City's urban water use target, because it is the most applicable to available data as well as the water use and demographic characteristics of the service area. The baseline and targets were developed individually (i.e., for SJMWS service area only), but the City is considering options for regional alliances. By 2020, daily per capita water use must be 80% of the 10-year base daily per capita water use. By 2015, daily per capita water use must be halfway between the 10-year base daily per capita water use and the 2020

target. A summary of the baselines, Method 1 targets, and minimum water use reduction values are presented in **Table 3-5**.

Table 3-5: Base Daily per Capita Water Use and Targets

Parameter	Daily per capita water use (gpcd)
10-year base daily per capita water use (1997-2006)	180
5-year base daily per capita water use (2003-2007)	176
2020 minimum water use target (95% of 5-year baseline)	167
Method 1 2015 water use target (90% of 10-year baseline)	**162**
Method 1 2020 water use target (80% of 10-year baseline)	**144**

The Method 1 2020 target of 144 gpcd is below the minimum water use target of 167 gpcd; therefore, no adjustment to the 2020 target is necessary.

3.4 WATER DEMANDS AND DEMAND PROJECTIONS

Past, current, and projected water use in SJMWS service areas are summarized by classification of the water delivered to all customers in **Table 3-6**, and by service area in **Table 3-7**. SJMWS supplies water to meet the demands of the population within its service areas and does not supply the potable demands of any other city, local agencies or environmental needs. Population is a primary factor affecting urban water demand. Prior to 1995, demand for service connections was growing at about 600 service connections per year; between 2000 and 2004 the demand for service connections grew at about 500 service connections per year. The addition of service connections has been slower over the past several years due to economic factors. The present and projected water demands for SJMWS are shown in **Table 3-6**, which show that SJMWS will experience significant growth in demand. It is anticipated that the demand will more than double from 2010 to 2035. The increase in demand is attributable to the proposed development projects as identified within the draft Envision San Jose 2040 General Plan Update. Some demand reduction as a result of conservation is included within the projected demands, particularly within the residential sectors. Decreased demand from 2005 to 2010 reflects the economic downturn.

Table 3-6: Past, Current, and Projected Water Use for SJMWS (AFY)

Customer Type	2005	2010	2015	2020	2025	2030	2035
Single family residential	10,235	9,280	10,925	10,940	10,950	10,961	10,975
Multi-family residential	3,224	2,050	3,724	4,480	4,985	5,517	6,245
Commercial	1,958	1,178	4,925	6,370	8,064	10,006	11,824
Industrial	2,072	2,303	2,954	3,341	3,794	4,315	4,802
Institutional/Governmental	0	327	51	76	106	140	171
Irrigation	4,429	3,047	4,310	4,310	4,310	4,310	4,310
Other Temporary	107	15	101	101	101	101	101
Total Potable	**22,025**	**18,200**	**26,991**	**29,618**	**32,309**	**35,349**	**38,428**
Total incl. Recycled Water	**25,092**	**21,545**	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**

Table 3-7: Projected Demand for SJMWS by Service Area (AFY)

Service Area	2005	2010	2015	2020	2025	2030	2035
North San Jose/Alviso	5,047	4,535	7,183	8,099	8,833	9,635	10,589
Evergreen	15,912	12,891	16,185	16,592	17,019	17,503	17,986
Edenvale	717	443	1,678	2,230	2,876	3,618	4,312
Coyote	349	330	1,945	2,698	3,580	4,593	5,540
Total Potable	**22,025**	**18,200**	**26,991**	**29,618**	**32,309**	**35,349**	**38,428**
Total incl. Recycled Water	**25,092**	**21,545**	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**

Table 3-8 provides all other water uses and losses that are not accounted for in the past, current, and projected demands associated with user demand. System losses are estimated to be approximately 3% of potable water demands. Saline water intrusion barriers, groundwater recharge, and conjunctive use are not shown below since these uses are managed by SCVWD and are reflected in SCVWD's UWMP for the entire County.

Table 3-8: Additional Water Uses and Losses for SJMWS (AFY)

Water Use	2005	2010	2015	2020	2025	2030	2035
Recycled Water	3,066	3,345	5,149	5,609	6,150	6,770	7,351
System Losses	753	646	810	889	969	1,060	1,153
Total	**3,819**	**3,991**	**5,959**	**6,498**	**7,119**	**7,830**	**8,504**

LOWER INCOME HOUSING WATER USE PROJECTION

Section 10631.1 (a) of the California Water Code requires that the water use projections specifically identify the projected water use for lower income single-family and multi-family residential homes. **Table 3-9** provides the water use projection for lower income households within SJMWS service area (these demands are already included in **Table 3-6** and **Table 3-7**). The current percentage of lower income housing within SJMWS service area is approximately 15.5% of the total lower income housing within the entire City. Assuming the same percentage will be maintained to meet the RHNA goal, an additional 2,026 multi-family dwelling units will be constructed within SJMWS service area between 2007 and 2014 for lower income housing. This

will result in an overall lower income housing demand of 925 AFY by 2015. Projections for additional units beyond 2014 are unknown at this time; however, for planning purposes, the amount of lower income water demand as a percentage of total water demand is assumed to remain constant. Currently, lower income demands are approximately 6% of the overall demands. The projected lower income demands are estimated to be 6% of the total projected residential demands.

Table 3-9: Lower Income Projected Water Use for SJMWS (AFY)

Customer Type	2015	2020	2025	2030	2035
Single family residential	4	4	4	4	4
Multi-family residential	921	921	952	985	1,029
Total Water Use	**925**	**925**	**956**	**989**	**1,033**

WATER DEMAND PROJECTIONS FOR WHOLESALE WATER AGENCIES

Below in **Table 3-10** are the projected demands given to each wholesale water agency that SJMWS receives water from. A copy of the documentation provided to the wholesale agencies is provided in **Appendix D**. No water is sold to other agencies by SJMWS.

Table 3-10: Water Demand Projections for Wholesale Water Agencies (AFY)

Customer Type	Contracted Volume	2015	2020	2025	2030	2035
SFPUC	5,039	5,039	5,039	5,039	5,039	5,039
SCVWD	17,500	16,185	16,592	17,019	17,500	17,500

3.5 WATER USE REDUCTION PLAN

Based on the projected population estimates (**Table 2-1**) and the projected water use (**Table 3-6**), additional conservation will be required to meet the water use targets. **Table 3-11** details the targets and projected water demands from 2015 through 2035 and the amount of additional conservation required to meet those targets.

Table 3-11: Past, Current, and Projected Water Use for SJMWS

Customer Type	2015	2020	2025	2030	2035
Population Estimate	135,821	147,091	160,303	175,459	189,644
Target Water Use Rates (gpcd)	162	144	144	144	144
Target Water Use (AFY)	24,646	23,726	25,857	28,302	30,590
Projected Water Use (AFY)	26,991	29,618	32,309	35,349	38,428
Additional Water Reduction Required	**2,345**	**5,892**	**6,452**	**7,047**	**7,838**

In an effort to meet the projected water use targets, SJMWS is currently working in cooperation with SCVWD and other agencies to increase efforts to conserve water and decrease potable water demand, and to evaluate possibilities for further demand reduction in areas of increased commercial/industrial/institutional use where increased population growth is not expected. SJMWS may also use revised methodologies issued by DWR before 2015 to revise its 2015

and 2020 targets, or it may join regional alliances. These are in addition to SJMWS' current efforts to implement water conservation.

In August 2008, the City's Environmental Services Department prepared a Water Conservation Plan. This three-year plan formalizes the city's commitment to a more sustainable water supply. The plan relies on tools and programs such as outreach and education, cost-sharing programs with SCVWD for residential and commercial users, legislative priorities, Water Shortage Contingency Plan and Drought Plan, conservation pricing, and partnerships (San José August 2008). A new Water Conservation Plan will be prepared in late 2011/early 2012.

The City is also a signatory to the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding (MOU). It has committed to the implementation of the Best Management Practices (BMPs) described in the MOU and summarized below:

- Utility Operations Programs
- Education Programs
- Residential Programs
- Commercial, Industrial, and Institutional Programs
- Landscape Programs

The goals and implementation of these BMPs are further discussed in **Chapter 6** (Demand Management Measures). The City's Water Conservation Plan is included as **Appendix E**.

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4
System Supplies

4.1 SOURCES OF SUPPLY

SJMWS relies on four sources of supply: surface water from SFPUC, local and imported surface water from SCVWD, groundwater from the Santa Clara groundwater basin, and recycled water from the South Bay Water Recycling (SBWR) Program. Supply sources received by SJMWS and discussed within this chapter are generally considered consistent sources, except during times of prolonged drought, during which time supplies are decreased in proportion to wholesale supplies available as discussed in Chapter 5. **Table 4-1** depicts the amount of supply from each source that was purchased in 2010 and is anticipated to be purchased in the future as determined by the City.

Table 4-1: Water Supplies – Current and Projected in a Normal Year for SJMWS (AFY)

Water Supply Sources	2010	2015	2020	2025	2030	2035
SFPUC	4,592	5,039	5,039	5,039	5,039	5,039
SCVWD	13,692	16,185	16,592	17,019	17,500	17,500
Groundwater	668	5,767	7,988	10,251	12,809	15,888
Recycled Water	3,339	5,148	5,609	6,150	6,770	7,351
Total:	**22,291**	**32,139**	**35,228**	**38,459**	**42,118**	**45,778**

Each of the four service areas is supplied by one or more of the water supply sources described in **Table 4-1**.

NORTH SAN JOSE/ALVISO

The area is served through two service connections to SFPUC Bay Division Pipelines 3 and 4. The turnouts feed the demand of the distribution system and storage requirements of the two reservoirs. There are pump station facilities at each of the reservoirs. There is only one pressure zone in this service area. The pumping facilities are used to boost the pressure of water stored in the reservoirs from elevation head to system pressure. There are four groundwater wells with a pumping capacity of approximately 1,500 gpm each; two of the wells are currently permitted to be used under normal conditions to supply water, and two are available for emergency use purposes.

EVERGREEN

Three turnouts are connected to SCVWD's East Pipeline. There are five different pressure zones with 13 storage tanks and 13 pump stations. There are four stand-by groundwater wells with a pumping capacity of approximately 1,500 gpm each that can be used for emergencies.

EDENVALE

Three groundwater wells, with a combined pumping capacity of approximately 3,400 gpm each, pump groundwater to the distribution system and a storage tank.

COYOTE VALLEY

Four groundwater wells, with a combined pumping capacity of approximately 5,500 gpm each, pump groundwater to the distribution system and a storage tank.

4.2 SFPUC – WHOLESALER (SURFACE WATER)

The City receives water from the City and County of San Francisco's Regional Water System (RWS), operated by SFPUC. This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties.

The amount of imported water available to SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, SFPUC is very dependent on reservoir storage to firm-up its water supplies.

SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. In practice, the local watershed facilities are operated to capture local runoff.

The business relationship between San Francisco and its wholesale customers is largely defined by the "Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County" entered into in July 2009 (WSA). The new WSA replaced the Settlement Agreement and Master Water Sales Contract that expired June 2009. The WSA addresses the rate-making methodology used by San Francisco in setting wholesale water rates for its wholesale customers in addition to addressing water supply and water shortages for the RWS. The WSA has a 25 year term.

In terms of water supply, the WSA provides for a 184 million gallon per day (MGD, expressed on an annual average basis) "Supply Assurance" to the SFPUC's wholesale customers, subject to reduction, to the extent and for the period made necessary by reason of water shortage, due to drought, emergencies, or by malfunctioning or rehabilitation of the regional water system. The WSA does not guarantee that San Francisco will meet peak daily or hourly customer demands when their annual usage exceeds the Supply Assurance. The SFPUC's wholesale customers have agreed to the allocation of the 184 MGD Supply Assurance among themselves, with each entity's share of the Supply Assurance set forth in Attachment C to the WSA. The Supply Assurance survives termination or expiration of the WSA and the City's Individual Water Sales Contract with San Francisco.

The Water Shortage Allocation Plan between the SFPUC and its wholesale customers, adopted as part of the WSA in July 2009, addresses shortages of up to 20% of system-wide use. The Tier 1 Shortage Plan allocates water from the RWS between San Francisco Retail and the wholesale customers during system-wide shortages of 20% or less. A Tier 2 Shortage Plan was

adopted by the wholesale customers, which would allocate the available water from the RWS among the wholesale customers.

The City of San Jose and City of Santa Clara's Agreement with SFPUC provides that both cities will remain temporary and interruptible customers until 2018. The maximum amount that SFPUC will deliver to them collectively until 2018 is 9 MGD or 10,082 AFY. The contract with SFPUC is temporary in that it provides an assurance of supply only until December 2018. By December 2018, SFPUC will make further decisions on future water supply beyond 2018, after completing necessary cost analyses and California Environmental Quality Act (CEQA) evaluation/documentation. The supply is interruptible before December 2018 if the SFPUC determines that aggregate use by all wholesale customers will exceed 184 MGD in 2018. The supply cannot be interrupted until five years after the City has received notice of SFPUC's intention to reduce or interrupt deliveries.

As part of the new WSA with SFPUC, SJMWS may purchase excess water, provided the combined purchases of SJMWS and the City of Santa Clara do not exceed 9 MGD. SJMWS may also purchase excess water supplies from other wholesale customers. There are no assurances that this excess water will be available and excess supply is not included in **Table 4-1** and **Table 4-2**. However, SJMWS is committed to purchasing the maximum amount of water available and reducing its reliance on groundwater due to the uncertainties regarding the availability and sustainability of the groundwater basin.

For the purposes of this Plan, it is assumed that the supply available to SJMWS will remain the same through 2035. This is an extrapolation of current and historical water deliveries, as these deliveries have been fulfilled for over three decades. Therefore, such extrapolation is a reasonable planning assumption based on available data.

BAWSCA

SJMWS is a member of the Bay Area Water Supply and Conservation Agency (BAWSCA). BAWSCA was created on May 27, 2003 to represent the interests of the 26 agencies that include cities, water districts, a water company, and a university, in Alameda, Santa Clara and San Mateo counties that purchase water on a wholesale basis from the RWS. The BAWSCA agencies are referred to as the Wholesale Customers.

BAWSCA is the only entity that has the authority to directly represent the needs of the Wholesale Customers that depend on the RWS. Through BAWSCA, the Wholesale Customers can work with SFPUC on an equal basis to ensure the RWS is rehabilitated and maintained and to collectively and efficiently meet local responsibilities.

BAWSCA has the authority to coordinate water conservation, supply and recycling activities for its agencies; acquire water and make it available to other agencies on a wholesale basis; finance projects, including improvements to the regional water system; and build facilities jointly with other local public agencies or on its own to carry out the agency's purposes.

4.3 SCVWD – WHOLESALER (SURFACE WATER)

SCVWD's water supply system is comprised of storage, conveyance, recharge, treatment, and distribution facilities that include local reservoirs, the groundwater subbasins, groundwater

recharge facilities, treatment plants, a treated water transmission system, imported supply, and raw and treated water conveyance facilities. SCVWD supplies water to local retail water agencies which in turn provide it to their retail customers in Santa Clara County. SCVWD has an active conjunctive water management program to optimize the use of groundwater and surface water, and to prevent groundwater overdraft and land subsidence. Nearly half of the County's water supply is from local groundwater aquifers and more than half is imported from Northern California watersheds through State Water Project (SWP) and Central Valley Project (CVP) pumping stations in the Sacramento-San Joaquin Delta. Both groundwater and imported water are sold to retailers.

Imported water is conveyed to Santa Clara County through two main conveyance facilities: the South Bay Aqueduct, which carries SWP water from the South Bay Pumping Plant; and the Santa Clara Conduit and Pacheco Conduit, which bring CVP water from the San Luis Reservoir.

Local runoff is captured in local reservoirs for recharge into the groundwater subbasins or treatment at one of the District's Water Treatment Plants (WTPs). The total storage capacity of these reservoirs is about 170,000 acre-feet (AF). The Rinconada WTP was constructed in 1967 and can sustain a maximum flow rate of 75 MGD. Upgrades are in the planning stage to increase production at Rinconada to 100 MGD. The Penitencia WTP was constructed in 1974 and can sustain a maximum flow rate of 42 MGD. The Santa Teresa WTP was constructed in 1989 and can sustain a maximum flow rate of 100 MGD.

Treated water pipelines that distribute water from the treatment plants to the water retail agencies include the West Pipeline, the Campbell Distributary, the Santa Clara Distributary, the Mountain View Distributary and the Sunnyvale Distributary from Rinconada WTP; the Snell Pipeline and Graystone Pipeline from Santa Teresa WTP; and the East Pipeline, Parallel East Pipeline, and Milpitas Pipeline, which can be fed from the Santa Teresa WTP or from Penitencia WTP.

SJMWS receives water from SCVWD's Santa Teresa and Penitencia WTPs through the East and Snell Pipelines. In 1972, SCVWD entered into the first contract to supply SJMWS with imported water. Another contract initiated in 1981 remains in effect until 2051. The contract established a schedule of water deliveries where SJMWS submits a projected request for a five-year period to facilitate planning and SCVWD contracts annually for minimum deliveries, with restrictions based on peak demand and annual distribution. SJMWS may have access to additional water above the amount indicated in **Table 4-2**, as available.

Table 4-2 shows the existing and planned contract amount for each wholesaler.

Table 4-2: Wholesale Supplies – Existing and Planned Treated Water Sources for SJMWS (AFY)

Wholesale Sources	Contracted	2015	2020	2025	2030	2035
SFPUC[1]	5,039	5,039	5,039	5,039	5,039	5,039
SCVWD[2]	17,500	16,185	16,592	17,019	17,500	17,500
Total	**22,539**	**22,539**	**22,539**	**22,539**	**22,539**	**22,539**

1. SFPUC contract amount may change after 2018 as discussed in Chapter 4.2.
2. SCVWD contract amount is based on 5-yr projection by SJMWS as discussed in Chapter 4.3.

4.4 GROUNDWATER

Groundwater provides about half of the County's water supply for potable use, through pumping by retail water agencies or individual well owners. The groundwater basin in Santa Clara County is not adjudicated and has not been identified or projected to be in overdraft by DWR. The quality, supply, and management of the local groundwater basin is monitored and managed by SCVWD and is summarized in their Groundwater Management Plan (**Appendix F**), adopted in 2001.

SCVWD operates and maintains 18 major recharge ponds, with a combined surface area of more than 320 acres, and over 30 local creeks. Runoff is captured in SCVWD's reservoirs and released into both in-stream and off-stream recharge ponds for percolation into the groundwater basin. In addition, imported water is delivered by the raw water conveyance system to streams and ponds for groundwater recharge. The capacity of these recharge systems is 138,000 AF.

The groundwater system in Santa Clara County performs multiple functions: treatment, transmission, and storage. Water enters the groundwater subbasins through recharge areas generally located at or near the subbasins' perimeter, and is transmitted into the deeper confined aquifer of the central part of the valley. In the process, the water is filtered and becomes suitable for drinking. Eventually the groundwater reaches pumping zones, where it is extracted for municipal, industrial, and agricultural uses. The groundwater basin has vast storage capacity, enabling supplies to be carried over from wet years to dry years.

Within Santa Clara County, SCVWD manages two groundwater subbasins that transmit, filter, and store water: the Santa Clara Subbasin (DWR Subbasin 2-9.02) and the Llagas Subbasin (DWR Subbasin 3.301). In its water supply planning, SCVWD frequently splits the Santa Clara Subbasin into two subareas: the Santa Clara Plain and the Coyote Valley. Although part of the same subbasin, these two subareas have different groundwater management challenges and opportunities and are in different groundwater charge zones.

These subbasins contain young alluvial fill formation and the older Santa Clara Formation. Both formations are similar in character and consist of gravel, sandy gravel, gravel and clay, sand, and silt and clay. The coarser materials are usually deposited along the elevated lateral edges of the subbasins, while the flat subbasin interiors are predominantly thick silt and clay sections inter-bedded with smaller beds of clean sand and gravel. A general discussion of each groundwater subarea is provided below.

SANTA CLARA SUBBASIN - SANTA CLARA PLAIN

The Santa Clara Plain is part of the Santa Clara Subbasin, located in a structural trough that is bounded by the Santa Cruz Mountains to the west and the Diablo Range to the east. The Plain, which is approximately 22 miles long, narrows from a width of 15 miles near the County's northern boundary to about half a mile wide at the Coyote Narrows, where the two ranges nearly converge. The Plain has a surface area of 225 square miles and is approximately 15 square miles smaller than the Santa Clara Subbasin (Basin 2-9.02) as defined by the DWR in Bulletin 118, Update 2003, since it does not include the Coyote Valley portion of the Santa Clara Subbasin. Although hydraulically connected, SCVWD refers to the Coyote Valley separately (see description below) since it is in a different groundwater charge zone than the Santa Clara Plain and has fewer water supply options than the Santa Clara Plain. The Plain

underlies the northerly portion of the Santa Clara County and includes the majority of the streams and recharge facilities operated by the District.

SANTA CLARA SUBBASIN - COYOTE VALLEY

The Coyote Valley portion of the Santa Clara Subbasin is an alluvial-filled basin hydraulically connected to the Santa Clara Plain to the north. The Coyote Valley extends from Metcalf Road south to Cochrane Road, where it joins the Llagas Subbasin at a groundwater divide. The Coyote Valley is approximately seven miles long and ranges in width from a half mile at the Coyote Narrows to three miles, with a surface area of approximately 15 square miles. The District estimates the operational storage capacity of the Coyote Valley to be between 23,000 and 33,000 AF.

LLAGAS SUBBASIN

The Llagas Subbasin extends from the groundwater divide at Cochrane Road, near Morgan Hill, to the Pajaro River (the Santa Clara-San Benito County line) and is bounded by the Diablo and Coast Ranges. The Llagas Subbasin is approximately 15 miles long, three miles wide along its northern boundary, and six miles wide along the Pajaro River. DWR Bulletin 118, Update 2003 identifies this subbasin as Basin 3-3.01 and includes it as part of the Gilroy Hollister Groundwater Basin. The depth of alluvial fill and the underlying Santa Clara Formation varies from about 500 feet at the northern divide to greater than 1,000 feet at its south end. SCVWD estimates the operational storage capacity of the Llagas Subbasin to be between 150,000 and 165,000 AF.

SJMWS

Groundwater is a source of supplemental water supply for SJMWS's North San Jose/Alviso and Evergreen service areas. The Edenvale and Coyote Valley service areas are supplied entirely by groundwater. SJMWS draws groundwater from the Santa Clara Subbasin. The Coyote Valley groundwater wells draw from the Coyote Valley subarea; whereas, the other service areas draw from the Santa Clara Plain subarea (**Figure 4-1**). During the past five years, SJMWS's groundwater demands have been sufficiently met. **Table 4-3** shows the historical volume pumped from each subarea. **Table 4-4** shows the projected groundwater demands for each subarea of the Santa Clara Subbasin.

Table 4-3: Groundwater – Historical Volume Pumped (AFY)

Subareas	2005	2006	2007	2008	2009	2010
Santa Clara Plain	563	404	424	409	383	340
Coyote Valley	324	393	373	377	429	329
Total	**887**	**797**	**797**	**786**	**812**	**669**

Table 4-4: Groundwater – Projected Volume to be Pumped (AFY)

Subareas	2010	2015	2020	2025	2030	2035
Santa Clara Plain	340	3,822	5,290	6,671	8,216	10,348
Coyote Valley	329	1,945	2,698	3,580	4,593	5,540
Total	**669**	**5,767**	**7,988**	**10,251**	**12,809**	**15,888**

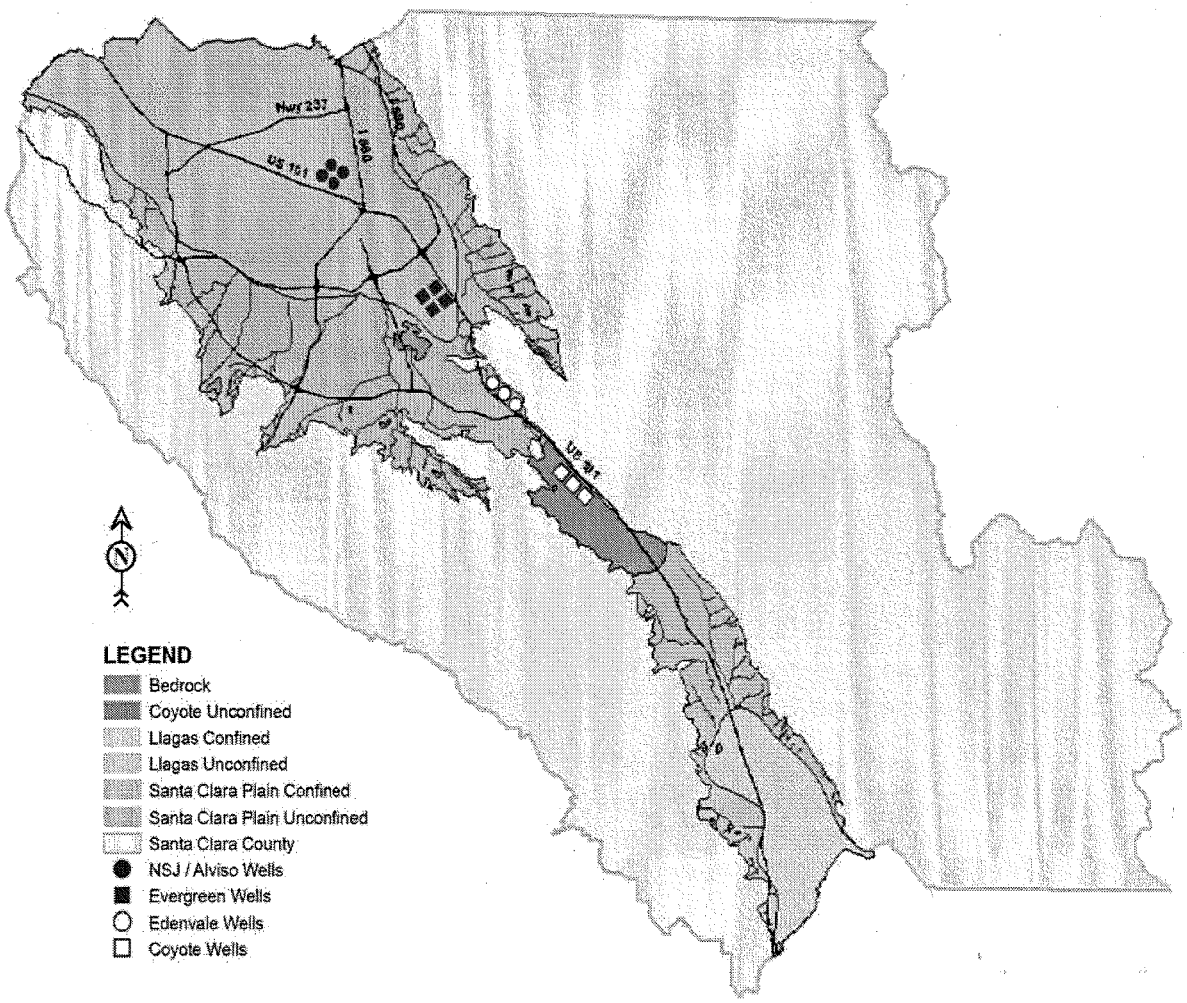
As required by the California Department of Public Health (CDPH) for their Drinking Water Source Assessment and Protection Program, drinking water source assessments were conducted for all 14 groundwater wells within SJMWS service areas during 2003/2004. The assessments were conducted by SJMWS staff, and consisted of information gathered from City records, databases, staff, the State Water Resources Control Board, and visual field surveys.

In North San Jose, potential contamination sources include local electronic manufacturing facilities, gas stations, leaking underground storage tanks and sewer collection facilities. The Evergreen wells are vulnerable to automobile gas stations, underground storage tank leaks and dry cleaning service activities. The Edenvale wells are vulnerable to chemical/petroleum processing storage activities. The Coyote wells are vulnerable to contamination caused by agricultural drainage, illegal activities/unauthorized dumping, storage tank leaks and sewer collection systems. However, the existing well locations and precautions taken during construction in combination with the local hydrology have provided a high level of protection against contamination of the local ground waters.

Saltwater intrusion has occurred in the shallow aquifer beneath North San Jose/Alviso. Saltwater from the Bay moves upstream during high tides and leaks through the clay cap into the upper aquifer zone when this zone is pumped. Land subsidence has also aggravated this condition. Elevated salinity is also present in the lower aquifer zone, but on a much smaller scale, and is attributed to improperly constructed, maintained, or abandoned wells that penetrate the clay aquitard and provide a conduit from the upper to the lower aquifer zone. In response, SCVWD has established an extensive program to locate and properly destroy such conduit wells (SCVWD, 2001).

As the groundwater management agency in Santa Clara County, SCVWD has ongoing groundwater protection programs to ensure high water quality and more reliable water supplies. These programs include well permitting, well destruction, wellhead protection, land use and development review, nitrate management (targeted to areas of elevated nitrate in the southern portion of the County), saltwater intrusion programs, and providing technical assistance to regulatory agencies to ensure local groundwater resources are protected (SCVWD, 2001).

Figure 4-1: Santa Clara County Groundwater Basin and SJMWS Groundwater Wells



4.5 TRANSFER/EXCHANGE OPPORTUNITIES

As noted above, SJMWS has the ability to purchase additional contract water from SFPUC as long as the combined amount between SJMWS and the City of Santa Clara does not exceed 9 MGD. SJMWS can also purchase excess water from other wholesale customers if available. SJMWS also has emergency tie-ins with the City of Santa Clara and San Jose Water Company for short-term transfers.

The majority of the transfer/exchange opportunities are managed by the wholesalers, SFPUC and SCVWD. In general, SFPUC has the ability to purchase additional water from the Tuolumne River and those sellers south of the Delta with water rights or entitlements to water diverted from the Delta. Water can also be purchased upstream of the Delta from sellers along the Sacramento, Feather, Yuba, American, San Joaquin Rivers and their tributaries.

SCVWD routinely uses short-term water transfers to increase water supplies in times of shortage. At present, SCVWD has two long-term transfer agreements. Under one agreement, SCVWD has an option for dry-year supplies totaling at least 20,000 AF over a 20-year period. The other agreement is for four-years which will allow 13,350 AF to be transferred over the term of the agreement, with flexible annual deliveries of at least 4,000 AF. SCVWD exchanges water with San Benito County Water District annually and works with other CVP contractors in San Joaquin Valley as exchange partners.

Additional details regarding wholesaler transfers and exchanges can be found in each individual wholesaler's UWMP.

4.6 DESALINATED WATER OPPORTUNITIES

As a water retailer who does not provide treatment (except fluoridation in the Evergreen area), SJMWS relies on wholesalers to explore desalinated water opportunities. Both SFPUC and SCVWD are working together with East Bay Municipal Utilities District, Contra Costa Water District, and Zone 7 Water Agency in the Bay Area Regional Desalination Project (BARDP). BARDP may consist of one or more desalination facilities that would remove salt from seawater or other brackish water sources, with an ultimate total combined capacity of up to 80 MGD. Desalination would provide a potential potable water supply for municipal and industrial use. The goals are to:

- Increase supply reliability by providing water supply when needed from a regional facility.
- Provide additional source of water during emergencies such as earthquakes or levee failures.
- Provide a supplemental water supply source during extended droughts.
- Allow other major facilities, such as treatment plants, water pipelines, and pump stations, to be taken out of service for maintenance or repairs.

Pre-feasibility studies and pilot testing have been completed. It is estimated that the environmental study will be completed by 2012, followed by design and permitting in 2013, with construction completed by 2015. Again, additional details regarding desalinated water opportunities can be found in SFPUC and SCVWD UWMPs.

4.7 RECYCLED WATER

The City began implementing a major water recycling program, known as the South Bay Water Recycling program (SBWR), under the auspices of the San Jose/Santa Clara Water Pollution Control Plant's (Plant) National Pollutant Discharge Elimination System Permit. The program was developed to protect the salt marsh habitat of two federally protected endangered species, the salt marsh harvest mouse and the California clapper rail, by reducing effluent flows from the Plant into the wetlands of the South Bay. A further benefit of this program was the development of a drought-proof supply of water, which augments local and imported water supplies.

The SBWR program delivers disinfected tertiary treated wastewater from the Plant through an extensive recycled water distribution system consisting of over 105 miles of pipeline (**Figure 4-2**). The recycled water is used for non-potable purposes such as agriculture; industrial cooling and processing; and irrigation of golf courses, parks, and schools. During the peak summer

season, SBWR diverts between 10 and 16 MGD of recycled water for irrigation and industrial uses to over 600 customers throughout San Jose, Santa Clara, and Milpitas.

WASTEWATER COLLECTION AND TREATMENT

Wastewater from SJMWS service areas is collected and treated at the Plant located at the south end of San Francisco Bay, which has a design capacity of 167 MGD. In addition to SJMWS service areas, the Plant treats wastewater from San Jose, Santa Clara, Milpitas, Campbell, Cupertino, Los Gatos, Monte Sereno and Saratoga, serving an area of over 300 square miles and a population of more than 1.5 million. **Table 4-5** illustrates the historical and projected wastewater to be treated at the Plant.

Table 4-5: Recycled Water – Wastewater Collection and Treatment (AFY)

Type of Wastewater	2005	2010	2015	2020	2025	2030	2035
Total wastewater collected and treated	126,673	136,762	142,367	149,093	153,577	158,061	163,666
Volume that meets recycled water standard	8,040	9,376	15,694	21,299	22,420	22,420	22,420

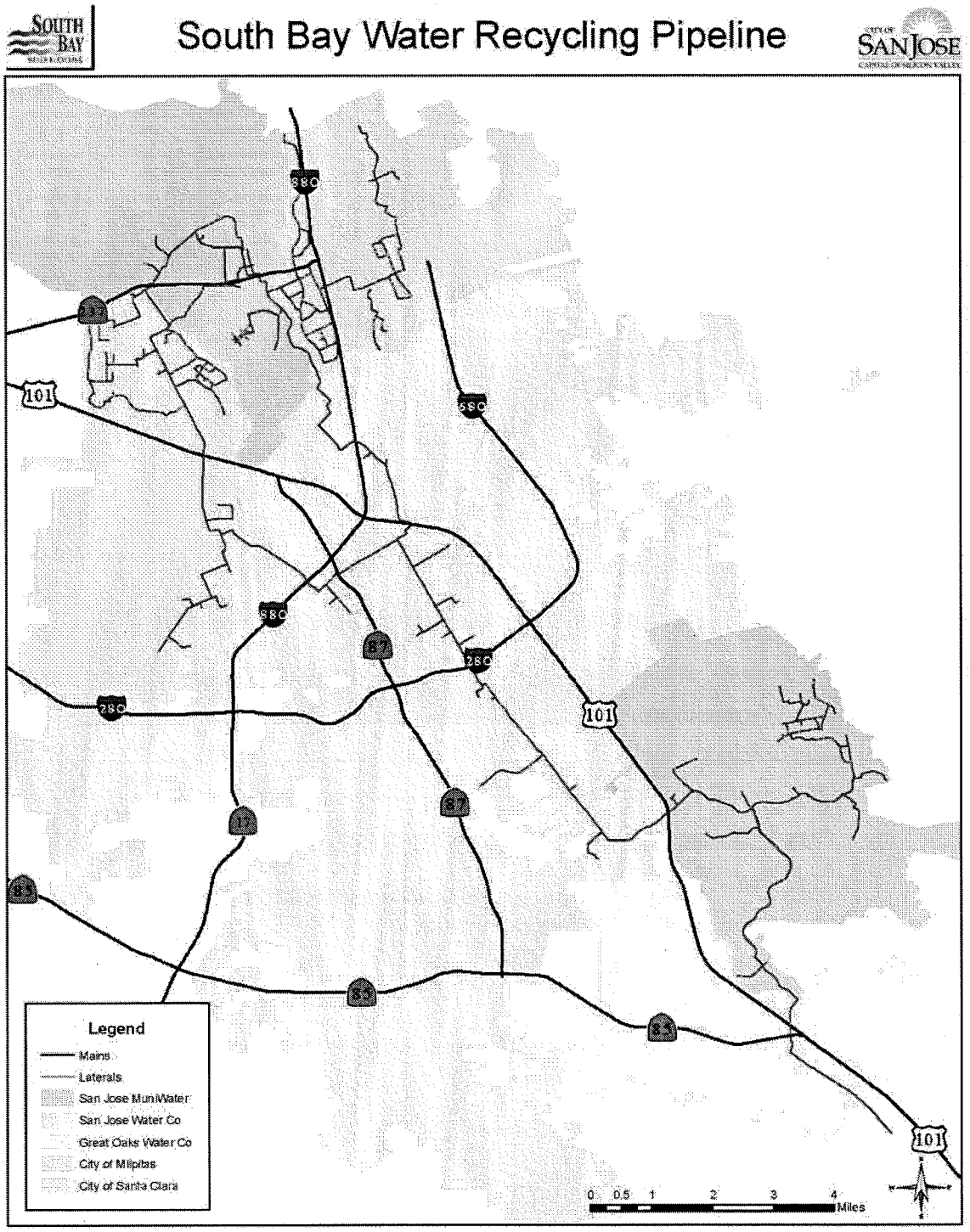
Wastewater is treated by the Plant to tertiary levels, and discharged through Artesian Slough and into the South San Francisco Bay. The SBWR system is part of an effort to maintain wastewater discharge below a level of 120 MGD. Expansion of the recycled water system will be an important part of the effort to prevent additional development-related flows from adversely impacting the salt marsh.

Recently, the City and SCVWD have entered into a 40-year long-term Agreement. The Agreement consists of the following:

- Ownership of an advanced recycled water treatment facility (AWTF)
- Operation and maintenance of recycled water facilities
- Decisions on export of recycled water outside the county
- Future expansion of SBWR that most effectively meets the needs of the community
- Joint technical studies on recycled water issues
- Coordinated recycled water outreach.

The AWTF will be located adjacent to the Plant and consist of microfiltration, reverse osmosis, and ultraviolet disinfection technologies to deliver up to 8 MGD of highly purified water. This high quality water will be blended with the existing tertiary treated recycled water to reduce the level of total dissolved solids (TDS) and enhance the use of recycled water for irrigation and industrial purposes. The AWTF is scheduled to be completed by 2012. This same technology is used by others to convert wastewater into drinking water.

Figure 4-2: SBWR Recycled Water System



RECYCLED WATER USES

Within SJMWS service area, there were 168 recycled water customer accounts as of the end of 2010. Typical uses of recycled water include irrigation (including landscape, median and streetscape irrigation) and industrial (including cooling towers, paper manufacturing, power generation, and dual plumbing water closet use).

These two general types of recycled water uses within SJMWS service area each currently account for approximately half of the total use. It is anticipated that there will be no significant new uses (wildlife habitat, wetlands, etc.) in the immediate future. **Table 4-6** details the quantity of recycled water based on type of usage.

Table 4-6: Recycled Water – Potential Future Use (AFY)

Use Type	Description	2015	2020	2025	2030	2035
Irrigation[1]	Planned use (included in **Table 4-5**)	2,980	3,441	3,982	4,603	5,183
Industrial[1]	Planned use (included in **Table 4-5**)	2,168	2,168	2,168	2,168	2,168
Groundwater Recharge	Use is being evaluated by SCVWD	0	0	11,210	11,210	11,210
Streamflow Augmentation	Use is being evaluated by SCVWD	0	0	11,210	11,210	11,210
	Total:	**5,148**	**5,609**	**28,570**	**29,191**	**29,771**

1. SJMWS has two categories for recycled water customers that correlate with recycled water rates: Irrigation and Industrial

A comparison of 2010 projected use figures to actual use figures is shown below in **Table 4-7**.

Table 4-7: Recycled Water – 2005 UWMP use projection compared to 2010 actual (AFY)

User Type	2010 Actual Use	2005 Projection for 2010[1]
Irrigation	1,678	N/A
Industrial	1,667	N/A
Total	**3,345**	**3,500**

1. Data is based on the total service area for SJMWS. Projections for 2010 in the 2005 UWMP did not separate user type.

SJMWS communicated with several local agencies to coordinate recycled water information, including the City-operated wastewater treatment plant.

OPTIMIZING USE OF RECYCLED WATER

Currently, the cities of San Jose, Santa Clara and Milpitas promote recycled water usage through a variety of mechanisms, including:

- Lower cost of recycled water than potable water.
- SBWR may contribute toward construction costs to retrofit an existing site to receive recycled water.
- SBWR obtains regulatory approval for recycled water usage.

- The cities of San Jose, Santa Clara, and Milpitas have ordinances requiring the use of recycled water for irrigation where available.
- The City prohibits the use of potable water for uses appropriate to recycled water.
- Public education through school curriculum, site supervisor training, marketing to potential customers and outreach at conventions, events, etc.
- SBWR participates in the Bay Area Regional Water Recycling Program (BARWRP), a regional recycled water planning effort.
- SBWR participates in the Bay Area Recycled Water Coalition to obtain Federal grant funding for recycled water projects.
- SBWR obtained ARRA funding to expand the recycled water distribution system.
- Expansion of system to areas where recycled water is unavailable and adding reliability to system.
- Pioneering new uses of recycled water, (i.e. printed circuit boards, paper manufacturing, streamflow augmentation, etc.)
- The City and SCVWD have partnered in the construction of the AWTF to improve the quality of recycled water to enhance the use by irrigation and industrial users.
- SCVWD is evaluating the possibility of indirect reuse.

Throughout the City, the system will continue to expand as additional distribution facilities are constructed by developers as needed to supply recycled water to fulfill their water and sewer flow diversion needs. Due to the many variables involved in recycled water uses and the possible applications of these optimization measures, it is unclear how each individual mechanism can be quantified. Therefore, **Table 4-8** lists the actions used to encourage recycled water use, but an actual projection that quantifies how each method increases the use of recycled water is unknown. SBWR will be soliciting a request for proposal in preparing a Recycled Water Master Plan later this year. It is anticipated that the Master Plan will help quantify the projected volume of recycled water based on type of use and outreach methods used.

Table 4-8: Methods Used to Encourage Recycled Water Use

Methods	Check if Used
Subsidized costs	X
Grants	X
Mandatory requirement for dual plumbing	
Regulatory Relief	X
Regional Planning	X
Incentive Program	X
Long-Term Contracts (Price/Reliability)	
Rate Discounts	X
Prohibit specific fresh water uses	X
Low-interest loans	X
Public education/information	X
Require recycled water use	X

4.8 FUTURE WATER PROJECTS

As a water retailer, SJMWS does not plan on developing "new" water supplies. Typically, capital improvement projects address infrastructure replacement and reliability needs. Future groundwater wells are needed in NSJ/Alviso, Edenvale, and Coyote service areas to support future demands. The Santa Clara Valley groundwater basin is not adjudicated; however, SJMWS will still rely on SCVWD to actively manage the groundwater basin to prevent overdraft and potential subsidence.

Table 4-9: Future Water Supply Projects (AFY)

Service Area	Potential Project	Projected Start	Estimated Per Well (Normal-Year)
NSJ/Alviso	Groundwater Well	2025	1,200
Edenvale	Groundwater Well	2020	1,900
Coyote	Groundwater Well	2025	1,100
		Total:	**4,200**

SJMWS is actively involved in the planning activities of water wholesalers, SFPUC and SCVWD. SJMWS is also involved in the planning activities for recycled water through SBWR. There is potential to use recycled water for indirect reuse which is being evaluated by SCVWD. Additionally, the SCVWD 5-Year Capital Improvement Program includes pipeline and diversion dam projects that have a total average yield or savings of about 20,000 AFY. SFPUC has a Water Supply Improvement Program geared towards improving reliability and water supply. Additional information regarding wholesalers' future projects can be found in their UWMPs.

SJMWS uses its entire allocation of SFPUC imported water, and also relies on groundwater and treated water supplies from SCVWD. In the Preferred Alternative (Water Supply Assessment for Envision San Jose 2040 General Plan Update, September 2010), 5,550 AFY is expected to come from groundwater or other SCVWD sources in the NSJ area; 486 AFY and 4,312 AFY is expected from the Evergreen and Edenvale groundwater, respectively. The wells in Evergreen should be maintained as supplemental supply during peak demand or emergency backup.

5
Water Supply Reliability & Water Shortage Contingency Planning

5.1 WATER SYSTEM RELIABILITY

As a water retailer, SJMWS depends heavily on water supply wholesalers to meet system demands. To meet future demand, SJMWS plans to rely on a portfolio of supplies. By utilizing different supply sources SJMWS may reduce the impact of water shortage from each source. Additionally, SJMWS has developed a Water Conservation Plan (**Appendix E**) to reduce future demands and increase water supply reliability.

NORTH SAN JOSE/ALVISO

SJMWS anticipates meeting future demands by using the full amount of SFPUC water available from the 10,082 AFY combined San Jose and Santa Clara supply. Additional SFPUC supply may be purchased from other SFPUC retail customers if available. Future potable water demand in excess of the SFPUC allocation can be supplemented with groundwater. The four existing groundwater wells can supply an estimated 4,500 AFY assuming year round pumping for 12 hours per day. SFPUC and groundwater supplies total 9,539 AFY which will meet the demands of the service area until 2030, at which time an additional 1,050 AFY of supply will be needed from a new groundwater well. The groundwater basin is not adjudicated and groundwater rights/entitlements have not been defined. Additional groundwater wells will be coordinated with SCVWD, who manages the groundwater basin to prevent overdrafting and contamination. Additionally, SJMWS is working with SCVWD to explore the potential of providing SCVWD treated water to this service area. Expansion of the recycled water system will also help to offset potable demand. The City will continue to promote the use of recycled water as described in **Chapter 4**. Recycled water is available for irrigation, industrial, and other approved uses.

EVERGREEN

SJMWS has a contract for SCVWD treated water supply. In addition, there is an estimated 4,842 AFY of available groundwater supply, assuming year round pumping for 12 hours per day from four existing groundwater wells. With the amount of combined available treated water and groundwater supplies, there is the potential that some supply entitlement could be supplied to help meet the North San Jose/Alviso projected demands, subject to interagency agreements where necessary. Expansion of the recycled water system in this service area will also offset potable water demand.

EDENVALE

This service area currently relies entirely on groundwater. Estimated annual pumping of the existing wells is approximately 2,421 AFY based on two operating wells. An additional 1,211 AFY is available upon rehabilitation of an existing well. A fourth well or additional supply from

SCVWD will be needed to meet 2035 demands. There is the potential to connect the Evergreen service area to Edenvale to utilize SCVWD treated water. Recycled water is also available to supply any approved non-potable needs.

COYOTE

The Coyote service area relies on groundwater and recycled water. Estimated annual pumping of the existing wells is approximately 4,439 AFY. An additional groundwater well will be needed to meet future demands by 2035. As this area grows, recycled water will be considered as a condition of development.

5.2 WATER SUPPLY RELIABILITY - SFPUC

The amount of imported water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to firm-up its water supplies.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. In practice, the local watershed facilities are operated to capture local runoff. The following describes allocation of SFPUC water supply during drought conditions. Additional information on SFPUC's supply reliability can be found in their UWMP.

5.2.1 WATER SHORTAGE ALLOCATION PLAN

In July 2009, in connection with the WSA, the wholesale customers and San Francisco adopted a Water Shortage Allocation Plan (WSAP) to allocate water from the regional water system to retail and wholesale customers during system-wide shortages of 20% or less (the "Tier One Plan"). The Tier One Plan replaced the prior Interim Water Shortage Allocation Plan, adopted in 2000, which also allocated water for shortages up to 20%. The Tier One Plan also allows for voluntary transfers of shortage allocations between SFPUC and any wholesale customer and between wholesale customers themselves. In addition, water "banked" by a wholesale customer, through reductions in usage greater than required, may also be transferred.

TIER ONE DROUGHT ALLOCATIONS

The Tier One Plan, which allocates water between San Francisco and the wholesale customers collectively, distributes water based on the level of shortage:

Table 5-1: Distribution of Water Based on Level of System-Wide Reduction

Level of System Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The Tier One Plan will expire at the end of the term of the Water Supply Agreement, unless extended by San Francisco and the wholesale customers.

TIER TWO DROUGHT ALLOCATIONS

The wholesale customers have negotiated and adopted the "Tier Two Plan", the second component of the WSAP which allocates the collective wholesale customer share among each of the 26 wholesale customers. This Tier Two allocation is based on a formula that takes multiple factors for each wholesale customer into account, including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the wholesale customers collectively will be allocated among them in proportion to each wholesale customer's Allocation Basis, expressed in MGD, which in turn is the weighted average of two components. The first component is the wholesale customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. San Jose's Water Sales Contract amount of 4.5 MGD is used as its fixed component. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the wholesale customers for all available water supplies. The second component is accorded twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain wholesale customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all wholesale customers' Allocation Bases to determine each wholesale customer's Allocation Factor. The final shortage allocation for each wholesale customer is determined by multiplying the amount of water available to the wholesale customers' collectively under the Tier One Plan, by the wholesale customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the wholesale customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each wholesale customer will also change. However, for long-term planning purposes, each wholesale customer has used the value identified in the Tier Two Plan when adopted as its Allocation Factor. The Tier Two Plan will expire in 2018 unless extended by the wholesale customers.

5.2.2 WATER SYSTEM IMPROVEMENT PROGRAM

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC has undertaken the Water System Improvement Program (WSIP), approved October 31, 2008. The WSIP will deliver capital improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing high quality water to customers in a reliable, affordable and environmentally sustainable manner. Many of the water supply and reliability projects evaluated in the WSIP were originally put forth in the SFPUC's Water Supply Master Plan (2000).

A Program Environmental Impact Report (PEIR) was prepared in accordance with the California Environmental Quality Act for the WSIP. The PEIR, certified in 2008, analyzed the broad environmental effects of the projects in the WSIP at a program level and the water supply impacts of various alternative supplies at a project level. Individual WSIP projects are also undergoing individual project specific environmental review as required.

In approving the WSIP, the Commission adopted a Phased WSIP Variant for water supply that was analyzed in the PEIR. This Phased WSIP Variant established a mid-term water supply planning milestone in 2018 when the Commission would reevaluate water demands through 2030. At the same meeting, the Commission also imposed the Interim Supply Limitation which limits the volume of water that the member agencies and San Francisco can collectively purchase from RWS to 265 MGD until at least 2018. Although the Phased WSIP Variant included a mid-term water supply planning milestone, it did include full implementation of all proposed WSIP facility improvement projects to insure that the public health, seismic safety, and delivery reliability goals were achieved as soon as possible.

As of July 1, 2010, the WSIP was 27% complete overall, with the planning and design work over 90% complete. The WSIP is scheduled to be completed in December 2015.

5.2.3 INTERIM SUPPLY LIMITATION

As part of its adoption of the WSIP, the Commission adopted a water supply element, the Interim Supply Limitation (ISL), to limit sales from the RWS watersheds to an average annual of 265 MGD through 2018. The wholesale customers' collective allocation under the ISL is 184 MGD and San Francisco's is 81 MGD. Although the wholesale customers did not agree to the ISL, the WSA provides a framework for administering the ISL. Strategies to address wholesale customers' unmet needs resulting from the ISL are further discussed below.

5.2.4 INTERIM SUPPLY ALLOCATIONS

The Interim Supply Allocations (ISAs) refers to each individual wholesale customer's share of the ISL. On December 14, 2010, the Commission established each agency's ISA through 2018. In general, the Commission based the allocations on the lesser of the projected fiscal year 2017-18 purchase projections or Individual Supply Guarantees. The ISAs are effective only until December 31, 2018 and do not affect the Supply Assurance or the Individual Supply Guarantees. San Francisco's ISA is 81 MGD. San Jose's ISA is 4.13 MGD.

As stated in the Water Supply Agreement, the wholesale customers do not concede the legality of the Commission's establishment of the ISAs and Environmental Enhancement Surcharge, discussed below, and expressly retain the right to challenge either or both, if and when imposed, in a court of competent jurisdiction.

5.2.5 ENVIRONMENTAL ENHANCEMENT SURCHARGE

The Commission plans to establish the Environmental Enhancement Surcharge concurrently with its budget-coordinated rate process. This surcharge will be unilaterally imposed by SFPUC on individual wholesale customers, and SFPUC retail customers, when each agency's use exceeds their Interim Supply Allocation and when sales of water to the wholesale customers and San Francisco retail customers, collectively, exceeds the Interim Supply Limitation of 265 MGD.

The SFPUC is in the process of developing the methodology and amount of this volume-based charge. The Environmental Enhancement Surcharge will become effective beginning fiscal year 2011-12.

5.2.6 WATER CONSERVATION IMPLEMENTATION PLAN

In September 2009, BAWSCA completed the Water Conservation Implementation Plan (WCIP). The goal of the WCIP is to develop an implementation plan for BAWSCA member agencies to attain the water efficiency goals that the agencies committed to in 2004 as part of the PEIR. The WCIP's goal was expanded to include identification of how BAWSCA member agencies could use water conservation as a way to continue to provide reliable water supplies to their customers through 2018 given the SFPUC's 265 MGD Interim Supply Limitation.

Based on the WCIP development and analysis process, BAWSCA and its member agencies identified five new water conservation measures, which, if implemented fully throughout the BAWSCA service area, could potentially save an additional 8.4 MGD by 2018 and 12.5 MGD by 2030. The demand projections for the BAWSCA member agencies, as transmitted to the SFPUC on June 30, 2010, indicate that collective purchases from the SFPUC will stay below 184 MGD through 2018 as a result of revised water demand projections, the identified water conservation savings, and other actions.

Several member agencies have elected to participate in the BAWSCA regional water conservation programs and BAWSCA continues to work with individual member agencies to incorporate the savings identified in the WCIP into their future water supply portfolios with the goal of maintaining collective SFPUC purchases below 184 MGD through 2018.

5.2.7 LONG TERM RELIABLE WATER SUPPLY STRATEGY

BAWSCA's water management objective is to ensure that a reliable, high quality supply of water is available where and when people within the BAWSCA service area need it. A reliable supply of water is required to support the health, safety, employment, and economic opportunities of the existing and expected future residents in the BAWSCA service area and to supply water to the agencies, businesses, and organizations that serve those communities. BAWSCA is developing the Long-Term Reliable Water Supply Strategy (Strategy) to meet the projected water needs of its member agencies and their customers through 2035 and to increase their water supply reliability under normal and drought conditions.

The Strategy is proceeding in three phases. Phase I was completed in 2010 and defined the magnitude of the water supply issue and the scope of work for the Strategy. Phase II of the Strategy is currently under development and will result in a refined estimate of when, where, and how much additional supply reliability and new water supplies are needed throughout the BAWSCA service area through 2035, as well as a detailed analysis of the water supply management projects, and the development of the Strategy implementation plan. Phase II will be complete by 2013. Phase III will include the implementation of specific water supply management projects. Depending on cost-effectiveness, as well as other considerations, the projects may be implemented by a single member agency, by a collection of the member agencies, or by BAWSCA in an appropriate timeframe to meet the identified needs. Project implementation may begin as early as 2013 and will continue throughout the Strategy planning horizon, in coordination with the timing and magnitude of the supply need.

The development and implementation of the Strategy will be coordinated with the BAWCSA member agencies and will be adaptively managed to ensure that the goals of the Strategy, i.e., increased normal and drought year reliability, are efficiently and cost-effectively being met.

The current contract between SJMWS and SFPUC to receive imported water expires in 2018. The future water allocation beyond 2018 is unknown at the present time. SFPUC will make a decision in December 2018 based on its ongoing environmental investigations. If SFPUC determines that it is necessary to reduce or eliminate San Jose's water supply, they would be required to first complete a CEQA analysis on the impacts of reducing or terminating the supply. San Francisco would work in cooperation with San Jose, BAWSCA, and the Santa Clara Valley Water District in the identification and implementation of additional water sources and conservation measures. As previously discussed in this section, BAWSCA is currently working on a long-term reliable water supply strategy to help ensure future supply to the member agencies. For the purposes of this report, it is assumed that delivery up to the contract maximum will continue beyond 2018.

5.3 WATER SUPPLY RELIABILITY - SCVWD

To maintain water supply reliability and flexibility, SCVWD's water supply includes a variety of sources including local groundwater, imported water and local surface water. SCVWD has an active conjunctive water management program to optimize the use of groundwater and surface water, and to prevent groundwater overdraft and land subsidence. Additional information on SCVWD's supply reliability can be found in their UWMP.

Several factors have the potential to negatively impact reliability, including: hydrologic variability, climate change, invasive species, infrastructure failure, regulatory actions as well as institutional, political and other uncertainties. Hydrologic uncertainties influence the projections of both local and imported water supplies and the anticipated reliability of those supplies. Supply analyses performed by SCVWD are based on the assumption of historical patterns of precipitation. The development of SCVWD projects and programs to meet future needs takes hydrologic variability and climate change into account.

Increases in average temperature due to climate change are occurring, and the impacts of increasing temperature have already been observed. Rises in average temperature will increase sea level and decrease the snow pack—by far the largest surface water "storage" facility in California. Decreased snow pack and projected earlier spring melts will reduce the amount of water available to meet peak demands in late spring and summer. These changes could decrease imported water and possibly local water supplies, while increasing salinity in the Delta, adversely impacting water quality and Bay-Delta ecosystems.

Under any climate change scenario, SCVWD may need to consider additional treatment options to respond to water quality impacts associated with increased salinity in the Delta. SCVWD may also need to consider additional storage to take advantage of more wet-season water, additional supplies to replace reduced water supply from existing sources, and additional water transfers (depending on water market impacts).

In determining the long-range availability of water, consideration must be given to the vulnerability of imported supplies to the effects of prolonged state-wide drought and

environmental impacts. Reductions by DWR or the US Bureau of Reclamation to SCVWD allocations of State Water Project (SWP) or Central Valley Project (CVP)-San Felipe Division water may result in a temporary supply shortfall for SJMWS and other SCVWD retailers. Although SJMWS has the facilities to pump additional groundwater, the Evergreen service area, whose current supplies are 100% imported water, could be faced with supply deficiency, especially during the summer months. Water demands could be met with groundwater, additional imported water supply, water conservation measures, and with expanded recycled water use.

SCVWD obtains its supplies from a variety of sources to maintain maximum efficiency, flexibility, and reliability, including local and imported water supplies. SCVWD augments natural groundwater recharge with a managed recharge program to offset groundwater pumping, sustain storage reserves, and minimize the risk of land subsidence. Through these recharge activities, SCVWD works to keep groundwater basins "full" to protect against drought. Storing surplus water in the groundwater basins enables part of the supply to be carried over from wet years to dry years. SCVWD also has a contract for 100,000 AFY for SWP, and 152,500 AFY for CVP. However, the actual amount of water delivered is typically significantly less than these contractual amounts and depends on hydrology, conveyance limitations, and environmental regulations, including regulatory constraints to protect water quality as well as fish. On a long-term average basis, 83% of the CVP supply is delivered for municipal and industrial use, and 17% is delivered for irrigation use. SCVWD routinely acquires supplemental imported water to meet the county's needs from the water transfer market, water exchanges, and groundwater banking activities.

In May 1996, SCVWD approved an agreement with Semitropic Water Storage District (Semitropic) to store 45,000 AF of SWP water in Semitropic's groundwater basin on behalf of SCVWD. In 1997, SCVWD approved a long-term agreement with Semitropic. Under the terms of this agreement, SCVWD has banked water in ten years since 1997, and withdrawn water in four years. The agreement allows SCVWD to maximize the economic value of its imported water contracts by fully utilizing water that might otherwise have to be turned back to the SWP or CVP. For example, in 2006, a very wet year, SCVWD was able to store nearly 58,000 AF of imported water for use in future dry years. The total storage capacity available to SCVWD in the Semitropic Water Bank is 350,000 AF and the current storage balance as of May 2010 is 151,123 AF (SCVWD, 2010 UWMP).

If demands are anticipated to reach the upper end of the demand range, SCVWD could consider additional long-term transfers. At present, SCVWD has two agreements that are classified as long-term transfers. In 1998, SCVWD and two other agencies (Pajaro Valley Water Management Agency and Westlands Water District) jointly participated in the permanent assignment of 6,260 AF from Mercy Springs Water District, an agricultural Central Valley Project (CVP) contractor. Under the agreement, SCVWD has an option for dry-year supplies totaling at least 20,000 AF over a 20-year period. The dry-year option may continue for subsequent terms depending on the future plans of Pajaro Valley Water Management Agency.

In 2010, SCVWD entered into a four-year agreement with Patterson Irrigation District, a contractor in the San Joaquin Valley with a reliable CVP supply based on their San Joaquin River water rights. The total amount that will be transferred over the term of the agreement is 13,350 AF, with flexible annual deliveries of at least 4,000 AF.

5.4 FACTORS AFFECTING SUPPLY

In addition to droughts, there are other threats to the sources providing water supply to SJMWS. SJMWS prepares for these threats through their portfolio of supplies, by working with SFPUC and SCVWD, and through demand management like the Water Shortage Ordinance and the Water Conservation Plan (included in **Appendix E**).

GLOBAL CLIMATE CHANGE

Global climate change represents a serious threat to water supply and the total impact is not fully understood or quantified. According to the Intergovernmental Panel on Climate Change, global warming could significantly alter California's hydrologic cycles and water supply. These impacts could include decreased Sierra snowpack, increased temperatures, more severe droughts, sea level rise, and increased floods. Climate models indicate that precipitation as rainfall is expected to increase as snowfall decreases over the Sierra Nevada and Cascade mountain ranges. Sierra snowpack is expected to be reduced by 25 percent by 2050 (DWR 2007). This reduction directly impacts the volume of imported water sources for SJMWS. Sierra snowmelt feeds reservoirs like Hetch-Hetchy and rivers that flow to the Delta, the sources of SFPUC and SCVWD imported water, respectively.

Climate change may also increase regional temperatures and cause more variable weather patterns. In addition to decreasing snowpack, these increased temperatures may also increase water demand. Higher temperatures could increase water demand throughout the state through increased agricultural irrigation and, in SJMWS service areas, through increased outdoor residential and commercial irrigation. Changing weather patterns could cause more severe flooding and longer droughts.

The Sacramento-San Joaquin Delta is at risk from climate change. More severe flooding and a rising sea level threaten the water ways that serve as a vital link in the state's water system. Additional threats to water supply and the Delta are discussed below. The State of California and DWR are working to reduce the effects of climate change both through reduction of emissions and strategies to address the impacts of climate change. DWR voluntarily joined the California Climate Action Registry, a tool to track and report emissions. DWR is also working to add more clean and renewable energy resources to its power portfolio and to reduce its carbon footprint. To address the impacts of climate change, DWR has included an extensive discussion of the topic in the state's "Water Plan Update 2005" and published "2009 California Climate Adaptation Strategy Discussion – Draft." The 2009 report summarizes climate change threats and ways to manage those threats. In addition, DWR has developed strategies to address impacts including increased monitoring of climatologic and water resource conditions, reduction of greenhouse gas emissions from water management activities, studying the combined effects of increased atmospheric carbon dioxide and increased temperature (to predict future water demand), and adaptation of statewide water management systems by incorporating more flexibility.

Initial climate change modeling completed by the SFPUC indicates that about seven percent of runoff currently draining into Hetch Hetchy Reservoir will shift from the spring and summer seasons to the fall and winter seasons in the Hetch Hetchy basin by 2025. This percentage is within the current interannual variation in runoff and is within the range accounted for during normal runoff forecasting and existing reservoir management practices. The predicted shift in runoff timing is similar to the results found by other researchers modeling water resource

impacts in the Sierra Nevada due to warming trends associated with climate change. The SFPUC has stated that based on this preliminary analysis, the potential impacts of climate change are not expected to affect the water supply available from the San Francisco Regional Water System (RWS) or the or the overall operation of the RWS through 2030.

DELTA PUMPING RESTRICTIONS

The Sacramento-San Joaquin Delta, at the confluence of the Sacramento and San Joaquin rivers, is a key component to the state's water system (DWR 2009b). Much of the water that feeds the State Water Project and Central Valley Project flows through the Delta, both Projects being a significant portion of SCVWD water supplies. The Delta is also home to a sensitive ecosystem with several federally listed threatened species. Balancing the needs of California's water supply with those of the environment has been a challenge for the State of California and DWR.

In 2007, pumping from the Delta for water supply was limited by a federal court to protect the Delta Smelt, a federally listed threatened species. Further restrictions have been imposed to protect other fish species, including the Longfin Smelt and Chinook salmon. These pumping limits directly affect the amount of imported water that SCVWD has available. While SJMWS currently has a contract with SCVWD for imported water in the Evergreen service area, these pumping limits could prevent SJMWS from increasing or maintaining the contracted volumes for SCVWD treated surface water.

The State of California and DWR are currently working to "avert an ecological disaster and ensure reliable water supplies for Californians now and in the future." Former Governor Schwarzenegger appointed a Delta Vision Blue Ribbon Task Force, who produced a final document with their recommendations, "Delta Vision," in January 2008. DWR also recommended strategies for the future of the Delta in its "Water Plan Update 2005". The Governor has also outlined a comprehensive plan for Delta sustainability, building on these recommendations. In addition, DWR is currently working on the Bay-Delta Conservation Plan environmental documents. These documents focus on both water supply reliability and the recovery of listed species, and examine alternatives to ensure the success of both (DWR 2009b).

NATURAL DISASTERS

Disasters such as earthquakes could threaten water delivery infrastructure. The wholesalers that provide SJMWS with water supply are taking steps to ensure water supply reliability.

SFPUC has adopted an Emergency Response and Recovery Plan (ERRP) to enable swift response in the event of damage to their imported water system. Additionally, SFPUC has the WSIP which will improve the regional system with respect to water quality, seismic response, water delivery, and water supply to meet water delivery needs in the service area through the year 2030. The WSIP also establishes level of service goals and system performance objectives. Completion of the WSIP will allow modified system operations, and will result in a series of facility improvement projects. The proposed program area spans seven counties—Tuolumne, Stanislaus, San Joaquin, Alameda, Santa Clara, San Mateo, and San Francisco.

While the SFPUC has historically met and is currently serving its customers' water demands, there are numerous factors contributing to the need for a comprehensive, system-wide program

such as the WSIP. In order to continue to provide reliable water service to its customers, the WSIP allows SFPUC to plan for the future as well as address existing, known deficiencies, including the following:

- *Aging Infrastructure.* Many of the components of the SFPUC regional water system were built in the 1800s and early 1900s. As the system ages, its reliability decreases and the risk of failure increases.
- *Exposure to Seismic and Other Hazards.* The system crosses five active earthquake faults, and many of the existing facilities do not meet modern seismic standards. The California Division of Safety of Dams imposed operating restrictions on two of the system's reservoirs, Calaveras and Lower Crystal Springs Reservoirs, due to seismic and flood control safety hazards, respectively. The restricted operations at these reservoirs reduce local storage capacity and impair normal system operations.
- *Delivery Reliability.* The system requires additional redundancy (i.e., backup) of some critical facilities to ensure sufficient operational flexibility to carry out adequate system inspection and maintenance and to be adequately prepared in the event of an earthquake, system failure, or other emergency. These critical facilities are necessary to meeting day-to-day customer water supply needs, and increased operational flexibility is needed in order to maintain service to all customers during a full range of operating conditions.

SFPUC goals and objectives for the WSIP target these deficiencies.

In 2003, SCVWD initiated the Water Utility Infrastructure Reliability Project (IRP) to determine the current reliability of its water supply infrastructure (pipes, pump stations, treatment plants) and to appropriately balance level of service with cost. The project measured the baseline performance of critical facilities in emergency events and identified system vulnerabilities. The study concluded that SCVWD's water supply system could suffer up to a 60-day outage if a major event, such as a 7.9 magnitude earthquake on the San Andreas Fault, were to occur. Less severe hazards, such as other earthquakes, flooding and regional power outages had less of an impact on SCVWD, with outage times ranging from one to 45 days.

The level of service goal identified for the IRP was "Potable water service at average winter flow rates available to a minimum of one turnout per retailer within seven days, with periodic one day interruptions for repairs." In order to meet this level of service goal, the project developed seven portfolios to mitigate the identified system risks, and identified a recommended portfolio for implementation. As a result, SCVWD has been implementing the recommended portfolio of reliability improvement projects (Portfolio 2). The cost to implement Portfolio 2 is estimated to be approximately $175 Million. Portfolio 2 is expected to reduce the post-earthquake outage period from 45-60 days to 7-14 days.

Additionally, SCVWD routinely monitors the conditions of all their ten dams used for both water supply and flood prevention. Seismic safety evaluations on eight dams are planned by 2013.

SJMWS' distribution system is designed to enable flexibility in water delivery options. Water tanks provide storage capacity to help meet demands during short-term wholesale supply outages, and groundwater wells can be used to supplement imported water supplies as well. Emergency interties with adjacent water retailers can be used if necessary.

5.5 WATER SHORTAGE CONTINGENCY & DROUGHT PLANNING

In response to AB11X, the City coordinated with SCVWD to create a Water Shortage Contingency Plan in 1991 to supplement the Urban Water Management Plan (see **Appendix G**). The Water Shortage Contingency Plan details the stages of action to be implemented in the case of a supply shortage. In 1994 and 2009, the City adopted revisions to the City Municipal Code Chapter 15.10 (**Appendix G**), which included water shortage measures to be enforced during a time of water shortage. A summary of the stages of action is described later on in this Chapter.

This section contains a three-year worst case scenario for water supply availability and details on the stages of action to be implemented in case of a supply shortage based on average, single dry, and multiple dry year supplies as defined below.

AVERAGE/NORMAL WATER YEAR

The "normal" year for the purposes of the report, is a year in the historical sequence that most closely represents median runoff levels and patterns. Based on an evaluation of total supplies available to SCVWD over the historical hydrologic sequence (1922–2003), and given current existing facilities and institutional arrangements, the median and average are within approximately 1 percent. The median year from the analysis of the historical hydrologic sequence is 1935. SCVWD selected 2002 as the "normal year" since it is close to the median and is essentially equal to the average. The selection of a "normal year" does not match the average year for all supply sources, but is the "best fit" for the hydrologic years included in the modeling analysis.

Carryover storage is that portion of the SCVWD's local and outside of the county surface storage, local groundwater storage and outside the county banked storage that is not required to meet the current year's demands but could potentially be utilized in subsequent years. Note that groundwater is used in all year types (including years where the total supplies exceed total demands) for distribution, storage and treatment.

SINGLY-DRY YEAR SUPPLY

The single dry year supply is defined as the year with the minimum usable supply. The hydrology of 1977 represents the minimum total supply that has been observed in the historical record according to SCVWD. The District will be able to meet the water needs of the county during the single dry year even with increasing demands, based on the historical hydrologic sequence and carryover supplies that are projected to be available leading into a single dry year. If a similar dry year occurred when carryover storage was not available, implementation of actions associated with the water shortage contingency plan would be required.

In the single dry year analysis, supplies for SCVWD from carryover storage are needed to meet the annual demands under all demand years and make up almost half of the total supplies in the single dry year. SCVWD's ability to take water from the Semitropic Water Bank is proportional to SWP allocation percentages for the year. During drought years, this can significantly limit how much of its water bank balance SCVWD can withdraw.

SFPUC modeling and historic hydrological sequence identifies 1978 as the model single dry year.

MULTIPLE-DRY YEAR SUPPLY

Multiple dry year scenario analysis is useful particularly in the evaluation of carryover storage. Evaluating the availability of the county's water supplies requires an understanding of the driest periods that can reasonably be expected to occur. Over the more than 120 years of recorded rainfall, seven major drought events have occurred. SCVWD modeling results indicate that the county's water supply system is more vulnerable to successive dry years, such as those that occurred in 1928-1934 and 1987-1992. Multiple dry year periods deplete water storage reserves in local and imported supply reservoirs and in the groundwater subbasins. Multiple dry years (such as the 1987-1992 drought) pose the greatest challenge to SCVWD's water supply. Although the supply in each year may be greater than in a single very dry year, as drought lingers, storage reserves are relied on more and more. The multiple dry year period selected for SCVWD's analysis is from 1987 through 1992.

SFPUC modeling and historic hydrological sequence identifies 1989-1993 as the model multiple dry year sequence.

The water supply available to individual retailers will ultimately be determined by SCVWD and SFPUC. SJMWS will work closely with SCVWD, SFPUC, and other water retail agencies to implement any stages of action to reduce the demand for water during water shortages.

Table 5-2 summarizes the average, single dry, and multiple dry water years used to determine the minimum water supply available as compared to the average/normal water year.

Table 5-2: Basis of Water Year Data

Water Year Type	Base Years	
	SFPUC	SCVWD
Average Water Year	2002	2002
Single Dry Water Year	1978	1977
Multiple Dry Water Years	1989-1993	1987-1992

As discussed earlier in this report, SJMWS relies mostly on SFPUC and SCVWD for its water supply and is directly affected by the water supply conditions both wholesaler faces. This section discusses water supply conditions as it affects the wholesalers.

SFPUC

SFPUC historically has met demand in its service area in all year types from its Tuolumne River, Alameda Creek, and San Mateo County watersheds. In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. SFPUC's adopted WSIP retains this mix of water supply for all year types. In order to achieve its target of meeting at least 80 percent of its customer demand during droughts, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP. SFPUC proposes to expand their water supply portfolio by increasing the types of

water supply resources to meet future demands. This includes approximately 2,240 AFY of transfers and 8,100 AFY of groundwater from the Westside Basin.

The Tier One and Tier Two Plans, as earlier described, would be implemented as necessary in the event of a shortage of SFPUC supplies.

SCVWD

As a result of the 1987 to 1992 drought, local reservoirs were reduced and wholesalers received only partial entitlement from its imported sources. In response to these circumstances, SCVWD instituted an aggressive water conservation program and augmented imported sources of water with additional water supplies. Since the end of the drought, local reservoir levels have returned to normal, allowing greater flexibility to meet water demands during a short-term dry period.

In the event of a multiple dry year supply scenario occurring between now and 2020, supplies for SCVWD and groundwater are planned to be adequate to continue to meet the increased demands, while supplies from SFPUC will decrease. SJMWS will compensate for temporarily decreased supply from SFPUC by using additional groundwater supply as available. SCVWD has accounted for additional groundwater pumping during a single-dry and multiple-dry years. Subsequent to 2020, implementation of water shortage contingency plan actions would be required to reduce demands by approximately 20-25% in the fifth year and beyond of a multi-year drought.

SUPPLY AVAILABILITY

In the event of a decrease of local supplies, SJMWS would respond by pursuing demand reduction programs in accordance with the severity of the supply shortage. Any supply deficit would be compensated for by increased conservation levels and restrictions in consumption.

An analysis of the supplies historically available during times of shortage is reflected in **Table 5-3**. This analysis does not account for population and system growth, and reflects the amount of supply available to meet the system's demands during the designated years.

Table 5-3: Supply Reliability – Historic Conditions (AFY)

Normal Water Year (2002)[1]	Single Dry Water Year (1977)	Multiple Dry Water Years			
		Year 1 (1987)	Year 2 (1988)	Year 3 (1989)	Year 4 (1990)
Percent of Normal Year[2]	37.1%	65.4%	64.1%	55.4%	58.6%

1. Does not include recycled water which was available in 2002, but not 1987-1990.
2. Percentage estimated based on available data, and not adjusted for population and system growth.

Table 5-4 is based on the projected demands during the indicated years, and analyses of the average/normal deliveries to SJMWS from SFPUC and SCVWD in 2002. This analysis uses decreased supply availability in accordance with historic conditions as described in **Table 5-3**; however, an analysis of current supply and wholesale supplier systems indicates that supplies would be available to meet demands even in times of drought, with no reduction of supply necessary until the fifth year and beyond of a multi-year drought.

Table 5-4: Supply Reliability – Current Water Sources (AFY)

Source	Average/ Normal Water Year 2002	Multiple Dry Water Years		
		Year 2011	Year 2012	Year 2013
SFPUC	5,207	3,385	2,939	2,939
SCVWD	15,275	8,225	8,889	8,733
Groundwater	651	3,590	5,808	1,260
Recycled Water[1]	1,720	3,706	4,067	4,427
TOTAL:	**22,853**	18,905	21,703	17,359
	Percent of Average/Normal:	**83%**	**95%**	**76%**

1. Recycled water supply is not anticipated to decrease during multiple dry years.

Table 5-5 through **Table 5-11** provides a comparison between supply and demand for normal, single dry and multiple dry water years. As SFPUC supply decreases, groundwater supplies increase, leaving a zero percent difference between supply and demand.

Table 5-5: Supply and Demand Comparison – Normal Year (AFY)

Source	2015	2020	2025	2030	2035
SFPUC	5,039	5,039	5,039	5,039	5,039
SCVWD & Groundwater	21,592	24,579	27,270	30,310	33,389
Recycled Water	5,148	5,609	6,150	6,770	7,351
Supply Totals	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**
Demand Totals	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**
Difference	0	0	0	0	0
Difference as % Supply	0%	0%	0%	0%	0%
Difference as % Demand	0%	0%	0%	0%	0%

Table 5-6: Supply and Demand Comparison – Single Dry Year (AFY)

Source	2015	2020	2025	2030	2035
SFPUC[1]	3,387	3,387	3,387	3,387	3,387
SCVWD & Groundwater	23,604	26,231	28,922	31,962	35,041
Recycled Water	5,148	5,609	6,150	6,770	7,351
Supply Totals	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**
Demand Totals	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**
Difference	0	0	0	0	0
Difference as % Supply	0%	0%	0%	0%	0%
Difference as % Demand	0%	0%	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

Table 5-7: Supply and Demand Comparison – Multiple Dry Year for 2015 (AFY)

Source	Year 1 2015	Year 2 2016	Year 3 2017
SFPUC[1]	3,387	3,387	2,941
SCVWD & Groundwater	23,604	24,130	25,102
Recycled Water	5,148	5,240	5,332
Supply Totals	**32,139**	**32,757**	**33,375**
Demand Totals	**32,139**	**32,757**	**33,375**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

Table 5-8: Supply and Demand Comparison – Multiple Dry Year for 2020 (AFY)

Source	Year 1 2020	Year 2 2021	Year 3 2022
SFPUC[1]	3,387	3,387	2,941
SCVWD & Groundwater	26,231	26,769	27,753
Recycled Water	5,609	5,717	5,825
Supply Totals	**35,227**	**35,873**	**36,519**
Demand Totals	**35,227**	**35,873**	**36,519**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

Table 5-9: Supply and Demand Comparison – Multiple Dry Year for 2025 (AFY)

Source	Year 1 2025	Year 2 2026	Year 3 2027
SFPUC[1]	3,387	3,387	2,941
SCVWD & Groundwater	28,922	29,530	30,584
Recycled Water	6,150	6,274	6,398
Supply Totals	**38,459**	**39,191**	**39,923**
Demand Totals	**38,459**	**39,191**	**39,923**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

Table 5-10: Supply and Demand Comparison – Multiple Dry Year for 2030 (AFY)

Source	Year 1 2030	Year 2 2031	Year 3 2032
SFPUC[1]	3,387	3,387	2,941
SCVWD & Groundwater	31,962	32,578	33,640
Recycled Water	6,770	6,886	7,002
Supply Totals	**42,119**	**42,851**	**43,583**
Demand Totals	**42,119**	**42,851**	**43,583**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

Table 5-11: Supply and Demand Comparison – Multiple Dry Year for 2035 (AFY)

Source	Year 1 2035	Year 2 2036	Year 3 2037
SFPUC[1]	3,387	3,387	2,941
SCVWD & Groundwater	35,041	35,041	35,041
Recycled Water	7,351	7,351	7,351
Supply Totals	**45,779**	**45,779**	**45,779**
Demand Totals	**45,779**	**45,779**	**45,779**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

The City Council has adopted several ordinances and resolutions to deal with drought and water waste. **Table 5-12** is a list of the Ordinances and Resolutions and dates they were adopted.

Table 5-12: City Resolutions and Ordinances Regarding Water Shortage

Resolution	Date Adopted
Resolution 60748	June 28, 1988
Resolution 60749	June 28, 1988
Resolution 60950	November 25, 1988
Ordinance 23083	April 18, 1989
Ordinance 23109	April 18, 1989
Ordinance 23110	April 18, 1989
Ordinance 23113	April 18, 1989
Resolution 61292	April 18, 1989
Resolution 62045	March 27, 1990

Resolution	Date Adopted
Resolution 62551	October 20, 1990
Resolution 63593	March 24, 1992
Ordinance 24600	April 26, 1994
Resolution 74917	May 19, 2009
Resolution 74918	May 19, 2009
Ordinance 28597	June 23, 2009
Resolution 75065	June 3, 2009

Of note is Resolution 63593, which formally adopted the Water Shortage Contingency Plan, and Ordinance 28597, which amended parts 2 and 3 of Chapter 15 of the City of San Jose Municipal Code to strengthen requirements related to water conservation and use during a period of water shortage. The Water Shortage Contingency Plan defines the stages of action to be taken at varying levels of supply shortages.

STAGES OF ACTION

In the event of a water shortage, restrictions on potable water use will be enforced by the City according to the water shortage provisions included within Chapter 15.10 of the City's Municipal Code (**Appendix G**). Mandatory restrictions on potable water use would be applied to different shortage levels to reduce potable demand. **Table 5-13** describes the water supply conditions in which SJMWS will implement the prohibitions at various stages described in **Table 5-14**.

Table 5-13: Water Shortage Contingency – Rationing Stages to Address Shortages

Stage No.	% Shortage	Water Supply Conditions
1	10%	10% shortage declared by wholesale water agency. Current water use is tapping into groundwater reserves.
2	25%	25% shortage declared by wholesale water agency. Shortage conditions are worsening. Groundwater levels continue to decrease
3	30%	30% shortage declared by wholesale water agency. Signs of multiyear drought.
4	40%	40% shortage declared by wholesale water agency. Continued signs of multiyear drought.
5	>40%	Greater than 40% shortage declared by wholesale water agency. Typically meant for immediate crisis such as major infrastructure failure. Water supply reserved for health and safety needs.

MANDATORY PROHIBITIONS AND CONSUMPTION LIMITS ON WATER USE

The City will enforce mandatory reduction programs as necessary to decrease consumption during a water shortage. SJMWS currently has no additional limits on consumption to discourage and/or prevent excessive use during times of supply shortage. However, during a time of water shortage, SJMWS will evaluate the need for any consumption limits, and the City Council may adopt additional consumption limits as deemed appropriate.

Table 5-14: Water Shortage Contingency – Mandatory Prohibitions

Stage No.	Prohibition
Stage 1 10% Mandatory Program	• Irrigation of outdoor landscaping is prohibited during designated daylight hours, with certain exceptions
Stage 2 25% Mandatory Program	• Continue and intensify all activities undertaken during Stage 1 • No potable water may be used to clean any exterior paved or hard-surfaced area, or the exterior of any building or structure • No filling ornamental lakes or ponds with potable water • No washing of vehicles, except at a commercial car washing facility that utilizes a re-circulating water system to capture or reuse water • No refilling swimming pools or outdoor spas more than one (1) foot • Operation of decorative fountains using potable water is prohibited, with certain exceptions
Stage 3 30% Mandatory Program	• Continue and intensify all activities undertaken during Stages 1-2 • Irrigation of outdoor landscaping is prohibited at all times, with certain exceptions • No new outdoor landscaping or plantings shall be installed during the months of May through October • Public use of water from hydrants is prohibited
Stage 4 40% Mandatory Program	• Continue and intensify all activities undertaken in Stages 1-3 • All irrigation of outdoor landscaping is prohibited at all times, with specific limited exceptions • Filling of any swimming pool, fountain or spa is prohibited • Leaks, broken water pipes, irrigation systems, and faucets must be fixed within 48 hours
Stage 5 50% Mandatory Program	• Continue and intensify all activities undertaken in Stages 1-4 • SJMWS evaluate actual water consumption to determine additional measures to be taken to further reduce potable water use. • City to enforce any additional measures deemed appropriate for the situation in order to reduce water use. • City Council will determine priorities for use of available water within SJMWS service area.

PENALTIES OR CHARGES FOR EXCESSIVE USE

The City will enforce mandatory reduction programs as necessary to decrease consumption during a water shortage. SJMWS currently has no set charge for penalties or fees for exceeding consumption limits to be set during times of supply shortage (as described above). However, during a time of water shortage, SJMWS will evaluate the need for any related penalties or fees, and the City Council may adopt additional penalties or charges as deemed appropriate.

Water use restrictions are contained within the City Municipal Code, and therefore SJMWS customers are required to comply with any measures the City determines the need to enforce, including those described in **Table 5-14**. Customers that do not comply with the use restrictions would be subject to citation from the City's Code Compliance inspectors. **Table 5-15** describes some administrative citation fine amounts that may be charged for violation of the prohibited activities at the various stages. Additional penalties or fees may be adopted by the City Council as deemed appropriate.

Table 5-15: Water Shortage Contingency – Penalties and Charges

Stage No.	Description	Penalty/Charge
2	Cleaning of structure/ surfaces	$160.00
2	Operation of certain decorative fountains	$160.00
3	Hydrants	$160.00
4	Landscape irrigation	$160.00

ANALYSIS OF REVENUE AND EXPENDITURE IMPACTS

SJMWS's initial response to shortage is to use reserve funds. A large portion of SJMWS's costs are not directly related to the quantity of water delivered. Examples of these costs include meter readers, billing staff, and pump and facilities maintenance. Expenses are increased during periods of drought by additional programs, staff time, and water purchase costs. Therefore, unit price increases must be implemented to offset the impacts of lower water sales and higher expenses. Finally, expenses such as capital improvements are deferred when feasible. **Table 5-16** shows an example of the financial impacts of reduced demand and the resulting rate increases necessary to meet unchanged expenses.

Due to the variable nature of costs associated with water wholesale purchase and costs related to operation of the distribution system, the increases in the water rate schedule to be charged during a water shortage will be determined during the time of an actual water shortage.

Table 5-16: Financial Impacts

Water Revenue	Percent Reduction	AF Sold	HCF Sold	Average Unit Price $/HCF
$22,616,425	Normal 2010	18,936	8,248,522	$2.74
$22,616,425	25%	14,202	6,186,391	$3.66
$22,616,425	35%	12,308	5,361,539	$4.22
$22,616,425	50%	9,468	4,124,261	$5.48

Operation expenditures and water revenue will be evaluated to determine the appropriate unit increase in the rate schedule. SJMWS will evaluate the situation and recommend an increased rate schedule to be enforced during the shortage, and submit the schedule for approval by the City Council.

IMPLEMENTATION OF THE CONTINGENCY PLAN

The water shortage measures described in Chapter 15.10 of the City of San Jose Municipal Code may be enforced upon resolution of the City Council. The City Council may, by resolution, declare a state of water shortage whenever it finds that water supplies are expected to be inadequate to meet at least ninety percent of projected water demand, or whenever a minimum conservation level of ten percent or more has been established by SFPUC or SCVWD. In adopting such a resolution, the City Council may declare whether the water shortage is a ten, twenty-five, thirty, or forty percent shortage. The resolution declaring a water shortage in 2009 is included as an example in **Appendix H**.

WATER USE MONITORING PROCEDURES

During the 1987-1992 drought, SJMWS compiled water production on a daily basis. All sources were monitored, and a monthly report was submitted to SJMWS Division Manager and SCVWD. This process was found effective in keeping SJMWS within its water allotment.

In the event of a Stage 1 or 2 water shortage, SJMWS would use the above procedure. During a Stage 3 or 4 water shortage, water production figures would be reported to SJMWS Division Manager, and monthly reports would be sent to the Director of Environmental Services Department and the City Council.

In addition, as demonstrated in previous drought periods, SCVWD monitors and tracks water savings. In the period from March 2009 to October 2010, water use decreased by 19% across Santa Clara County (18-20% within San Jose) compared to a baseline period of average water use and adjusted for population growth. Several factors contributed to this, such as the weather, reduced economic activity, and the community's response to SCVWD's and City's short-term water conservation marketing and education efforts.

DISASTER PREPAREDNESS/EMERGENCY RESPONSE PLAN

SJMWS's facilities have been designed to provide adequate supplies of water during normal and emergency operations. Reservoirs and emergency backup generators have been placed at elevations and locations which will maintain supplies to customers during power failures. SJMWS staff is on duty 24 hours a day to respond to emergency situations. Engine-driven generators or pumps are installed to provide emergency supplies of water. SJMWS's facilities are designed such that water stored in reservoirs at the highest elevations may be drawn down to the lower pressure zones for emergency use.

Connections are maintained with adjacent water utilities to provide limited supplies in the event of an emergency. A connection to the San Jose Water Company is maintained in the Evergreen service area. A two-way connection to the City of Santa Clara is maintained in the North San Jose/Alviso service area.

SJMWS has developed an Emergency Response Plan, which includes appendices such as an Emergency Notification Plan, Public Notification Plan, Blackout Plan, and Disaster Operation Plan. The Emergency Response Plan is updated as needed.

5.6 WATER QUALITY

SFPUC

The SFPUC aggressively protects the natural water resources entrusted to its care. Its annual Hetch Hetchy Watershed survey evaluates the sanitary conditions, water quality, potential contamination sources, and the results of watershed management activities by the SFPUC and its partner agencies, including the National Park Service, to reduce or eliminate contamination sources. The SFPUC also conducts sanitary surveys of the local Alameda and Peninsula watersheds every five years. These surveys identified wildlife and human activity as potential contamination sources. The regional system currently meets or exceeds existing water quality standards. However, system upgrades as identified in the WSIP are needed to improve the

SFPUC's ability to maintain compliance with current water quality standards and to meet anticipated future water quality standards.

SCVWD

Treatment of surface water is necessary to ensure that the water SCVWD provides meets or exceeds all federal and state drinking water standards. Surface water quality programs include: treating local and imported surface water for sale to retailers; participating in regional and statewide coalitions to safeguard source water quality protection; and investigating opportunities for water quality improvements through partnership in regional facilities or exchanges.

SCVWD's source waters are susceptible to potential contamination from sea water intrusion and organic matter in the Delta and from a variety of land use practices, such as agricultural and urban runoff, recreational activities, livestock grazing, and residential and industrial development. Local sources are also vulnerable to potential contamination from commercial stables and historic mining practices. No contaminant associated with any of these activities has been detected in the treated water. The water treatment plants provide multiple barriers for physical removal and disinfection of contaminants. Additionally, SCVWD monitors surface water quality in local reservoirs and in the Sacramento-San Joaquin Delta.

GROUNDWATER

SCVWD monitors groundwater quality to assess current conditions and identify trends or areas of special concern. Wells are monitored for major ions, such as calcium and sodium, nutrients such as nitrate, and trace elements such as iron. Wells are also monitored for man-made contaminants, such as organic solvents. The type and frequency of monitoring depends on the well location, historic and current land use, and the availability of groundwater data in the area. Overall groundwater quality in Santa Clara County is good. The most notable exceptions are nitrate and perchlorate, which have impacted groundwater quality in Llagas Subbasin. Historically, no perchlorate has been detected in any of the groundwater sources within SJMWS's service areas. Nitrate detection in SJMWS service areas' groundwater has been historically low and well below the maximum contaminant level set by Federal and State Regulations. Constant monitoring of all wells is required, as wells are vulnerable to potential contamination from local sources and activities.

As required by CDPH for their Drinking Water Source Assessment and Protection Program, drinking water source assessments were conducted for all 14 groundwater wells within SJMWS service areas during 2003/2004. The assessments were conducted by SJMWS staff, and consisted of information gathered from City records, databases, staff, the Water Resources Control Board, and visual field surveys.

In North San Jose, potential contamination sources include local electronic manufacturing facilities, gas stations, leaking underground storage tanks and sewer collection facilities. The Edenvale wells are vulnerable to chemical/petroleum processing storage activities. The Evergreen wells are vulnerable to automobile gas stations, underground storage tank leaks and dry cleaning service activities. The Coyote wells are vulnerable to contamination caused by agricultural drainage, illegal activities/unauthorized dumping, storage tank leaks and sewer collection systems. However, the existing well locations and precautions taken during construction in combination with the local hydrology have provided a high level of protection against contamination of the local ground waters. Water quality for new groundwater wells is

monitored during well development. Well head treatment can be installed to address exceedence of a state and/or federally regulated constituent for both new and existing wells if feasible. City staff will address new water quality regulations in the future to determine if treatment is necessary to meet any new or revised drinking water standard.

Saltwater intrusion has occurred in the shallow aquifer beneath North San Jose/Alviso. Saltwater from the Bay moves upstream during high tides and leaks through the clay cap into the upper aquifer zone when this zone is pumped. Land subsidence has also aggravated this condition. Elevated salinity is also present in the lower aquifer zone, but on a much smaller scale, and is attributed to improperly constructed, maintained, or abandoned wells that penetrate the clay aquitard and provide a conduit from the upper to the lower aquifer zone. In response, SCVWD has established an extensive program to locate and properly destroy such conduit wells.

As the groundwater management agency in Santa Clara County, SCVWD has ongoing groundwater protection programs to ensure high water quality and more reliable water supplies. These programs includes well permitting, well destruction, wellhead protection, land use and development review, nitrate management (targeted to areas of elevated nitrate in the Coyote Subarea and the Llagas Subbasin), saltwater intrusion programs, and providing technical assistance to regulatory agencies to ensure local groundwater resources are protected.

6
Demand Management Measures

6.1 BACKGROUND, IMPLEMENTATION AND EVALUATION

The City of San José Environmental Services Department has been a signatory to the MOU and a member of the California Urban Water Conservation Council (CUWCC) since 1995. As a signatory, the City submits Best Management Practice (BMP) Activity Reports and Coverage Reports to the CUWCC reporting database on a biennial basis. The BMP Program is a program through the CUWCC and is intended to establish water conservation measures to improve water use efficiency with its partners. The City will report to the CUWCC on the implementation of the CUWCC BMPs, but will include a discussion of each of the Demand Management Measures (DMMs) for the purposes of this report. This section describes the DMMs that are implemented within SJMWS service area in an effort to increase water conservation and meet the 2015 and 2020 water use targets.

Water conservation activities for SJMWS are implemented by the City's water conservation program and SCVWD. Since the mid 1990s, City staff has focused primarily on indoor water conservation with the goal of reduced wastewater flows to the San Jose/Santa Clara Water Pollution Control Plant (WPCP). Outdoor water conservation activities for SJMWS have been administered by SCVWD. City staff also performs outreach and education for indoor and outdoor water conservation to customers within SJMWS service area and other areas.

Evaluation of Effectiveness: Evaluating the effectiveness of a single DMM is difficult and generally not cost-effective for the City. Each program is not necessarily monitored separately for effectiveness and water savings. Evaluating the effectiveness of all DMMs as a whole provides a better representation and can be translated into overall water conservation savings, which is discussed below.

Water Conservation Savings: Water savings estimates are not available for each individual DMM. SCVWD has provided the projected savings as a result of DMM implementation as shown in **Table 6-1**. SJMWS participates in SCVWD programs through cost sharing and partnerships. Through SCVWD program participation and partnerships, these projected savings can be achieved.

Table 6-1: SCVWD Total Water Conservation Program Water Savings Goals

Year	2010	2015	2020	2025	2030	2035
Water Conservation Savings Goal (AFY)[1]	50,600	63,100	76,100	86,700	98,500	98,500

Source: SCVWD – Draft 2010 Urban Water Management Plan, Chapter 5.
1. Total conservation savings goal includes both urban and agricultural conservation using 1992 as the base year.

Installation of water-conserving plumbing will conserve water overall in the long-term, but could reduce the ability to save water for short-term DMMs during water shortages, a phenomenon termed "demand hardening." Long-term water conserving DMMS are technology based, as such, further water savings rely on customers to actively reduce their water consumption. Saturation of water-conserving device installations and reliance on the behavioral changes of users makes future water savings more challenging than in the past.

6.2 DEMAND MANAGEMENT MEASURES

A. WATER SURVEY PROGRAMS FOR SINGLE-FAMILY RESIDENTIAL AND MULTI-FAMILY RESIDENTIAL CUSTOMERS

Implementation: This program was first implemented in July of 1998 as a pilot program. It is an active program administered by SCVWD. The City shares the cost to support this program. SCVWD plans to continue its program to meet the region's long-term water conservation goals.

Description: SCVWD markets water-use surveys to single-family and multi-family residential customers throughout the County. Since 1998, SCVWD has performed more than 29,600 residential audits, including more than 2,000 in FY 2009-2010 of which 106 surveys were completed in SJMWS service area.

The program includes educating the customer on how to read a water meter; checking flow rates of showerheads, faucet aerators and toilets; checking for leaks; installing low-flow showerheads; aerators and/or toilet flappers if necessary; checking the irrigation system for efficiency (including leaks); measuring landscaped area; developing an efficient irrigation schedule for the different seasons; and providing the customer with evaluation results, water savings recommendations, and other educational materials. In 2004, SCVWD began programming a homeowner's irrigation controllers as well (i.e., if allowed by the homeowner, the surveyors will input the recommended schedules into the controller).

Each year these programs are promoted countywide through a summer media campaign, which typically includes television, radio, and print advertisements.

B. RESIDENTIAL PLUMBING RETROFIT

Implementation: This program was first implemented in 1992. It is an active program administered by SCVWD. SJMWS also implements the program and shares the cost to support this program. This program is expected to continue into the future.

Description: SJMWS and SCVWD distribute high-quality, low-flow showerheads and faucet aerators to single-family and multi-family residents as the implementation of the residential plumbing retrofits program. SJMWS obtains the devices from SCVWD and distributes to customers both at SJMWS office and at public water conservation presentations. Since program inception, more than 296,000 low-flow showerheads and aerators have been distributed throughout the County, including more than 22,000 in FY 2009-2010. The cost for these devices is not tracked by SJMWS. **Table 6-2** below provides the number of plumbing retrofits during FY 2009-2010 in SJMWS service area.

Table 6-2: Residential Plumbing Retrofits Conducted in FY 2009-2010

	FY 2009-2010
No. of Showerhead retrofits distributed	**500**
No. of Aerator retrofits distributed	**163**

Source: SCVWD – Water Conservation Program Monthly Report Totals through June 2010, dated August 3, 2010.

C. *SYSTEM WATER AUDITS, LEAK DETECTION, AND REPAIR*

Implementation: SJMWS continuously implements water audits and leak detection and repair for the water distribution system. Since FY 1999-2000, the City has been reporting the results of pre-screen audits to the CUWCC for BMP compliance. SJMWS expects to continue the implementation of this DMM as part of the new CUWCC BMP 1.2, Water Loss Control.

Description: To prevent water waste and water losses in the system, SJMWS conducts an annual pre-screening system audit. The pre-screening audit is a comparison of the metered water sales and the total supply into the system. The difference between the two values represents potential water losses or leaks in the system. Compliance with the CUWCC BMP is achieved when the metered sales (plus other verifiable uses) are at least 90% of the water supplied to the system. Since FY 1999-2000, SJMWS has been reporting full compliance with the BMP pre-screening requirement.

Leak detection is implemented using a sonic device technique, flushing, and valve surveys. Any issues, reported leaks, and repairs are noted, mapped and entered into a leak repair database for tracking purposes to identify patterns. SJMWS also implements a valve maintenance program that uses both Global Positioning System (GPS) and Geographic Information System (GIS) technology. The program helps to facilitate leak detection and maintenance. SJMWS also implements a program to notify customers of leaks on the customer's side of the meter. In addition, SJMWS has prepared a plan to test source and production meters, and a plan to locate and repair unreported leaks.

D. *METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS*

Implementation: SJMWS implements metering requirements within SJMWS service area. SJMWS will continue to implement the metering requirements within the service area.

Description: SJMWS requires that all service connections within the service area are metered. All new service connections are metered and are billed by volume of water. Fire services are each equipped with a detection meter, for which customers are billed a meter charge. Connections to SJMWS are governed by Section 15.08 of the San José Municipal Code. SJMWS has also prepared a plan to test, repair, and replace meters to assure that they are properly maintained and operational, to check for tampering, and to prevent and repair leaks. The Municipal Code Section 15.08 is provided as **Appendix D**.

E. *LARGE LANDSCAPE CONSERVATION PROGRAMS AND INCENTIVES*

Implementation: Large landscape conservation programs are administered by SCVWD. There are currently two programs implemented, including the Landscape Survey Program (LSP) and the Landscape Rebate Program. The landscape survey program was first implemented in 1995.

The landscape rebate program is a combination of programs including the weather-based irrigation controllers (WBICs) program, the Irrigation System Hardware Rebate Program (ISHRP), the Residential Irrigation System Hardware Rebate Program (RISHRP), and the Water Efficient Landscape Rebate Program (WELRP). The WELRP was first implemented in 2005 and the other three programs were first implemented in 2006. The four programs were combined

into the Landscape Rebate Program in 2009. Both survey and rebate programs are currently active and both programs will continue to be implemented in the future.

Description of Landscape Survey Program (LSP): Since 1995, SCVWD has offered and provided large landscape water audits to sites in the County with one acre or more of landscaping. Landscape managers have been provided water-use analyses, scheduling information, in-depth irrigation evaluation, and recommendations for affordable irrigation upgrades. Each site receives a detailed report upon completion of the audit. An annual report is generated to recap the previous year's efforts. To generate several reporting and monitoring options, water use history, meter numbers, account numbers, and site contacts and addresses are captured for each site in a specialized database. In 2009, in an effort to expedite program participation and water savings, the program was expanded to include any commercial, industrial, and institutional sites with 5,000 square feet or more of irrigated landscape.

The LSP reaches the community through advertising in Tri-County Apartment Association's monthly Apartment Management magazine, colorful flyers at the biannual Home & Garden Show, NCTLC Turf & Landscape Expo, and retailer outreach through direct mailing of personalized letters to high water use customers and also through City newsletters and business newsletters. There have been 30 audits conducted in SJMWS service area through this program in FY 2009-2010.

Description of Landscape Rebate Program: In 2006, SCVWD partnered with five bay area water supply agencies and received a DWR Proposition 13 grant that provided funding for the installation of WBICs. This new generation of irrigation controller utilizes the principals of evapo-transpiration (ET) to automatically calculate a site-specific irrigation schedule based on several factors, including plants and soil type. The controller then adjusts the irrigation schedule as local weather changes to regulate unnecessary irrigation.

SCVWD first implemented a direct install program which installed two types of WBICs (real-time and historic) in both residential and commercial sites throughout SCVWD's service area. In order to expedite program participation and include emerging WBIC manufacturers, SCVWD shifted the WBIC program to a rebate style program that offered rebates of $300-$1,100 per approved controller installed.

SCVWD expanded its irrigation equipment incentives beyond the WBIC program, when two grants were received in 2006 for the implementation of two types of water efficient irrigation hardware installation rebate programs.

The first grant, received from DWR, kicked off implementation of the ISHRP. This program aimed to install a variety of water efficient irrigation hardware at commercial, industrial, and institutional sites throughout the County. Through ISHRP, SCVWD provided rebates ranging from $200 to a maximum of $2,000 per site (not to exceed 50% of the hardware cost). Qualifying hardware included rain sensors, high distribution uniformity nozzles, dedicated landscape meters, replacement sprinkler heads, converting overhead irrigation to drip irrigation, pressure reducing valves, and spray heads or rotors with pressure compensating heads and/or check valves.

The second water efficient irrigation equipment grant was received from the United States Bureau of Reclamation and was to launch the RISHRP. The program was designed to retrofit inefficient irrigation equipment at residential sites with new water conserving equipment. This residential version of the ISHRP offered rebates for the same efficient irrigation equipment but

was unique as RISRHP offered flat rebate amounts per equipment items. Through the RISHRP program, residents could receive rebates ranging from $50 up to $1,000 per site.

In addition to efficient irrigation equipment retrofits, SCVWD began to focus on water efficient landscapes by launching the WELRP in early 2005. The WELRP offered rebates to residential and commercial sites for the replacement of approved high water using landscape with low water use plants, mulch, and permeable hardscape. WELRP participants could receive up to $0.75 per square foot of irrigated turf grass with a maximum of rebate of $1,000 and $10,000 for residential and commercial sites respectively. In an effort to expedite program participation, SCVWD Board of Directors moved to double the maximum rebate from $1,000 up to $2,000 for residents and from $10,000 up to $20,000 for commercial sites in March 2009.

A summary of the surveys and rebates issued within SJMWS service area during FY 2009-2010 is provided in **Table 6-3**.

Table 6-3: Large Landscape Surveys Conducted during FY 2009-2010

	FY 2009-2010
No. of Surveys Completed	30
No. of Equipment Retrofit Rebates	3
No. of Landscape Conversion Rebates	5
No. of WBIC Rebates	0

Source: SCVWD – Water Conservation Program Monthly Report Totals through June 2010, dated August 3, 2010.

F. HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAMS

Implementation: The residential rebate program was first implemented in July 1995. In October 2001, SCVWD began participating in the regional Bay Area Water Utility Clothes Washer Rebate Program. Since January 2008, the regional program has partnered with Pacific Gas & Electric (PG&E). This is an active program administered by SCVWD and the City shares the cost to support this program. The program is expected to continue in the future, though in the year 2019, it is expected that higher clothes washer standards will be in effect and cost-sharing may be re-evaluated at that time.

Description: Residents of the County are eligible for a rebate of up to $175 for qualifying clothes washers. Qualifying clothes washers are rated by the Consortium for Energy Efficiency (CEE) as Tier 3. The total rebate is a combined rebate from both SCVWD and PG&E. In FY 2009-2010, 1,225 residential clothes washer rebates were issued in SJMWS service area.

G. PUBLIC INFORMATION PROGRAMS

Implementation: The City, SJMWS, and SCVWD participate in developing and implementing public information programs. SCVWD designs, funds, and implements a public information program and SJMWS conducts additional outreach efforts supporting SCVWD program. The City also implements outreach programs in the WPCP service area. The City, SJMWS, and SCVWD will continue to implement public information programs in the future.

Description: The City, SJMWS, and SCVWD have carried out various public information campaigns in the past and present. Multi-media advertising have covered topics such as water

conservation, urban runoff pollution prevention, water quality, groundwater recharge, water supply, water recycling, watershed and flood protection, and stream stewardship. Efforts included paid advertising, public service announcements, bill inserts/brochures, website development, and special events. Campaigns have been carried out in various languages including English, Spanish, Vietnamese, and Chinese. The City's annual expenditure for public information programs (not including administration) is up to $100,000.

H. SCHOOL EDUCATION PROGRAMS

Implementation: In 1995, SCVWD's Public Information Office hired a full-time, fully credentialed educator who holds life-time teaching and Administrative Services credentials to coordinate the school education programs. From 2001-2007, a second, bilingual educator joined SCVWD's full-time staff to assist with the program. The City has also been implementing school education programs in the WPCP service area for over 10 years. The City and SCVWD will continue to implement school education programs in the future.

Description: SCVWD's educators develop school programs, contract with the Youth Science Institute for additional instructors, and supervise university student interns as classroom assistants. SCVWD has been continuously active in this area by providing free classroom presentations, puppet plays, and tours of SCVWD facilities to schools within the County. The objective is to teach students about water conservation, water supply, watershed stewardship, and flood protection. SCVWD also provides school curricula to area educators, including workbooks and videos, as well as hands-on training for teachers. Materials distributed to students include topical lessons. All meet state education framework requirements and are grade-level appropriate. All students who participate in the program received materials.

The City's school education program is implemented through its annual grant program for youth education projects. The City provides grants of up to $5,000 to local schools and educational organizations for projects that result in increasing water-related awareness among youth in Kindergarten through Grade 12. Each year, the City funds up to $50,000 in water-related education projects. In 2010, the City's school education program was expanded to include funding for and participation in BAWSCA's regional school education program, which provides group assembly presentations and lesson plans for teachers about water conservation, and a residential water audit and plumbing retrofit kit for the students who participate.

I. CONSERVATION PROGRAMS FOR COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL (CII) ACCOUNTS

Implementation: Since 1992, SCVWD has implemented various programs targeting commercial, industrial, and institutional (CII) customers. The City also has implemented the Water Efficient Technologies (WET) Program since 1995. Both the City and SCVWD expect to continue the programs in the future, with the potential for minor changes based on technological advancements.

Description: Many initiatives and programs are implemented to increase water efficiency in the CII sectors. Following is a description of the programs offered:

City's Water Efficient Technologies (WET) Program: To encourage all commercial and industrial businesses to implement permanent water reduction measures, the City offers financial incentives to businesses that discharge within the WPCP service area, offering $4 for every

HCF[1] of wastewater flow reduced. Rebates range from $400 to $50,000 per site. The maximum rebate is $50,000 per project, or 50% of the project cost, whichever is less. The City budgets up to $150,000 annually for the program.

SCVWD's Commercial Toilet Program: SCVWD has a free high-efficiency toilet replacement program specifically for businesses in Santa Clara County. The program is for CII users as well as apartment complexes. The existing toilet must flush at 3.5 gallons per flush or higher. The toilets to be installed are high-efficiency toilets (HETs) utilizing state-of-the-art technology. The toilet and the installation are free of charge. In FY 2009-2010, there were 17 HET direct installs in SJMWS service area.

SCVWD's Commercial Washer Program: In July 1999, SCVWD partnered with Silicon Valley Power and the City to offer rebates for the replacement of laundromat clothes washers with high-efficiency washers. In 2000, the program was expanded to commercial machines in multi-family complexes. The program offers rebates of $400 per unit on approved purchased and leased high-efficiency washing machines within the County. In FY 2009-2010, 78 commercial clothes washer rebates were issued in SJMWS service area.

SCVWD's Pre-Rinse Spray Valve Program: SCVWD purchased a quantity of high-efficiency pre-rinse spray valves with a flow rate of 1.15 gallons per minute for distribution to commercial sites, especially those identified through the CII Water Survey Program. In FY 2009-2010, 2 pre-rinse spray valves were installed in SJMWS service area.

SCVWD's Submeter Rebate Program: This program, which began as a pilot program in FY 2000-2001, gives a rebate of $100 for every water submeter installed at multi-family housing complexes, such as mobile home parks and condominium complexes. Water use records from participating mobile home parks showed an average water savings of 23 percent per mobile home. In FY 2009-2010, the City assisted with SCVWD's efforts to install submeters and this resulted in participation by two mobile home parks in the SJMWS service area.

J. WHOLESALE AGENCY PROGRAMS

SJMWS is not a wholesale agency and does not provide water to other retailers.

K. CONSERVATION PRICING

Implementation: Conservation pricing is implemented by SJMWS and will continue to be implemented by SJMWS in the future.

Description: Single- and multi-family residential customers are subject to a tiered rate structure while commercial, industrial, institutional, and irrigation customers are subject to a uniform rate structure. SJMWS is not required to comply with the sewer rate requirement because sewer service is administered by the WPCP. In addition, for customers in SJMWS service area, the County of Santa Clara collects payment for sewer service through property taxes.

[1] A HCF is the unit water suppliers commonly use to measure volume and is equal to 748 gallons or one hundred cubic feet.

L. WATER CONSERVATION COORDINATOR

Implementation and Description: The City has a full-time equivalent (FTE) Water Conservation Coordinator. The position was established as early as 1995. The current Water Conservation Coordinator information is provided below:

Name:	Alice Ringer
Title:	Environmental Services Specialist, Water Conservation Environmental Services Department, City of San José
Address:	3025 Tuers Road, San Jose CA 95121
Phone:	408-363-4708
Fax:	408-277-4954
Email:	alice.ringer@sanjoseca.gov

There is at least one additional staff member that works with the Water Conservation Coordinator ensuring that there is at least one FTE staff working on water conservation programs. It is expected that there will continue to be at least one FTE staff member dedicated to water conservation programs.

M. WATER WASTE PROHIBITION

Implementation: The City has a water waste ordinance that was adopted in 1994 and updated in 2009. The ordinance will continue to be in effect unless it is superseded or amended with a new ordinance.

Description: SJMWS service area is within City limits and is governed by the City's municipal code. Municipal Code Section 15.10 dictates the water waste prohibitions within the City. Prohibitions include the following:

- No water use which results in gutter flooding or water runoff;
- No serving water in food service establishments unless requested;
- Notices shall be displayed in bathrooms of hotels, motels, and other lodging providing guests with the option to not launder towels and linens to help conserve water;
- Restrictions on washing building exteriors, hard or paved surfaces, and vehicles;
- Restrictions on commercial car washes;
- Requirements for building and construction use of fire hydrants ; and
- Restrictions on landscape irrigation including time of day and duration.

SJMWS' water conservation staff assists in the enforcement of the ordinance for the entire City including SJMWS service area. The Municipal Code Section 15.10 is provided as **Appendix D**.

N. RESIDENTIAL ULTRA-LOW-FLUSH TOILET REPLACEMENT PROGRAMS

Implementation: This program was first implemented by SCVWD in 1992 as a ULFT program and was active through 2003. The City administered its own ULFT program from 1999 to 2004. Beginning in 2004, SCVWD began implementing a High Efficiency Toilet (HET) program as described below. This program is an active program that the City also shares the cost to implement. The program is expected to continue in the future, though in the year 2014, it is expected that higher toilet water efficiency standards will be in effect and cost-sharing may be re-evaluated at that time.

Description: The current program consists of a rebate program for single-family and multi-family accounts and a full-installation program for multi-family accounts. County residents can receive up to $125 per toilet for replacing old, high water-use toilets that use 3.5 gallons per flush (gpf) or more, with a new HET or Dual Flush Toilet from an approved toilet list. In FY 2009-2010, 155 HET or Dual Flush Toilet rebates were issued in SJMWS service area.

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Appendix A

San Jose Municipal Water System
2010 Urban Water Management Plan
Postings and Notifications for UWMP Preparation

San Jose Mercury News

750 RIDDER PARK DRIVE
SAN JOSE, CALIFORNIA 95190
408-920-5332

PROOF OF PUBLICATION

IN THE
CITY OF SAN JOSE
STATE OF CALIFORNIA
COUNTY OF SANTA CLARA

SAN JOSE,CITY OF
OFFICE THE CITY GROUP/REBECCA,200 E SANTA CLARA STREET,2ND FLOOR
San Jose CA 95113

FILE NO. S. Guzzetta

In the matter of

The San Jose Mercury News

The undersigned, being first duly sworn, deposes and says: That at all times hereinafter mentioned affiant was and still is a citizen of the United States, over the age of eighteen years, and not a party to or interested in the above entitled proceedings; and was at and during all said times and still is the principal clerk of the printer and publisher of the San Jose Mercury News, a newspaper of general circulation printed and published daily in the city of San Jose in said County of Santa Clara, State of California as determined by the court's decree dated June 27, 1952, case numbers 84096 and 84097, and that said San Jose Mercury News is and was at all times herein mentioned a newspaper of general circulation as that term is defined by Sections 6000 and following, of the Government Code of the State of California and, as provided by said sections, is published for the dissemination of local or telegraphic news and intelligence of a general character, having a bona fide subscription list of paying subscribers, and is not devoted to the interests or published for the entertainment or instruction of a particular class, professional, trade, calling, race or denomination, or for the entertainment and instruction of any number of such classes, professionals, trades, callings, races or denominations; that at all times said newspaper has been established, printed and published in the said city of San Jose in said County and State at regular intervals for more than one year preceding the first publication of the notice herein mentioned. Said decree has not been revoked, vacated or set aside.

I declare that the notice, of which the annexed is a true printed copy, has been published in each regular or entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

2/25/2011

Dated at San Jose, California
02/25/11

I declare under penalty of perjury that the foregoing is true and correct.

Signed _____

Principal clerk of the printer and publisher of the San Jose Mercury News.

Legal No. **0003879515**

RECEIVED
San Jose City Clerk

2011 MAR -1 A 9:35

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CITY OF SAN JOSE MUNICIPAL WATER SYSTEM

UPDATE OF URBAN WATER MANAGEMENT PLAN

City of San Jose Municipal Water System is currently reviewing and updating our Urban Water Management Plan, which was last updated in 2005. The Plan includes water supply and demand projections and identifies a water supply contingency plan for the Municipal Water System service area. We encourage all of our customers to participate in this review process. We will make any proposed revisions to the Plan available for public review and will hold a public hearing in 2011. In the meantime, if you would like to learn more about the current Plan, the schedule for considering changes to it, or how to participate in the process, please contact:

Nicole Quesada (Nicole.Quesada@sanjoseca.gov)
3025 Tuers Road, San Jose, CA 95121
Phone: 408.277.3671
Fax: 408.277.4954

SJMN #3879515 Feb. 25, 2011

SAN JOSE POST-RECORD

95 S. Market St., Ste. 535, SAN JOSE, CA 95113
Telephone (408) 287-4866 / Fax (408) 287-2544

RECEIVED
This space for filing stamp only
San Jose City Clerk

2011 FEB 22 A 10: 10

2"

SUZANNE GUZZETTA
SAN JOSE CITY CLERK
200 E. SANTA CLARA ST.
SAN JOSE, CA - 95113

PROOF OF PUBLICATION

(2015.5 C.C.P.)

State of California)
County of SANTA CLARA) ss

Notice Type: GPHSJ - SAN JOSE CITY PUBLIC HEARING

Ad Description: SJ MUNICIPAL WATER SYSTEM WATER USE TARGETS IN URBAN WATER MGMT PLAN

I am a citizen of the United States and a resident of the State of California; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer and publisher of the SAN JOSE POST-RECORD, a newspaper published in the English language in the city of SAN JOSE, county of SANTA CLARA, and adjudged a newspaper of general circulation as defined by the laws of the State of California by the Superior Court of the County of SANTA CLARA, State of California, under date 02/03/1922, Case No. 27844. That the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

02/17/2011

Executed on: 02/17/2011
At Los Angeles, California

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Signature

SJ#: 2043600

Notice of Public Meeting
San Jose Municipal Water System
WATER USE TARGETS IN URBAN WATER MANAGEMENT PLAN

The City of San Jose Municipal Water System will hold a public meeting to receive public input on its Urban Per Capita Water Use Targets, which will be incorporated in its 2010 Urban Water Management Plan, pursuant to Section 10608.26(a) of the California Water Code. Public input will be taken on the water use targets, the method for determining the targets, the implementation plan for achieving the targets, and any impacts to the local economy. If you are interested in sharing your comments, please join us:

Monday, March 21, 2011
5:00 p.m.
San Jose Municipal Water System
3025 Tuers Road
San Jose, CA 95121

The proposed water use targets are on file and available for public review at the above address of the San Jose Municipal Water System. If you have any questions, please call (408) 363-4708.
2/17/11

SJ-2043600#

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CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

Environmental Services Department
MUNICIPAL WATER SYSTEM DIVISION

February 14, 2011

Santa Clara Valley Water District
5750 Almaden Expressway
San José, CA 95118

Subject: Notice of Preparation of Urban Water Management Plan

The Urban Water Management Plan Act (Water Code Section 10610 - 10657) requires the City of San José Municipal Water System to update its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

We will make any proposed revisions to our Plan available for public review and will hold a public hearing later this year. In the meantime, if you have any questions about our Plan, or the process for updating it, please contact:

Nicole Quesada
City of San José Municipal Water System
3025 Tuers Road, San José, CA 95121
Phone: 408.277.3671
Fax: 408.277.4954
Email: Nicole.Quesada@sanjoseca.gov

Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

February 14, 2011

BAWSCA
155 Bovet Road, Suite 302
San Mateo, CA 94404

Subject: Notice of Preparation of Urban Water Management Plan

The Urban Water Management Plan Act (Water Code Section 10610 - 10657) requires the City of San José Municipal Water System to update its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

We will make any proposed revisions to our Plan available for public review and will hold a public hearing later this year. In the meantime, if you have any questions about our Plan, or the process for updating it, please contact:

Nicole Quesada
City of San José Municipal Water System
3025 Tuers Road, San José, CA 95121
Phone: 408.277.3671
Fax: 408.277.4954
Email: Nicole.Quesada@sanjoseca.gov

Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

February 14, 2011

San Francisco Public Utilities Commission
1155 Market Street, 11th Floor
San Francisco, CA 94103

Subject: Notice of Preparation of Urban Water Management Plan

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Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

February 14, 2011

City of San José
Department of Planning, Building, and Code Enforcement
200 East Santa Clara Street
San José, CA 95113

Subject: Notice of Preparation of Urban Water Management Plan

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Phone: 408.277.3671
Fax: 408.277.4954
Email: Nicole.Quesada@sanjoseca.gov

Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

February 14, 2011

County of Santa Clara
70 West Hedding Street
San José, CA 95110

Subject: Notice of Preparation of Urban Water Management Plan

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3025 Tuers Road, San José, CA 95121
Phone: 408.277.3671
Fax: 408.277.4954
Email: Nicole.Quesada@sanjoseca.gov

Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

February 14, 2011

San José/Santa Clara Water Pollution Control Plant
700 Los Esteros Road
San José, CA 95134

Subject: Notice of Preparation of Urban Water Management Plan

The Urban Water Management Plan Act (Water Code Section 10610 - 10657) requires the City of San José Municipal Water System to update its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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Phone: 408.277.3671
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Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

Appendix B

San Jose Municipal Water System
2010 Urban Water Management Plan
Resolution for Adoption of the UWMP

Appendix C

San Jose Municipal Water System
2010 Urban Water Management Plan
City of San Jose Demographic Data

Table DP-2. Profile of Selected Social Characteristics: 2000

Geographic area: San Jose city, California

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
SCHOOL ENROLLMENT		
Population 3 years and over enrolled in school	**262,348**	**100.0**
Nursery school, preschool	14,831	5.7
Kindergarten	14,579	5.6
Elementary school (grades 1-8)	105,456	40.2
High school (grades 9-12)	53,813	20.5
College or graduate school	73,669	28.1
EDUCATIONAL ATTAINMENT		
Population 25 years and over	**570,755**	**100.0**
Less than 9th grade	61,613	10.8
9th to 12th grade, no diploma	62,071	10.9
High school graduate (includes equivalency)	103,529	18.1
Some college, no degree	119,200	20.9
Associate degree	44,220	7.7
Bachelor's degree	118,948	20.8
Graduate or professional degree	61,174	10.7
Percent high school graduate or higher	78.3	(X)
Percent bachelor's degree or higher	31.6	(X)
MARITAL STATUS		
Population 15 years and over	**694,087**	**100.0**
Never married	216,403	31.2
Now married, except separated	374,805	54.0
Separated	13,915	2.0
Widowed	30,590	4.4
Female	25,246	3.6
Divorced	58,374	8.4
Female	33,706	4.9
GRANDPARENTS AS CAREGIVERS		
Grandparent living in household with one or more own grandchildren under 18 years	**29,903**	**100.0**
Grandparent responsible for grandchildren	8,080	27.0
VETERAN STATUS		
Civilian population 18 years and over	**658,051**	**100.0**
Civilian veterans	50,678	7.7
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION		
Population 5 to 20 years	**203,889**	**100.0**
With a disability	14,432	7.1
Population 21 to 64 years	**547,248**	**100.0**
With a disability	107,382	19.6
Percent employed	61.6	(X)
No disability	439,866	80.4
Percent employed	76.2	(X)
Population 65 years and over	**70,745**	**100.0**
With a disability	30,275	42.8
RESIDENCE IN 1995		
Population 5 years and over	**825,954**	**100.0**
Same house in 1995	427,470	51.8
Different house in the U.S. in 1995	341,885	41.4
Same county	255,388	30.9
Different county	86,497	10.5
Same state	55,690	6.7
Different state	30,807	3.7
Elsewhere in 1995	56,599	6.9

Subject	Number	Percent
NATIVITY AND PLACE OF BIRTH		
Total population	**893,889**	**100.0**
Native	564,132	63.1
Born in United States	553,631	61.9
State of residence	400,204	44.8
Different state	153,427	17.2
Born outside United States	10,501	1.2
Foreign born	329,757	36.9
Entered 1990 to March 2000	145,338	16.3
Naturalized citizen	140,542	15.7
Not a citizen	189,215	21.2
REGION OF BIRTH OF FOREIGN BORN		
Total (excluding born at sea)	**329,750**	**100.0**
Europe	21,904	6.6
Asia	182,712	55.4
Africa	5,189	1.6
Oceania	1,956	0.6
Latin America	114,300	34.7
Northern America	3,689	1.1
LANGUAGE SPOKEN AT HOME		
Population 5 years and over	**825,954**	**100.0**
English only	402,804	48.8
Language other than English	423,150	51.2
Speak English less than "very well"	222,042	26.9
Spanish	186,647	22.6
Speak English less than "very well"	99,975	12.1
Other Indo-European languages	48,759	5.9
Speak English less than "very well"	15,727	1.9
Asian and Pacific Island languages	178,101	21.6
Speak English less than "very well"	103,052	12.5
ANCESTRY (single or multiple)		
Total population	**893,889**	**100.0**
Total ancestries reported	*923,169*	*103.3*
Arab	4,302	0.5
Czech[1]	2,284	0.3
Danish	4,326	0.5
Dutch	7,920	0.9
English	50,448	5.6
French (except Basque)[1]	15,983	1.8
French Canadian[1]	3,149	0.4
German	67,712	7.6
Greek	3,734	0.4
Hungarian	2,436	0.3
Irish[1]	54,339	6.1
Italian	43,165	4.8
Lithuanian	919	0.1
Norwegian	9,506	1.1
Polish	10,766	1.2
Portuguese	15,285	1.7
Russian	6,930	0.8
Scotch-Irish	7,565	0.8
Scottish	11,103	1.2
Slovak	647	0.1
Subsaharan African	5,722	0.6
Swedish	9,350	1.0
Swiss	2,661	0.3
Ukrainian	1,423	0.2
United States or American	16,961	1.9
Welsh	3,669	0.4
West Indian (excluding Hispanic groups)	962	0.1
Other ancestries	559,902	62.6

-Represents zero or rounds to zero. (X) Not applicable.

[1]The data represent a combination of two ancestries shown separately in Summary File 3. Czech includes Czechoslovakian. French includes Alsatian. French Canadian includes Acadian/Cajun. Irish includes Celtic.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-4. Profile of Selected Housing Characteristics: 2000

Geographic area: San Jose city, California

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total housing units	**281,706**	**100.0**
UNITS IN STRUCTURE		
1-unit, detached	161,962	57.5
1-unit, attached	27,560	9.8
2 units	5,751	2.0
3 or 4 units	17,403	6.2
5 to 9 units	13,525	4.8
10 to 19 units	12,922	4.6
20 or more units	31,564	11.2
Mobile home	10,658	3.8
Boat, RV, van, etc	361	0.1
YEAR STRUCTURE BUILT		
1999 to March 2000	5,908	2.1
1995 to 1998	15,877	5.6
1990 to 1994	12,931	4.6
1980 to 1989	41,557	14.8
1970 to 1979	80,156	28.5
1960 to 1969	66,369	23.6
1940 to 1959	44,130	15.7
1939 or earlier	14,778	5.2
ROOMS		
1 room	13,013	4.6
2 rooms	25,933	9.2
3 rooms	40,577	14.4
4 rooms	35,848	12.7
5 rooms	46,881	16.6
6 rooms	49,183	17.5
7 rooms	35,404	12.6
8 rooms	22,021	7.8
9 or more rooms	12,846	4.6
Median (rooms)	5.0	(X)
Occupied housing units	**276,417**	**100.0**
YEAR HOUSEHOLDER MOVED INTO UNIT		
1999 to March 2000	57,743	20.9
1995 to 1998	83,880	30.3
1990 to 1994	44,029	15.9
1980 to 1989	44,309	16.0
1970 to 1979	28,255	10.2
1969 or earlier	18,201	6.6
VEHICLES AVAILABLE		
None	16,885	6.1
1	74,552	27.0
2	112,341	40.6
3 or more	72,639	26.3
HOUSE HEATING FUEL		
Utility gas	193,585	70.0
Bottled, tank, or LP gas	3,624	1.3
Electricity	76,127	27.5
Fuel oil, kerosene, etc	172	0.1
Coal or coke	-	-
Wood	774	0.3
Solar energy	108	-
Other fuel	187	0.1
No fuel used	1,840	0.7
SELECTED CHARACTERISTICS		
Lacking complete plumbing facilities	1,710	0.6
Lacking complete kitchen facilities	1,548	0.6
No telephone service	1,763	0.6

Subject	Number	Percent
OCCUPANTS PER ROOM		
Occupied housing units	**276,417**	**100.0**
1.00 or less	225,768	81.7
1.01 to 1.50	20,446	7.4
1.51 or more	30,203	10.9
Specified owner-occupied units	**146,892**	**100.0**
VALUE		
Less than $50,000	1,915	1.3
$50,000 to $99,999	1,177	0.8
$100,000 to $149,999	979	0.7
$150,000 to $199,999	4,034	2.7
$200,000 to $299,999	25,241	17.2
$300,000 to $499,999	76,529	52.1
$500,000 to $999,999	34,420	23.4
$1,000,000 or more	2,597	1.8
Median (dollars)	394,000	(X)
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS		
With a mortgage	122,324	83.3
Less than $300	157	0.1
$300 to $499	1,312	0.9
$500 to $699	3,038	2.1
$700 to $999	7,167	4.9
$1,000 to $1,499	20,915	14.2
$1,500 to $1,999	32,944	22.4
$2,000 or more	56,791	38.7
Median (dollars)	1,717	(X)
Not mortgaged	24,568	16.7
Median (dollars)	342	(X)
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	40,376	27.5
15.0 to 19.9 percent	22,336	15.2
20.0 to 24.9 percent	21,948	14.9
25.0 to 29.9 percent	17,145	11.7
30.0 to 34.9 percent	12,222	8.3
35.0 percent or more	31,968	21.8
Not computed	897	0.6
Specified renter-occupied units	**105,414**	**100.0**
GROSS RENT		
Less than $200	1,780	1.7
$200 to $299	1,883	1.8
$300 to $499	4,409	4.2
$500 to $749	9,699	9.2
$750 to $999	22,444	21.3
$1,000 to $1,499	40,756	38.7
$1,500 or more	22,346	21.2
No cash rent	2,097	2.0
Median (dollars)	1,123	(X)
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	15,103	14.3
15.0 to 19.9 percent	15,156	14.4
20.0 to 24.9 percent	14,965	14.2
25.0 to 29.9 percent	12,295	11.7
30.0 to 34.9 percent	9,757	9.3
35.0 percent or more	34,099	32.3
Not computed	4,039	3.8

-Represents zero or rounds to zero. (X) Not applicable.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-3. Profile of Selected Economic Characteristics: 2000

Geographic area: San Jose city, California

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
EMPLOYMENT STATUS		
Population 16 years and over	**682,152**	**100.0**
In labor force	456,641	66.9
Civilian labor force	456,442	66.9
Employed	436,890	64.0
Unemployed	19,552	2.9
Percent of civilian labor force	4.3	(X)
Armed Forces	199	-
Not in labor force	225,511	33.1
Females 16 years and over	**337,674**	**100.0**
In labor force	199,842	59.2
Civilian labor force	199,780	59.2
Employed	190,384	56.4
Own children under 6 years	**75,380**	**100.0**
All parents in family in labor force	41,083	54.5
COMMUTING TO WORK		
Workers 16 years and over	**427,984**	**100.0**
Car, truck, or van - - drove alone	326,928	76.4
Car, truck, or van - - carpooled	60,177	14.1
Public transportation (including taxicab)	17,482	4.1
Walked	6,170	1.4
Other means	6,578	1.5
Worked at home	10,649	2.5
Mean travel time to work (minutes)[1]	27.8	(X)
Employed civilian population 16 years and over	**436,890**	**100.0**
OCCUPATION		
Management, professional, and related occupations	178,366	40.8
Service occupations	53,782	12.3
Sales and office occupations	106,472	24.4
Farming, fishing, and forestry occupations	1,383	0.3
Construction, extraction, and maintenance occupations	34,560	7.9
Production, transportation, and material moving occupations	62,327	14.3
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	1,552	0.4
Construction	25,190	5.8
Manufacturing	122,913	28.1
Wholesale trade	14,016	3.2
Retail trade	45,941	10.5
Transportation and warehousing, and utilities	14,523	3.3
Information	17,629	4.0
Finance, insurance, real estate, and rental and leasing	19,532	4.5
Professional, scientific, management, administrative, and waste management services	59,179	13.5
Educational, health and social services	59,504	13.6
Arts, entertainment, recreation, accommodation and food services	28,093	6.4
Other services (except public administration)	17,006	3.9
Public administration	11,812	2.7
CLASS OF WORKER		
Private wage and salary workers	369,048	84.5
Government workers	42,954	9.8
Self-employed workers in own not incorporated business	23,697	5.4
Unpaid family workers	1,191	0.3

Subject	Number	Percent
INCOME IN 1999		
Households	**276,408**	**100.0**
Less than $10,000	13,166	4.8
$10,000 to $14,999	8,364	3.0
$15,000 to $24,999	17,854	6.5
$25,000 to $34,999	20,285	7.3
$35,000 to $49,999	32,824	11.9
$50,000 to $74,999	55,453	20.1
$75,000 to $99,999	43,337	15.7
$100,000 to $149,999	51,374	18.6
$150,000 to $199,999	19,818	7.2
$200,000 or more	13,933	5.0
Median household income (dollars)	70,243	(X)
With earnings	245,780	88.9
Mean earnings (dollars)[1]	84,675	(X)
With Social Security income	46,189	16.7
Mean Social Security income (dollars)[1]	11,573	(X)
With Supplemental Security Income	14,384	5.2
Mean Supplemental Security Income (dollars)[1]	7,474	(X)
With public assistance income	10,329	3.7
Mean public assistance income (dollars)[1]	4,833	(X)
With retirement income	36,211	13.1
Mean retirement income (dollars)[1]	17,122	(X)
Families	**205,906**	**100.0**
Less than $10,000	6,651	3.2
$10,000 to $14,999	5,196	2.5
$15,000 to $24,999	12,268	6.0
$25,000 to $34,999	14,171	6.9
$35,000 to $49,999	23,759	11.5
$50,000 to $74,999	41,142	20.0
$75,000 to $99,999	33,967	16.5
$100,000 to $149,999	41,050	19.9
$150,000 to $199,999	16,450	8.0
$200,000 or more	11,252	5.5
Median family income (dollars)	74,813	(X)
Per capita income (dollars)[1]	26,697	(X)
Median earnings (dollars):		
Male full-time, year-round workers	49,347	(X)
Female full-time, year-round workers	36,936	(X)

Subject	Number below poverty level	Percent below poverty level
POVERTY STATUS IN 1999		
Families	**12,309**	**6.0**
With related children under 18 years	9,621	8.1
With related children under 5 years	4,793	9.0
Families with female householder, no husband present	**4,903**	**15.8**
With related children under 18 years	4,226	21.4
With related children under 5 years	2,001	28.8
Individuals	**77,893**	**8.8**
18 years and over	52,859	8.1
65 years and over	5,213	7.4
Related children under 18 years	23,590	10.3
Related children 5 to 17 years	16,915	10.4
Unrelated individuals 15 years and over	28,226	20.4

-Represents zero or rounds to zero. (X) Not applicable.

[1]If the denominator of a mean value or per capita value is less than 30, then that value is calculated using a rounded aggregate in the numerator. See text.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-1. Profile of General Demographic Characteristics: 2000

Geographic Area: San Jose city, California

[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total population	**894,943**	**100.0**
SEX AND AGE		
Male	454,798	50.8
Female	440,145	49.2
Under 5 years	68,243	7.6
5 to 9 years	68,484	7.7
10 to 14 years	62,439	7.0
15 to 19 years	61,487	6.9
20 to 24 years	64,418	7.2
25 to 34 years	160,945	18.0
35 to 44 years	155,751	17.4
45 to 54 years	111,383	12.4
55 to 59 years	38,770	4.3
60 to 64 years	29,163	3.3
65 to 74 years	41,962	4.7
75 to 84 years	24,085	2.7
85 years and over	7,813	0.9
Median age (years)	32.6	(X)
18 years and over	658,819	73.6
Male	333,405	37.3
Female	325,414	36.4
21 years and over	621,844	69.5
62 years and over	90,394	10.1
65 years and over	73,860	8.3
Male	31,394	3.5
Female	42,466	4.7
RACE		
One race	849,881	95.0
White	425,017	47.5
Black or African American	31,349	3.5
American Indian and Alaska Native	6,865	0.8
Asian	240,375	26.9
Asian Indian	26,606	3.0
Chinese	51,109	5.7
Filipino	48,149	5.4
Japanese	11,484	1.3
Korean	9,425	1.1
Vietnamese	78,842	8.8
Other Asian [1]	14,760	1.6
Native Hawaiian and Other Pacific Islander	3,584	0.4
Native Hawaiian	624	0.1
Guamanian or Chamorro	675	0.1
Samoan	1,417	0.2
Other Pacific Islander [2]	868	0.1
Some other race	142,691	15.9
Two or more races	45,062	5.0
Race alone or in combination with one or more other races: [3]		
White	460,772	51.5
Black or African American	36,928	4.1
American Indian and Alaska Native	13,228	1.5
Asian	257,571	28.8
Native Hawaiian and Other Pacific Islander	7,091	0.8
Some other race	167,353	18.7

Subject	Number	Percent
HISPANIC OR LATINO AND RACE		
Total population	**894,943**	**100.0**
Hispanic or Latino (of any race)	269,989	30.2
Mexican	221,148	24.7
Puerto Rican	4,072	0.5
Cuban	1,001	0.1
Other Hispanic or Latino	43,768	4.9
Not Hispanic or Latino	624,954	69.8
White alone	322,534	36.0
RELATIONSHIP		
Total population	**894,943**	**100.0**
In households	884,079	98.8
Householder	276,598	30.9
Spouse	155,000	17.3
Child	274,074	30.6
Own child under 18 years	199,859	22.3
Other relatives	104,822	11.7
Under 18 years	29,110	3.3
Nonrelatives	73,585	8.2
Unmarried partner	15,059	1.7
In group quarters	10,864	1.2
Institutionalized population	3,846	0.4
Noninstitutionalized population	7,018	0.8
HOUSEHOLD BY TYPE		
Total households	**276,598**	**100.0**
Family households (families)	203,681	73.6
With own children under 18 years	105,935	38.3
Married-couple family	155,000	56.0
With own children under 18 years	82,694	29.9
Female householder, no husband present	32,256	11.7
With own children under 18 years	16,654	6.0
Nonfamily households	72,917	26.4
Householder living alone	50,938	18.4
Householder 65 years and over	13,572	4.9
Households with individuals under 18 years	119,063	43.0
Households with individuals 65 years and over	52,797	19.1
Average household size	3.20	(X)
Average family size	3.62	(X)
HOUSING OCCUPANCY		
Total housing units	**281,841**	**100.0**
Occupied housing units	276,598	98.1
Vacant housing units	5,243	1.9
For seasonal, recreational, or occasional use	818	0.3
Homeowner vacancy rate (percent)	0.4	(X)
Rental vacancy rate (percent)	1.8	(X)
HOUSING TENURE		
Occupied housing units	**276,598**	**100.0**
Owner-occupied housing units	170,950	61.8
Renter-occupied housing units	105,648	38.2
Average household size of owner-occupied units	3.22	(X)
Average household size of renter-occupied units	3.16	(X)

- Represents zero or rounds to zero. (X) Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000.

Appendix D

San Jose Municipal Water System
2010 Urban Water Management Plan
Projected Demands Provided to Wholesale Agencies

From: Quesada, Nicole
Sent: Monday, March 07, 2011 3:48 PM
To: 'James O'Brien'
Subject: RE: San Jose Muni Demand projections for 2010 UWMP

Hi James,

Following up on our earlier conversation – please use the 2040 General Plan WSA figures for the preferred alternative as SJMWS supply projections. Please note that this does include a 20% reduction in NEW single-family and multi-family usage, but no other conservation specifically required to meet SB7 goals. We will be going to Council with the SB7 baseline/targets at the same time as our UWMP hearing in June.

Please give me a call if you'd like to discuss further. Thanks -

Preferred Alternative	2015	2020	2025	2030	2035	2040
SFPUC	5,039	5,039	5,039	5,039	5,039	5,039
SCVWD	16,185	16,592	17,019	17,500	17,500	17,500
NSJ Wells	2,144	3,060	3,794	4,595	5,550	5,550
Evergreen Wells	0	0	0	3	486	486
Edenvale Wells	1,678	2,230	2,876	3,618	4,312	4,312
Coyote Wells	1,945	2,698	3,580	4,593	5,540	5,540
Recycled Water	5,148	5,609	6,150	6,770	7,351	7,351
TOTAL	**32,138**	**35,227**	**38,459**	**42,119**	**45,779**	**45,779**

Nicole Quesada, P.E.
San Jose Municipal Water System
3025 Tuers Road, San Jose CA 95121
P 408.277.3671 F 408.277.4954

From: James O'Brien [mailto:JOBrien@valleywater.org]
Sent: Monday, February 14, 2011 11:33 AM
To: Quesada, Nicole
Subject: San Jose Muni Demand projections for 2010 UWMP

Hi Nicole,

We would like to get updated San Jose Muni demand projections by source for the District's 2010 UWMP consistent with what you will be including in your 2010 UWMP. We are currently using preliminary demand projections from the "Water Supply Assessment for Envision San Jose 2040 General Plan Update" June 2010. Our schedule is to open the public hearing on the District's 2010 UWMP on April 12th and we will need to finalize the demand projections we will be using in our plan by March 3rd.

The demand projections should include information on estimated San Jose Muni conservation and the conservation base year you are using. We need this information to avoid double counting of conservation. We will be adding up all of the retailer projected conservation to

compare to what we are currently projecting for countywide conservation and make adjustments in total countywide demand as appropriate. The District currently projects countywide conservation of 98,500 AF/YR in 2030 with 1992 as the base year.

Please let me know if the demand projections are based on the City of San Jose Envision 2040 General Plan update preferred alternative or something else.

Also, please provide San Jose Muni recycled water use projections and indicate if the demand projections are before or after the projected recycled water use.

In addition, please provide us with estimates of the SFPUC Hetch-Hetchy use you will be using in your 2010 UWMP.

Also note that DWR will be holding a 2010 UWMP workshop at the District on Friday February 25th from 9:30 to 3:30. Here is a link to the DWR notice of the workshop -> http://www.water.ca.gov/calendar/index.cfm?meeting=15964

Thanks again for all of your help on this project.
-James

From: Nicole Sandkulla [mailto:NSandkulla@bawsca.org]
Sent: Thursday, February 24, 2011 3:04 PM
To: Levin, Ellen
Cc: Art Jensen; Allison C. Schutte; Anona Dutton; Petrick, Molly; Alan Kurotori (akurotori@santaclaraca.gov); Alex Ameri (alex.ameri@hayward-ca.gov); Art Morimoto (amorimoto@burlingame.org); Cari Lemke; Carrasco, Anthony; cathya@midpeninsulawater.org; David Dickson (ddickson@coastsidewater.org); dbarrow@westboroughwater.com; eric.cartwright@acwd.com; Flegel, Elizabeth; Gregg Hosfeldt (gregg.hosfeldt@mountainview.gov); Henry Young (henryy@midpeninsulawater.org); James Craig; Jerry Flanagan; Justin Ezell (jezell@redwoodcity.org); smtp:kphalen@ci.milpitas.ca.gov; Klara Fabry (kfabry@sanbruno.ca.gov); koconnell@nccwd.com; ksteffens@menlopark.org; M. L. Gordon (acmoffice2415@yahoo.com); Nasser, Mansour; Marty Laporte (martyl@bonair.stanford.edu); Marvin Rose (mrose@ci.sunnyvale.ca.us); mdebry@hillsca.org; Patrick Sweetland (psweetland@dalycity.org); Patrick Walter (pwalter@purissimawater.org); paulr@midpeninsulawater.org; Procos, Nicolas; Randy Breault; Rebecca Fotu (rlfotu@menlopark.org); rpopp@ci.millbrae.ca.us; rtowne@fostercity.org; Thomas.Niesar@acwd.com; Tim McAuliffe (tmcauliffe@burlingame.org); (mbolzowski@calwater.com); Alicia Sargiotto; Allison turner (alison.turner@mountainview.gov); Aparna Chatterjee; Brendan McCarthy; Brent Chester; Cathleen Brennan (cbrennan@coastsidewater.org); Cindy Bertsch; croyer@dalycity.org; Dana Jacobson; ECooney@HILLSBOROUGH.NET; Elvert, Catherine; gnathan@amwater.com; Howard Salamanca (hsalamanca@ci.milpitas.ca.gov); Jade Williams (jawilliams@calwater.com); Jeanette Kalabolas (jeanettek@midpeninsulawater.org); Krista Kuehnnackl; Leah Edwards; marilyn.mosher@hayward-ca.gov; Quesada, Nicole; Nina Hawk (nhawk@santaclaraca.gov); Norm Dorais (NDORAIS@fostercity.org); Shelly Reider (sreider@ci.millbrae.ca.us); Stephanie Nevins (stephanie.nevins@acwd.com); Toni Harris; Tracy Ingebrigtsen (tracyi@bonair.stanford.edu); Val Conzet (vconzet@ci.sunnyvale.ca.us); Virginia Parks; William Lai; Zach Goldberg
Subject: FW: Projected SFPUC Purchases for UWMP Preparation Needed by February 17, 2011

Dear Ms. Levine,

In response to the e-mail below and the SFPUC's request for purchase projections from its Wholesale Customers for use in the SFPUC's Urban Water Management Plan 2011 Update, attached is the requested information that I have received from the BAWSCA agencies. The table below provides a summary display of the responses received from the BAWSCA member agencies as transmitted in this e-mail.

If you have any further questions, please contact me at the BAWSCA office. I will forward to the SFPUC any additional responses that are received at a later date.

Sincerely,
Nicole Sandkulla

Updated Purchase Projections for SFPUC	
Agency Name	**Projections Included in 2/24/11 E-Mail**
ACWD	x
Brisbane	x
Burlingame	x
Cal Water	x
Coastside	x
Daly City	x
East Palo Alto	
Estero	x
Guadalupe Valley	x
Hayward	x
Hillsborough	E-Mail Response Included, Projections Not Yet Available
Menlo Park	
Mid-Peninsula	x
Millbrae	x
Milpitas	x
Mountain View	E-Mail Response Included, Projections Not Yet Available
North Coast	
Palo Alto	
Purissima Hills	
Redwood City	x
San Bruno	x
San Jose	x
Santa Clara	x
Stanford	E-Mail Response Included, Projections Not Yet Available
Sunnyvale	x
Westborough	x

Nicole M. Sandkulla, P. E.
Water Resources Planning Manager
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 302

San Mateo, CA 94402
Ph: (650) 349-3000 Fax: (650) 349-8395
EMail: NSandkulla@BAWSCA.org
Website: WWW.BAWSCA.org

From: Nicole Sandkulla [mailto:NSandkulla@bawsca.org]
Sent: Friday, February 04, 2011 12:03 PM
Subject: Projected SFPUC Purchases for UWMP Preparation Needed by February 17, 2011
Importance: High

Dear BAWSCA Water Management Representatives,

The San Francisco Public Utilities Commission (SFPUC) has requested projections from each of its wholesale customers of purchases from the San Francisco Regional Water System (System) in five year increments from 2015 to 2030 (or 2035). The SFPUC will use this information to prepare its Wholesale Urban Water Management Plan for the System.

SFPUC's request is consistent with the requirements of Section 10631 of the California Water Code which states:

> *(k) Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).*

Historically, the SFPUC has relied on each agency's water purchase projections reported in the BAWSCA Annual Report. However, past purchase projections may not be appropriate for a variety of reasons:

- Changes in the economy and overall water use characteristics in the region
- Agencies are updating their projected needs and use of sources as they prepare their UWMP's
- Projections in the FY 2008-2009 Annual Report do not include the results of the Water Conservation Implementation Plan and the status of each agency's conservation programs

The SFPUC will need to document estimated water sales, including amounts for Wholesale Customers that are exempt from filing UWMP's. We recommend that those agencies that

are not required to prepare UWMP's provide BAWSCA with the five-year projected purchases you wish the SFPUC to use in preparing its report.

As in the past, BAWSCA will support providing this information to the SFPUC in a coordinated fashion. To meet the SFPUC's deadline, please provide BAWSCA your projected SFPUC purchases in 5-year increments by close-of-business on Thursday, February 17, 2011. In addition to the numbers themselves, BAWSCA will forward to the SFPUC any qualifications that you wish to have associated with the data you provide at this time (e.g. that the data is draft and subject to modification as part of finalizing your agency UWMP). BAWSCA will forward information received to SFPUC on Friday, February 18th.

BAWSCA will only send to the SFPUC data that it receives from each of your agencies specifically for this purpose. No data will be provided to the SFPUC for agencies that do not provide data to BAWSCA.

Lastly, please note that BAWSCA will also utilize these purchase projections provided by each BAWSCA agency to prepare and submit the water purchase projections through 2018 due to the SFPUC by June 30, 2011 in compliance with Section 4.05 of the 2009 Water Supply Agreement unless otherwise notified of a change in the numbers by individual member agencies.

If you have any questions, please call me or Anona Dutton.

Sincerely,
Nicole Sandkulla

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Website: WWW.BAWSCA.org

SJ
p. 1 & 1

Nicole Sandkulla

From: Quesada, Nicole [Nicole.Quesada@sanjoseca.gov]
Sent: Friday, February 18, 2011 5:10 PM
To: Nicole Sandkulla
Cc: Nasser, Mansour
Subject: SJ purchases

Nicole,

Here are San Jose's purchase projection estimates for SFPUC:

2015 – 4.5 mgd
2020, 2025, 2030 and 2035 – minimum 4.5 mgd, however San Jose is interested in obtaining additional supply for a total of 6.34 mgd

Thanks,
Nicole Quesada, P.E.
San Jose Municipal Water System
3025 Tuers Road, San Jose CA 95121
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Appendix E

San Jose Municipal Water System
2010 Urban Water Management Plan
Water Conservation Plan

Water Conservation Plan

City of San José
Environmental Services Department

August 2008

Table of Contents

1. Introduction and Background

1.1 Purpose of the Water Conservation Plan 1
1.2 City's Drivers and Targets for Water Conservation 1
1.2.1 Wastewater Flow Management 1
1.2.2 Water Supply Challenges 1
1.2.3 Long-term Water Conservation Targets 2

2. Water Supply Overview and Issues

2.1 Sources of Water Supply 2
2.2 Water Supply Issues 3
2.2.1 Delta Pumping Restrictions 3
2.2.2 Global Climate Change 3
2.3 Meeting Future Demand with Increased Water Conservation and Recycling 4

3. Past and Current Water Conservation Programs and Strategies

3.1 Past Conservation Programs 5
3.2 Current Programs and Strategies 5

4. Planned Conservation Strategies to FY 10-11

4.1 Planning and Development Strategies 6
4.2 Outreach and Education 8
4.3 Cost-Sharing with Water District Programs 8
4.3.1 Residential Cost-Shared Programs 9
4.3.2 Commercial, Industrial and Institutional Cost-Shared Programs 9
4.4 Legislative Priorities 9
4.5 Water Shortage Contingency Plan and Drought Plan 9
4.6 Conservation Pricing 10
4.7 Partnerships 10

5. Three-Year Implementation Plan

5.1 Staffing 11
5.2 Budget & Grants 12
5.3 Prioritization of programs 12
5.4 Performance Measures 12

Appendix A Attachment 1
Appendix B Attachment 2

Middle and right photos on cover page are courtesy of the Santa Clara Valley Water District

1. Introduction and Background

1.1. Purpose of the Water Conservation Plan

The purpose of the Water Conservation Plan is to formalize and detail the City's commitment and contribution towards a sustainable water supply for its current and future residents. As population and economic growth increases, water conservation is a key strategy towards the vision of San José as a thriving, environmentally sustainable city. This three-year plan provides City staff the direction to manage this finite resource in a way that maintains the quality of life and economic viability in San José.

1.2. City's Drivers and Targets for Water Conservation

There are multiple drivers for the City to implement water conservation efforts, namely regulatory drivers for wastewater flow management and drivers for water supply reliability and sustainability.

1.2.1. Wastewater Flow Management

Previously the primary driver for the City's conservation work has been the goal of reducing wastewater flows from the San Jose/Santa Clara Water Pollution Control Plant (Plant). Because of permit requirements the Plant is under direction to maintain summer flows below a trigger of 120 million gallons per day (mgd) to protect salt marsh habitat and endangered species in San Francisco Bay. Past conservation programs have been successful in maintaining flows below this trigger. Flow reduction remains a driver for water conservation but presently there are additional drivers.

1.2.2. Water Supply Challenges

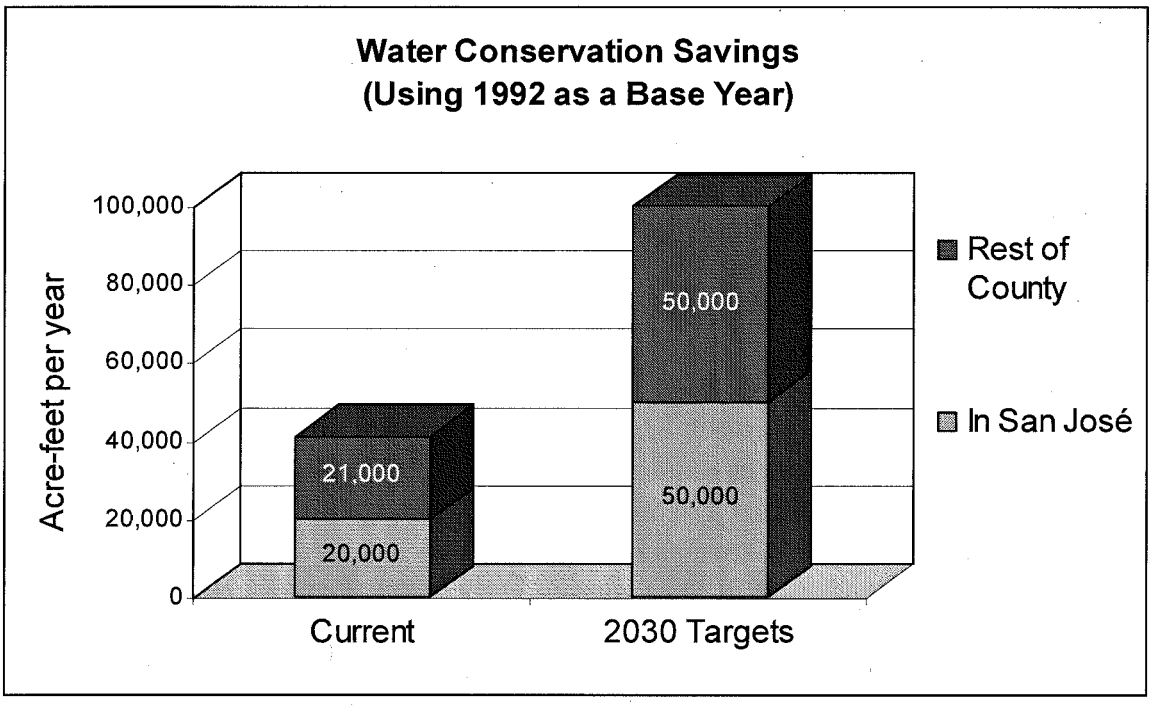
Many factors affect the water supply situation and present challenges to maintaining a sustainable water supply for the City. These factors include precipitation, local water storage, restrictions on water imported from the Sacramento-San Joaquin River Delta, other imported water allocation and management, and long term impacts due to global climate change and aging infrastructure. These water supply challenges present the need for the City to increase its efforts for water conservation.

1.2.3. Long-term Water Conservation Targets

In 2006, the primary wholesale water supply agency for Santa Clara County, the Santa Clara Valley Water District (Water District), established a long-term conservation goal

to achieve roughly 100,000 acre-feet per year of water savings countywide by 2030 (using 1992 as a base-year). An acre-foot is equivalent to almost 326,000 gallons. Currently, water conservation achieves 41,000 acre-feet per year of savings since 1992.

As 50% of the county's population, and as a major partner with the Water District for conservation, the City's goal should be for citywide water savings to be half of the Water District's countywide goal. **This translates to a citywide goal of 50,000 acre-feet per year of water savings by 2030**. The chart below illustrates these targets.



2. Water Supply Overview and Issues

2.1. Sources of Water Supply

More than half of the water supplied in Santa Clara County is imported, coming from Hetch Hetchy reservoir and the Sacramento-San Joaquin River Delta (Delta). The other half is supplied by local surface and ground water and approximately 4% is supplied by recycled water. Water service within San José is provided by three water retailer operations. The city operates the San José Municipal Water System to provide water to almost 26,000 customers, serving approximately 14% of the citywide water demand. The other water retailers are the San Jose Water Company and Great Oaks Water Company.

2.2. Water Supply Issues

Future water demand is expected to increase given the projected increase in population and jobs in the City. At the same time, several factors are redefining water supply reliability in current and future years. These factors include Delta pumping restrictions, global climate change, potential catastrophes (earthquakes, levee failures, or infrastructure failures), aging infrastructure and reduced precipitation or the possibility of multi-year drought events.

2.2.1. Delta Pumping Restrictions

The Delta is a sensitive environment, and the amount of water that can be pumped from the Delta is heavily influenced by hydrological, environmental and legal factors and competition. In 2007, a federal court ruling imposed limits on pumping from the Delta to protect the Delta Smelt, a federally listed threatened species. Further restrictions may be imposed in light of recent findings that populations of other fish species, the Longfin Smelt and Chinook salmon, have fallen sharply. In the event of a long-term decrease in imported water availability and with the prolonged use of reserve supplies to make up for the decrease in Delta water, the amount of water available to supply the County may drastically decrease.

2.2.2. Global Climate Change

There is growing acknowledgement of the potential risks that climate change presents to California's water supply. Projections by the Intergovernmental Panel on Climate Change indicate that regional climate change associated with global warming could significantly alter California's hydrologic cycles and water supply.[1] Precipitation is expected to increase as snowfall decreases over the Sierra Nevada and Cascades mountain ranges. The shift in the nature and timing of precipitation and snowmelt in California will affect the state's procurement of water. The San Francisco Public Utilities Commission projects that as temperatures increase, snow level will rise in elevation as well, from 6000 feet in 2000 to 7500 feet by 2075. Between now and 2050, snow pack is predicted to decrease from 87% to 76% of normal and precipitation runoff will occur earlier in the spring, impacting snowmelt-fed reservoirs such as Hetch-Hetchy and the rivers that flow to the Delta.

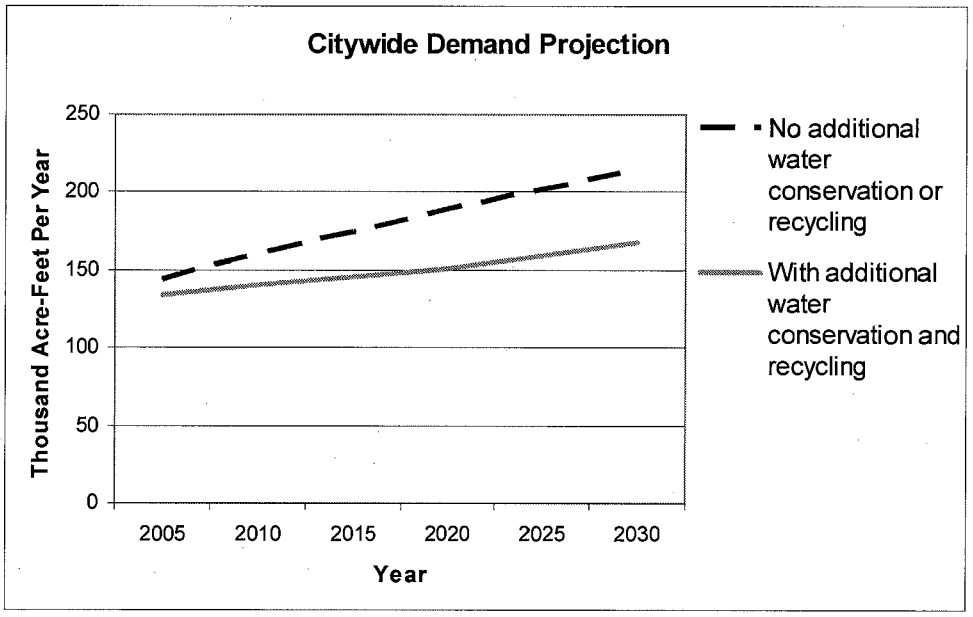
Salinity levels in the San Francisco Bay estuary and the Delta may also increase, affecting water quality and the existing flora and fauna which inhabit these

[1] Landers, J. (2002). Climate change to alter California's water supplies, study says. Civil Engineering 72(8): 16-17.

environments.[2] Reduced spring snowmelt will also decrease hydropower generation.[3] These issues could have implications for California's approach to its water storage needs.[4] Another possible effect of global warming is increased temperatures, which may lead to increased landscape water demands.

2.3. Meeting Future Demand with Increased Water Conservation and Recycling

Increasing our water conservation and recycling efforts can reduce the projected increase in demand. The chart below illustrates the projected increase in total citywide water demand from 2005 to 2030, compared to the citywide demand including recycled water and additional conservation.



Sources: Santa Clara Valley Water District, San Jose Water Company

Through administration and management of the South Bay Water Recycling Program, the City is a major supplier of recycled water in the County and one of the City's Green Vision goals sets targets for increasing recycled water. This Plan presents strategies for increasing water conservation as described in the next section. In

[2] Knowles, N. and Cayan, D. (2002). Potential effects of global warming on the Sacramento/San Joaquin watershed and the San Francisco estuary. Geophysical Research Letters 29(18): 1891.

[3] Kim, J. et al (2002). Impacts of Increased Atmospheric CO2 on the Hydroclimate of the Western United States. Journal of Climate 15(14): 1926-1942.

[4] Landers, J. (2002). Climate change to alter California's water supplies, study says. Civil Engineering 72(8): 16-17.

addition to reducing water demand, water conservation has multiple benefits, which are discussed in Appendix A.

3. Past and Current Water Conservation Programs and Strategies

3.1 Past Conservation Programs

Prior to the mid-1990s, the City conducted indoor and outdoor water conservation programs, primarily in response to the drought of 1987 – 1992 and flow reduction requirements in the wastewater discharge permit for the Plant. Conservation measures included rebates for Ultra Low Flush Toilets and front-loading washing machines. Since the mid-1990s, the City's water conservation efforts focused on wastewater flow reduction, namely conservation strategies such as toilet retrofits, washing machine rebates, water use audits, and other residential and commercial conservation programs to reduce indoor water use.

3.2 Current Programs and Strategies

Since 1998 the City and Water District have signed a **cost sharing agreement** in which the two agencies financially support each other's water conservation programs. In recent years, the cost sharing agreement has reduced the required number of City FTEs devoted to conservation and allowed the City to capitalize on large-scale program efficiencies at the County and state levels. The City cost-shares in programs administered by the Water District that result in wastewater flow reductions in the Plant Service Area, and receives funding from the District for programs the City administers. City staff administers the Water Efficient Technologies (WET) rebate program for businesses in the Plant Service Area and the Neighborhood Preservation Water Conservation program for residents in San José. The latter program is for low-income residents who have been issued an enforcement notice under the City's Neighborhood Preservation Ordinance, offering financial assistance to upgrade their properties in water conserving ways.

Another conservation strategy has been the implementation of **Best Management Practice** measures for water conservation (BMPs) as defined by the California Urban Water Council, of which the City is a signatory member. These BMPs are listed in Appendix B. Implementation of these BMPs is now a requirement for agencies applying for grant funds from the Department of Water Resources.

City staff also **reviews development plans** that come through the City's Planning Department for water conservation opportunities. However, identified conservation

opportunities, such as water-efficient landscape practices or design modifications beyond current standards, are not mandatory.

The City has also enacted **ordinances for periods of water shortages**. Chapter 15 of the City's Municipal Code includes short-term measures to be implemented (for water use reductions of 10% to 40%) if a water shortage is declared by the City Council. Measures include, but are not limited to, landscape irrigation restrictions, public noticing and outreach, and restrictions on filling of pools, spas and fountains. These measures supplement ongoing water conservation programs and water waste prevention ordinances.

4. Planned Conservation Strategies to FY 10-11

In response to the many challenges for water supply reliability and sustainability, it is time for the City to play a more active role in water conservation. About half of the targeted water conservation savings will result from "passive" conservation such as plumbing code changes and building guidelines. The other half will result from "active" conservation, such as continued implementation of water conservation BMPs and emerging conservation technologies. The following strategies and program elements are proposed to expand our efforts between now and FY10-11.

4.1. Planning and Development Strategies

The City's General Plan includes the following statement in the Natural Resources Section: "The City should encourage more efficient use of water by promoting water conservation and the use of water saving devices." San José can achieve considerable water conservation savings with the following strategies:

a. **Developer Plans**: Continue to review developer plans to recommend water conservation and other environmental improvements.

b. **Municipal Code**: Review the municipal code to identify potential areas which can be strengthened for water conservation. Amend the City's **landscape ordinance** to be in compliance with AB 1881 (requiring municipalities to adopt a landscape ordinance by 2010 similar to the State's Updated Model Landscape Ordinance).

c. **Envision San José 2040 General Plan Update**: Work with the Planning Department to identify **visionary strategies and guidelines for land use decisions and city services** that result in increased water efficiency.

d. **Pilot Programs for Water Conserving Fixtures**: In collaboration with the Water District, conduct a pilot program to offer incentives that encourage developers to **design and construct water efficient homes and buildings** with water conserving fixtures, irrigation systems and landscapes. Such new developments can have tremendous water conserving potential and a pilot program is currently being designed at the State level. The Metropolitan Water District began its "California Friendly Homes" program in 2001 and estimates savings at 50,000 gallons per year per single family home. This effort would be in conjunction with **developing citywide green building policies and standards**.

e. **Pilot Programs for New Technologies**: Conduct pilots on creative and innovative water conserving and reuse technologies. These technologies can be coupled with other green building designs. The pilots would **identify hurdles and opportunities related to the installation and use of technologies** such as graywater systems, rainwater collection systems, water cycling systems in commercial or manufacturing applications.

f. **Feasibility of new ordinances**: Research the feasibility and efficacy of establishing a "**retrofit on resale**" code requiring the installation of water conserving fixtures when properties change hands (both residential and commercial). Santa Cruz has enacted such an ordinance and estimates 28 million gallons in cumulative savings since 2003. Research new ordinances other cities have adopted for water efficiency, such as **requiring new developments to mitigate their water demand** by funding or conducting retrofits that save water elsewhere.

g. **Design Guidelines**: Revise the City's Guidelines for **Residential, Commercial and Industrial Buildings** to more fully address water conservation elements such as landscape requirements. Enforce compliance with the guidelines. Such a review would be an opportunity to review the guidelines for other potential environmental elements as well.

h. **Specific Plans**: work to ensure that water conservation (and other environmental considerations) is fully incorporated into future Specific Plans.

i. **Water supply assessments**: review water supply assessments associated with developments over 499 units to ensure that they are as water-conserving as possible. Train Planning staff to ensure that they are conversant in water conservation requirements and guidelines for development.

4.2. Outreach and Education

The results of the City's 2006 public survey for water conservation and recycling show that conservation knowledge and practices are increasing. Staff currently conducts conservation outreach and education through direct marketing, tabling at community events, and developing and delivering educational programs for teachers and students. The City's current annual outreach budget for indoor conservation messages is $150,000.

With the need for an increase in conservation savings, the City needs to increase its outreach efforts. The following programs and strategies will enable the City to be more effective in outreach. More specific strategies will be identified and implemented after the Water District completes it Water Conservation Marketing Plan, which will analyze issues and recommend specific campaigns, messages and strategies.

a. **Campaigns**: Conduct conservation campaigns in conjunction with the Water District, water retailers, San Francisco Public Utilities Commission, and/or Bay Area Water Supply and Conservation Agency. An example is the regional "Be a Water Saving Hero" campaign currently underway. When appropriate, collaborate to ensure complimentary messages are delivered, such as conservation and pollution prevention messages. Provide customers with usage info so they can compare their water usage to previous years and/or track current usage. Partner with other agencies and organizations to host/co-sponsor speaker events/workshops, produce joint messages or press releases and/or to fund a joint campaign.

b. **Messages**: Tie conservation messages to saving money, an incentive for residents and businesses. Promote residential and commercial water audits as gateways to other conservation programs as, currently, awareness of these programs is low. Promote conservation behaviors such as watering before dawn, planting drought-tolerant plants, sweeping instead of hosing off sidewalks, and fixing leaks promptly. Promote incentives for retrofits such as high efficient toilets and clothes washers. Create and disseminate general messages about the water supply situation and the potential effects of climate change on water supply.

c. **Outreach Strategies**: Increase outreach through such strategies as media advertising (television, radio and newspapers), bill inserts, bus advertising, educational programs, and public relations mechanisms. Increase support for local water conservation programs for schools. Increase outreach to City employees, through brown bag events, tabling at citywide information fairs, and/or existing newsletters. Continue supporting water education programs for teachers and students.

4.3. Cost-Sharing with Water District Programs

For the next three years, it is recommended that the Water District maintain the role of implementing the majority of local conservation programs, with the City cost sharing to support these programs. Cost Sharing has proven to be a cost-effective way for the City to fund water conservation, allowing us to capitalize on large-scale program efficiencies at the County and state levels. It is recommended that the City continue to cost-share with the Water District on the following programs.

4.3.1. Residential Cost-Shared Programs

1) Continue to support (financially and with outreach) water use audits and utilize them as a gateway to other conservation opportunities
2) High Efficiency Toilet (HET) rebates
3) High efficiency clothes washer rebates
4) Landscape and irrigation incentives for water-wise landscaping, hardware, and evapo-transpiration (ET) controllers
5) Neighborhood Preservation Water Conservation Program.

4.3.2. Commercial, Industrial and Institutional Cost-Shared Programs

1) Commercial water conservation audits that identify conservation opportunities
2) Cooling Tower Connectivity Controller rebates
3) Continue the WET rebate for both indoor and outdoor retrofits
4) High Efficiency Toilet replacements
5) Commercial washing machine rebates
6) Commercial landscape programs such as landscape audits, and financial assistance for water-wise landscape and hardware upgrades.

4.4. Legislative Priorities

City staff will continue to evaluate legislation that impacts or encourages water use efficiency and to recommend priorities for legislative actions as needed. One proposed legislation that will impact the City's conservation goals and efforts is AB 2175 (Laird), which sets targets for statewide per capita water use to be reduced by 20% by 2020, and also mandates specific targets for urban water retailers including the City's San José Municipal Water System.

4.5. Water Shortage Contingency Plan and Drought Plan

City staff will evaluate and update the current Water Shortage Contingency Plan, and clarify enforcement responsibilities and coordinate with other water agencies within

the City. In addition, the City's Water Waste Prevention and Water Shortage ordinances may need to be updated.

If water supply wholesalers for the City (the Water District and San Francisco Public Utilities Commission) declare a water shortage and call for mandatory rationing, the City will need to adopt a Drought Plan for the San José Municipal Water System (Muni Water). This includes identifying alternative water supply options, short-term rationing measures and mandatory water allocations for customers in the Muni Water service area. Staff has started the analysis and process for preparing a Drought Plan and will continue while coordinating with other water agencies to be ready to prepare and implement a Drought Plan if needed.

4.6. Conservation Pricing

Water rates based on a tiered structure can be an incentive to users to conserve while potentially providing funding for conservation programs. Increased conservation can cause a decrease in revenue to a water utility, so increasing water rates may be necessary to encourage conservation and cover fixed operating and maintenance costs. The City's Municipal Water System uses a tiered rate structure. San Jose Water Company has submitted to the California Public Utilities Commission its application for a tiered rate structure and the Commission's decision is pending. The City will continue to implement a pricing structure that best supports conservation. One possible strategy is to work with the Water District and other retailers to develop budget-based tiered rates for dedicated landscape irrigation meters.

4.7. Partnerships

The City intends to work more closely with the other water retailers in San José to identify how they can more directly support conservation efforts. San Jose Water Company currently achieves water conservation through customer education and outreach events, plumbing fixture distribution and water use audits. Some examples for partnerships include joint proposals for grant funds, co-sponsorship of outreach events, and development of budget-based rates for irrigation.

5. Three-Year Implementation Plan

The table below lists the tasks and timeline for the City's water conservation efforts, starting with FY 08-09 as Year 1 and ending with FY 10-11 as Year 3. Additional tasks may be identified and implemented as needed during this period.

Task	Year 1	Year 2	Year 3
Administer current Cost Sharing Agreement with the Water District	✓	✓	✓
Adopt future Cost Sharing Agreement with the Water District	✓	✓	✓
Administer the Water Efficient Technologies rebate program in the Plant Service Area	✓	✓	✓
Administer the Neighborhood Preservation Water Conservation Program	✓	✓	✓
Develop a Water Conservation Communication Plan to strategize for outreach and education	✓		
Deliver outreach and education through identified campaigns, messages and strategies	✓	✓	✓
Recommend visionary water conservation guidelines for the Envision San José 2040 General Plan update	✓		
Develop a citywide green building policy with strong water efficiency standards	✓		
Amend the City's Landscape Ordinance to be comparable to the State's Revised Model Landscape Ordinance	✓	✓	
Revise Residential and Commercial Building Guidelines to incorporate water conservation improvements.	✓	✓	✓
Work with other water agencies to develop a pilot model development program	✓	✓	✓
Research feasibility of new ordinances such as "Retrofit on Resale" or requiring mitigation of increased water demand	✓	✓	
Based on feasibility analysis of new ordinances, enact and enforce new ordinances		✓	✓
Begin efforts to quantify savings potential for specific conservation strategies and technologies	✓	✓	✓
Determine investment proposals including potential funding opportunities for outdoor water conservation	✓	✓	✓
Continue legislative analysis to advocate for state and federal legislation that supports increased water efficiency	✓	✓	✓
Evaluate progress and strategize for future conservation efforts		✓	✓

5.1. Staffing

In 1999, the City employed 7 full time staff and several interns to implement flow reduction programs. Since that time, staff levels have been reduced to a maximum two FTEs. Currently, staffing is approximately 1.5 FTEs. With expanded

conservation efforts, an increase in staffing resources will be needed and the FY 08-09 budget proposal includes one new FTE position to support water conservation.

5.2. Budget & Grants

In FY 07-08, the budget for the WEP is $1.5 million funded from Sewer Service and Use Charges and $150,000 in outreach funds. In order to fund outdoor conservation, where the majority of future savings will be achieved, non-513 funding would need to be appropriated. The City supports the Water District's efforts to secure grant money for countywide conservation programs. In the future, the City will evaluate the benefits of securing its own grant funds for outdoor conservation programs.

5.3. Prioritization of programs

To strategize for future priorities, staff will develop or use externally-developed criteria to evaluate priorities and develop goals and strategies past FY 10-11. This process will be similar to prioritization methods performed by other water agencies such as the CUWCC and/or the Water District.

5.4 Performance Measures

Currently the City tracks wastewater flow reduction and knowledge of water conservation issues and practices (from public survey results) as performance measures for water conservation. The table below shows the performance measures targeted for the next three years. The targets for flow reduction below reflect the 2.43% annual increase in conservation savings that is needed to reach the 2030 goal of 50,000 acre-feet (16.2 billion gallons) per year of water savings citywide.

Measure	FY 08-09 Target	FY 09-10 Target	FY 10-11 Target
% of residents demonstrating water conservation knowledge	35	37	39
% of residents with water conserving fixtures or appliances	52	55	57
Gallons per day of flow reduced in Plant Service Area	200,000	204,860	209,838
Cumulative millions of gallons per day of flow reduced in Plant Service Area since 1992	8.5	8.7	8.9

In addition, for future strategies, the benefits and cost effectiveness of specific conservation programs or technologies will be evaluated using metrics and analysis methods developed by the CUWCC and other industry standards. This would allow the City to do an evaluation and prioritization of water conservation measures for future or continued implementation.

City of San José Water Conservation Plan
Appendix A
Benefits of Water Conservation

Water conservation programs provide a myriad of benefits – to the water utility that provides them to benefits, to the private citizen or business that partakes of them, and to the environment. Considerable research has been done to quantify these benefits. The Status Report and Assessment of the Revised South Bay Action Plan Programs (2001) included a benefit cost analysis of its various flow reduction programs such as stream flow augmentation, conservation, and recycled water. Water conservation programs had a favorable benefit cost ratio of 8.63 compared to recycled water at 2.7 and stream flow augmentation at 1.47. Below is a summary of the benefits of water conservation programs.

Benefits to Utilities*

- Increases water supply reliability
- Reduced need to secure additional water supplies
- Reduced operations and maintenance costs
- Deferred, downsized or eliminated need for new facilities
- Image enhancement as responsible environmental steward
- Less competition among utilities for water supplies
- Additional supply available for growth and environmental needs
- Wastewater treatment plant benefits related to reduced operations, maintenance and capital costs; the Plant estimates a cost of $890/mgd of wastewater treated
- Helps meet short-term demands associated with dry periods and long-term demands.

* It should be noted that decreased water demand from conservation programs can result in decreased revenues to water retailers and wholesalers. For some utilities, this issue can be addressed by implementing tiered rate structures for water rates.

Benefits to Customers

- Lower water, sewer and energy bills
- Reduced landscape and property maintenance costs and services
- Improved quality of life through preservation of the environment and community for future generations.

Environmental benefits and energy savings

- Water freed up for environmental uses such as maintaining stream flows for aquatic species such as the Delta Smelt
- Significant energy savings due to water conveyance, treatment and uses being California's single biggest energy user
- Reduced greenhouse gas emissions. The Water District estimates that, between the District's baseline conservation year of FY 92-93 and FY 06-07, countywide water conservation and recycling achieved 1.62 billion kilowatt-hours in savings and avoided the emission of 381 million kilograms of carbon dioxide.
- Less risk of overdrafting groundwater
- Preservation of the habitats such as South Bay and Delta and their associated species.

City of San José Water Conservation Plan
Appendix B
List of Best Management Practices of the California Urban Water Conservation Council (CUWCC)

The City of San José, as a signatory to the CUWCC Memorandum of Understanding (MOU), has committed to the implementation of the Best Management Practices (BMPs) listed below. "Implementation" means achieving and maintaining the staffing, funding, and in general, the priority levels necessary to achieve the level of activity called for in each BMP, and to satisfy the commitment to use good faith efforts to optimize water savings as described the MOU.

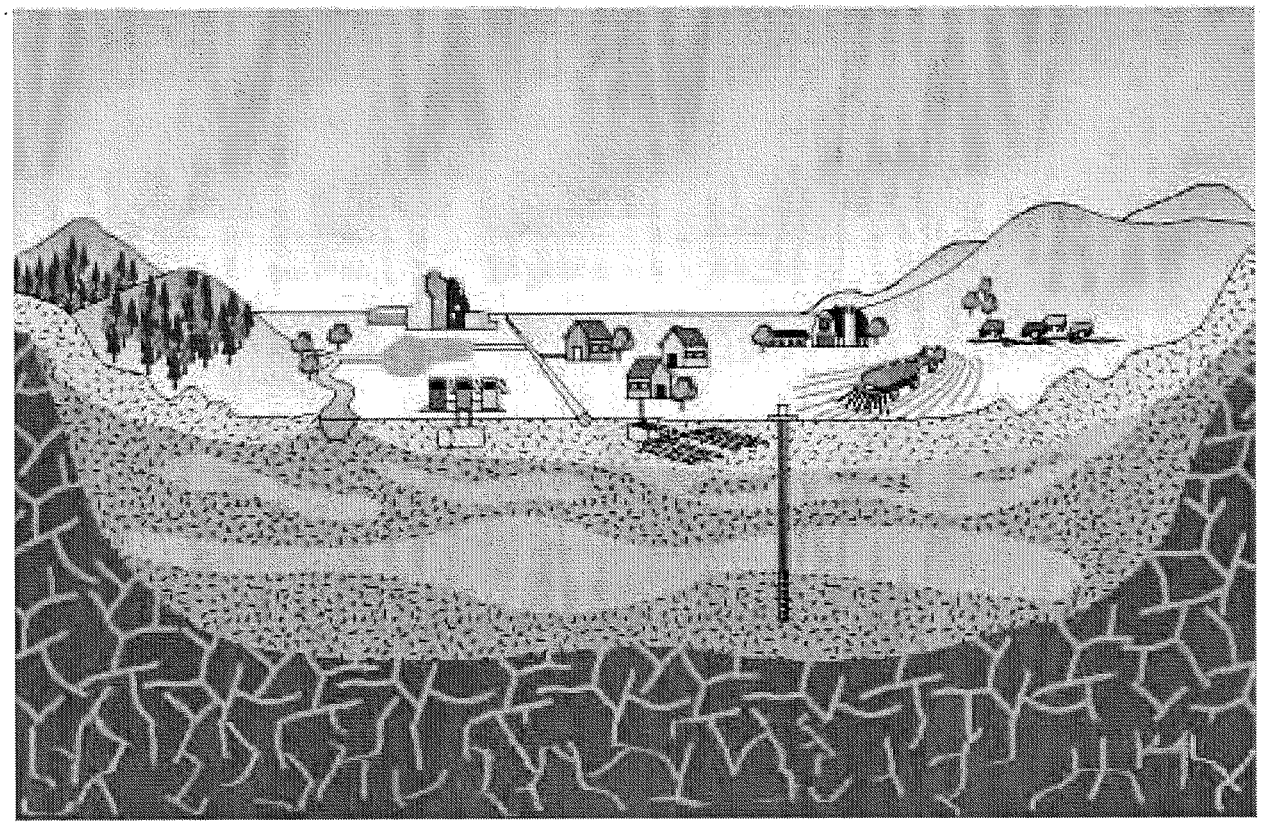
1. Water survey programs for single-family residential and multi-family residential customers
2. Residential plumbing retrofit
3. System water audits, leak detection and repair
4. Metering with commodity rates for all new connections and retrofit of existing connections
5. Large landscape conservation programs and incentives
6. High-efficiency clothes washing machine financial incentive programs
7. Public information programs
8. School education programs
9. Conservation programs for commercial, industrial, and institutional (CII) accounts
10. Wholesale agency assistance programs
11. Conservation pricing
12. Conservation coordinator
13. Water waste prohibition
14. Residential ULFT replacement programs

The CUWCC is undergoing a process to revise and update these BMPs with input from signatory members, with the aim of completing this process by 2009.

Appendix F

San Jose Municipal Water System
2010 Urban Water Management Plan
Groundwater Management Plan

Santa Clara Valley Water District
Groundwater Management Plan



July 2001

Santa Clara Valley Water District

SANTA CLARA VALLEY WATER DISTRICT

Santa Clara Valley Water District Groundwater Management Plan

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TABLE OF CONTENTS

EXECUTIVE SUMMARY ____ *1*

Chapter 1 ____ *4*

INTRODUCTION ____ *4*
- Purpose ____ 4
- Background ____ 4
- Report Contents ____ 5

Chapter 2 ____ *6*

BACKGROUND ____ *6*
- Geography ____ 6
- History of the County's Groundwater ____ 7
- District History ____ 7
- District Board of Directors ____ 9
- District System ____ 9
- Current Groundwater Conditions ____ 12

Chapter 3 ____ *16*

GROUNDWATER SUPPLY MANAGEMENT ____ *16*

GROUNDWATER RECHARGE ____ 16
- Program Objective ____ 16
- Background ____ 16
- Current Status ____ 16
- Future Direction ____ 18

TREATED GROUNDWATER RECHARGE/REINJECTION PROGRAM ____ 18
- Program Objective ____ 18
- Background ____ 18
- Current Status ____ 19
- Future Direction ____ 19

WATER USE EFFICIENCY PROGRAMS ____ 19

Recycled Water ____ 19
- Program Objective ____ 19
- Background ____ 20
- Current Status ____ 20
- Future Direction ____ 20

Water Conservation Programs ____ 21
- Program Objective ____ 21
- Background ____ 21
- Current Status ____ 22
- Future Direction ____ 23

Agricultural Water Efficiency ____ 23
- Program Objective ____ 23
- Background ____ 23
- Current Status ____ 24
- Future Direction ____ 24

INTEGRATED WATER RESOURCES PLAN ____ 25
- Program Objective ____ 25
- Background ____ 25
- Current Status ____ 26
- Future Direction ____ 27

Additional Groundwater Supply Management Activities ____ 27

Groundwater Modeling 27
Operational Storage Capacity Analysis 27
Subsidence Modeling 28

Chapter 4 ***29***

GROUNDWATER MONITORING PROGRAMS ***29***
GROUNDWATER QUALITY MONITORING 29
Program Objective 29
Background 29
Current Status 29
Future Direction 31
GROUNDWATER ELEVATION MONITORING 32
Program Objective 32
Background 32
Current Status 32
Future Direction 32
GROUNDWATER EXTRACTION MONITORING 34
Program Objective 34
Background 34
Current Status 34
Future Direction 36
LAND SUBSIDENCE MONITORING 36
Program Objective 36
Background 36
Current Status 37
Future Direction 38

Chapter 5 ***39***

GROUNDWATER QUALITY MANAGEMENT PROGRAMS ***39***
NITRATE MANAGEMENT 39
Program Objective 39
Background 39
Current Status 42
Future Direction 43
SALTWATER INTRUSION PREVENTION 43
Program Objective 43
Background 44
Current Status 46
Future Direction 48
WELL CONSTRUCTION/DESTRUCTION PROGRAMS 48
Well Ordinance 48
Program Objective 48
Background 49
Current Status 49
Future Direction 50
Dry Well Program 50
Program Objective 50
Background 50
Current Status 51
Future Direction 51
Abandoned Water Well Destruction Assistance 51
Program Objective 51
Background 51
Current Status 52
Future Direction 53

WELLHEAD PROTECTION 53
Program Objective 53
Background 53
Current Status 53
Future Direction 55
LEAKING UNDERGROUND STORAGE TANK OVERSIGHT 55
Program Objective 55
Background 55
Current Status 57
Future Direction 58
TOXICS CLEANUP 59
Program Objective 59
Background 59
Current Status 59
Future Direction 60
LAND USE AND DEVELOPMENT REVIEW 60
Program Objective 60
Background 60
Current Status 60
Future Direction 61
Additional Groundwater Quality Management Activities 61
Groundwater Guardian Affiliate 61
Comprehensive Reservoir Watershed Management 62
Watershed Management Initiative 62
Non-Point Source Pollution Control 62

Chapter 6 ***63***

SUMMARY ***63***
Groundwater Supply Management 63
Groundwater Monitoring 63
Groundwater Quality Management 64
Recommendations 64

REFERENCES ***67***

ACRONYMS USED

af – acre-feet
BMP – Best Management Practices
CEQA – California Environmental Quality Act
CIMIS – California Irrigation Management Information System
CVP – Central Valley Project
DEIR – Draft Environmental Impact Report
DRASTIC – Depth to water table, net Recharge, Aquifer media, Soil media, Topography, Impact of the vadose zone, and hydraulic Conductivity
DWR – Department of Water Resources
DWSAP – Drinking Water Source Assessment and Protection
EIR – Environmental Impact Report
EPA – Environmental Protection Agency
GIS – Geographic Information Systems
InSAR – Interferometric Synthetic Aperture Radar
IWRP – Integrated Water Resources Plan
LUSTOP – Leaking Underground Storage Tank Oversight Program
MCL – Maximum Contaminant Level
MOU – Memorandum of Understanding
MTBE – Methyl Tert Butyl Ether
NPDES – National Pollution Discharge Elimination System
NTU – Nephelometric Turbidity Unit
PCB - Polychlorinated biphenyl
RWQCB – Regional Water Quality Control Board
SBA – South Bay Aqueduct
SBWRP – South Bay Water Recycling Program
SCRWA – South County Regional Wastewater Authority
SCVWCD – Santa Clara Valley Water Conservation District
SCVWD – Santa Clara Valley Water District
SWRCB – State Water Resources Control Board
USGS – United States Geological Survey
UST – Underground Storage Tank
VOC – Volatile Organic Compound
WHP – Wellhead Protection Program
WMI – Watershed Management Initiative
WTP – Water Treatment Plant

EXECUTIVE SUMMARY

The Santa Clara Valley Water District (District) has managed the groundwater basin in Santa Clara County (County) since the early 1930s and is nationally recognized as a leader in groundwater management. The District works in conjunction with local retailers, the Regional Water Quality Control Board, and other agencies to ensure a safe and healthy supply of groundwater. In 2000, the groundwater basin supplied nearly half of the 390,000 acre-feet used in the County.

The District is the groundwater management agency in Santa Clara County as authorized by the California legislature under the Santa Clara Valley Water District Act (District Act), California Water Code Appendix, Chapter 60. Since its creation, the District has worked to minimize subsidence and protect the groundwater resources of the County under the direction of the District Act. As stated in the District Act, the District's objectives related to groundwater management are to recharge the groundwater basin, conserve water, increase water supply, and to prevent waste or diminution of the District's water supply.

The mission of the District is a healthy, safe, and enhanced quality of living in Santa Clara County through the comprehensive management of water resources in a practical, cost-effective, and environmentally-sensitive manner. In the Global Governance Commitment adopted by the District Board of Directors, it is stated that the conjunctive management of the groundwater basins is an integral part of the District's comprehensive water supply management program.

The District has always effectively managed the groundwater basin to fulfill the objectives of the District Act and its mission. The goal of these groundwater management efforts has been, and continues to be, ***to ensure that groundwater resources are sustained and protected***.

The Groundwater Management Plan formally documents the District's groundwater management goal and describes programs in place that are designed to meet that goal. The following programs are documented in the plan:

- Groundwater supply management programs that replenish the groundwater basin, sustain the basin's water supplies, help to mitigate groundwater overdraft, and sustain storage reserves for use during dry periods.

- Groundwater monitoring programs that provide data to assist the District in evaluating and managing the groundwater basin.

- Groundwater quality management programs that identify and evaluate threats to groundwater quality and prevent or mitigate contamination associated with those threats.

This plan serves as the first step toward a more formal and integrated approach to the management of groundwater programs, and to the management of the basin overall. The

various groundwater management programs and activities described in this document demonstrate that the District is proactive and effective in protecting the County's groundwater resources.

Recommendations

The groundwater management programs described in the Groundwater Management Plan were developed and implemented before the Board of Directors adopted the Ends Policies in 1999, and were therefore not driven by these formally documented ends. As the District is now guided by these policies, we need to ensure that the outcomes of our groundwater management programs match those of the Ends Policies. In addition, we need to ensure that existing programs are integrated and effective in terms of achieving the District's groundwater management goal.

Although the District manages the basin effectively, there is room for improvement of the groundwater management programs in terms of meeting these outcomes. Specific areas where further analysis is recommended include:

1. **Coordination between the Groundwater Management Plan and the Integrated Water Resources Plan (IWRP)** – As the District's water supply planning document through year 2040, the IWRP has identified the operation of the groundwater basin as a critical component to help the District respond to changing water supply and demand conditions. Planning and analysis efforts for future updates of the Groundwater Management Plan and the IWRP need to be integrated in order to provide a coordinated and comprehensive water supply plan for Santa Clara County.

2. **Integration of groundwater management programs and activities** – Individual groundwater management programs tend to be implemented almost independently of other programs. A more integrated approach to the management of these programs, and to the management of the basin overall needs to be developed. Integration of these programs and improved conjunctive use strategies will result in more effective basin management.

3. **Optimization of recharge operations** – As artificial recharge is critical to sustaining groundwater resources, an analysis of the most effective amount, location, and timing of recharge should be conducted.

4. **Improved understanding of the groundwater basin** – In general, the existing groundwater management programs seem to focus on managing the basin to meet demands and protecting the basin from contamination and the threat of contamination. However, improving the District's understanding of the complexity of the groundwater basin is critical to improved groundwater management. The more we know about the basin, the better we can analyze the impact of different groundwater scenarios and management alternatives.

5. **Effective coordination and communication with internal and external agencies** – Improved communication and coordination will lead to improved groundwater

management programs. Increased sharing of ideas, knowledge, and technical expertise among people involved with groundwater at the District will result in increased knowledge, well-coordinated and efficient work, and well-informed analyses and conclusions. Improved coordination with external agencies, such as retailers and state and federal organizations, will result in improved knowledge of customer needs and increased awareness of District activities.

A detailed analysis of these areas and of all groundwater programs as they relate to the Ends Policies and the groundwater management goal is recommended. District staff have already begun to address some of these issues, which will be fully discussed in the first update to the Groundwater Management Plan. The update, which is scheduled for 2002, will fully address the issues above and the overall management of the basin by presenting a formal groundwater management strategy. The update will evaluate each groundwater program's contribution and effectiveness in terms of the groundwater management goal and outcomes directed by the Ends Policies. If there is no direct connection between the Ends Policies and a specific program, that program's contribution to other linked programs will be analyzed. The update will include recommendations for changes to existing programs or for the development of new programs, standards, or ordinances. The update will also develop an integrated approach for the management of groundwater programs, and for the management of the groundwater basin in general.

Groundwater is critical to the water supply needs of Santa Clara County. Therefore, it is of the utmost importance that the District continues the progress begun with this Groundwater Management Plan. Increased demands and the possibility of reduced imported water in the future make effective and efficient management of the groundwater basin essential. The Groundwater Management Plan and future updates will identify how the management of the groundwater basin can be improved, thereby ensuring that groundwater resources will continue to be sustained and protected.

Chapter 1
INTRODUCTION

The Santa Clara Valley Water District (District) has managed the groundwater basin in Santa Clara County (County) since the early 1930s and is nationally recognized as a leader in groundwater management. Effective management of the groundwater basin is essential, as the groundwater basin provides nearly half of the County's overall water supply. Since its creation, the District has implemented numerous groundwater management programs and activities to manage the basin and to ensure a safe and healthy supply of groundwater.

Purpose

The purpose of this Groundwater Management Plan is to describe existing groundwater management programs and to formally document the District's groundwater management goal of ensuring that groundwater resources are sustained and protected. The following groundwater management programs are documented in this plan:

- Groundwater supply management programs that replenish the groundwater basin, sustain the basin's water supplies, help to mitigate groundwater overdraft, and sustain storage reserves for use during dry periods.

- Groundwater monitoring programs that provide data to assist the District in evaluating and managing the groundwater basin.

- Groundwater quality management programs that identify and evaluate threats to groundwater quality and prevent or mitigate contamination associated with those threats.

Background

The District is the groundwater management agency in Santa Clara County as authorized by the California legislature under the Santa Clara Valley Water District Act (District Act), California Water Code Appendix, Chapter 60. Since its creation, the District has worked to minimize subsidence and protect the groundwater resources of the County under the direction of the District Act. As stated in the District Act, the District's objectives related to groundwater management are to recharge the groundwater basin, conserve water, increase water supply, and to prevent waste or diminution of the District's water supply. The District Act also provides the District with the authority to levy groundwater user fees and to use those revenues to manage the County's groundwater resources.

The mission of the District is a healthy, safe, and enhanced quality of living in Santa Clara County through the comprehensive management of water resources in a practical, cost-effective, and environmentally-sensitive manner. As part of the District's Global Governance Commitment adopted by the Board of Directors, "the District will provide a healthy, clean, reliable, and affordable water supply that meets or exceeds all applicable water quality regulatory standards in a cost-effective manner. Utilizing a variety of water supply sources and strategies, the District will pursue a comprehensive water

management program both within the county and statewide that reflects its commitment to public health and environmental stewardship." The policy also states that the conjunctive management of the groundwater basins to be an integral part of the District's comprehensive water supply management program.

The District has always effectively managed the groundwater basin to fulfill the objectives of the District Act and its mission. The goal of these efforts has been, and continues to be, to sustain and protect groundwater resources.

This Groundwater Management Plan is the District's first step toward a more formal and integrated approach to groundwater management. This Groundwater Management Plan describes existing groundwater management programs and formally documents the District's groundwater management goal, which is ***to ensure that groundwater resources are sustained and protected.***

Report Contents

The structure of the Groundwater Management Plan is outlined below. Chapters 3 through 5, which pertain to specific groundwater management programs, are organized to provide program objectives, related background information, the current status of the program, and information on the future direction of each program.

- Chapter 1 (this Introduction)

- Chapter 2 describes the geography and geology of the County as well as the history of local groundwater use. The chapter also describes the development of District facilities, and explains the various components of the existing water conservation and distribution system. A brief discussion on current groundwater conditions is also presented.

- Chapter 3 describes District groundwater supply management programs that replenish the groundwater basin, sustain the basin's supplies, and/or help in mitigating groundwater overdraft. In addition, the chapter summarizes the role of groundwater in the District's overall water supply outlook, and describes water use efficiency programs for groundwater users.

- Chapter 4 describes groundwater monitoring programs that provide data to assist the District in evaluating groundwater basin management.

- Chapter 5 describes groundwater quality management programs that evaluate groundwater quality and protect the groundwater from contamination and the threat of contamination.

- Chapter 6 summarizes existing groundwater management programs and activities designed to sustain and protect groundwater resources and provides recommendations for future work.

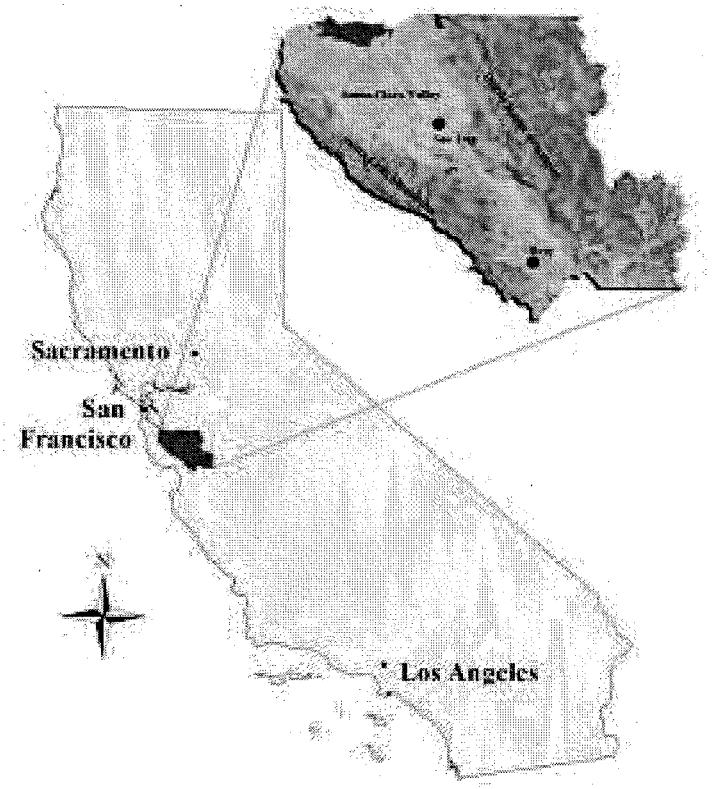
Chapter 2
BACKGROUND

This chapter describes the study area as well as the history of local groundwater use and the development of District facilities. Various components of the District's existing water conservation and distribution system are also described. A brief discussion on current groundwater conditions is also presented.

Geography

Santa Clara County is located at the southern tip of the San Francisco Bay. It encompasses approximately 1,300 square miles, making it the largest of the nine Bay Area counties. The County contributes about one fourth of the Bay Area's total population and more than a quarter of all Bay Area jobs.

Figure 2-1
Location of Santa Clara County



The County boasts a combination of physical attractiveness, economic diversity, and numerous natural amenities. Major topographical features include the Santa Clara Valley, the Diablo Range to the east, and Santa Cruz Mountains to the west. The Baylands lie in the northwestern part of the County, adjacent to the waters of the southern San Francisco Bay.

History of the County's Groundwater

Water has played an important part in the development of Santa Clara County since the arrival of the Spaniards in 1776. Unlike the indigenous peoples, who for thousands of years depended upon the availability of wild food, the Spaniards cultivated food crops and irrigated with surface water. Population growth and the United States' conquest of the area in 1846 increased the demand for these crops, which forced the use of the groundwater basin. Groundwater was drawn to the surface by windmill pumps or flowed up under artesian conditions. The first well was drilled in the early 1850s in San Jose.

By 1865, there were close to 500 artesian wells in the valley and already signs of potential misuse of groundwater supplies. In the valley's newspapers a series of editorials and letters appeared which complained of farmers and others who left their wells uncapped, and blamed them for a water shortage and erosion damage to the lowlands.

As a result of several dry years in the late 1890s, more and more wells were sunk. Dry winters in the early 1900s were accompanied by a growing demand for the County's fruits and vegetables, which were irrigated with groundwater. This trend of increased irrigation and well drilling continued until 1915. During this period, less water replenished the groundwater basin than was taken out, causing groundwater levels to drop rapidly.

In 1913 a group of farmers asked the federal government for relief from the increased cost of pumping that resulted from a lower groundwater table. The farmers formed an irrigation district to investigate possible reservoir sites; however, the following year was wet and no action was taken. It was not until 1919 that the Farm Owners and Operators Association presented a resolution to the County Board of Supervisors expressing their strong opposition to the waste resulting from the use of artesian wells, and again raised the issue of building dams to supplement existing water supplies. By that year subsidence of 0.4 ft had occurred in San Jose. Between 1912 and 1932 subsidence ranged from 0.35 ft in Palo Alto to 3.66 ft in San Jose.

In 1921, a report was presented to the Santa Clara Valley Water Conservation Committee showing that far more water was being pumped from the ground than nature could replace. The committee planned to form a water district that differed from others in the state by having a provision for groundwater recharge. Their effort to form the water district failed, but they were able to implement several water recharge and conservation programs. It was not until 1929 that the County's voters approved the Santa Clara Valley Water Conservation District (SCVWCD), with the initial mission of stopping groundwater overdraft and ground surface subsidence.

District History

The SCVWCD was the forerunner of today's District, which was formed through the consolidation and annexation of other flood control and water districts within Santa Clara County. By 1935, the District had completed the construction of Almaden, Calero, Guadalupe, Stevens Creek, and Vasona dams to impound winter waters for recharge into percolation facilities during the summer. Later dams completed include Coyote in 1936, Anderson in 1950 and Lexington in 1952. The Gavilan Water District in the southern

portion of the County constructed Chesbro Dam in 1955 and Uvas Dam in 1957. These dams enabled the District to capture surface water runoff and release it for groundwater recharge.

The late 1930s to 1947 marked a period of recovery in groundwater levels that reduced subsidence. In 1947 conditions became dry, groundwater levels declined rapidly and subsidence resumed. In 1950 almost all of the County's water requirements were met by water extracted from the groundwater basin. This resulted in an all-time low water level in the northern subbasin.

In 1952, the first imported water was delivered by the water retailers in northern Santa Clara County through the Hetch-Hetchy southern aqueduct. By 1960, the population of the County had doubled from that of 1950. To supply this growth, groundwater pumping increased and groundwater levels continued to decline. By the early 1960s, it was evident that the combination of Hetch-Hetchy and local water supplies could not meet the area's water demands, so the District contracted with the state to receive an entitlement of 100,000 acre-feet (af) per year through the South Bay Aqueduct (SBA).

The SBA supply could not be fully utilized for recharge in the groundwater basin. Hence, to supplement the basin, the District constructed its first water treatment plant (WTP), Rinconada. In 1967, the District started delivering treated surface water to North County residents (North County refers to the Santa Clara Valley Subbasin), thus reducing the need for pumping. This led to a recovery of groundwater levels and reduced the rate of subsidence as well.

From 1960 to 1970 the County's population nearly doubled yet again. The semiconductor and computer manufacturing industries contributed to almost 34 percent of the job growth between 1960 and 1970. Population growth and economic diversity seemed especially important to Santa Clara County, which had been predominantly agricultural. This transformation was not without its problems. In the early 1980s a major underground tank storing a solvent for a manufacturing process in south San Jose was discovered to be leaking and the District's attention focused on water quality of the groundwater basin.

The growth and prosperity of the County continued, and jobs grew 39 percent between 1970 and 1980. In 1974, Penitencia (the District's second WTP) started delivering treated water. Groundwater pumping accounted for about half of the total water use by the mid-1980s. The rate of subsidence was reduced to about 0.01 ft/year compared to 1 ft/year in 1961. To provide a reliable source of supply the District contracted with the federal government for the delivery of an entitlement of 152,500 af per year of imported water from the Central Valley Project (CVP) through the San Felipe Project. The first delivery of San Felipe water took place in 1987, but it was not until 1989 that the District's Santa Teresa WTP was began operating to fully utilize this additional source of imported supply. Since the 1980s, the population of Santa Clara County has continued to increase, and the change in land use toward urbanization has continued.

District Board of Directors
The District is governed by a seven-member Board of Directors. Five of the members are elected, one from each of the five County supervisorial districts, and the remaining two directors are appointed by the Santa Clara County Board of Supervisors to represent the County at large. The directors serve overlapping four-year terms.

The Board establishes policy on the District's mission, goals, and operations and represents the general public in deciding issues related to water supply and flood control. The Board also has the authority to adopt ordinances that have the force of law within the District. The Board reviews staff recommendations and decides which policies should be implemented in light of the District's mission and goals. The Board also monitors the implementation of its policies, and supervises management to see that work is accomplished on time and efficiently.

The Board of Directors holds biweekly public meetings, at which the public is given the opportunity to express opinions or voice concerns. In addition, the public can participate in the annual process of groundwater rate setting through public hearings.

The Board of Directors identifies the conjunctive management of the groundwater basins to maximize water supply reliability as an integral part of the District's commitment to a comprehensive water management program.

District System
As a water resource management agency for the entire County, the District provides a reliable supply of high-quality water to 13 private and public water retailers serving more than 1.7 million residents, and to private well owners who rely on groundwater.

The District operates and maintains a Countywide conservation and distribution system to convey raw water for groundwater recharge and treated water for wholesale to private and public retailers. The components of this distribution system are described in detail below.

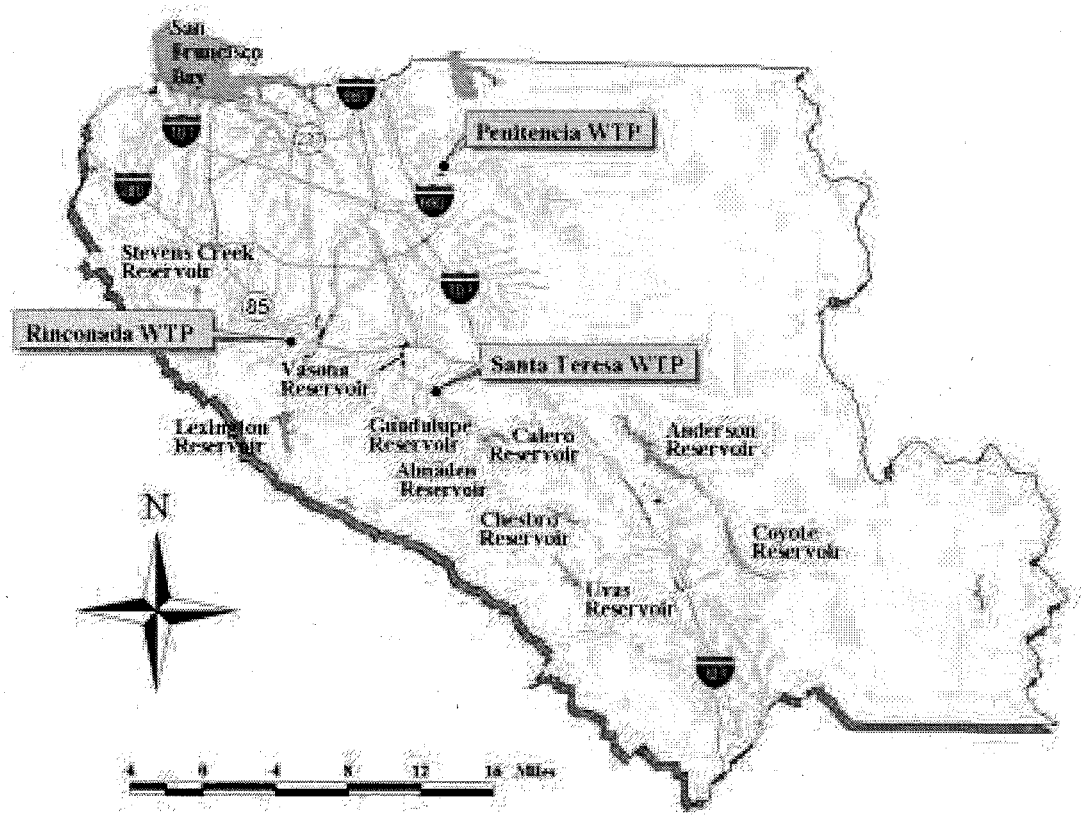
Reservoirs
Local runoff is captured in reservoirs within the County with a combined capacity of about 169,000 af. The stored water is released for beneficial use at a later time. The District's reservoirs are described in Table 2-1 and are shown in Figure 2-2.

Treatment Plants
The District also operates three water treatment plants (WTPs): Rinconada, Penitencia, and Santa Teresa. These facilities are all connected by five major raw water conduits, which also connect the two imported raw water sources from the State Water Project (SWP) and the CVP. Two pumping plants (Coyote and Vasona) provide the lifts required for conveyance during peak usage.

Table 2-1
District Reservoirs

Reservoir	*Capacity(af)*	*Year Completed*	*Surface Area (ac)*	*Dam Height (ft)*
Almaden	*1,586*	*1935*	*59*	*108*
Anderson	*89,073*	*1950*	*1,245*	*240*
Calero	*10,050*	*1935*	*347*	*98*
Chesbro	*8,952*	*1955*	*265*	*95*
Coyote	*22,925*	*1936*	*648*	*138*
Guadalupe	*3,228*	*1935*	*79*	*129*
Lexington	*19,834*	*1952*	*475*	*195*
Stevens Creek	*3,465*	*1935*	*91*	*129*
Uvas	*9,935*	*1957*	*286*	*105*
Vasona	*400*	*1935*	*57*	*30*

Figure 2-2
District Reservoir Locations



Recharge Facilities
The Districts operates and maintains 18 major recharge systems, which consist of a combination of off-stream and in-stream facilities. These systems have a combined pond surface recharge area of more than 390 acres, and contain over 30 local creeks for artificial in-stream recharge to replenish the groundwater basin. The total annual average recharge capacity of these systems is 157,200 af.

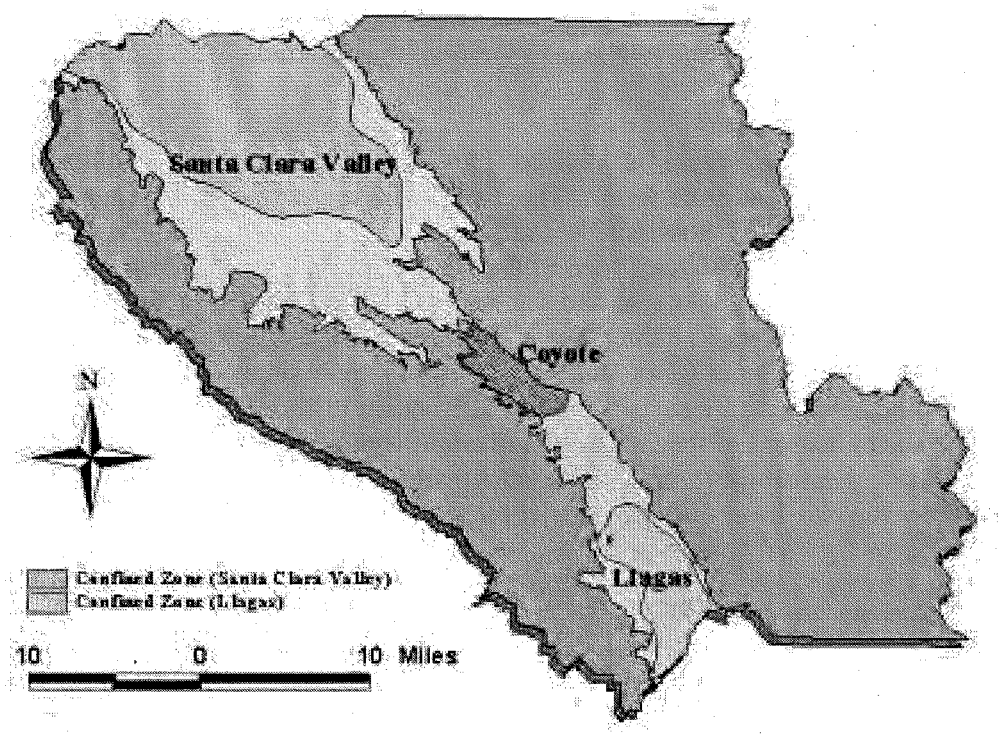
Groundwater Basins
The groundwater basin is divided into three interconnected subbasins that transmit, filter, and store water. These subbasins are portrayed in Figure 2-3. The Santa Clara Valley Subbasin in the northern part of the County extends from Coyote Narrows at Metcalf road to the County's northern boundary. The Diablo Range bounds it on the east and the Santa Cruz Mountains on the west. These two ranges converge at the Coyote Narrows to form the southern limits of the subbasin. The Santa Clara Valley Subbasin is approximately 22 miles long and 15 miles wide, with a surface area of 225 square miles. A confined zone within the northern areas of the subbasin is overlaid with a series of clay layers resulting in a low permeability zone. The southern area is the unconfined zone, or forebay, where the clay layer does not restrict recharge.

The Coyote Subbasin extends from Metcalf Road south to Cochran Road, where it joins the Llagas Subbasin at a groundwater divide. The Coyote Subbasin is approximately 7 miles long and 2 miles wide and has a surface area of approximately 15 square miles. The subbasin is generally unconfined and has no thick clay layers. This subbasin generally drains into the Santa Clara Valley Subbasin.

The Llagas Subbasin extends from Cochran Road, near Morgan Hill, south to the County's southern boundary. It is connected to the Bolsa Subbasin of the Hollister Basin and bounded on the south by the Pajaro River (the Santa Clara - San Benito County line). The Llagas Subbasin is approximately 15 miles long, 3 miles wide along its northern boundary, and 6 miles wide along the Pajaro River. A series of interbedded clay layers, which extends north from the Pajaro River, divides this subbasin into confined and forebay zones.

The three subbasins serve multiple functions. They transmit water through the gravelly alluvial fans of streams into the deeper confined aquifer of the central part of the valley. They filter water, making it suitable for drinking and for municipal, industrial, and agricultural uses. They also have vast storage capacity, together supplying as much as half of the annual water needs of the County. In 2000, the groundwater basin supplied 165,000 acre-feet of the total water use of 390,000 acre-feet.

Figure 2-3
Santa Clara County Groundwater Subbasins



Current Groundwater Conditions

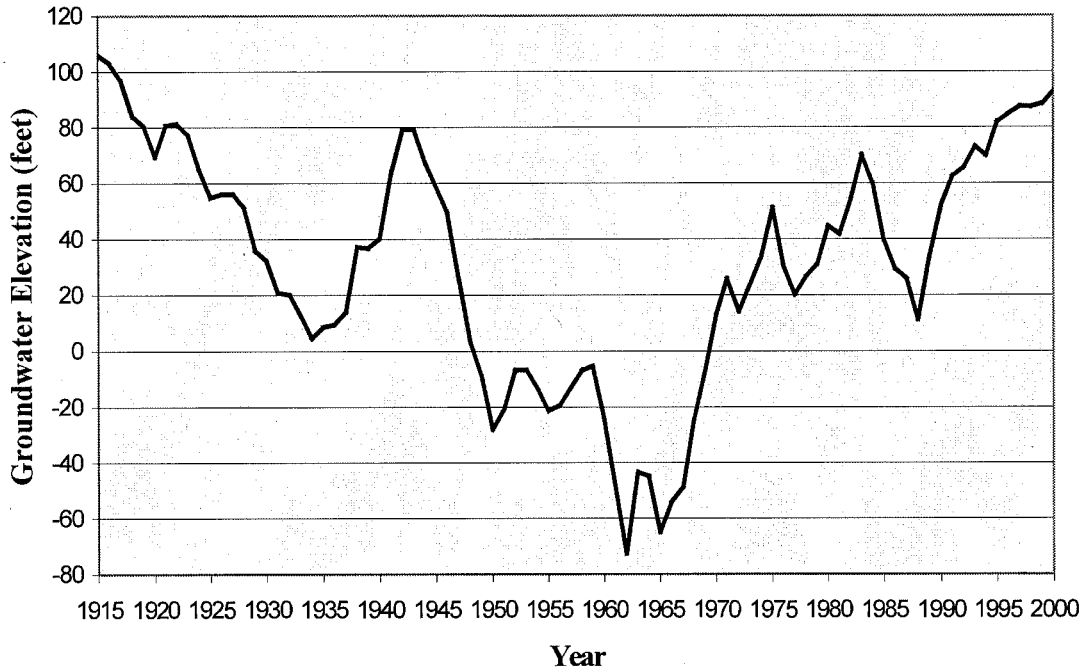
Groundwater conditions throughout the County are generally very good, as District efforts to prevent groundwater basin overdraft, curb land subsidence, and protect water quality have been largely successful. Groundwater elevations are generally recovered from overdraft conditions throughout the basin, inelastic land subsidence has been curtailed, and groundwater quality supports beneficial uses. The District evaluates current groundwater conditions based on the results of its groundwater monitoring programs, which are described in Chapter 4 of this plan.

Groundwater Elevations

Groundwater elevations are affected by natural and artificial recharge and groundwater extraction, and are an indicator of how much groundwater is in storage at a particular time. Both low and high elevations can cause severe, adverse conditions. Low groundwater levels can lead to land subsidence and high water levels can lead to nuisance conditions for below ground structures.

Figure 2-4 shows groundwater elevations in the San Jose Index Well in the Santa Clara Valley Subbasin. While groundwater elevations in the well are not indicative of actual groundwater elevations throughout the County, they demonstrate relative changes in groundwater levels.

Figure 2-4
Groundwater Elevations in San Jose Index Well



Land Subsidence
Land subsidence occurs in the Santa Clara Valley when the fluid pressure in the pores of aquifer systems is reduced significantly by overpumping, resulting in the compression of clay materials and the sinking of the land surface. Historically, the Santa Clara Valley Subbasin has experienced as much as 13 feet of inelastic, or nonrecoverable, land subsidence that necessitated the construction of additional dikes, levees, and flood control facilities to protect properties from flooding. The costs associated with inelastic land subsidence are high, as it can lead to saltwater intrusion that degrades groundwater quality and flooding that damages buildings and infrastructure. However, imported water from the State Water Project and Central Valley Project has increased District water supplies, reducing the demand on the groundwater basin, and providing water for the recharge of the basin. As a result, the rate of inelastic land subsidence has been curtailed to less than 0.01 feet per year.

Groundwater Quality
Natural interactions between water, the atmosphere, rock minerals, and surface water control groundwater quality. Anthropogenic (man-made) compounds released into the environment, such as nitrogen-based fertilizer, solvents, and fuel products, can also affect groundwater quality. Groundwater quality in the Santa Clara Valley Subbasin is generally high. Drinking water standards are met at public water supply wells without the use of treatment methods.

A few water quality problems have been detected. High mineral salt concentrations have been identified in the upper aquifer zone along San Francisco Bay, the lower aquifer zone underlying Palo Alto, and the southeastern portion of the forebay area of the Santa Clara Valley Subbasin. Nitrate concentrations in the South County (Coyote and Llagas Subbasins) are elevated and high nitrate concentrations are sporadically observed in the Santa Clara Valley Subbasin. Lastly, even though Santa Clara County is home to a large number of Superfund sites, there are few groundwater supply impacts from the chemicals from these sites; volatile organic compounds VOCs) are intermittently detected at trace concentrations in public water supply wells. In four wells, such contamination has been severe enough to cause the wells to be destroyed. Overall, the District's groundwater protection programs, including its well permitting, well destruction, and leaking underground storage tank programs, have been effective in protecting the groundwater basin from contamination.

Water quality data for common inorganic compounds during the period from 1997 through 2000 are summarized in Table 2-2. The typical concentration ranges were computed using standard statistical methods. Organic compounds were nondetectable in almost all wells and below drinking water standards in all wells. Data for organic compounds, including MTBE, solvents, and pesticides is not shown in Table 2-2 due to the large number of compounds.

Table 2-2
Summary of Santa Clara County Groundwater Data (1997-2000) and Water Quality Objectives[a]

Constituents	Santa Clara Valley Subbasin		Coyote Subbasin	Llagas Subbasin	Drinking Water Standard	Ag. Objective[f]
	Principal Aquifer Zone[d]	Upper Aquifer Zone[d]				
Chloride (mg/l)	40 – 45	92 – 117	16 – 27	24 -52	500[c,e]	355
Sulfate (mg/l)	37 – 41	106 – 237	32 - 65	32 -65	500[c,e]	-
Nitrate (mg/l)	15 – 18	0.002 – 4	12 -38	44 -47	45[b]	30
Total Dissolved Solids (mg/l)	366 – 396	733 – 1210	250 - 490	320 -540	1000[c,e]	10,000
Sodium Adsorption Ratio	0.89 - 1.26	1.23 - 3.84	NA	NA	-	9
Electrical Conductance (uS/cm at 25 C)	596 - 650	1090 – 1590	375 - 391	500 - 715	1600[c,e]	3000
Aluminum (ug/l)	6 - 18	23 – 97	<5 - 86	5 -51	1000[b]	20,000
Arsenic (ug/l)	0.7- 1.2	1.2 – 3.7	<2	<2	50[b]	500
Barium (ug/l)	141 - 161	60 – 220	71 - 130	99 - 180	1000[b]	-
Boron (ug/l)	115 - 150	200 – 523	81 - 119	82 -159	-	500
Cadmium (ug/l)	<1	<0.5	< 0.5	<0.5	5[b]	500
Chromium (ug/l)	6 – 8	0.5 – 1.8	0.5 - 10	2 - 10	50[b]	1000
Copper (ug/l)	1.9 – 4.4	0.3 – 1	<1 - 50	0.75 – 3.90	1000[c]	-
Fluoride (mg/l)	0.13 – 0.16	0.15 – 0.3	0.12 – 0.21	0.12 – 0.17	1.8[b]	15
Iron (ug/l)	10 – 38	40 – 160	19 - 100	14 - 170	300[c]	20,000
Lead (ug/l)	0.2 – 1.1	<0.5	<2	<2	50[b]	10,000
Manganese (ug/l)	.15 – 1.5	120 – 769	<0.5 - 29	0.86 - 21	50[c]	10,000
Mercury (ug/l)	<1	<0.2	<0.2	<0.2	2[b]	-
Nickel (ug/l)	1.8 – 3.4	4 – 10	<2- 10	<2 - 10	100[b]	2000
Selenium (ug/l)	2.5 – 3.8	0.4 – 2	<2	<2	50[b]	20
Silver (ug/l)	<5	<0.5	<0.5	<0.5	100[b]	-
Zinc (ug/l)	3 – 8	3 - 13	<50	10 - 32	500[c]	10,000

[a] For common inorganic water quality constituents
[b] Maximum Contaminant Level as specified in Table 64431-A of Section 64431, Title 22 of the California Code of Regulations
[c] Secondary Maximum Contaminant Level as specified in Table 64449-B of Section 64449, Title 22 of the California Code of Regulations
[d] Typical range = approximate 95% Confidence Interval estimate of the true population median
[e] Upper limit of secondary drinking water standard
[f] Taken from the Water Quality Control Plan for the San Francisco Bay Basin, 1995 Regional Water Quality Control Boards

Chapter 3
GROUNDWATER SUPPLY MANAGEMENT

This chapter covers the District programs that relate to groundwater supply management. It describes the District's groundwater recharge, treated groundwater recharge/reinjection, and water use efficiency programs. It also summarizes the role of the groundwater basin in terms of the District's overall water supply plan, the Integrated Water Resources Plan (IWRP). Groundwater supply management programs support the District's groundwater management goal by sustaining the basin's groundwater supplies, mitigating groundwater overdraft, minimizing land subsidence, protecting recharge and pumping capabilities, and sustaining storage reserves for use during dry periods.

Future efforts in groundwater supply management will include strengthening the District's groundwater recharge program so that the District makes the most effective use of its resources with regard to the amount, location, and timing of groundwater recharge.

GROUNDWATER RECHARGE

Program Objective

The objective of the Groundwater Recharge Program is to sustain groundwater supplies through the effective operation and maintenance of District recharge facilities.

Background

Groundwater recharge is categorized as either natural recharge or facility recharge. The District defines "natural" groundwater recharge to be any type of recharge not controlled by the District. Sources may include rainfall, net leakage from pipelines, seepage from surrounding hills, seepage into and out of the groundwater basin, and net irrigation return flows to the basin. Facility recharge consists of controlled and uncontrolled recharge through District facilities, which include about 90 miles of stream channel and 71 off-stream recharge ponds. Controlled recharge refers to the active and intentional recharge of the basin by releases from reservoirs or the distribution system. Uncontrolled recharge occurs through District facilities, such as creeks, but refers to recharge that would occur without any action on the part of the District. This includes natural recharge through streams as a result of rainfall and runoff. This section focuses exclusively on controlled and uncontrolled facility recharge.

Current Status

The District's current recharge program is accomplished by releasing locally conserved water and imported water to District in-stream and off-stream recharge facilities.

In-stream Recharge

The controlled in-stream recharge accounts for approximately 45 percent of groundwater recharge through District facilities. In-stream recharge occurs along stream channels in the alluvial plain, upstream of the confined zone that eventually reaches the drinking water aquifer. The District can release flow for

recharge into 80 of the 90 miles of streams. Uncontrolled in-stream recharge accounts for approximately 20 percent of groundwater recharge.

Spreader dams have been a key component of the in-stream recharge program. These temporary or permanent dams are constructed within streambeds to impound water in the channels and increase recharge rates via percolation through stream banks. The use of spreader dams increases in-stream recharge capacity by about 15,000 af, or approximately ten percent. Spreader dams have been constructed at 60 or more sites since they were first employed in the 1920s.

Off-stream Recharge

The off-stream recharge accounts for approximately 35 percent of groundwater recharge through District facilities. The off-stream facilities include abandoned gravel pits and areas excavated specifically as recharge ponds. Ponds range in size from less than 1 acre to more than 20 acres. The District operates 71 off-stream ponds in 18 major recharge systems with a cumulative area of about 393 acres. Locally conserved and imported water is delivered to these ponds by the raw water distribution system.

Off-stream recharge facilities are generally operated in one of two modes: constant head mode or wet/dry cycle mode. The District most often uses the constant head mode, which involves filling the pond and maintaining inflow at a rate equal to the recharge rate of the pond. This operation is continued until the recharge rate of the pond has decreased to an unacceptable rate. In order to maintain high recharge rates, ponds are cleaned periodically. Pond cleaning is generally considered when the recharge rate has decreased by about 75 percent. The pond is then emptied and any sediment cleaned out. In some cases, the pond is emptied and allowed to dry out and the recharge operation is restarted without cleaning. However, this typically results in a slightly reduced recharge rate. The recharge rates of the District's ponds generally range from 1 af/acre/day to about 2 af/acre/day, although some ponds have rates up to 5 af/acre/day.

In the constant head mode, algae and weed growth generally occurs. The algae growth varies according to sunlight, water temperature, nutrients and other factors. As the algae dies, it falls to the pond bottom, also contributing to a reduced recharge rate. The algae are generally controlled using chemical additives. Using deeper ponds can also reduce algae growth, as ponds in the range of 13 to 15 feet deep do not support algae growth as rapidly as shallower ponds.

Water Quality

High turbidity of incoming water results in a rapid decrease of recharge rates. In order to increase recharge pond efficiency, the District works to reduce turbidity levels with coagulants, simple mixing procedures, settling basins and skimming weirs. At most facilities, water with turbidity levels up to about 100 Nephelometric Turbidity Unit (NTU) can be treated effectively. Water with turbidity levels of less than 10 NTU is usually not treated. Each NTU represents

several pounds of fine-grained material per acre-foot of water. Allowable influent turbidity levels may depend on the availability of water.

Monitoring
Recharge facilities are monitored around the clock by operations center personnel using a computerized control system, and in the field by technicians. The raw water control system provides for remote operation of water distribution facilities and real-time system performance data. Operations technicians perform daily inspection of recharge facilities and record flows and water levels.

A periodic water balance is performed to reconcile all measured imported water, inflows, releases and changes in surface water storage. The results of this balance become the final accounting for distribution and facility processing. The data is used for water rights reporting, accounting for usage of federal water, for facility performance measurement purposes, and for the groundwater basin water budget.

Future Direction
Although spreader dams have traditionally been a key component of the in-stream recharge program, their use has been limited significantly because of more stringent permitting due to fish and wildlife concerns.

The District has completed the feasibility testing of a direct injection facility to increase recharge and has completed construction of a full-scale well. The injection well has a capacity of 750 af/year and will be supplied with water treated at the Rinconada WTP. The potential for additional direct injection facilities may be evaluated in the future.

TREATED GROUNDWATER RECHARGE/REINJECTION PROGRAM

Program Objective
The objective of the Treated Groundwater Recharge/Reinjection Program is to encourage the reuse or recharge of treated groundwater from contamination cleanup sites in order to enhance cleanup activities and protect the County's groundwater resources.

Background
District Resolution 94-84 encourages the reuse or recharge of treated groundwater from groundwater contamination cleanup projects and provides a financial incentive program to qualifying cleanup project sponsors. Sponsors must document that all non-potable demands are satisfied to the maximum extent possible prior to injecting any water into the aquifer. All injected water must be recovered by the pump-and-treat cleanup activities at the site.

Each application is processed within 45 working days. Once an applicant has met the qualifying conditions and is accepted, a legal contract is prepared and signed by the District and the clean-up project sponsor. This contract details how the sponsor will

receive a financial incentive from the District. The sponsor is responsible for providing periodic updates on the amount and quality of water reinjected/recharged.

Current Status
The amount of this financial incentive is equivalent to the basic groundwater user rate. IBM (San Jose) is currently recharging between 900 and 1,000 af per year, and is the only approved sponsor currently injecting/recharging groundwater and receiving this financial incentive.

Future Direction
Any future applications will be evaluated rigorously with respect to overall groundwater basin management to ensure that the groundwater basin will not be adversely impacted.

WATER USE EFFICIENCY PROGRAMS

The District's Water Use Efficiency Programs are designed to promote more effective use of the County's water supplies. The District's demand management measures are described in the Water Conservation and Agricultural Water Efficiency sections that follow the discussion of Recycled Water. The District's commitment to increasing the use of recycled water within the County will also help the District to more effectively use the County's water.

Recycled Water

Program Objective
The objective of the Recycled Water Program is to increase the use of recycled water, thereby promoting more effective use of the County's water supplies. To meet this objective, the District is forming partnerships with the four sewage treatment plant operators in the County and is taking every opportunity to expand the distribution and use of tertiary treated recycled water for non-potable uses. Present efforts focus on planning for future uses in agriculture, industry, commercial irrigation, and indirect potable reuse. To meet the objective of increasing the use of recycled water, the District is:

- Partnering with and providing rebates to the South Bay Water Recycling Program (SBWRP) which includes the cities of San Jose, Santa Clara and Milpitas.

- Operating and expanding the South County Recycled Water System as the recycled water wholesaler in the area. Formal agreements with the recycled water producer, the South County Regional Wastewater Authority (SCRWA), and the recycled water retailer, the City of Gilroy, are in place.

- Providing the City of Sunnyvale a rebate on the recycled water delivered each year.

- Meeting with the City of Palo Alto and their stakeholder group to help plan for expanded future use of recycled water in the North County.

- Contracting a consultant to perform a feasibility study on Advanced Treated Recycled Water.

Background
The District has been involved in water recycling since the 1970s when it supported research in Palo Alto and partnered in the establishment of the South County distribution system in Gilroy. Since the early 1990s, the District has become involved in an ever-increasing role. Recycled water use in the County has grown from about 1,000 af in 1990 to over 6,000 af in the year 2000. To encourage the use of recycled water, in 1993 the District started providing rebates to agencies delivering recycled water.

The largest system for recycled water distribution is the South Bay Water Recycling Program, which has over 60 miles of distribution pipelines and serves over 300 customers. The District continues a partnership with the SBWRP in its planning effort for expansion. In 1999, the District formalized its partnership with the South County Regional Wastewater Authority and the cities of Gilroy and Morgan Hill to plan and operate the recycled water distribution system in South County. Since then, the District has begun construction on major pumping and reservoir facilities to modernize the system.

Current Status
The District is expanding its planning efforts and is continuing discussions with the SBWRP for expanding the use of recycled water. This will involve transporting recycled water south from the existing pipeline in south San Jose in order to supply agricultural and industrial customers that now use groundwater or untreated surface water. The City of San Jose, who administers the SBWRP, has installed several groundwater monitoring wells at the District's request in order to monitor potential changes in groundwater quality as a result of the application of recycled water for irrigation.

The District continues to modernize and expand the South County Recycled Water System. Besides serving golf courses and parks, expansion of this system will involve delivering water to industrial and agricultural users. District staff has inventoried the volume of use and location of the largest groundwater and surface water users in the area and is beginning a marketing study for expansion of the system. The District is also working with the City of Gilroy to plan for the connection of new large water use developments to the system.

A project has been initiated to study the feasibility of installing a pilot plant for the advanced treatment of recycled water for use in agriculture, commercial irrigation, industry, and possibly for future streamflow augmentation and groundwater replenishment.

Future Direction
The future direction of the recycled water program is driven by District Board policy, which directs staff to increase recycled water use to 5% of total water use in the County by the year 2010 and to 10% of total use by the year 2020. To meet this goal, it is assumed that a countywide network of recycled water distribution systems will be

developed. The initial stage will provide for a major transmission main from the area of south San Jose in the SBWRP service area to the major commercial and agricultural customers in South County. Developing advanced treatment methods and facilities to provide recycled water of a higher quality standard than the present tertiary treatment will be required in order to meet the needs of some potential customers. Methods and facilities to blend recycled water with untreated surface water and with groundwater will also need to be developed in order to provide for peaking factors and the quality requirements of some customers. Additional research on the most effective method of advanced treatment and ways to develop more industrial use and onsite treatment of recycled water will be performed.

District efforts to expand recycled water use within Santa Clara County will be coordinated with the District's Integrated Water Resources Plan which will evaluate the various options for obtaining the additional water the County will require in future years. This effort will evaluate the comparative costs and benefits of recycled water, water conservation, water banking, and water transfers. District staff will work with partnering agencies to ensure that any potential uses of recycled water will not adversely impact the groundwater basin or recharge and extraction capabilities.

Water Conservation Programs

Program Objective

The objective of the Water Conservation Program is to promote more efficient use of the County's water resources and to reduce the demands placed on the District's water supplies. To meet this objective, the District has implemented a variety of programs designed to increase water use efficiency in the residential, commercial, industrial, and agricultural sectors, which all rely, in part, on extraction from the groundwater basin.

Background

The District's Water Conservation Program has been developed in large part to comply with the Best Management Practices (BMPs) commitments, defined in the 1991 Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California. The program targets residential, commercial/industrial/institutional, and agricultural water use.

The District has promoted conservation of the County's water supplies since its creation. However, a series of drought years between 1987 and 1992 prompted the District and local water retailers to significantly increase conservation efforts. The District enjoys a special cooperative partnership with the water retailers in regional implementation of the BMPs; several program elements were developed in partnership with the local water retailers. Water retailers have partnered with the District in marketing efforts for cooperative programs and in the distribution of water-saving devices such as showerheads and aerators.

Current Status

The Water Conservation Program has designed programs aimed specifically at residential, commercial, and agricultural users. Residential programs include:

- Water-Wise House Call Program designed to measure residential water use and provide recommendations for improved efficiency.
- Showerhead/Aerator Retrofit Distribution Program, which provides free showerheads and aerators to replace less efficient devices.
- Clothes Washer Rebate Program for the installation of high-efficiency washing machines.
- Landscape workshops focused on water efficient landscape and irrigation design.
- Ultra-Low-Flush Toilet (ULFT) Program (free or low-cost).
- Multi-Family Submeter Pilot Program aimed at reducing water use in multi-family dwellings.
- Education programs in English and Spanish, including the distribution of literature, promotion of water conservation at organized events, and the survey program.

District programs targeting water conservation in the commercial sector include:

- Irrigation Technical Assistance Program (ITAP) designed to help large landscape managers improve irrigation efficiency through free site evaluations.
- Commercial Clothes Washer Rebate Program, in conjunction with PG&E, San Jose/Santa Clara Water Pollution Control Plant, and the City of Santa Clara.
- Project WET (Water Efficient Technologies), which offers rebates to commercial and industrial customers for the reduction of water use and wastewater discharges (in conjunction with the City of San Jose).
- Ultra-Low-Flush Toilet Retrofit Program in conjunction with the San Jose/Santa Clara Water Pollution Control Plant.
- Irrigation Submeter Program to encourage better water management at large commercial sites.

The District has also implemented several programs to promote water use efficiency in the agricultural sector, which relies mainly on the groundwater basin for its water needs. These programs are discussed in the following section of this report.

In fiscal year 1999/2000, the District's water conservation programs achieved an estimated water savings of over 24,000 af, which includes 10,000 af through water retailer participation.

Future Direction
Water conservation efforts are anticipated to reduce County water demands by approximately 30,000 af in 2001, and by almost 32,000 af in 2002. Future programs and projects being developed include:

- Water Use Efficiency Baseline Survey to provide specific information needed to tailor the District's water use efficiency program to result in effective long-term water use efficiency, to evaluate the impacts of water efficiency measures, and further promote and implement Best Management Practices (BMPs).
- Expansion of the Water Efficient Technologies (WET) Program to the entire county.
- Landscape and Agricultural Area Measurement and Water Use Budgets.

Agricultural Water Efficiency

Program Objective
The objective of the Agricultural Water Efficiency Program is to promote, demonstrate and achieve water use efficiency in the agricultural sector, which relies on groundwater supplies for most of its water needs. To meet this objective the District has implemented the following program elements:

- Mobile Lab Program
- California Irrigation Management Information System (CIMIS) Program
- Outreach Program

Background
As required by the Central Valley Project Improvement Act, in 1994 the District adopted a Water Conservation Plan to comply with U.S. Bureau of Reclamation criteria. This plan commits the District to support various agricultural water management activities and to implement the urban BMPs discussed in the Water Conservation Programs section.

Among the agricultural water management activities outlined in the plan is a Mobile Irrigation Lab program. This program provides local farmers with on-site irrigation system evaluations and recommendations for efficiency improvement. The mobile lab is designed to help increase water distribution uniformity and on-farm irrigation and energy efficiencies for all types of irrigation systems. Proper distribution uniformity can result in lower water and energy bills and decreased fertilizer application. Managing nitrogen and irrigation input to more closely match actual crop needs can also reduce water and

energy bills; this approach reduces the potential for nitrate to leach into groundwater while maintaining or improving agricultural productivity.

California Irrigation Management Information System (CIMIS) is a related program that helps large-scale water users to develop water budgets for determining when to irrigate and how much water to apply. Created in 1982 through a joint effort of UC Davis and the Department of Water Resources (DWR), CIMIS is a network of more than 100 computerized weather stations across the state that collects, measures and analyzes all the climatological factors that influence irrigation. This information provides major irrigators daily data on the amount of water that evaporates from the soil and the amount used by grasses.

The District owns and supervises two CIMIS weather stations, one at the UC field station in downtown San Jose, and the other at Live Oak High School in Morgan Hill. Both of these stations, as well as others around the state, are connected to a central computer run by the DWR in Sacramento. The updated information from the District's two stations is automatically downloaded and then provided to the public via a telephone hotline recording or the Internet.

An Outreach Program is an essential component of the agricultural efficiency programs. Outreach to the agricultural community includes public information dissemination, seminars or workshops, public presentations, newsletter articles and specific program materials.

Current Status

The District continues to implement the Mobile Lab Program, which provides on-farm irrigation evaluations, pump efficiency tests, nitrate field test demonstrations, and recommendations for efficient irrigation improvements. Approximately 30 sites participate in the program each year.

The District is currently assessing the potential need for an additional CIMIS station in the North County.

As part of the Outreach Program, significant work has been channeled into developing educational materials on the use of CIMIS in efficient irrigation scheduling. Presentations on the various program elements have been made to the District's Agriculture Advisory Committee, Farm Bureau and grower associations. Articles and brochures have been developed for CIMIS and the mobile lab program. In addition, the staff from the District's Water Use Efficiency and Groundwater Management Units have worked together to hold various workshops and seminars in the South County on irrigation and nutrient and pesticide management. All seminars have been well attended.

Future Direction

The future direction of the agricultural water efficiency programs includes the continuation and further development of the Mobile Lab Program. District staff will recommend continuation of the program as long as it demonstrates its cost-effectiveness.

The District is currently evaluating the feasibility of implementing a financial incentives program to complement the mobile lab.

A Monitoring and Evaluation Program is necessary to determine and assess the effectiveness of the various programs. The focus of the current monitoring effort has been the tracking of activity levels and program costs. To ensure that future water saving goals are achieved and urban and agricultural programs are successful, the District will need to enhance its existing monitoring program to more rigorously quantify actual water savings.

INTEGRATED WATER RESOURCES PLAN

Program Objective
The objective of the Integrated Water Resources Plan (IWRP) is to develop a long-term, flexible, comprehensive water supply plan for the County through year 2040 that incorporates community input and can respond to changing water supply and demand conditions.

Background
The District's 1975 water supply master plan identified the Federal San Felipe Project as the best solution to meet future water demands. However, recent severe droughts, changing state and federal environmental and water quality regulations, and the variability and reliability of both local and imported supplies underscored the need for an updated, more flexible water supply planning process. In the early 1990s, District staff developed a water supply overview study and began to outline a process to update the 1975 master plan.

The overview study described the District's water system and identified drinking water quality issues, the County's water needs, existing water supplies, projected water supplies, potential water shortages, and other components for managing water supplies. The overview study also evaluated water supply alternatives and recommended a stakeholder process to help the District select the preferred alternative.

As a result of the recommendations from the water supply overview process and several workshops involving the Board and overview study project team, the District Board of Directors authorized staff to undertake the IWRP.

In March of 1996, the project team introduced the Board's planning objectives for the IWRP evaluation of water supply strategies. These objectives were refined by stakeholders, including: the general public, representatives of business, community, environmental and agricultural groups, District technical staff, and officials of local municipalities and other water agencies. Stakeholders used these objectives to evaluate various water supply strategies and agree upon an IWRP Preferred Strategy.

The IWRP Preferred Strategy aims to maximize the District's flexibility to meet actual water demands, whether they exceed or fall short of projections. It relies on water

banking, recycled water, demand management, and water transfers, plus "core elements" designed to ensure the validity of baseline planning assumptions, monitor or evaluate resource options, and help meet planning objectives. The Board approved the preferred strategy in December of 1996.

The groundwater basin is a critical component in the management of the County's water supply. The basin treats, transmits, and stores water for the County. The management objective of the 1996 IWRP is to maintain the highest storage possible in the three interconnected subbasins (or to bank groundwater) without creating high groundwater problems. During dry periods when local and imported water supplies do not meet the County's water needs, stored groundwater is used to make up the difference. However, the use of this storage has to be balanced with the potential occurrence of land subsidence.

Land subsidence has been a great concern in the valley. As much as thirteen feet of subsidence occurred in parts of the basin before subsidence was minimized through recharge activities and imported water deliveries. If subsidence were to recommence, the damage to infrastructure would be significant, as many levees, pipelines, and wells would need to be rebuilt. Therefore, the IWRP must balance the use of the groundwater basin with the avoidance of adverse impacts.

Current Status

The preferred strategy from the 1996 IWRP is being implemented. Action on several elements of the plan that has already taken place includes the following:

Water Banking

The District reached an agreement with Semitropic Storage District to bank up to 350,000 af in their storage facilities. The District currently has stored about 140,000 af in the water banking program.

Recycled Water

The District is working closely with the city of San Jose and Sunnyvale to develop and market recycled water in lieu of groundwater pumping for irrigation. Planning with South County Regional Wastewater Agency is also occurring (see section on Water Use Efficiency).

Demand Management

The Water Use Efficiency Unit has developed an aggressive program to minimize water use and provide assistance to irrigators to improve the efficiencies in their irrigation systems (see section on Water Use Efficiency).

Water Transfers

In 1999, the District entered into a multi-party water transfer agreement for an agricultural supply from a Central Valley Project (CVP) contractor. This transfer will make a small amount of dry year water available to the District during the next 20 years.

Core Elements

- In 1997, the District entered into a Reallocation Agreement that provides a reliability "floor" of 75 percent of contract quantity for the District's Municipal and Industrial CVP supply, except for extreme years when CVP allocations are made on the basis of public health and safety.

- A study was recently conducted to determine the frequency of critical dry periods using a statistical approach that showed the preferred strategies are very robust although not perfect.

- The Operational Storage Capacity of the Santa Clara Valley Subbasin was evaluated and refined in 1999 (SCVWD, 1999) – see section on operational storage capacity.

Future Direction

An ongoing process of monitoring the baseline conditions and contingency action levels is being developed. Updates to the IWRP are scheduled for every 3 to 5 years. The District is currently developing the 2002 IWRP Update.

As the District's water supply planning document through year 2040, the IWRP has identified the operation of the groundwater basin as a critical component to help the District respond to changing water supply and demand conditions. Planning and analysis efforts for future updates of the Groundwater Management Plan and the IWRP need to be integrated in order to provide a coordinated and comprehensive water supply plan for Santa Clara County.

Additional Groundwater Supply Management Activities

Groundwater Modeling

The District uses a three-dimensional groundwater flow model to estimate the short-and long-term yield of the Santa Clara Valley Subbasin and to evaluate groundwater management alternatives. Six layers are used to represent the subbasin, and changes in rainfall, recharge, and pumping are simulated. The model is used to simulate and predict groundwater levels under various scenarios, such as drought conditions, reduced imported water availability, or increased demand. The groundwater model also allows the District to evaluate the operational storage capacity (discussed below) in the Santa Clara Valley Subbasin.

In the future, a three-dimensional flow model similar to the one used in the Santa Clara Valley Subbasin will be developed for the Coyote and Llagas Subbasins, enabling the District to simulate groundwater conditions throughout the County.

Operational Storage Capacity Analysis

The operational storage capacity is an estimate of the storage capacity of the groundwater basin as a result of District operation. Operational storage capacity is generally less than the total storage capacity of the basin, as it accounts for operational constraints such as

available pumping capacity and the avoidance of land subsidence or high groundwater levels. Identifying a reasonable range for the amount of groundwater that can be safely stored in wet years and withdrawn in drier years is critical to proper management of the groundwater basin.

The operational storage capacity of the Santa Clara Valley Subbasin was evaluated (SCVWD, 1999) using the groundwater flow model and historical hydrology, which included two periods of severe drought. The key findings of the analysis were that:

- The operational storage capacity of the Santa Clara Valley Subbasin is estimated to be 350,000 af.
- The rate of withdrawal from the basin is a controlling function and pumping should not exceed 200,000 af in any one year.
- The western portion of the subbasin is operationally sensitive which requires the Rinconada Water Treatment Plant to receive the highest priority when supplies become limited.

In 2001, an analysis of the operational storage capacity for the Coyote and Llagas Subbasins was conducted (SCVWD, 2001). As the District does not currently have a groundwater model for these two subbasins, a static analysis was used. Unlike a groundwater model, a static analysis cannot simulate changes in recharge, pumping, or demand. Instead, the operational storage capacity was estimated as the volume between high and low groundwater surfaces, chosen to maximize storage while accounting for operational constraints such as high groundwater conditions. The draft estimate for the combined operational storage capacity of the Coyote and Llagas Subbasins ranges from 175,000 to 198,000 af. The District is working to narrow the range of estimates for operational storage capacity through further analysis.

Having an estimate of the amount of water that can be stored within the basin during wet years and withdrawn during drier times will continue to be critical in terms of long-term water supply planning. As hydrology, water demands, recharge, and pumping patterns change, the estimate of operational storage capacity will need to be updated.

Subsidence Modeling

Due to substantial land subsidence that has occurred within the Santa Clara Valley Subbasin, the District uses numerical modeling to simulate current conditions and predict future subsidence under various groundwater conditions. PRESS (Predictions Relating Effective Stress and Subsidence) is a two-dimensional model that relates the stress associated with groundwater extraction to the resulting strain in fine-grained materials such as clays. The District has calibrated the model at ten index wells within the subbasin, and has established subsidence thresholds equal to the current acceptable rate of 0.01 feet per year.

Chapter 4
GROUNDWATER MONITORING PROGRAMS

This chapter describes District programs that monitor the water quality, water levels and extraction from the groundwater basin. It also describes the District's land subsidence monitoring program. These programs provide data to assist the District in evaluating and managing the groundwater basin. Specifically, the groundwater and subsidence monitoring programs provide the data necessary for evaluating whether the program outcomes result in achievement of the groundwater management goal.

Future efforts in groundwater monitoring will include the annual development of a groundwater conditions report, which will contain information regarding groundwater quality, groundwater elevation, and land subsidence.

GROUNDWATER QUALITY MONITORING

Program Objective

The objective of the General Groundwater Quality Monitoring Program is to determine the water quality conditions of the County's groundwater resources. By monitoring the quality of the groundwater basin, the District can discover adverse water quality trends before conditions become severe and intractable, so that timely remedial action to prevent or correct costly damage can be implemented. In general, the District monitors groundwater quality to ensure that it meets water quality objectives for all designated beneficial uses, including municipal and domestic, agricultural, industrial service, and industrial process water supply uses.

Background

Groundwater quality samples have been collected in the County since the 1940s by the District and by others. In 1980, District staff reviewed the existing general groundwater quality monitoring program and recommended changes and enhancements. The recommended changes and enhancements included revising the monitoring well network, revising the list of water quality parameters to be measured, and collecting groundwater samples biennially (every other year). Groundwater samples were analyzed for general mineral and physical water quality parameters.

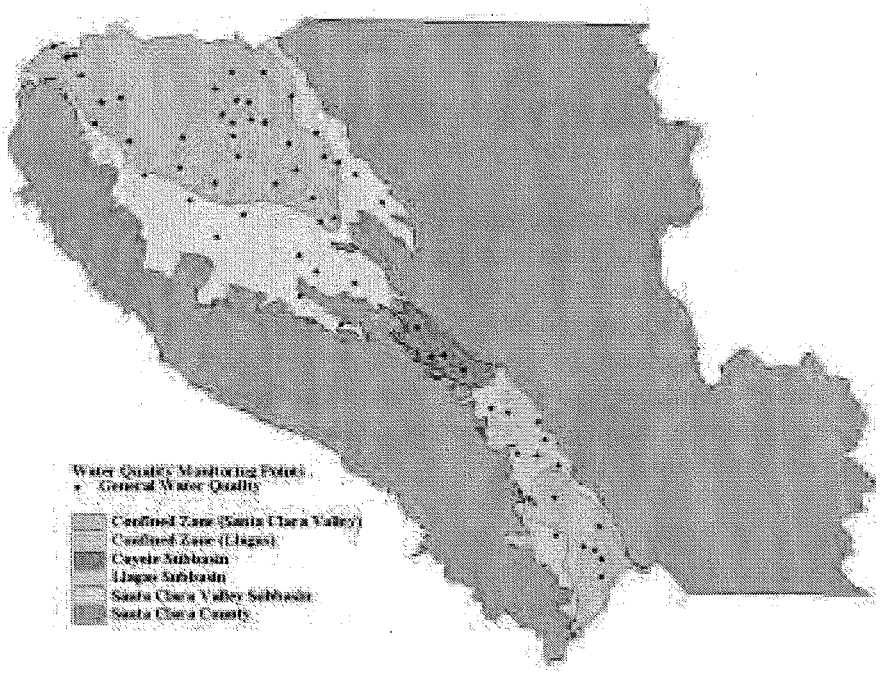
Current Status

The general groundwater quality monitoring program is designed to provide specific water quality data for each of the three subbasins (Figure 2-3). The monitoring well network includes one or more wells in each hydrographic unit yielding significant amounts of water. Groundwater samples collected from the monitoring network are intended to reflect the general areal and vertical groundwater quality conditions. Currently, the following program activities occur biennially:

- Water quality samples are collected from a monitoring network of approximately 60 wells (Figure 4-1).

- Samples are analyzed for general minerals, trace metals, and physical characteristics.
- Analytical results are evaluated, the database is updated, and routine water quality computations are performed.
- A summary report describing the water quality of the groundwater resources in the County is prepared.

Figure 4-1
Water Quality Monitoring Wells



In addition to the 60 wells monitored by the District for general groundwater quality analysis, the District monitors additional wells for special studies. There are currently approximately 100 wells monitored for MTBE, 60 wells monitored for nitrate, and 30 wells monitored for saltwater intrusion. The District also receives groundwater quality data for approximately 300 water retailer wells from the California Department of Health Services.

Monitoring results suggest that water quality is excellent to good for all major zones of the groundwater basin. This is based on comparing groundwater quality monitoring results to water quality objectives. Regional Water Quality Control Boards designed water quality objectives based on beneficial uses. Water quality objectives for municipal and domestic, industrial service, and industrial process water supply beneficial uses are equivalent to the drinking water standards established by the California Department of

Health Services. Water quality objectives for agricultural beneficial uses are defined specifically in the Regional Water Quality Control Boards' Water Quality Control Plans. Drinking water standards, agricultural water quality objectives, and monitoring results for common groundwater constituents are summarized in Table 2-2.

The more common trace constituents, which are considered unwanted impurities when present in high concentrations, are generally not observed in concentrations that adversely affect beneficial uses. Areas with somewhat degraded waters in terms of total mineral salt content have been identified in the Santa Clara Valley Subbasin and elevated nitrate concentrations have been observed in the Coyote and Llagas Subbasins. In addition, volatile organic compounds and other anthropogenic compounds have affected shallow aquifers in localized areas. Special groundwater monitoring programs have been developed to define the extent and severity of these problems and are discussed in Chapter 5.

Radon analysis was performed as a one-time special survey of current conditions and provided data for analyzing the potential impacts of upcoming drinking water standards for radon. The results of the 1999 sampling are presented in the 2000 General Groundwater Quality Monitoring report.

Future Direction

The General Groundwater Quality Monitoring Program utilizes relatively few, widely spaced monitoring points to assess large areas. Certain hydrographic units of the basin are only sparsely monitored at present. Staff is continuing to review the monitoring network to ensure that groundwater samples collected from the monitoring well network reflect areal and vertical groundwater quality conditions within each hydrographic unit. If it is determined that additional monitoring points are needed in some areas where there are no existing wells, District staff will recommend the installation of additional monitoring wells.

The District is also planning to increase the frequency of monitoring and the number of water quality parameters that are measured. Historically, the most frequent sampling frequency has been biennially. However, in order to parallel District efforts to better monitor performance in achieving desired results, the sampling frequency for the General Groundwater Quality Monitoring Program will be increased to annually. The number of water quality parameters that are measured will also be increased, so that samples are analyzed for volatile organic compounds, a significant concern in Santa Clara County. Samples will continue to be analyzed for general minerals, trace constituents, and physical characteristics.

The District will continue to assess and provide recommendations to address any adverse water quality trends that are observed through the General Groundwater Quality Monitoring Program. In addition, the District will continue to conduct special studies for specific contaminants as the need arises. As part of groundwater management planning, action levels and triggers will be developed for the constituents monitored.

The District will also begin developing annual groundwater conditions reports, which will summarize information regarding groundwater quality, groundwater elevation, and land subsidence.

GROUNDWATER ELEVATION MONITORING

Program Objective
The objective of the Groundwater Elevation Monitoring Program is to provide accurate and dependable depth-to-water field measurements for the County's major groundwater subbasins. By monitoring the groundwater elevations, the District can evaluate the groundwater supply conditions and formulate strategies to ensure adequate water supplies, prioritize recharge activities, and minimize any adverse impacts.

Background
Collecting depth-to-water information has been one of the District's functions since it was first formed as a water conservation district in 1929. Depth-to-water information is used to create groundwater elevation contour maps, which depict the conditions of the groundwater basin in the fall and spring of each year. Depth-to-water data are also used for subsidence modeling, to generate hydrographs needed to analyze groundwater model simulations, and to provide information to District customers on current and historical groundwater elevations.

Current Status
The District continues to collect depth-to-water field measurements, obtain depth-to-water measurements from other agencies and record that information for approximately 275 wells. Most wells in the current program are privately owned and their locations are fairly evenly distributed among the three subbasins (Figure 4-2). Current groundwater elevation monitoring includes the following:

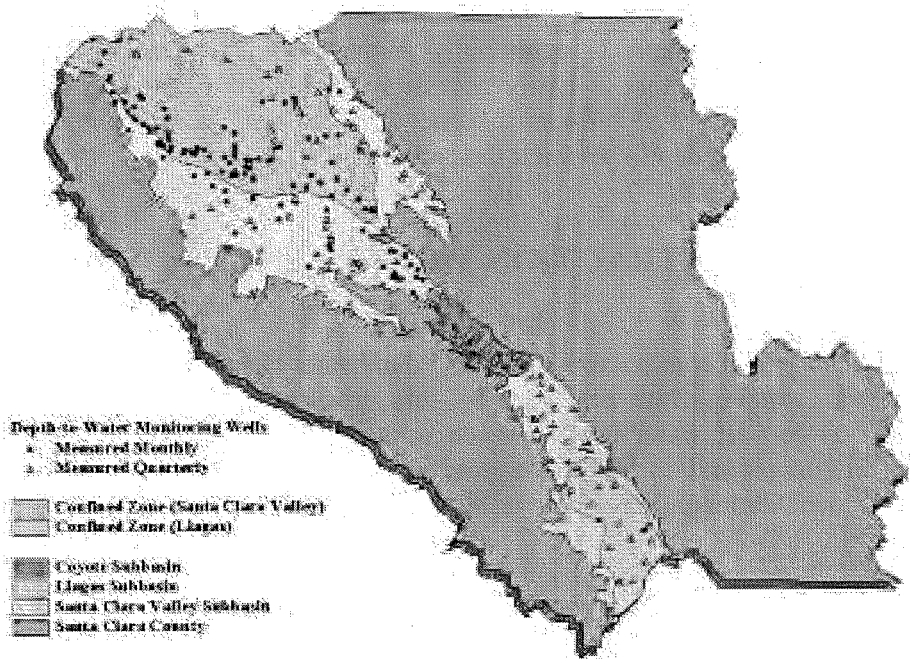
- Collection of monthly depth-to-water field measurements from approximately 168 wells, including approximately 150 wells owned by other agencies (Figure 4-2).
- Collection of quarterly depth-to-water field measurements from approximately 108 wells (Figure 4-2).
- Maintenance of a groundwater elevation database.
- Preparation of semi-annual groundwater level elevation contour maps.

The information in the District depth-to-water database is used regularly by District staff. Each year the District answers several hundred requests for depth-to-water information from other public agencies, consultants, and the public.

Future Direction
Although the District collects depth-to-water data from many wells throughout the County, most wells were designed as production wells, with perforations at multiple

intervals to increase groundwater extraction. There are relatively few wells that measure groundwater elevations in a single depth zone. The existing Groundwater Elevation Monitoring Program is currently being updated to target monitoring wells where discrete, depth-specific groundwater elevations can be obtained, which will enable better characterization of the three-dimensional groundwater system. A new groundwater elevation monitoring network has already been designed for the Santa Clara Valley Subbasin, and another project will be undertaken to develop a monitoring network for the Coyote and Llagas Subbasins by 2003.

Figure 4-2
Groundwater Elevation Monitoring Wells



The proposed network for the Santa Clara Valley Subbasin will include monitoring the individual piezometric pressures at the following 79 wells, which are geographically distributed among the hydrographic units in the subbasin. Specific recommendations include the:

- Continued monitoring of 31 depth-specific wells monitored in the existing depth-to-water program.
- Acquisition of 16 aquifer-specific wells from other organizations.
- Addition of 25 wells that are not part of the existing depth-to-water program.
- Installation of 7 new multiple-well monitoring sites to be constructed by 2003.

Monitoring these 79 wells will provide invaluable information to aid in characterizing depth-specific groundwater conditions. However, in addition to these 79 wells, monitoring of the wells in the current groundwater elevation network will continue indefinitely, as the water level data can be useful even though it cannot be attributed to specific depth zones. Monitoring is recommended on a quarterly basis during the months of January, April, July, and October, although some wells will be monitored monthly. A quarterly monitoring frequency is consistent with the historical groundwater level data in the basin, and is currently adequate in terms of current groundwater elevation monitoring needs. A change in monitoring frequency will be assessed if necessary.

The proposed monitoring network for the Santa Clara Valley Subbasin will be re-evaluated in 2003 to ensure that monitoring needs can be met with the wells proposed. A monitoring network for the Coyote and Llagas Subbasins will be developed by 2003.

Since groundwater information is continually utilized both within and outside the District, an online database that is easily accessible through the District's web site is being evaluated as it would significantly reduce District staff time spent in database maintenance and fulfilling depth- to-water data requests.

GROUNDWATER EXTRACTION MONITORING

Program Objective

The amount of groundwater extracted from the groundwater basin is recorded through the Water Revenue Program. Data produced by this program are used primarily to: 1) determine the amount of water used by each water-producing facility and collect the revenue for this usage, and 2) fulfill the provisions of Section 26.5 of the District Act which requires the District to annually investigate and report on groundwater conditions.

Background

The Water Revenue Program tracks groundwater, surface water, treated water and recycled water production within the District. The first collection of groundwater extraction data began shortly after the State Legislature authorized amendments to the Santa Clara County Flood Control and Water District Act in June 1965. As part of implementation of the District Act, wells within the District were registered. The District has been collecting groundwater extraction data from wells in the Santa Clara Valley Subbasin (also known as the North Zone or Zone W-2) since the early 1960s. After the merger with Gavilan Water Conservation District in 1987, this program expanded to the Coyote and Llagas Subbasins (the South Zone, or Zone W-5).

Current Status

To determine the amount of all water produced in the District, including groundwater, the Water Revenue Program:

- Develops and distributes water extraction statements to well owners within the two water extraction zones on a monthly, semi-annual, and annual basis.

- Audits incoming water extraction statements and completes field surveillance to ensure that water extraction information is accurate.
- Audits and invoices surface, treated and recycled water accounts.
- Assists the public in completing and filing water extraction statements.
- Maintains files for surface, ground, treated and recycled water accounts.
- Administers and maintains a database containing all water extraction information.
- Initiates and approves the installation of water measurement devices (meters) on water-producing wells.
- Registers (assigns state well numbers) and maps all water extraction wells.

Water extraction data is stored in an electronic database (Water Revenue Information System) and on paper. Program staff maintain accounts and records for more than 6,000 water extraction wells and approximately 27,000 monitoring wells. Staff provide information on these accounts to other District programs and outside customers, and provide other customer support as necessary.

Although approximately half of the wells within the County are not metered, metered wells extract the vast majority of groundwater used within the County. Where meters are not feasible, crop factors are used to determine agricultural water usage and average values adjusted for residences. Water meter testing and maintenance are performed on a regular basis. Maintenance is done to ensure meters are performing properly and accurately. When problems are discovered, meters are repaired or replaced. Meters are also replaced on a regular basis for testing and rebuilding.

The following table shows type of usage for wells in Zone W-2 (Santa Clara Valley Subbasin) and Zone W-5 (Coyote and Llagas Subbasins) and the number of meters recording usage.

Table 4-1
1998 Statistics on Extraction Wells

	North Zone (W-2)	**South Zone (W-5)**
Agricultural Wells	81	570
Municipal & Industrial Wells	1,875	350
Domestic Wells	567	2,569
Ag & M&I Wells	77	511
Total Number of Wells	2,600	4,000
Number of Metered Wells	1,017	395
Percentage of Metered Wells	40%	10%

In accordance with Section 26.5 of the District Act, the District prepares an annual Water Utility Enterprise Report, which contains the following information: present and future water requirements of the County; available water supply; future capital improvement, maintenance and operating requirements; financing methods; and the water charges by zone for agricultural and nonagricultural water. Recommended water rates are based on multi-year projections of capital and operating costs. Water charges can be used as a groundwater supply management tool, as the surcharge for treated water can be adjusted to encourage or discourage extraction from the groundwater basin.

Future Direction

Groundwater extraction monitoring data will continue to be important as a basis of groundwater management decisions and for groundwater revenue receipts. Program staff are currently evaluating the existing database and hope to convert the database into a relational database and link it to the newly developed Geographic Information System (GIS) based well mapping system. This will enable staff to evaluate groundwater use data geographically and to provide this data to groundwater management decision-makers in a meaningful and easy to use format.

LAND SUBSIDENCE MONITORING

Program Objective

The objective of the Land Subsidence Monitoring Program is to maintain a comprehensive system to measure existing land subsidence and to predict the potential for further subsidence.

Background

Land subsidence was first noticed in 1919 after an initial level survey conducted in 1912 by the National Geodetic Survey. At that time, 0.4 feet of subsidence was measured in downtown San Jose. Between 1912 and 1932, over 3 feet of subsidence were measured at the same location. As a result of this drastic increase in subsidence, an intensive leveling network was installed for periodic re-leveling to evaluate the magnitude and geographical extent of subsidence. From 1912 to 1970, cumulative subsidence measured at the same San Jose location totaled approximately 13 feet.

A cross-valley differential leveling survey circuit was run in the 1960s and continues to be conducted. The level circuit was conducted almost annually from 1960 through 1976, once in 1983, and annually from 1988 to the present.

In 1960, the United States Geologic Survey (USGS) installed extensometers, or compaction recorders, in the two 1,000-foot boreholes drilled in the centers of recorded subsidence sites in Sunnyvale and San Jose. The purpose for installing these wells was to measure the rate and magnitude of compaction that occurs between the land surface and the bottom of the well.

In the mid-1960s, imported water from San Francisco's Hetch-Hetchy reservoir and the State Water Project's South Bay Aqueduct played a major role in restoring groundwater

levels and curbing land subsidence. A combination of factors including imported water, natural recharge, decreased pumping and increased artificial recharge has reduced land subsidence to an average 0.01 feet per year.

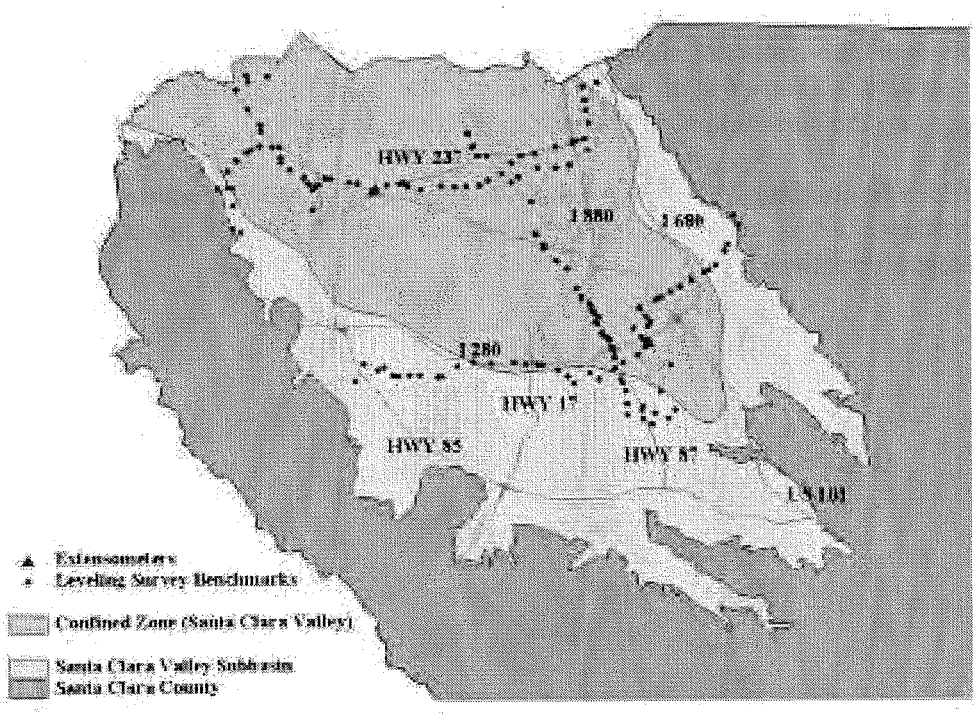
The District developed subsidence thresholds that relate the expected rate of land subsidence from various groundwater elevations. The Predictions Relating Effective Stress and Subsidence (PRESS) computer code was utilized for this model, and 10 index wells located throughout the Santa Clara Valley Subbasin were used as control points for the subsidence calibration and prediction.

Current Status

The existing land subsidence monitoring program includes the following:

- Monitoring land subsidence at two extensometer sites in San Jose and Sunnyvale (Figure 4-3).
- Conducting an annual leveling survey across three different directions in the valley to measure any land subsidence that may be occurring away from the extensometers (Figure 4-3).
- Analyzing data to evaluate the potential of re-initiating land subsidence.

Figure 4-3
Location of Extensometers and Leveling Survey Benchmarks



The extensometer in the San Jose site has recently been upgraded and equipped with monitoring and storage instrumentation to execute the data acquisition process electronically. Data collected from this site continues to be analyzed to determine any changes in the rate of land subsidence.

In 1998, the District entered into a cooperative agreement with the USGS to use Interferometric Synthetic Aperture Radar (InSAR) technology to measure any subsidence that may have not been captured in the existing monitoring program. This new technology compares satellite images taken at different times and reveals any changes in ground surface elevations with an accuracy of a few millimeters. INSAR covers the entire County, unlike traditional monitoring which is site-specific. Under the cooperative agreement, InSAR images were analyzed both seasonally and over a five-year period. Data from this study reasonably replicated and supported the data obtained from the District's extensometers.

The leveling survey continues to be conducted annually. A new leveling line was added to the leveling survey in 1998 as InSAR images indicated that additional information was needed along the Silver Creek Fault in San Jose.

Future Direction

Monitoring and data storage equipment have been installed at the San Jose extensometer site. Plans to enhance the land subsidence monitoring network program include the installation of new equipment to facilitate the monitoring and storage of data from the extensometer site in Sunnyvale, and the evaluation of datum stability at this site.

Through the 1998 study with the USGS, InSAR technology was proven able to reasonably replicate historical subsidence data from extensometers and the cross-valley leveling surveys. District staff will investigate the benefits of incorporating InSAR technology into the current land subsidence monitoring program.

The District will continue to utilize groundwater flow and subsidence models to simulate land subsidence as a result of different groundwater scenarios and groundwater management alternatives.

Chapter 5
GROUNDWATER QUALITY MANAGEMENT PROGRAMS

This chapter describes District programs that address nitrate management, saltwater intrusion, well construction and destruction, wellhead protection, leaking underground storage tanks, toxic cleanup, land use and land development review, and other groundwater protection issues. These programs help protect groundwater quality by identifying existing and potential groundwater quality problems, assessing the extent and severity of such problems, and preventing and mitigating groundwater contamination.

NITRATE MANAGEMENT

Program Objective

The objective of the Nitrate Management Program is to delineate, track and manage nitrate contamination in the groundwater basin in order to ensure the basin's viability as a long-term potable water supply. More specifically, the objectives are as follows:

- Reduce the public's exposure to high nitrate concentrations.
- Reduce further loading of nitrate.
- Monitor the occurrence of nitrate.

Background

The conversion of nitrogen to nitrate is a natural progression in the nitrogen cycle. In the form of nitrate, nitrogen is highly soluble and mobile. Due to its solubility and mobility, nitrate is one of the most widespread contaminants in groundwater. Unlike other compounds, nitrate is not filtered out by soil particles. It travels readily with rain and irrigation water into surface and groundwater supplies.

The amount of nitrate reaching the groundwater depends on the amount of water infiltrating the soil, the concentration of nitrate in the infiltrating water and soil, the soil type, the depth to groundwater, plant uptake rates, and other processes. Nitrate concentrations now observed in the groundwater basin might be a result of land use practices from several decades ago.

High concentrations of nitrate in drinking water supplies are a particular concern for infants. Nitrate concentrations above the federal and state maximum contaminant level (MCL) of 45 milligrams per liter (45 mg/L NO_3) have been linked to cases of methemoglobinemia ("Blue Baby Syndrome") in infants less than 6 months of age. In addition, public health agencies, including the California Department of Health Services, are conducting research to determine whether excess nitrate in food and drinking water might also have long term carcinogenic (tendency to cause cancer) or teratogenic (tendency to cause fetal malformations) effects on exposed populations.

Communities in the South County rely solely on groundwater for their drinking water supply. The District created the Nitrate Management Program in October 1991 to manage increasing nitrate concentrations in the Llagas Subbasin.

In June of 1992, an extensive study was initiated to review historical nitrate concentrations, identify potential sources, collect and analyze groundwater samples for nitrate, and develop a set of recommendations for the prevention and control of nitrate loading in South County. The results of the study, completed in February 1996, indicated that nitrate concentrations in the Llagas Subbasin are generally increasing over time and that elevated concentrations still exist throughout the subbasin.

In addition, the study found that there are many sources of nitrate loading in Llagas Subbasin. The major sources of nitrate are fertilizer applications, and animal and human waste generation. The southern portion of Santa Clara County has historically been an agricultural area. Only in recent years has agricultural acreage declined due to residential growth. However, due to the slow movement of surface water to the water table, residual nitrate concentrations in the soil from past practices may continue to contribute to increasing nitrate concentrations in the groundwater for several years or decades to come.

The specific recommendations of the study were the following: increase public education to reduce loading and exposure; blend water to reduce exposure; review and possibly revise the well standards; increase the level of regional wastewater treatment in order to reduce reliance on septic systems; increase point source regulation; conduct recharge feasibility studies; increase monitoring of the groundwater basin; and to consider alternative water supplies, treated surface water, water recycling and enhanced sewage treatment technologies for on-site systems.

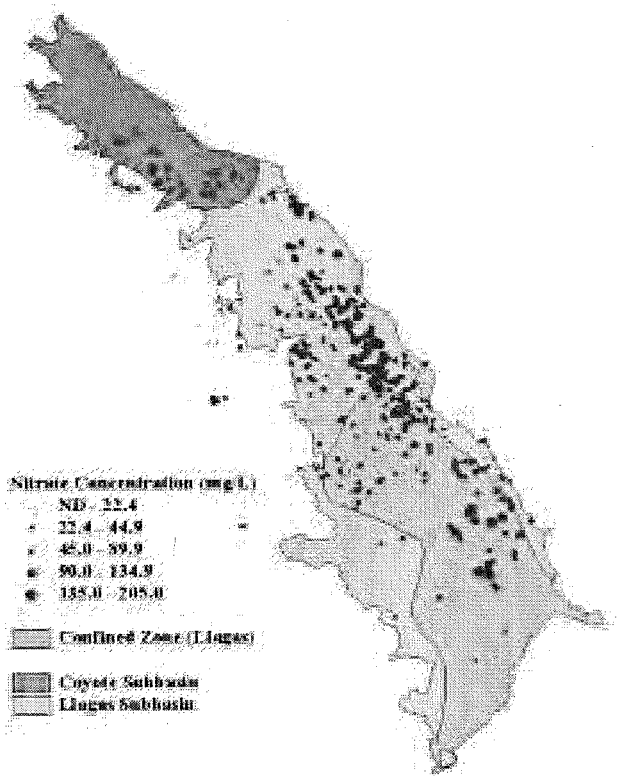
In 1997, the District began implementing the public education portion of the study recommendations. A large agricultural outreach effort was initiated. As part of that outreach, the District entered into a contract with a Mobile Irrigation Lab to offer free irrigation evaluations to farmers in order to improve the efficiency of their irrigation systems and scheduling. By improving the irrigation efficiency and distribution uniformity, the irrigators can reduce the amount of water and nitrate leached beyond the active root zone of the crop and into the groundwater. Over 250 people have attended seminars to increase their awareness of the mobile lab and to learn nitrate-sampling and nitrogen management techniques. Approximately 150 free soil nitrate test kits have been prepared and distributed. A series of 5 fact sheets on Nitrogen and Water Management in Agriculture was produced in cooperation with Monterey County Water Resources Agency and the Pajaro Valley Water Management Agency. English and Spanish versions have been distributed to the agricultural community through a series of seminars, mobile lab operators, other agricultural agencies and the on the District's new Agricultural web page.

To reduce exposure, reduce loading and monitor occurrence, a large-scale public outreach effort was launched offering a free nitrate analysis to all well water users in the Llagas and Coyote Subbasins. Approximately 2,500 residents were notified through

direct mailings about the program and the issues surrounding nitrate in drinking water. An unknown number were notified through newspaper, radio and television coverage. More than 600 private wells shown in Figure 5-1 have been tested for nitrate. Along with the results of the testing, residents were mailed a fact sheet describing what nitrate is, where it comes from, what the health effects are, how to prevent further loading and where to find more information.

Of the 600 private wells tested, more than half exceed the federal safe drinking water standard for nitrate. Of those that exceed the standard, half of the residents use an alternate water source or point-of-use treatment for their drinking water. The data also indicated that nitrate concentrations in the Llagas Subbasin continue to increase, that nitrate concentrations in the Coyote Subbasin have remained steady, and that high concentrations of nitrate are sporadically located throughout both subbasins. A report on the findings was produced in December 1998 and was distributed to several local and state agencies. These elevated nitrate levels were detected only in private wells; it should be noted again that public water supply wells within the County meet drinking water standards.

Figure 5-1
South County Nitrate Concentration

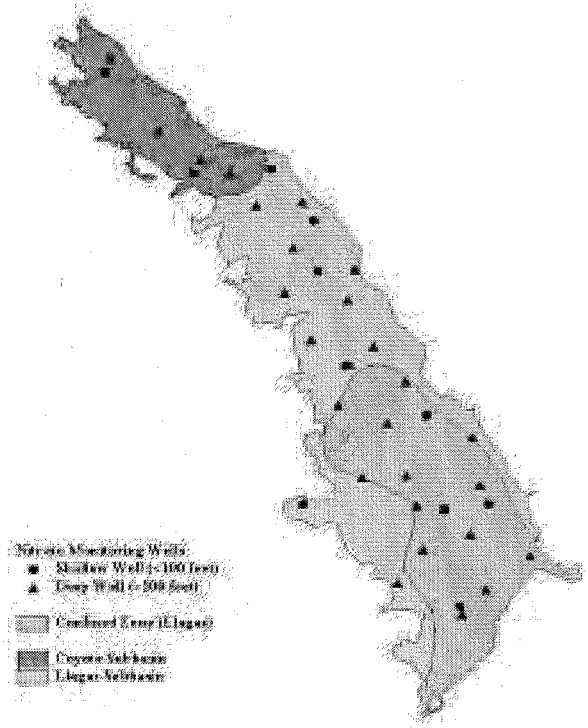


Current Status

To reduce nitrate loading, the District continues to schedule mobile lab evaluations and agricultural seminars. These seminars focus on how to apply irrigation water more efficiently and how to conduct soil testing for nitrate. In addition, the District is a cooperator on a grant with a soil scientist to establish field trials demonstrating and evaluating the effectiveness of in-field nitrate testing in drip and sprinkler irrigated vegetables.

To monitor nitrate occurrence, the District is conducting a comprehensive monitoring effort to track seasonal, areal, vertical and long-term trends in nitrate concentrations. The current monitoring program shown in Figure 5-2 consists of 42 deep groundwater wells (greater than 100 feet deep) and 15 shallow monitoring wells (less than 100 feet deep).The shallow monitoring wells will allow us to track what we might expect to see in the deeper wells in the future. Network wells are being monitored on a quarterly basis to track seasonal variations.

Figure 5-2
Current South County Nitrate Monitoring Network



To reduce nitrate exposure, the District is working with the Santa Clara County Department of Environmental Health to produce a well owner's guide. Among other things, the guide will contain information on recommended sampling, testing and disinfecting practices, as well as measures to protect against contamination.

Future Direction
Continued public education and outreach will remain the focus of the nitrate management program to reduce further loading and prevent possible exposure. If nitrate concentrations continue to increase at all depths, more extensive action may be required. The District may need to investigate alternate water supplies for the many private well water users in the area. Alternate water supplies could include a water treatment plant to remove the nitrate from the existing groundwater supply or the treatment of water from the San Felipe pipeline.

More research is needed to determine how much nitrate is contributed through the various manure management practices currently used. Best Management Practices (BMPs) for manure management need to be determined, and they need to be communicated to the public in a manner that will encourage adoption. More research is also needed regarding reduction of nitrate loading from septic systems; specifically, regarding whether the benefit of removing or reducing septic system loading justifies the economic and political cost of increasing sewer line connections.

To achieve the objective of monitoring nitrate occurrence, the District will continue to sample the existing monitoring network in the Llagas and Coyote Subbasins on a quarterly basis. Two years of quarterly data has been collected so far and staff are in the process of analyzing the data for seasonal, areal, and long-term trends. Staff is beginning a thorough evaluation of the extent and severity of nitrate contamination in the Santa Clara Subbasin, based on water quality data from the District's groundwater monitoring program and the water retailers.

The District may also investigate the feasibility of remediating nitrate contamination. There is some indication that nitrate concentrations around recharge facilities are lower than elsewhere. This finding would need to be confirmed as part of an investigation into reducing nitrate concentrations by additional recharge. Similarly, the District may be able to remediate nitrate contamination by setting up several pump and treat operations. High nitrate water would be pumped out of the basin, treated and injected back into the basin. Phytoremediation, which uses deep-rooted plants to draw the nitrate out of the vadose zone before it can reach groundwater, may be employed in some areas. A fourth possibility is reactive zone remediation where a reagent is injected into the system to intercept and immobilize or degrade the nitrate into a harmless end product. A thorough investigation of any remediation technology would need to occur before prior to its adoption.

SALTWATER INTRUSION PREVENTION

Program Objective
The objective of the Saltwater Intrusion Prevention Program is to monitor and to protect the groundwater basin from seawater intrusion.

Background

The movement of saline water into a freshwater aquifer constitutes saltwater intrusion. This potential exists in groundwater basins adjacent to the sea or other bodies of saline water. Intrusion of saltwater into a freshwater aquifer degrades the water for most beneficial uses and, when severe, can render it virtually unusable. Salty water can corrode holes in well casings and travel vertically to other aquifers not previously impacted. Once freshwater aquifers are rendered useless by a severe case of saltwater contamination or intrusion, it is extremely difficult and costly to reclaim them.

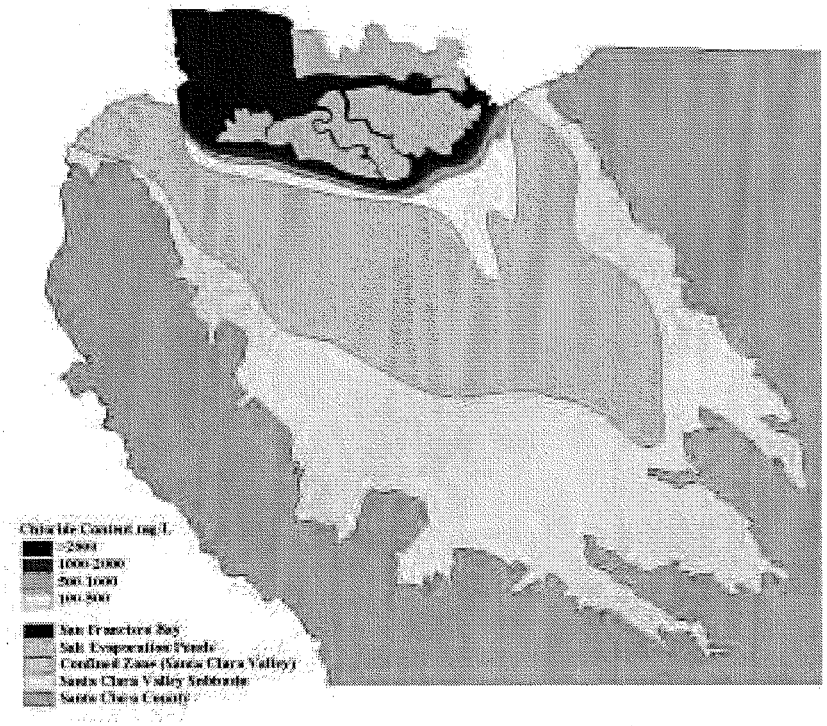
Comparison of older mineral analyses of groundwater from wells in the San Francisco bayfront area in Santa Clara and Alameda counties, some dating back to 1907, with more recent data shows that saltwater intrusion has occurred in the upper aquifer. With much higher water demands after World War II and the occurrence of land subsidence, saltwater intrusion conditions became aggravated and encompassed a portion of the baylands (the area adjacent to the southern San Francisco Bay). Bayshore Freeway (U.S. Route 101) and the Nimitz Freeway (Interstate 880) delineate the southern limits of this area.

The alluvial fill deposits of the Santa Clara Valley Subbasin in the flat baylands area consist of thin aquifers amongst abundant clays. The aquifers are broadly grouped into two water-bearing zones referred to as the "upper aquifer zone," which usually occurs at depths less than 100 feet, and the "lower aquifer zone," which usually occurs at depths greater than 150 to 250 feet, and which constitutes the potable aquifer system. Previous studies indicate the upper aquifer zone fringing San Francisco Bay is widely intruded by saltwater. The lower aquifer zone has pockets of small areas of elevated salinity associated with migration through abandoned wells.

Within the upper aquifer zone, the "classical case" of intrusion which occurs by displacement of freshwater by seawater and is indicated by total dissolved salt content over 5,000 mg/L, has progressed only a short distance inland from the bayfront, estuaries or salt evaporator ponds as shown in Figure 5-3. This intrusion had been induced when pumping of the upper aquifer and land subsidence reversed the hydraulic gradients, which had originally been toward the Bay. A large mixed transition zone precedes this intruding front with its outer limit arbitrarily defined by the 100 mg/L chloride line.

The greatest inland intrusion of the mixed transition water occurs along Guadalupe River and Coyote Creek. The large mixed transition zone is caused by saltwater moving upstream during the high tides and leaking through the clay cap into the upper aquifer zone when this zone is pumped. Land surface subsidence has aggravated the condition of intrusion by allowing farther inland incursion of saltwater up the stream channels from the Bay and by changing the gradient directions.

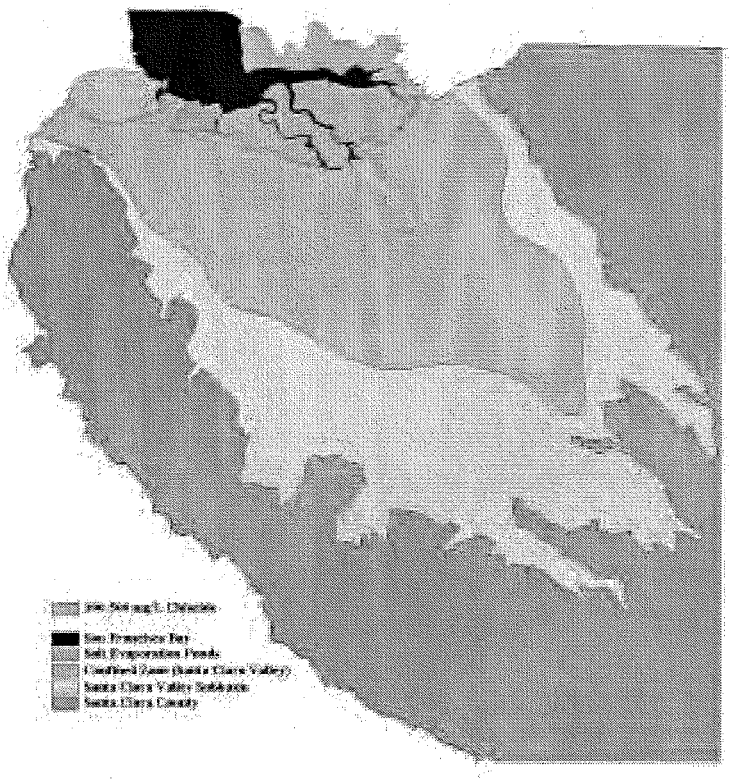
Figure 5-3
Upper Zone Saltwater Intrusion



Data has revealed a local area of high salt concentration in the upper aquifer zone in the Palo Alto bayfront area. This locally concentrated groundwater has moved inland historically and has the potential to continue farther inland. It is in this area that the District constructed a 2-mile-long hydraulic barrier in order to prevent further intrusion and to reclaim portions of the intruded aquifers.

The lower aquifer zone is only mildly affected; the area of elevated salinity encompasses a much smaller area than that of the upper aquifer zone (Figure 5-4). The contaminated lower aquifers lie beneath the intruded portion of the upper aquifer zone. The areal distribution and the variable concentration of the saltwater contamination with time imply that the intrusion into the lower aquifer occurred as seasonal slugs of contaminated water were induced from either the surface or the upper aquifer. As the clay aquitard between the upper and lower aquifer zones is essentially impermeable, the salinity in the lower aquifer zone is thought to have occurred through improperly constructed, maintained or abandoned wells. As a result of this finding, the operation of the hydraulic barrier was discontinued.

Figure 5-4
Lower Zone Saltwater Intrusion



The resumption of land surface subsidence is the greatest potential threat to aggravating the intrusion condition, as it would further depress the land surface fronting South San Francisco Bay. This would increase the inland hydraulic gradient relative to the classical intrusion front and expose a larger area of the upper aquifer zone to intrusion as a consequence of the greater inland incursion of tidal waters. A lowering of the piezometric level in the lower aquifers, which is related to the cause of subsidence, will also increase the potential for intrusion into the lower zone.

Current Status

As part of the Saltwater Intrusion Prevention Program, the defective wells in the northern Santa Clara Valley Subbasin along San Francisco Bay were to be located and destroyed. The District conducted an extensive program of locating and properly destroying these contaminant conduit wells. After these defective wells were located, the owners were required to properly destroy them under District ordinance, or by litigation if necessary. From District records, a list of 45 defective wells to be destroyed was generated.

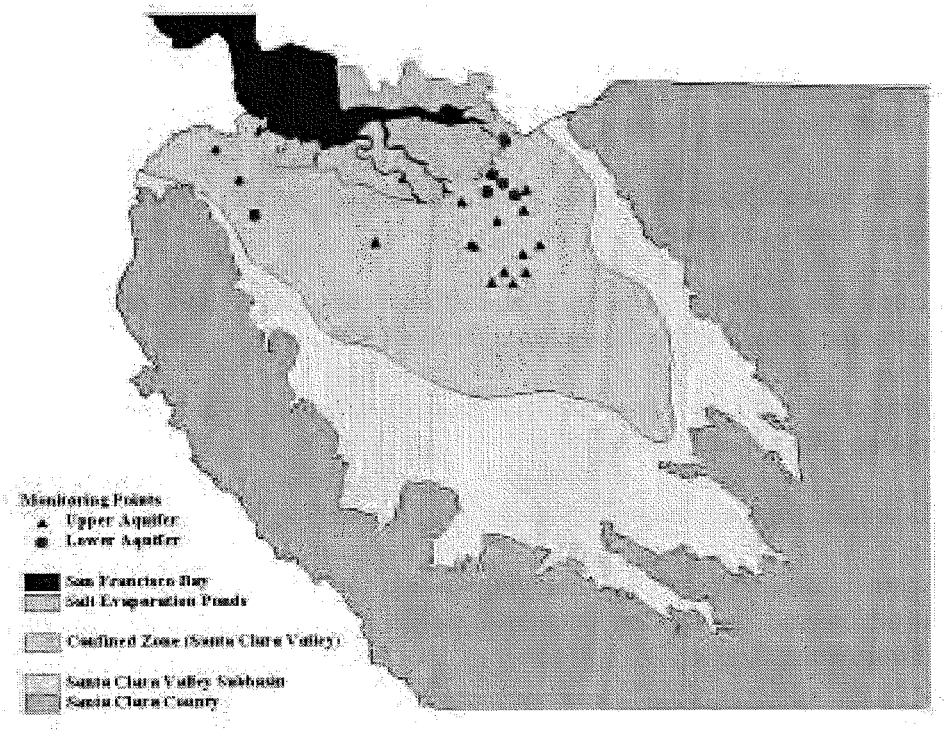
Since the inception of this program, the Board has authorized a more comprehensive well destruction program, through which abandoned wells near areas of known chemical contamination can be destroyed with District funds. This program began in October 1984, and was in part a result of general concerns about contamination of useable aquifers by saltwater as well as by industrial chemicals throughout the County. Several

wells in the area were included in this parallel program, many of which were not identified as defective or potential conduit wells.

Of the 45 potential conduit wells, six were removed from the list as they do not appear to be acting as conduits. In 1985, the District's Groundwater Protection Section pursued destroying the remaining 39 wells through District Ordinance No. 85-1. This ordinance gives the District authority to require owners of wells determined to be "public nuisances" to destroy the wells or to upgrade them to active or inactive status. Of the 39 potential conduit wells identified, 10 were not located and were presumed destroyed without a permit. The remaining wells were all properly destroyed.

The District continues to monitor the extent and severity of saltwater intrusion. The current Saltwater Intrusion Monitoring Program consists of 21 monitoring wells that are sampled quarterly as shown in Figure 5-5. Five of these wells monitor the status of saltwater intrusion in the lower aquifer zone, while the remaining 16 wells monitor the upper aquifer zone. Originally, the program consisted of 25 wells. Eight of these wells could not be located during recent field investigations and presumably were destroyed by the owners. However, work is commencing to replace the lost wells with District-owned wells and restore the monitoring program to its original form.

Figure 5-5
Saltwater Intrusion Monitoring Locations



Future Direction
The present status of the Saltwater Intrusion Prevention Program is subject to change, depending upon the future basin operation and groundwater demand in the area. The two economically practical ways to prevent or minimize any further intrusion are through management of the groundwater basin and strict enforcement of ordinances on well construction and destruction standards. These approaches have been adopted by the District and should continue to be implemented.

Saltwater intrusion continues to be monitored. Monitoring data are stored by electronic and conventional means. Electronic storage consists of a geographically referenced database of monitoring wells and a related database of water quality information. Conventional storage consists of filing hard copies of laboratory analytical reports in the appropriate well folders and providing data to DWR. Biennial evaluations of the data are documented in the General Groundwater Quality Monitoring Program reports. The monitoring program, including well location and sampling frequency, will be evaluated with respect to long-term groundwater quality protection strategies and overall basin management.

WELL CONSTRUCTION/DESTRUCTION PROGRAMS

Well Ordinance

Program Objective
The objective of the Well Ordinance Program is to protect the County's groundwater resources by ensuring that wells and other deep excavations are constructed, maintained and destroyed such that they will not cause groundwater contamination. To meet this goal, the Well Ordinance Program:

- Develops standards for the proper construction, maintenance, and destruction of wells and other deep excavations.
- Educates the public, including contractors, consultants and other government agencies about the Well Ordinance and the Well Standards.
- Verifies that wells are properly constructed, maintained and destroyed using a permitting and inspection mechanism.
- Takes enforcement action against violators of the well ordinance.
- Maintains a database and well mapping system to document information about well construction and destruction details, a well's location, and well permit and well violation status.

The scope of the Well Ordinance Program includes all activities relating to the construction, modification, maintenance, or destruction of wells and other deep excavations in the County.

Background

In the late 1960s, following post-war industrialization and development of Santa Clara County, it became apparent that abandoned or improperly constructed wells and other deep excavations (e.g. elevator shaft pits) are potential conduits through which contaminants can travel from shallow, potentially contaminated aquifers, to deeper drinking water aquifers. Recognizing this, in 1971; a District advisory committee consisting of representatives from local agencies, the District, and the Association of Drilling Contractors, was established.

The committee was charged with the development of well construction standards and standards for the proper destruction of abandoned wells. The Board adopted standards for well destruction and construction in October 1972 and January 1975, respectively. In 1975, the District Board of Directors passed the first District Well Ordinance.

Both the Standards and the Well Ordinance have undergone numerous revisions. The most recent version of the well standards, the *Standards for the Construction and Destruction of Wells and Other Deep Excavations in Santa Clara County*, was adopted by the Board in July 1989. The Board passed district Well Ordinance 90-1 in April 1990. These documents address the permitting and proper construction and destruction of wells and other deep excavations, including water supply wells, monitoring wells, remedial extraction wells, vadose wells, cathodic protection wells, injection wells, storm water infiltration wells and elevator shaft pits.

Beginning in 1975, well construction and destruction permits were required by the District and the District began inspecting every well that was constructed. Well destruction activities were first inspected by the District in 1984.

Since the inception of well permitting, the annual number of permits issued has greatly increased. The District issued approximately 400 well permits in 1976, the first full year of permitting, to a maximum of approximately 2,544 permits in 1994.

The District is in compliance with Sections 13803 and 13804 of the State Water Code and thereby has the authority to assume the lead role in the enforcement of the State Well Standards, the assignment of State Well Numbers, and the collection of State Drillers Reports for all wells constructed or destroyed in Santa Clara County.

Current Status

To date, the District has permitted and inspected the construction of approximately 3,000 water supply wells, 22,000 monitoring wells, 4,000 exploratory borings, and the destruction of 9,500 wells under the Well Ordinance Program.

The District has recently completed converting the paper-based well maps to a GIS based well mapping system.

Future Direction
In order to continue protecting the District's groundwater resource, the District will continue implementation of the program and will continue to regulate the construction and destruction of wells in the County. District staff will re-write District's well standards and ordinance to address recent changes in well construction and destruction techniques. District staff is also currently evaluating District's existing well information database and would like to convert the database into a relational database format and link it to the newly developed GIS based Well Mapping System.

Dry Well Program

Program Objective
The objective of the Dry Well Program is to minimize the impacts of dry wells on groundwater quality. The main objectives of this program are to:

- Control installation of new dry wells.
- Destroy existing dry wells that have contaminated or may contaminate groundwater.
- Educate planning agencies and the public about the threat that dry wells pose to groundwater quality.

Background
Dry wells, also known as storm water infiltration devices, are designed to direct storm water runoff into the ground. Storm water runoff can carry pollution from surface activities. Because dry wells introduce runoff directly into the ground, they circumvent the natural processes of pollution breakdown and thereby increase the chance of groundwater contamination. Additionally, dry wells have been sites of illegal dumping of pollutants.

In Santa Clara County, at least 8 serious contamination sites were caused or aggravated by the presence of dry wells introducing contamination into the groundwater. One dry well site has a solvent plume more than 2,000 feet long and more than 200 feet deep in a recharge area of South County where the only source of drinking water is groundwater.

In 1974, the Environmental Protection Agency (EPA) developed the Underground Injection Control Program under the Safe Drinking Water Act. The program requires the owners and operators of all shallow drainage wells to submit information regarding the status of each well to the EPA. The Regional Board adopted the "Shallow Drainage Wells" amendment to the Basin Plan in 1992. The Basin Plan amendment requires the local agency to develop a shallow drainage well control program that would locate existing shallow wells and establish a permitting program for existing and new wells.

In 1991, the District and municipal agencies began development of a Storm Water Infiltration Policy to satisfy Regional Board requirements. In August 1993, the District adopted Resolution 93-59 regarding Storm Water Infiltration Devices.

Current Status
Since 1993, owners of dry wells deeper than 10 feet have been required to register their wells by filing a "Notice to Continue Use" with the District. Dry well owners can continue using their wells as long as the well is not an immediate threat to groundwater quality. Local cities, businesses, contractors and private citizens regularly call for District guidance on dry wells.

The District continues to issue permits for dry wells greater than 10 feet deep and for the destruction of dry wells. District staff advise the public and planning agencies about the appropriate use of dry wells to mediate storm water problems generally and on a case-by-case basis. District staff continue to work with local programs to clarify the District dry well policy. Local inspecting agencies continue to work with the District to locate and register dry wells.

Future Direction
The Dry Well Program is being incorporated into the Well Ordinance Program. Specific standards for dry wells will be incorporated into the next revision to the Well Standards. These standards include prohibiting the construction of dry wells greater than 10 feet deep and defining dry wells to include all shallow drainage wells, not just shallow drainage wells receiving storm water. The purpose of revising the program to incorporate it into the Well Ordinance Program is to clarify permitting and construction standards for dry wells, to expand the definition of devices covered by the Well Standards so that all wells that bypass natural protection processes are subject to standards for protecting groundwater, and to simplify the process by which dry wells are permitted.

Abandoned Water Well Destruction Assistance

Program Objective
The objective of the Abandoned Well Destruction Assistance Program is to protect the County's groundwater resources by helping property owners properly destroy old, abandoned water supply wells that they have discovered.

To meet the program's objective, the District:

- Passed a Board Resolution (94-87) allowing District assistance to property owners who discover abandoned wells.
- Enters into annual contracts with well drillers to complete work associated with the project.
- Destroys abandoned wells for property owners.

Background
Due to the agricultural history of the County and to subsequent post-World War II development, many former water supply wells were abandoned and buried and remain

potential vertical conduits that may transport contaminants into the District's deep, water supply aquifers.

Some estimates indicate that there may be as many as 10,000 abandoned water supply wells within the boundaries of the Santa Clara Subbasin. Since there are no official records for these wells, the District has no knowledge of their existence or their locations.

In the mid-1980s, the District took a proactive stance on active and abandoned water supply wells found within known contamination plumes. At that time, with assistance from the Regional Board, the District actively searched for and destroyed known active wells and abandoned wells.

However, when abandoned water wells were discovered in areas not threatened by known groundwater contamination, they were not included in the District's well destruction efforts, but instead were treated as well violations under the Well Ordinance Program. As well violations, the District proceeded with enforcement action to force the property owner to properly destroy the well.

Unfortunately, this enforcement action often took months to complete. Property owners often didn't have the $3,000 to $15,000 dollars needed to destroy the well and had to secure loans to complete the destruction. Many property owners had negative feelings about the District after the enforcement action, especially considering that most property owners had no previous knowledge of the well and when they had discovered the well, they had been the first to inform the District of its existence.

District staff believed that while a well was found on an owner's property (and according to the Well Ordinance, that the property owner is responsible for destroying it), the owner wasn't actually responsible for the well's current status (abandoned and buried) and because the destruction of the well was in the best interest of the District, that the District should destroy it.

Therefore, in 1994, the District initiated the Abandoned Well Destruction Assistance Program to aid property owners who happen to discover an abandoned water supply well on their property. Under the Abandoned Well Destruction Program, the District destroys abandoned water wells if: 1) the property owner had no previous knowledge of the well, 2) the well was not registered with the District, 3) the well has no surface features that would have obviously indicated its presence, and, 4) the property owner enters into a Right of Entry Agreement with the District.

Current Status

Since the program's inception in 1994, the District has destroyed 108 abandoned wells under the Abandoned Well Destruction Program. Most of these wells were first discovered and reported to the District because they were flowing under artesian pressure.

Future Direction
Staff will continue to implement the program. Annually, staff receives reports of approximately 20 wells that meet program criteria and staff expect that this trend to continue.

WELLHEAD PROTECTION

Program Objective
The Wellhead Protection Program (WHP) represents the groundwater portion of the District's Source Water Assessment Program. The objective of the Wellhead Protection Program is to identify areas of the groundwater basin that are particularly vulnerable to contamination. The District uses this knowledge to focus groundwater protection, monitoring, and cleanup efforts.

Background
Groundwater vulnerability is based on groundwater sensitivity to contamination and the presence of potentially contaminating activities. Groundwater sensitivity is evaluated based on hydrogeology and groundwater use patterns. Areas with shallow groundwater, high recharge, high conductivity aquifers, permeable soils and subsurface materials, mild slopes, and high groundwater pumping rates are most sensitive to contamination. The District compiles data on hydrogeologic conditions, pumping patterns, and contamination sources, and uses GIS technology to identify areas of the groundwater basin that are particularly vulnerable to contamination.

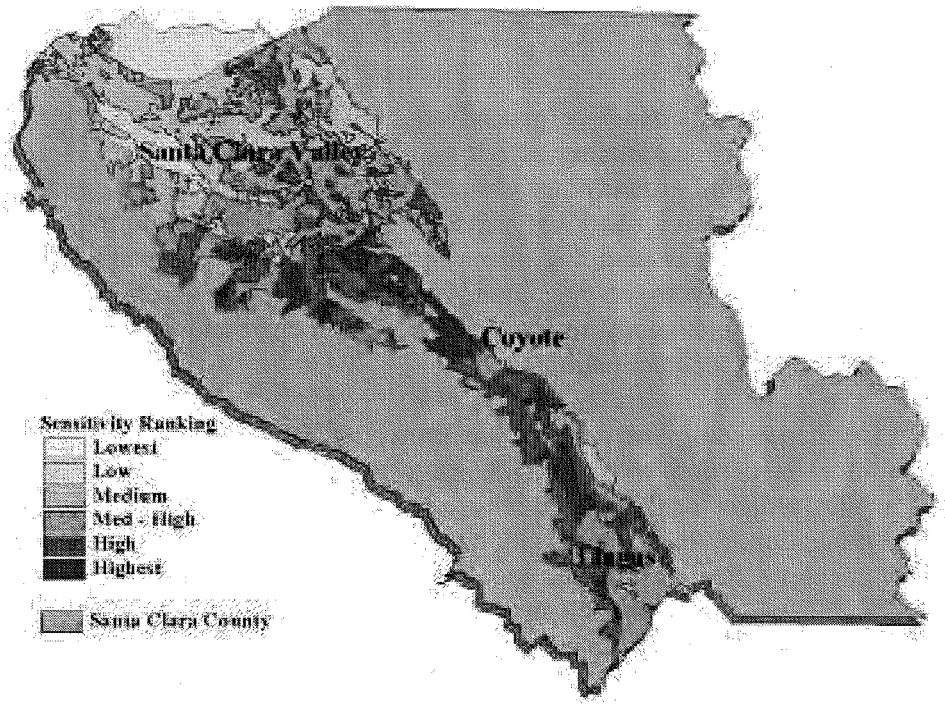
The District first began compiling groundwater protection data in the late 1980's. In 1989, the District, in collaboration with the U.S. Environmental Protection Agency (EPA), conducted a pilot project in the Campbell area to evaluate the usefulness of GIS for groundwater protection. Data on roads, city boundaries, hazardous material storage sites, groundwater recharge facilities, wells and hydrogeology were collected and used to create GIS coverages for the Campbell study area. The project team used GIS to evaluate groundwater sensitivity and draw areas to be protected around production wells. The study concluded that GIS is a feasible tool to use for WHP programs.

After the Campbell pilot study, the District expanded its groundwater protection data collection effort to encompass the entire County. Staff developed Countywide GIS coverages of active wells, abandoned and destroyed wells, geology, soil types, depth to groundwater, leaking underground storage tank sites, and petroleum storage facilities. This data, along with water quality data, is used to identify and evaluate threats to groundwater quality.

Current Status
The District created a groundwater sensitivity map to evaluate land use development proposals and make recommendations for appropriate groundwater protection strategies. In 1996, the District built upon the pilot GIS project to assess groundwater sensitivity throughout the groundwater basin using EPA's DRASTIC method. DRASTIC stands for

depth to water table, net recharge, aquifer media, soil media, topography, impact of the vadose zone, and hydraulic conductivity of the aquifer. The DRASTIC method is a quantitative evaluation of these hydrogeologic factors to assess relative groundwater sensitivity. The results of this effort were several GIS coverages and a groundwater sensitivity map (Figure 5-6), which the District uses to review land development proposals. In sensitive groundwater areas, the District requests that planning agencies require, and that property owners implement, best management practices and other protection activities beyond those required by minimum standards.

Figure 5-6
Groundwater Sensitivity Map



Staff uses information on land use and the location of contaminated sites to help identify and evaluate the sources of contamination that are detected in wells. Although groundwater quality is generally good throughout the basin, contamination is occasionally detected in individual wells. By quickly locating contamination sources, we can work with the regulatory agencies to ensure prompt and adequate cleanup.

The District also uses information on well construction, well location, well pumping, leaking Underground Storage Tank (UST) site locations and conditions, land use, and hydrogeology to prioritize leaking UST sites and identify vulnerable water supply wells. Sites that pose the greatest threat to groundwater supplies are the first to receive detailed regulatory oversight. Staff also uses this information to select wells for groundwater monitoring and special studies.

District staff is working with local water retailers on the state's Drinking Water Source Assessment and Protection (DWSAP) Program. The state's DWSAP Program is required by the 1996 reauthorization of the federal Safe Drinking Water Act. California has until May 2003 to assess all of its drinking water sources for vulnerability to contamination. The District developed a GIS-based wellhead assessment and protection area delineation tool, which delineates protection areas according to state guidelines. Once the vulnerability assessments are completed in Santa Clara County, the District will work with the water retailers to ensure that the greatest threats to their drinking water supply wells are being addressed.

Future Direction

District staff continues to create GIS coverages that help assess groundwater vulnerability. Some coverages that are in development include solvent contamination sites and plumes, dry cleaners, hazardous materials storage facilities, septic system locations, and sewer lines. The District has found great utility in these GIS coverages, and is beginning to work with other agencies and organizations to determine how we can share GIS information and increase its use for groundwater protection. We will continue to use this information to identify areas vulnerable to groundwater contamination, and focus our monitoring, protection, and cleanup efforts.

LEAKING UNDERGROUND STORAGE TANK OVERSIGHT

Program Objective

The objective of the Leaking Underground Storage Tank Oversight Program (LUSTOP) is to protect the groundwater basin from water quality degradation as a result of releases of contaminants from underground storage tanks. The District provides regulatory oversight of the investigation and cleanup of fuel releases from USTs for most of Santa Clara County.

Background

In 1983, the State Legislature enacted the UST Law [Chapter 6.7 of the Health and Safety Code] authorizing local agencies to regulate the design, construction, monitoring, repair, leak reporting and response, and closure of USTs. In the early 1980s, several drinking water wells in the County were shut down as a result of contamination by chlorinated solvents. In 1986, the Board decided to implement a leaking UST oversight program for petroleum fuels in coordination with the San Francisco Bay Regional Water Quality Control Board (RWQCB). The District Board recognized that releases from USTs affect groundwater quality and that effective protection of the County's groundwater basin demanded a proactive approach. They committed financial and technical resources in-house to quickly initiate the program.

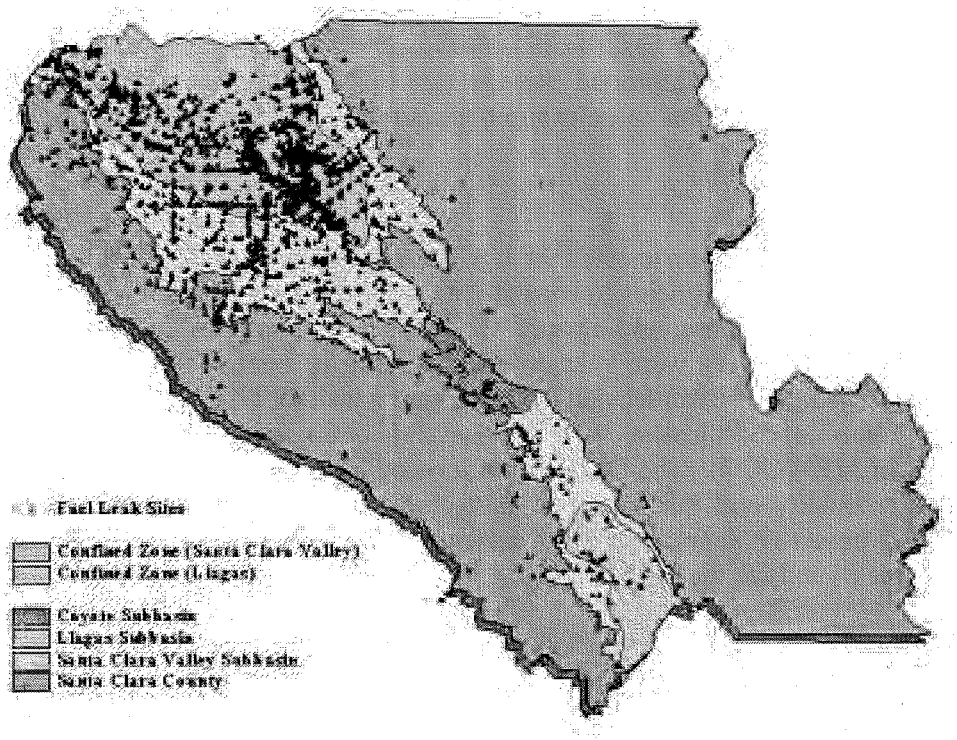
In 1987, the District entered into an informal agreement with the San Francisco RWQCB to create a pilot oversight program. At that time more than 1,000 fuel leaks had been reported within the County. The District developed an in-house technical group of employees capable of providing regulatory oversight of the investigation and cleanup of

releases from USTs. In 1988, the District and the County of Santa Clara entered into a contract with the State Water Resources Control Board to implement one of the State's first Local Oversight Programs. This allowed the District to get reimbursed by state and federal funds for costs associated with operation of the program.

The State Water Resources Control Board (SWRCB) amends its Local Oversight Program contract with the District and the County annually. Over the years, many changes have occurred in the UST regulatory process as new laws were passed, scientific knowledge improved, and new investigation and cleanup strategies became available. The District's program actively participates in ensuring that new laws and regulations continue to protect groundwater quality into the future. The District has been at the forefront of several initiatives for improving the effectiveness and efficiency of our regulatory oversight efforts and the cost-effectiveness of corrective action while protecting human health, safety, the environment and water resources.

Every leaking petroleum UST case is currently assigned to a District caseworker who provides technical and regulatory guidance to responsible parties and their consultants (Figure 5-7).

Figure 5-7
Fuel Leak Cases in Santa Clara County



The District only provides regulatory oversight on investigation and cleanup at UST sites where a release has occurred. Tank removals, leak prevention, and UST release detection activities are overseen by one of 10 other agencies, usually the local fire department. Each agency has jurisdiction over a designated geographical area in the County. If there is evidence of a leak or if contamination is detected, an agency inspector or UST owner/operator notifies the District and/or the Regional Board. The District reviews the data to confirm the release, lists the site on the Leaking Underground Storage Tank Oversight Program database, and notifies the responsible party and the SWRCB. The District then determines if the unauthorized release poses a threat to human health and safety, the environment, or water resources and, if necessary, a caseworker requests additional investigation and cleanup.

To get case closure for the release, the responsible party must provide evidence that the release does not pose a significant threat to human health and safety, the environment or water resources; or, that the release has been adequately investigated and cleaned up. Fuel leak investigation and cleanup is closely monitored by a caseworker, and the case is promptly closed when the unauthorized release no longer poses a threat to human health, safety, the environment or water resources.

Current Status

As of January 2000, a total of 2,315 fuel leak cases have been reported in the County, the majority of which have affected groundwater. Approximately 1,650 (71 percent) of reported leak cases have been closed. About 575 cases are currently within the District's UST program, while about 75 cases receive Regional Board oversight. As a local oversight program, the District has made significant progress in closing low-risk sites and sites that have performed appropriate corrective action to reduce contamination to below levels of regulatory concern.

The presence of Methyl tert-Butyl Ether (MTBE) in gasoline has precipitated additional changes in the UST regulatory process and the manner in which sites are investigated and cleaned up. Since 1995, MTBE and other oxygenates have emerged as significant contaminants at fuel leak sites within the County, causing increased concern for the protection of groundwater resources. MTBE has been blended into gasoline in high percentages (up to 15 percent by volume) beginning in the winter of 1992 with the intent to significantly improve air quality. However, MTBE is a recalcitrant chemical in groundwater, as it does not undergo significant breakdown (bio-degradation) in groundwater. As a result, MTBE contamination can migrate considerable distances in groundwater and may impact wells miles downgradient. MTBE has been detected at more than 375 current fuel leak cases in the County, with concentrations at these sites ranging from 5 parts per billion to more than 1 million parts per billion. The District has taken a progressive and vigilant approach to protecting groundwater resources from MTBE contamination through the use of GIS to manage and analyze both UST site and regional information and in demanding a more intense and detailed level of work be performed at MTBE release sites.

The District is also very concerned regarding the increasing occurrence of MTBE at operating gasoline stations, which poses a significant threat to municipal drinking water wells within the County. In response to this threat, the District completed two studies of operating gasoline stations that were in compliance with the 1998 UST upgrade requirements. The first study, completed by Levine-Fricke in 1999, involved soil and groundwater sampling at 28 facilities to determine if releases were occurring from upgraded UST systems. MTBE was detected in groundwater at 13 of the 27 sites where groundwater was encountered. The second study, completed in 2000 (SCVWD, 2000), was a case study of 16 sites with operating USTs and high levels of MTBE in groundwater to evaluate whether undetected releases are occurring and to assess weaknesses in fuel storage, management, and delivery operation. Of the 16 sites studied, undetected releases were suspected at 13 sites.

Despite the fact that gasoline stations have been upgraded to meet stringent requirements, it is clear that faulty installations, poor maintenance and poor facility operation practices are resulting in leaks, and that improvements in the management of USTs are needed to prevent widespread contamination of groundwater.

Future Direction

The District continues to provide technical guidance and regulatory oversight to cases using improved scientific knowledge and latest investigation and cleanup strategies. The District will continue to work closely with local universities, research organizations, the water community, major oil companies, local, state and federal agencies, and the state and federal legislature to ensure that problems in the UST program are identified and that prompt effective solutions are implemented to protect groundwater quality.

An effective UST leak prevention and monitoring program is essential. There are several studies underway regarding the effectiveness of leak prevention and monitoring systems at sites. The District will continue to monitor all developments in this area and propose ongoing studies and/or regulatory changes. To ensure water resources are protected, the District actively participates in the legislative process to ensure that recalcitrant chemicals like MTBE that can cause significant groundwater degradation are not used in fuels.

One of the biggest concerns for the District regarding MTBE is the significance of both short-term and long-term threats to groundwater quality. The District is committing additional resources to gain a more extensive understanding of the groundwater basin, groundwater flow patterns, and groundwater pumping trends. This improved understanding allows for better decisions regarding: the level of oversight necessary at sites; how much investigation is required to properly understand the nature and extent of contamination at sites; the level of cleanup necessary to protect groundwater resources; and the effectiveness of the program in preventing significant short-term and long-term water quality degradation.

The District will continue responding to the public regarding USTs and groundwater contamination and will ensure that files and information are available for public review.

District staff plan to have all fuel leak files scanned and electronically accessible over the Internet in the near future. Program guidance, site information, and news of the latest developments in the program are available on the District's web site.

TOXICS CLEANUP

Program Objective

The objective of the Toxics Cleanup Program is to ensure the protection of the groundwater basins from water quality degradation as a result of toxics and solvent contamination and spills of other non-fuel chemicals. The District performs peer review of these cases and makes water use and geologic information available to the public and environmental consultants. District staff also provide expert technical assistance to the regulatory agencies (County of Santa Clara, San Francisco and Central Coast Regional Boards, Department of Toxics Substances Control, and the Federal Environmental Protection Agency) responsible for the oversight of investigation and cleanup at non-fuel contaminated sites within Santa Clara County.

Background

Since the late 1970s, the District has provided expert technical and hydrogeologic assistance to agencies having the legal responsibility for the protection of the water resources serving the needs of Santa Clara County. The discovery of groundwater contamination at Fairchild Semiconductor in 1981 resulted in heightening the awareness for the protection of groundwater quality and the need for the District to be actively involved in ensuring that appropriate investigation and cleanup of sites was undertaken in a timely manner. District staff were actively involved with the review and analysis of early laws governing the regulation of underground storage tanks and hazardous materials and in laws, regulations, and policies to ensure groundwater resource protection. District staff have documented the migration of contamination down abandoned wells and conduits and fashioned a well installation and destruction ordinance to ensure that wells were properly installed and potential conduits properly destroyed.

Current Status

The District has records of over 700 releases of non-fuel related cases involving the release of solvents, metals, pesticides, Polychlorinated Biphenyls (PCBs), and a variety of other chemicals in Santa Clara County. The San Francisco Bay RWQCB provides regulatory oversight on over 600 cases in the Santa Clara Valley and Coyote Subbasins. The Central Coast RWQCB provides oversight on an estimated 35 cases in the Llagas Subbasin. The California Department of Toxics Substances Control provides oversight of 17 cases and the Federal EPA provides oversight of 11 sites.

The District maintains an elaborate filing system for these cases that is heavily used by the environmental consultants and the public researching contaminated sites. District staff actively track and peer review the most serious of these cases (primarily the Superfund sites). Staff provide review and comment on Site Cleanup Requirements and Cleanup and Abatement Orders prepared by the Regional Boards and investigation and cleanup reports prepared for these sites. The District provides geologic and technical

expertise to responsible parties (site owners and operators) and their consultants and staff, and regularly participate in various committees and public meetings to ensure groundwater protection issues are properly addressed.

Future Direction
The District plans to continue these efforts in addition to conducting a review of all the recorded cases to ensure that all have been properly addressed by the various regulatory agencies. Many cases have remained "inactive" and may not have performed appropriate investigation and cleanup. The District plans to inform the regional boards and other agencies of these reviews and assist them to ensure appropriate work is performed. The District also plans to make more information available regarding geologic conditions and the status of solvent and toxics cases in GIS and over the Internet.

LAND USE AND DEVELOPMENT REVIEW

Program Objective
The objective of the Land Use and Development Review Program is to evaluate the land use and developments occurring within the County for adverse impacts to watercourses under District jurisdiction and to other District facilities, including the pollution of groundwater.

Background
Land development decisions made by the cities and the County influence a variety of issues related to water quality and quantity. The District reviews land development proposals, identifies any potential adverse impacts to District facilities and provides comments to the lead agency charged with making the final decision for the proposals. The District also reviews Draft Environmental Impact Reports (DEIRs) and/or EIRs and provides comments to the lead agency.

Current Status
The District reviews and comments on proposed land development, environmental documents and city and County General plans. Review of land development proposals includes a determination of direct and indirect impacts to District facilities. Indirect impacts could result from increased runoff and flooding due to new impervious surface or introduction of pollutants to a watercourse from construction activities or urban runoff. Direct impacts to watercourses under District jurisdiction are addressed through the District's permitting program as defined by Ordinance 83-2.

This ordinance allows the District to investigate whether a proposed project or activity will:

a. Impede, restrict, retard, pollute or change the direction of the flow of water.

b. Catch or collect debris carried by such water.

c. Be located where natural flow of the storm and flood waters will damage or carry any structure or any part thereof downstream.

d. Damage, weaken, erode, or reduce the effectiveness of the banks to withhold storm and flood waters.

e. Resist erosion and siltation and prevent entry of pollutants and contaminants into water supply.

f. Interfere with maintenance responsibility or with structures placed or erected for flood protection, water conservation, or distribution.

If a project appears likely to do any of the above, the District may deny or conditionally approve the permit application for the proposed project.

Future Direction
The California Environmental Quality Act (CEQA) provides the District an opportunity to comment in areas relevant to the issues listed above; however, cities need to make certain these issues are adequately addressed and treated. The use of Ordinance 83-2 and CEQA have generally not effected adequate attention to these issues.

In years past the District has relied on local agencies to place conditions on development projects and to include provisions that address District water supply and flood protection measures. The recent increase in development and land use coupled with more stringent environmental concerns and requirements imposed by other regulatory agencies has made it necessary for the District to shift to a more proactive approach and to undertake greater participation in development planning activities. District land use and development review staff plan to participate on interagency project teams, conduct general plan review and revision, and development of relevant policies (such as riparian corridor and building setback policies). The program will also seek revisions to Ordinance 83-2, and greater education of land development planning staff and officials.

Additional Groundwater Quality Management Activities

Groundwater Guardian Affiliate
The District was designated as Groundwater Guardian Affiliate for the year 2000. Groundwater Guardian is an annually earned designation for communities and affiliates that take voluntary, proactive steps toward groundwater protection. The district earned the designation in 2000 based on activities such as conducting irrigation, nutrient, and pesticides management seminars, sponsoring a mobile irrigation management laboratory, and creating a prototype zone of contribution delineation tool for delineating wellhead protection areas. The Groundwater Guardian Program is sponsored by The Groundwater Foundation, a private, international, not-for-profit education organization that educates and motivates people to care about and for groundwater. The District will continue to participate in the program by submitting annual work plans and reports documenting our groundwater protection efforts.

Comprehensive Reservoir Watershed Management

The District has initiated a Comprehensive Reservoir Watershed Management Project to protect the water quality and supply reliability of the District's reservoirs. The District seeks to balance watershed uses, such as the rights of private property owners and public recreational activities, with the protection and management of natural resources. The District recognizes that preserving beneficial watershed uses can benefit reservoir water quality, which in turn benefits drinking water quality delivered to the District treatment plants and recharged into the groundwater basins.

Watershed Management Initiative

The District is an active participant in the San Francisco Bay Regional Water Quality Control Board's Santa Clara Basin Watershed Management Initiative (WMI). The purpose of the WMI is to develop and implement a comprehensive watershed management program. The goals of the WMI include balancing the objectives of water supply management, habitat protection, flood management, and land use to protect and enhance water quality, including the quality of water used for groundwater recharge and water in the groundwater basins. The WMI will develop a watershed management plan that will set out agreed upon actions to meet stakeholder goals, including water quality protection and enhancement.

Non-Point Source Pollution Control

The District along with other agencies is the co-permittee for National Pollution Discharge Elimination System (NPDES) permit number CAS029718. The co-permittees formed the Santa Clara Valley Urban Runoff Management Program in 1990 to develop and implement efficient and uniform approaches to control non-point source pollution in storm water runoff that flows to the South San Francisco Bay, in compliance with NPDES permit responsibilities.

Chapter 6
SUMMARY

The many groundwater management programs and activities described in this document demonstrate that the District is proactive and effective in terms of ensuring that groundwater resources are sustained and protected. A summary of existing District groundwater programs is presented here, organized by report section.

Groundwater Supply Management
The objective of the District's groundwater supply management programs is to sustain groundwater resources by replenishing the groundwater basin, increasing basin supplies, and mitigating groundwater overdraft. This is currently achieved through:

- In-stream recharge, including controlled and uncontrolled recharge through District facilities.
- Off-stream recharge through District percolation ponds and abandoned gravel pits, including activities to reduce turbidity of incoming water.
- Periodic water balance to reconcile water imports, inflows, releases, and changes in surface water storage.
- Direct injection recharge facilities.
- Water use efficiency programs.
- Estimation of operational storage capacity.
- Subsidence and groundwater flow modeling to evaluate potential impacts to the groundwater basin.
- Public outreach and education for water use efficiency programs.

Groundwater Monitoring
The District's groundwater monitoring programs provide basic data to assist in the evaluation of groundwater conditions. Programs include:

- Groundwater quality monitoring, including sampling for general minerals, trace metals, and physical characteristics.
- Groundwater elevation monitoring, including depth-to-water measurements and the development of groundwater contour maps.
- Groundwater extraction monitoring, which tracks groundwater use throughout the County.

- Land subsidence monitoring, which measures existing subsidence.

Groundwater Quality Management
Existing programs designed to protect the groundwater from contamination and the threat of contamination include the following:

- Nitrate management program designed to delineate, track, and manage nitrate contamination by monitoring nitrate occurrence, and by reducing further loading and the public's exposure to nitrate.

- Saltwater intrusion prevention program to prevent freshwater aquifers from degradation through monitoring and the sealing of contaminant conduit wells.

- Well construction and destruction programs to protect groundwater resources by ensuring that wells will not allow the vertical transport of contaminants.

- Wellhead protection program to identify areas of the basin that are particularly vulnerable to contamination to focus groundwater protection, monitoring, and cleanup efforts.

- Leaking underground storage tank oversight program to protect the groundwater from water quality degradation and provide regulatory oversight of investigation and cleanup of fuel releases from underground tanks.

- Toxics cleanup program to protect the basin from contamination by non-fuel chemicals.

- Land use and development review to evaluate land use proposals in terms of potential adverse impacts to District facilities.

- Public outreach and education for groundwater quality management programs.

Recommendations
In 1999, the District Board of Directors established Ends Policies that direct the Chief Executive Officer/General Manager to achieve specific results or benefits. The following Ends Policies are related to groundwater:

E.1.1.2. The water supply is reliable to meet current demands.
E.1.1.3. The water supply is reliable to meet future demands as identified in the District's Integrated Water Resource Plan (IWRP) process.
E.1.1.4. There are a variety of water supply sources.
E.1.1.5. The groundwater basins are aggressively protected from contamination and the threat of contamination.
E.1.1.6. Water recycling is expanded consistent with the District's Integrated Water Resource Plan (IWRP) within Santa Clara County.
E.1.2.2.3. Groundwater supplies are sustained.

Two of the Ends Policies directly relate to the management of groundwater resources: 1.1.5 - The groundwater basins are aggressively protected from contamination and the threat of contamination, and 1.2.2.3 - Groundwater supplies are sustained. As the District is now formally guided by these policies, we need to ensure that program outcomes match these ends.

Although the District manages the basin effectively, there is room for improvement of the groundwater programs in terms of meeting the Ends Policies and in the coordination and integration of the programs. Specific areas where further analysis is recommended include:

1. **Coordination between the Groundwater Management Plan and the Integrated Water Resources Plan (IWRP)** – As the District's water supply planning document through 2040, the IWRP has identified the operation of the groundwater basin as a critical component to help the District respond to changing water supply and demand conditions. Planning and analysis efforts for future updates of the Groundwater Management Plan and the IWRP need to be integrated in order to provide a coordinated and comprehensive water supply plan for Santa Clara County.

2. **Integration of groundwater management programs and activities** – Individual groundwater management programs tend to be implemented almost independently of other programs. A more integrated approach to the management of these programs, and to the management of the basin overall needs to be developed. Integration of these programs and improved conjunctive use strategies will result in more effective basin management.

3. **Optimization of recharge operations** – As artificial recharge is critical to sustaining groundwater resources, an analysis of the most effective amount, location, and timing of recharge should be conducted.

4. **Improved understanding of the groundwater basin** – In general, the existing groundwater management programs seem to focus on managing the basin to meet demands and protecting the basin from contamination and the threat of contamination. However, improving the District's understanding of the complexity of the groundwater basin is critical to improved groundwater management. The more we know about the basin, the better we can analyze the impact of different groundwater scenarios and management alternatives.

5. **Effective coordination and communication with internal and external agencies** – Improved communication and coordination will lead to improved groundwater management programs. Increased sharing of ideas, knowledge, and technical expertise among people involved with groundwater at the District will result in increased knowledge, well-coordinated and efficient work, and well-informed analyses and conclusions. Improved coordination with external agencies, such as retailers and state and federal organizations, will result in improved knowledge of customer needs and increased awareness of District activities.

A detailed analysis of the areas above and of all groundwater programs as they relate to Ends Policies and the groundwater management goal is recommended.

The next update of the Groundwater Management Plan, scheduled for 2002, will address the issues above and the overall management of the basin by presenting a formal groundwater management strategy for achieving the groundwater management goal in a practical, cost-effective, and environmentally-sensitive manner. The update will evaluate each groundwater program's contribution and effectiveness in terms of the groundwater management goal and Ends Policies. Measurement criteria will be developed, and if there is no direct connection between the Ends Policies and a specific program, that program's contribution to other linked programs will be analyzed. The update will include recommendations for changes to existing programs or for the development of new programs, standards, or ordinances. The update will also develop an integrated approach for the management of groundwater programs, and for the management of the groundwater basin in general.

Groundwater is critical to the water supply needs of Santa Clara County. Therefore, it is of the utmost importance that the District continues the progress begun with this Groundwater Management Plan. Increased demands and the possibility of reduced imported water in the future make effective and efficient management of the groundwater basin essential. The Groundwater Management Plan and future updates will identify how the management of the groundwater basin can be improved, thereby ensuring that groundwater resources will continue to be sustained and protected.

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Appendix G

San Jose Municipal Water System
2010 Urban Water Management Plan
Water Shortage Contingency Plan and Municipal Code

Resolution No. 63593

A RESOLUTION OF THE CITY OF SAN JOSE APPROVING THE WATER SHORTAGE CONTINGENCY PLAN IN THOSE AREAS OF NORTH SAN JOSE, ALVISO, EVERGREEN, EDENVALE AND COYOTE SERVICED BY THE SAN JOSE MUNICIPAL WATER SYSTEM

WHEREAS, the California Legislature enacted Assembly Bill 11X to amend Water Code Sections 10620, 10621, 10631 and 10652, and added to Section 10656 during the First Extraordinary Session of 1991-92 such that each urban water supplier shall prepare, adopt, and submit to the California Department of Water Resources an amendment to its Urban Water Management Plan, the primary objective of which is to plan for water supply shortages; and

WHEREAS, the City of San Jose prepared and filed an Urban Water Management Plan with the California Department of Water Resources in May of 1991; and

WHEREAS, AB 11X mandates that every urban water supplier providing municipal water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre feet of water annually to develop a Water Shortage Contingency Plan and file said Plan with the California Department of Water Resources; and

WHEREAS, there have now been five consecutive years of drought; and

WHEREAS, local water shortage reserves within the Santa Clara Valley have been severely depleted by the drought; and

WHEREAS, the City of San Jose is an urban supplier of water providing water to more than 16,000 customers, and has therefore prepared and circulated for public review a Draft Water Shortage Contingency Plan, in compliance with the requirements of AB 11X, and a properly noticed public hearing regarding said Draft Plan was held by the City on February 28, 1992, and a Final Water Shortage Contingency Plan prepared;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of San Jose that:

1. The Water Shortage Contingency Plan is hereby approved and ordered filed with the City Clerk;

2. The City Manager is hereby authorized and directed to file this Plan with the California Department of Resources;

3. The City Manager is hereby authorized to declare a Water Shortage Emergency and implement this Water Shortage Contingency Plan.

ADOPTED this 24th day of March, 1992, by the following vote:

AYES: ALVARADO, BEALL, HEAD, JOHNSON, LEWIS, PANDORI, SAUSEDO, STABILE, HAMMER

NOES: NONE

ABSENT: IANNI, SHIRAKAWA

SUSAN HAMMER, Mayor

ATTEST:

PATRICIA L. O'HEARN, City Clerk

ORDINANCE NO. 28597

AN ORDINANCE OF THE CITY OF SAN JOSÉ AMENDING PARTS 2 AND 3 OF CHAPTER 15.10 OF TITLE 15 OF THE SAN JOSÉ MUNICIPAL CODE TO STRENGTHEN REQUIREMENTS RELATED TO WATER CONSERVATION AND WATER SHORTAGES

WHEREAS, on June 12, 2009, this Ordinance was found to be categorically exempt from environmental review per the provisions of Section 15061(b)(3) of the California Environmental Quality Act of 1970, as amended, under File No. PP09-134;

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF SAN JOSÉ:

SECTION 1. Chapter 15.10 of Title 15 of the San José Municipal Code is amended by adding a Section to be numbered, entitled, and to read as follows:

15.10.045 Food Service Establishment

"Food Service Establishment" means a user that prepares and/or sells food for consumption either on or off the premises or washes utensils or dishes on premises, including, but not limited to, restaurants, sandwich shops, delicatessens, bakeries, cafeterias, markets, bed and breakfast inns, motels, hotels, meeting halls, caterers, retirement and nursing homes or pizzerias.

SECTION 2. Section 15.10.230 of Part 2 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to be entitled and read as follows:

15.10.230 Food Service Establishments.

A. No person shall provide any water to any customer at any Food Service Establishment unless and until the customer requests water.

B. No person shall use any non-water conserving dish wash spray valve in any Food Service Establishment

SECTION 3. Chapter 15.10 of Title 15 of the San José Municipal Code is amended by adding a Section to be numbered, entitled, and to read as follows:

15.19.235 Hotels, Motels and Other Lodgings

The owner and manager of every hotel, motel, inn, guest house, bed and breakfast facility, and every other short-term commercial lodging shall prominently display a written notice in each bathroom of the facility providing customers or guests with the option of helping to conserve water by not having towels and linens laundered daily.

SECTION 4. Section 15.10.290 of Part 2 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows:

15.10.290 Landscape Irrigation

A. No person shall use, permit or allow the use of potable water to irrigate any outdoor landscaping or other vegetated material at any time between the hours of 8:00 a.m. and 6:00 p.m. during Pacific Daylight Savings Time, or between the hours of 10:00 a.m. and 3:00 p.m. during Pacific Standard Time, unless the person using or allowing the use of the water is using a bucket, hand-carried container, or a hose equipped with an automatic positive self-closing valve.

B. No person shall use, permit or allow the use of potable water to irrigate any outdoor landscaping or other vegetated area more than fifteen (15) minutes per day per station when using a landscape irrigation system or a watering device that is not continuously attended, except for landscape irrigation systems that exclusively use very low-flow drip type irrigation systems when no emitter produces more than two (2) gallons of water per hour and weather-based controllers or stream rotor sprinklers that meet a 70% efficiency standard.

C. The restrictions on landscape irrigation contained in this Section do not apply to the following activities:

1. Syringing of golf course greens, golf course tees, lawn bowling greens or lawn tennis courts;

2. The conduct of a landscape water management audit to provide for the evaluation and adjustment of a landscape irrigation system.

SECTION 5. Section 15.10.300 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.300 Water Shortage Measures

A. The City Council may, by resolution, declare a state of water shortage whenever it finds that water supplies are expected to be inadequate to meet at least ninety percent (90%) of projected water demand, or whenever a minimum conservation level of ten percent (10%) or more has been established by the Santa Clara Valley Water District.

B. In adopting such a resolution, the City Council may declare whether the water shortage is a ten percent (10%) shortage; a twenty-five percent (25%) shortage; a thirty percent (30%) shortage; or a forty percent (40%) shortage. In the event

that a water shortage resolution adopted by the City Council fails to declare the level of water shortage, the resolution shall be deemed to be a resolution of a ten percent (10%) water shortage.

C. In addition to the requirements of Part 2 of this Chapter, the provisions of this Part 3 shall apply to all uses of water for such period of time as a water shortage resolution adopted by the Council remains in effect.

SECTION 6. Section 15.10.320 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.320 Ornamental Lakes and Ponds

Upon adoption by the City Council of a resolution declaring a twenty five percent 25%) or greater water shortage, no person shall cause, permit or allow filling or re-filling ornamental lakes or ponds with potable water, except to the extent needed to sustain aquatic life that is of significant value and which has been actively managed within the water feature prior to declaration of a supply shortage level by the City Council.

SECTION 7. Section 15.10.325 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.325 Car Washing

Upon adoption by the City Council of a resolution declaring a twenty-five percent (25%) or greater water shortage, no person shall cause, permit or allow the use of water to wash or clean a vehicle, except at a commercial car washing facility that utilizes a re-circulating water system to capture or reuse water.

SECTION 8. Section 15.10.330 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.330 Residential Swimming Pools and Outdoor Spas

Upon adoption by the City Council of a resolution declaring a twenty five percent (25%) or greater water shortage, no person shall cause, permit or allow re-filling of more than one (1) foot or initial filling of residential swimming pools or outdoor spas with potable water.

SECTION 9. Section 15.10.340 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows:

15.10.340 Cleaning Of Structures And Surfaces

Upon adoption by the City Council of a resolution declaring a twenty-five percent (25%) or greater water shortage, it shall be unlawful for any person to:

A. Use potable water, to clean sidewalks, driveways, patios, decks, tennis courts, parking lots or any other exterior paved or hard-surfaced areas, except by the use of a bucket or pursuant to a prior approved written exception from the Director.

B. Use potable water, to clean the exterior of any building or structure, except as surface preparation for the application of any architectural coating, or in connection with waxing, except by the use of a bucket or pursuant to a prior approved written exception from the Director. For purposes of this section, "structures" includes mobile homes and manufactured homes.

SECTION 10. Section 15.10.350 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.350 Operation of Decorative Fountains

After the adoption by the City Council of a resolution declaring a twenty five percent (25%) or greater water shortage, it shall be unlawful for any person to operate any decorative fountain with potable water unless such decorative fountain is recirculating, non-misting and fully lined.

SECTION 11. Chapter 15.10 of Title 15 of the San José Municipal Code is amended by adding a Section to be numbered, entitled, and to read as follows:

15.10.355 Leak Repair

A. Upon adoption by the City Council of a resolution declaring a forty percent (40%) or greater water shortage no owner or manager or other person responsible for the day-to-day operation of any premises shall fail to initiate repair of any leaking, broken or defective water pipes, faucets, plumbing fixtures, other water service appliances, sprinklers, watering or irrigation systems within forty eight (48) hours after the owner, manager or other responsible person knew or should have known of such leaks, breaks or defects.

B. Upon adoption by the City Council of a resolution declaring a forty percent (40%) or greater water shortage no owner or manager or other person responsible for the day-to-day operation of any premises shall fail to complete repair of any leaking, broken or defective water pipes, faucets, plumbing fixtures, other water service appliances, sprinklers, watering or irrigation systems, as soon as practical after initiation of such repair.

SECTION 12. Section 15.10.370 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.370 Prohibition on Landscape Irrigation

Upon adoption by the City Council of a resolution declaring a forty percent (40%) or greater water shortage, it shall be unlawful for any person to use or allow the use of potable water to irrigate any outdoor landscaping, unless the person using or allowing the use of the water is using a bucket, hand-carried container, or a hose equipped with an automatic positive self-closing valve, except for the following purposes: fire protection; soil erosion control; maintenance of rare or protected species; maintenance of public parks, playing fields, day care centers, golf course greens and school grounds provided such irrigation is done in a water efficient manner; and irrigation of environmental mitigation projects.

PASSED FOR PUBLICATION of title this 16th day of June, 2009, by the following vote:

AYES:	CAMPOS, CHIRCO, CHU, CONSTANT, HERRERA, KALRA, LICCARDO, OLIVERIO, PYLE; REED.
NOES:	NONE.
ABSENT:	NGUYEN.
DISQUALIFIED:	NONE.

Chuck Reed

CHUCK REED
Mayor

ATTEST:

LEE PRICE, MMC
City Clerk

Appendix H

San Jose Municipal Water System
2010 Urban Water Management Plan
2009 Declaration of Water Shortage Resolution

RESOLUTION NO. 74917

A RESOLUTION OF THE COUNCIL OF THE CITY OF SAN JOSE DECLARING A FIFTEEN PERCENT WATER SHORTAGE EFFECTIVE JUNE 1 2009 THROUGH DECEMBER 31, 2009

WHEREAS, on February 27, 2009, the Governor declared a state of emergency due to drought and issued a proclamation directing various state agencies to implement a drought emergency plan and provide assistance to those impacted by the drought, and requesting that all urban water users immediately reduce their individual water use by twenty percent (20%); and

WHEREAS, local reservoirs are at roughly sixty-five percent (65%) of capacity, and state reservoirs are below fifty percent (50%), and severe regulatory restrictions on pumping from the Sacramento-San Joaquin River Delta to protect endangered fisheries have sharply reduced the quantity and reliability of imported water supply for the Santa Clara Valley Water District (District); and

WHEREAS, based on the local and state water supply conditions, as well as the Governor's drought proclamation, the District Board on March 24, 2009 adopted a resolution declaring a water shortage and establishing a minimum water conservation level of fifteen percent (15%); and

WHEREAS, as a wholesale water provider, the District does not have direct authority to require residents and businesses to cut water use, and also sent a letter to cities and water retailers asking them to enact ordinances or implement actions according to their Urban Water Management Plans; and

WHEREAS, Chapter 15.10 of Title 15 of the San José Municipal Code provides for the adoption of a resolution declaring a water shortage by this Council whenever a

minimum water conservation level of ten percent (10%) or more has been established by the District; and

WHEREAS, Chapter 15.10 of Title 15 of the San José Municipal Code contains mandatory requirements for water conservation measures that become effective City-wide, upon Council declaration of at least a ten percent (10%) water shortage, with additional mandatory measures applicable upon City Council declaration of water shortages of twenty percent (20%) and above; and

WHEREAS, on April 14, 2009 this Resolution was found to be categorically exempt from environmental review per the provisions of Section 15061(b)(3) of the California Environmental Quality Act of 1970, as amended, under File No. PP09-082;

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF SAN JOSE THAT:

Pursuant to Chapter 15.10 of Title 15 of the San Jose Municipal Code, a fifteen percent (15%) water shortage is hereby declared for the purpose of implementing and enforcing mandatory City-wide water conservation measures applicable to a ten percent (10%) water shortage.

ADOPTED this 19th day of May, 2009, by the following vote:

AYES:	CHU, CONSTANT, KALRA, LICCARDO, NGUYEN, OLIVERIO, PYLE, REED.
NOES:	NONE.
ABSENT:	CAMPOS, CHIRCO, HERRERA.
DISQUALIFIED:	NONE.

CHUCK REED
Mayor

ATTEST:

LEE PRICE, MMC
City Clerk

Attachment A

San Jose Municipal Water System

2010 Urban Water Management Plan

Final Draft, May 2011

Prepared for

San Jose Municipal Water System
3025 Tuers Road
San Jose, CA 95121

Prepared by

HydroScience Engineers
4055 Evergreen Village Square
Suite 250
San Jose, CA 95135

HydroScience Engineers

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TABLE OF CONTENTS

CHAPTER		PAGE
1 PLAN PREPARATION		**1-1**
1.1	Introduction	1-1
1.2	Coordination and Public Notification	1-2
1.3	Plan Adoption	1-3
2 SYSTEM DESCRIPTION		**2-1**
2.1	History	2-1
2.2	Organization Structure	2-1
2.3	Climate	2-2
2.4	Population	2-2
2.5	Demographics	2-3
2.6	Service Area Boundaries	2-3
3 DEMAND		**3-1**
3.1	History	3-1
3.2	Baseline Water Use	3-2
3.3	Urban Water Use Targets	3-3
3.4	Water Demands and Demand Projections	3-4
3.5	Water Use Reduction Plan	3-6
4 SYSTEM SUPPLIES		**4-1**
4.1	Sources of Supply	4-1
4.2	SFPUC – Wholesaler (Surface Water)	4-2
4.3	SCVWD – Wholesaler (Surface Water)	4-3
4.4	Groundwater	4-5
4.5	Transfer/Exchange Opportunities	4-8
4.6	DesAlinated Water OppoRTunities	4-9
4.7	Recycled Water	4-9
4.8	Future Water Projects	4-14
5 WATER SUPPLY RELIABILITY & WATER SHORTAGE CONTINGENCY PLANNING		**5-1**
5.1	Water System Reliability	5-1
5.2	Water Supply Reliability - SFPUC	5-2
5.2.1	Water Shortage Allocation Plan	5-2
5.2.2	Water System Improvement Program	5-3
5.2.3	Interim Supply Limitation	5-4
5.2.4	Interim Supply Allocations	5-4
5.2.5	Environmental Enhancement Surcharge	5-4
5.2.6	Water Conservation Implementation Plan	5-5
5.2.7	Long Term Reliable Water Supply Strategy	5-5
5.3	Water Supply Reliability - SCVWD	5-6
5.4	Factors Affecting Supply	5-8
5.5	Water Shortage Contingency & Drought Planning	5-11
5.6	Water Quality	5-20
6 DEMAND MANAGEMENT MEASURES		**6-1**
6.1	Background, Implementation and Evaluation	6-1
6.2	Demand Management Measures	6-2

TABLES **PAGE**

Table 1-1: List of Notified Agencies 1-2
Table 1-2: Schedule for Adoption and Submittal 1-3

Table 2-1: Population Projections for SJMWS 2-3
Table 2-2: Proposed 2040 Additional Dwelling Units and Jobs within SJMWS 2-3

Table 3-1: Historical and Present Water Production in SJMWS Service Areas (AFY) 3-1
Table 3-2: Base Water Use Periods 3-2
Table 3-3: Base Daily per Capita Water Use (10-year Range) 3-3
Table 3-4: Base Daily per Capita Water Use (5-year Range) 3-3
Table 3-5: Base Daily per Capita Water Use and Targets 3-4
Table 3-6: Past, Current, and Projected Water Use for SJMWS (AFY) 3-5
Table 3-7: Projected Demand for SJMWS by Service Area (AFY) 3-5
Table 3-8: Additional Water Uses and Losses for SJMWS (AFY) 3-5
Table 3-9: Lower Income Projected Water Use for SJMWS (AFY) 3-6
Table 3-10: Water Demand Projections for Wholesale Water Agencies (AFY) 3-6
Table 3-11: Past, Current, and Projected Water Use for SJMWS 3-6

Table 4-1: Water Supplies – Current and Projected in a Normal Year for SJMWS (AFY) 4-1
Table 4-2: Wholesale Supplies – Existing and Planned Treated Water Sources for SJMWS (AFY) 4-4
Table 4-3: Groundwater – Historical Volume Pumped (AFY) 4-6
Table 4-4: Groundwater – Projected Volume to be Pumped (AFY) 4-7
Table 4-5: Recycled Water – Wastewater Collection and Treatment (AFY) 4-10
Table 4-6: Recycled Water – Potential Future Use (AFY) 4-12
Table 4-7: Recycled Water – 2005 UWMP use projection compared to 2010 actual (AFY) 4-12
Table 4-8: Methods Used to Encourage Recycled Water Use 4-13
Table 4-9: Future Water Supply Projects (AFY) 4-14

Table 5-1: Distribution of Water Based on Level of System-Wide Reduction 5-2
Table 5-2: Basis of Water Year Data 5-12
Table 5-3: Supply Reliability – Historic Conditions (AFY) 5-13
Table 5-4: Supply Reliability – Current Water Sources (AFY) 5-14
Table 5-5: Supply and Demand Comparison – Normal Year (AFY) 5-14
Table 5-6: Supply and Demand Comparison – Single Dry Year (AFY) 5-14
Table 5-7: Supply and Demand Comparison – Multiple Dry Year for 2015 (AFY) 5-15
Table 5-8: Supply and Demand Comparison – Multiple Dry Year for 2020 (AFY) 5-15
Table 5-9: Supply and Demand Comparison – Multiple Dry Year for 2025 (AFY) 5-15
Table 5-10: Supply and Demand Comparison – Multiple Dry Year for 2030 (AFY) 5-16
Table 5-11: Supply and Demand Comparison – Multiple Dry Year for 2035 (AFY) 5-16
Table 5-12: City Resolutions and Ordinances Regarding Water Shortage 5-16
Table 5-13: Water Shortage Contingency – Rationing Stages to Address Shortages 5-17
Table 5-14: Water Shortage Contingency – Mandatory Prohibitions 5-18
Table 5-15: Water Shortage Contingency – Penalties and Charges 5-19
Table 5-16: Financial Impacts 5-19

Table 6-1: SCVWD Total Water Conservation Program Water Savings Goals 6-1
Table 6-2: Residential Plumbing Retrofits Conducted in FY 2009-2010 6-2
Table 6-3: Large Landscape Surveys Conducted during FY 2009-2010 6-5

FIGURES **PAGE**

Figure 2-1: City of San Jose Municipal Water System Boundaries 2-4

Figure 4-1: Santa Clara County Groundwater Basin and SJMWS Groundwater Wells.....4-8
Figure 4-2: SBWR Recycled Water System 4-11

APPENDICES

Appendix A Postings and Notifications for UWMP Preparation
Appendix B Resolution for Adoption of the UWMP
Appendix C City of San Jose Demographic Data
Appendix D Projected Demands Provided to Wholesale Agencies
Appendix E Water Conservation Plan
Appendix F Groundwater Management Plan
Appendix G Water Shortage Contingency Plan and Municipal Code
Appendix H 2009 Declaration of Water Shortage Resolution

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1
Plan Preparation

1.1 INTRODUCTION

The 1983 California Urban Water Management Act (Act), also referred to as Assembly Bill 797, requires all urban water suppliers who directly serve 3,000 or more customers or who provide 3,000 or more acre feet of water per year to prepare an Urban Water Management Plan (Plan). The purpose of the Act is to ensure that water suppliers plan for the long-term conservation and efficient use of the State's limited urban water supplies. The City of San José (City) submitted its first Plan in 1985 in compliance with the Act. Updates to the Plan are required every five years. The City prepared updates to the Plan in 1990, 1995, 2000, and 2005. The normal cycle requires that the Plan be submitted in December of years ending in five and zero. Recent changes in the Plan requirements have necessitated the need for State law to extend the 2010 deadline to July 1, 2011. However, this Plan is referred to as the 2010 Plan to retain consistency with the five-year submittal cycle.

Current Plan requirements incorporate State legislative mandates that have been enacted, in particular Senate Bill (SB) X7-7 Water Conservation Bill of 2009 and Assembly Bill (AB) 1420 Water Demand Management Measures, to ensure 20% water use reduction per capita by 2020. Specific requirements include identifying the base daily per capita water use (baseline), urban water use target, interim water use target, and compliance daily per capita water use.

The 2010 Plan must also include water deliveries and uses; water supply source; efficient water uses; and demand management measures, including implementation strategy and schedule. The California State Department of Water Resources (DWR) has the responsibility for the review and certification process of the Plan pursuant to the Act. A current Plan is required in order to be eligible for a water management grant or loan administered by DWR, the State Water Resources Control Board, or the Delta Stewardship Council.

Many methods are being practiced by the City to maximize water resources while minimizing the need to import supplies. The City has demonstrated its commitment to water conservation with the many programs that have been implemented and by the recognition that water conservation is a permanent and ongoing activity. Through its conservation activities, the City has managed to reduce demand and increase water supply reliability. By supplying the City's customers with water supplies from several different sources, the City achieves greater flexibility to monitor each source and ensure that high quality water is being delivered to customers. Additionally, the reuse of treated wastewater through the South Bay Water Recycling Program has also helped the City to conserve fresh water supplies.

This Plan examines the City's current and projected water supplies, demands, and sources; and discusses the City's conservation efforts and water shortage plan. Chapter 2 provides general information about the City's water system. Within Chapters 3 and 4 are discussions of water supplies and demands, including a supply/demand comparison through the year 2035. Chapter 5 details system reliability and describes the water shortage contingency plan, including the stages of action to be taken during drought years. Chapter 6 describes the City's demand management measures. Collectively, the Plan documents the City's planning efforts involved in ensuring a reliable, high quality, supply of water to the public.

1.2 COORDINATION AND PUBLIC NOTIFICATION

The City has encouraged community participation in its urban water management planning efforts since the first plan was developed in 1985. For this update, preliminary notifications were published in the local newspaper as shown in **Appendix A**. As required by the Water Conservation Bill of 2009, a formal public meeting was held on March 21, 2011 to receive public input on the following:

- Water use targets
- Method for determining the targets
- Economic impacts for SJMWS implementation plan for achieving the targets

Another public meeting is scheduled to allow the public to comment on the draft 2010 UWMP before City Council's approval. Notices for the public meetings were advertised in the local San Jose Mercury News and San Jose Post Record and posted on the City's internet website.

The City coordinated with several local agencies to encourage input and participation in its planning. To maintain a level of plan consistency, the City attended and participated in several meetings between other local retailers hosted by its wholesalers, Santa Clara Valley Water District (SCVWD) and San Francisco Public Utilities Commission (SFPUC). Notification letters were sent to local agencies and other water retailers informing them that the planning efforts were underway, and welcoming any comments or other participation. Coordination between the City and its wholesalers, SCVWD and SFPUC, was maintained throughout the planning process. By consulting with the planning documents completed by the wholesalers, including water supply studies and the Groundwater Management Plans, the City is better able to plan for future water supplies and minimize the need to import water from other regions by creating a realistic, consistent source supply plan. Additionally, as part of the City's General Plan Update process, the City established a forum for public participation, including participation from other water retailers and SCVWD, in which water management and conservation policies and coordination between future land uses and management of the urban water supply was discussed.

A Notice of Preparation of Urban Water Management Plan was sent to the following agencies listed in **Table 1-1**.

Table 1-1: List of Notified Agencies

Agency Name	
ALAMEDA COUNTY WATER DISTRICT	LOS TRANCOS COUNTY WATER DISTRICT
CITY OF HAYWARD	MID-PENINSULA WATER DISTRICT
CITY OF MILPITAS	NORTH COAST COUNTY WATER DISTRICT
CITY OF MOUNTAIN VIEW	SKYLINE COUNTY WATER DISTRICT
CITY OF PALO ALTO	WESTBOROUGH WATER DISTRICT
CITY OF SANTA CLARA	CALIFORNIA WATER SERVICE COMPANY
CITY OF SUNNYVALE	GREAT OAKS WATER COMPANY
PURISSMA HILLS WATER DISTRICT	SAN JOSE WATER COMPANY
CITY OF BRISBANE	CITY OF EAST PALO ALTO
CITY OF BURLINGAME	CITY OF GILROY

Agency Name	
CITY OF DALY CITY	CITY OF MORGAN HILL
TOWN OF HILSBOROUGH	COUNTY OF SANTA CLARA
CITY OF MENLO PARK	SANTA CLARA VALLEY WATER DISTRICT
CITY OF MILLBRAE	SAN FRANCISCO PUBLIC UTILITIES COMMISSION
CITY OF REDWOOD CITY	BAY AREA WATER SUPPLY & CONSERVATION AGENCY
CITY OF SAN BRUNO	
GUADALUPE VALLEY MUNICIPAL IMPROVEMENT DISTRICT	SAN JOSE/SANTA CLARA WATER POLLUTION PLANT
COASTSIDE COUNTY WATER DISTRICT	ESTERO MUNICIPAL IMPROVEMENT DISTRICT

Representative copies of postings and letters are included in **Appendix A**.

1.3 PLAN ADOPTION

A public hearing of the 2010 Plan must take place prior to or on the day of adoption by the City Council. Upon adoption of the Plan by City Council, implementation will take place as identified in the Plan. Submission of the adopted Plan to DWR, the California State Library, and Santa Clara County must take place within 30 days from the date of adoption. The Plan must then be made available to the public within 30 days of submission to DWR. The Plan will be made available via the internet at www.sjmuniwater.com. Below is the schedule for adoption and submittal.

Table 1-2: Schedule for Adoption and Submittal

Action	Completion Date
Public Meeting for Water Use Targets	March 21, 2011
Public Meeting for draft 2010 UWMP	May 23, 2011
Public Hearing and Adoption by City Council	June 7, 2011
Submittal to DWR, the California State Library, and Santa Clara County	July 1, 2011
Available to the public via internet	August 1, 2011

A copy of the resolution adopting the Plan is included in **Appendix B**.

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2
System Description

2.1 HISTORY

The City was founded in 1777 and incorporated in 1850. The City consists of 179.2 square miles. It is the third largest city in California following Los Angeles and San Diego, and it is the 10th largest city in the US. It is located in Santa Clara County, south of the San Francisco Bay and is the center of a large and expanding metropolitan area commonly known as Silicon Valley. The City is bordered by Santa Cruz Mountains on the west and the Diablo Mountain range on the east. The majority of the City lies in the bay flats with various hills subdividing the valley into smaller areas such as Almaden Valley, Blossom Valley, and Evergreen Valley.

Three water companies provide drinking water to the City: Great Oaks Water Company, San Jose Water Company, and the San Jose Municipal Water System (SJMWS). The first two are private retailers; whereas, SJMWS is operated by the City's Environmental Services Department. This Plan describes the water supply for SJMWS.

SJMWS entered the water business in May 1961 with the purchase of the Evergreen Water Company. The Evergreen system served a 6,000 acre franchise area with several hundred customers. The City was concerned that a safe, adequate and reliable supply of water be assured for new development within this and other areas newly annexed to the City. It was felt that the extension of City services and facilities to these newly annexed areas would greatly encourage their improvement and development. When the City of Alviso was annexed, SJMWS acquired the North San Jose and Alviso areas. The Edenvale service area was established in 1983, and the Coyote Valley service area was established in 1988.

2.2 ORGANIZATION STRUCTURE

The City operates under the Council/Manager form of government, a system that combines the policy leadership of elected officials in the form of a City Council, with the managerial expertise of an appointed City Manager. The Council is the legislative body that represents the community and is empowered by the City Charter to formulate citywide policy. The City Council is comprised of the Mayor, who is elected by the community at-large, and ten council members who are elected by districts. Under the City Charter, the Mayor is responsible for recommending policy, program and budget priorities to the City Council, which in turn approves policy direction for the City. The City Charter limits the Mayor and Council members from serving more than two consecutive terms.

The City Manager is appointed by the Council and serves as the chief administrative officer of the organization. The City Manager is responsible for administration of City affairs, day-to-day operations, and implementation of Council policies.

The City is organized by City Service Areas (CSAs) that best reflect the way the organization delivers services to the residents. A CSA represents the policy-making level for strategic planning, policy setting, and investment decisions in the critical functions the City provides to the community. SJMWS operates under the CSA of Environmental and Utility Services.

2.3 CLIMATE

The City has a semiarid, Mediterranean climate, characterized by warm dry summers and cool winters. Irrigation water demand is often high in the dry summer months and in winter is fulfilled by rainfall. The City averages 300 days of sunshine annually, with temperatures varying from an average of 50 degrees Fahrenheit in January to an average of 70 degrees in July with a mean precipitation of 15.08 inches. In addition to seasonal variation, the area's climate is subject to periodic droughts that impact water supply. An extreme single-year drought occurred in 1976, when annual rainfall amounted to only 7.2 inches, or about one-half of the average rainfall. A severe, prolonged drought occurred in the late 1980s and early 1990s; over a four-year period, where annual rainfall averaged only two-thirds of the annual average. The area has recently been in the midst of another dry period. Precipitation in 2007 was 7.09 inches, less than half of average rainfall and the lowest rainfall in over 50 years. The Desert Research Institute (DRI) reports that 2008 total precipitation for the City was 10.71 inches, or 73 percent of normal. Total precipitation in 2009 was 13.84 inches, slightly below normal. The cumulative precipitation from 2007 to 2009 indicates that the area has been in a multiple-year drought.

2.4 POPULATION

SJMWS currently provides water service to approximately 27,000 metered connections with a population of over 100,000. Population growth in SJMWS service areas is expected to increase in the next 25 years by approximately 65%. Population estimates as shown in **Table 2-1** were calculated using the DWR methodology, Category 2 since SJMWS service area is less than 95% of the city boundaries. Data from the 2000 Census was used in calculating SJMWS's year 2000 service area population. The population from the 2000 Census is available by Census Block, which is a relatively small geographic area smaller than a Census Tract. Census Blocks are available in GIS format and was used in conjunction with existing City service area GIS resources. Census blocks that are within SJMWS service area by 50% or more was used to determine the year 2000 population for SJMWS. The method is to use year 2000 single-family and multi-family connection and census data to develop a ratio of persons per connection for each of these connection types. The number of single-family and multi-family connections for the other years can then be used to scale the population of the respective years from the year 2000 persons per connection type ratio.

In general, as population increases, so does water demand. The population within SJMWS service area is expected to increase due to the proposed development identified within the Preferred Scenario of the draft Envision San Jose 2040 General Plan Update. Analysis of the Preferred Scenario was completed in late 2010, and reflects projected estimates and figures as available through approximately August, 2010. The service area with the greatest increase in population is in North San José, with a projected increase of over 67,000 people. Population is projected at 3.06 residents per dwelling unit, which is consistent with Department of Planning, Building and Code Enforcement's planning assumptions. Population is expected to increase at least five times over existing conditions. The phasing of the General Plan Update development areas was estimated from the City of San José's "Projections of Jobs, Population and Households". The report provides projections of the total population and jobs in the City from 2020 to 2040.

Table 2-1: Population Projections for SJMWS

	2010	2015	2020	2025	2030	2035
SJMWS Service Area[1]	114,974	135,821	147,091	160,303	175,459	189,644

1. Service area population is defined as the population served by the distribution system.

2.5 DEMOGRAPHICS

The City is in the process of updating its General Plan (Envision San Jose 2040). It is anticipated that Envision San Jose 2040 will be adopted by October 2011. The Preferred Scenario of the draft Envision San Jose 2040 General Plan identifies the addition of 120,000 dwelling units and 470,000 new jobs throughout the city limits. The additional housing and employment will have a significant impact within SJMWS service area as shown in **Table 2-2**.

Table 2-2: Proposed 2040 Additional Dwelling Units and Jobs within SJMWS

	Dwelling Units			Number of Jobs By Job Category					
	Total MFD	Total SFD	TOTAL	Industrial	Office	Retail	Restaurant	Institutional	TOTAL
North San Jose/Alviso	21,637	120	**21,757**	15,484	73,377	2,791	310	100	**92,062**
Evergreen	2,832	366	**3,198**	18	15,676	2,512	279	1,491	**19,976**
Edenvale	0	0	**0**	9,000	7,000	0	0	0	**16,000**
Coyote Valley	0	0	**0**	0	50,000	0	0	0	**50,000**
Total	**24,469**	**486**	**24,955**	**24,502**	**146,053**	**5,303**	**589**	**1,591**	**178,038**

Additional demographic information for the entire city can be found in **Appendix C**.

2.6 SERVICE AREA BOUNDARIES

SJMWS services four different areas of the city: North San Jose/Alviso, Evergreen, Edenvale, and Coyote Valley (**Figure 2-1**).

NORTH SAN JOSE/ALVISO

The North San Jose/Alviso service area consists of 5,600 acres and extends from Trimble Road on the south to the Alviso Slough on the north. The area is bordered on the west by the Guadalupe River and on the east by the Coyote Creek. The land use is predominantly industrial, with some residential and commercial.

EVERGREEN

The Evergreen Service Area extends from Highway 101 on the west to the foothills of the Mount Diablo Range on the east. The area is bounded on the north by Tully Road and on the south by

the City limits. The current land use in Evergreen is predominantly residential (94%) and commercial (5%). The service area contains approximately 10,750 acres.

EDENVALE

The Edenvale service area is located east of Coyote Creek and south of Hellyer Avenue. Covering about 700 acres, Edenvale is zoned for industrial and commercial use.

COYOTE VALLEY

The Coyote Valley service area is located west of Highway 101, south of Tulare Hill, and north of Palm Avenue. The area includes approximately 7,500 acres and is currently largely undeveloped (not including 51% as permanent open space lands).

Figure 2-1: City of San Jose Municipal Water System Boundaries

3
Demand

3.1 HISTORY

Water use has climbed steadily from 1978 until 1988, when it began to decline in response to a drought-related water conservation and allocation program. Since 1991, when water usage reached its lowest level in response to enforced drought-related conservation measures, the use of water has been steadily increasing in SJMWS service areas. In 1993, total water usage had recovered from the drought, surpassing the previous high usage year of 1987. Water use in more recent years decreased because of drought, weather, and economic factors. **Table 3-1** reflects the total yearly water use in acre-feet per year (AFY) by SJMWS since 1985.

Table 3-1: Historical and Present Water Production in SJMWS Service Areas (AFY)

Year	SFPUC	SCVWD	Evergreen Wells	NSJ Wells	Edenvale Wells	Coyote Wells	Recycled Water	SJMWS Total[1]
1985	3,255	8,083	810	138	124			**12,410**
1986	3,382	8,535	900	65	102			**12,984**
1987	3,426	8,853	1,133	269	135			**13,816**
1988	2,638	9,244	855	615	157	40		**13,549**
1989	2,649	8,783	82	48	101	41		**11,704**
1990	2,512	9,118	40	540	114	52		**12,376**
1991	1,913	8,280	11	924	99	46		**11,273**
1992	2,443	10,198	11	811	123	57		**13,643**
1993	3,057	10,256	14	517	95	48		**13,987**
1994	3,390	11,237	6	541	98	55		**15,327**
1995	4,139	11,060	40	7	92	59		**15,397**
1996	4,474	11,846	11	117	111	54		**16,613**
1997	4,686	13,795	5	189	112	70		**18,857**
1998	4,539	12,104	6	354	121	52		**17,176**
1999	4,989	13,750	5	0	234	35	916	**19,929**
2000	5,303	14,285	1	0	500	64	1,384	**21,537**
2001	5,207	14,805	2	0	605	74	1,787	**22,480**
2002	5,207	15,275	1	0	577	73	1,720	**22,853**
2003	5,171	15,541	4	0	580	59	1,963	**23,318**
2004	5,300	16,561	0	0	535	61	2,333	**24,790**
2005	4,848	15,384	0	0	563	324	3,066	**24,185**
2006	5,113	15,776	0	0	404	393	3,151	**24,837**
2007	5,358	16,576	0	0	424	373	3,694	**26,425**
2008	5,283	16,217	0	0	409	377	4,225	**26,511**
2009	4,784	14,864	0	0	383	429	3,861	**24,321**
2010	4,592	13,692	0	0	338	329	3,345	**22,296**

1. Discrepancies between the noted water production in **Table 3-1** and water demands in **Chapter 3.4** are due to dissimilar billing cycles.

3.2 BASELINE WATER USE

In accordance with the Water Conservation Bill of 2009, water suppliers must define a 10- or 15-year water use period for use as the basis for calculating the base daily per capita water use in gallons per capita per day (gpcd). This value serves as the baseline for computing required future water use reductions. A 5-year base period is used to calculate the minimum water use reduction requirement.

For recycled water retailers, there is the option to use a base period of up to 15 years. The baseline determination is dependent on recycled water use during 2008 as a percentage of total retail water delivery. If the recycled water use in 2008 was greater than 10% of the total retail water delivery, then the retailer has the option to use a 15-year baseline. While the City is eligible for the 15-year period based on its 2008 recycled water use, connection data (and therefore population estimates) are not available for earlier years. Based on the limited population data, the City has opted to use a 10 year base period.

The 5- and 10-year base period determination is shown in **Table 3-2**. The selected period is representative of long-term water use for the City; water use in more recent years was artificially low because of drought, weather, and economic factors.

Table 3-2: Base Water Use Periods

Parameter	Value
2008 total water deliveries (potable and recycled)	26,511 AFY
2008 total volume of delivered recycled water	4,225 AFY
2008 recycled water as a percent of total deliveries	16%
Year beginning 10-year base period range[1]	1997
Year ending 10-year base period range	2006
Year beginning 5-year base period range	2003
Year ending 5-year base period range	2007

1. While the City is eligible for the 15-year period based on its 2008 recycled water use, connection data (and therefore population estimates) were not available for earlier years. As such, the baseline per capita determination defaults to the 10-year range.

Table 3-3 and **Table 3-4** show the gross water use for each year within the 5- and 10-year base periods as well as the baseline daily per capita water use.

Table 3-3: Base Daily per Capita Water Use (10-year Range)

Year	Service Area Population	Gross Water Use (MGD)	Daily per capita water use (gpcd)
1997	84,971	16.83	198
1998	88,788	15.33	173
1999	94,147	16.97	180
2000	97,504	17.99	185
2001	100,613	18.47	184
2002	103,647	18.68	180
2003	105,440	19.06	181
2004	108,698	20.02	184
2005	113,281	18.85	166
2006	114,230	19.36	169
Base Daily Per Capita Water Use (1997-2006)			**180**

Table 3-4: Base Daily per Capita Water Use (5-year Range)

Year	Service Area Population	Gross Water Use (MGD)	Daily per capita water use (gpcd)
2003	105,440	19.06	181
2004	108,698	20.02	184
2005	113,281	18.85	166
2006	114,230	19.36	169
2007	114,831	20.29	177
Base Daily Per Capita Water Use (2003-2007)			**176**

The base daily per capita water use for 1997-2006 is 180 gpcd as shown on **Table 3-3**. The population estimates were calculated using the DWR methodology and 2000 US Census data. Base daily per capita water use during the 5-year base period was 176 gpcd, as shown on **Table 3-4**. Because the 5-year base daily per capita water use is greater than 100 gpcd, the minimum water use reduction requirement must be calculated to determine whether the City's 2015 and 2020 water use targets exceed the minimum water use reduction requirement (per Section 10608.22 of the Water Code). The 2020 per capita water use target must be less than the minimum water use reduction target of 95% of the 5-year base daily per capita water use.

3.3 URBAN WATER USE TARGETS

Four methods are allowed by Water Conservation Bill of 2009 for calculating the 2015 and 2020 water use targets. Urban Water Use Target Method 1 (80% of 10-Year Base Daily Per Capita Water Use) was used to determine the City's urban water use target, because it is the most applicable to available data as well as the water use and demographic characteristics of the service area. The baseline and targets were developed individually (i.e., for SJMWS service area only), but the City is considering options for regional alliances. By 2020, daily per capita water use must be 80% of the 10-year base daily per capita water use. By 2015, daily per capita water use must be halfway between the 10-year base daily per capita water use and the 2020

target. A summary of the baselines, Method 1 targets, and minimum water use reduction values are presented in **Table 3-5**.

Table 3-5: Base Daily per Capita Water Use and Targets

Parameter	Daily per capita water use (gpcd)
10-year base daily per capita water use (1997-2006)	180
5-year base daily per capita water use (2003-2007)	176
2020 minimum water use target (95% of 5-year baseline)	167
Method 1 2015 water use target (90% of 10-year baseline)	**162**
Method 1 2020 water use target (80% of 10-year baseline)	**144**

The Method 1 2020 target of 144 gpcd is below the minimum water use target of 167 gpcd; therefore, no adjustment to the 2020 target is necessary.

3.4 WATER DEMANDS AND DEMAND PROJECTIONS

Past, current, and projected water use in SJMWS service areas are summarized by classification of the water delivered to all customers in **Table 3-6**, and by service area in **Table 3-7**. SJMWS supplies water to meet the demands of the population within its service areas and does not supply the potable demands of any other city, local agencies or environmental needs. Population is a primary factor affecting urban water demand. Prior to 1995, demand for service connections was growing at about 600 service connections per year; between 2000 and 2004 the demand for service connections grew at about 500 service connections per year. The addition of service connections has been slower over the past several years due to economic factors. The present and projected water demands for SJMWS are shown in **Table 3-6**, which show that SJMWS will experience significant growth in demand. It is anticipated that the demand will more than double from 2010 to 2035. The increase in demand is attributable to the proposed development projects as identified within the draft Envision San Jose 2040 General Plan Update. Some demand reduction as a result of conservation is included within the projected demands, particularly within the residential sectors. Decreased demand from 2005 to 2010 reflects the economic downturn.

Table 3-6: Past, Current, and Projected Water Use for SJMWS (AFY)

Customer Type	2005	2010	2015	2020	2025	2030	2035
Single family residential	10,235	9,280	10,925	10,940	10,950	10,961	10,975
Multi-family residential	3,224	2,050	3,724	4,480	4,985	5,517	6,245
Commercial	1,958	1,178	4,925	6,370	8,064	10,006	11,824
Industrial	2,072	2,303	2,954	3,341	3,794	4,315	4,802
Institutional/Governmental	0	327	51	76	106	140	171
Irrigation	4,429	3,047	4,310	4,310	4,310	4,310	4,310
Other Temporary	107	15	101	101	101	101	101
Total Potable	**22,025**	**18,200**	**26,991**	**29,618**	**32,309**	**35,349**	**38,428**
Total incl. Recycled Water	**25,092**	**21,545**	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**

Table 3-7: Projected Demand for SJMWS by Service Area (AFY)

Service Area	2005	2010	2015	2020	2025	2030	2035
North San Jose/Alviso	5,047	4,535	7,183	8,099	8,833	9,635	10,589
Evergreen	15,912	12,891	16,185	16,592	17,019	17,503	17,986
Edenvale	717	443	1,678	2,230	2,876	3,618	4,312
Coyote	349	330	1,945	2,698	3,580	4,593	5,540
Total Potable	**22,025**	**18,200**	**26,991**	**29,618**	**32,309**	**35,349**	**38,428**
Total incl. Recycled Water	**25,092**	**21,545**	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**

Table 3-8 provides all other water uses and losses that are not accounted for in the past, current, and projected demands associated with user demand. System losses are estimated to be approximately 3% of potable water demands. Saline water intrusion barriers, groundwater recharge, and conjunctive use are not shown below since these uses are managed by SCVWD and are reflected in SCVWD's UWMP for the entire County.

Table 3-8: Additional Water Uses and Losses for SJMWS (AFY)

Water Use	2005	2010	2015	2020	2025	2030	2035
Recycled Water	3,066	3,345	5,149	5,609	6,150	6,770	7,351
System Losses	753	646	810	889	969	1,060	1,153
Total	**3,819**	**3,991**	**5,959**	**6,498**	**7,119**	**7,830**	**8,504**

LOWER INCOME HOUSING WATER USE PROJECTION

Section 10631.1 (a) of the California Water Code requires that the water use projections specifically identify the projected water use for lower income single-family and multi-family residential homes. **Table 3-9** provides the water use projection for lower income households within SJMWS service area (these demands are already included in **Table 3-6** and **Table 3-7**). The current percentage of lower income housing within SJMWS service area is approximately 15.5% of the total lower income housing within the entire City. Assuming the same percentage will be maintained to meet the RHNA goal, an additional 2,026 multi-family dwelling units will be constructed within SJMWS service area between 2007 and 2014 for lower income housing. This

will result in an overall lower income housing demand of 925 AFY by 2015. Projections for additional units beyond 2014 are unknown at this time; however, for planning purposes, the amount of lower income water demand as a percentage of total water demand is assumed to remain constant. Currently, lower income demands are approximately 6% of the overall demands. The projected lower income demands are estimated to be 6% of the total projected residential demands.

Table 3-9: Lower Income Projected Water Use for SJMWS (AFY)

Customer Type	2015	2020	2025	2030	2035
Single family residential	4	4	4	4	4
Multi-family residential	921	921	952	985	1,029
Total Water Use	**925**	**925**	**956**	**989**	**1,033**

WATER DEMAND PROJECTIONS FOR WHOLESALE WATER AGENCIES

Below in **Table 3-10** are the projected demands given to each wholesale water agency that SJMWS receives water from. A copy of the documentation provided to the wholesale agencies is provided in **Appendix D**. No water is sold to other agencies by SJMWS.

Table 3-10: Water Demand Projections for Wholesale Water Agencies (AFY)

Customer Type	Contracted Volume	2015	2020	2025	2030	2035
SFPUC	5,039	5,039	5,039	5,039	5,039	5,039
SCVWD	17,500	16,185	16,592	17,019	17,500	17,500

3.5 WATER USE REDUCTION PLAN

Based on the projected population estimates (**Table 2-1**) and the projected water use (**Table 3-6**), additional conservation will be required to meet the water use targets. **Table 3-11** details the targets and projected water demands from 2015 through 2035 and the amount of additional conservation required to meet those targets.

Table 3-11: Past, Current, and Projected Water Use for SJMWS

Customer Type	2015	2020	2025	2030	2035
Population Estimate	135,821	147,091	160,303	175,459	189,644
Target Water Use Rates (gpcd)	162	144	144	144	144
Target Water Use (AFY)	24,646	23,726	25,857	28,302	30,590
Projected Water Use (AFY)	26,991	29,618	32,309	35,349	38,428
Additional Water Reduction Required	**2,345**	**5,892**	**6,452**	**7,047**	**7,838**

In an effort to meet the projected water use targets, SJMWS is currently working in cooperation with SCVWD and other agencies to increase efforts to conserve water and decrease potable water demand, and to evaluate possibilities for further demand reduction in areas of increased commercial/industrial/institutional use where increased population growth is not expected. SJMWS may also use revised methodologies issued by DWR before 2015 to revise its 2015

and 2020 targets, or it may join regional alliances. These are in addition to SJMWS' current efforts to implement water conservation.

In August 2008, the City's Environmental Services Department prepared a Water Conservation Plan. This three-year plan formalizes the city's commitment to a more sustainable water supply. The plan relies on tools and programs such as outreach and education, cost-sharing programs with SCVWD for residential and commercial users, legislative priorities, Water Shortage Contingency Plan and Drought Plan, conservation pricing, and partnerships (San José August 2008). A new Water Conservation Plan will be prepared in late 2011/early 2012.

The City is also a signatory to the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding (MOU). It has committed to the implementation of the Best Management Practices (BMPs) described in the MOU and summarized below:

- Utility Operations Programs
- Education Programs
- Residential Programs
- Commercial, Industrial, and Institutional Programs
- Landscape Programs

The goals and implementation of these BMPs are further discussed in **Chapter 6** (Demand Management Measures). The City's Water Conservation Plan is included as **Appendix E**.

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4
System Supplies

4.1 SOURCES OF SUPPLY

SJMWS relies on four sources of supply: surface water from SFPUC, local and imported surface water from SCVWD, groundwater from the Santa Clara groundwater basin, and recycled water from the South Bay Water Recycling (SBWR) Program. Supply sources received by SJMWS and discussed within this chapter are generally considered consistent sources, except during times of prolonged drought, during which time supplies are decreased in proportion to wholesale supplies available as discussed in Chapter 5. **Table 4-1** depicts the amount of supply from each source that was purchased in 2010 and is anticipated to be purchased in the future as determined by the City.

Table 4-1: Water Supplies – Current and Projected in a Normal Year for SJMWS (AFY)

Water Supply Sources	2010	2015	2020	2025	2030	2035
SFPUC	4,592	5,039	5,039	5,039	5,039	5,039
SCVWD	13,692	16,185	16,592	17,019	17,500	17,500
Groundwater	668	5,767	7,988	10,251	12,809	15,888
Recycled Water	3,339	5,148	5,609	6,150	6,770	7,351
Total:	**22,291**	**32,139**	**35,228**	**38,459**	**42,118**	**45,778**

Each of the four service areas is supplied by one or more of the water supply sources described in **Table 4-1**.

NORTH SAN JOSE/ALVISO

The area is served through two service connections to SFPUC Bay Division Pipelines 3 and 4. The turnouts feed the demand of the distribution system and storage requirements of the two reservoirs. There are pump station facilities at each of the reservoirs. There is only one pressure zone in this service area. The pumping facilities are used to boost the pressure of water stored in the reservoirs from elevation head to system pressure. There are four groundwater wells with a pumping capacity of approximately 1,500 gpm each; two of the wells are currently permitted to be used under normal conditions to supply water, and two are available for emergency use purposes.

EVERGREEN

Three turnouts are connected to SCVWD's East Pipeline. There are five different pressure zones with 13 storage tanks and 13 pump stations. There are four stand-by groundwater wells with a pumping capacity of approximately 1,500 gpm each that can be used for emergencies.

EDENVALE

Three groundwater wells, with a combined pumping capacity of approximately 3,400 gpm each, pump groundwater to the distribution system and a storage tank.

COYOTE VALLEY

Four groundwater wells, with a combined pumping capacity of approximately 5,500 gpm each, pump groundwater to the distribution system and a storage tank.

4.2 SFPUC – WHOLESALER (SURFACE WATER)

The City receives water from the City and County of San Francisco's Regional Water System (RWS), operated by SFPUC. This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties.

The amount of imported water available to SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, SFPUC is very dependent on reservoir storage to firm-up its water supplies.

SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. In practice, the local watershed facilities are operated to capture local runoff.

The business relationship between San Francisco and its wholesale customers is largely defined by the "Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County" entered into in July 2009 (WSA). The new WSA replaced the Settlement Agreement and Master Water Sales Contract that expired June 2009. The WSA addresses the rate-making methodology used by San Francisco in setting wholesale water rates for its wholesale customers in addition to addressing water supply and water shortages for the RWS. The WSA has a 25 year term.

In terms of water supply, the WSA provides for a 184 million gallon per day (MGD, expressed on an annual average basis) "Supply Assurance" to the SFPUC's wholesale customers, subject to reduction, to the extent and for the period made necessary by reason of water shortage, due to drought, emergencies, or by malfunctioning or rehabilitation of the regional water system. The WSA does not guarantee that San Francisco will meet peak daily or hourly customer demands when their annual usage exceeds the Supply Assurance. The SFPUC's wholesale customers have agreed to the allocation of the 184 MGD Supply Assurance among themselves, with each entity's share of the Supply Assurance set forth in Attachment C to the WSA. The Supply Assurance survives termination or expiration of the WSA and the City's Individual Water Sales Contract with San Francisco.

The Water Shortage Allocation Plan between the SFPUC and its wholesale customers, adopted as part of the WSA in July 2009, addresses shortages of up to 20% of system-wide use. The Tier 1 Shortage Plan allocates water from the RWS between San Francisco Retail and the wholesale customers during system-wide shortages of 20% or less. A Tier 2 Shortage Plan was

adopted by the wholesale customers, which would allocate the available water from the RWS among the wholesale customers.

The City of San Jose and City of Santa Clara's Agreement with SFPUC provides that both cities will remain temporary and interruptible customers until 2018. The maximum amount that SFPUC will deliver to them collectively until 2018 is 9 MGD or 10,082 AFY. The contract with SFPUC is temporary in that it provides an assurance of supply only until December 2018. By December 2018, SFPUC will make further decisions on future water supply beyond 2018, after completing necessary cost analyses and California Environmental Quality Act (CEQA) evaluation/documentation. The supply is interruptible before December 2018 if the SFPUC determines that aggregate use by all wholesale customers will exceed 184 MGD in 2018. The supply cannot be interrupted until five years after the City has received notice of SFPUC's intention to reduce or interrupt deliveries.

As part of the new WSA with SFPUC, SJMWS may purchase excess water, provided the combined purchases of SJMWS and the City of Santa Clara do not exceed 9 MGD. SJMWS may also purchase excess water supplies from other wholesale customers. There are no assurances that this excess water will be available and excess supply is not included in **Table 4-1** and **Table 4-2**. However, SJMWS is committed to purchasing the maximum amount of water available and reducing its reliance on groundwater due to the uncertainties regarding the availability and sustainability of the groundwater basin.

For the purposes of this Plan, it is assumed that the supply available to SJMWS will remain the same through 2035. This is an extrapolation of current and historical water deliveries, as these deliveries have been fulfilled for over three decades. Therefore, such extrapolation is a reasonable planning assumption based on available data.

BAWSCA

SJMWS is a member of the Bay Area Water Supply and Conservation Agency (BAWSCA). BAWSCA was created on May 27, 2003 to represent the interests of the 26 agencies that include cities, water districts, a water company, and a university, in Alameda, Santa Clara and San Mateo counties that purchase water on a wholesale basis from the RWS. The BAWSCA agencies are referred to as the Wholesale Customers.

BAWSCA is the only entity that has the authority to directly represent the needs of the Wholesale Customers that depend on the RWS. Through BAWSCA, the Wholesale Customers can work with SFPUC on an equal basis to ensure the RWS is rehabilitated and maintained and to collectively and efficiently meet local responsibilities.

BAWSCA has the authority to coordinate water conservation, supply and recycling activities for its agencies; acquire water and make it available to other agencies on a wholesale basis; finance projects, including improvements to the regional water system; and build facilities jointly with other local public agencies or on its own to carry out the agency's purposes.

4.3 SCVWD – WHOLESALER (SURFACE WATER)

SCVWD's water supply system is comprised of storage, conveyance, recharge, treatment, and distribution facilities that include local reservoirs, the groundwater subbasins, groundwater

recharge facilities, treatment plants, a treated water transmission system, imported supply, and raw and treated water conveyance facilities. SCVWD supplies water to local retail water agencies which in turn provide it to their retail customers in Santa Clara County. SCVWD has an active conjunctive water management program to optimize the use of groundwater and surface water, and to prevent groundwater overdraft and land subsidence. Nearly half of the County's water supply is from local groundwater aquifers and more than half is imported from Northern California watersheds through State Water Project (SWP) and Central Valley Project (CVP) pumping stations in the Sacramento-San Joaquin Delta. Both groundwater and imported water are sold to retailers.

Imported water is conveyed to Santa Clara County through two main conveyance facilities: the South Bay Aqueduct, which carries SWP water from the South Bay Pumping Plant; and the Santa Clara Conduit and Pacheco Conduit, which bring CVP water from the San Luis Reservoir.

Local runoff is captured in local reservoirs for recharge into the groundwater subbasins or treatment at one of the District's Water Treatment Plants (WTPs). The total storage capacity of these reservoirs is about 170,000 acre-feet (AF). The Rinconada WTP was constructed in 1967 and can sustain a maximum flow rate of 75 MGD. Upgrades are in the planning stage to increase production at Rinconada to 100 MGD. The Penitencia WTP was constructed in 1974 and can sustain a maximum flow rate of 42 MGD. The Santa Teresa WTP was constructed in 1989 and can sustain a maximum flow rate of 100 MGD.

Treated water pipelines that distribute water from the treatment plants to the water retail agencies include the West Pipeline, the Campbell Distributary, the Santa Clara Distributary, the Mountain View Distributary and the Sunnyvale Distributary from Rinconada WTP; the Snell Pipeline and Graystone Pipeline from Santa Teresa WTP; and the East Pipeline, Parallel East Pipeline, and Milpitas Pipeline, which can be fed from the Santa Teresa WTP or from Penitencia WTP.

SJMWS receives water from SCVWD's Santa Teresa and Penitencia WTPs through the East and Snell Pipelines. In 1972, SCVWD entered into the first contract to supply SJMWS with imported water. Another contract initiated in 1981 remains in effect until 2051. The contract established a schedule of water deliveries where SJMWS submits a projected request for a five-year period to facilitate planning and SCVWD contracts annually for minimum deliveries, with restrictions based on peak demand and annual distribution. SJMWS may have access to additional water above the amount indicated in **Table 4-2**, as available.

Table 4-2 shows the existing and planned contract amount for each wholesaler.

Table 4-2: Wholesale Supplies – Existing and Planned Treated Water Sources for SJMWS (AFY)

Wholesale Sources	Contracted	2015	2020	2025	2030	2035
SFPUC[1]	5,039	5,039	5,039	5,039	5,039	5,039
SCVWD[2]	17,500	16,185	16,592	17,019	17,500	17,500
Total	**22,539**	**22,539**	**22,539**	**22,539**	**22,539**	**22,539**

1. SFPUC contract amount may change after 2018 as discussed in Chapter 4.2.
2. SCVWD contract amount is based on 5-yr projection by SJMWS as discussed in Chapter 4.3.

4.4 GROUNDWATER

Groundwater provides about half of the County's water supply for potable use, through pumping by retail water agencies or individual well owners. The groundwater basin in Santa Clara County is not adjudicated and has not been identified or projected to be in overdraft by DWR. The quality, supply, and management of the local groundwater basin is monitored and managed by SCVWD and is summarized in their Groundwater Management Plan (**Appendix F**), adopted in 2001.

SCVWD operates and maintains 18 major recharge ponds, with a combined surface area of more than 320 acres, and over 30 local creeks. Runoff is captured in SCVWD's reservoirs and released into both in-stream and off-stream recharge ponds for percolation into the groundwater basin. In addition, imported water is delivered by the raw water conveyance system to streams and ponds for groundwater recharge. The capacity of these recharge systems is 138,000 AF.

The groundwater system in Santa Clara County performs multiple functions: treatment, transmission, and storage. Water enters the groundwater subbasins through recharge areas generally located at or near the subbasins' perimeter, and is transmitted into the deeper confined aquifer of the central part of the valley. In the process, the water is filtered and becomes suitable for drinking. Eventually the groundwater reaches pumping zones, where it is extracted for municipal, industrial, and agricultural uses. The groundwater basin has vast storage capacity, enabling supplies to be carried over from wet years to dry years.

Within Santa Clara County, SCVWD manages two groundwater subbasins that transmit, filter, and store water: the Santa Clara Subbasin (DWR Subbasin 2-9.02) and the Llagas Subbasin (DWR Subbasin 3.301). In its water supply planning, SCVWD frequently splits the Santa Clara Subbasin into two subareas: the Santa Clara Plain and the Coyote Valley. Although part of the same subbasin, these two subareas have different groundwater management challenges and opportunities and are in different groundwater charge zones.

These subbasins contain young alluvial fill formation and the older Santa Clara Formation. Both formations are similar in character and consist of gravel, sandy gravel, gravel and clay, sand, and silt and clay. The coarser materials are usually deposited along the elevated lateral edges of the subbasins, while the flat subbasin interiors are predominantly thick silt and clay sections inter-bedded with smaller beds of clean sand and gravel. A general discussion of each groundwater subarea is provided below.

SANTA CLARA SUBBASIN - SANTA CLARA PLAIN

The Santa Clara Plain is part of the Santa Clara Subbasin, located in a structural trough that is bounded by the Santa Cruz Mountains to the west and the Diablo Range to the east. The Plain, which is approximately 22 miles long, narrows from a width of 15 miles near the County's northern boundary to about half a mile wide at the Coyote Narrows, where the two ranges nearly converge. The Plain has a surface area of 225 square miles and is approximately 15 square miles smaller than the Santa Clara Subbasin (Basin 2-9.02) as defined by the DWR in Bulletin 118, Update 2003, since it does not include the Coyote Valley portion of the Santa Clara Subbasin. Although hydraulically connected, SCVWD refers to the Coyote Valley separately (see description below) since it is in a different groundwater charge zone than the Santa Clara Plain and has fewer water supply options than the Santa Clara Plain. The Plain

underlies the northerly portion of the Santa Clara County and includes the majority of the streams and recharge facilities operated by the District.

SANTA CLARA SUBBASIN - COYOTE VALLEY

The Coyote Valley portion of the Santa Clara Subbasin is an alluvial-filled basin hydraulically connected to the Santa Clara Plain to the north. The Coyote Valley extends from Metcalf Road south to Cochrane Road, where it joins the Llagas Subbasin at a groundwater divide. The Coyote Valley is approximately seven miles long and ranges in width from a half mile at the Coyote Narrows to three miles, with a surface area of approximately 15 square miles. The District estimates the operational storage capacity of the Coyote Valley to be between 23,000 and 33,000 AF.

LLAGAS SUBBASIN

The Llagas Subbasin extends from the groundwater divide at Cochrane Road, near Morgan Hill, to the Pajaro River (the Santa Clara-San Benito County line) and is bounded by the Diablo and Coast Ranges. The Llagas Subbasin is approximately 15 miles long, three miles wide along its northern boundary, and six miles wide along the Pajaro River. DWR Bulletin 118, Update 2003 identifies this subbasin as Basin 3-3.01 and includes it as part of the Gilroy Hollister Groundwater Basin. The depth of alluvial fill and the underlying Santa Clara Formation varies from about 500 feet at the northern divide to greater than 1,000 feet at its south end. SCVWD estimates the operational storage capacity of the Llagas Subbasin to be between 150,000 and 165,000 AF.

SJMWS

Groundwater is a source of supplemental water supply for SJMWS's North San Jose/Alviso and Evergreen service areas. The Edenvale and Coyote Valley service areas are supplied entirely by groundwater. SJMWS draws groundwater from the Santa Clara Subbasin. The Coyote Valley groundwater wells draw from the Coyote Valley subarea; whereas, the other service areas draw from the Santa Clara Plain subarea (**Figure 4-1**). During the past five years, SJMWS's groundwater demands have been sufficiently met. **Table 4-3** shows the historical volume pumped from each subarea. **Table 4-4** shows the projected groundwater demands for each subarea of the Santa Clara Subbasin.

Table 4-3: Groundwater – Historical Volume Pumped (AFY)

Subareas	2005	2006	2007	2008	2009	2010
Santa Clara Plain	563	404	424	409	383	340
Coyote Valley	324	393	373	377	429	329
Total	**887**	**797**	**797**	**786**	**812**	**669**

Table 4-4: Groundwater – Projected Volume to be Pumped (AFY)

Subareas	2010	2015	2020	2025	2030	2035
Santa Clara Plain	340	3,822	5,290	6,671	8,216	10,348
Coyote Valley	329	1,945	2,698	3,580	4,593	5,540
Total	**669**	**5,767**	**7,988**	**10,251**	**12,809**	**15,888**

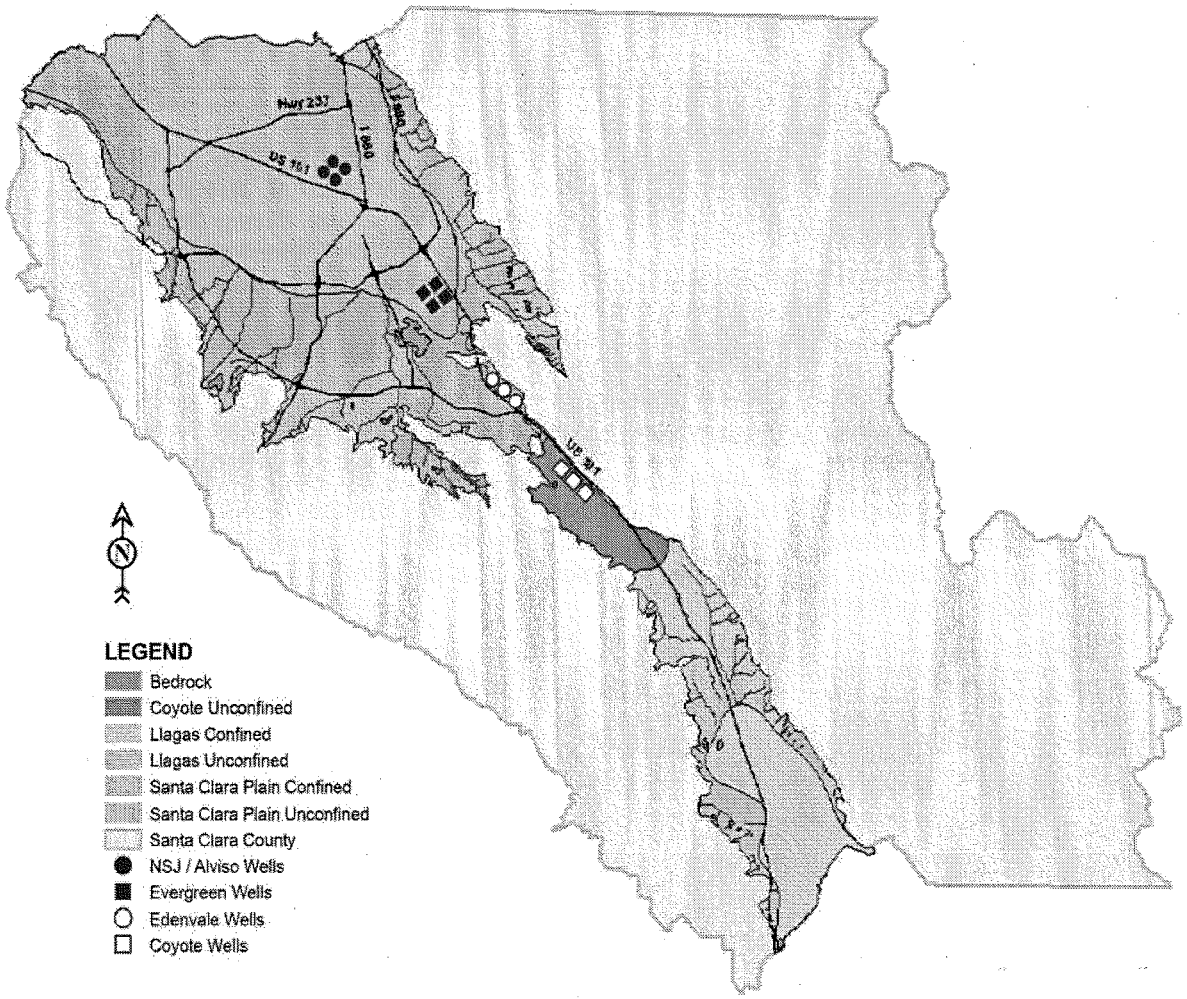
As required by the California Department of Public Health (CDPH) for their Drinking Water Source Assessment and Protection Program, drinking water source assessments were conducted for all 14 groundwater wells within SJMWS service areas during 2003/2004. The assessments were conducted by SJMWS staff, and consisted of information gathered from City records, databases, staff, the State Water Resources Control Board, and visual field surveys.

In North San Jose, potential contamination sources include local electronic manufacturing facilities, gas stations, leaking underground storage tanks and sewer collection facilities. The Evergreen wells are vulnerable to automobile gas stations, underground storage tank leaks and dry cleaning service activities. The Edenvale wells are vulnerable to chemical/petroleum processing storage activities. The Coyote wells are vulnerable to contamination caused by agricultural drainage, illegal activities/unauthorized dumping, storage tank leaks and sewer collection systems. However, the existing well locations and precautions taken during construction in combination with the local hydrology have provided a high level of protection against contamination of the local ground waters.

Saltwater intrusion has occurred in the shallow aquifer beneath North San Jose/Alviso. Saltwater from the Bay moves upstream during high tides and leaks through the clay cap into the upper aquifer zone when this zone is pumped. Land subsidence has also aggravated this condition. Elevated salinity is also present in the lower aquifer zone, but on a much smaller scale, and is attributed to improperly constructed, maintained, or abandoned wells that penetrate the clay aquitard and provide a conduit from the upper to the lower aquifer zone. In response, SCVWD has established an extensive program to locate and properly destroy such conduit wells (SCVWD, 2001).

As the groundwater management agency in Santa Clara County, SCVWD has ongoing groundwater protection programs to ensure high water quality and more reliable water supplies. These programs include well permitting, well destruction, wellhead protection, land use and development review, nitrate management (targeted to areas of elevated nitrate in the southern portion of the County), saltwater intrusion programs, and providing technical assistance to regulatory agencies to ensure local groundwater resources are protected (SCVWD, 2001).

Figure 4-1: Santa Clara County Groundwater Basin and SJMWS Groundwater Wells



4.5 TRANSFER/EXCHANGE OPPORTUNITIES

As noted above, SJMWS has the ability to purchase additional contract water from SFPUC as long as the combined amount between SJMWS and the City of Santa Clara does not exceed 9 MGD. SJMWS can also purchase excess water from other wholesale customers if available. SJMWS also has emergency tie-ins with the City of Santa Clara and San Jose Water Company for short-term transfers.

The majority of the transfer/exchange opportunities are managed by the wholesalers, SFPUC and SCVWD. In general, SFPUC has the ability to purchase additional water from the Tuolumne River and those sellers south of the Delta with water rights or entitlements to water diverted from the Delta. Water can also be purchased upstream of the Delta from sellers along the Sacramento, Feather, Yuba, American, San Joaquin Rivers and their tributaries.

SCVWD routinely uses short-term water transfers to increase water supplies in times of shortage. At present, SCVWD has two long-term transfer agreements. Under one agreement, SCVWD has an option for dry-year supplies totaling at least 20,000 AF over a 20-year period. The other agreement is for four-years which will allow 13,350 AF to be transferred over the term of the agreement, with flexible annual deliveries of at least 4,000 AF. SCVWD exchanges water with San Benito County Water District annually and works with other CVP contractors in San Joaquin Valley as exchange partners.

Additional details regarding wholesaler transfers and exchanges can be found in each individual wholesaler's UWMP.

4.6 DESALINATED WATER OPPORTUNITIES

As a water retailer who does not provide treatment (except fluoridation in the Evergreen area), SJMWS relies on wholesalers to explore desalinated water opportunities. Both SFPUC and SCVWD are working together with East Bay Municipal Utilities District, Contra Costa Water District, and Zone 7 Water Agency in the Bay Area Regional Desalination Project (BARDP). BARDP may consist of one or more desalination facilities that would remove salt from seawater or other brackish water sources, with an ultimate total combined capacity of up to 80 MGD. Desalination would provide a potential potable water supply for municipal and industrial use. The goals are to:

- Increase supply reliability by providing water supply when needed from a regional facility.
- Provide additional source of water during emergencies such as earthquakes or levee failures.
- Provide a supplemental water supply source during extended droughts.
- Allow other major facilities, such as treatment plants, water pipelines, and pump stations, to be taken out of service for maintenance or repairs.

Pre-feasibility studies and pilot testing have been completed. It is estimated that the environmental study will be completed by 2012, followed by design and permitting in 2013, with construction completed by 2015. Again, additional details regarding desalinated water opportunities can be found in SFPUC and SCVWD UWMPs.

4.7 RECYCLED WATER

The City began implementing a major water recycling program, known as the South Bay Water Recycling program (SBWR), under the auspices of the San Jose/Santa Clara Water Pollution Control Plant's (Plant) National Pollutant Discharge Elimination System Permit. The program was developed to protect the salt marsh habitat of two federally protected endangered species, the salt marsh harvest mouse and the California clapper rail, by reducing effluent flows from the Plant into the wetlands of the South Bay. A further benefit of this program was the development of a drought-proof supply of water, which augments local and imported water supplies.

The SBWR program delivers disinfected tertiary treated wastewater from the Plant through an extensive recycled water distribution system consisting of over 105 miles of pipeline (**Figure 4-2**). The recycled water is used for non-potable purposes such as agriculture; industrial cooling and processing; and irrigation of golf courses, parks, and schools. During the peak summer

season, SBWR diverts between 10 and 16 MGD of recycled water for irrigation and industrial uses to over 600 customers throughout San Jose, Santa Clara, and Milpitas.

WASTEWATER COLLECTION AND TREATMENT

Wastewater from SJMWS service areas is collected and treated at the Plant located at the south end of San Francisco Bay, which has a design capacity of 167 MGD. In addition to SJMWS service areas, the Plant treats wastewater from San Jose, Santa Clara, Milpitas, Campbell, Cupertino, Los Gatos, Monte Sereno and Saratoga, serving an area of over 300 square miles and a population of more than 1.5 million. **Table 4-5** illustrates the historical and projected wastewater to be treated at the Plant.

Table 4-5: Recycled Water – Wastewater Collection and Treatment (AFY)

Type of Wastewater	2005	2010	2015	2020	2025	2030	2035
Total wastewater collected and treated	126,673	136,762	142,367	149,093	153,577	158,061	163,666
Volume that meets recycled water standard	8,040	9,376	15,694	21,299	22,420	22,420	22,420

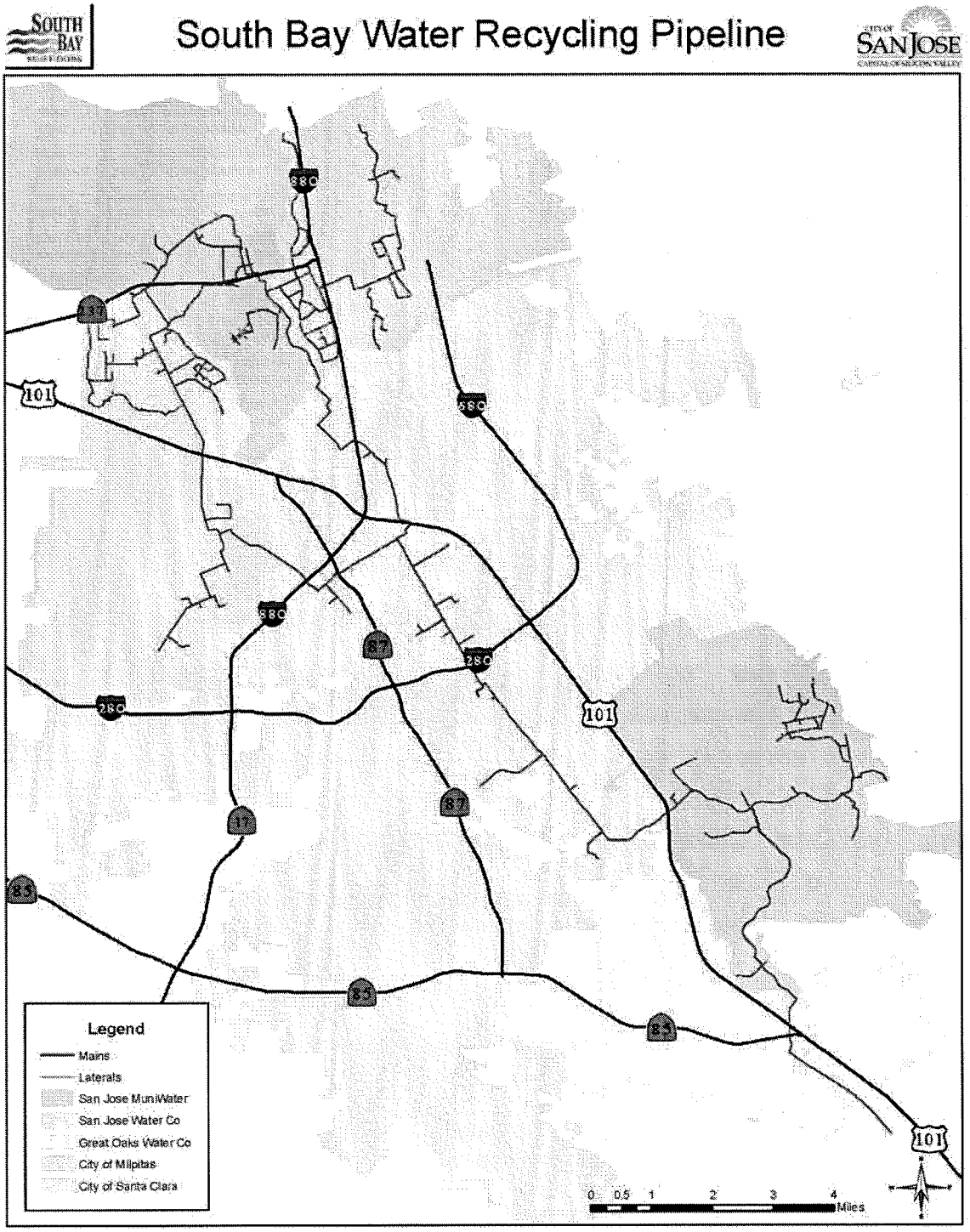
Wastewater is treated by the Plant to tertiary levels, and discharged through Artesian Slough and into the South San Francisco Bay. The SBWR system is part of an effort to maintain wastewater discharge below a level of 120 MGD. Expansion of the recycled water system will be an important part of the effort to prevent additional development-related flows from adversely impacting the salt marsh.

Recently, the City and SCVWD have entered into a 40-year long-term Agreement. The Agreement consists of the following:

- Ownership of an advanced recycled water treatment facility (AWTF)
- Operation and maintenance of recycled water facilities
- Decisions on export of recycled water outside the county
- Future expansion of SBWR that most effectively meets the needs of the community
- Joint technical studies on recycled water issues
- Coordinated recycled water outreach.

The AWTF will be located adjacent to the Plant and consist of microfiltration, reverse osmosis, and ultraviolet disinfection technologies to deliver up to 8 MGD of highly purified water. This high quality water will be blended with the existing tertiary treated recycled water to reduce the level of total dissolved solids (TDS) and enhance the use of recycled water for irrigation and industrial purposes. The AWTF is scheduled to be completed by 2012. This same technology is used by others to convert wastewater into drinking water.

Figure 4-2: SBWR Recycled Water System



RECYCLED WATER USES

Within SJMWS service area, there were 168 recycled water customer accounts as of the end of 2010. Typical uses of recycled water include irrigation (including landscape, median and streetscape irrigation) and industrial (including cooling towers, paper manufacturing, power generation, and dual plumbing water closet use).

These two general types of recycled water uses within SJMWS service area each currently account for approximately half of the total use. It is anticipated that there will be no significant new uses (wildlife habitat, wetlands, etc.) in the immediate future. **Table 4-6** details the quantity of recycled water based on type of usage.

Table 4-6: Recycled Water – Potential Future Use (AFY)

Use Type	Description	2015	2020	2025	2030	2035
Irrigation[1]	Planned use (included in **Table 4-5**)	2,980	3,441	3,982	4,603	5,183
Industrial[1]	Planned use (included in **Table 4-5**)	2,168	2,168	2,168	2,168	2,168
Groundwater Recharge	Use is being evaluated by SCVWD	0	0	11,210	11,210	11,210
Streamflow Augmentation	Use is being evaluated by SCVWD	0	0	11,210	11,210	11,210
	Total:	**5,148**	**5,609**	**28,570**	**29,191**	**29,771**

1. SJMWS has two categories for recycled water customers that correlate with recycled water rates: Irrigation and Industrial

A comparison of 2010 projected use figures to actual use figures is shown below in **Table 4-7**.

Table 4-7: Recycled Water – 2005 UWMP use projection compared to 2010 actual (AFY)

User Type	2010 Actual Use	2005 Projection for 2010[1]
Irrigation	1,678	N/A
Industrial	1,667	N/A
Total	**3,345**	**3,500**

1. Data is based on the total service area for SJMWS. Projections for 2010 in the 2005 UWMP did not separate user type.

SJMWS communicated with several local agencies to coordinate recycled water information, including the City-operated wastewater treatment plant.

OPTIMIZING USE OF RECYCLED WATER

Currently, the cities of San Jose, Santa Clara and Milpitas promote recycled water usage through a variety of mechanisms, including:

- Lower cost of recycled water than potable water.
- SBWR may contribute toward construction costs to retrofit an existing site to receive recycled water.
- SBWR obtains regulatory approval for recycled water usage.

- The cities of San Jose, Santa Clara, and Milpitas have ordinances requiring the use of recycled water for irrigation where available.
- The City prohibits the use of potable water for uses appropriate to recycled water.
- Public education through school curriculum, site supervisor training, marketing to potential customers and outreach at conventions, events, etc.
- SBWR participates in the Bay Area Regional Water Recycling Program (BARWRP), a regional recycled water planning effort.
- SBWR participates in the Bay Area Recycled Water Coalition to obtain Federal grant funding for recycled water projects.
- SBWR obtained ARRA funding to expand the recycled water distribution system.
- Expansion of system to areas where recycled water is unavailable and adding reliability to system.
- Pioneering new uses of recycled water, (i.e. printed circuit boards, paper manufacturing, streamflow augmentation, etc.)
- The City and SCVWD have partnered in the construction of the AWTF to improve the quality of recycled water to enhance the use by irrigation and industrial users.
- SCVWD is evaluating the possibility of indirect reuse.

Throughout the City, the system will continue to expand as additional distribution facilities are constructed by developers as needed to supply recycled water to fulfill their water and sewer flow diversion needs. Due to the many variables involved in recycled water uses and the possible applications of these optimization measures, it is unclear how each individual mechanism can be quantified. Therefore, **Table 4-8** lists the actions used to encourage recycled water use, but an actual projection that quantifies how each method increases the use of recycled water is unknown. SBWR will be soliciting a request for proposal in preparing a Recycled Water Master Plan later this year. It is anticipated that the Master Plan will help quantify the projected volume of recycled water based on type of use and outreach methods used.

Table 4-8: Methods Used to Encourage Recycled Water Use

Methods	Check if Used
Subsidized costs	X
Grants	X
Mandatory requirement for dual plumbing	
Regulatory Relief	X
Regional Planning	X
Incentive Program	X
Long-Term Contracts (Price/Reliability)	
Rate Discounts	X
Prohibit specific fresh water uses	X
Low-interest loans	X
Public education/information	X
Require recycled water use	X

4.8 FUTURE WATER PROJECTS

As a water retailer, SJMWS does not plan on developing "new" water supplies. Typically, capital improvement projects address infrastructure replacement and reliability needs. Future groundwater wells are needed in NSJ/Alviso, Edenvale, and Coyote service areas to support future demands. The Santa Clara Valley groundwater basin is not adjudicated; however, SJMWS will still rely on SCVWD to actively manage the groundwater basin to prevent overdraft and potential subsidence.

Table 4-9: Future Water Supply Projects (AFY)

Service Area	Potential Project	Projected Start	Estimated Per Well (Normal-Year)
NSJ/Alviso	Groundwater Well	2025	1,200
Edenvale	Groundwater Well	2020	1,900
Coyote	Groundwater Well	2025	1,100
		Total:	**4,200**

SJMWS is actively involved in the planning activities of water wholesalers, SFPUC and SCVWD. SJMWS is also involved in the planning activities for recycled water through SBWR. There is potential to use recycled water for indirect reuse which is being evaluated by SCVWD. Additionally, the SCVWD 5-Year Capital Improvement Program includes pipeline and diversion dam projects that have a total average yield or savings of about 20,000 AFY. SFPUC has a Water Supply Improvement Program geared towards improving reliability and water supply. Additional information regarding wholesalers' future projects can be found in their UWMPs.

SJMWS uses its entire allocation of SFPUC imported water, and also relies on groundwater and treated water supplies from SCVWD. In the Preferred Alternative (Water Supply Assessment for Envision San Jose 2040 General Plan Update, September 2010), 5,550 AFY is expected to come from groundwater or other SCVWD sources in the NSJ area; 486 AFY and 4,312 AFY is expected from the Evergreen and Edenvale groundwater, respectively. The wells in Evergreen should be maintained as supplemental supply during peak demand or emergency backup.

5
Water Supply Reliability & Water Shortage Contingency Planning

5.1 WATER SYSTEM RELIABILITY

As a water retailer, SJMWS depends heavily on water supply wholesalers to meet system demands. To meet future demand, SJMWS plans to rely on a portfolio of supplies. By utilizing different supply sources SJMWS may reduce the impact of water shortage from each source. Additionally, SJMWS has developed a Water Conservation Plan (**Appendix E**) to reduce future demands and increase water supply reliability.

NORTH SAN JOSE/ALVISO

SJMWS anticipates meeting future demands by using the full amount of SFPUC water available from the 10,082 AFY combined San Jose and Santa Clara supply. Additional SFPUC supply may be purchased from other SFPUC retail customers if available. Future potable water demand in excess of the SFPUC allocation can be supplemented with groundwater. The four existing groundwater wells can supply an estimated 4,500 AFY assuming year round pumping for 12 hours per day. SFPUC and groundwater supplies total 9,539 AFY which will meet the demands of the service area until 2030, at which time an additional 1,050 AFY of supply will be needed from a new groundwater well. The groundwater basin is not adjudicated and groundwater rights/entitlements have not been defined. Additional groundwater wells will be coordinated with SCVWD, who manages the groundwater basin to prevent overdrafting and contamination. Additionally, SJMWS is working with SCVWD to explore the potential of providing SCVWD treated water to this service area. Expansion of the recycled water system will also help to offset potable demand. The City will continue to promote the use of recycled water as described in **Chapter 4**. Recycled water is available for irrigation, industrial, and other approved uses.

EVERGREEN

SJMWS has a contract for SCVWD treated water supply. In addition, there is an estimated 4,842 AFY of available groundwater supply, assuming year round pumping for 12 hours per day from four existing groundwater wells. With the amount of combined available treated water and groundwater supplies, there is the potential that some supply entitlement could be supplied to help meet the North San Jose/Alviso projected demands, subject to interagency agreements where necessary. Expansion of the recycled water system in this service area will also offset potable water demand.

EDENVALE

This service area currently relies entirely on groundwater. Estimated annual pumping of the existing wells is approximately 2,421 AFY based on two operating wells. An additional 1,211 AFY is available upon rehabilitation of an existing well. A fourth well or additional supply from

SCVWD will be needed to meet 2035 demands. There is the potential to connect the Evergreen service area to Edenvale to utilize SCVWD treated water. Recycled water is also available to supply any approved non-potable needs.

COYOTE

The Coyote service area relies on groundwater and recycled water. Estimated annual pumping of the existing wells is approximately 4,439 AFY. An additional groundwater well will be needed to meet future demands by 2035. As this area grows, recycled water will be considered as a condition of development.

5.2 WATER SUPPLY RELIABILITY - SFPUC

The amount of imported water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to firm-up its water supplies.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. In practice, the local watershed facilities are operated to capture local runoff. The following describes allocation of SFPUC water supply during drought conditions. Additional information on SFPUC's supply reliability can be found in their UWMP.

5.2.1 WATER SHORTAGE ALLOCATION PLAN

In July 2009, in connection with the WSA, the wholesale customers and San Francisco adopted a Water Shortage Allocation Plan (WSAP) to allocate water from the regional water system to retail and wholesale customers during system-wide shortages of 20% or less (the "Tier One Plan"). The Tier One Plan replaced the prior Interim Water Shortage Allocation Plan, adopted in 2000, which also allocated water for shortages up to 20%. The Tier One Plan also allows for voluntary transfers of shortage allocations between SFPUC and any wholesale customer and between wholesale customers themselves. In addition, water "banked" by a wholesale customer, through reductions in usage greater than required, may also be transferred.

TIER ONE DROUGHT ALLOCATIONS

The Tier One Plan, which allocates water between San Francisco and the wholesale customers collectively, distributes water based on the level of shortage:

Table 5-1: Distribution of Water Based on Level of System-Wide Reduction

Level of System Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The Tier One Plan will expire at the end of the term of the Water Supply Agreement, unless extended by San Francisco and the wholesale customers.

TIER TWO DROUGHT ALLOCATIONS

The wholesale customers have negotiated and adopted the "Tier Two Plan", the second component of the WSAP which allocates the collective wholesale customer share among each of the 26 wholesale customers. This Tier Two allocation is based on a formula that takes multiple factors for each wholesale customer into account, including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the wholesale customers collectively will be allocated among them in proportion to each wholesale customer's Allocation Basis, expressed in MGD, which in turn is the weighted average of two components. The first component is the wholesale customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. San Jose's Water Sales Contract amount of 4.5 MGD is used as its fixed component. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the wholesale customers for all available water supplies. The second component is accorded twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain wholesale customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all wholesale customers' Allocation Bases to determine each wholesale customer's Allocation Factor. The final shortage allocation for each wholesale customer is determined by multiplying the amount of water available to the wholesale customers' collectively under the Tier One Plan, by the wholesale customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the wholesale customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each wholesale customer will also change. However, for long-term planning purposes, each wholesale customer has used the value identified in the Tier Two Plan when adopted as its Allocation Factor. The Tier Two Plan will expire in 2018 unless extended by the wholesale customers.

5.2.2 WATER SYSTEM IMPROVEMENT PROGRAM

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC has undertaken the Water System Improvement Program (WSIP), approved October 31, 2008. The WSIP will deliver capital improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing high quality water to customers in a reliable, affordable and environmentally sustainable manner. Many of the water supply and reliability projects evaluated in the WSIP were originally put forth in the SFPUC's Water Supply Master Plan (2000).

A Program Environmental Impact Report (PEIR) was prepared in accordance with the California Environmental Quality Act for the WSIP. The PEIR, certified in 2008, analyzed the broad environmental effects of the projects in the WSIP at a program level and the water supply impacts of various alternative supplies at a project level. Individual WSIP projects are also undergoing individual project specific environmental review as required.

In approving the WSIP, the Commission adopted a Phased WSIP Variant for water supply that was analyzed in the PEIR. This Phased WSIP Variant established a mid-term water supply planning milestone in 2018 when the Commission would reevaluate water demands through 2030. At the same meeting, the Commission also imposed the Interim Supply Limitation which limits the volume of water that the member agencies and San Francisco can collectively purchase from RWS to 265 MGD until at least 2018. Although the Phased WSIP Variant included a mid-term water supply planning milestone, it did include full implementation of all proposed WSIP facility improvement projects to insure that the public health, seismic safety, and delivery reliability goals were achieved as soon as possible.

As of July 1, 2010, the WSIP was 27% complete overall, with the planning and design work over 90% complete. The WSIP is scheduled to be completed in December 2015.

5.2.3 INTERIM SUPPLY LIMITATION

As part of its adoption of the WSIP, the Commission adopted a water supply element, the Interim Supply Limitation (ISL), to limit sales from the RWS watersheds to an average annual of 265 MGD through 2018. The wholesale customers' collective allocation under the ISL is 184 MGD and San Francisco's is 81 MGD. Although the wholesale customers did not agree to the ISL, the WSA provides a framework for administering the ISL. Strategies to address wholesale customers' unmet needs resulting from the ISL are further discussed below.

5.2.4 INTERIM SUPPLY ALLOCATIONS

The Interim Supply Allocations (ISAs) refers to each individual wholesale customer's share of the ISL. On December 14, 2010, the Commission established each agency's ISA through 2018. In general, the Commission based the allocations on the lesser of the projected fiscal year 2017-18 purchase projections or Individual Supply Guarantees. The ISAs are effective only until December 31, 2018 and do not affect the Supply Assurance or the Individual Supply Guarantees. San Francisco's ISA is 81 MGD. San Jose's ISA is 4.13 MGD.

As stated in the Water Supply Agreement, the wholesale customers do not concede the legality of the Commission's establishment of the ISAs and Environmental Enhancement Surcharge, discussed below, and expressly retain the right to challenge either or both, if and when imposed, in a court of competent jurisdiction.

5.2.5 ENVIRONMENTAL ENHANCEMENT SURCHARGE

The Commission plans to establish the Environmental Enhancement Surcharge concurrently with its budget-coordinated rate process. This surcharge will be unilaterally imposed by SFPUC on individual wholesale customers, and SFPUC retail customers, when each agency's use exceeds their Interim Supply Allocation and when sales of water to the wholesale customers and San Francisco retail customers, collectively, exceeds the Interim Supply Limitation of 265 MGD.

The SFPUC is in the process of developing the methodology and amount of this volume-based charge. The Environmental Enhancement Surcharge will become effective beginning fiscal year 2011-12.

5.2.6 WATER CONSERVATION IMPLEMENTATION PLAN

In September 2009, BAWSCA completed the Water Conservation Implementation Plan (WCIP). The goal of the WCIP is to develop an implementation plan for BAWSCA member agencies to attain the water efficiency goals that the agencies committed to in 2004 as part of the PEIR. The WCIP's goal was expanded to include identification of how BAWSCA member agencies could use water conservation as a way to continue to provide reliable water supplies to their customers through 2018 given the SFPUC's 265 MGD Interim Supply Limitation.

Based on the WCIP development and analysis process, BAWSCA and its member agencies identified five new water conservation measures, which, if implemented fully throughout the BAWSCA service area, could potentially save an additional 8.4 MGD by 2018 and 12.5 MGD by 2030. The demand projections for the BAWSCA member agencies, as transmitted to the SFPUC on June 30, 2010, indicate that collective purchases from the SFPUC will stay below 184 MGD through 2018 as a result of revised water demand projections, the identified water conservation savings, and other actions.

Several member agencies have elected to participate in the BAWSCA regional water conservation programs and BAWSCA continues to work with individual member agencies to incorporate the savings identified in the WCIP into their future water supply portfolios with the goal of maintaining collective SFPUC purchases below 184 MGD through 2018.

5.2.7 LONG TERM RELIABLE WATER SUPPLY STRATEGY

BAWSCA's water management objective is to ensure that a reliable, high quality supply of water is available where and when people within the BAWSCA service area need it. A reliable supply of water is required to support the health, safety, employment, and economic opportunities of the existing and expected future residents in the BAWSCA service area and to supply water to the agencies, businesses, and organizations that serve those communities. BAWSCA is developing the Long-Term Reliable Water Supply Strategy (Strategy) to meet the projected water needs of its member agencies and their customers through 2035 and to increase their water supply reliability under normal and drought conditions.

The Strategy is proceeding in three phases. Phase I was completed in 2010 and defined the magnitude of the water supply issue and the scope of work for the Strategy. Phase II of the Strategy is currently under development and will result in a refined estimate of when, where, and how much additional supply reliability and new water supplies are needed throughout the BAWSCA service area through 2035, as well as a detailed analysis of the water supply management projects, and the development of the Strategy implementation plan. Phase II will be complete by 2013. Phase III will include the implementation of specific water supply management projects. Depending on cost-effectiveness, as well as other considerations, the projects may be implemented by a single member agency, by a collection of the member agencies, or by BAWSCA in an appropriate timeframe to meet the identified needs. Project implementation may begin as early as 2013 and will continue throughout the Strategy planning horizon, in coordination with the timing and magnitude of the supply need.

The development and implementation of the Strategy will be coordinated with the BAWCSA member agencies and will be adaptively managed to ensure that the goals of the Strategy, i.e., increased normal and drought year reliability, are efficiently and cost-effectively being met.

The current contract between SJMWS and SFPUC to receive imported water expires in 2018. The future water allocation beyond 2018 is unknown at the present time. SFPUC will make a decision in December 2018 based on its ongoing environmental investigations. If SFPUC determines that it is necessary to reduce or eliminate San Jose's water supply, they would be required to first complete a CEQA analysis on the impacts of reducing or terminating the supply. San Francisco would work in cooperation with San Jose, BAWSCA, and the Santa Clara Valley Water District in the identification and implementation of additional water sources and conservation measures. As previously discussed in this section, BAWSCA is currently working on a long-term reliable water supply strategy to help ensure future supply to the member agencies. For the purposes of this report, it is assumed that delivery up to the contract maximum will continue beyond 2018.

5.3 WATER SUPPLY RELIABILITY - SCVWD

To maintain water supply reliability and flexibility, SCVWD's water supply includes a variety of sources including local groundwater, imported water and local surface water. SCVWD has an active conjunctive water management program to optimize the use of groundwater and surface water, and to prevent groundwater overdraft and land subsidence. Additional information on SCVWD's supply reliability can be found in their UWMP.

Several factors have the potential to negatively impact reliability, including: hydrologic variability, climate change, invasive species, infrastructure failure, regulatory actions as well as institutional, political and other uncertainties. Hydrologic uncertainties influence the projections of both local and imported water supplies and the anticipated reliability of those supplies. Supply analyses performed by SCVWD are based on the assumption of historical patterns of precipitation. The development of SCVWD projects and programs to meet future needs takes hydrologic variability and climate change into account.

Increases in average temperature due to climate change are occurring, and the impacts of increasing temperature have already been observed. Rises in average temperature will increase sea level and decrease the snow pack—by far the largest surface water "storage" facility in California. Decreased snow pack and projected earlier spring melts will reduce the amount of water available to meet peak demands in late spring and summer. These changes could decrease imported water and possibly local water supplies, while increasing salinity in the Delta, adversely impacting water quality and Bay-Delta ecosystems.

Under any climate change scenario, SCVWD may need to consider additional treatment options to respond to water quality impacts associated with increased salinity in the Delta. SCVWD may also need to consider additional storage to take advantage of more wet-season water, additional supplies to replace reduced water supply from existing sources, and additional water transfers (depending on water market impacts).

In determining the long-range availability of water, consideration must be given to the vulnerability of imported supplies to the effects of prolonged state-wide drought and

environmental impacts. Reductions by DWR or the US Bureau of Reclamation to SCVWD allocations of State Water Project (SWP) or Central Valley Project (CVP)-San Felipe Division water may result in a temporary supply shortfall for SJMWS and other SCVWD retailers. Although SJMWS has the facilities to pump additional groundwater, the Evergreen service area, whose current supplies are 100% imported water, could be faced with supply deficiency, especially during the summer months. Water demands could be met with groundwater, additional imported water supply, water conservation measures, and with expanded recycled water use.

SCVWD obtains its supplies from a variety of sources to maintain maximum efficiency, flexibility, and reliability, including local and imported water supplies. SCVWD augments natural groundwater recharge with a managed recharge program to offset groundwater pumping, sustain storage reserves, and minimize the risk of land subsidence. Through these recharge activities, SCVWD works to keep groundwater basins "full" to protect against drought. Storing surplus water in the groundwater basins enables part of the supply to be carried over from wet years to dry years. SCVWD also has a contract for 100,000 AFY for SWP, and 152,500 AFY for CVP. However, the actual amount of water delivered is typically significantly less than these contractual amounts and depends on hydrology, conveyance limitations, and environmental regulations, including regulatory constraints to protect water quality as well as fish. On a long-term average basis, 83% of the CVP supply is delivered for municipal and industrial use, and 17% is delivered for irrigation use. SCVWD routinely acquires supplemental imported water to meet the county's needs from the water transfer market, water exchanges, and groundwater banking activities.

In May 1996, SCVWD approved an agreement with Semitropic Water Storage District (Semitropic) to store 45,000 AF of SWP water in Semitropic's groundwater basin on behalf of SCVWD. In 1997, SCVWD approved a long-term agreement with Semitropic. Under the terms of this agreement, SCVWD has banked water in ten years since 1997, and withdrawn water in four years. The agreement allows SCVWD to maximize the economic value of its imported water contracts by fully utilizing water that might otherwise have to be turned back to the SWP or CVP. For example, in 2006, a very wet year, SCVWD was able to store nearly 58,000 AF of imported water for use in future dry years. The total storage capacity available to SCVWD in the Semitropic Water Bank is 350,000 AF and the current storage balance as of May 2010 is 151,123 AF (SCVWD, 2010 UWMP).

If demands are anticipated to reach the upper end of the demand range, SCVWD could consider additional long-term transfers. At present, SCVWD has two agreements that are classified as long-term transfers. In 1998, SCVWD and two other agencies (Pajaro Valley Water Management Agency and Westlands Water District) jointly participated in the permanent assignment of 6,260 AF from Mercy Springs Water District, an agricultural Central Valley Project (CVP) contractor. Under the agreement, SCVWD has an option for dry-year supplies totaling at least 20,000 AF over a 20-year period. The dry-year option may continue for subsequent terms depending on the future plans of Pajaro Valley Water Management Agency.

In 2010, SCVWD entered into a four-year agreement with Patterson Irrigation District, a contractor in the San Joaquin Valley with a reliable CVP supply based on their San Joaquin River water rights. The total amount that will be transferred over the term of the agreement is 13,350 AF, with flexible annual deliveries of at least 4,000 AF.

5.4 FACTORS AFFECTING SUPPLY

In addition to droughts, there are other threats to the sources providing water supply to SJMWS. SJMWS prepares for these threats through their portfolio of supplies, by working with SFPUC and SCVWD, and through demand management like the Water Shortage Ordinance and the Water Conservation Plan (included in **Appendix E**).

GLOBAL CLIMATE CHANGE

Global climate change represents a serious threat to water supply and the total impact is not fully understood or quantified. According to the Intergovernmental Panel on Climate Change, global warming could significantly alter California's hydrologic cycles and water supply. These impacts could include decreased Sierra snowpack, increased temperatures, more severe droughts, sea level rise, and increased floods. Climate models indicate that precipitation as rainfall is expected to increase as snowfall decreases over the Sierra Nevada and Cascade mountain ranges. Sierra snowpack is expected to be reduced by 25 percent by 2050 (DWR 2007). This reduction directly impacts the volume of imported water sources for SJMWS. Sierra snowmelt feeds reservoirs like Hetch-Hetchy and rivers that flow to the Delta, the sources of SFPUC and SCVWD imported water, respectively.

Climate change may also increase regional temperatures and cause more variable weather patterns. In addition to decreasing snowpack, these increased temperatures may also increase water demand. Higher temperatures could increase water demand throughout the state through increased agricultural irrigation and, in SJMWS service areas, through increased outdoor residential and commercial irrigation. Changing weather patterns could cause more severe flooding and longer droughts.

The Sacramento-San Joaquin Delta is at risk from climate change. More severe flooding and a rising sea level threaten the water ways that serve as a vital link in the state's water system. Additional threats to water supply and the Delta are discussed below. The State of California and DWR are working to reduce the effects of climate change both through reduction of emissions and strategies to address the impacts of climate change. DWR voluntarily joined the California Climate Action Registry, a tool to track and report emissions. DWR is also working to add more clean and renewable energy resources to its power portfolio and to reduce its carbon footprint. To address the impacts of climate change, DWR has included an extensive discussion of the topic in the state's "Water Plan Update 2005" and published "2009 California Climate Adaptation Strategy Discussion – Draft." The 2009 report summarizes climate change threats and ways to manage those threats. In addition, DWR has developed strategies to address impacts including increased monitoring of climatologic and water resource conditions, reduction of greenhouse gas emissions from water management activities, studying the combined effects of increased atmospheric carbon dioxide and increased temperature (to predict future water demand), and adaptation of statewide water management systems by incorporating more flexibility.

Initial climate change modeling completed by the SFPUC indicates that about seven percent of runoff currently draining into Hetch Hetchy Reservoir will shift from the spring and summer seasons to the fall and winter seasons in the Hetch Hetchy basin by 2025. This percentage is within the current interannual variation in runoff and is within the range accounted for during normal runoff forecasting and existing reservoir management practices. The predicted shift in runoff timing is similar to the results found by other researchers modeling water resource

impacts in the Sierra Nevada due to warming trends associated with climate change. The SFPUC has stated that based on this preliminary analysis, the potential impacts of climate change are not expected to affect the water supply available from the San Francisco Regional Water System (RWS) or the or the overall operation of the RWS through 2030.

DELTA PUMPING RESTRICTIONS

The Sacramento-San Joaquin Delta, at the confluence of the Sacramento and San Joaquin rivers, is a key component to the state's water system (DWR 2009b). Much of the water that feeds the State Water Project and Central Valley Project flows through the Delta, both Projects being a significant portion of SCVWD water supplies. The Delta is also home to a sensitive ecosystem with several federally listed threatened species. Balancing the needs of California's water supply with those of the environment has been a challenge for the State of California and DWR.

In 2007, pumping from the Delta for water supply was limited by a federal court to protect the Delta Smelt, a federally listed threatened species. Further restrictions have been imposed to protect other fish species, including the Longfin Smelt and Chinook salmon. These pumping limits directly affect the amount of imported water that SCVWD has available. While SJMWS currently has a contract with SCVWD for imported water in the Evergreen service area, these pumping limits could prevent SJMWS from increasing or maintaining the contracted volumes for SCVWD treated surface water.

The State of California and DWR are currently working to "avert an ecological disaster and ensure reliable water supplies for Californians now and in the future." Former Governor Schwarzenegger appointed a Delta Vision Blue Ribbon Task Force, who produced a final document with their recommendations, "Delta Vision," in January 2008. DWR also recommended strategies for the future of the Delta in its "Water Plan Update 2005". The Governor has also outlined a comprehensive plan for Delta sustainability, building on these recommendations. In addition, DWR is currently working on the Bay-Delta Conservation Plan environmental documents. These documents focus on both water supply reliability and the recovery of listed species, and examine alternatives to ensure the success of both (DWR 2009b).

NATURAL DISASTERS

Disasters such as earthquakes could threaten water delivery infrastructure. The wholesalers that provide SJMWS with water supply are taking steps to ensure water supply reliability.

SFPUC has adopted an Emergency Response and Recovery Plan (ERRP) to enable swift response in the event of damage to their imported water system. Additionally, SFPUC has the WSIP which will improve the regional system with respect to water quality, seismic response, water delivery, and water supply to meet water delivery needs in the service area through the year 2030. The WSIP also establishes level of service goals and system performance objectives. Completion of the WSIP will allow modified system operations, and will result in a series of facility improvement projects. The proposed program area spans seven counties—Tuolumne, Stanislaus, San Joaquin, Alameda, Santa Clara, San Mateo, and San Francisco.

While the SFPUC has historically met and is currently serving its customers' water demands, there are numerous factors contributing to the need for a comprehensive, system-wide program

such as the WSIP. In order to continue to provide reliable water service to its customers, the WSIP allows SFPUC to plan for the future as well as address existing, known deficiencies, including the following:

- *Aging Infrastructure.* Many of the components of the SFPUC regional water system were built in the 1800s and early 1900s. As the system ages, its reliability decreases and the risk of failure increases.
- *Exposure to Seismic and Other Hazards.* The system crosses five active earthquake faults, and many of the existing facilities do not meet modern seismic standards. The California Division of Safety of Dams imposed operating restrictions on two of the system's reservoirs, Calaveras and Lower Crystal Springs Reservoirs, due to seismic and flood control safety hazards, respectively. The restricted operations at these reservoirs reduce local storage capacity and impair normal system operations.
- *Delivery Reliability.* The system requires additional redundancy (i.e., backup) of some critical facilities to ensure sufficient operational flexibility to carry out adequate system inspection and maintenance and to be adequately prepared in the event of an earthquake, system failure, or other emergency. These critical facilities are necessary to meeting day-to-day customer water supply needs, and increased operational flexibility is needed in order to maintain service to all customers during a full range of operating conditions.

SFPUC goals and objectives for the WSIP target these deficiencies.

In 2003, SCVWD initiated the Water Utility Infrastructure Reliability Project (IRP) to determine the current reliability of its water supply infrastructure (pipes, pump stations, treatment plants) and to appropriately balance level of service with cost. The project measured the baseline performance of critical facilities in emergency events and identified system vulnerabilities. The study concluded that SCVWD's water supply system could suffer up to a 60-day outage if a major event, such as a 7.9 magnitude earthquake on the San Andreas Fault, were to occur. Less severe hazards, such as other earthquakes, flooding and regional power outages had less of an impact on SCVWD, with outage times ranging from one to 45 days.

The level of service goal identified for the IRP was "Potable water service at average winter flow rates available to a minimum of one turnout per retailer within seven days, with periodic one day interruptions for repairs." In order to meet this level of service goal, the project developed seven portfolios to mitigate the identified system risks, and identified a recommended portfolio for implementation. As a result, SCVWD has been implementing the recommended portfolio of reliability improvement projects (Portfolio 2). The cost to implement Portfolio 2 is estimated to be approximately $175 Million. Portfolio 2 is expected to reduce the post-earthquake outage period from 45-60 days to 7-14 days.

Additionally, SCVWD routinely monitors the conditions of all their ten dams used for both water supply and flood prevention. Seismic safety evaluations on eight dams are planned by 2013.

SJMWS' distribution system is designed to enable flexibility in water delivery options. Water tanks provide storage capacity to help meet demands during short-term wholesale supply outages, and groundwater wells can be used to supplement imported water supplies as well. Emergency interties with adjacent water retailers can be used if necessary.

5.5 WATER SHORTAGE CONTINGENCY & DROUGHT PLANNING

In response to AB11X, the City coordinated with SCVWD to create a Water Shortage Contingency Plan in 1991 to supplement the Urban Water Management Plan (see **Appendix G**). The Water Shortage Contingency Plan details the stages of action to be implemented in the case of a supply shortage. In 1994 and 2009, the City adopted revisions to the City Municipal Code Chapter 15.10 (**Appendix G**), which included water shortage measures to be enforced during a time of water shortage. A summary of the stages of action is described later on in this Chapter.

This section contains a three-year worst case scenario for water supply availability and details on the stages of action to be implemented in case of a supply shortage based on average, single dry, and multiple dry year supplies as defined below.

AVERAGE/NORMAL WATER YEAR

The "normal" year for the purposes of the report, is a year in the historical sequence that most closely represents median runoff levels and patterns. Based on an evaluation of total supplies available to SCVWD over the historical hydrologic sequence (1922–2003), and given current existing facilities and institutional arrangements, the median and average are within approximately 1 percent. The median year from the analysis of the historical hydrologic sequence is 1935. SCVWD selected 2002 as the "normal year" since it is close to the median and is essentially equal to the average. The selection of a "normal year" does not match the average year for all supply sources, but is the "best fit" for the hydrologic years included in the modeling analysis.

Carryover storage is that portion of the SCVWD's local and outside of the county surface storage, local groundwater storage and outside the county banked storage that is not required to meet the current year's demands but could potentially be utilized in subsequent years. Note that groundwater is used in all year types (including years where the total supplies exceed total demands) for distribution, storage and treatment.

SINGLY-DRY YEAR SUPPLY

The single dry year supply is defined as the year with the minimum usable supply. The hydrology of 1977 represents the minimum total supply that has been observed in the historical record according to SCVWD. The District will be able to meet the water needs of the county during the single dry year even with increasing demands, based on the historical hydrologic sequence and carryover supplies that are projected to be available leading into a single dry year. If a similar dry year occurred when carryover storage was not available, implementation of actions associated with the water shortage contingency plan would be required.

In the single dry year analysis, supplies for SCVWD from carryover storage are needed to meet the annual demands under all demand years and make up almost half of the total supplies in the single dry year. SCVWD's ability to take water from the Semitropic Water Bank is proportional to SWP allocation percentages for the year. During drought years, this can significantly limit how much of its water bank balance SCVWD can withdraw.

SFPUC modeling and historic hydrological sequence identifies 1978 as the model single dry year.

MULTIPLE-DRY YEAR SUPPLY

Multiple dry year scenario analysis is useful particularly in the evaluation of carryover storage. Evaluating the availability of the county's water supplies requires an understanding of the driest periods that can reasonably be expected to occur. Over the more than 120 years of recorded rainfall, seven major drought events have occurred. SCVWD modeling results indicate that the county's water supply system is more vulnerable to successive dry years, such as those that occurred in 1928-1934 and 1987-1992. Multiple dry year periods deplete water storage reserves in local and imported supply reservoirs and in the groundwater subbasins. Multiple dry years (such as the 1987-1992 drought) pose the greatest challenge to SCVWD's water supply. Although the supply in each year may be greater than in a single very dry year, as drought lingers, storage reserves are relied on more and more. The multiple dry year period selected for SCVWD's analysis is from 1987 through 1992.

SFPUC modeling and historic hydrological sequence identifies 1989-1993 as the model multiple dry year sequence.

The water supply available to individual retailers will ultimately be determined by SCVWD and SFPUC. SJMWS will work closely with SCVWD, SFPUC, and other water retail agencies to implement any stages of action to reduce the demand for water during water shortages.

Table 5-2 summarizes the average, single dry, and multiple dry water years used to determine the minimum water supply available as compared to the average/normal water year.

Table 5-2: Basis of Water Year Data

Water Year Type	Base Years	
	SFPUC	SCVWD
Average Water Year	2002	2002
Single Dry Water Year	1978	1977
Multiple Dry Water Years	1989-1993	1987-1992

As discussed earlier in this report, SJMWS relies mostly on SFPUC and SCVWD for its water supply and is directly affected by the water supply conditions both wholesaler faces. This section discusses water supply conditions as it affects the wholesalers.

SFPUC

SFPUC historically has met demand in its service area in all year types from its Tuolumne River, Alameda Creek, and San Mateo County watersheds. In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. SFPUC's adopted WSIP retains this mix of water supply for all year types. In order to achieve its target of meeting at least 80 percent of its customer demand during droughts, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP. SFPUC proposes to expand their water supply portfolio by increasing the types of

water supply resources to meet future demands. This includes approximately 2,240 AFY of transfers and 8,100 AFY of groundwater from the Westside Basin.

The Tier One and Tier Two Plans, as earlier described, would be implemented as necessary in the event of a shortage of SFPUC supplies.

SCVWD

As a result of the 1987 to 1992 drought, local reservoirs were reduced and wholesalers received only partial entitlement from its imported sources. In response to these circumstances, SCVWD instituted an aggressive water conservation program and augmented imported sources of water with additional water supplies. Since the end of the drought, local reservoir levels have returned to normal, allowing greater flexibility to meet water demands during a short-term dry period.

In the event of a multiple dry year supply scenario occurring between now and 2020, supplies for SCVWD and groundwater are planned to be adequate to continue to meet the increased demands, while supplies from SFPUC will decrease. SJMWS will compensate for temporarily decreased supply from SFPUC by using additional groundwater supply as available. SCVWD has accounted for additional groundwater pumping during a single-dry and multiple-dry years. Subsequent to 2020, implementation of water shortage contingency plan actions would be required to reduce demands by approximately 20-25% in the fifth year and beyond of a multi-year drought.

SUPPLY AVAILABILITY

In the event of a decrease of local supplies, SJMWS would respond by pursuing demand reduction programs in accordance with the severity of the supply shortage. Any supply deficit would be compensated for by increased conservation levels and restrictions in consumption.

An analysis of the supplies historically available during times of shortage is reflected in **Table 5-3**. This analysis does not account for population and system growth, and reflects the amount of supply available to meet the system's demands during the designated years.

Table 5-3: Supply Reliability – Historic Conditions (AFY)

Normal Water Year (2002)[1]	Single Dry Water Year (1977)	Multiple Dry Water Years			
		Year 1 (1987)	Year 2 (1988)	Year 3 (1989)	Year 4 (1990)
Percent of Normal Year[2]	37.1%	65.4%	64.1%	55.4%	58.6%

1. Does not include recycled water which was available in 2002, but not 1987-1990.
2. Percentage estimated based on available data, and not adjusted for population and system growth.

Table 5-4 is based on the projected demands during the indicated years, and analyses of the average/normal deliveries to SJMWS from SFPUC and SCVWD in 2002. This analysis uses decreased supply availability in accordance with historic conditions as described in **Table 5-3**; however, an analysis of current supply and wholesale supplier systems indicates that supplies would be available to meet demands even in times of drought, with no reduction of supply necessary until the fifth year and beyond of a multi-year drought.

Table 5-4: Supply Reliability – Current Water Sources (AFY)

Source	Average/ Normal Water Year 2002	Multiple Dry Water Years		
		Year 2011	Year 2012	Year 2013
SFPUC	5,207	3,385	2,939	2,939
SCVWD	15,275	8,225	8,889	8,733
Groundwater	651	3,590	5,808	1,260
Recycled Water[1]	1,720	3,706	4,067	4,427
TOTAL:	**22,853**	18,905	21,703	17,359
	Percent of Average/Normal:	**83%**	**95%**	**76%**

1. Recycled water supply is not anticipated to decrease during multiple dry years.

Table 5-5 through **Table 5-11** provides a comparison between supply and demand for normal, single dry and multiple dry water years. As SFPUC supply decreases, groundwater supplies increase, leaving a zero percent difference between supply and demand.

Table 5-5: Supply and Demand Comparison – Normal Year (AFY)

Source	2015	2020	2025	2030	2035
SFPUC	5,039	5,039	5,039	5,039	5,039
SCVWD & Groundwater	21,592	24,579	27,270	30,310	33,389
Recycled Water	5,148	5,609	6,150	6,770	7,351
Supply Totals	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**
Demand Totals	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**
Difference	0	0	0	0	0
Difference as % Supply	0%	0%	0%	0%	0%
Difference as % Demand	0%	0%	0%	0%	0%

Table 5-6: Supply and Demand Comparison – Single Dry Year (AFY)

Source	2015	2020	2025	2030	2035
SFPUC[1]	3,387	3,387	3,387	3,387	3,387
SCVWD & Groundwater	23,604	26,231	28,922	31,962	35,041
Recycled Water	5,148	5,609	6,150	6,770	7,351
Supply Totals	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**
Demand Totals	**32,139**	**35,227**	**38,459**	**42,119**	**45,779**
Difference	0	0	0	0	0
Difference as % Supply	0%	0%	0%	0%	0%
Difference as % Demand	0%	0%	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

Table 5-7: Supply and Demand Comparison – Multiple Dry Year for 2015 (AFY)

Source	Year 1 2015	Year 2 2016	Year 3 2017
SFPUC[1]	3,387	3,387	2,941
SCVWD & Groundwater	23,604	24,130	25,102
Recycled Water	5,148	5,240	5,332
Supply Totals	**32,139**	**32,757**	**33,375**
Demand Totals	**32,139**	**32,757**	**33,375**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

Table 5-8: Supply and Demand Comparison – Multiple Dry Year for 2020 (AFY)

Source	Year 1 2020	Year 2 2021	Year 3 2022
SFPUC[1]	3,387	3,387	2,941
SCVWD & Groundwater	26,231	26,769	27,753
Recycled Water	5,609	5,717	5,825
Supply Totals	**35,227**	**35,873**	**36,519**
Demand Totals	**35,227**	**35,873**	**36,519**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

Table 5-9: Supply and Demand Comparison – Multiple Dry Year for 2025 (AFY)

Source	Year 1 2025	Year 2 2026	Year 3 2027
SFPUC[1]	3,387	3,387	2,941
SCVWD & Groundwater	28,922	29,530	30,584
Recycled Water	6,150	6,274	6,398
Supply Totals	**38,459**	**39,191**	**39,923**
Demand Totals	**38,459**	**39,191**	**39,923**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

Table 5-10: Supply and Demand Comparison – Multiple Dry Year for 2030 (AFY)

Source	Year 1 2030	Year 2 2031	Year 3 2032
SFPUC[1]	3,387	3,387	2,941
SCVWD & Groundwater	31,962	32,578	33,640
Recycled Water	6,770	6,886	7,002
Supply Totals	**42,119**	**42,851**	**43,583**
Demand Totals	**42,119**	**42,851**	**43,583**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

Table 5-11: Supply and Demand Comparison – Multiple Dry Year for 2035 (AFY)

Source	Year 1 2035	Year 2 2036	Year 3 2037
SFPUC[1]	3,387	3,387	2,941
SCVWD & Groundwater	35,041	35,041	35,041
Recycled Water	7,351	7,351	7,351
Supply Totals	**45,779**	**45,779**	**45,779**
Demand Totals	**45,779**	**45,779**	**45,779**
Difference	0	0	0
Difference as % Supply	0%	0%	0%
Difference as % Demand	0%	0%	0%

1. Groundwater will supplement decrease in SFPUC supply

The City Council has adopted several ordinances and resolutions to deal with drought and water waste. **Table 5-12** is a list of the Ordinances and Resolutions and dates they were adopted.

Table 5-12: City Resolutions and Ordinances Regarding Water Shortage

Resolution	Date Adopted
Resolution 60748	June 28, 1988
Resolution 60749	June 28, 1988
Resolution 60950	November 25, 1988
Ordinance 23083	April 18, 1989
Ordinance 23109	April 18, 1989
Ordinance 23110	April 18, 1989
Ordinance 23113	April 18, 1989
Resolution 61292	April 18, 1989
Resolution 62045	March 27, 1990

Resolution	Date Adopted
Resolution 62551	October 20, 1990
Resolution 63593	March 24, 1992
Ordinance 24600	April 26, 1994
Resolution 74917	May 19, 2009
Resolution 74918	May 19, 2009
Ordinance 28597	June 23, 2009
Resolution 75065	June 3, 2009

Of note is Resolution 63593, which formally adopted the Water Shortage Contingency Plan, and Ordinance 28597, which amended parts 2 and 3 of Chapter 15 of the City of San Jose Municipal Code to strengthen requirements related to water conservation and use during a period of water shortage. The Water Shortage Contingency Plan defines the stages of action to be taken at varying levels of supply shortages.

STAGES OF ACTION

In the event of a water shortage, restrictions on potable water use will be enforced by the City according to the water shortage provisions included within Chapter 15.10 of the City's Municipal Code (**Appendix G**). Mandatory restrictions on potable water use would be applied to different shortage levels to reduce potable demand. **Table 5-13** describes the water supply conditions in which SJMWS will implement the prohibitions at various stages described in **Table 5-14**.

Table 5-13: Water Shortage Contingency – Rationing Stages to Address Shortages

Stage No.	% Shortage	Water Supply Conditions
1	10%	10% shortage declared by wholesale water agency. Current water use is tapping into groundwater reserves.
2	25%	25% shortage declared by wholesale water agency. Shortage conditions are worsening. Groundwater levels continue to decrease
3	30%	30% shortage declared by wholesale water agency. Signs of multiyear drought.
4	40%	40% shortage declared by wholesale water agency. Continued signs of multiyear drought.
5	>40%	Greater than 40% shortage declared by wholesale water agency. Typically meant for immediate crisis such as major infrastructure failure. Water supply reserved for health and safety needs.

MANDATORY PROHIBITIONS AND CONSUMPTION LIMITS ON WATER USE

The City will enforce mandatory reduction programs as necessary to decrease consumption during a water shortage. SJMWS currently has no additional limits on consumption to discourage and/or prevent excessive use during times of supply shortage. However, during a time of water shortage, SJMWS will evaluate the need for any consumption limits, and the City Council may adopt additional consumption limits as deemed appropriate.

Table 5-14: Water Shortage Contingency – Mandatory Prohibitions

Stage No.	Prohibition
Stage 1 10% Mandatory Program	• Irrigation of outdoor landscaping is prohibited during designated daylight hours, with certain exceptions
Stage 2 25% Mandatory Program	• Continue and intensify all activities undertaken during Stage 1 • No potable water may be used to clean any exterior paved or hard-surfaced area, or the exterior of any building or structure • No filling ornamental lakes or ponds with potable water • No washing of vehicles, except at a commercial car washing facility that utilizes a re-circulating water system to capture or reuse water • No refilling swimming pools or outdoor spas more than one (1) foot • Operation of decorative fountains using potable water is prohibited, with certain exceptions
Stage 3 30% Mandatory Program	• Continue and intensify all activities undertaken during Stages 1-2 • Irrigation of outdoor landscaping is prohibited at all times, with certain exceptions • No new outdoor landscaping or plantings shall be installed during the months of May through October • Public use of water from hydrants is prohibited
Stage 4 40% Mandatory Program	• Continue and intensify all activities undertaken in Stages 1-3 • All irrigation of outdoor landscaping is prohibited at all times, with specific limited exceptions • Filling of any swimming pool, fountain or spa is prohibited • Leaks, broken water pipes, irrigation systems, and faucets must be fixed within 48 hours
Stage 5 50% Mandatory Program	• Continue and intensify all activities undertaken in Stages 1-4 • SJMWS evaluate actual water consumption to determine additional measures to be taken to further reduce potable water use. • City to enforce any additional measures deemed appropriate for the situation in order to reduce water use. • City Council will determine priorities for use of available water within SJMWS service area.

PENALTIES OR CHARGES FOR EXCESSIVE USE

The City will enforce mandatory reduction programs as necessary to decrease consumption during a water shortage. SJMWS currently has no set charge for penalties or fees for exceeding consumption limits to be set during times of supply shortage (as described above). However, during a time of water shortage, SJMWS will evaluate the need for any related penalties or fees, and the City Council may adopt additional penalties or charges as deemed appropriate.

Water use restrictions are contained within the City Municipal Code, and therefore SJMWS customers are required to comply with any measures the City determines the need to enforce, including those described in **Table 5-14**. Customers that do not comply with the use restrictions would be subject to citation from the City's Code Compliance inspectors. **Table 5-15** describes some administrative citation fine amounts that may be charged for violation of the prohibited activities at the various stages. Additional penalties or fees may be adopted by the City Council as deemed appropriate.

Table 5-15: Water Shortage Contingency – Penalties and Charges

Stage No.	Description	Penalty/Charge
2	Cleaning of structure/ surfaces	$160.00
2	Operation of certain decorative fountains	$160.00
3	Hydrants	$160.00
4	Landscape irrigation	$160.00

ANALYSIS OF REVENUE AND EXPENDITURE IMPACTS

SJMWS's initial response to shortage is to use reserve funds. A large portion of SJMWS's costs are not directly related to the quantity of water delivered. Examples of these costs include meter readers, billing staff, and pump and facilities maintenance. Expenses are increased during periods of drought by additional programs, staff time, and water purchase costs. Therefore, unit price increases must be implemented to offset the impacts of lower water sales and higher expenses. Finally, expenses such as capital improvements are deferred when feasible. **Table 5-16** shows an example of the financial impacts of reduced demand and the resulting rate increases necessary to meet unchanged expenses.

Due to the variable nature of costs associated with water wholesale purchase and costs related to operation of the distribution system, the increases in the water rate schedule to be charged during a water shortage will be determined during the time of an actual water shortage.

Table 5-16: Financial Impacts

Water Revenue	Percent Reduction	AF Sold	HCF Sold	Average Unit Price $/HCF
$22,616,425	Normal 2010	18,936	8,248,522	$2.74
$22,616,425	25%	14,202	6,186,391	$3.66
$22,616,425	35%	12,308	5,361,539	$4.22
$22,616,425	50%	9,468	4,124,261	$5.48

Operation expenditures and water revenue will be evaluated to determine the appropriate unit increase in the rate schedule. SJMWS will evaluate the situation and recommend an increased rate schedule to be enforced during the shortage, and submit the schedule for approval by the City Council.

IMPLEMENTATION OF THE CONTINGENCY PLAN

The water shortage measures described in Chapter 15.10 of the City of San Jose Municipal Code may be enforced upon resolution of the City Council. The City Council may, by resolution, declare a state of water shortage whenever it finds that water supplies are expected to be inadequate to meet at least ninety percent of projected water demand, or whenever a minimum conservation level of ten percent or more has been established by SFPUC or SCVWD. In adopting such a resolution, the City Council may declare whether the water shortage is a ten, twenty-five, thirty, or forty percent shortage. The resolution declaring a water shortage in 2009 is included as an example in **Appendix H**.

WATER USE MONITORING PROCEDURES

During the 1987-1992 drought, SJMWS compiled water production on a daily basis. All sources were monitored, and a monthly report was submitted to SJMWS Division Manager and SCVWD. This process was found effective in keeping SJMWS within its water allotment.

In the event of a Stage 1 or 2 water shortage, SJMWS would use the above procedure. During a Stage 3 or 4 water shortage, water production figures would be reported to SJMWS Division Manager, and monthly reports would be sent to the Director of Environmental Services Department and the City Council.

In addition, as demonstrated in previous drought periods, SCVWD monitors and tracks water savings. In the period from March 2009 to October 2010, water use decreased by 19% across Santa Clara County (18-20% within San Jose) compared to a baseline period of average water use and adjusted for population growth. Several factors contributed to this, such as the weather, reduced economic activity, and the community's response to SCVWD's and City's short-term water conservation marketing and education efforts.

DISASTER PREPAREDNESS/EMERGENCY RESPONSE PLAN

SJMWS's facilities have been designed to provide adequate supplies of water during normal and emergency operations. Reservoirs and emergency backup generators have been placed at elevations and locations which will maintain supplies to customers during power failures. SJMWS staff is on duty 24 hours a day to respond to emergency situations. Engine-driven generators or pumps are installed to provide emergency supplies of water. SJMWS's facilities are designed such that water stored in reservoirs at the highest elevations may be drawn down to the lower pressure zones for emergency use.

Connections are maintained with adjacent water utilities to provide limited supplies in the event of an emergency. A connection to the San Jose Water Company is maintained in the Evergreen service area. A two-way connection to the City of Santa Clara is maintained in the North San Jose/Alviso service area.

SJMWS has developed an Emergency Response Plan, which includes appendices such as an Emergency Notification Plan, Public Notification Plan, Blackout Plan, and Disaster Operation Plan. The Emergency Response Plan is updated as needed.

5.6 WATER QUALITY

SFPUC

The SFPUC aggressively protects the natural water resources entrusted to its care. Its annual Hetch Hetchy Watershed survey evaluates the sanitary conditions, water quality, potential contamination sources, and the results of watershed management activities by the SFPUC and its partner agencies, including the National Park Service, to reduce or eliminate contamination sources. The SFPUC also conducts sanitary surveys of the local Alameda and Peninsula watersheds every five years. These surveys identified wildlife and human activity as potential contamination sources. The regional system currently meets or exceeds existing water quality standards. However, system upgrades as identified in the WSIP are needed to improve the

SFPUC's ability to maintain compliance with current water quality standards and to meet anticipated future water quality standards.

SCVWD

Treatment of surface water is necessary to ensure that the water SCVWD provides meets or exceeds all federal and state drinking water standards. Surface water quality programs include: treating local and imported surface water for sale to retailers; participating in regional and statewide coalitions to safeguard source water quality protection; and investigating opportunities for water quality improvements through partnership in regional facilities or exchanges.

SCVWD's source waters are susceptible to potential contamination from sea water intrusion and organic matter in the Delta and from a variety of land use practices, such as agricultural and urban runoff, recreational activities, livestock grazing, and residential and industrial development. Local sources are also vulnerable to potential contamination from commercial stables and historic mining practices. No contaminant associated with any of these activities has been detected in the treated water. The water treatment plants provide multiple barriers for physical removal and disinfection of contaminants. Additionally, SCVWD monitors surface water quality in local reservoirs and in the Sacramento-San Joaquin Delta.

GROUNDWATER

SCVWD monitors groundwater quality to assess current conditions and identify trends or areas of special concern. Wells are monitored for major ions, such as calcium and sodium, nutrients such as nitrate, and trace elements such as iron. Wells are also monitored for man-made contaminants, such as organic solvents. The type and frequency of monitoring depends on the well location, historic and current land use, and the availability of groundwater data in the area. Overall groundwater quality in Santa Clara County is good. The most notable exceptions are nitrate and perchlorate, which have impacted groundwater quality in Llagas Subbasin. Historically, no perchlorate has been detected in any of the groundwater sources within SJMWS's service areas. Nitrate detection in SJMWS service areas' groundwater has been historically low and well below the maximum contaminant level set by Federal and State Regulations. Constant monitoring of all wells is required, as wells are vulnerable to potential contamination from local sources and activities.

As required by CDPH for their Drinking Water Source Assessment and Protection Program, drinking water source assessments were conducted for all 14 groundwater wells within SJMWS service areas during 2003/2004. The assessments were conducted by SJMWS staff, and consisted of information gathered from City records, databases, staff, the Water Resources Control Board, and visual field surveys.

In North San Jose, potential contamination sources include local electronic manufacturing facilities, gas stations, leaking underground storage tanks and sewer collection facilities. The Edenvale wells are vulnerable to chemical/petroleum processing storage activities. The Evergreen wells are vulnerable to automobile gas stations, underground storage tank leaks and dry cleaning service activities. The Coyote wells are vulnerable to contamination caused by agricultural drainage, illegal activities/unauthorized dumping, storage tank leaks and sewer collection systems. However, the existing well locations and precautions taken during construction in combination with the local hydrology have provided a high level of protection against contamination of the local ground waters. Water quality for new groundwater wells is

monitored during well development. Well head treatment can be installed to address exceedence of a state and/or federally regulated constituent for both new and existing wells if feasible. City staff will address new water quality regulations in the future to determine if treatment is necessary to meet any new or revised drinking water standard.

Saltwater intrusion has occurred in the shallow aquifer beneath North San Jose/Alviso. Saltwater from the Bay moves upstream during high tides and leaks through the clay cap into the upper aquifer zone when this zone is pumped. Land subsidence has also aggravated this condition. Elevated salinity is also present in the lower aquifer zone, but on a much smaller scale, and is attributed to improperly constructed, maintained, or abandoned wells that penetrate the clay aquitard and provide a conduit from the upper to the lower aquifer zone. In response, SCVWD has established an extensive program to locate and properly destroy such conduit wells.

As the groundwater management agency in Santa Clara County, SCVWD has ongoing groundwater protection programs to ensure high water quality and more reliable water supplies. These programs includes well permitting, well destruction, wellhead protection, land use and development review, nitrate management (targeted to areas of elevated nitrate in the Coyote Subarea and the Llagas Subbasin), saltwater intrusion programs, and providing technical assistance to regulatory agencies to ensure local groundwater resources are protected.

6
Demand Management Measures

6.1 BACKGROUND, IMPLEMENTATION AND EVALUATION

The City of San José Environmental Services Department has been a signatory to the MOU and a member of the California Urban Water Conservation Council (CUWCC) since 1995. As a signatory, the City submits Best Management Practice (BMP) Activity Reports and Coverage Reports to the CUWCC reporting database on a biennial basis. The BMP Program is a program through the CUWCC and is intended to establish water conservation measures to improve water use efficiency with its partners. The City will report to the CUWCC on the implementation of the CUWCC BMPs, but will include a discussion of each of the Demand Management Measures (DMMs) for the purposes of this report. This section describes the DMMs that are implemented within SJMWS service area in an effort to increase water conservation and meet the 2015 and 2020 water use targets.

Water conservation activities for SJMWS are implemented by the City's water conservation program and SCVWD. Since the mid 1990s, City staff has focused primarily on indoor water conservation with the goal of reduced wastewater flows to the San Jose/Santa Clara Water Pollution Control Plant (WPCP). Outdoor water conservation activities for SJMWS have been administered by SCVWD. City staff also performs outreach and education for indoor and outdoor water conservation to customers within SJMWS service area and other areas.

Evaluation of Effectiveness: Evaluating the effectiveness of a single DMM is difficult and generally not cost-effective for the City. Each program is not necessarily monitored separately for effectiveness and water savings. Evaluating the effectiveness of all DMMs as a whole provides a better representation and can be translated into overall water conservation savings, which is discussed below.

Water Conservation Savings: Water savings estimates are not available for each individual DMM. SCVWD has provided the projected savings as a result of DMM implementation as shown in **Table 6-1**. SJMWS participates in SCVWD programs through cost sharing and partnerships. Through SCVWD program participation and partnerships, these projected savings can be achieved.

Table 6-1: SCVWD Total Water Conservation Program Water Savings Goals

Year	2010	2015	2020	2025	2030	2035
Water Conservation Savings Goal (AFY)[1]	50,600	63,100	76,100	86,700	98,500	98,500

Source: SCVWD – Draft 2010 Urban Water Management Plan, Chapter 5.
1. Total conservation savings goal includes both urban and agricultural conservation using 1992 as the base year.

Installation of water-conserving plumbing will conserve water overall in the long-term, but could reduce the ability to save water for short-term DMMs during water shortages, a phenomenon termed "demand hardening." Long-term water conserving DMMS are technology based, as such, further water savings rely on customers to actively reduce their water consumption. Saturation of water-conserving device installations and reliance on the behavioral changes of users makes future water savings more challenging than in the past.

6.2 DEMAND MANAGEMENT MEASURES

A. *WATER SURVEY PROGRAMS FOR SINGLE-FAMILY RESIDENTIAL AND MULTI-FAMILY RESIDENTIAL CUSTOMERS*

Implementation: This program was first implemented in July of 1998 as a pilot program. It is an active program administered by SCVWD. The City shares the cost to support this program. SCVWD plans to continue its program to meet the region's long-term water conservation goals.

Description: SCVWD markets water-use surveys to single-family and multi-family residential customers throughout the County. Since 1998, SCVWD has performed more than 29,600 residential audits, including more than 2,000 in FY 2009-2010 of which 106 surveys were completed in SJMWS service area.

The program includes educating the customer on how to read a water meter; checking flow rates of showerheads, faucet aerators and toilets; checking for leaks; installing low-flow showerheads; aerators and/or toilet flappers if necessary; checking the irrigation system for efficiency (including leaks); measuring landscaped area; developing an efficient irrigation schedule for the different seasons; and providing the customer with evaluation results, water savings recommendations, and other educational materials. In 2004, SCVWD began programming a homeowner's irrigation controllers as well (i.e., if allowed by the homeowner, the surveyors will input the recommended schedules into the controller).

Each year these programs are promoted countywide through a summer media campaign, which typically includes television, radio, and print advertisements.

B. *RESIDENTIAL PLUMBING RETROFIT*

Implementation: This program was first implemented in 1992. It is an active program administered by SCVWD. SJMWS also implements the program and shares the cost to support this program. This program is expected to continue into the future.

Description: SJMWS and SCVWD distribute high-quality, low-flow showerheads and faucet aerators to single-family and multi-family residents as the implementation of the residential plumbing retrofits program. SJMWS obtains the devices from SCVWD and distributes to customers both at SJMWS office and at public water conservation presentations. Since program inception, more than 296,000 low-flow showerheads and aerators have been distributed throughout the County, including more than 22,000 in FY 2009-2010. The cost for these devices is not tracked by SJMWS. **Table 6-2** below provides the number of plumbing retrofits during FY 2009-2010 in SJMWS service area.

Table 6-2: Residential Plumbing Retrofits Conducted in FY 2009-2010

	FY 2009-2010
No. of Showerhead retrofits distributed	**500**
No. of Aerator retrofits distributed	**163**

Source: SCVWD – Water Conservation Program Monthly Report Totals through June 2010, dated August 3, 2010.

C. *SYSTEM WATER AUDITS, LEAK DETECTION, AND REPAIR*

Implementation: SJMWS continuously implements water audits and leak detection and repair for the water distribution system. Since FY 1999-2000, the City has been reporting the results of pre-screen audits to the CUWCC for BMP compliance. SJMWS expects to continue the implementation of this DMM as part of the new CUWCC BMP 1.2, Water Loss Control.

Description: To prevent water waste and water losses in the system, SJMWS conducts an annual pre-screening system audit. The pre-screening audit is a comparison of the metered water sales and the total supply into the system. The difference between the two values represents potential water losses or leaks in the system. Compliance with the CUWCC BMP is achieved when the metered sales (plus other verifiable uses) are at least 90% of the water supplied to the system. Since FY 1999-2000, SJMWS has been reporting full compliance with the BMP pre-screening requirement.

Leak detection is implemented using a sonic device technique, flushing, and valve surveys. Any issues, reported leaks, and repairs are noted, mapped and entered into a leak repair database for tracking purposes to identify patterns. SJMWS also implements a valve maintenance program that uses both Global Positioning System (GPS) and Geographic Information System (GIS) technology. The program helps to facilitate leak detection and maintenance. SJMWS also implements a program to notify customers of leaks on the customer's side of the meter. In addition, SJMWS has prepared a plan to test source and production meters, and a plan to locate and repair unreported leaks.

D. *METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS*

Implementation: SJMWS implements metering requirements within SJMWS service area. SJMWS will continue to implement the metering requirements within the service area.

Description: SJMWS requires that all service connections within the service area are metered. All new service connections are metered and are billed by volume of water. Fire services are each equipped with a detection meter, for which customers are billed a meter charge. Connections to SJMWS are governed by Section 15.08 of the San José Municipal Code. SJMWS has also prepared a plan to test, repair, and replace meters to assure that they are properly maintained and operational, to check for tampering, and to prevent and repair leaks. The Municipal Code Section 15.08 is provided as **Appendix D**.

E. *LARGE LANDSCAPE CONSERVATION PROGRAMS AND INCENTIVES*

Implementation: Large landscape conservation programs are administered by SCVWD. There are currently two programs implemented, including the Landscape Survey Program (LSP) and the Landscape Rebate Program. The landscape survey program was first implemented in 1995.

The landscape rebate program is a combination of programs including the weather-based irrigation controllers (WBICs) program, the Irrigation System Hardware Rebate Program (ISHRP), the Residential Irrigation System Hardware Rebate Program (RISHRP), and the Water Efficient Landscape Rebate Program (WELRP). The WELRP was first implemented in 2005 and the other three programs were first implemented in 2006. The four programs were combined

into the Landscape Rebate Program in 2009. Both survey and rebate programs are currently active and both programs will continue to be implemented in the future.

Description of Landscape Survey Program (LSP): Since 1995, SCVWD has offered and provided large landscape water audits to sites in the County with one acre or more of landscaping. Landscape managers have been provided water-use analyses, scheduling information, in-depth irrigation evaluation, and recommendations for affordable irrigation upgrades. Each site receives a detailed report upon completion of the audit. An annual report is generated to recap the previous year's efforts. To generate several reporting and monitoring options, water use history, meter numbers, account numbers, and site contacts and addresses are captured for each site in a specialized database. In 2009, in an effort to expedite program participation and water savings, the program was expanded to include any commercial, industrial, and institutional sites with 5,000 square feet or more of irrigated landscape.

The LSP reaches the community through advertising in Tri-County Apartment Association's monthly Apartment Management magazine, colorful flyers at the biannual Home & Garden Show, NCTLC Turf & Landscape Expo, and retailer outreach through direct mailing of personalized letters to high water use customers and also through City newsletters and business newsletters. There have been 30 audits conducted in SJMWS service area through this program in FY 2009-2010.

Description of Landscape Rebate Program: In 2006, SCVWD partnered with five bay area water supply agencies and received a DWR Proposition 13 grant that provided funding for the installation of WBICs. This new generation of irrigation controller utilizes the principals of evapo-transpiration (ET) to automatically calculate a site-specific irrigation schedule based on several factors, including plants and soil type. The controller then adjusts the irrigation schedule as local weather changes to regulate unnecessary irrigation.

SCVWD first implemented a direct install program which installed two types of WBICs (real-time and historic) in both residential and commercial sites throughout SCVWD's service area. In order to expedite program participation and include emerging WBIC manufacturers, SCVWD shifted the WBIC program to a rebate style program that offered rebates of $300-$1,100 per approved controller installed.

SCVWD expanded its irrigation equipment incentives beyond the WBIC program, when two grants were received in 2006 for the implementation of two types of water efficient irrigation hardware installation rebate programs.

The first grant, received from DWR, kicked off implementation of the ISHRP. This program aimed to install a variety of water efficient irrigation hardware at commercial, industrial, and institutional sites throughout the County. Through ISHRP, SCVWD provided rebates ranging from $200 to a maximum of $2,000 per site (not to exceed 50% of the hardware cost). Qualifying hardware included rain sensors, high distribution uniformity nozzles, dedicated landscape meters, replacement sprinkler heads, converting overhead irrigation to drip irrigation, pressure reducing valves, and spray heads or rotors with pressure compensating heads and/or check valves.

The second water efficient irrigation equipment grant was received from the United States Bureau of Reclamation and was to launch the RISHRP. The program was designed to retrofit inefficient irrigation equipment at residential sites with new water conserving equipment. This residential version of the ISHRP offered rebates for the same efficient irrigation equipment but

was unique as RISRHP offered flat rebate amounts per equipment items. Through the RISHRP program, residents could receive rebates ranging from $50 up to $1,000 per site.

In addition to efficient irrigation equipment retrofits, SCVWD began to focus on water efficient landscapes by launching the WELRP in early 2005. The WELRP offered rebates to residential and commercial sites for the replacement of approved high water using landscape with low water use plants, mulch, and permeable hardscape. WELRP participants could receive up to $0.75 per square foot of irrigated turf grass with a maximum of rebate of $1,000 and $10,000 for residential and commercial sites respectively. In an effort to expedite program participation, SCVWD Board of Directors moved to double the maximum rebate from $1,000 up to $2,000 for residents and from $10,000 up to $20,000 for commercial sites in March 2009.

A summary of the surveys and rebates issued within SJMWS service area during FY 2009-2010 is provided in **Table 6-3**.

Table 6-3: Large Landscape Surveys Conducted during FY 2009-2010

	FY 2009-2010
No. of Surveys Completed	30
No. of Equipment Retrofit Rebates	3
No. of Landscape Conversion Rebates	5
No. of WBIC Rebates	0

Source: SCVWD – Water Conservation Program Monthly Report Totals through June 2010, dated August 3, 2010.

F. HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAMS

Implementation: The residential rebate program was first implemented in July 1995. In October 2001, SCVWD began participating in the regional Bay Area Water Utility Clothes Washer Rebate Program. Since January 2008, the regional program has partnered with Pacific Gas & Electric (PG&E). This is an active program administered by SCVWD and the City shares the cost to support this program. The program is expected to continue in the future, though in the year 2019, it is expected that higher clothes washer standards will be in effect and cost-sharing may be re-evaluated at that time.

Description: Residents of the County are eligible for a rebate of up to $175 for qualifying clothes washers. Qualifying clothes washers are rated by the Consortium for Energy Efficiency (CEE) as Tier 3. The total rebate is a combined rebate from both SCVWD and PG&E. In FY 2009-2010, 1,225 residential clothes washer rebates were issued in SJMWS service area.

G. PUBLIC INFORMATION PROGRAMS

Implementation: The City, SJMWS, and SCVWD participate in developing and implementing public information programs. SCVWD designs, funds, and implements a public information program and SJMWS conducts additional outreach efforts supporting SCVWD program. The City also implements outreach programs in the WPCP service area. The City, SJMWS, and SCVWD will continue to implement public information programs in the future.

Description: The City, SJMWS, and SCVWD have carried out various public information campaigns in the past and present. Multi-media advertising have covered topics such as water

conservation, urban runoff pollution prevention, water quality, groundwater recharge, water supply, water recycling, watershed and flood protection, and stream stewardship. Efforts included paid advertising, public service announcements, bill inserts/brochures, website development, and special events. Campaigns have been carried out in various languages including English, Spanish, Vietnamese, and Chinese. The City's annual expenditure for public information programs (not including administration) is up to $100,000.

H. SCHOOL EDUCATION PROGRAMS

Implementation: In 1995, SCVWD's Public Information Office hired a full-time, fully credentialed educator who holds life-time teaching and Administrative Services credentials to coordinate the school education programs. From 2001-2007, a second, bilingual educator joined SCVWD's full-time staff to assist with the program. The City has also been implementing school education programs in the WPCP service area for over 10 years. The City and SCVWD will continue to implement school education programs in the future.

Description: SCVWD's educators develop school programs, contract with the Youth Science Institute for additional instructors, and supervise university student interns as classroom assistants. SCVWD has been continuously active in this area by providing free classroom presentations, puppet plays, and tours of SCVWD facilities to schools within the County. The objective is to teach students about water conservation, water supply, watershed stewardship, and flood protection. SCVWD also provides school curricula to area educators, including workbooks and videos, as well as hands-on training for teachers. Materials distributed to students include topical lessons. All meet state education framework requirements and are grade-level appropriate. All students who participate in the program received materials.

The City's school education program is implemented through its annual grant program for youth education projects. The City provides grants of up to $5,000 to local schools and educational organizations for projects that result in increasing water-related awareness among youth in Kindergarten through Grade 12. Each year, the City funds up to $50,000 in water-related education projects. In 2010, the City's school education program was expanded to include funding for and participation in BAWSCA's regional school education program, which provides group assembly presentations and lesson plans for teachers about water conservation, and a residential water audit and plumbing retrofit kit for the students who participate.

I. CONSERVATION PROGRAMS FOR COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL (CII) ACCOUNTS

Implementation: Since 1992, SCVWD has implemented various programs targeting commercial, industrial, and institutional (CII) customers. The City also has implemented the Water Efficient Technologies (WET) Program since 1995. Both the City and SCVWD expect to continue the programs in the future, with the potential for minor changes based on technological advancements.

Description: Many initiatives and programs are implemented to increase water efficiency in the CII sectors. Following is a description of the programs offered:

City's Water Efficient Technologies (WET) Program: To encourage all commercial and industrial businesses to implement permanent water reduction measures, the City offers financial incentives to businesses that discharge within the WPCP service area, offering $4 for every

HCF[1] of wastewater flow reduced. Rebates range from $400 to $50,000 per site. The maximum rebate is $50,000 per project, or 50% of the project cost, whichever is less. The City budgets up to $150,000 annually for the program.

SCVWD's Commercial Toilet Program: SCVWD has a free high-efficiency toilet replacement program specifically for businesses in Santa Clara County. The program is for CII users as well as apartment complexes. The existing toilet must flush at 3.5 gallons per flush or higher. The toilets to be installed are high-efficiency toilets (HETs) utilizing state-of-the-art technology. The toilet and the installation are free of charge. In FY 2009-2010, there were 17 HET direct installs in SJMWS service area.

SCVWD's Commercial Washer Program: In July 1999, SCVWD partnered with Silicon Valley Power and the City to offer rebates for the replacement of laundromat clothes washers with high-efficiency washers. In 2000, the program was expanded to commercial machines in multi-family complexes. The program offers rebates of $400 per unit on approved purchased and leased high-efficiency washing machines within the County. In FY 2009-2010, 78 commercial clothes washer rebates were issued in SJMWS service area.

SCVWD's Pre-Rinse Spray Valve Program: SCVWD purchased a quantity of high-efficiency pre-rinse spray valves with a flow rate of 1.15 gallons per minute for distribution to commercial sites, especially those identified through the CII Water Survey Program. In FY 2009-2010, 2 pre-rinse spray valves were installed in SJMWS service area.

SCVWD's Submeter Rebate Program: This program, which began as a pilot program in FY 2000-2001, gives a rebate of $100 for every water submeter installed at multi-family housing complexes, such as mobile home parks and condominium complexes. Water use records from participating mobile home parks showed an average water savings of 23 percent per mobile home. In FY 2009-2010, the City assisted with SCVWD's efforts to install submeters and this resulted in participation by two mobile home parks in the SJMWS service area.

J. WHOLESALE AGENCY PROGRAMS

SJMWS is not a wholesale agency and does not provide water to other retailers.

K. CONSERVATION PRICING

Implementation: Conservation pricing is implemented by SJMWS and will continue to be implemented by SJMWS in the future.

Description: Single- and multi-family residential customers are subject to a tiered rate structure while commercial, industrial, institutional, and irrigation customers are subject to a uniform rate structure. SJMWS is not required to comply with the sewer rate requirement because sewer service is administered by the WPCP. In addition, for customers in SJMWS service area, the County of Santa Clara collects payment for sewer service through property taxes.

[1] A HCF is the unit water suppliers commonly use to measure volume and is equal to 748 gallons or one hundred cubic feet.

L. WATER CONSERVATION COORDINATOR

Implementation and Description: The City has a full-time equivalent (FTE) Water Conservation Coordinator. The position was established as early as 1995. The current Water Conservation Coordinator information is provided below:

Name:	Alice Ringer
Title:	Environmental Services Specialist, Water Conservation Environmental Services Department, City of San José
Address:	3025 Tuers Road, San Jose CA 95121
Phone:	408-363-4708
Fax:	408-277-4954
Email:	alice.ringer@sanjoseca.gov

There is at least one additional staff member that works with the Water Conservation Coordinator ensuring that there is at least one FTE staff working on water conservation programs. It is expected that there will continue to be at least one FTE staff member dedicated to water conservation programs.

M. WATER WASTE PROHIBITION

Implementation: The City has a water waste ordinance that was adopted in 1994 and updated in 2009. The ordinance will continue to be in effect unless it is superseded or amended with a new ordinance.

Description: SJMWS service area is within City limits and is governed by the City's municipal code. Municipal Code Section 15.10 dictates the water waste prohibitions within the City. Prohibitions include the following:

- No water use which results in gutter flooding or water runoff;
- No serving water in food service establishments unless requested;
- Notices shall be displayed in bathrooms of hotels, motels, and other lodging providing guests with the option to not launder towels and linens to help conserve water;
- Restrictions on washing building exteriors, hard or paved surfaces, and vehicles;
- Restrictions on commercial car washes;
- Requirements for building and construction use of fire hydrants ; and
- Restrictions on landscape irrigation including time of day and duration.

SJMWS' water conservation staff assists in the enforcement of the ordinance for the entire City including SJMWS service area. The Municipal Code Section 15.10 is provided as **Appendix D**.

N. RESIDENTIAL ULTRA-LOW-FLUSH TOILET REPLACEMENT PROGRAMS

Implementation: This program was first implemented by SCVWD in 1992 as a ULFT program and was active through 2003. The City administered its own ULFT program from 1999 to 2004. Beginning in 2004, SCVWD began implementing a High Efficiency Toilet (HET) program as described below. This program is an active program that the City also shares the cost to implement. The program is expected to continue in the future, though in the year 2014, it is expected that higher toilet water efficiency standards will be in effect and cost-sharing may be re-evaluated at that time.

Description: The current program consists of a rebate program for single-family and multi-family accounts and a full-installation program for multi-family accounts. County residents can receive up to $125 per toilet for replacing old, high water-use toilets that use 3.5 gallons per flush (gpf) or more, with a new HET or Dual Flush Toilet from an approved toilet list. In FY 2009-2010, 155 HET or Dual Flush Toilet rebates were issued in SJMWS service area.

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Appendix A

San Jose Municipal Water System
2010 Urban Water Management Plan
Postings and Notifications for UWMP Preparation

San Jose Mercury News

750 RIDDER PARK DRIVE
SAN JOSE, CALIFORNIA 95190
408-920-5332

PROOF OF PUBLICATION

IN THE
CITY OF SAN JOSE
STATE OF CALIFORNIA
COUNTY OF SANTA CLARA

SAN JOSE,CITY OF
OFFICE THE CITY GROUP/REBECCA,200 E SANTA CLARA STREET,2ND FLOOR
San Jose CA 95113

FILE NO. S. Guzzetta

In the matter of

The San Jose Mercury News

The undersigned, being first duly sworn, deposes and says: That at all times hereinafter mentioned affiant was and still is a citizen of the United States, over the age of eighteen years, and not a party to or interested in the above entitled proceedings; and was at and during all said times and still is the principal clerk of the printer and publisher of the San Jose Mercury News, a newspaper of general circulation printed and published daily in the city of San Jose in said County of Santa Clara, State of California as determined by the court's decree dated June 27, 1952, case numbers 84096 and 84097, and that said San Jose Mercury News is and was at all times herein mentioned a newspaper of general circulation as that term is defined by Sections 6000 and following, of the Government Code of the State of California and, as provided by said sections, is published for the dissemination of local or telegraphic news and intelligence of a general character, having a bona fide subscription list of paying subscribers, and is not devoted to the interests or published for the entertainment or instruction of a particular class, professional, trade, calling, race or denomination, or for the entertainment and instruction of any number of such classes, professionals, trades, callings, races or denominations; that at all times said newspaper has been established, printed and published in the said city of San Jose in said County and State at regular intervals for more than one year preceding the first publication of the notice herein mentioned. Said decree has not been revoked, vacated or set aside.

I declare that the notice, of which the annexed is a true printed copy, has been published in each regular or entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

2/25/2011

Dated at San Jose, California
02/25/11

I declare under penalty of perjury that the foregoing is true and correct.

Signed _____

Principal clerk of the printer and publisher of the San Jose Mercury News.

Legal No. **0003879515**

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San Jose City Clerk

2011 MAR -1 A 9:35

2" x 3½"

CITY OF SAN JOSE MUNICIPAL WATER SYSTEM

UPDATE OF URBAN WATER MANAGEMENT PLAN

City of San Jose Municipal Water System is currently reviewing and updating our Urban Water Management Plan, which was last updated in 2005. The Plan includes water supply and demand projections and identifies a water supply contingency plan for the Municipal Water System service area. We encourage all of our customers to participate in this review process. We will make any proposed revisions to the Plan available for public review and will hold a public hearing in 2011. In the meantime, if you would like to learn more about the current Plan, the schedule for considering changes to it, or how to participate in the process, please contact:

Nicole Quesada (Nicole.Quesada@sanjoseca.gov)
3025 Tuers Road, San Jose, CA 95121
Phone: 408.277.3671
Fax: 408.277.4954

SJMN #3879515 Feb. 25, 2011.

SAN JOSE POST-RECORD

95 S. Market St., Ste. 535, SAN JOSE, CA 95113
Telephone (408) 287-4866 / Fax (408) 287-2544

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San Jose City Clerk

2011 FEB 22 A 10: 10

2

SUZANNE GUZZETTA
SAN JOSE CITY CLERK
200 E. SANTA CLARA ST.
SAN JOSE, CA - 95113

PROOF OF PUBLICATION

(2015.5 C.C.P.)

State of California)
County of SANTA CLARA) ss

Notice Type: GPHSJ - SAN JOSE CITY PUBLIC HEARING

Ad Description: SJ MUNICIPAL WATER SYSTEM WATER USE TARGETS IN URBAN WATER MGMT PLAN

I am a citizen of the United States and a resident of the State of California; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer and publisher of the SAN JOSE POST-RECORD, a newspaper published in the English language in the city of SAN JOSE, county of SANTA CLARA, and adjudged a newspaper of general circulation as defined by the laws of the State of California by the Superior Court of the County of SANTA CLARA, State of California, under date 02/03/1922, Case No. 27844. That the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

02/17/2011

Executed on: 02/17/2011
At Los Angeles, California

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Signature

SJ#: 2043600

Notice of Public Meeting
San Jose Municipal Water System
WATER USE TARGETS IN URBAN WATER MANAGEMENT PLAN

The City of San Jose Municipal Water System will hold a public meeting to receive public input on its Urban Per Capita Water Use Targets, which will be incorporated in its 2010 Urban Water Management Plan, pursuant to Section 10608.26(a) of the California Water Code. Public input will be taken on the water use targets, the method for determining the targets, the implementation plan for achieving the targets, and any impacts to the local economy. If you are interested in sharing your comments, please join us:
Monday, March 21, 2011
5:00 p.m.
San Jose Municipal Water System
3025 Tuers Road
San Jose, CA 95121

The proposed water use targets are on file and available for public review at the above address of the San Jose Municipal Water System. If you have any questions, please call (408) 363-4708.
2/17/11

SJ-2043600#

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CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

Environmental Services Department
MUNICIPAL WATER SYSTEM DIVISION

February 14, 2011

Santa Clara Valley Water District
5750 Almaden Expressway
San José, CA 95118

Subject: Notice of Preparation of Urban Water Management Plan

The Urban Water Management Plan Act (Water Code Section 10610 - 10657) requires the City of San José Municipal Water System to update its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

We will make any proposed revisions to our Plan available for public review and will hold a public hearing later this year. In the meantime, if you have any questions about our Plan, or the process for updating it, please contact:

Nicole Quesada
City of San José Municipal Water System
3025 Tuers Road, San José, CA 95121
Phone: 408.277.3671
Fax: 408.277.4954
Email: Nicole.Quesada@sanjoseca.gov

Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

February 14, 2011

BAWSCA
155 Bovet Road, Suite 302
San Mateo, CA 94404

Subject: Notice of Preparation of Urban Water Management Plan

The Urban Water Management Plan Act (Water Code Section 10610 - 10657) requires the City of San José Municipal Water System to update its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

February 14, 2011

San Francisco Public Utilities Commission
1155 Market Street, 11th Floor
San Francisco, CA 94103

Subject: Notice of Preparation of Urban Water Management Plan

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3025 Tuers Road, San José, CA 95121
Phone: 408.277.3671
Fax: 408.277.4954
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Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

February 14, 2011

City of San José
Department of Planning, Building, and Code Enforcement
200 East Santa Clara Street
San José, CA 95113

Subject: Notice of Preparation of Urban Water Management Plan

The Urban Water Management Plan Act (Water Code Section 10610 - 10657) requires the City of San José Municipal Water System to update its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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City of San José Municipal Water System
3025 Tuers Road, San José, CA 95121
Phone: 408.277.3671
Fax: 408.277.4954
Email: Nicole.Quesada@sanjoseca.gov

Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

February 14, 2011

County of Santa Clara
70 West Hedding Street
San José, CA 95110

Subject: Notice of Preparation of Urban Water Management Plan

The Urban Water Management Plan Act (Water Code Section 10610 - 10657) requires the City of San José Municipal Water System to update its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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3025 Tuers Road, San José, CA 95121
Phone: 408.277.3671
Fax: 408.277.4954
Email: Nicole.Quesada@sanjoseca.gov

Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

February 14, 2011

San José/Santa Clara Water Pollution Control Plant
700 Los Esteros Road
San José, CA 95134

Subject: Notice of Preparation of Urban Water Management Plan

The Urban Water Management Plan Act (Water Code Section 10610 - 10657) requires the City of San José Municipal Water System to update its Urban Water Management Plan by July 1, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it. We invite your agency's participation in this process.

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3025 Tuers Road, San José, CA 95121
Phone: 408.277.3671
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Sincerely,

Mansour M. Nasser, P.E.
Deputy Director
Environmental Services Department

Appendix B

San Jose Municipal Water System
2010 Urban Water Management Plan
Resolution for Adoption of the UWMP

Appendix C

San Jose Municipal Water System
2010 Urban Water Management Plan
City of San Jose Demographic Data

Table DP-2. Profile of Selected Social Characteristics: 2000

Geographic area: San Jose city, California

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
SCHOOL ENROLLMENT		
Population 3 years and over enrolled in school	**262,348**	**100.0**
Nursery school, preschool	14,831	5.7
Kindergarten	14,579	5.6
Elementary school (grades 1-8)	105,456	40.2
High school (grades 9-12)	53,813	20.5
College or graduate school	73,669	28.1
EDUCATIONAL ATTAINMENT		
Population 25 years and over	**570,755**	**100.0**
Less than 9th grade	61,613	10.8
9th to 12th grade, no diploma	62,071	10.9
High school graduate (includes equivalency)	103,529	18.1
Some college, no degree	119,200	20.9
Associate degree	44,220	7.7
Bachelor's degree	118,948	20.8
Graduate or professional degree	61,174	10.7
Percent high school graduate or higher	78.3	(X)
Percent bachelor's degree or higher	31.6	(X)
MARITAL STATUS		
Population 15 years and over	**694,087**	**100.0**
Never married	216,403	31.2
Now married, except separated	374,805	54.0
Separated	13,915	2.0
Widowed	30,590	4.4
Female	25,246	3.6
Divorced	58,374	8.4
Female	33,706	4.9
GRANDPARENTS AS CAREGIVERS		
Grandparent living in household with one or more own grandchildren under 18 years	**29,903**	**100.0**
Grandparent responsible for grandchildren	8,080	27.0
VETERAN STATUS		
Civilian population 18 years and over	**658,051**	**100.0**
Civilian veterans	50,678	7.7
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION		
Population 5 to 20 years	**203,889**	**100.0**
With a disability	14,432	7.1
Population 21 to 64 years	**547,248**	**100.0**
With a disability	107,382	19.6
Percent employed	61.6	(X)
No disability	439,866	80.4
Percent employed	76.2	(X)
Population 65 years and over	**70,745**	**100.0**
With a disability	30,275	42.8
RESIDENCE IN 1995		
Population 5 years and over	**825,954**	**100.0**
Same house in 1995	427,470	51.8
Different house in the U.S. in 1995	341,885	41.4
Same county	255,388	30.9
Different county	86,497	10.5
Same state	55,690	6.7
Different state	30,807	3.7
Elsewhere in 1995	56,599	6.9

Subject	Number	Percent
NATIVITY AND PLACE OF BIRTH		
Total population	**893,889**	**100.0**
Native	564,132	63.1
Born in United States	553,631	61.9
State of residence	400,204	44.8
Different state	153,427	17.2
Born outside United States	10,501	1.2
Foreign born	329,757	36.9
Entered 1990 to March 2000	145,338	16.3
Naturalized citizen	140,542	15.7
Not a citizen	189,215	21.2
REGION OF BIRTH OF FOREIGN BORN		
Total (excluding born at sea)	**329,750**	**100.0**
Europe	21,904	6.6
Asia	182,712	55.4
Africa	5,189	1.6
Oceania	1,956	0.6
Latin America	114,300	34.7
Northern America	3,689	1.1
LANGUAGE SPOKEN AT HOME		
Population 5 years and over	**825,954**	**100.0**
English only	402,804	48.8
Language other than English	423,150	51.2
Speak English less than "very well"	222,042	26.9
Spanish	186,647	22.6
Speak English less than "very well"	99,975	12.1
Other Indo-European languages	48,759	5.9
Speak English less than "very well"	15,727	1.9
Asian and Pacific Island languages	178,101	21.6
Speak English less than "very well"	103,052	12.5
ANCESTRY (single or multiple)		
Total population	**893,889**	**100.0**
Total ancestries reported	*923,169*	*103.3*
Arab	4,302	0.5
Czech[1]	2,284	0.3
Danish	4,326	0.5
Dutch	7,920	0.9
English	50,448	5.6
French (except Basque)[1]	15,983	1.8
French Canadian[1]	3,149	0.4
German	67,712	7.6
Greek	3,734	0.4
Hungarian	2,436	0.3
Irish[1]	54,339	6.1
Italian	43,165	4.8
Lithuanian	919	0.1
Norwegian	9,506	1.1
Polish	10,766	1.2
Portuguese	15,285	1.7
Russian	6,930	0.8
Scotch-Irish	7,565	0.8
Scottish	11,103	1.2
Slovak	647	0.1
Subsaharan African	5,722	0.6
Swedish	9,350	1.0
Swiss	2,661	0.3
Ukrainian	1,423	0.2
United States or American	16,961	1.9
Welsh	3,669	0.4
West Indian (excluding Hispanic groups)	962	0.1
Other ancestries	559,902	62.6

-Represents zero or rounds to zero. (X) Not applicable.

[1]The data represent a combination of two ancestries shown separately in Summary File 3. Czech includes Czechoslovakian. French includes Alsatian. French Canadian includes Acadian/Cajun. Irish includes Celtic.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-4. Profile of Selected Housing Characteristics: 2000

Geographic area: San Jose city, California

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total housing units	**281,706**	**100.0**
UNITS IN STRUCTURE		
1-unit, detached	161,962	57.5
1-unit, attached	27,560	9.8
2 units	5,751	2.0
3 or 4 units	17,403	6.2
5 to 9 units	13,525	4.8
10 to 19 units	12,922	4.6
20 or more units	31,564	11.2
Mobile home	10,658	3.8
Boat, RV, van, etc	361	0.1
YEAR STRUCTURE BUILT		
1999 to March 2000	5,908	2.1
1995 to 1998	15,877	5.6
1990 to 1994	12,931	4.6
1980 to 1989	41,557	14.8
1970 to 1979	80,156	28.5
1960 to 1969	66,369	23.6
1940 to 1959	44,130	15.7
1939 or earlier	14,778	5.2
ROOMS		
1 room	13,013	4.6
2 rooms	25,933	9.2
3 rooms	40,577	14.4
4 rooms	35,848	12.7
5 rooms	46,881	16.6
6 rooms	49,183	17.5
7 rooms	35,404	12.6
8 rooms	22,021	7.8
9 or more rooms	12,846	4.6
Median (rooms)	5.0	(X)
Occupied housing units	**276,417**	**100.0**
YEAR HOUSEHOLDER MOVED INTO UNIT		
1999 to March 2000	57,743	20.9
1995 to 1998	83,880	30.3
1990 to 1994	44,029	15.9
1980 to 1989	44,309	16.0
1970 to 1979	28,255	10.2
1969 or earlier	18,201	6.6
VEHICLES AVAILABLE		
None	16,885	6.1
1	74,552	27.0
2	112,341	40.6
3 or more	72,639	26.3
HOUSE HEATING FUEL		
Utility gas	193,585	70.0
Bottled, tank, or LP gas	3,624	1.3
Electricity	76,127	27.5
Fuel oil, kerosene, etc	172	0.1
Coal or coke	-	-
Wood	774	0.3
Solar energy	108	-
Other fuel	187	0.1
No fuel used	1,840	0.7
SELECTED CHARACTERISTICS		
Lacking complete plumbing facilities	1,710	0.6
Lacking complete kitchen facilities	1,548	0.6
No telephone service	1,763	0.6

Subject	Number	Percent
OCCUPANTS PER ROOM		
Occupied housing units	**276,417**	**100.0**
1.00 or less	225,768	81.7
1.01 to 1.50	20,446	7.4
1.51 or more	30,203	10.9
Specified owner-occupied units	**146,892**	**100.0**
VALUE		
Less than $50,000	1,915	1.3
$50,000 to $99,999	1,177	0.8
$100,000 to $149,999	979	0.7
$150,000 to $199,999	4,034	2.7
$200,000 to $299,999	25,241	17.2
$300,000 to $499,999	76,529	52.1
$500,000 to $999,999	34,420	23.4
$1,000,000 or more	2,597	1.8
Median (dollars)	394,000	(X)
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS		
With a mortgage	122,324	83.3
Less than $300	157	0.1
$300 to $499	1,312	0.9
$500 to $699	3,038	2.1
$700 to $999	7,167	4.9
$1,000 to $1,499	20,915	14.2
$1,500 to $1,999	32,944	22.4
$2,000 or more	56,791	38.7
Median (dollars)	1,717	(X)
Not mortgaged	24,568	16.7
Median (dollars)	342	(X)
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	40,376	27.5
15.0 to 19.9 percent	22,336	15.2
20.0 to 24.9 percent	21,948	14.9
25.0 to 29.9 percent	17,145	11.7
30.0 to 34.9 percent	12,222	8.3
35.0 percent or more	31,968	21.8
Not computed	897	0.6
Specified renter-occupied units	**105,414**	**100.0**
GROSS RENT		
Less than $200	1,780	1.7
$200 to $299	1,883	1.8
$300 to $499	4,409	4.2
$500 to $749	9,699	9.2
$750 to $999	22,444	21.3
$1,000 to $1,499	40,756	38.7
$1,500 or more	22,346	21.2
No cash rent	2,097	2.0
Median (dollars)	1,123	(X)
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	15,103	14.3
15.0 to 19.9 percent	15,156	14.4
20.0 to 24.9 percent	14,965	14.2
25.0 to 29.9 percent	12,295	11.7
30.0 to 34.9 percent	9,757	9.3
35.0 percent or more	34,099	32.3
Not computed	4,039	3.8

-Represents zero or rounds to zero. (X) Not applicable.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-3. Profile of Selected Economic Characteristics: 2000

Geographic area: San Jose city, California

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
EMPLOYMENT STATUS		
Population 16 years and over	**682,152**	**100.0**
In labor force	456,641	66.9
Civilian labor force	456,442	66.9
Employed	436,890	64.0
Unemployed	19,552	2.9
Percent of civilian labor force	4.3	(X)
Armed Forces	199	-
Not in labor force	225,511	33.1
Females 16 years and over	**337,674**	**100.0**
In labor force	199,842	59.2
Civilian labor force	199,780	59.2
Employed	190,384	56.4
Own children under 6 years	**75,380**	**100.0**
All parents in family in labor force	41,083	54.5
COMMUTING TO WORK		
Workers 16 years and over	**427,984**	**100.0**
Car, truck, or van - - drove alone	326,928	76.4
Car, truck, or van - - carpooled	60,177	14.1
Public transportation (including taxicab)	17,482	4.1
Walked	6,170	1.4
Other means	6,578	1.5
Worked at home	10,649	2.5
Mean travel time to work (minutes)[1]	27.8	(X)
Employed civilian population 16 years and over	**436,890**	**100.0**
OCCUPATION		
Management, professional, and related occupations	178,366	40.8
Service occupations	53,782	12.3
Sales and office occupations	106,472	24.4
Farming, fishing, and forestry occupations	1,383	0.3
Construction, extraction, and maintenance occupations	34,560	7.9
Production, transportation, and material moving occupations	62,327	14.3
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	1,552	0.4
Construction	25,190	5.8
Manufacturing	122,913	28.1
Wholesale trade	14,016	3.2
Retail trade	45,941	10.5
Transportation and warehousing, and utilities	14,523	3.3
Information	17,629	4.0
Finance, insurance, real estate, and rental and leasing	19,532	4.5
Professional, scientific, management, administrative, and waste management services	59,179	13.5
Educational, health and social services	59,504	13.6
Arts, entertainment, recreation, accommodation and food services	28,093	6.4
Other services (except public administration)	17,006	3.9
Public administration	11,812	2.7
CLASS OF WORKER		
Private wage and salary workers	369,048	84.5
Government workers	42,954	9.8
Self-employed workers in own not incorporated business	23,697	5.4
Unpaid family workers	1,191	0.3

Subject	Number	Percent
INCOME IN 1999		
Households	**276,408**	**100.0**
Less than $10,000	13,166	4.8
$10,000 to $14,999	8,364	3.0
$15,000 to $24,999	17,854	6.5
$25,000 to $34,999	20,285	7.3
$35,000 to $49,999	32,824	11.9
$50,000 to $74,999	55,453	20.1
$75,000 to $99,999	43,337	15.7
$100,000 to $149,999	51,374	18.6
$150,000 to $199,999	19,818	7.2
$200,000 or more	13,933	5.0
Median household income (dollars)	70,243	(X)
With earnings	245,780	88.9
Mean earnings (dollars)[1]	84,675	(X)
With Social Security income	46,189	16.7
Mean Social Security income (dollars)[1]	11,573	(X)
With Supplemental Security Income	14,384	5.2
Mean Supplemental Security Income (dollars)[1]	7,474	(X)
With public assistance income	10,329	3.7
Mean public assistance income (dollars)[1]	4,833	(X)
With retirement income	36,211	13.1
Mean retirement income (dollars)[1]	17,122	(X)
Families	**205,906**	**100.0**
Less than $10,000	6,651	3.2
$10,000 to $14,999	5,196	2.5
$15,000 to $24,999	12,268	6.0
$25,000 to $34,999	14,171	6.9
$35,000 to $49,999	23,759	11.5
$50,000 to $74,999	41,142	20.0
$75,000 to $99,999	33,967	16.5
$100,000 to $149,999	41,050	19.9
$150,000 to $199,999	16,450	8.0
$200,000 or more	11,252	5.5
Median family income (dollars)	74,813	(X)
Per capita income (dollars)[1]	26,697	(X)
Median earnings (dollars):		
Male full-time, year-round workers	49,347	(X)
Female full-time, year-round workers	36,936	(X)

Subject	Number below poverty level	Percent below poverty level
POVERTY STATUS IN 1999		
Families	**12,309**	**6.0**
With related children under 18 years	9,621	8.1
With related children under 5 years	4,793	9.0
Families with female householder, no husband present	**4,903**	**15.8**
With related children under 18 years	4,226	21.4
With related children under 5 years	2,001	28.8
Individuals	**77,893**	**8.8**
18 years and over	52,859	8.1
65 years and over	5,213	7.4
Related children under 18 years	23,590	10.3
Related children 5 to 17 years	16,915	10.4
Unrelated individuals 15 years and over	28,226	20.4

-Represents zero or rounds to zero. (X) Not applicable.

[1]If the denominator of a mean value or per capita value is less than 30, then that value is calculated using a rounded aggregate in the numerator. See text.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-1. Profile of General Demographic Characteristics: 2000

Geographic Area: San Jose city, California

[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total population	**894,943**	**100.0**
SEX AND AGE		
Male	454,798	50.8
Female	440,145	49.2
Under 5 years	68,243	7.6
5 to 9 years	68,484	7.7
10 to 14 years	62,439	7.0
15 to 19 years	61,487	6.9
20 to 24 years	64,418	7.2
25 to 34 years	160,945	18.0
35 to 44 years	155,751	17.4
45 to 54 years	111,383	12.4
55 to 59 years	38,770	4.3
60 to 64 years	29,163	3.3
65 to 74 years	41,962	4.7
75 to 84 years	24,085	2.7
85 years and over	7,813	0.9
Median age (years)	32.6	(X)
18 years and over	658,819	73.6
Male	333,405	37.3
Female	325,414	36.4
21 years and over	621,844	69.5
62 years and over	90,394	10.1
65 years and over	73,860	8.3
Male	31,394	3.5
Female	42,466	4.7
RACE		
One race	849,881	95.0
White	425,017	47.5
Black or African American	31,349	3.5
American Indian and Alaska Native	6,865	0.8
Asian	240,375	26.9
Asian Indian	26,606	3.0
Chinese	51,109	5.7
Filipino	48,149	5.4
Japanese	11,484	1.3
Korean	9,425	1.1
Vietnamese	78,842	8.8
Other Asian [1]	14,760	1.6
Native Hawaiian and Other Pacific Islander	3,584	0.4
Native Hawaiian	624	0.1
Guamanian or Chamorro	675	0.1
Samoan	1,417	0.2
Other Pacific Islander [2]	868	0.1
Some other race	142,691	15.9
Two or more races	45,062	5.0
Race alone or in combination with one or more other races: [3]		
White	460,772	51.5
Black or African American	36,928	4.1
American Indian and Alaska Native	13,228	1.5
Asian	257,571	28.8
Native Hawaiian and Other Pacific Islander	7,091	0.8
Some other race	167,353	18.7

Subject	Number	Percent
HISPANIC OR LATINO AND RACE		
Total population	**894,943**	**100.0**
Hispanic or Latino (of any race)	269,989	30.2
Mexican	221,148	24.7
Puerto Rican	4,072	0.5
Cuban	1,001	0.1
Other Hispanic or Latino	43,768	4.9
Not Hispanic or Latino	624,954	69.8
White alone	322,534	36.0
RELATIONSHIP		
Total population	**894,943**	**100.0**
In households	884,079	98.8
Householder	276,598	30.9
Spouse	155,000	17.3
Child	274,074	30.6
Own child under 18 years	199,859	22.3
Other relatives	104,822	11.7
Under 18 years	29,110	3.3
Nonrelatives	73,585	8.2
Unmarried partner	15,059	1.7
In group quarters	10,864	1.2
Institutionalized population	3,846	0.4
Noninstitutionalized population	7,018	0.8
HOUSEHOLD BY TYPE		
Total households	**276,598**	**100.0**
Family households (families)	203,681	73.6
With own children under 18 years	105,935	38.3
Married-couple family	155,000	56.0
With own children under 18 years	82,694	29.9
Female householder, no husband present	32,256	11.7
With own children under 18 years	16,654	6.0
Nonfamily households	72,917	26.4
Householder living alone	50,938	18.4
Householder 65 years and over	13,572	4.9
Households with individuals under 18 years	119,063	43.0
Households with individuals 65 years and over	52,797	19.1
Average household size	3.20	(X)
Average family size	3.62	(X)
HOUSING OCCUPANCY		
Total housing units	**281,841**	**100.0**
Occupied housing units	276,598	98.1
Vacant housing units	5,243	1.9
For seasonal, recreational, or occasional use	818	0.3
Homeowner vacancy rate (percent)	0.4	(X)
Rental vacancy rate (percent)	1.8	(X)
HOUSING TENURE		
Occupied housing units	**276,598**	**100.0**
Owner-occupied housing units	170,950	61.8
Renter-occupied housing units	105,648	38.2
Average household size of owner-occupied units	3.22	(X)
Average household size of renter-occupied units	3.16	(X)

- Represents zero or rounds to zero. (X) Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000.

Appendix D

San Jose Municipal Water System
2010 Urban Water Management Plan
Projected Demands Provided to Wholesale Agencies

From: Quesada, Nicole
Sent: Monday, March 07, 2011 3:48 PM
To: 'James O'Brien'
Subject: RE: San Jose Muni Demand projections for 2010 UWMP

Hi James,

Following up on our earlier conversation – please use the 2040 General Plan WSA figures for the preferred alternative as SJMWS supply projections. Please note that this does include a 20% reduction in NEW single-family and multi-family usage, but no other conservation specifically required to meet SB7 goals. We will be going to Council with the SB7 baseline/targets at the same time as our UWMP hearing in June.

Please give me a call if you'd like to discuss further. Thanks -

Preferred Alternative	2015	2020	2025	2030	2035	2040
SFPUC	5,039	5,039	5,039	5,039	5,039	5,039
SCVWD	16,185	16,592	17,019	17,500	17,500	17,500
NSJ Wells	2,144	3,060	3,794	4,595	5,550	5,550
Evergreen Wells	0	0	0	3	486	486
Edenvale Wells	1,678	2,230	2,876	3,618	4,312	4,312
Coyote Wells	1,945	2,698	3,580	4,593	5,540	5,540
Recycled Water	5,148	5,609	6,150	6,770	7,351	7,351
TOTAL	**32,138**	**35,227**	**38,459**	**42,119**	**45,779**	**45,779**

Nicole Quesada, P.E.
San Jose Municipal Water System
3025 Tuers Road, San Jose CA 95121
P 408.277.3671 F 408.277.4954

From: James O'Brien [mailto:JOBrien@valleywater.org]
Sent: Monday, February 14, 2011 11:33 AM
To: Quesada, Nicole
Subject: San Jose Muni Demand projections for 2010 UWMP

Hi Nicole,

We would like to get updated San Jose Muni demand projections by source for the District's 2010 UWMP consistent with what you will be including in your 2010 UWMP. We are currently using preliminary demand projections from the "Water Supply Assessment for Envision San Jose 2040 General Plan Update" June 2010. Our schedule is to open the public hearing on the District's 2010 UWMP on April 12th and we will need to finalize the demand projections we will be using in our plan by March 3rd.

The demand projections should include information on estimated San Jose Muni conservation and the conservation base year you are using. We need this information to avoid double counting of conservation. We will be adding up all of the retailer projected conservation to

compare to what we are currently projecting for countywide conservation and make adjustments in total countywide demand as appropriate. The District currently projects countywide conservation of 98,500 AF/YR in 2030 with 1992 as the base year.

Please let me know if the demand projections are based on the City of San Jose Envision 2040 General Plan update preferred alternative or something else.

Also, please provide San Jose Muni recycled water use projections and indicate if the demand projections are before or after the projected recycled water use.

In addition, please provide us with estimates of the SFPUC Hetch-Hetchy use you will be using in your 2010 UWMP.

Also note that DWR will be holding a 2010 UWMP workshop at the District on Friday February 25th from 9:30 to 3:30. Here is a link to the DWR notice of the workshop -> http://www.water.ca.gov/calendar/index.cfm?meeting=15964

Thanks again for all of your help on this project.
-James

From: Nicole Sandkulla [mailto:NSandkulla@bawsca.org]
Sent: Thursday, February 24, 2011 3:04 PM
To: Levin, Ellen
Cc: Art Jensen; Allison C. Schutte; Anona Dutton; Petrick, Molly; Alan Kurotori (akurotori@santaclaraca.gov); Alex Ameri (alex.ameri@hayward-ca.gov); Art Morimoto (amorimoto@burlingame.org); Cari Lemke; Carrasco, Anthony; cathya@midpeninsulawater.org; David Dickson (ddickson@coastsidewater.org); dbarrow@westboroughwater.com; eric.cartwright@acwd.com; Flegel, Elizabeth; Gregg Hosfeldt (gregg.hosfeldt@mountainview.gov); Henry Young (henryy@midpeninsulawater.org); James Craig; Jerry Flanagan; Justin Ezell (jezell@redwoodcity.org); smtp:kphalen@ci.milpitas.ca.gov; Klara Fabry (kfabry@sanbruno.ca.gov); koconnell@nccwd.com; ksteffens@menlopark.org; M. L. Gordon (acmoffice2415@yahoo.com); Nasser, Mansour; Marty Laporte (martyl@bonair.stanford.edu); Marvin Rose (mrose@ci.sunnyvale.ca.us); mdebry@hillsca.org; Patrick Sweetland (psweetland@dalycity.org); Patrick Walter (pwalter@purissimawater.org); paulr@midpeninsulawater.org; Procos, Nicolas; Randy Breault; Rebecca Fotu (rlfotu@menlopark.org); rpopp@ci.millbrae.ca.us; rtowne@fostercity.org; Thomas.Niesar@acwd.com; Tim McAuliffe (tmcauliffe@burlingame.org); (mbolzowski@calwater.com); Alicia Sargiotto; Allison turner (alison.turner@mountainview.gov); Aparna Chatterjee; Brendan McCarthy; Brent Chester; Cathleen Brennan (cbrennan@coastsidewater.org); Cindy Bertsch; croyer@dalycity.org; Dana Jacobson; ECooney@HILLSBOROUGH.NET; Elvert, Catherine; gnathan@amwater.com; Howard Salamanca (hsalamanca@ci.milpitas.ca.gov); Jade Williams (jawilliams@calwater.com); Jeanette Kalabolas (jeanettek@midpeninsulawater.org); Krista Kuehnnackl; Leah Edwards; marilyn.mosher@hayward-ca.gov; Quesada, Nicole; Nina Hawk (nhawk@santaclaraca.gov); Norm Dorais (NDORAIS@fostercity.org); Shelly Reider (sreider@ci.millbrae.ca.us); Stephanie Nevins (stephanie.nevins@acwd.com); Toni Harris; Tracy Ingebrigtsen (tracyi@bonair.stanford.edu); Val Conzet (vconzet@ci.sunnyvale.ca.us); Virginia Parks; William Lai; Zach Goldberg
Subject: FW: Projected SFPUC Purchases for UWMP Preparation Needed by February 17, 2011

Dear Ms. Levine,

In response to the e-mail below and the SFPUC's request for purchase projections from its Wholesale Customers for use in the SFPUC's Urban Water Management Plan 2011 Update, attached is the requested information that I have received from the BAWSCA agencies. The table below provides a summary display of the responses received from the BAWSCA member agencies as transmitted in this e-mail.

If you have any further questions, please contact me at the BAWSCA office. I will forward to the SFPUC any additional responses that are received at a later date.

Sincerely,
Nicole Sandkulla

Updated Purchase Projections for SFPUC	
Agency Name	**Projections Included in 2/24/11 E-Mail**
ACWD	x
Brisbane	x
Burlingame	x
Cal Water	x
Coastside	x
Daly City	x
East Palo Alto	
Estero	x
Guadalupe Valley	x
Hayward	x
Hillsborough	E-Mail Response Included, Projections Not Yet Available
Menlo Park	
Mid-Peninsula	x
Millbrae	x
Milpitas	x
Mountain View	E-Mail Response Included, Projections Not Yet Available
North Coast	
Palo Alto	
Purissima Hills	
Redwood City	x
San Bruno	x
San Jose	x
Santa Clara	x
Stanford	E-Mail Response Included, Projections Not Yet Available
Sunnyvale	x
Westborough	x

Nicole M. Sandkulla, P. E.
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Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 302

San Mateo, CA 94402
Ph: (650) 349-3000 Fax: (650) 349-8395
EMail: NSandkulla@BAWSCA.org
Website: WWW.BAWSCA.org

From: Nicole Sandkulla [mailto:NSandkulla@bawsca.org]
Sent: Friday, February 04, 2011 12:03 PM
Subject: Projected SFPUC Purchases for UWMP Preparation Needed by February 17, 2011
Importance: High

Dear BAWSCA Water Management Representatives,

The San Francisco Public Utilities Commission (SFPUC) has requested projections from each of its wholesale customers of purchases from the San Francisco Regional Water System (System) in five year increments from 2015 to 2030 (or 2035). The SFPUC will use this information to prepare its Wholesale Urban Water Management Plan for the System.

SFPUC's request is consistent with the requirements of Section 10631 of the California Water Code which states:

> *(k) Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).*

Historically, the SFPUC has relied on each agency's water purchase projections reported in the BAWSCA Annual Report. However, past purchase projections may not be appropriate for a variety of reasons:

- Changes in the economy and overall water use characteristics in the region
- Agencies are updating their projected needs and use of sources as they prepare their UWMP's
- Projections in the FY 2008-2009 Annual Report do not include the results of the Water Conservation Implementation Plan and the status of each agency's conservation programs

The SFPUC will need to document estimated water sales, including amounts for Wholesale Customers that are exempt from filing UWMP's. We recommend that those agencies that

are not required to prepare UWMP's provide BAWSCA with the five-year projected purchases you wish the SFPUC to use in preparing its report.

As in the past, BAWSCA will support providing this information to the SFPUC in a coordinated fashion. To meet the SFPUC's deadline, please provide BAWSCA your projected SFPUC purchases in 5-year increments by close-of-business on Thursday, February 17, 2011. In addition to the numbers themselves, BAWSCA will forward to the SFPUC any qualifications that you wish to have associated with the data you provide at this time (e.g. that the data is draft and subject to modification as part of finalizing your agency UWMP). BAWSCA will forward information received to SFPUC on Friday, February 18th.

BAWSCA will only send to the SFPUC data that it receives from each of your agencies specifically for this purpose. No data will be provided to the SFPUC for agencies that do not provide data to BAWSCA.

Lastly, please note that BAWSCA will also utilize these purchase projections provided by each BAWSCA agency to prepare and submit the water purchase projections through 2018 due to the SFPUC by June 30, 2011 in compliance with Section 4.05 of the 2009 Water Supply Agreement unless otherwise notified of a change in the numbers by individual member agencies.

If you have any questions, please call me or Anona Dutton.

Sincerely,
Nicole Sandkulla

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Website: WWW.BAWSCA.org

SJ
p. 1 & 1

Nicole Sandkulla

From: Quesada, Nicole [Nicole.Quesada@sanjoseca.gov]
Sent: Friday, February 18, 2011 5:10 PM
To: Nicole Sandkulla
Cc: Nasser, Mansour
Subject: SJ purchases

Nicole,

Here are San Jose's purchase projection estimates for SFPUC:

2015 – 4.5 mgd
2020, 2025, 2030 and 2035 – minimum 4.5 mgd, however San Jose is interested in obtaining additional supply for a total of 6.34 mgd

Thanks,
Nicole Quesada, P.E.
San Jose Municipal Water System
3025 Tuers Road, San Jose CA 95121
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Appendix E

San Jose Municipal Water System
2010 Urban Water Management Plan
Water Conservation Plan

Water Conservation Plan

City of San José
Environmental Services Department

August 2008

Table of Contents

1. Introduction and Background

1.1 Purpose of the Water Conservation Plan 1
1.2 City's Drivers and Targets for Water Conservation 1
1.2.1 Wastewater Flow Management 1
1.2.2 Water Supply Challenges 1
1.2.3 Long-term Water Conservation Targets 2

2. Water Supply Overview and Issues

2.1 Sources of Water Supply 2
2.2 Water Supply Issues 3
2.2.1 Delta Pumping Restrictions 3
2.2.2 Global Climate Change 3
2.3 Meeting Future Demand with Increased Water Conservation and Recycling 4

3. Past and Current Water Conservation Programs and Strategies

3.1 Past Conservation Programs 5
3.2 Current Programs and Strategies 5

4. Planned Conservation Strategies to FY 10-11

4.1 Planning and Development Strategies 6
4.2 Outreach and Education 8
4.3 Cost-Sharing with Water District Programs 8
4.3.1 Residential Cost-Shared Programs 9
4.3.2 Commercial, Industrial and Institutional Cost-Shared Programs 9
4.4 Legislative Priorities 9
4.5 Water Shortage Contingency Plan and Drought Plan 9
4.6 Conservation Pricing 10
4.7 Partnerships 10

5. Three-Year Implementation Plan

5.1 Staffing 11
5.2 Budget & Grants 12
5.3 Prioritization of programs 12
5.4 Performance Measures 12

Appendix A Attachment 1
Appendix B Attachment 2

Middle and right photos on cover page are courtesy of the Santa Clara Valley Water District

1. Introduction and Background

1.1. Purpose of the Water Conservation Plan

The purpose of the Water Conservation Plan is to formalize and detail the City's commitment and contribution towards a sustainable water supply for its current and future residents. As population and economic growth increases, water conservation is a key strategy towards the vision of San José as a thriving, environmentally sustainable city. This three-year plan provides City staff the direction to manage this finite resource in a way that maintains the quality of life and economic viability in San José.

1.2. City's Drivers and Targets for Water Conservation

There are multiple drivers for the City to implement water conservation efforts, namely regulatory drivers for wastewater flow management and drivers for water supply reliability and sustainability.

1.2.1. Wastewater Flow Management

Previously the primary driver for the City's conservation work has been the goal of reducing wastewater flows from the San Jose/Santa Clara Water Pollution Control Plant (Plant). Because of permit requirements the Plant is under direction to maintain summer flows below a trigger of 120 million gallons per day (mgd) to protect salt marsh habitat and endangered species in San Francisco Bay. Past conservation programs have been successful in maintaining flows below this trigger. Flow reduction remains a driver for water conservation but presently there are additional drivers.

1.2.2. Water Supply Challenges

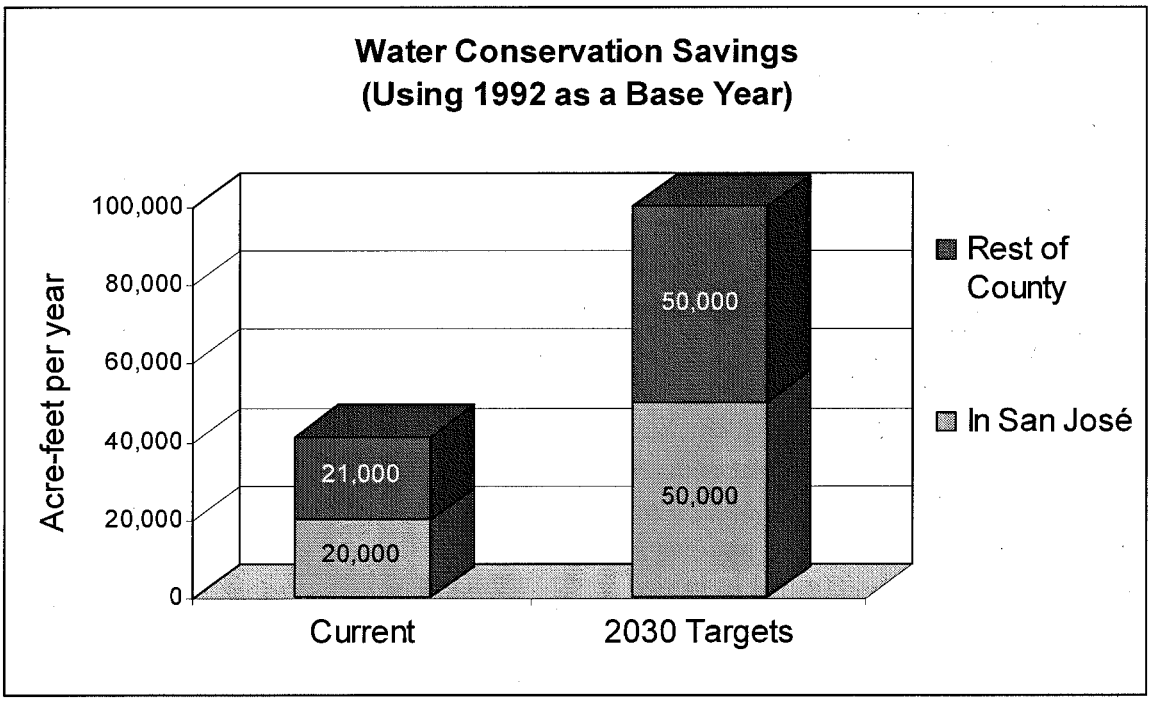
Many factors affect the water supply situation and present challenges to maintaining a sustainable water supply for the City. These factors include precipitation, local water storage, restrictions on water imported from the Sacramento-San Joaquin River Delta, other imported water allocation and management, and long term impacts due to global climate change and aging infrastructure. These water supply challenges present the need for the City to increase its efforts for water conservation.

1.2.3. Long-term Water Conservation Targets

In 2006, the primary wholesale water supply agency for Santa Clara County, the Santa Clara Valley Water District (Water District), established a long-term conservation goal

to achieve roughly 100,000 acre-feet per year of water savings countywide by 2030 (using 1992 as a base-year). An acre-foot is equivalent to almost 326,000 gallons. Currently, water conservation achieves 41,000 acre-feet per year of savings since 1992.

As 50% of the county's population, and as a major partner with the Water District for conservation, the City's goal should be for citywide water savings to be half of the Water District's countywide goal. **This translates to a citywide goal of 50,000 acre-feet per year of water savings by 2030**. The chart below illustrates these targets.



2. Water Supply Overview and Issues

2.1. Sources of Water Supply

More than half of the water supplied in Santa Clara County is imported, coming from Hetch Hetchy reservoir and the Sacramento-San Joaquin River Delta (Delta). The other half is supplied by local surface and ground water and approximately 4% is supplied by recycled water. Water service within San José is provided by three water retailer operations. The city operates the San José Municipal Water System to provide water to almost 26,000 customers, serving approximately 14% of the citywide water demand. The other water retailers are the San Jose Water Company and Great Oaks Water Company.

2.2. Water Supply Issues

Future water demand is expected to increase given the projected increase in population and jobs in the City. At the same time, several factors are redefining water supply reliability in current and future years. These factors include Delta pumping restrictions, global climate change, potential catastrophes (earthquakes, levee failures, or infrastructure failures), aging infrastructure and reduced precipitation or the possibility of multi-year drought events.

2.2.1. Delta Pumping Restrictions

The Delta is a sensitive environment, and the amount of water that can be pumped from the Delta is heavily influenced by hydrological, environmental and legal factors and competition. In 2007, a federal court ruling imposed limits on pumping from the Delta to protect the Delta Smelt, a federally listed threatened species. Further restrictions may be imposed in light of recent findings that populations of other fish species, the Longfin Smelt and Chinook salmon, have fallen sharply. In the event of a long-term decrease in imported water availability and with the prolonged use of reserve supplies to make up for the decrease in Delta water, the amount of water available to supply the County may drastically decrease.

2.2.2. Global Climate Change

There is growing acknowledgement of the potential risks that climate change presents to California's water supply. Projections by the Intergovernmental Panel on Climate Change indicate that regional climate change associated with global warming could significantly alter California's hydrologic cycles and water supply.[1] Precipitation is expected to increase as snowfall decreases over the Sierra Nevada and Cascades mountain ranges. The shift in the nature and timing of precipitation and snowmelt in California will affect the state's procurement of water. The San Francisco Public Utilities Commission projects that as temperatures increase, snow level will rise in elevation as well, from 6000 feet in 2000 to 7500 feet by 2075. Between now and 2050, snow pack is predicted to decrease from 87% to 76% of normal and precipitation runoff will occur earlier in the spring, impacting snowmelt-fed reservoirs such as Hetch-Hetchy and the rivers that flow to the Delta.

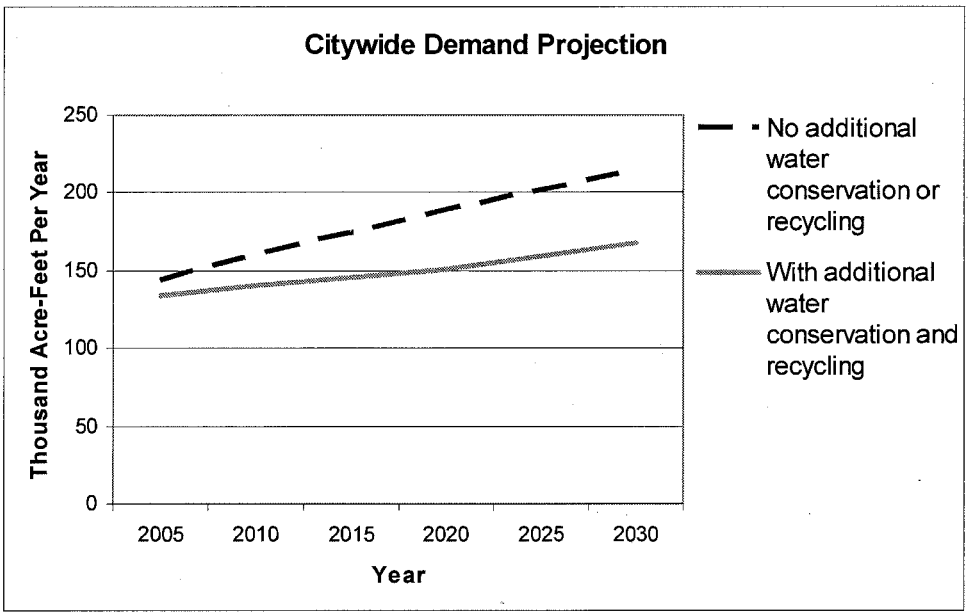
Salinity levels in the San Francisco Bay estuary and the Delta may also increase, affecting water quality and the existing flora and fauna which inhabit these

[1] Landers, J. (2002). Climate change to alter California's water supplies, study says. Civil Engineering 72(8): 16-17.

environments.[2] Reduced spring snowmelt will also decrease hydropower generation.[3] These issues could have implications for California's approach to its water storage needs.[4] Another possible effect of global warming is increased temperatures, which may lead to increased landscape water demands.

2.3. Meeting Future Demand with Increased Water Conservation and Recycling

Increasing our water conservation and recycling efforts can reduce the projected increase in demand. The chart below illustrates the projected increase in total citywide water demand from 2005 to 2030, compared to the citywide demand including recycled water and additional conservation.



Sources: Santa Clara Valley Water District, San Jose Water Company

Through administration and management of the South Bay Water Recycling Program, the City is a major supplier of recycled water in the County and one of the City's Green Vision goals sets targets for increasing recycled water. This Plan presents strategies for increasing water conservation as described in the next section. In

[2] Knowles, N. and Cayan, D. (2002). Potential effects of global warming on the Sacramento/San Joaquin watershed and the San Francisco estuary. Geophysical Research Letters 29(18): 1891.

[3] Kim, J. et al (2002). Impacts of Increased Atmospheric CO2 on the Hydroclimate of the Western United States. Journal of Climate 15(14): 1926-1942.

[4] Landers, J. (2002). Climate change to alter California's water supplies, study says. Civil Engineering 72(8): 16-17.

addition to reducing water demand, water conservation has multiple benefits, which are discussed in Appendix A.

3. Past and Current Water Conservation Programs and Strategies

3.1 Past Conservation Programs

Prior to the mid-1990s, the City conducted indoor and outdoor water conservation programs, primarily in response to the drought of 1987 – 1992 and flow reduction requirements in the wastewater discharge permit for the Plant. Conservation measures included rebates for Ultra Low Flush Toilets and front-loading washing machines. Since the mid-1990s, the City's water conservation efforts focused on wastewater flow reduction, namely conservation strategies such as toilet retrofits, washing machine rebates, water use audits, and other residential and commercial conservation programs to reduce indoor water use.

3.2 Current Programs and Strategies

Since 1998 the City and Water District have signed a **cost sharing agreement** in which the two agencies financially support each other's water conservation programs. In recent years, the cost sharing agreement has reduced the required number of City FTEs devoted to conservation and allowed the City to capitalize on large-scale program efficiencies at the County and state levels. The City cost-shares in programs administered by the Water District that result in wastewater flow reductions in the Plant Service Area, and receives funding from the District for programs the City administers. City staff administers the Water Efficient Technologies (WET) rebate program for businesses in the Plant Service Area and the Neighborhood Preservation Water Conservation program for residents in San José. The latter program is for low-income residents who have been issued an enforcement notice under the City's Neighborhood Preservation Ordinance, offering financial assistance to upgrade their properties in water conserving ways.

Another conservation strategy has been the implementation of **Best Management Practice** measures for water conservation (BMPs) as defined by the California Urban Water Council, of which the City is a signatory member. These BMPs are listed in Appendix B. Implementation of these BMPs is now a requirement for agencies applying for grant funds from the Department of Water Resources.

City staff also **reviews development plans** that come through the City's Planning Department for water conservation opportunities. However, identified conservation

opportunities, such as water-efficient landscape practices or design modifications beyond current standards, are not mandatory.

The City has also enacted **ordinances for periods of water shortages**. Chapter 15 of the City's Municipal Code includes short-term measures to be implemented (for water use reductions of 10% to 40%) if a water shortage is declared by the City Council. Measures include, but are not limited to, landscape irrigation restrictions, public noticing and outreach, and restrictions on filling of pools, spas and fountains. These measures supplement ongoing water conservation programs and water waste prevention ordinances.

4. Planned Conservation Strategies to FY 10-11

In response to the many challenges for water supply reliability and sustainability, it is time for the City to play a more active role in water conservation. About half of the targeted water conservation savings will result from "passive" conservation such as plumbing code changes and building guidelines. The other half will result from "active" conservation, such as continued implementation of water conservation BMPs and emerging conservation technologies. The following strategies and program elements are proposed to expand our efforts between now and FY10-11.

4.1. Planning and Development Strategies

The City's General Plan includes the following statement in the Natural Resources Section: "The City should encourage more efficient use of water by promoting water conservation and the use of water saving devices." San José can achieve considerable water conservation savings with the following strategies:

a. **Developer Plans**: Continue to review developer plans to recommend water conservation and other environmental improvements.

b. **Municipal Code**: Review the municipal code to identify potential areas which can be strengthened for water conservation. Amend the City's **landscape ordinance** to be in compliance with AB 1881 (requiring municipalities to adopt a landscape ordinance by 2010 similar to the State's Updated Model Landscape Ordinance).

c. **Envision San José 2040 General Plan Update**: Work with the Planning Department to identify **visionary strategies and guidelines for land use decisions and city services** that result in increased water efficiency.

d. **Pilot Programs for Water Conserving Fixtures**: In collaboration with the Water District, conduct a pilot program to offer incentives that encourage developers to **design and construct water efficient homes and buildings** with water conserving fixtures, irrigation systems and landscapes. Such new developments can have tremendous water conserving potential and a pilot program is currently being designed at the State level. The Metropolitan Water District began its "California Friendly Homes" program in 2001 and estimates savings at 50,000 gallons per year per single family home. This effort would be in conjunction with **developing citywide green building policies and standards**.

e. **Pilot Programs for New Technologies**: Conduct pilots on creative and innovative water conserving and reuse technologies. These technologies can be coupled with other green building designs. The pilots would **identify hurdles and opportunities related to the installation and use of technologies** such as graywater systems, rainwater collection systems, water cycling systems in commercial or manufacturing applications.

f. **Feasibility of new ordinances**: Research the feasibility and efficacy of establishing a "**retrofit on resale**" code requiring the installation of water conserving fixtures when properties change hands (both residential and commercial). Santa Cruz has enacted such an ordinance and estimates 28 million gallons in cumulative savings since 2003. Research new ordinances other cities have adopted for water efficiency, such as **requiring new developments to mitigate their water demand** by funding or conducting retrofits that save water elsewhere.

g. **Design Guidelines**: Revise the City's Guidelines for **Residential, Commercial and Industrial Buildings** to more fully address water conservation elements such as landscape requirements. Enforce compliance with the guidelines. Such a review would be an opportunity to review the guidelines for other potential environmental elements as well.

h. **Specific Plans**: work to ensure that water conservation (and other environmental considerations) is fully incorporated into future Specific Plans.

i. **Water supply assessments**: review water supply assessments associated with developments over 499 units to ensure that they are as water-conserving as possible. Train Planning staff to ensure that they are conversant in water conservation requirements and guidelines for development.

4.2. Outreach and Education

The results of the City's 2006 public survey for water conservation and recycling show that conservation knowledge and practices are increasing. Staff currently conducts conservation outreach and education through direct marketing, tabling at community events, and developing and delivering educational programs for teachers and students. The City's current annual outreach budget for indoor conservation messages is $150,000.

With the need for an increase in conservation savings, the City needs to increase its outreach efforts. The following programs and strategies will enable the City to be more effective in outreach. More specific strategies will be identified and implemented after the Water District completes it Water Conservation Marketing Plan, which will analyze issues and recommend specific campaigns, messages and strategies.

a. **Campaigns**: Conduct conservation campaigns in conjunction with the Water District, water retailers, San Francisco Public Utilities Commission, and/or Bay Area Water Supply and Conservation Agency. An example is the regional "Be a Water Saving Hero" campaign currently underway. When appropriate, collaborate to ensure complimentary messages are delivered, such as conservation and pollution prevention messages. Provide customers with usage info so they can compare their water usage to previous years and/or track current usage. Partner with other agencies and organizations to host/co-sponsor speaker events/workshops, produce joint messages or press releases and/or to fund a joint campaign.

b. **Messages**: Tie conservation messages to saving money, an incentive for residents and businesses. Promote residential and commercial water audits as gateways to other conservation programs as, currently, awareness of these programs is low. Promote conservation behaviors such as watering before dawn, planting drought-tolerant plants, sweeping instead of hosing off sidewalks, and fixing leaks promptly. Promote incentives for retrofits such as high efficient toilets and clothes washers. Create and disseminate general messages about the water supply situation and the potential effects of climate change on water supply.

c. **Outreach Strategies**: Increase outreach through such strategies as media advertising (television, radio and newspapers), bill inserts, bus advertising, educational programs, and public relations mechanisms. Increase support for local water conservation programs for schools. Increase outreach to City employees, through brown bag events, tabling at citywide information fairs, and/or existing newsletters. Continue supporting water education programs for teachers and students.

4.3. Cost-Sharing with Water District Programs

For the next three years, it is recommended that the Water District maintain the role of implementing the majority of local conservation programs, with the City cost sharing to support these programs. Cost Sharing has proven to be a cost-effective way for the City to fund water conservation, allowing us to capitalize on large-scale program efficiencies at the County and state levels. It is recommended that the City continue to cost-share with the Water District on the following programs.

4.3.1. Residential Cost-Shared Programs

1) Continue to support (financially and with outreach) water use audits and utilize them as a gateway to other conservation opportunities
2) High Efficiency Toilet (HET) rebates
3) High efficiency clothes washer rebates
4) Landscape and irrigation incentives for water-wise landscaping, hardware, and evapo-transpiration (ET) controllers
5) Neighborhood Preservation Water Conservation Program.

4.3.2. Commercial, Industrial and Institutional Cost-Shared Programs

1) Commercial water conservation audits that identify conservation opportunities
2) Cooling Tower Connectivity Controller rebates
3) Continue the WET rebate for both indoor and outdoor retrofits
4) High Efficiency Toilet replacements
5) Commercial washing machine rebates
6) Commercial landscape programs such as landscape audits, and financial assistance for water-wise landscape and hardware upgrades.

4.4. Legislative Priorities

City staff will continue to evaluate legislation that impacts or encourages water use efficiency and to recommend priorities for legislative actions as needed. One proposed legislation that will impact the City's conservation goals and efforts is AB 2175 (Laird), which sets targets for statewide per capita water use to be reduced by 20% by 2020, and also mandates specific targets for urban water retailers including the City's San José Municipal Water System.

4.5. Water Shortage Contingency Plan and Drought Plan

City staff will evaluate and update the current Water Shortage Contingency Plan, and clarify enforcement responsibilities and coordinate with other water agencies within

the City. In addition, the City's Water Waste Prevention and Water Shortage ordinances may need to be updated.

If water supply wholesalers for the City (the Water District and San Francisco Public Utilities Commission) declare a water shortage and call for mandatory rationing, the City will need to adopt a Drought Plan for the San José Municipal Water System (Muni Water). This includes identifying alternative water supply options, short-term rationing measures and mandatory water allocations for customers in the Muni Water service area. Staff has started the analysis and process for preparing a Drought Plan and will continue while coordinating with other water agencies to be ready to prepare and implement a Drought Plan if needed.

4.6. Conservation Pricing

Water rates based on a tiered structure can be an incentive to users to conserve while potentially providing funding for conservation programs. Increased conservation can cause a decrease in revenue to a water utility, so increasing water rates may be necessary to encourage conservation and cover fixed operating and maintenance costs. The City's Municipal Water System uses a tiered rate structure. San Jose Water Company has submitted to the California Public Utilities Commission its application for a tiered rate structure and the Commission's decision is pending. The City will continue to implement a pricing structure that best supports conservation. One possible strategy is to work with the Water District and other retailers to develop budget-based tiered rates for dedicated landscape irrigation meters.

4.7. Partnerships

The City intends to work more closely with the other water retailers in San José to identify how they can more directly support conservation efforts. San Jose Water Company currently achieves water conservation through customer education and outreach events, plumbing fixture distribution and water use audits. Some examples for partnerships include joint proposals for grant funds, co-sponsorship of outreach events, and development of budget-based rates for irrigation.

5. Three-Year Implementation Plan

The table below lists the tasks and timeline for the City's water conservation efforts, starting with FY 08-09 as Year 1 and ending with FY 10-11 as Year 3. Additional tasks may be identified and implemented as needed during this period.

Task	Year 1	Year 2	Year 3
Administer current Cost Sharing Agreement with the Water District	✓	✓	✓
Adopt future Cost Sharing Agreement with the Water District	✓	✓	✓
Administer the Water Efficient Technologies rebate program in the Plant Service Area	✓	✓	✓
Administer the Neighborhood Preservation Water Conservation Program	✓	✓	✓
Develop a Water Conservation Communication Plan to strategize for outreach and education	✓		
Deliver outreach and education through identified campaigns, messages and strategies	✓	✓	✓
Recommend visionary water conservation guidelines for the Envision San José 2040 General Plan update	✓		
Develop a citywide green building policy with strong water efficiency standards	✓		
Amend the City's Landscape Ordinance to be comparable to the State's Revised Model Landscape Ordinance	✓	✓	
Revise Residential and Commercial Building Guidelines to incorporate water conservation improvements.	✓	✓	✓
Work with other water agencies to develop a pilot model development program	✓	✓	✓
Research feasibility of new ordinances such as "Retrofit on Resale" or requiring mitigation of increased water demand	✓	✓	
Based on feasibility analysis of new ordinances, enact and enforce new ordinances		✓	✓
Begin efforts to quantify savings potential for specific conservation strategies and technologies	✓	✓	✓
Determine investment proposals including potential funding opportunities for outdoor water conservation	✓	✓	✓
Continue legislative analysis to advocate for state and federal legislation that supports increased water efficiency	✓	✓	✓
Evaluate progress and strategize for future conservation efforts		✓	✓

5.1. Staffing

In 1999, the City employed 7 full time staff and several interns to implement flow reduction programs. Since that time, staff levels have been reduced to a maximum two FTEs. Currently, staffing is approximately 1.5 FTEs. With expanded

conservation efforts, an increase in staffing resources will be needed and the FY 08-09 budget proposal includes one new FTE position to support water conservation.

5.2. Budget & Grants

In FY 07-08, the budget for the WEP is $1.5 million funded from Sewer Service and Use Charges and $150,000 in outreach funds. In order to fund outdoor conservation, where the majority of future savings will be achieved, non-513 funding would need to be appropriated. The City supports the Water District's efforts to secure grant money for countywide conservation programs. In the future, the City will evaluate the benefits of securing its own grant funds for outdoor conservation programs.

5.3. Prioritization of programs

To strategize for future priorities, staff will develop or use externally-developed criteria to evaluate priorities and develop goals and strategies past FY 10-11. This process will be similar to prioritization methods performed by other water agencies such as the CUWCC and/or the Water District.

5.4 Performance Measures

Currently the City tracks wastewater flow reduction and knowledge of water conservation issues and practices (from public survey results) as performance measures for water conservation. The table below shows the performance measures targeted for the next three years. The targets for flow reduction below reflect the 2.43% annual increase in conservation savings that is needed to reach the 2030 goal of 50,000 acre-feet (16.2 billion gallons) per year of water savings citywide.

Measure	**FY 08-09 Target**	**FY 09-10 Target**	**FY 10-11 Target**
% of residents demonstrating water conservation knowledge	35	37	39
% of residents with water conserving fixtures or appliances	52	55	57
Gallons per day of flow reduced in Plant Service Area	200,000	204,860	209,838
Cumulative millions of gallons per day of flow reduced in Plant Service Area since 1992	8.5	8.7	8.9

In addition, for future strategies, the benefits and cost effectiveness of specific conservation programs or technologies will be evaluated using metrics and analysis methods developed by the CUWCC and other industry standards. This would allow the City to do an evaluation and prioritization of water conservation measures for future or continued implementation.

City of San José Water Conservation Plan
Appendix A
Benefits of Water Conservation

Water conservation programs provide a myriad of benefits – to the water utility that provides them to benefits, to the private citizen or business that partakes of them, and to the environment. Considerable research has been done to quantify these benefits. The Status Report and Assessment of the Revised South Bay Action Plan Programs (2001) included a benefit cost analysis of its various flow reduction programs such as stream flow augmentation, conservation, and recycled water. Water conservation programs had a favorable benefit cost ratio of 8.63 compared to recycled water at 2.7 and stream flow augmentation at 1.47. Below is a summary of the benefits of water conservation programs.

Benefits to Utilities*

- Increases water supply reliability
- Reduced need to secure additional water supplies
- Reduced operations and maintenance costs
- Deferred, downsized or eliminated need for new facilities
- Image enhancement as responsible environmental steward
- Less competition among utilities for water supplies
- Additional supply available for growth and environmental needs
- Wastewater treatment plant benefits related to reduced operations, maintenance and capital costs; the Plant estimates a cost of $890/mgd of wastewater treated
- Helps meet short-term demands associated with dry periods and long-term demands.

* It should be noted that decreased water demand from conservation programs can result in decreased revenues to water retailers and wholesalers. For some utilities, this issue can be addressed by implementing tiered rate structures for water rates.

Benefits to Customers

- Lower water, sewer and energy bills
- Reduced landscape and property maintenance costs and services
- Improved quality of life through preservation of the environment and community for future generations.

Environmental benefits and energy savings

- Water freed up for environmental uses such as maintaining stream flows for aquatic species such as the Delta Smelt
- Significant energy savings due to water conveyance, treatment and uses being California's single biggest energy user
- Reduced greenhouse gas emissions. The Water District estimates that, between the District's baseline conservation year of FY 92-93 and FY 06-07, countywide water conservation and recycling achieved 1.62 billion kilowatt-hours in savings and avoided the emission of 381 million kilograms of carbon dioxide.
- Less risk of overdrafting groundwater
- Preservation of the habitats such as South Bay and Delta and their associated species.

City of San José Water Conservation Plan
Appendix B
List of Best Management Practices of the California Urban Water Conservation Council (CUWCC)

The City of San José, as a signatory to the CUWCC Memorandum of Understanding (MOU), has committed to the implementation of the Best Management Practices (BMPs) listed below. "Implementation" means achieving and maintaining the staffing, funding, and in general, the priority levels necessary to achieve the level of activity called for in each BMP, and to satisfy the commitment to use good faith efforts to optimize water savings as described the MOU.

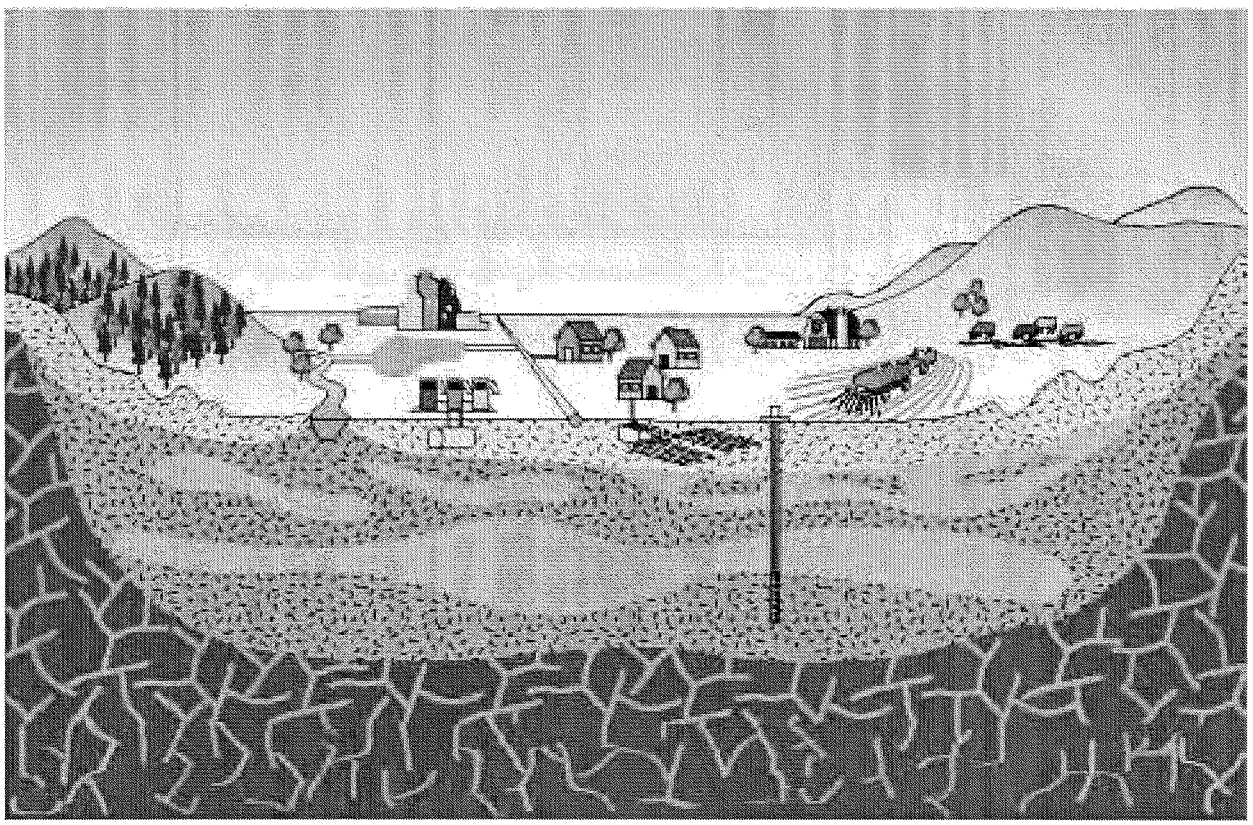
1. Water survey programs for single-family residential and multi-family residential customers
2. Residential plumbing retrofit
3. System water audits, leak detection and repair
4. Metering with commodity rates for all new connections and retrofit of existing connections
5. Large landscape conservation programs and incentives
6. High-efficiency clothes washing machine financial incentive programs
7. Public information programs
8. School education programs
9. Conservation programs for commercial, industrial, and institutional (CII) accounts
10. Wholesale agency assistance programs
11. Conservation pricing
12. Conservation coordinator
13. Water waste prohibition
14. Residential ULFT replacement programs

The CUWCC is undergoing a process to revise and update these BMPs with input from signatory members, with the aim of completing this process by 2009.

Appendix F

San Jose Municipal Water System
2010 Urban Water Management Plan
Groundwater Management Plan

Santa Clara Valley Water District
Groundwater Management Plan



July 2001

Santa Clara Valley Water District

SANTA CLARA VALLEY WATER DISTRICT

Santa Clara Valley Water District Groundwater Management Plan

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TABLE OF CONTENTS

EXECUTIVE SUMMARY ____ *1*

Chapter 1 ____ *4*

INTRODUCTION ____ *4*
Purpose ____ 4
Background ____ 4
Report Contents ____ 5

Chapter 2 ____ *6*

BACKGROUND ____ *6*
Geography ____ 6
History of the County's Groundwater ____ 7
District History ____ 7
District Board of Directors ____ 9
District System ____ 9
Current Groundwater Conditions ____ 12

Chapter 3 ____ *16*

GROUNDWATER SUPPLY MANAGEMENT ____ *16*
GROUNDWATER RECHARGE ____ 16
Program Objective ____ 16
Background ____ 16
Current Status ____ 16
Future Direction ____ 18
TREATED GROUNDWATER RECHARGE/REINJECTION PROGRAM ____ 18
Program Objective ____ 18
Background ____ 18
Current Status ____ 19
Future Direction ____ 19
WATER USE EFFICIENCY PROGRAMS ____ 19
Recycled Water ____ 19
Program Objective ____ 19
Background ____ 20
Current Status ____ 20
Future Direction ____ 20
Water Conservation Programs ____ 21
Program Objective ____ 21
Background ____ 21
Current Status ____ 22
Future Direction ____ 23
Agricultural Water Efficiency ____ 23
Program Objective ____ 23
Background ____ 23
Current Status ____ 24
Future Direction ____ 24
INTEGRATED WATER RESOURCES PLAN ____ 25
Program Objective ____ 25
Background ____ 25
Current Status ____ 26
Future Direction ____ 27
Additional Groundwater Supply Management Activities ____ 27

Groundwater Modeling 27
Operational Storage Capacity Analysis 27
Subsidence Modeling 28

Chapter 4 ***29***

GROUNDWATER MONITORING PROGRAMS ***29***
GROUNDWATER QUALITY MONITORING 29
Program Objective 29
Background 29
Current Status 29
Future Direction 31
GROUNDWATER ELEVATION MONITORING 32
Program Objective 32
Background 32
Current Status 32
Future Direction 32
GROUNDWATER EXTRACTION MONITORING 34
Program Objective 34
Background 34
Current Status 34
Future Direction 36
LAND SUBSIDENCE MONITORING 36
Program Objective 36
Background 36
Current Status 37
Future Direction 38

Chapter 5 ***39***

GROUNDWATER QUALITY MANAGEMENT PROGRAMS ***39***
NITRATE MANAGEMENT 39
Program Objective 39
Background 39
Current Status 42
Future Direction 43
SALTWATER INTRUSION PREVENTION 43
Program Objective 43
Background 44
Current Status 46
Future Direction 48
WELL CONSTRUCTION/DESTRUCTION PROGRAMS 48
Well Ordinance 48
Program Objective 48
Background 49
Current Status 49
Future Direction 50
Dry Well Program 50
Program Objective 50
Background 50
Current Status 51
Future Direction 51
Abandoned Water Well Destruction Assistance 51
Program Objective 51
Background 51
Current Status 52
Future Direction 53

WELLHEAD PROTECTION 53
Program Objective 53
Background 53
Current Status 53
Future Direction 55
LEAKING UNDERGROUND STORAGE TANK OVERSIGHT 55
Program Objective 55
Background 55
Current Status 57
Future Direction 58
TOXICS CLEANUP 59
Program Objective 59
Background 59
Current Status 59
Future Direction 60
LAND USE AND DEVELOPMENT REVIEW 60
Program Objective 60
Background 60
Current Status 60
Future Direction 61
Additional Groundwater Quality Management Activities 61
Groundwater Guardian Affiliate 61
Comprehensive Reservoir Watershed Management 62
Watershed Management Initiative 62
Non-Point Source Pollution Control 62

Chapter 6 ***63***

SUMMARY ***63***
Groundwater Supply Management 63
Groundwater Monitoring 63
Groundwater Quality Management 64
Recommendations 64

REFERENCES ***67***

ACRONYMS USED

af – acre-feet
BMP – Best Management Practices
CEQA – California Environmental Quality Act
CIMIS – California Irrigation Management Information System
CVP – Central Valley Project
DEIR – Draft Environmental Impact Report
DRASTIC – Depth to water table, net Recharge, Aquifer media, Soil media, Topography, Impact of the vadose zone, and hydraulic Conductivity
DWR – Department of Water Resources
DWSAP – Drinking Water Source Assessment and Protection
EIR – Environmental Impact Report
EPA – Environmental Protection Agency
GIS – Geographic Information Systems
InSAR – Interferometric Synthetic Aperture Radar
IWRP – Integrated Water Resources Plan
LUSTOP – Leaking Underground Storage Tank Oversight Program
MCL – Maximum Contaminant Level
MOU – Memorandum of Understanding
MTBE – Methyl Tert Butyl Ether
NPDES – National Pollution Discharge Elimination System
NTU – Nephelometric Turbidity Unit
PCB - Polychlorinated biphenyl
RWQCB – Regional Water Quality Control Board
SBA – South Bay Aqueduct
SBWRP – South Bay Water Recycling Program
SCRWA – South County Regional Wastewater Authority
SCVWCD – Santa Clara Valley Water Conservation District
SCVWD – Santa Clara Valley Water District
SWRCB – State Water Resources Control Board
USGS – United States Geological Survey
UST – Underground Storage Tank
VOC – Volatile Organic Compound
WHP – Wellhead Protection Program
WMI – Watershed Management Initiative
WTP – Water Treatment Plant

EXECUTIVE SUMMARY

The Santa Clara Valley Water District (District) has managed the groundwater basin in Santa Clara County (County) since the early 1930s and is nationally recognized as a leader in groundwater management. The District works in conjunction with local retailers, the Regional Water Quality Control Board, and other agencies to ensure a safe and healthy supply of groundwater. In 2000, the groundwater basin supplied nearly half of the 390,000 acre-feet used in the County.

The District is the groundwater management agency in Santa Clara County as authorized by the California legislature under the Santa Clara Valley Water District Act (District Act), California Water Code Appendix, Chapter 60. Since its creation, the District has worked to minimize subsidence and protect the groundwater resources of the County under the direction of the District Act. As stated in the District Act, the District's objectives related to groundwater management are to recharge the groundwater basin, conserve water, increase water supply, and to prevent waste or diminution of the District's water supply.

The mission of the District is a healthy, safe, and enhanced quality of living in Santa Clara County through the comprehensive management of water resources in a practical, cost-effective, and environmentally-sensitive manner. In the Global Governance Commitment adopted by the District Board of Directors, it is stated that the conjunctive management of the groundwater basins is an integral part of the District's comprehensive water supply management program.

The District has always effectively managed the groundwater basin to fulfill the objectives of the District Act and its mission. The goal of these groundwater management efforts has been, and continues to be, ***to ensure that groundwater resources are sustained and protected.***

The Groundwater Management Plan formally documents the District's groundwater management goal and describes programs in place that are designed to meet that goal. The following programs are documented in the plan:

- Groundwater supply management programs that replenish the groundwater basin, sustain the basin's water supplies, help to mitigate groundwater overdraft, and sustain storage reserves for use during dry periods.

- Groundwater monitoring programs that provide data to assist the District in evaluating and managing the groundwater basin.

- Groundwater quality management programs that identify and evaluate threats to groundwater quality and prevent or mitigate contamination associated with those threats.

This plan serves as the first step toward a more formal and integrated approach to the management of groundwater programs, and to the management of the basin overall. The

various groundwater management programs and activities described in this document demonstrate that the District is proactive and effective in protecting the County's groundwater resources.

Recommendations

The groundwater management programs described in the Groundwater Management Plan were developed and implemented before the Board of Directors adopted the Ends Policies in 1999, and were therefore not driven by these formally documented ends. As the District is now guided by these policies, we need to ensure that the outcomes of our groundwater management programs match those of the Ends Policies. In addition, we need to ensure that existing programs are integrated and effective in terms of achieving the District's groundwater management goal.

Although the District manages the basin effectively, there is room for improvement of the groundwater management programs in terms of meeting these outcomes. Specific areas where further analysis is recommended include:

1. **Coordination between the Groundwater Management Plan and the Integrated Water Resources Plan (IWRP)** – As the District's water supply planning document through year 2040, the IWRP has identified the operation of the groundwater basin as a critical component to help the District respond to changing water supply and demand conditions. Planning and analysis efforts for future updates of the Groundwater Management Plan and the IWRP need to be integrated in order to provide a coordinated and comprehensive water supply plan for Santa Clara County.

2. **Integration of groundwater management programs and activities** – Individual groundwater management programs tend to be implemented almost independently of other programs. A more integrated approach to the management of these programs, and to the management of the basin overall needs to be developed. Integration of these programs and improved conjunctive use strategies will result in more effective basin management.

3. **Optimization of recharge operations** – As artificial recharge is critical to sustaining groundwater resources, an analysis of the most effective amount, location, and timing of recharge should be conducted.

4. **Improved understanding of the groundwater basin** – In general, the existing groundwater management programs seem to focus on managing the basin to meet demands and protecting the basin from contamination and the threat of contamination. However, improving the District's understanding of the complexity of the groundwater basin is critical to improved groundwater management. The more we know about the basin, the better we can analyze the impact of different groundwater scenarios and management alternatives.

5. **Effective coordination and communication with internal and external agencies** – Improved communication and coordination will lead to improved groundwater

management programs. Increased sharing of ideas, knowledge, and technical expertise among people involved with groundwater at the District will result in increased knowledge, well-coordinated and efficient work, and well-informed analyses and conclusions. Improved coordination with external agencies, such as retailers and state and federal organizations, will result in improved knowledge of customer needs and increased awareness of District activities.

A detailed analysis of these areas and of all groundwater programs as they relate to the Ends Policies and the groundwater management goal is recommended. District staff have already begun to address some of these issues, which will be fully discussed in the first update to the Groundwater Management Plan. The update, which is scheduled for 2002, will fully address the issues above and the overall management of the basin by presenting a formal groundwater management strategy. The update will evaluate each groundwater program's contribution and effectiveness in terms of the groundwater management goal and outcomes directed by the Ends Policies. If there is no direct connection between the Ends Policies and a specific program, that program's contribution to other linked programs will be analyzed. The update will include recommendations for changes to existing programs or for the development of new programs, standards, or ordinances. The update will also develop an integrated approach for the management of groundwater programs, and for the management of the groundwater basin in general.

Groundwater is critical to the water supply needs of Santa Clara County. Therefore, it is of the utmost importance that the District continues the progress begun with this Groundwater Management Plan. Increased demands and the possibility of reduced imported water in the future make effective and efficient management of the groundwater basin essential. The Groundwater Management Plan and future updates will identify how the management of the groundwater basin can be improved, thereby ensuring that groundwater resources will continue to be sustained and protected.

Chapter 1
INTRODUCTION

The Santa Clara Valley Water District (District) has managed the groundwater basin in Santa Clara County (County) since the early 1930s and is nationally recognized as a leader in groundwater management. Effective management of the groundwater basin is essential, as the groundwater basin provides nearly half of the County's overall water supply. Since its creation, the District has implemented numerous groundwater management programs and activities to manage the basin and to ensure a safe and healthy supply of groundwater.

Purpose

The purpose of this Groundwater Management Plan is to describe existing groundwater management programs and to formally document the District's groundwater management goal of ensuring that groundwater resources are sustained and protected. The following groundwater management programs are documented in this plan:

- Groundwater supply management programs that replenish the groundwater basin, sustain the basin's water supplies, help to mitigate groundwater overdraft, and sustain storage reserves for use during dry periods.

- Groundwater monitoring programs that provide data to assist the District in evaluating and managing the groundwater basin.

- Groundwater quality management programs that identify and evaluate threats to groundwater quality and prevent or mitigate contamination associated with those threats.

Background

The District is the groundwater management agency in Santa Clara County as authorized by the California legislature under the Santa Clara Valley Water District Act (District Act), California Water Code Appendix, Chapter 60. Since its creation, the District has worked to minimize subsidence and protect the groundwater resources of the County under the direction of the District Act. As stated in the District Act, the District's objectives related to groundwater management are to recharge the groundwater basin, conserve water, increase water supply, and to prevent waste or diminution of the District's water supply. The District Act also provides the District with the authority to levy groundwater user fees and to use those revenues to manage the County's groundwater resources.

The mission of the District is a healthy, safe, and enhanced quality of living in Santa Clara County through the comprehensive management of water resources in a practical, cost-effective, and environmentally-sensitive manner. As part of the District's Global Governance Commitment adopted by the Board of Directors, "the District will provide a healthy, clean, reliable, and affordable water supply that meets or exceeds all applicable water quality regulatory standards in a cost-effective manner. Utilizing a variety of water supply sources and strategies, the District will pursue a comprehensive water

management program both within the county and statewide that reflects its commitment to public health and environmental stewardship." The policy also states that the conjunctive management of the groundwater basins to be an integral part of the District's comprehensive water supply management program.

The District has always effectively managed the groundwater basin to fulfill the objectives of the District Act and its mission. The goal of these efforts has been, and continues to be, to sustain and protect groundwater resources.

This Groundwater Management Plan is the District's first step toward a more formal and integrated approach to groundwater management. This Groundwater Management Plan describes existing groundwater management programs and formally documents the District's groundwater management goal, which is ***to ensure that groundwater resources are sustained and protected.***

Report Contents

The structure of the Groundwater Management Plan is outlined below. Chapters 3 through 5, which pertain to specific groundwater management programs, are organized to provide program objectives, related background information, the current status of the program, and information on the future direction of each program.

- Chapter 1 (this Introduction)

- Chapter 2 describes the geography and geology of the County as well as the history of local groundwater use. The chapter also describes the development of District facilities, and explains the various components of the existing water conservation and distribution system. A brief discussion on current groundwater conditions is also presented.

- Chapter 3 describes District groundwater supply management programs that replenish the groundwater basin, sustain the basin's supplies, and/or help in mitigating groundwater overdraft. In addition, the chapter summarizes the role of groundwater in the District's overall water supply outlook, and describes water use efficiency programs for groundwater users.

- Chapter 4 describes groundwater monitoring programs that provide data to assist the District in evaluating groundwater basin management.

- Chapter 5 describes groundwater quality management programs that evaluate groundwater quality and protect the groundwater from contamination and the threat of contamination.

- Chapter 6 summarizes existing groundwater management programs and activities designed to sustain and protect groundwater resources and provides recommendations for future work.

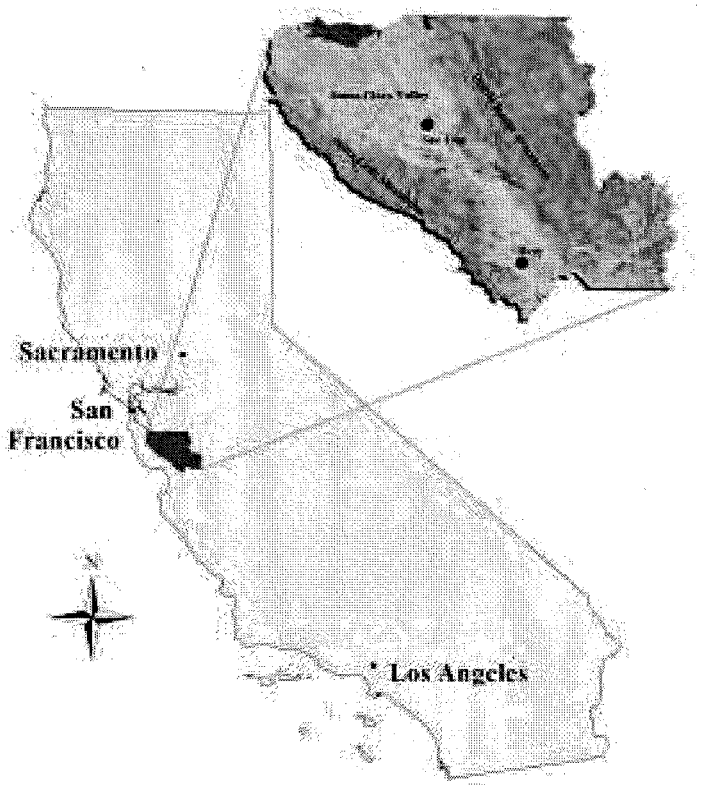
Chapter 2
BACKGROUND

This chapter describes the study area as well as the history of local groundwater use and the development of District facilities. Various components of the District's existing water conservation and distribution system are also described. A brief discussion on current groundwater conditions is also presented.

Geography

Santa Clara County is located at the southern tip of the San Francisco Bay. It encompasses approximately 1,300 square miles, making it the largest of the nine Bay Area counties. The County contributes about one fourth of the Bay Area's total population and more than a quarter of all Bay Area jobs.

Figure 2-1
Location of Santa Clara County



The County boasts a combination of physical attractiveness, economic diversity, and numerous natural amenities. Major topographical features include the Santa Clara Valley, the Diablo Range to the east, and Santa Cruz Mountains to the west. The Baylands lie in the northwestern part of the County, adjacent to the waters of the southern San Francisco Bay.

History of the County's Groundwater

Water has played an important part in the development of Santa Clara County since the arrival of the Spaniards in 1776. Unlike the indigenous peoples, who for thousands of years depended upon the availability of wild food, the Spaniards cultivated food crops and irrigated with surface water. Population growth and the United States' conquest of the area in 1846 increased the demand for these crops, which forced the use of the groundwater basin. Groundwater was drawn to the surface by windmill pumps or flowed up under artesian conditions. The first well was drilled in the early 1850s in San Jose.

By 1865, there were close to 500 artesian wells in the valley and already signs of potential misuse of groundwater supplies. In the valley's newspapers a series of editorials and letters appeared which complained of farmers and others who left their wells uncapped, and blamed them for a water shortage and erosion damage to the lowlands.

As a result of several dry years in the late 1890s, more and more wells were sunk. Dry winters in the early 1900s were accompanied by a growing demand for the County's fruits and vegetables, which were irrigated with groundwater. This trend of increased irrigation and well drilling continued until 1915. During this period, less water replenished the groundwater basin than was taken out, causing groundwater levels to drop rapidly.

In 1913 a group of farmers asked the federal government for relief from the increased cost of pumping that resulted from a lower groundwater table. The farmers formed an irrigation district to investigate possible reservoir sites; however, the following year was wet and no action was taken. It was not until 1919 that the Farm Owners and Operators Association presented a resolution to the County Board of Supervisors expressing their strong opposition to the waste resulting from the use of artesian wells, and again raised the issue of building dams to supplement existing water supplies. By that year subsidence of 0.4 ft had occurred in San Jose. Between 1912 and 1932 subsidence ranged from 0.35 ft in Palo Alto to 3.66 ft in San Jose.

In 1921, a report was presented to the Santa Clara Valley Water Conservation Committee showing that far more water was being pumped from the ground than nature could replace. The committee planned to form a water district that differed from others in the state by having a provision for groundwater recharge. Their effort to form the water district failed, but they were able to implement several water recharge and conservation programs. It was not until 1929 that the County's voters approved the Santa Clara Valley Water Conservation District (SCVWCD), with the initial mission of stopping groundwater overdraft and ground surface subsidence.

District History

The SCVWCD was the forerunner of today's District, which was formed through the consolidation and annexation of other flood control and water districts within Santa Clara County. By 1935, the District had completed the construction of Almaden, Calero, Guadalupe, Stevens Creek, and Vasona dams to impound winter waters for recharge into percolation facilities during the summer. Later dams completed include Coyote in 1936, Anderson in 1950 and Lexington in 1952. The Gavilan Water District in the southern

portion of the County constructed Chesbro Dam in 1955 and Uvas Dam in 1957. These dams enabled the District to capture surface water runoff and release it for groundwater recharge.

The late 1930s to 1947 marked a period of recovery in groundwater levels that reduced subsidence. In 1947 conditions became dry, groundwater levels declined rapidly and subsidence resumed. In 1950 almost all of the County's water requirements were met by water extracted from the groundwater basin. This resulted in an all-time low water level in the northern subbasin.

In 1952, the first imported water was delivered by the water retailers in northern Santa Clara County through the Hetch-Hetchy southern aqueduct. By 1960, the population of the County had doubled from that of 1950. To supply this growth, groundwater pumping increased and groundwater levels continued to decline. By the early 1960s, it was evident that the combination of Hetch-Hetchy and local water supplies could not meet the area's water demands, so the District contracted with the state to receive an entitlement of 100,000 acre-feet (af) per year through the South Bay Aqueduct (SBA).

The SBA supply could not be fully utilized for recharge in the groundwater basin. Hence, to supplement the basin, the District constructed its first water treatment plant (WTP), Rinconada. In 1967, the District started delivering treated surface water to North County residents (North County refers to the Santa Clara Valley Subbasin), thus reducing the need for pumping. This led to a recovery of groundwater levels and reduced the rate of subsidence as well.

From 1960 to 1970 the County's population nearly doubled yet again. The semiconductor and computer manufacturing industries contributed to almost 34 percent of the job growth between 1960 and 1970. Population growth and economic diversity seemed especially important to Santa Clara County, which had been predominantly agricultural. This transformation was not without its problems. In the early 1980s a major underground tank storing a solvent for a manufacturing process in south San Jose was discovered to be leaking and the District's attention focused on water quality of the groundwater basin.

The growth and prosperity of the County continued, and jobs grew 39 percent between 1970 and 1980. In 1974, Penitencia (the District's second WTP) started delivering treated water. Groundwater pumping accounted for about half of the total water use by the mid-1980s. The rate of subsidence was reduced to about 0.01 ft/year compared to 1 ft/year in 1961. To provide a reliable source of supply the District contracted with the federal government for the delivery of an entitlement of 152,500 af per year of imported water from the Central Valley Project (CVP) through the San Felipe Project. The first delivery of San Felipe water took place in 1987, but it was not until 1989 that the District's Santa Teresa WTP was began operating to fully utilize this additional source of imported supply. Since the 1980s, the population of Santa Clara County has continued to increase, and the change in land use toward urbanization has continued.

District Board of Directors
The District is governed by a seven-member Board of Directors. Five of the members are elected, one from each of the five County supervisorial districts, and the remaining two directors are appointed by the Santa Clara County Board of Supervisors to represent the County at large. The directors serve overlapping four-year terms.

The Board establishes policy on the District's mission, goals, and operations and represents the general public in deciding issues related to water supply and flood control. The Board also has the authority to adopt ordinances that have the force of law within the District. The Board reviews staff recommendations and decides which policies should be implemented in light of the District's mission and goals. The Board also monitors the implementation of its policies, and supervises management to see that work is accomplished on time and efficiently.

The Board of Directors holds biweekly public meetings, at which the public is given the opportunity to express opinions or voice concerns. In addition, the public can participate in the annual process of groundwater rate setting through public hearings.

The Board of Directors identifies the conjunctive management of the groundwater basins to maximize water supply reliability as an integral part of the District's commitment to a comprehensive water management program.

District System
As a water resource management agency for the entire County, the District provides a reliable supply of high-quality water to 13 private and public water retailers serving more than 1.7 million residents, and to private well owners who rely on groundwater.

The District operates and maintains a Countywide conservation and distribution system to convey raw water for groundwater recharge and treated water for wholesale to private and public retailers. The components of this distribution system are described in detail below.

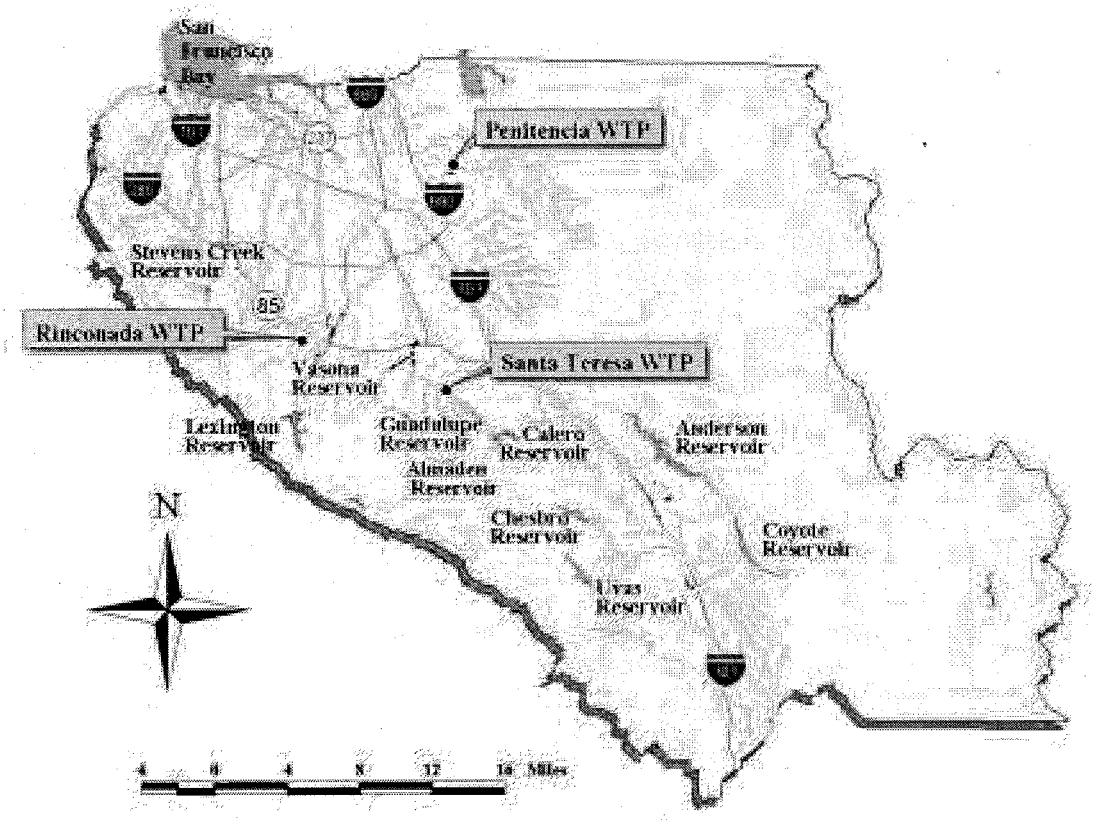
Reservoirs
Local runoff is captured in reservoirs within the County with a combined capacity of about 169,000 af. The stored water is released for beneficial use at a later time. The District's reservoirs are described in Table 2-1 and are shown in Figure 2-2.

Treatment Plants
The District also operates three water treatment plants (WTPs): Rinconada, Penitencia, and Santa Teresa. These facilities are all connected by five major raw water conduits, which also connect the two imported raw water sources from the State Water Project (SWP) and the CVP. Two pumping plants (Coyote and Vasona) provide the lifts required for conveyance during peak usage.

Table 2-1
District Reservoirs

Reservoir	*Capacity(af)*	*Year Completed*	*Surface Area (ac)*	*Dam Height (ft)*
Almaden	*1,586*	*1935*	*59*	*108*
Anderson	*89,073*	*1950*	*1,245*	*240*
Calero	*10,050*	*1935*	*347*	*98*
Chesbro	*8,952*	*1955*	*265*	*95*
Coyote	*22,925*	*1936*	*648*	*138*
Guadalupe	*3,228*	*1935*	*79*	*129*
Lexington	*19,834*	*1952*	*475*	*195*
Stevens Creek	*3,465*	*1935*	*91*	*129*
Uvas	*9,935*	*1957*	*286*	*105*
Vasona	*400*	*1935*	*57*	*30*

Figure 2-2
District Reservoir Locations



Recharge Facilities
The Districts operates and maintains 18 major recharge systems, which consist of a combination of off-stream and in-stream facilities. These systems have a combined pond surface recharge area of more than 390 acres, and contain over 30 local creeks for artificial in-stream recharge to replenish the groundwater basin. The total annual average recharge capacity of these systems is 157,200 af.

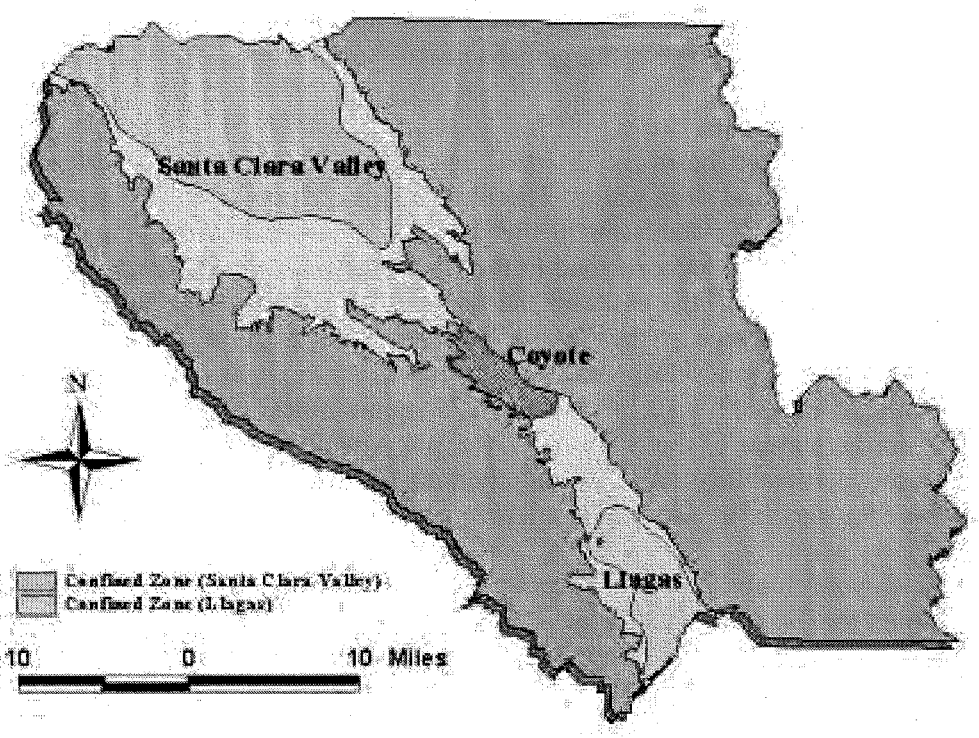
Groundwater Basins
The groundwater basin is divided into three interconnected subbasins that transmit, filter, and store water. These subbasins are portrayed in Figure 2-3. The Santa Clara Valley Subbasin in the northern part of the County extends from Coyote Narrows at Metcalf road to the County's northern boundary. The Diablo Range bounds it on the east and the Santa Cruz Mountains on the west. These two ranges converge at the Coyote Narrows to form the southern limits of the subbasin. The Santa Clara Valley Subbasin is approximately 22 miles long and 15 miles wide, with a surface area of 225 square miles. A confined zone within the northern areas of the subbasin is overlaid with a series of clay layers resulting in a low permeability zone. The southern area is the unconfined zone, or forebay, where the clay layer does not restrict recharge.

The Coyote Subbasin extends from Metcalf Road south to Cochran Road, where it joins the Llagas Subbasin at a groundwater divide. The Coyote Subbasin is approximately 7 miles long and 2 miles wide and has a surface area of approximately 15 square miles. The subbasin is generally unconfined and has no thick clay layers. This subbasin generally drains into the Santa Clara Valley Subbasin.

The Llagas Subbasin extends from Cochran Road, near Morgan Hill, south to the County's southern boundary. It is connected to the Bolsa Subbasin of the Hollister Basin and bounded on the south by the Pajaro River (the Santa Clara - San Benito County line). The Llagas Subbasin is approximately 15 miles long, 3 miles wide along its northern boundary, and 6 miles wide along the Pajaro River. A series of interbedded clay layers, which extends north from the Pajaro River, divides this subbasin into confined and forebay zones.

The three subbasins serve multiple functions. They transmit water through the gravelly alluvial fans of streams into the deeper confined aquifer of the central part of the valley. They filter water, making it suitable for drinking and for municipal, industrial, and agricultural uses. They also have vast storage capacity, together supplying as much as half of the annual water needs of the County. In 2000, the groundwater basin supplied 165,000 acre-feet of the total water use of 390,000 acre-feet.

Figure 2-3
Santa Clara County Groundwater Subbasins



Current Groundwater Conditions

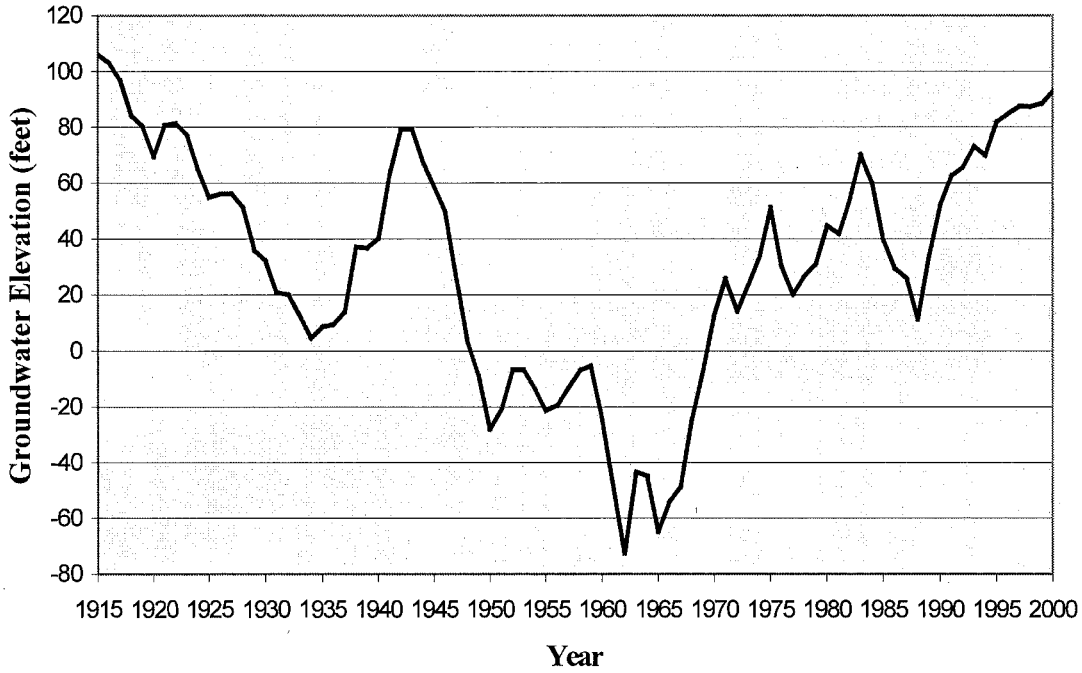
Groundwater conditions throughout the County are generally very good, as District efforts to prevent groundwater basin overdraft, curb land subsidence, and protect water quality have been largely successful. Groundwater elevations are generally recovered from overdraft conditions throughout the basin, inelastic land subsidence has been curtailed, and groundwater quality supports beneficial uses. The District evaluates current groundwater conditions based on the results of its groundwater monitoring programs, which are described in Chapter 4 of this plan.

Groundwater Elevations

Groundwater elevations are affected by natural and artificial recharge and groundwater extraction, and are an indicator of how much groundwater is in storage at a particular time. Both low and high elevations can cause severe, adverse conditions. Low groundwater levels can lead to land subsidence and high water levels can lead to nuisance conditions for below ground structures.

Figure 2-4 shows groundwater elevations in the San Jose Index Well in the Santa Clara Valley Subbasin. While groundwater elevations in the well are not indicative of actual groundwater elevations throughout the County, they demonstrate relative changes in groundwater levels.

Figure 2-4
Groundwater Elevations in San Jose Index Well



Land Subsidence
Land subsidence occurs in the Santa Clara Valley when the fluid pressure in the pores of aquifer systems is reduced significantly by overpumping, resulting in the compression of clay materials and the sinking of the land surface. Historically, the Santa Clara Valley Subbasin has experienced as much as 13 feet of inelastic, or nonrecoverable, land subsidence that necessitated the construction of additional dikes, levees, and flood control facilities to protect properties from flooding. The costs associated with inelastic land subsidence are high, as it can lead to saltwater intrusion that degrades groundwater quality and flooding that damages buildings and infrastructure. However, imported water from the State Water Project and Central Valley Project has increased District water supplies, reducing the demand on the groundwater basin, and providing water for the recharge of the basin. As a result, the rate of inelastic land subsidence has been curtailed to less than 0.01 feet per year.

Groundwater Quality
Natural interactions between water, the atmosphere, rock minerals, and surface water control groundwater quality. Anthropogenic (man-made) compounds released into the environment, such as nitrogen-based fertilizer, solvents, and fuel products, can also affect groundwater quality. Groundwater quality in the Santa Clara Valley Subbasin is generally high. Drinking water standards are met at public water supply wells without the use of treatment methods.

A few water quality problems have been detected. High mineral salt concentrations have been identified in the upper aquifer zone along San Francisco Bay, the lower aquifer zone underlying Palo Alto, and the southeastern portion of the forebay area of the Santa Clara Valley Subbasin. Nitrate concentrations in the South County (Coyote and Llagas Subbasins) are elevated and high nitrate concentrations are sporadically observed in the Santa Clara Valley Subbasin. Lastly, even though Santa Clara County is home to a large number of Superfund sites, there are few groundwater supply impacts from the chemicals from these sites; volatile organic compounds VOCs) are intermittently detected at trace concentrations in public water supply wells. In four wells, such contamination has been severe enough to cause the wells to be destroyed. Overall, the District's groundwater protection programs, including its well permitting, well destruction, and leaking underground storage tank programs, have been effective in protecting the groundwater basin from contamination.

Water quality data for common inorganic compounds during the period from 1997 through 2000 are summarized in Table 2-2. The typical concentration ranges were computed using standard statistical methods. Organic compounds were nondetectable in almost all wells and below drinking water standards in all wells. Data for organic compounds, including MTBE, solvents, and pesticides is not shown in Table 2-2 due to the large number of compounds.

Table 2-2
Summary of Santa Clara County Groundwater Data (1997-2000) and Water Quality Objectives[a]

Constituents	Santa Clara Valley Subbasin		Coyote Subbasin	Llagas Subbasin	Drinking Water Standard	Ag. Objective[f]
	Principal Aquifer Zone[d]	Upper Aquifer Zone[d]				
Chloride (mg/l)	40 – 45	92 – 117	16 – 27	24 -52	500[c,e]	355
Sulfate (mg/l)	37 – 41	106 – 237	32 - 65	32 -65	500[c,e]	-
Nitrate (mg/l)	15 – 18	0.002 – 4	12 -38	44 -47	45[b]	30
Total Dissolved Solids (mg/l)	366 – 396	733 – 1210	250 - 490	320 -540	1000[c,e]	10,000
Sodium Adsorption Ratio	0.89 - 1.26	1.23 - 3.84	NA	NA	-	9
Electrical Conductance (uS/cm at 25 C)	596 - 650	1090 – 1590	375 - 391	500 - 715	1600[c,e]	3000
Aluminum (ug/l)	6 - 18	23 – 97	<5 - 86	5 -51	1000[b]	20,000
Arsenic (ug/l)	0.7- 1.2	1.2 – 3.7	<2	<2	50[b]	500
Barium (ug/l)	141 - 161	60 – 220	71 - 130	99 - 180	1000[b]	-
Boron (ug/l)	115 - 150	200 – 523	81 - 119	82 -159	-	500
Cadmium (ug/l)	<1	<0.5	< 0.5	<0.5	5[b]	500
Chromium (ug/l)	6 – 8	0.5 – 1.8	0.5 - 10	2 - 10	50[b]	1000
Copper (ug/l)	1.9 – 4.4	0.3 – 1	<1 - 50	0.75 – 3.90	1000[c]	-
Fluoride (mg/l)	0.13 – 0.16	0.15 – 0.3	0.12 – 0.21	0.12 – 0.17	1.8[b]	15
Iron (ug/l)	10 – 38	40 – 160	19 - 100	14 - 170	300[c]	20,000
Lead (ug/l)	0.2 – 1.1	<0.5	<2	<2	50[b]	10,000
Manganese (ug/l)	.15 – 1.5	120 – 769	<0.5 - 29	0.86 - 21	50[c]	10,000
Mercury (ug/l)	<1	<0.2	<0.2	<0.2	2[b]	-
Nickel (ug/l)	1.8 – 3.4	4 – 10	<2- 10	<2 - 10	100[b]	2000
Selenium (ug/l)	2.5 – 3.8	0.4 – 2	<2	<2	50[b]	20
Silver (ug/l)	<5	<0.5	<0.5	<0.5	100[b]	-
Zinc (ug/l)	3 – 8	3 - 13	<50	10 - 32	500[c]	10,000

[a] For common inorganic water quality constituents
[b] Maximum Contaminant Level as specified in Table 64431-A of Section 64431, Title 22 of the California Code of Regulations
[c] Secondary Maximum Contaminant Level as specified in Table 64449-B of Section 64449, Title 22 of the California Code of Regulations
[d] Typical range = approximate 95% Confidence Interval estimate of the true population median
[e] Upper limit of secondary drinking water standard
[f] Taken from the Water Quality Control Plan for the San Francisco Bay Basin, 1995 Regional Water Quality Control Boards

Chapter 3
GROUNDWATER SUPPLY MANAGEMENT

This chapter covers the District programs that relate to groundwater supply management. It describes the District's groundwater recharge, treated groundwater recharge/reinjection, and water use efficiency programs. It also summarizes the role of the groundwater basin in terms of the District's overall water supply plan, the Integrated Water Resources Plan (IWRP). Groundwater supply management programs support the District's groundwater management goal by sustaining the basin's groundwater supplies, mitigating groundwater overdraft, minimizing land subsidence, protecting recharge and pumping capabilities, and sustaining storage reserves for use during dry periods.

Future efforts in groundwater supply management will include strengthening the District's groundwater recharge program so that the District makes the most effective use of its resources with regard to the amount, location, and timing of groundwater recharge.

GROUNDWATER RECHARGE

Program Objective

The objective of the Groundwater Recharge Program is to sustain groundwater supplies through the effective operation and maintenance of District recharge facilities.

Background

Groundwater recharge is categorized as either natural recharge or facility recharge. The District defines "natural" groundwater recharge to be any type of recharge not controlled by the District. Sources may include rainfall, net leakage from pipelines, seepage from surrounding hills, seepage into and out of the groundwater basin, and net irrigation return flows to the basin. Facility recharge consists of controlled and uncontrolled recharge through District facilities, which include about 90 miles of stream channel and 71 off-stream recharge ponds. Controlled recharge refers to the active and intentional recharge of the basin by releases from reservoirs or the distribution system. Uncontrolled recharge occurs through District facilities, such as creeks, but refers to recharge that would occur without any action on the part of the District. This includes natural recharge through streams as a result of rainfall and runoff. This section focuses exclusively on controlled and uncontrolled facility recharge.

Current Status

The District's current recharge program is accomplished by releasing locally conserved water and imported water to District in-stream and off-stream recharge facilities.

In-stream Recharge

The controlled in-stream recharge accounts for approximately 45 percent of groundwater recharge through District facilities. In-stream recharge occurs along stream channels in the alluvial plain, upstream of the confined zone that eventually reaches the drinking water aquifer. The District can release flow for

recharge into 80 of the 90 miles of streams. Uncontrolled in-stream recharge accounts for approximately 20 percent of groundwater recharge.

Spreader dams have been a key component of the in-stream recharge program. These temporary or permanent dams are constructed within streambeds to impound water in the channels and increase recharge rates via percolation through stream banks. The use of spreader dams increases in-stream recharge capacity by about 15,000 af, or approximately ten percent. Spreader dams have been constructed at 60 or more sites since they were first employed in the 1920s.

Off-stream Recharge
The off-stream recharge accounts for approximately 35 percent of groundwater recharge through District facilities. The off-stream facilities include abandoned gravel pits and areas excavated specifically as recharge ponds. Ponds range in size from less than 1 acre to more than 20 acres. The District operates 71 off-stream ponds in 18 major recharge systems with a cumulative area of about 393 acres. Locally conserved and imported water is delivered to these ponds by the raw water distribution system.

Off-stream recharge facilities are generally operated in one of two modes: constant head mode or wet/dry cycle mode. The District most often uses the constant head mode, which involves filling the pond and maintaining inflow at a rate equal to the recharge rate of the pond. This operation is continued until the recharge rate of the pond has decreased to an unacceptable rate. In order to maintain high recharge rates, ponds are cleaned periodically. Pond cleaning is generally considered when the recharge rate has decreased by about 75 percent. The pond is then emptied and any sediment cleaned out. In some cases, the pond is emptied and allowed to dry out and the recharge operation is restarted without cleaning. However, this typically results in a slightly reduced recharge rate. The recharge rates of the District's ponds generally range from 1 af/acre/day to about 2 af/acre/day, although some ponds have rates up to 5 af/acre/day.

In the constant head mode, algae and weed growth generally occurs. The algae growth varies according to sunlight, water temperature, nutrients and other factors. As the algae dies, it falls to the pond bottom, also contributing to a reduced recharge rate. The algae are generally controlled using chemical additives. Using deeper ponds can also reduce algae growth, as ponds in the range of 13 to 15 feet deep do not support algae growth as rapidly as shallower ponds.

Water Quality
High turbidity of incoming water results in a rapid decrease of recharge rates. In order to increase recharge pond efficiency, the District works to reduce turbidity levels with coagulants, simple mixing procedures, settling basins and skimming weirs. At most facilities, water with turbidity levels up to about 100 Nephelometric Turbidity Unit (NTU) can be treated effectively. Water with turbidity levels of less than 10 NTU is usually not treated. Each NTU represents

several pounds of fine-grained material per acre-foot of water. Allowable influent turbidity levels may depend on the availability of water.

Monitoring
Recharge facilities are monitored around the clock by operations center personnel using a computerized control system, and in the field by technicians. The raw water control system provides for remote operation of water distribution facilities and real-time system performance data. Operations technicians perform daily inspection of recharge facilities and record flows and water levels.

A periodic water balance is performed to reconcile all measured imported water, inflows, releases and changes in surface water storage. The results of this balance become the final accounting for distribution and facility processing. The data is used for water rights reporting, accounting for usage of federal water, for facility performance measurement purposes, and for the groundwater basin water budget.

Future Direction
Although spreader dams have traditionally been a key component of the in-stream recharge program, their use has been limited significantly because of more stringent permitting due to fish and wildlife concerns.

The District has completed the feasibility testing of a direct injection facility to increase recharge and has completed construction of a full-scale well. The injection well has a capacity of 750 af/year and will be supplied with water treated at the Rinconada WTP. The potential for additional direct injection facilities may be evaluated in the future.

TREATED GROUNDWATER RECHARGE/REINJECTION PROGRAM

Program Objective
The objective of the Treated Groundwater Recharge/Reinjection Program is to encourage the reuse or recharge of treated groundwater from contamination cleanup sites in order to enhance cleanup activities and protect the County's groundwater resources.

Background
District Resolution 94-84 encourages the reuse or recharge of treated groundwater from groundwater contamination cleanup projects and provides a financial incentive program to qualifying cleanup project sponsors. Sponsors must document that all non-potable demands are satisfied to the maximum extent possible prior to injecting any water into the aquifer. All injected water must be recovered by the pump-and-treat cleanup activities at the site.

Each application is processed within 45 working days. Once an applicant has met the qualifying conditions and is accepted, a legal contract is prepared and signed by the District and the clean-up project sponsor. This contract details how the sponsor will

receive a financial incentive from the District. The sponsor is responsible for providing periodic updates on the amount and quality of water reinjected/recharged.

Current Status
The amount of this financial incentive is equivalent to the basic groundwater user rate. IBM (San Jose) is currently recharging between 900 and 1,000 af per year, and is the only approved sponsor currently injecting/recharging groundwater and receiving this financial incentive.

Future Direction
Any future applications will be evaluated rigorously with respect to overall groundwater basin management to ensure that the groundwater basin will not be adversely impacted.

WATER USE EFFICIENCY PROGRAMS

The District's Water Use Efficiency Programs are designed to promote more effective use of the County's water supplies. The District's demand management measures are described in the Water Conservation and Agricultural Water Efficiency sections that follow the discussion of Recycled Water. The District's commitment to increasing the use of recycled water within the County will also help the District to more effectively use the County's water.

Recycled Water

Program Objective
The objective of the Recycled Water Program is to increase the use of recycled water, thereby promoting more effective use of the County's water supplies. To meet this objective, the District is forming partnerships with the four sewage treatment plant operators in the County and is taking every opportunity to expand the distribution and use of tertiary treated recycled water for non-potable uses. Present efforts focus on planning for future uses in agriculture, industry, commercial irrigation, and indirect potable reuse. To meet the objective of increasing the use of recycled water, the District is:

- Partnering with and providing rebates to the South Bay Water Recycling Program (SBWRP) which includes the cities of San Jose, Santa Clara and Milpitas.

- Operating and expanding the South County Recycled Water System as the recycled water wholesaler in the area. Formal agreements with the recycled water producer, the South County Regional Wastewater Authority (SCRWA), and the recycled water retailer, the City of Gilroy, are in place.

- Providing the City of Sunnyvale a rebate on the recycled water delivered each year.

- Meeting with the City of Palo Alto and their stakeholder group to help plan for expanded future use of recycled water in the North County.

- Contracting a consultant to perform a feasibility study on Advanced Treated Recycled Water.

Background
The District has been involved in water recycling since the 1970s when it supported research in Palo Alto and partnered in the establishment of the South County distribution system in Gilroy. Since the early 1990s, the District has become involved in an ever-increasing role. Recycled water use in the County has grown from about 1,000 af in 1990 to over 6,000 af in the year 2000. To encourage the use of recycled water, in 1993 the District started providing rebates to agencies delivering recycled water.

The largest system for recycled water distribution is the South Bay Water Recycling Program, which has over 60 miles of distribution pipelines and serves over 300 customers. The District continues a partnership with the SBWRP in its planning effort for expansion. In 1999, the District formalized its partnership with the South County Regional Wastewater Authority and the cities of Gilroy and Morgan Hill to plan and operate the recycled water distribution system in South County. Since then, the District has begun construction on major pumping and reservoir facilities to modernize the system.

Current Status
The District is expanding its planning efforts and is continuing discussions with the SBWRP for expanding the use of recycled water. This will involve transporting recycled water south from the existing pipeline in south San Jose in order to supply agricultural and industrial customers that now use groundwater or untreated surface water. The City of San Jose, who administers the SBWRP, has installed several groundwater monitoring wells at the District's request in order to monitor potential changes in groundwater quality as a result of the application of recycled water for irrigation.

The District continues to modernize and expand the South County Recycled Water System. Besides serving golf courses and parks, expansion of this system will involve delivering water to industrial and agricultural users. District staff has inventoried the volume of use and location of the largest groundwater and surface water users in the area and is beginning a marketing study for expansion of the system. The District is also working with the City of Gilroy to plan for the connection of new large water use developments to the system.

A project has been initiated to study the feasibility of installing a pilot plant for the advanced treatment of recycled water for use in agriculture, commercial irrigation, industry, and possibly for future streamflow augmentation and groundwater replenishment.

Future Direction
The future direction of the recycled water program is driven by District Board policy, which directs staff to increase recycled water use to 5% of total water use in the County by the year 2010 and to 10% of total use by the year 2020. To meet this goal, it is assumed that a countywide network of recycled water distribution systems will be

developed. The initial stage will provide for a major transmission main from the area of south San Jose in the SBWRP service area to the major commercial and agricultural customers in South County. Developing advanced treatment methods and facilities to provide recycled water of a higher quality standard than the present tertiary treatment will be required in order to meet the needs of some potential customers. Methods and facilities to blend recycled water with untreated surface water and with groundwater will also need to be developed in order to provide for peaking factors and the quality requirements of some customers. Additional research on the most effective method of advanced treatment and ways to develop more industrial use and onsite treatment of recycled water will be performed.

District efforts to expand recycled water use within Santa Clara County will be coordinated with the District's Integrated Water Resources Plan which will evaluate the various options for obtaining the additional water the County will require in future years. This effort will evaluate the comparative costs and benefits of recycled water, water conservation, water banking, and water transfers. District staff will work with partnering agencies to ensure that any potential uses of recycled water will not adversely impact the groundwater basin or recharge and extraction capabilities.

Water Conservation Programs

Program Objective

The objective of the Water Conservation Program is to promote more efficient use of the County's water resources and to reduce the demands placed on the District's water supplies. To meet this objective, the District has implemented a variety of programs designed to increase water use efficiency in the residential, commercial, industrial, and agricultural sectors, which all rely, in part, on extraction from the groundwater basin.

Background

The District's Water Conservation Program has been developed in large part to comply with the Best Management Practices (BMPs) commitments, defined in the 1991 Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California. The program targets residential, commercial/industrial/institutional, and agricultural water use.

The District has promoted conservation of the County's water supplies since its creation. However, a series of drought years between 1987 and 1992 prompted the District and local water retailers to significantly increase conservation efforts. The District enjoys a special cooperative partnership with the water retailers in regional implementation of the BMPs; several program elements were developed in partnership with the local water retailers. Water retailers have partnered with the District in marketing efforts for cooperative programs and in the distribution of water-saving devices such as showerheads and aerators.

Current Status

The Water Conservation Program has designed programs aimed specifically at residential, commercial, and agricultural users. Residential programs include:

- Water-Wise House Call Program designed to measure residential water use and provide recommendations for improved efficiency.
- Showerhead/Aerator Retrofit Distribution Program, which provides free showerheads and aerators to replace less efficient devices.
- Clothes Washer Rebate Program for the installation of high-efficiency washing machines.
- Landscape workshops focused on water efficient landscape and irrigation design.
- Ultra-Low-Flush Toilet (ULFT) Program (free or low-cost).
- Multi-Family Submeter Pilot Program aimed at reducing water use in multi-family dwellings.
- Education programs in English and Spanish, including the distribution of literature, promotion of water conservation at organized events, and the survey program.

District programs targeting water conservation in the commercial sector include:

- Irrigation Technical Assistance Program (ITAP) designed to help large landscape managers improve irrigation efficiency through free site evaluations.
- Commercial Clothes Washer Rebate Program, in conjunction with PG&E, San Jose/Santa Clara Water Pollution Control Plant, and the City of Santa Clara.
- Project WET (Water Efficient Technologies), which offers rebates to commercial and industrial customers for the reduction of water use and wastewater discharges (in conjunction with the City of San Jose).
- Ultra-Low-Flush Toilet Retrofit Program in conjunction with the San Jose/Santa Clara Water Pollution Control Plant.
- Irrigation Submeter Program to encourage better water management at large commercial sites.

The District has also implemented several programs to promote water use efficiency in the agricultural sector, which relies mainly on the groundwater basin for its water needs. These programs are discussed in the following section of this report.

In fiscal year 1999/2000, the District's water conservation programs achieved an estimated water savings of over 24,000 af, which includes 10,000 af through water retailer participation.

Future Direction
Water conservation efforts are anticipated to reduce County water demands by approximately 30,000 af in 2001, and by almost 32,000 af in 2002. Future programs and projects being developed include:

- Water Use Efficiency Baseline Survey to provide specific information needed to tailor the District's water use efficiency program to result in effective long-term water use efficiency, to evaluate the impacts of water efficiency measures, and further promote and implement Best Management Practices (BMPs).

- Expansion of the Water Efficient Technologies (WET) Program to the entire county.

- Landscape and Agricultural Area Measurement and Water Use Budgets.

Agricultural Water Efficiency

Program Objective
The objective of the Agricultural Water Efficiency Program is to promote, demonstrate and achieve water use efficiency in the agricultural sector, which relies on groundwater supplies for most of its water needs. To meet this objective the District has implemented the following program elements:

- Mobile Lab Program

- California Irrigation Management Information System (CIMIS) Program

- Outreach Program

Background
As required by the Central Valley Project Improvement Act, in 1994 the District adopted a Water Conservation Plan to comply with U.S. Bureau of Reclamation criteria. This plan commits the District to support various agricultural water management activities and to implement the urban BMPs discussed in the Water Conservation Programs section.

Among the agricultural water management activities outlined in the plan is a Mobile Irrigation Lab program. This program provides local farmers with on-site irrigation system evaluations and recommendations for efficiency improvement. The mobile lab is designed to help increase water distribution uniformity and on-farm irrigation and energy efficiencies for all types of irrigation systems. Proper distribution uniformity can result in lower water and energy bills and decreased fertilizer application. Managing nitrogen and irrigation input to more closely match actual crop needs can also reduce water and

energy bills; this approach reduces the potential for nitrate to leach into groundwater while maintaining or improving agricultural productivity.

California Irrigation Management Information System (CIMIS) is a related program that helps large-scale water users to develop water budgets for determining when to irrigate and how much water to apply. Created in 1982 through a joint effort of UC Davis and the Department of Water Resources (DWR), CIMIS is a network of more than 100 computerized weather stations across the state that collects, measures and analyzes all the climatological factors that influence irrigation. This information provides major irrigators daily data on the amount of water that evaporates from the soil and the amount used by grasses.

The District owns and supervises two CIMIS weather stations, one at the UC field station in downtown San Jose, and the other at Live Oak High School in Morgan Hill. Both of these stations, as well as others around the state, are connected to a central computer run by the DWR in Sacramento. The updated information from the District's two stations is automatically downloaded and then provided to the public via a telephone hotline recording or the Internet.

An Outreach Program is an essential component of the agricultural efficiency programs. Outreach to the agricultural community includes public information dissemination, seminars or workshops, public presentations, newsletter articles and specific program materials.

Current Status

The District continues to implement the Mobile Lab Program, which provides on-farm irrigation evaluations, pump efficiency tests, nitrate field test demonstrations, and recommendations for efficient irrigation improvements. Approximately 30 sites participate in the program each year.

The District is currently assessing the potential need for an additional CIMIS station in the North County.

As part of the Outreach Program, significant work has been channeled into developing educational materials on the use of CIMIS in efficient irrigation scheduling. Presentations on the various program elements have been made to the District's Agriculture Advisory Committee, Farm Bureau and grower associations. Articles and brochures have been developed for CIMIS and the mobile lab program. In addition, the staff from the District's Water Use Efficiency and Groundwater Management Units have worked together to hold various workshops and seminars in the South County on irrigation and nutrient and pesticide management. All seminars have been well attended.

Future Direction

The future direction of the agricultural water efficiency programs includes the continuation and further development of the Mobile Lab Program. District staff will recommend continuation of the program as long as it demonstrates its cost-effectiveness.

The District is currently evaluating the feasibility of implementing a financial incentives program to complement the mobile lab.

A Monitoring and Evaluation Program is necessary to determine and assess the effectiveness of the various programs. The focus of the current monitoring effort has been the tracking of activity levels and program costs. To ensure that future water saving goals are achieved and urban and agricultural programs are successful, the District will need to enhance its existing monitoring program to more rigorously quantify actual water savings.

INTEGRATED WATER RESOURCES PLAN

Program Objective
The objective of the Integrated Water Resources Plan (IWRP) is to develop a long-term, flexible, comprehensive water supply plan for the County through year 2040 that incorporates community input and can respond to changing water supply and demand conditions.

Background
The District's 1975 water supply master plan identified the Federal San Felipe Project as the best solution to meet future water demands. However, recent severe droughts, changing state and federal environmental and water quality regulations, and the variability and reliability of both local and imported supplies underscored the need for an updated, more flexible water supply planning process. In the early 1990s, District staff developed a water supply overview study and began to outline a process to update the 1975 master plan.

The overview study described the District's water system and identified drinking water quality issues, the County's water needs, existing water supplies, projected water supplies, potential water shortages, and other components for managing water supplies. The overview study also evaluated water supply alternatives and recommended a stakeholder process to help the District select the preferred alternative.

As a result of the recommendations from the water supply overview process and several workshops involving the Board and overview study project team, the District Board of Directors authorized staff to undertake the IWRP.

In March of 1996, the project team introduced the Board's planning objectives for the IWRP evaluation of water supply strategies. These objectives were refined by stakeholders, including: the general public, representatives of business, community, environmental and agricultural groups, District technical staff, and officials of local municipalities and other water agencies. Stakeholders used these objectives to evaluate various water supply strategies and agree upon an IWRP Preferred Strategy.

The IWRP Preferred Strategy aims to maximize the District's flexibility to meet actual water demands, whether they exceed or fall short of projections. It relies on water

banking, recycled water, demand management, and water transfers, plus "core elements" designed to ensure the validity of baseline planning assumptions, monitor or evaluate resource options, and help meet planning objectives. The Board approved the preferred strategy in December of 1996.

The groundwater basin is a critical component in the management of the County's water supply. The basin treats, transmits, and stores water for the County. The management objective of the 1996 IWRP is to maintain the highest storage possible in the three interconnected subbasins (or to bank groundwater) without creating high groundwater problems. During dry periods when local and imported water supplies do not meet the County's water needs, stored groundwater is used to make up the difference. However, the use of this storage has to be balanced with the potential occurrence of land subsidence.

Land subsidence has been a great concern in the valley. As much as thirteen feet of subsidence occurred in parts of the basin before subsidence was minimized through recharge activities and imported water deliveries. If subsidence were to recommence, the damage to infrastructure would be significant, as many levees, pipelines, and wells would need to be rebuilt. Therefore, the IWRP must balance the use of the groundwater basin with the avoidance of adverse impacts.

Current Status

The preferred strategy from the 1996 IWRP is being implemented. Action on several elements of the plan that has already taken place includes the following:

Water Banking

The District reached an agreement with Semitropic Storage District to bank up to 350,000 af in their storage facilities. The District currently has stored about 140,000 af in the water banking program.

Recycled Water

The District is working closely with the city of San Jose and Sunnyvale to develop and market recycled water in lieu of groundwater pumping for irrigation. Planning with South County Regional Wastewater Agency is also occurring (see section on Water Use Efficiency).

Demand Management

The Water Use Efficiency Unit has developed an aggressive program to minimize water use and provide assistance to irrigators to improve the efficiencies in their irrigation systems (see section on Water Use Efficiency).

Water Transfers

In 1999, the District entered into a multi-party water transfer agreement for an agricultural supply from a Central Valley Project (CVP) contractor. This transfer will make a small amount of dry year water available to the District during the next 20 years.

Core Elements

- In 1997, the District entered into a Reallocation Agreement that provides a reliability "floor" of 75 percent of contract quantity for the District's Municipal and Industrial CVP supply, except for extreme years when CVP allocations are made on the basis of public health and safety.

- A study was recently conducted to determine the frequency of critical dry periods using a statistical approach that showed the preferred strategies are very robust although not perfect.

- The Operational Storage Capacity of the Santa Clara Valley Subbasin was evaluated and refined in 1999 (SCVWD, 1999) – see section on operational storage capacity.

Future Direction

An ongoing process of monitoring the baseline conditions and contingency action levels is being developed. Updates to the IWRP are scheduled for every 3 to 5 years. The District is currently developing the 2002 IWRP Update.

As the District's water supply planning document through year 2040, the IWRP has identified the operation of the groundwater basin as a critical component to help the District respond to changing water supply and demand conditions. Planning and analysis efforts for future updates of the Groundwater Management Plan and the IWRP need to be integrated in order to provide a coordinated and comprehensive water supply plan for Santa Clara County.

Additional Groundwater Supply Management Activities

Groundwater Modeling

The District uses a three-dimensional groundwater flow model to estimate the short-and long-term yield of the Santa Clara Valley Subbasin and to evaluate groundwater management alternatives. Six layers are used to represent the subbasin, and changes in rainfall, recharge, and pumping are simulated. The model is used to simulate and predict groundwater levels under various scenarios, such as drought conditions, reduced imported water availability, or increased demand. The groundwater model also allows the District to evaluate the operational storage capacity (discussed below) in the Santa Clara Valley Subbasin.

In the future, a three-dimensional flow model similar to the one used in the Santa Clara Valley Subbasin will be developed for the Coyote and Llagas Subbasins, enabling the District to simulate groundwater conditions throughout the County.

Operational Storage Capacity Analysis

The operational storage capacity is an estimate of the storage capacity of the groundwater basin as a result of District operation. Operational storage capacity is generally less than the total storage capacity of the basin, as it accounts for operational constraints such as

available pumping capacity and the avoidance of land subsidence or high groundwater levels. Identifying a reasonable range for the amount of groundwater that can be safely stored in wet years and withdrawn in drier years is critical to proper management of the groundwater basin.

The operational storage capacity of the Santa Clara Valley Subbasin was evaluated (SCVWD, 1999) using the groundwater flow model and historical hydrology, which included two periods of severe drought. The key findings of the analysis were that:

- The operational storage capacity of the Santa Clara Valley Subbasin is estimated to be 350,000 af.
- The rate of withdrawal from the basin is a controlling function and pumping should not exceed 200,000 af in any one year.
- The western portion of the subbasin is operationally sensitive which requires the Rinconada Water Treatment Plant to receive the highest priority when supplies become limited.

In 2001, an analysis of the operational storage capacity for the Coyote and Llagas Subbasins was conducted (SCVWD, 2001). As the District does not currently have a groundwater model for these two subbasins, a static analysis was used. Unlike a groundwater model, a static analysis cannot simulate changes in recharge, pumping, or demand. Instead, the operational storage capacity was estimated as the volume between high and low groundwater surfaces, chosen to maximize storage while accounting for operational constraints such as high groundwater conditions. The draft estimate for the combined operational storage capacity of the Coyote and Llagas Subbasins ranges from 175,000 to 198,000 af. The District is working to narrow the range of estimates for operational storage capacity through further analysis.

Having an estimate of the amount of water that can be stored within the basin during wet years and withdrawn during drier times will continue to be critical in terms of long-term water supply planning. As hydrology, water demands, recharge, and pumping patterns change, the estimate of operational storage capacity will need to be updated.

Subsidence Modeling

Due to substantial land subsidence that has occurred within the Santa Clara Valley Subbasin, the District uses numerical modeling to simulate current conditions and predict future subsidence under various groundwater conditions. PRESS (Predictions Relating Effective Stress and Subsidence) is a two-dimensional model that relates the stress associated with groundwater extraction to the resulting strain in fine-grained materials such as clays. The District has calibrated the model at ten index wells within the subbasin, and has established subsidence thresholds equal to the current acceptable rate of 0.01 feet per year.

Chapter 4
GROUNDWATER MONITORING PROGRAMS

This chapter describes District programs that monitor the water quality, water levels and extraction from the groundwater basin. It also describes the District's land subsidence monitoring program. These programs provide data to assist the District in evaluating and managing the groundwater basin. Specifically, the groundwater and subsidence monitoring programs provide the data necessary for evaluating whether the program outcomes result in achievement of the groundwater management goal.

Future efforts in groundwater monitoring will include the annual development of a groundwater conditions report, which will contain information regarding groundwater quality, groundwater elevation, and land subsidence.

GROUNDWATER QUALITY MONITORING

Program Objective

The objective of the General Groundwater Quality Monitoring Program is to determine the water quality conditions of the County's groundwater resources. By monitoring the quality of the groundwater basin, the District can discover adverse water quality trends before conditions become severe and intractable, so that timely remedial action to prevent or correct costly damage can be implemented. In general, the District monitors groundwater quality to ensure that it meets water quality objectives for all designated beneficial uses, including municipal and domestic, agricultural, industrial service, and industrial process water supply uses.

Background

Groundwater quality samples have been collected in the County since the 1940s by the District and by others. In 1980, District staff reviewed the existing general groundwater quality monitoring program and recommended changes and enhancements. The recommended changes and enhancements included revising the monitoring well network, revising the list of water quality parameters to be measured, and collecting groundwater samples biennially (every other year). Groundwater samples were analyzed for general mineral and physical water quality parameters.

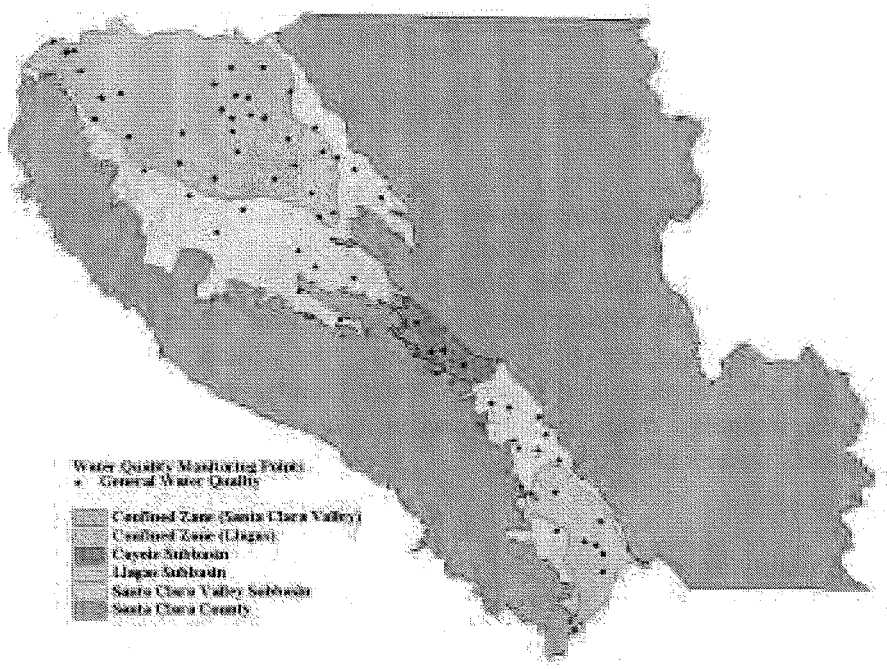
Current Status

The general groundwater quality monitoring program is designed to provide specific water quality data for each of the three subbasins (Figure 2-3). The monitoring well network includes one or more wells in each hydrographic unit yielding significant amounts of water. Groundwater samples collected from the monitoring network are intended to reflect the general areal and vertical groundwater quality conditions. Currently, the following program activities occur biennially:

- Water quality samples are collected from a monitoring network of approximately 60 wells (Figure 4-1).

- Samples are analyzed for general minerals, trace metals, and physical characteristics.
- Analytical results are evaluated, the database is updated, and routine water quality computations are performed.
- A summary report describing the water quality of the groundwater resources in the County is prepared.

Figure 4-1
Water Quality Monitoring Wells



In addition to the 60 wells monitored by the District for general groundwater quality analysis, the District monitors additional wells for special studies. There are currently approximately 100 wells monitored for MTBE, 60 wells monitored for nitrate, and 30 wells monitored for saltwater intrusion. The District also receives groundwater quality data for approximately 300 water retailer wells from the California Department of Health Services.

Monitoring results suggest that water quality is excellent to good for all major zones of the groundwater basin. This is based on comparing groundwater quality monitoring results to water quality objectives. Regional Water Quality Control Boards designed water quality objectives based on beneficial uses. Water quality objectives for municipal and domestic, industrial service, and industrial process water supply beneficial uses are equivalent to the drinking water standards established by the California Department of

Health Services. Water quality objectives for agricultural beneficial uses are defined specifically in the Regional Water Quality Control Boards' Water Quality Control Plans. Drinking water standards, agricultural water quality objectives, and monitoring results for common groundwater constituents are summarized in Table 2-2.

The more common trace constituents, which are considered unwanted impurities when present in high concentrations, are generally not observed in concentrations that adversely affect beneficial uses. Areas with somewhat degraded waters in terms of total mineral salt content have been identified in the Santa Clara Valley Subbasin and elevated nitrate concentrations have been observed in the Coyote and Llagas Subbasins. In addition, volatile organic compounds and other anthropogenic compounds have affected shallow aquifers in localized areas. Special groundwater monitoring programs have been developed to define the extent and severity of these problems and are discussed in Chapter 5.

Radon analysis was performed as a one-time special survey of current conditions and provided data for analyzing the potential impacts of upcoming drinking water standards for radon. The results of the 1999 sampling are presented in the 2000 General Groundwater Quality Monitoring report.

Future Direction

The General Groundwater Quality Monitoring Program utilizes relatively few, widely spaced monitoring points to assess large areas. Certain hydrographic units of the basin are only sparsely monitored at present. Staff is continuing to review the monitoring network to ensure that groundwater samples collected from the monitoring well network reflect areal and vertical groundwater quality conditions within each hydrographic unit. If it is determined that additional monitoring points are needed in some areas where there are no existing wells, District staff will recommend the installation of additional monitoring wells.

The District is also planning to increase the frequency of monitoring and the number of water quality parameters that are measured. Historically, the most frequent sampling frequency has been biennially. However, in order to parallel District efforts to better monitor performance in achieving desired results, the sampling frequency for the General Groundwater Quality Monitoring Program will be increased to annually. The number of water quality parameters that are measured will also be increased, so that samples are analyzed for volatile organic compounds, a significant concern in Santa Clara County. Samples will continue to be analyzed for general minerals, trace constituents, and physical characteristics.

The District will continue to assess and provide recommendations to address any adverse water quality trends that are observed through the General Groundwater Quality Monitoring Program. In addition, the District will continue to conduct special studies for specific contaminants as the need arises. As part of groundwater management planning, action levels and triggers will be developed for the constituents monitored.

The District will also begin developing annual groundwater conditions reports, which will summarize information regarding groundwater quality, groundwater elevation, and land subsidence.

GROUNDWATER ELEVATION MONITORING

Program Objective
The objective of the Groundwater Elevation Monitoring Program is to provide accurate and dependable depth-to-water field measurements for the County's major groundwater subbasins. By monitoring the groundwater elevations, the District can evaluate the groundwater supply conditions and formulate strategies to ensure adequate water supplies, prioritize recharge activities, and minimize any adverse impacts.

Background
Collecting depth-to-water information has been one of the District's functions since it was first formed as a water conservation district in 1929. Depth-to-water information is used to create groundwater elevation contour maps, which depict the conditions of the groundwater basin in the fall and spring of each year. Depth-to-water data are also used for subsidence modeling, to generate hydrographs needed to analyze groundwater model simulations, and to provide information to District customers on current and historical groundwater elevations.

Current Status
The District continues to collect depth-to-water field measurements, obtain depth-to-water measurements from other agencies and record that information for approximately 275 wells. Most wells in the current program are privately owned and their locations are fairly evenly distributed among the three subbasins (Figure 4-2). Current groundwater elevation monitoring includes the following:

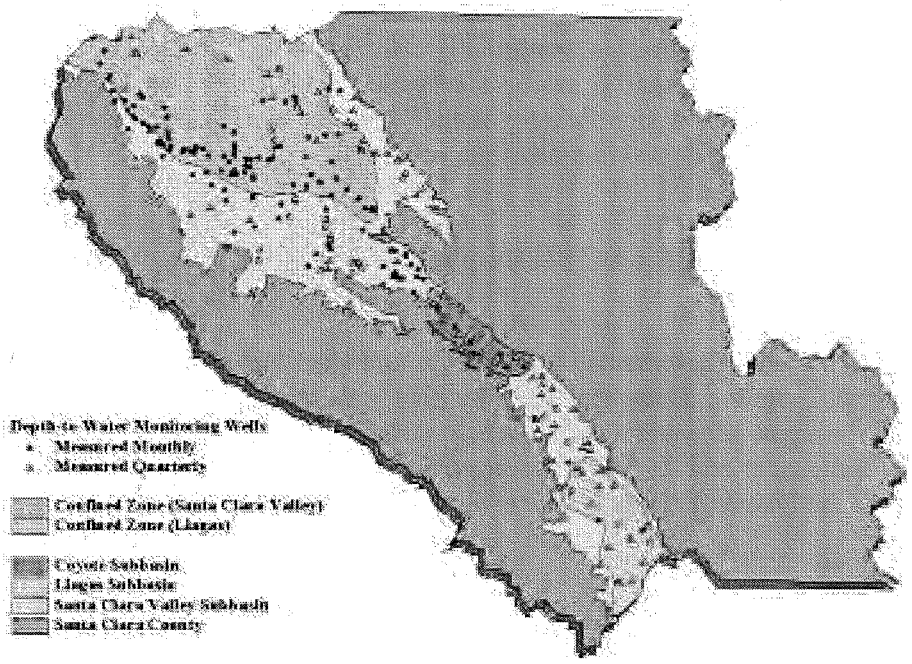
- Collection of monthly depth-to-water field measurements from approximately 168 wells, including approximately 150 wells owned by other agencies (Figure 4-2).
- Collection of quarterly depth-to-water field measurements from approximately 108 wells (Figure 4-2).
- Maintenance of a groundwater elevation database.
- Preparation of semi-annual groundwater level elevation contour maps.

The information in the District depth-to-water database is used regularly by District staff. Each year the District answers several hundred requests for depth-to-water information from other public agencies, consultants, and the public.

Future Direction
Although the District collects depth-to-water data from many wells throughout the County, most wells were designed as production wells, with perforations at multiple

intervals to increase groundwater extraction. There are relatively few wells that measure groundwater elevations in a single depth zone. The existing Groundwater Elevation Monitoring Program is currently being updated to target monitoring wells where discrete, depth-specific groundwater elevations can be obtained, which will enable better characterization of the three-dimensional groundwater system. A new groundwater elevation monitoring network has already been designed for the Santa Clara Valley Subbasin, and another project will be undertaken to develop a monitoring network for the Coyote and Llagas Subbasins by 2003.

Figure 4-2
Groundwater Elevation Monitoring Wells



The proposed network for the Santa Clara Valley Subbasin will include monitoring the individual piezometric pressures at the following 79 wells, which are geographically distributed among the hydrographic units in the subbasin. Specific recommendations include the:

- Continued monitoring of 31 depth-specific wells monitored in the existing depth-to-water program.
- Acquisition of 16 aquifer-specific wells from other organizations.
- Addition of 25 wells that are not part of the existing depth-to-water program.
- Installation of 7 new multiple-well monitoring sites to be constructed by 2003.

Monitoring these 79 wells will provide invaluable information to aid in characterizing depth-specific groundwater conditions. However, in addition to these 79 wells, monitoring of the wells in the current groundwater elevation network will continue indefinitely, as the water level data can be useful even though it cannot be attributed to specific depth zones. Monitoring is recommended on a quarterly basis during the months of January, April, July, and October, although some wells will be monitored monthly. A quarterly monitoring frequency is consistent with the historical groundwater level data in the basin, and is currently adequate in terms of current groundwater elevation monitoring needs. A change in monitoring frequency will be assessed if necessary.

The proposed monitoring network for the Santa Clara Valley Subbasin will be re-evaluated in 2003 to ensure that monitoring needs can be met with the wells proposed. A monitoring network for the Coyote and Llagas Subbasins will be developed by 2003.

Since groundwater information is continually utilized both within and outside the District, an online database that is easily accessible through the District's web site is being evaluated as it would significantly reduce District staff time spent in database maintenance and fulfilling depth- to-water data requests.

GROUNDWATER EXTRACTION MONITORING

Program Objective

The amount of groundwater extracted from the groundwater basin is recorded through the Water Revenue Program. Data produced by this program are used primarily to: 1) determine the amount of water used by each water-producing facility and collect the revenue for this usage, and 2) fulfill the provisions of Section 26.5 of the District Act which requires the District to annually investigate and report on groundwater conditions.

Background

The Water Revenue Program tracks groundwater, surface water, treated water and recycled water production within the District. The first collection of groundwater extraction data began shortly after the State Legislature authorized amendments to the Santa Clara County Flood Control and Water District Act in June 1965. As part of implementation of the District Act, wells within the District were registered. The District has been collecting groundwater extraction data from wells in the Santa Clara Valley Subbasin (also known as the North Zone or Zone W-2) since the early 1960s. After the merger with Gavilan Water Conservation District in 1987, this program expanded to the Coyote and Llagas Subbasins (the South Zone, or Zone W-5).

Current Status

To determine the amount of all water produced in the District, including groundwater, the Water Revenue Program:

- Develops and distributes water extraction statements to well owners within the two water extraction zones on a monthly, semi-annual, and annual basis.

- Audits incoming water extraction statements and completes field surveillance to ensure that water extraction information is accurate.
- Audits and invoices surface, treated and recycled water accounts.
- Assists the public in completing and filing water extraction statements.
- Maintains files for surface, ground, treated and recycled water accounts.
- Administers and maintains a database containing all water extraction information.
- Initiates and approves the installation of water measurement devices (meters) on water-producing wells.
- Registers (assigns state well numbers) and maps all water extraction wells.

Water extraction data is stored in an electronic database (Water Revenue Information System) and on paper. Program staff maintain accounts and records for more than 6,000 water extraction wells and approximately 27,000 monitoring wells. Staff provide information on these accounts to other District programs and outside customers, and provide other customer support as necessary.

Although approximately half of the wells within the County are not metered, metered wells extract the vast majority of groundwater used within the County. Where meters are not feasible, crop factors are used to determine agricultural water usage and average values adjusted for residences. Water meter testing and maintenance are performed on a regular basis. Maintenance is done to ensure meters are performing properly and accurately. When problems are discovered, meters are repaired or replaced. Meters are also replaced on a regular basis for testing and rebuilding.

The following table shows type of usage for wells in Zone W-2 (Santa Clara Valley Subbasin) and Zone W-5 (Coyote and Llagas Subbasins) and the number of meters recording usage.

Table 4-1
1998 Statistics on Extraction Wells

	North Zone (W-2)	South Zone (W-5)
Agricultural Wells	81	570
Municipal & Industrial Wells	1,875	350
Domestic Wells	567	2,569
Ag & M&I Wells	77	511
Total Number of Wells	2,600	4,000
Number of Metered Wells	1,017	395
Percentage of Metered Wells	40%	10%

In accordance with Section 26.5 of the District Act, the District prepares an annual Water Utility Enterprise Report, which contains the following information: present and future water requirements of the County; available water supply; future capital improvement, maintenance and operating requirements; financing methods; and the water charges by zone for agricultural and nonagricultural water. Recommended water rates are based on multi-year projections of capital and operating costs. Water charges can be used as a groundwater supply management tool, as the surcharge for treated water can be adjusted to encourage or discourage extraction from the groundwater basin.

Future Direction

Groundwater extraction monitoring data will continue to be important as a basis of groundwater management decisions and for groundwater revenue receipts. Program staff are currently evaluating the existing database and hope to convert the database into a relational database and link it to the newly developed Geographic Information System (GIS) based well mapping system. This will enable staff to evaluate groundwater use data geographically and to provide this data to groundwater management decision-makers in a meaningful and easy to use format.

LAND SUBSIDENCE MONITORING

Program Objective

The objective of the Land Subsidence Monitoring Program is to maintain a comprehensive system to measure existing land subsidence and to predict the potential for further subsidence.

Background

Land subsidence was first noticed in 1919 after an initial level survey conducted in 1912 by the National Geodetic Survey. At that time, 0.4 feet of subsidence was measured in downtown San Jose. Between 1912 and 1932, over 3 feet of subsidence were measured at the same location. As a result of this drastic increase in subsidence, an intensive leveling network was installed for periodic re-leveling to evaluate the magnitude and geographical extent of subsidence. From 1912 to 1970, cumulative subsidence measured at the same San Jose location totaled approximately 13 feet.

A cross-valley differential leveling survey circuit was run in the 1960s and continues to be conducted. The level circuit was conducted almost annually from 1960 through 1976, once in 1983, and annually from 1988 to the present.

In 1960, the United States Geologic Survey (USGS) installed extensometers, or compaction recorders, in the two 1,000-foot boreholes drilled in the centers of recorded subsidence sites in Sunnyvale and San Jose. The purpose for installing these wells was to measure the rate and magnitude of compaction that occurs between the land surface and the bottom of the well.

In the mid-1960s, imported water from San Francisco's Hetch-Hetchy reservoir and the State Water Project's South Bay Aqueduct played a major role in restoring groundwater

levels and curbing land subsidence. A combination of factors including imported water, natural recharge, decreased pumping and increased artificial recharge has reduced land subsidence to an average 0.01 feet per year.

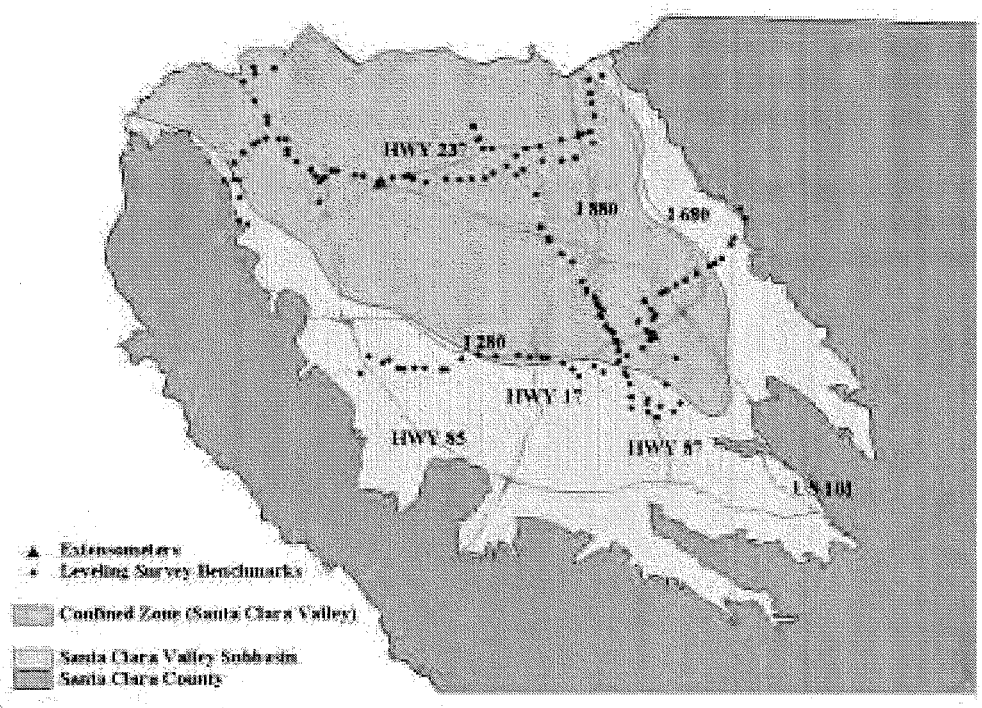
The District developed subsidence thresholds that relate the expected rate of land subsidence from various groundwater elevations. The Predictions Relating Effective Stress and Subsidence (PRESS) computer code was utilized for this model, and 10 index wells located throughout the Santa Clara Valley Subbasin were used as control points for the subsidence calibration and prediction.

Current Status

The existing land subsidence monitoring program includes the following:

- Monitoring land subsidence at two extensometer sites in San Jose and Sunnyvale (Figure 4-3).
- Conducting an annual leveling survey across three different directions in the valley to measure any land subsidence that may be occurring away from the extensometers (Figure 4-3).
- Analyzing data to evaluate the potential of re-initiating land subsidence.

Figure 4-3
Location of Extensometers and Leveling Survey Benchmarks



The extensometer in the San Jose site has recently been upgraded and equipped with monitoring and storage instrumentation to execute the data acquisition process electronically. Data collected from this site continues to be analyzed to determine any changes in the rate of land subsidence.

In 1998, the District entered into a cooperative agreement with the USGS to use Interferometric Synthetic Aperture Radar (InSAR) technology to measure any subsidence that may have not been captured in the existing monitoring program. This new technology compares satellite images taken at different times and reveals any changes in ground surface elevations with an accuracy of a few millimeters. INSAR covers the entire County, unlike traditional monitoring which is site-specific. Under the cooperative agreement, InSAR images were analyzed both seasonally and over a five-year period. Data from this study reasonably replicated and supported the data obtained from the District's extensometers.

The leveling survey continues to be conducted annually. A new leveling line was added to the leveling survey in 1998 as InSAR images indicated that additional information was needed along the Silver Creek Fault in San Jose.

Future Direction

Monitoring and data storage equipment have been installed at the San Jose extensometer site. Plans to enhance the land subsidence monitoring network program include the installation of new equipment to facilitate the monitoring and storage of data from the extensometer site in Sunnyvale, and the evaluation of datum stability at this site.

Through the 1998 study with the USGS, InSAR technology was proven able to reasonably replicate historical subsidence data from extensometers and the cross-valley leveling surveys. District staff will investigate the benefits of incorporating InSAR technology into the current land subsidence monitoring program.

The District will continue to utilize groundwater flow and subsidence models to simulate land subsidence as a result of different groundwater scenarios and groundwater management alternatives.

Chapter 5
GROUNDWATER QUALITY MANAGEMENT PROGRAMS

This chapter describes District programs that address nitrate management, saltwater intrusion, well construction and destruction, wellhead protection, leaking underground storage tanks, toxic cleanup, land use and land development review, and other groundwater protection issues. These programs help protect groundwater quality by identifying existing and potential groundwater quality problems, assessing the extent and severity of such problems, and preventing and mitigating groundwater contamination.

NITRATE MANAGEMENT

Program Objective

The objective of the Nitrate Management Program is to delineate, track and manage nitrate contamination in the groundwater basin in order to ensure the basin's viability as a long-term potable water supply. More specifically, the objectives are as follows:

- Reduce the public's exposure to high nitrate concentrations.
- Reduce further loading of nitrate.
- Monitor the occurrence of nitrate.

Background

The conversion of nitrogen to nitrate is a natural progression in the nitrogen cycle. In the form of nitrate, nitrogen is highly soluble and mobile. Due to its solubility and mobility, nitrate is one of the most widespread contaminants in groundwater. Unlike other compounds, nitrate is not filtered out by soil particles. It travels readily with rain and irrigation water into surface and groundwater supplies.

The amount of nitrate reaching the groundwater depends on the amount of water infiltrating the soil, the concentration of nitrate in the infiltrating water and soil, the soil type, the depth to groundwater, plant uptake rates, and other processes. Nitrate concentrations now observed in the groundwater basin might be a result of land use practices from several decades ago.

High concentrations of nitrate in drinking water supplies are a particular concern for infants. Nitrate concentrations above the federal and state maximum contaminant level (MCL) of 45 milligrams per liter (45 mg/L NO_3) have been linked to cases of methemoglobinemia ("Blue Baby Syndrome") in infants less than 6 months of age. In addition, public health agencies, including the California Department of Health Services, are conducting research to determine whether excess nitrate in food and drinking water might also have long term carcinogenic (tendency to cause cancer) or teratogenic (tendency to cause fetal malformations) effects on exposed populations.

Communities in the South County rely solely on groundwater for their drinking water supply. The District created the Nitrate Management Program in October 1991 to manage increasing nitrate concentrations in the Llagas Subbasin.

In June of 1992, an extensive study was initiated to review historical nitrate concentrations, identify potential sources, collect and analyze groundwater samples for nitrate, and develop a set of recommendations for the prevention and control of nitrate loading in South County. The results of the study, completed in February 1996, indicated that nitrate concentrations in the Llagas Subbasin are generally increasing over time and that elevated concentrations still exist throughout the subbasin.

In addition, the study found that there are many sources of nitrate loading in Llagas Subbasin. The major sources of nitrate are fertilizer applications, and animal and human waste generation. The southern portion of Santa Clara County has historically been an agricultural area. Only in recent years has agricultural acreage declined due to residential growth. However, due to the slow movement of surface water to the water table, residual nitrate concentrations in the soil from past practices may continue to contribute to increasing nitrate concentrations in the groundwater for several years or decades to come.

The specific recommendations of the study were the following: increase public education to reduce loading and exposure; blend water to reduce exposure; review and possibly revise the well standards; increase the level of regional wastewater treatment in order to reduce reliance on septic systems; increase point source regulation; conduct recharge feasibility studies; increase monitoring of the groundwater basin; and to consider alternative water supplies, treated surface water, water recycling and enhanced sewage treatment technologies for on-site systems.

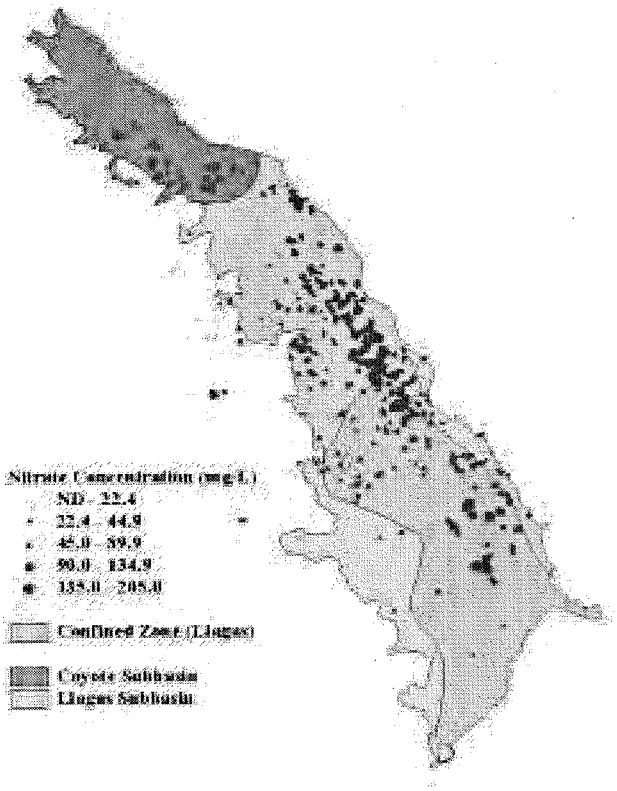
In 1997, the District began implementing the public education portion of the study recommendations. A large agricultural outreach effort was initiated. As part of that outreach, the District entered into a contract with a Mobile Irrigation Lab to offer free irrigation evaluations to farmers in order to improve the efficiency of their irrigation systems and scheduling. By improving the irrigation efficiency and distribution uniformity, the irrigators can reduce the amount of water and nitrate leached beyond the active root zone of the crop and into the groundwater. Over 250 people have attended seminars to increase their awareness of the mobile lab and to learn nitrate-sampling and nitrogen management techniques. Approximately 150 free soil nitrate test kits have been prepared and distributed. A series of 5 fact sheets on Nitrogen and Water Management in Agriculture was produced in cooperation with Monterey County Water Resources Agency and the Pajaro Valley Water Management Agency. English and Spanish versions have been distributed to the agricultural community through a series of seminars, mobile lab operators, other agricultural agencies and the on the District's new Agricultural web page.

To reduce exposure, reduce loading and monitor occurrence, a large-scale public outreach effort was launched offering a free nitrate analysis to all well water users in the Llagas and Coyote Subbasins. Approximately 2,500 residents were notified through

direct mailings about the program and the issues surrounding nitrate in drinking water. An unknown number were notified through newspaper, radio and television coverage. More than 600 private wells shown in Figure 5-1 have been tested for nitrate. Along with the results of the testing, residents were mailed a fact sheet describing what nitrate is, where it comes from, what the health effects are, how to prevent further loading and where to find more information.

Of the 600 private wells tested, more than half exceed the federal safe drinking water standard for nitrate. Of those that exceed the standard, half of the residents use an alternate water source or point-of-use treatment for their drinking water. The data also indicated that nitrate concentrations in the Llagas Subbasin continue to increase, that nitrate concentrations in the Coyote Subbasin have remained steady, and that high concentrations of nitrate are sporadically located throughout both subbasins. A report on the findings was produced in December 1998 and was distributed to several local and state agencies. These elevated nitrate levels were detected only in private wells; it should be noted again that public water supply wells within the County meet drinking water standards.

Figure 5-1
South County Nitrate Concentration

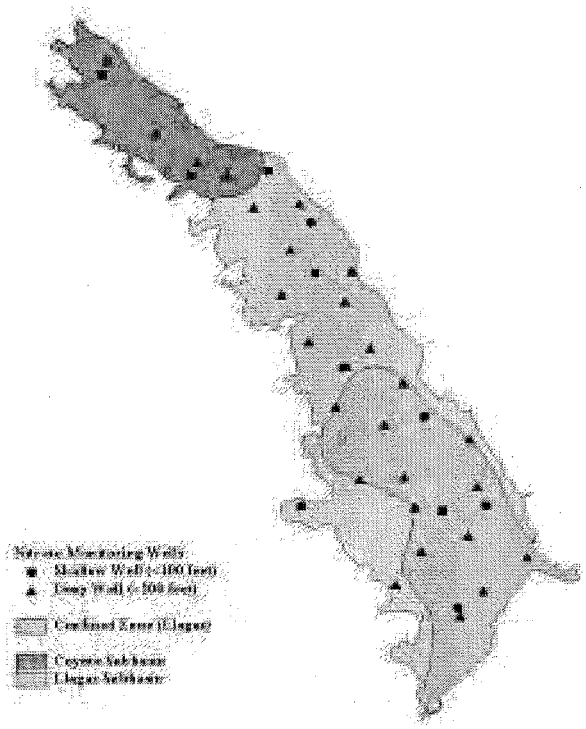


Current Status

To reduce nitrate loading, the District continues to schedule mobile lab evaluations and agricultural seminars. These seminars focus on how to apply irrigation water more efficiently and how to conduct soil testing for nitrate. In addition, the District is a cooperator on a grant with a soil scientist to establish field trials demonstrating and evaluating the effectiveness of in-field nitrate testing in drip and sprinkler irrigated vegetables.

To monitor nitrate occurrence, the District is conducting a comprehensive monitoring effort to track seasonal, areal, vertical and long-term trends in nitrate concentrations. The current monitoring program shown in Figure 5-2 consists of 42 deep groundwater wells (greater than 100 feet deep) and 15 shallow monitoring wells (less than 100 feet deep).The shallow monitoring wells will allow us to track what we might expect to see in the deeper wells in the future. Network wells are being monitored on a quarterly basis to track seasonal variations.

Figure 5-2
Current South County Nitrate Monitoring Network



To reduce nitrate exposure, the District is working with the Santa Clara County Department of Environmental Health to produce a well owner's guide. Among other things, the guide will contain information on recommended sampling, testing and disinfecting practices, as well as measures to protect against contamination.

Future Direction
Continued public education and outreach will remain the focus of the nitrate management program to reduce further loading and prevent possible exposure. If nitrate concentrations continue to increase at all depths, more extensive action may be required. The District may need to investigate alternate water supplies for the many private well water users in the area. Alternate water supplies could include a water treatment plant to remove the nitrate from the existing groundwater supply or the treatment of water from the San Felipe pipeline.

More research is needed to determine how much nitrate is contributed through the various manure management practices currently used. Best Management Practices (BMPs) for manure management need to be determined, and they need to be communicated to the public in a manner that will encourage adoption. More research is also needed regarding reduction of nitrate loading from septic systems; specifically, regarding whether the benefit of removing or reducing septic system loading justifies the economic and political cost of increasing sewer line connections.

To achieve the objective of monitoring nitrate occurrence, the District will continue to sample the existing monitoring network in the Llagas and Coyote Subbasins on a quarterly basis. Two years of quarterly data has been collected so far and staff are in the process of analyzing the data for seasonal, areal, and long-term trends. Staff is beginning a thorough evaluation of the extent and severity of nitrate contamination in the Santa Clara Subbasin, based on water quality data from the District's groundwater monitoring program and the water retailers.

The District may also investigate the feasibility of remediating nitrate contamination. There is some indication that nitrate concentrations around recharge facilities are lower than elsewhere. This finding would need to be confirmed as part of an investigation into reducing nitrate concentrations by additional recharge. Similarly, the District may be able to remediate nitrate contamination by setting up several pump and treat operations. High nitrate water would be pumped out of the basin, treated and injected back into the basin. Phytoremediation, which uses deep-rooted plants to draw the nitrate out of the vadose zone before it can reach groundwater, may be employed in some areas. A fourth possibility is reactive zone remediation where a reagent is injected into the system to intercept and immobilize or degrade the nitrate into a harmless end product. A thorough investigation of any remediation technology would need to occur before prior to its adoption.

SALTWATER INTRUSION PREVENTION

Program Objective
The objective of the Saltwater Intrusion Prevention Program is to monitor and to protect the groundwater basin from seawater intrusion.

Background

The movement of saline water into a freshwater aquifer constitutes saltwater intrusion. This potential exists in groundwater basins adjacent to the sea or other bodies of saline water. Intrusion of saltwater into a freshwater aquifer degrades the water for most beneficial uses and, when severe, can render it virtually unusable. Salty water can corrode holes in well casings and travel vertically to other aquifers not previously impacted. Once freshwater aquifers are rendered useless by a severe case of saltwater contamination or intrusion, it is extremely difficult and costly to reclaim them.

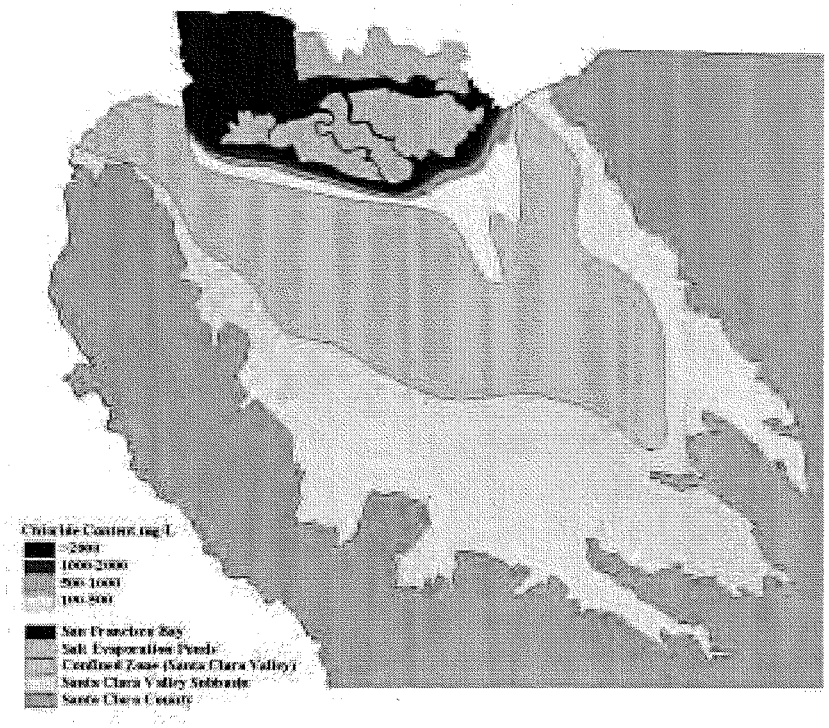
Comparison of older mineral analyses of groundwater from wells in the San Francisco bayfront area in Santa Clara and Alameda counties, some dating back to 1907, with more recent data shows that saltwater intrusion has occurred in the upper aquifer. With much higher water demands after World War II and the occurrence of land subsidence, saltwater intrusion conditions became aggravated and encompassed a portion of the baylands (the area adjacent to the southern San Francisco Bay). Bayshore Freeway (U.S. Route 101) and the Nimitz Freeway (Interstate 880) delineate the southern limits of this area.

The alluvial fill deposits of the Santa Clara Valley Subbasin in the flat baylands area consist of thin aquifers amongst abundant clays. The aquifers are broadly grouped into two water-bearing zones referred to as the "upper aquifer zone," which usually occurs at depths less than 100 feet, and the "lower aquifer zone," which usually occurs at depths greater than 150 to 250 feet, and which constitutes the potable aquifer system. Previous studies indicate the upper aquifer zone fringing San Francisco Bay is widely intruded by saltwater. The lower aquifer zone has pockets of small areas of elevated salinity associated with migration through abandoned wells.

Within the upper aquifer zone, the "classical case" of intrusion which occurs by displacement of freshwater by seawater and is indicated by total dissolved salt content over 5,000 mg/L, has progressed only a short distance inland from the bayfront, estuaries or salt evaporator ponds as shown in Figure 5-3. This intrusion had been induced when pumping of the upper aquifer and land subsidence reversed the hydraulic gradients, which had originally been toward the Bay. A large mixed transition zone precedes this intruding front with its outer limit arbitrarily defined by the 100 mg/L chloride line.

The greatest inland intrusion of the mixed transition water occurs along Guadalupe River and Coyote Creek. The large mixed transition zone is caused by saltwater moving upstream during the high tides and leaking through the clay cap into the upper aquifer zone when this zone is pumped. Land surface subsidence has aggravated the condition of intrusion by allowing farther inland incursion of saltwater up the stream channels from the Bay and by changing the gradient directions.

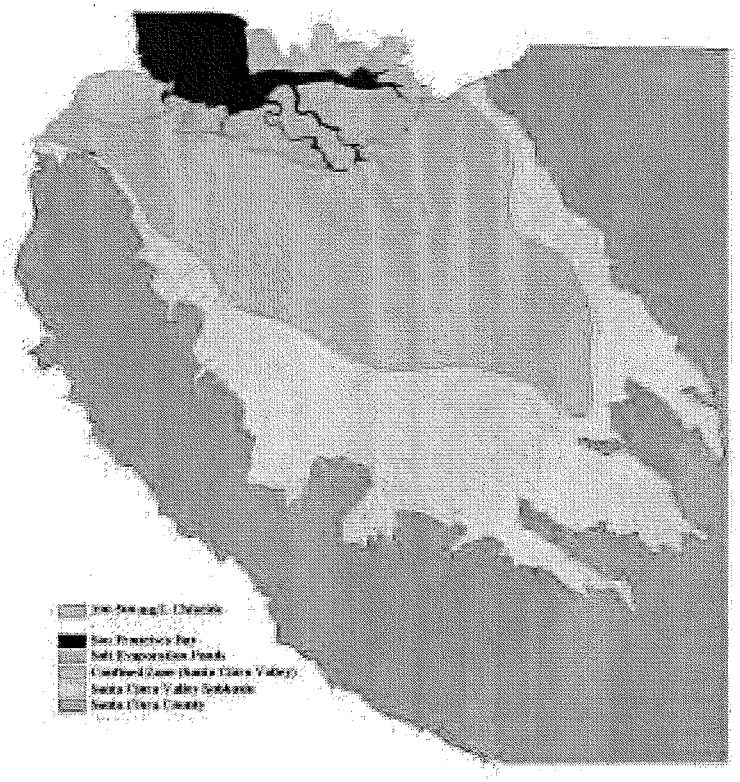
Figure 5-3
Upper Zone Saltwater Intrusion



Data has revealed a local area of high salt concentration in the upper aquifer zone in the Palo Alto bayfront area. This locally concentrated groundwater has moved inland historically and has the potential to continue farther inland. It is in this area that the District constructed a 2-mile-long hydraulic barrier in order to prevent further intrusion and to reclaim portions of the intruded aquifers.

The lower aquifer zone is only mildly affected; the area of elevated salinity encompasses a much smaller area than that of the upper aquifer zone (Figure 5-4). The contaminated lower aquifers lie beneath the intruded portion of the upper aquifer zone. The areal distribution and the variable concentration of the saltwater contamination with time imply that the intrusion into the lower aquifer occurred as seasonal slugs of contaminated water were induced from either the surface or the upper aquifer. As the clay aquitard between the upper and lower aquifer zones is essentially impermeable, the salinity in the lower aquifer zone is thought to have occurred through improperly constructed, maintained or abandoned wells. As a result of this finding, the operation of the hydraulic barrier was discontinued.

Figure 5-4
Lower Zone Saltwater Intrusion



The resumption of land surface subsidence is the greatest potential threat to aggravating the intrusion condition, as it would further depress the land surface fronting South San Francisco Bay. This would increase the inland hydraulic gradient relative to the classical intrusion front and expose a larger area of the upper aquifer zone to intrusion as a consequence of the greater inland incursion of tidal waters. A lowering of the piezometric level in the lower aquifers, which is related to the cause of subsidence, will also increase the potential for intrusion into the lower zone.

Current Status

As part of the Saltwater Intrusion Prevention Program, the defective wells in the northern Santa Clara Valley Subbasin along San Francisco Bay were to be located and destroyed. The District conducted an extensive program of locating and properly destroying these contaminant conduit wells. After these defective wells were located, the owners were required to properly destroy them under District ordinance, or by litigation if necessary. From District records, a list of 45 defective wells to be destroyed was generated.

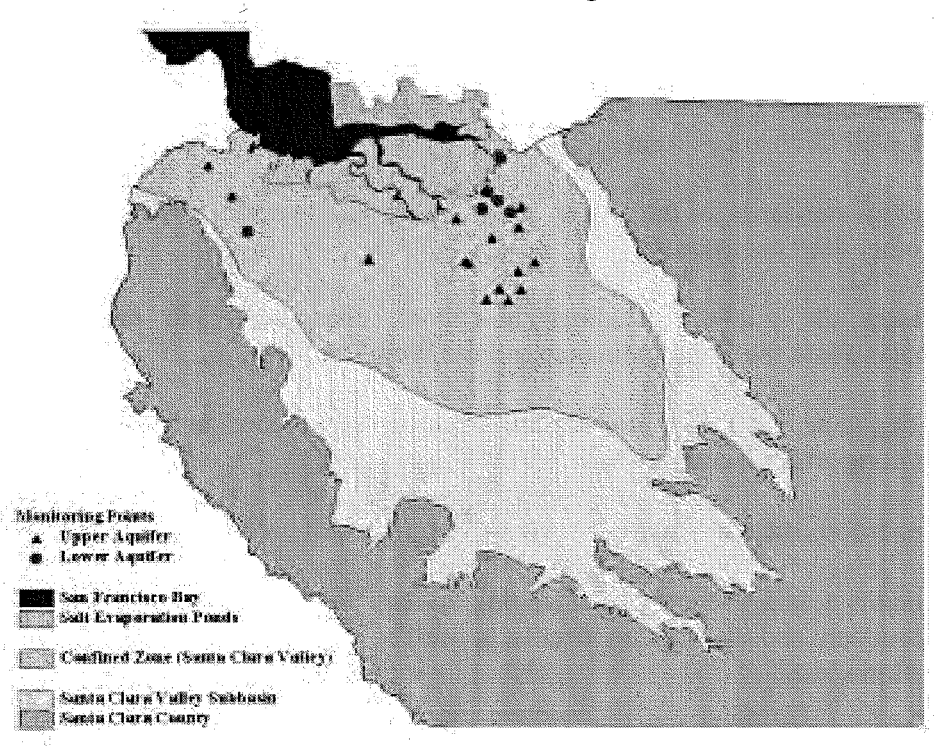
Since the inception of this program, the Board has authorized a more comprehensive well destruction program, through which abandoned wells near areas of known chemical contamination can be destroyed with District funds. This program began in October 1984, and was in part a result of general concerns about contamination of useable aquifers by saltwater as well as by industrial chemicals throughout the County. Several

wells in the area were included in this parallel program, many of which were not identified as defective or potential conduit wells.

Of the 45 potential conduit wells, six were removed from the list as they do not appear to be acting as conduits. In 1985, the District's Groundwater Protection Section pursued destroying the remaining 39 wells through District Ordinance No. 85-1. This ordinance gives the District authority to require owners of wells determined to be "public nuisances" to destroy the wells or to upgrade them to active or inactive status. Of the 39 potential conduit wells identified, 10 were not located and were presumed destroyed without a permit. The remaining wells were all properly destroyed.

The District continues to monitor the extent and severity of saltwater intrusion. The current Saltwater Intrusion Monitoring Program consists of 21 monitoring wells that are sampled quarterly as shown in Figure 5-5. Five of these wells monitor the status of saltwater intrusion in the lower aquifer zone, while the remaining 16 wells monitor the upper aquifer zone. Originally, the program consisted of 25 wells. Eight of these wells could not be located during recent field investigations and presumably were destroyed by the owners. However, work is commencing to replace the lost wells with District-owned wells and restore the monitoring program to its original form.

Figure 5-5
Saltwater Intrusion Monitoring Locations



Future Direction
The present status of the Saltwater Intrusion Prevention Program is subject to change, depending upon the future basin operation and groundwater demand in the area. The two economically practical ways to prevent or minimize any further intrusion are through management of the groundwater basin and strict enforcement of ordinances on well construction and destruction standards. These approaches have been adopted by the District and should continue to be implemented.

Saltwater intrusion continues to be monitored. Monitoring data are stored by electronic and conventional means. Electronic storage consists of a geographically referenced database of monitoring wells and a related database of water quality information. Conventional storage consists of filing hard copies of laboratory analytical reports in the appropriate well folders and providing data to DWR. Biennial evaluations of the data are documented in the General Groundwater Quality Monitoring Program reports. The monitoring program, including well location and sampling frequency, will be evaluated with respect to long-term groundwater quality protection strategies and overall basin management.

WELL CONSTRUCTION/DESTRUCTION PROGRAMS

Well Ordinance

Program Objective
The objective of the Well Ordinance Program is to protect the County's groundwater resources by ensuring that wells and other deep excavations are constructed, maintained and destroyed such that they will not cause groundwater contamination. To meet this goal, the Well Ordinance Program:

- Develops standards for the proper construction, maintenance, and destruction of wells and other deep excavations.
- Educates the public, including contractors, consultants and other government agencies about the Well Ordinance and the Well Standards.
- Verifies that wells are properly constructed, maintained and destroyed using a permitting and inspection mechanism.
- Takes enforcement action against violators of the well ordinance.
- Maintains a database and well mapping system to document information about well construction and destruction details, a well's location, and well permit and well violation status.

The scope of the Well Ordinance Program includes all activities relating to the construction, modification, maintenance, or destruction of wells and other deep excavations in the County.

Background

In the late 1960s, following post-war industrialization and development of Santa Clara County, it became apparent that abandoned or improperly constructed wells and other deep excavations (e.g. elevator shaft pits) are potential conduits through which contaminants can travel from shallow, potentially contaminated aquifers, to deeper drinking water aquifers. Recognizing this, in 1971, a District advisory committee consisting of representatives from local agencies, the District, and the Association of Drilling Contractors, was established.

The committee was charged with the development of well construction standards and standards for the proper destruction of abandoned wells. The Board adopted standards for well destruction and construction in October 1972 and January 1975, respectively. In 1975, the District Board of Directors passed the first District Well Ordinance.

Both the Standards and the Well Ordinance have undergone numerous revisions. The most recent version of the well standards, the *Standards for the Construction and Destruction of Wells and Other Deep Excavations in Santa Clara County*, was adopted by the Board in July 1989. The Board passed district Well Ordinance 90-1 in April 1990. These documents address the permitting and proper construction and destruction of wells and other deep excavations, including water supply wells, monitoring wells, remedial extraction wells, vadose wells, cathodic protection wells, injection wells, storm water infiltration wells and elevator shaft pits.

Beginning in 1975, well construction and destruction permits were required by the District and the District began inspecting every well that was constructed. Well destruction activities were first inspected by the District in 1984.

Since the inception of well permitting, the annual number of permits issued has greatly increased. The District issued approximately 400 well permits in 1976, the first full year of permitting, to a maximum of approximately 2,544 permits in 1994.

The District is in compliance with Sections 13803 and 13804 of the State Water Code and thereby has the authority to assume the lead role in the enforcement of the State Well Standards, the assignment of State Well Numbers, and the collection of State Drillers Reports for all wells constructed or destroyed in Santa Clara County.

Current Status

To date, the District has permitted and inspected the construction of approximately 3,000 water supply wells, 22,000 monitoring wells, 4,000 exploratory borings, and the destruction of 9,500 wells under the Well Ordinance Program.

The District has recently completed converting the paper-based well maps to a GIS based well mapping system.

Future Direction
In order to continue protecting the District's groundwater resource, the District will continue implementation of the program and will continue to regulate the construction and destruction of wells in the County. District staff will re-write District's well standards and ordinance to address recent changes in well construction and destruction techniques. District staff is also currently evaluating District's existing well information database and would like to convert the database into a relational database format and link it to the newly developed GIS based Well Mapping System.

Dry Well Program

Program Objective
The objective of the Dry Well Program is to minimize the impacts of dry wells on groundwater quality. The main objectives of this program are to:

- Control installation of new dry wells.
- Destroy existing dry wells that have contaminated or may contaminate groundwater.
- Educate planning agencies and the public about the threat that dry wells pose to groundwater quality.

Background
Dry wells, also known as storm water infiltration devices, are designed to direct storm water runoff into the ground. Storm water runoff can carry pollution from surface activities. Because dry wells introduce runoff directly into the ground, they circumvent the natural processes of pollution breakdown and thereby increase the chance of groundwater contamination. Additionally, dry wells have been sites of illegal dumping of pollutants.

In Santa Clara County, at least 8 serious contamination sites were caused or aggravated by the presence of dry wells introducing contamination into the groundwater. One dry well site has a solvent plume more than 2,000 feet long and more than 200 feet deep in a recharge area of South County where the only source of drinking water is groundwater.

In 1974, the Environmental Protection Agency (EPA) developed the Underground Injection Control Program under the Safe Drinking Water Act. The program requires the owners and operators of all shallow drainage wells to submit information regarding the status of each well to the EPA. The Regional Board adopted the "Shallow Drainage Wells" amendment to the Basin Plan in 1992. The Basin Plan amendment requires the local agency to develop a shallow drainage well control program that would locate existing shallow wells and establish a permitting program for existing and new wells.

In 1991, the District and municipal agencies began development of a Storm Water Infiltration Policy to satisfy Regional Board requirements. In August 1993, the District adopted Resolution 93-59 regarding Storm Water Infiltration Devices.

Current Status
Since 1993, owners of dry wells deeper than 10 feet have been required to register their wells by filing a "Notice to Continue Use" with the District. Dry well owners can continue using their wells as long as the well is not an immediate threat to groundwater quality. Local cities, businesses, contractors and private citizens regularly call for District guidance on dry wells.

The District continues to issue permits for dry wells greater than 10 feet deep and for the destruction of dry wells. District staff advise the public and planning agencies about the appropriate use of dry wells to mediate storm water problems generally and on a case-by-case basis. District staff continue to work with local programs to clarify the District dry well policy. Local inspecting agencies continue to work with the District to locate and register dry wells.

Future Direction
The Dry Well Program is being incorporated into the Well Ordinance Program. Specific standards for dry wells will be incorporated into the next revision to the Well Standards. These standards include prohibiting the construction of dry wells greater than 10 feet deep and defining dry wells to include all shallow drainage wells, not just shallow drainage wells receiving storm water. The purpose of revising the program to incorporate it into the Well Ordinance Program is to clarify permitting and construction standards for dry wells, to expand the definition of devices covered by the Well Standards so that all wells that bypass natural protection processes are subject to standards for protecting groundwater, and to simplify the process by which dry wells are permitted.

Abandoned Water Well Destruction Assistance

Program Objective
The objective of the Abandoned Well Destruction Assistance Program is to protect the County's groundwater resources by helping property owners properly destroy old, abandoned water supply wells that they have discovered.

To meet the program's objective, the District:

- Passed a Board Resolution (94-87) allowing District assistance to property owners who discover abandoned wells.
- Enters into annual contracts with well drillers to complete work associated with the project.
- Destroys abandoned wells for property owners.

Background
Due to the agricultural history of the County and to subsequent post-World War II development, many former water supply wells were abandoned and buried and remain

potential vertical conduits that may transport contaminants into the District's deep, water supply aquifers.

Some estimates indicate that there may be as many as 10,000 abandoned water supply wells within the boundaries of the Santa Clara Subbasin. Since there are no official records for these wells, the District has no knowledge of their existence or their locations.

In the mid-1980s, the District took a proactive stance on active and abandoned water supply wells found within known contamination plumes. At that time, with assistance from the Regional Board, the District actively searched for and destroyed known active wells and abandoned wells.

However, when abandoned water wells were discovered in areas not threatened by known groundwater contamination, they were not included in the District's well destruction efforts, but instead were treated as well violations under the Well Ordinance Program. As well violations, the District proceeded with enforcement action to force the property owner to properly destroy the well.

Unfortunately, this enforcement action often took months to complete. Property owners often didn't have the $3,000 to $15,000 dollars needed to destroy the well and had to secure loans to complete the destruction. Many property owners had negative feelings about the District after the enforcement action, especially considering that most property owners had no previous knowledge of the well and when they had discovered the well, they had been the first to inform the District of its existence.

District staff believed that while a well was found on an owner's property (and according to the Well Ordinance, that the property owner is responsible for destroying it), the owner wasn't actually responsible for the well's current status (abandoned and buried) and because the destruction of the well was in the best interest of the District, that the District should destroy it.

Therefore, in 1994, the District initiated the Abandoned Well Destruction Assistance Program to aid property owners who happen to discover an abandoned water supply well on their property. Under the Abandoned Well Destruction Program, the District destroys abandoned water wells if: 1) the property owner had no previous knowledge of the well, 2) the well was not registered with the District, 3) the well has no surface features that would have obviously indicated its presence, and, 4) the property owner enters into a Right of Entry Agreement with the District.

Current Status

Since the program's inception in 1994, the District has destroyed 108 abandoned wells under the Abandoned Well Destruction Program. Most of these wells were first discovered and reported to the District because they were flowing under artesian pressure.

Future Direction
Staff will continue to implement the program. Annually, staff receives reports of approximately 20 wells that meet program criteria and staff expect that this trend to continue.

WELLHEAD PROTECTION

Program Objective
The Wellhead Protection Program (WHP) represents the groundwater portion of the District's Source Water Assessment Program. The objective of the Wellhead Protection Program is to identify areas of the groundwater basin that are particularly vulnerable to contamination. The District uses this knowledge to focus groundwater protection, monitoring, and cleanup efforts.

Background
Groundwater vulnerability is based on groundwater sensitivity to contamination and the presence of potentially contaminating activities. Groundwater sensitivity is evaluated based on hydrogeology and groundwater use patterns. Areas with shallow groundwater, high recharge, high conductivity aquifers, permeable soils and subsurface materials, mild slopes, and high groundwater pumping rates are most sensitive to contamination. The District compiles data on hydrogeologic conditions, pumping patterns, and contamination sources, and uses GIS technology to identify areas of the groundwater basin that are particularly vulnerable to contamination.

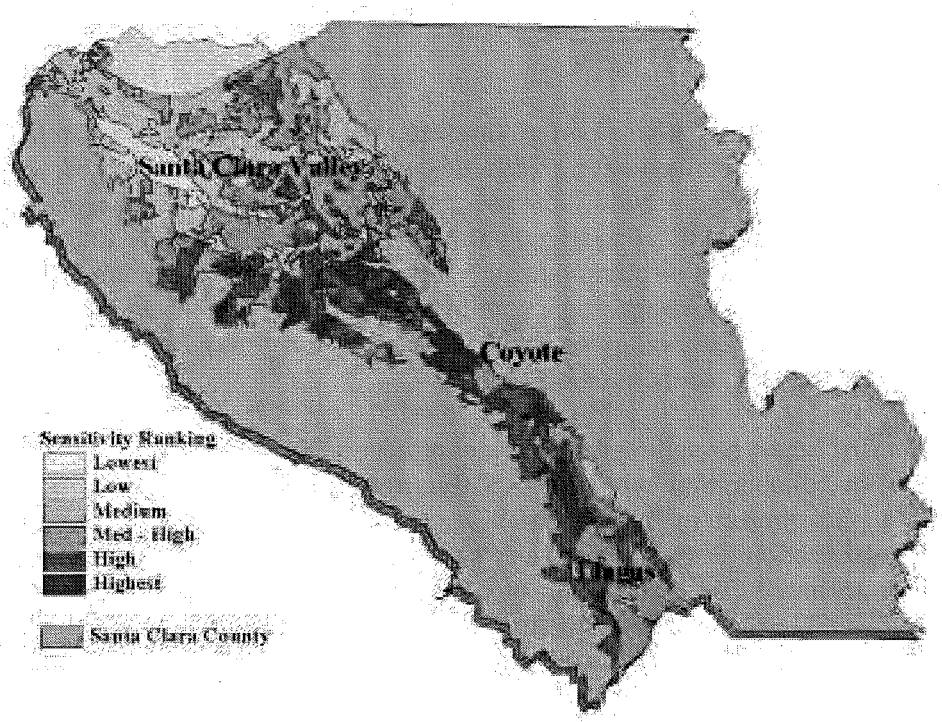
The District first began compiling groundwater protection data in the late 1980's. In 1989, the District, in collaboration with the U.S. Environmental Protection Agency (EPA), conducted a pilot project in the Campbell area to evaluate the usefulness of GIS for groundwater protection. Data on roads, city boundaries, hazardous material storage sites, groundwater recharge facilities, wells and hydrogeology were collected and used to create GIS coverages for the Campbell study area. The project team used GIS to evaluate groundwater sensitivity and draw areas to be protected around production wells. The study concluded that GIS is a feasible tool to use for WHP programs.

After the Campbell pilot study, the District expanded its groundwater protection data collection effort to encompass the entire County. Staff developed Countywide GIS coverages of active wells, abandoned and destroyed wells, geology, soil types, depth to groundwater, leaking underground storage tank sites, and petroleum storage facilities. This data, along with water quality data, is used to identify and evaluate threats to groundwater quality.

Current Status
The District created a groundwater sensitivity map to evaluate land use development proposals and make recommendations for appropriate groundwater protection strategies. In 1996, the District built upon the pilot GIS project to assess groundwater sensitivity throughout the groundwater basin using EPA's DRASTIC method. DRASTIC stands for

depth to water table, net recharge, aquifer media, soil media, topography, impact of the vadose zone, and hydraulic conductivity of the aquifer. The DRASTIC method is a quantitative evaluation of these hydrogeologic factors to assess relative groundwater sensitivity. The results of this effort were several GIS coverages and a groundwater sensitivity map (Figure 5-6), which the District uses to review land development proposals. In sensitive groundwater areas, the District requests that planning agencies require, and that property owners implement, best management practices and other protection activities beyond those required by minimum standards.

Figure 5-6
Groundwater Sensitivity Map



Staff uses information on land use and the location of contaminated sites to help identify and evaluate the sources of contamination that are detected in wells. Although groundwater quality is generally good throughout the basin, contamination is occasionally detected in individual wells. By quickly locating contamination sources, we can work with the regulatory agencies to ensure prompt and adequate cleanup.

The District also uses information on well construction, well location, well pumping, leaking Underground Storage Tank (UST) site locations and conditions, land use, and hydrogeology to prioritize leaking UST sites and identify vulnerable water supply wells. Sites that pose the greatest threat to groundwater supplies are the first to receive detailed regulatory oversight. Staff also uses this information to select wells for groundwater monitoring and special studies.

District staff is working with local water retailers on the state's Drinking Water Source Assessment and Protection (DWSAP) Program. The state's DWSAP Program is required by the 1996 reauthorization of the federal Safe Drinking Water Act. California has until May 2003 to assess all of its drinking water sources for vulnerability to contamination. The District developed a GIS-based wellhead assessment and protection area delineation tool, which delineates protection areas according to state guidelines. Once the vulnerability assessments are completed in Santa Clara County, the District will work with the water retailers to ensure that the greatest threats to their drinking water supply wells are being addressed.

Future Direction

District staff continues to create GIS coverages that help assess groundwater vulnerability. Some coverages that are in development include solvent contamination sites and plumes, dry cleaners, hazardous materials storage facilities, septic system locations, and sewer lines. The District has found great utility in these GIS coverages, and is beginning to work with other agencies and organizations to determine how we can share GIS information and increase its use for groundwater protection. We will continue to use this information to identify areas vulnerable to groundwater contamination, and focus our monitoring, protection, and cleanup efforts.

LEAKING UNDERGROUND STORAGE TANK OVERSIGHT

Program Objective

The objective of the Leaking Underground Storage Tank Oversight Program (LUSTOP) is to protect the groundwater basin from water quality degradation as a result of releases of contaminants from underground storage tanks. The District provides regulatory oversight of the investigation and cleanup of fuel releases from USTs for most of Santa Clara County.

Background

In 1983, the State Legislature enacted the UST Law [Chapter 6.7 of the Health and Safety Code] authorizing local agencies to regulate the design, construction, monitoring, repair, leak reporting and response, and closure of USTs. In the early 1980s, several drinking water wells in the County were shut down as a result of contamination by chlorinated solvents. In 1986, the Board decided to implement a leaking UST oversight program for petroleum fuels in coordination with the San Francisco Bay Regional Water Quality Control Board (RWQCB). The District Board recognized that releases from USTs affect groundwater quality and that effective protection of the County's groundwater basin demanded a proactive approach. They committed financial and technical resources in-house to quickly initiate the program.

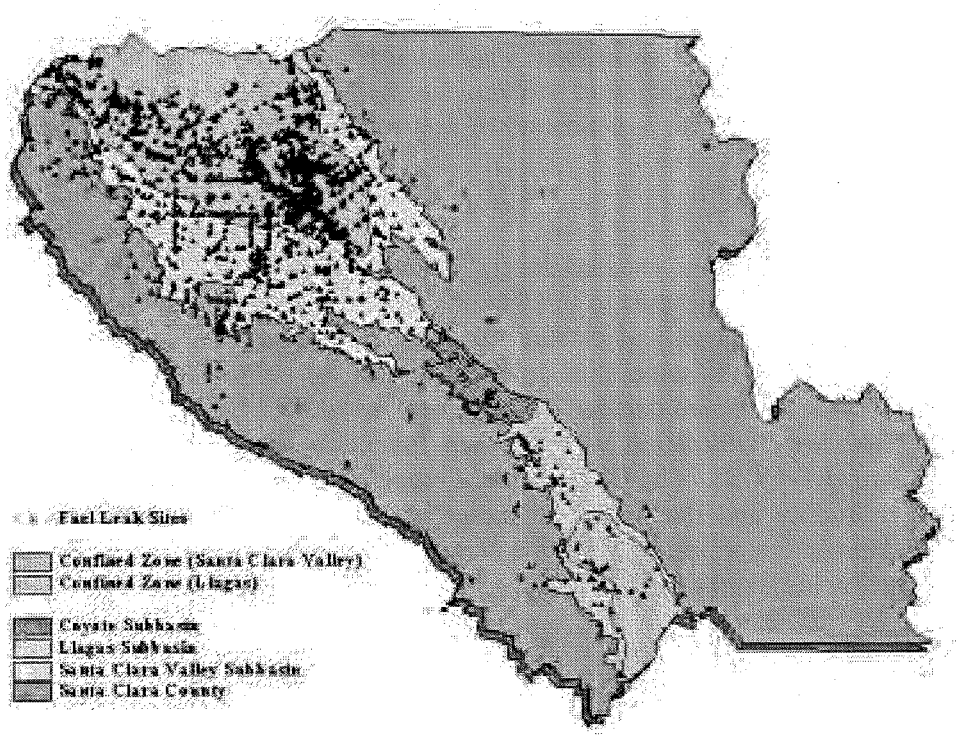
In 1987, the District entered into an informal agreement with the San Francisco RWQCB to create a pilot oversight program. At that time more than 1,000 fuel leaks had been reported within the County. The District developed an in-house technical group of employees capable of providing regulatory oversight of the investigation and cleanup of

releases from USTs. In 1988, the District and the County of Santa Clara entered into a contract with the State Water Resources Control Board to implement one of the State's first Local Oversight Programs. This allowed the District to get reimbursed by state and federal funds for costs associated with operation of the program.

The State Water Resources Control Board (SWRCB) amends its Local Oversight Program contract with the District and the County annually. Over the years, many changes have occurred in the UST regulatory process as new laws were passed, scientific knowledge improved, and new investigation and cleanup strategies became available. The District's program actively participates in ensuring that new laws and regulations continue to protect groundwater quality into the future. The District has been at the forefront of several initiatives for improving the effectiveness and efficiency of our regulatory oversight efforts and the cost-effectiveness of corrective action while protecting human health, safety, the environment and water resources.

Every leaking petroleum UST case is currently assigned to a District caseworker who provides technical and regulatory guidance to responsible parties and their consultants (Figure 5-7).

Figure 5-7
Fuel Leak Cases in Santa Clara County



The District only provides regulatory oversight on investigation and cleanup at UST sites where a release has occurred. Tank removals, leak prevention, and UST release detection activities are overseen by one of 10 other agencies, usually the local fire department. Each agency has jurisdiction over a designated geographical area in the County. If there is evidence of a leak or if contamination is detected, an agency inspector or UST owner/operator notifies the District and/or the Regional Board. The District reviews the data to confirm the release, lists the site on the Leaking Underground Storage Tank Oversight Program database, and notifies the responsible party and the SWRCB. The District then determines if the unauthorized release poses a threat to human health and safety, the environment, or water resources and, if necessary, a caseworker requests additional investigation and cleanup.

To get case closure for the release, the responsible party must provide evidence that the release does not pose a significant threat to human health and safety, the environment or water resources; or, that the release has been adequately investigated and cleaned up. Fuel leak investigation and cleanup is closely monitored by a caseworker, and the case is promptly closed when the unauthorized release no longer poses a threat to human health, safety, the environment or water resources.

Current Status

As of January 2000, a total of 2,315 fuel leak cases have been reported in the County, the majority of which have affected groundwater. Approximately 1,650 (71 percent) of reported leak cases have been closed. About 575 cases are currently within the District's UST program, while about 75 cases receive Regional Board oversight. As a local oversight program, the District has made significant progress in closing low-risk sites and sites that have performed appropriate corrective action to reduce contamination to below levels of regulatory concern.

The presence of Methyl tert-Butyl Ether (MTBE) in gasoline has precipitated additional changes in the UST regulatory process and the manner in which sites are investigated and cleaned up. Since 1995, MTBE and other oxygenates have emerged as significant contaminants at fuel leak sites within the County, causing increased concern for the protection of groundwater resources. MTBE has been blended into gasoline in high percentages (up to 15 percent by volume) beginning in the winter of 1992 with the intent to significantly improve air quality. However, MTBE is a recalcitrant chemical in groundwater, as it does not undergo significant breakdown (bio-degradation) in groundwater. As a result, MTBE contamination can migrate considerable distances in groundwater and may impact wells miles downgradient. MTBE has been detected at more than 375 current fuel leak cases in the County, with concentrations at these sites ranging from 5 parts per billion to more than 1 million parts per billion. The District has taken a progressive and vigilant approach to protecting groundwater resources from MTBE contamination through the use of GIS to manage and analyze both UST site and regional information and in demanding a more intense and detailed level of work be performed at MTBE release sites.

The District is also very concerned regarding the increasing occurrence of MTBE at operating gasoline stations, which poses a significant threat to municipal drinking water wells within the County. In response to this threat, the District completed two studies of operating gasoline stations that were in compliance with the 1998 UST upgrade requirements. The first study, completed by Levine-Fricke in 1999, involved soil and groundwater sampling at 28 facilities to determine if releases were occurring from upgraded UST systems. MTBE was detected in groundwater at 13 of the 27 sites where groundwater was encountered. The second study, completed in 2000 (SCVWD, 2000), was a case study of 16 sites with operating USTs and high levels of MTBE in groundwater to evaluate whether undetected releases are occurring and to assess weaknesses in fuel storage, management, and delivery operation. Of the 16 sites studied, undetected releases were suspected at 13 sites.

Despite the fact that gasoline stations have been upgraded to meet stringent requirements, it is clear that faulty installations, poor maintenance and poor facility operation practices are resulting in leaks, and that improvements in the management of USTs are needed to prevent widespread contamination of groundwater.

Future Direction

The District continues to provide technical guidance and regulatory oversight to cases using improved scientific knowledge and latest investigation and cleanup strategies. The District will continue to work closely with local universities, research organizations, the water community, major oil companies, local, state and federal agencies, and the state and federal legislature to ensure that problems in the UST program are identified and that prompt effective solutions are implemented to protect groundwater quality.

An effective UST leak prevention and monitoring program is essential. There are several studies underway regarding the effectiveness of leak prevention and monitoring systems at sites. The District will continue to monitor all developments in this area and propose ongoing studies and/or regulatory changes. To ensure water resources are protected, the District actively participates in the legislative process to ensure that recalcitrant chemicals like MTBE that can cause significant groundwater degradation are not used in fuels.

One of the biggest concerns for the District regarding MTBE is the significance of both short-term and long-term threats to groundwater quality. The District is committing additional resources to gain a more extensive understanding of the groundwater basin, groundwater flow patterns, and groundwater pumping trends. This improved understanding allows for better decisions regarding: the level of oversight necessary at sites; how much investigation is required to properly understand the nature and extent of contamination at sites; the level of cleanup necessary to protect groundwater resources; and the effectiveness of the program in preventing significant short-term and long-term water quality degradation.

The District will continue responding to the public regarding USTs and groundwater contamination and will ensure that files and information are available for public review.

District staff plan to have all fuel leak files scanned and electronically accessible over the Internet in the near future. Program guidance, site information, and news of the latest developments in the program are available on the District's web site.

TOXICS CLEANUP

Program Objective

The objective of the Toxics Cleanup Program is to ensure the protection of the groundwater basins from water quality degradation as a result of toxics and solvent contamination and spills of other non-fuel chemicals. The District performs peer review of these cases and makes water use and geologic information available to the public and environmental consultants. District staff also provide expert technical assistance to the regulatory agencies (County of Santa Clara, San Francisco and Central Coast Regional Boards, Department of Toxics Substances Control, and the Federal Environmental Protection Agency) responsible for the oversight of investigation and cleanup at non-fuel contaminated sites within Santa Clara County.

Background

Since the late 1970s, the District has provided expert technical and hydrogeologic assistance to agencies having the legal responsibility for the protection of the water resources serving the needs of Santa Clara County. The discovery of groundwater contamination at Fairchild Semiconductor in 1981 resulted in heightening the awareness for the protection of groundwater quality and the need for the District to be actively involved in ensuring that appropriate investigation and cleanup of sites was undertaken in a timely manner. District staff were actively involved with the review and analysis of early laws governing the regulation of underground storage tanks and hazardous materials and in laws, regulations, and policies to ensure groundwater resource protection. District staff have documented the migration of contamination down abandoned wells and conduits and fashioned a well installation and destruction ordinance to ensure that wells were properly installed and potential conduits properly destroyed.

Current Status

The District has records of over 700 releases of non-fuel related cases involving the release of solvents, metals, pesticides, Polychlorinated Biphenyls (PCBs), and a variety of other chemicals in Santa Clara County. The San Francisco Bay RWQCB provides regulatory oversight on over 600 cases in the Santa Clara Valley and Coyote Subbasins. The Central Coast RWQCB provides oversight on an estimated 35 cases in the Llagas Subbasin. The California Department of Toxics Substances Control provides oversight of 17 cases and the Federal EPA provides oversight of 11 sites.

The District maintains an elaborate filing system for these cases that is heavily used by the environmental consultants and the public researching contaminated sites. District staff actively track and peer review the most serious of these cases (primarily the Superfund sites). Staff provide review and comment on Site Cleanup Requirements and Cleanup and Abatement Orders prepared by the Regional Boards and investigation and cleanup reports prepared for these sites. The District provides geologic and technical

expertise to responsible parties (site owners and operators) and their consultants and staff, and regularly participate in various committees and public meetings to ensure groundwater protection issues are properly addressed.

Future Direction
The District plans to continue these efforts in addition to conducting a review of all the recorded cases to ensure that all have been properly addressed by the various regulatory agencies. Many cases have remained "inactive" and may not have performed appropriate investigation and cleanup. The District plans to inform the regional boards and other agencies of these reviews and assist them to ensure appropriate work is performed. The District also plans to make more information available regarding geologic conditions and the status of solvent and toxics cases in GIS and over the Internet.

LAND USE AND DEVELOPMENT REVIEW

Program Objective
The objective of the Land Use and Development Review Program is to evaluate the land use and developments occurring within the County for adverse impacts to watercourses under District jurisdiction and to other District facilities, including the pollution of groundwater.

Background
Land development decisions made by the cities and the County influence a variety of issues related to water quality and quantity. The District reviews land development proposals, identifies any potential adverse impacts to District facilities and provides comments to the lead agency charged with making the final decision for the proposals. The District also reviews Draft Environmental Impact Reports (DEIRs) and/or EIRs and provides comments to the lead agency.

Current Status
The District reviews and comments on proposed land development, environmental documents and city and County General plans. Review of land development proposals includes a determination of direct and indirect impacts to District facilities. Indirect impacts could result from increased runoff and flooding due to new impervious surface or introduction of pollutants to a watercourse from construction activities or urban runoff. Direct impacts to watercourses under District jurisdiction are addressed through the District's permitting program as defined by Ordinance 83-2.

This ordinance allows the District to investigate whether a proposed project or activity will:

a. Impede, restrict, retard, pollute or change the direction of the flow of water.

b. Catch or collect debris carried by such water.

c. Be located where natural flow of the storm and flood waters will damage or carry any structure or any part thereof downstream.

d. Damage, weaken, erode, or reduce the effectiveness of the banks to withhold storm and flood waters.

e. Resist erosion and siltation and prevent entry of pollutants and contaminants into water supply.

f. Interfere with maintenance responsibility or with structures placed or erected for flood protection, water conservation, or distribution.

If a project appears likely to do any of the above, the District may deny or conditionally approve the permit application for the proposed project.

Future Direction

The California Environmental Quality Act (CEQA) provides the District an opportunity to comment in areas relevant to the issues listed above; however, cities need to make certain these issues are adequately addressed and treated. The use of Ordinance 83-2 and CEQA have generally not effected adequate attention to these issues.

In years past the District has relied on local agencies to place conditions on development projects and to include provisions that address District water supply and flood protection measures. The recent increase in development and land use coupled with more stringent environmental concerns and requirements imposed by other regulatory agencies has made it necessary for the District to shift to a more proactive approach and to undertake greater participation in development planning activities. District land use and development review staff plan to participate on interagency project teams, conduct general plan review and revision, and development of relevant policies (such as riparian corridor and building setback policies). The program will also seek revisions to Ordinance 83-2, and greater education of land development planning staff and officials.

Additional Groundwater Quality Management Activities

Groundwater Guardian Affiliate

The District was designated as Groundwater Guardian Affiliate for the year 2000. Groundwater Guardian is an annually earned designation for communities and affiliates that take voluntary, proactive steps toward groundwater protection. The district earned the designation in 2000 based on activities such as conducting irrigation, nutrient, and pesticides management seminars, sponsoring a mobile irrigation management laboratory, and creating a prototype zone of contribution delineation tool for delineating wellhead protection areas. The Groundwater Guardian Program is sponsored by The Groundwater Foundation, a private, international, not-for-profit education organization that educates and motivates people to care about and for groundwater. The District will continue to participate in the program by submitting annual work plans and reports documenting our groundwater protection efforts.

Comprehensive Reservoir Watershed Management

The District has initiated a Comprehensive Reservoir Watershed Management Project to protect the water quality and supply reliability of the District's reservoirs. The District seeks to balance watershed uses, such as the rights of private property owners and public recreational activities, with the protection and management of natural resources. The District recognizes that preserving beneficial watershed uses can benefit reservoir water quality, which in turn benefits drinking water quality delivered to the District treatment plants and recharged into the groundwater basins.

Watershed Management Initiative

The District is an active participant in the San Francisco Bay Regional Water Quality Control Board's Santa Clara Basin Watershed Management Initiative (WMI). The purpose of the WMI is to develop and implement a comprehensive watershed management program. The goals of the WMI include balancing the objectives of water supply management, habitat protection, flood management, and land use to protect and enhance water quality, including the quality of water used for groundwater recharge and water in the groundwater basins. The WMI will develop a watershed management plan that will set out agreed upon actions to meet stakeholder goals, including water quality protection and enhancement.

Non-Point Source Pollution Control

The District along with other agencies is the co-permittee for National Pollution Discharge Elimination System (NPDES) permit number CAS029718. The co-permittees formed the Santa Clara Valley Urban Runoff Management Program in 1990 to develop and implement efficient and uniform approaches to control non-point source pollution in storm water runoff that flows to the South San Francisco Bay, in compliance with NPDES permit responsibilities.

Chapter 6
SUMMARY

The many groundwater management programs and activities described in this document demonstrate that the District is proactive and effective in terms of ensuring that groundwater resources are sustained and protected. A summary of existing District groundwater programs is presented here, organized by report section.

Groundwater Supply Management
The objective of the District's groundwater supply management programs is to sustain groundwater resources by replenishing the groundwater basin, increasing basin supplies, and mitigating groundwater overdraft. This is currently achieved through:

- In-stream recharge, including controlled and uncontrolled recharge through District facilities.
- Off-stream recharge through District percolation ponds and abandoned gravel pits, including activities to reduce turbidity of incoming water.
- Periodic water balance to reconcile water imports, inflows, releases, and changes in surface water storage.
- Direct injection recharge facilities.
- Water use efficiency programs.
- Estimation of operational storage capacity.
- Subsidence and groundwater flow modeling to evaluate potential impacts to the groundwater basin.
- Public outreach and education for water use efficiency programs.

Groundwater Monitoring
The District's groundwater monitoring programs provide basic data to assist in the evaluation of groundwater conditions. Programs include:

- Groundwater quality monitoring, including sampling for general minerals, trace metals, and physical characteristics.
- Groundwater elevation monitoring, including depth-to-water measurements and the development of groundwater contour maps.
- Groundwater extraction monitoring, which tracks groundwater use throughout the County.

- Land subsidence monitoring, which measures existing subsidence.

Groundwater Quality Management
Existing programs designed to protect the groundwater from contamination and the threat of contamination include the following:

- Nitrate management program designed to delineate, track, and manage nitrate contamination by monitoring nitrate occurrence, and by reducing further loading and the public's exposure to nitrate.

- Saltwater intrusion prevention program to prevent freshwater aquifers from degradation through monitoring and the sealing of contaminant conduit wells.

- Well construction and destruction programs to protect groundwater resources by ensuring that wells will not allow the vertical transport of contaminants.

- Wellhead protection program to identify areas of the basin that are particularly vulnerable to contamination to focus groundwater protection, monitoring, and cleanup efforts.

- Leaking underground storage tank oversight program to protect the groundwater from water quality degradation and provide regulatory oversight of investigation and cleanup of fuel releases from underground tanks.

- Toxics cleanup program to protect the basin from contamination by non-fuel chemicals.

- Land use and development review to evaluate land use proposals in terms of potential adverse impacts to District facilities.

- Public outreach and education for groundwater quality management programs.

Recommendations
In 1999, the District Board of Directors established Ends Policies that direct the Chief Executive Officer/General Manager to achieve specific results or benefits. The following Ends Policies are related to groundwater:

E.1.1.2. The water supply is reliable to meet current demands.
E.1.1.3. The water supply is reliable to meet future demands as identified in the District's Integrated Water Resource Plan (IWRP) process.
E.1.1.4. There are a variety of water supply sources.
E.1.1.5. The groundwater basins are aggressively protected from contamination and the threat of contamination.
E.1.1.6. Water recycling is expanded consistent with the District's Integrated Water Resource Plan (IWRP) within Santa Clara County.
E.1.2.2.3. Groundwater supplies are sustained.

Two of the Ends Policies directly relate to the management of groundwater resources: 1.1.5 - The groundwater basins are aggressively protected from contamination and the threat of contamination, and 1.2.2.3 - Groundwater supplies are sustained. As the District is now formally guided by these policies, we need to ensure that program outcomes match these ends.

Although the District manages the basin effectively, there is room for improvement of the groundwater programs in terms of meeting the Ends Policies and in the coordination and integration of the programs. Specific areas where further analysis is recommended include:

1. **Coordination between the Groundwater Management Plan and the Integrated Water Resources Plan (IWRP)** – As the District's water supply planning document through 2040, the IWRP has identified the operation of the groundwater basin as a critical component to help the District respond to changing water supply and demand conditions. Planning and analysis efforts for future updates of the Groundwater Management Plan and the IWRP need to be integrated in order to provide a coordinated and comprehensive water supply plan for Santa Clara County.

2. **Integration of groundwater management programs and activities** – Individual groundwater management programs tend to be implemented almost independently of other programs. A more integrated approach to the management of these programs, and to the management of the basin overall needs to be developed. Integration of these programs and improved conjunctive use strategies will result in more effective basin management.

3. **Optimization of recharge operations** – As artificial recharge is critical to sustaining groundwater resources, an analysis of the most effective amount, location, and timing of recharge should be conducted.

4. **Improved understanding of the groundwater basin** – In general, the existing groundwater management programs seem to focus on managing the basin to meet demands and protecting the basin from contamination and the threat of contamination. However, improving the District's understanding of the complexity of the groundwater basin is critical to improved groundwater management. The more we know about the basin, the better we can analyze the impact of different groundwater scenarios and management alternatives.

5. **Effective coordination and communication with internal and external agencies** – Improved communication and coordination will lead to improved groundwater management programs. Increased sharing of ideas, knowledge, and technical expertise among people involved with groundwater at the District will result in increased knowledge, well-coordinated and efficient work, and well-informed analyses and conclusions. Improved coordination with external agencies, such as retailers and state and federal organizations, will result in improved knowledge of customer needs and increased awareness of District activities.

A detailed analysis of the areas above and of all groundwater programs as they relate to Ends Policies and the groundwater management goal is recommended.

The next update of the Groundwater Management Plan, scheduled for 2002, will address the issues above and the overall management of the basin by presenting a formal groundwater management strategy for achieving the groundwater management goal in a practical, cost-effective, and environmentally-sensitive manner. The update will evaluate each groundwater program's contribution and effectiveness in terms of the groundwater management goal and Ends Policies. Measurement criteria will be developed, and if there is no direct connection between the Ends Policies and a specific program, that program's contribution to other linked programs will be analyzed. The update will include recommendations for changes to existing programs or for the development of new programs, standards, or ordinances. The update will also develop an integrated approach for the management of groundwater programs, and for the management of the groundwater basin in general.

Groundwater is critical to the water supply needs of Santa Clara County. Therefore, it is of the utmost importance that the District continues the progress begun with this Groundwater Management Plan. Increased demands and the possibility of reduced imported water in the future make effective and efficient management of the groundwater basin essential. The Groundwater Management Plan and future updates will identify how the management of the groundwater basin can be improved, thereby ensuring that groundwater resources will continue to be sustained and protected.

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Appendix G

San Jose Municipal Water System
2010 Urban Water Management Plan
Water Shortage Contingency Plan and Municipal Code

Resolution No. 63593

A RESOLUTION OF THE CITY OF SAN JOSE APPROVING THE WATER SHORTAGE CONTINGENCY PLAN IN THOSE AREAS OF NORTH SAN JOSE, ALVISO, EVERGREEN, EDENVALE AND COYOTE SERVICED BY THE SAN JOSE MUNICIPAL WATER SYSTEM

WHEREAS, the California Legislature enacted Assembly Bill 11X to amend Water Code Sections 10620, 10621, 10631 and 10652, and added to Section 10656 during the First Extraordinary Session of 1991-92 such that each urban water supplier shall prepare, adopt, and submit to the California Department of Water Resources an amendment to its Urban Water Management Plan, the primary objective of which is to plan for water supply shortages; and

WHEREAS, the City of San Jose prepared and filed an Urban Water Management Plan with the California Department of Water Resources in May of 1991; and

WHEREAS, AB 11X mandates that every urban water supplier providing municipal water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre feet of water annually to develop a Water Shortage Contingency Plan and file said Plan with the California Department of Water Resources; and

WHEREAS, there have now been five consecutive years of drought; and

WHEREAS, local water shortage reserves within the Santa Clara Valley have been severely depleted by the drought; and

WHEREAS, the City of San Jose is an urban supplier of water providing water to more than 16,000 customers, and has therefore prepared and circulated for public review a Draft Water Shortage Contingency Plan, in compliance with the requirements of AB 11X, and a properly noticed public hearing regarding said Draft Plan was held by the City on February 28, 1992, and a Final Water Shortage Contingency Plan prepared;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of San Jose that:

1. The Water Shortage Contingency Plan is hereby approved and ordered filed with the City Clerk;

2. The City Manager is hereby authorized and directed to file this Plan with the California Department of Resources;

3. The City Manager is hereby authorized to declare a Water Shortage Emergency and implement this Water Shortage Contingency Plan.

ADOPTED this 24th day of March, 1992, by the following vote:

AYES: ALVARADO, BEALL, HEAD, JOHNSON, LEWIS, PANDORI, SAUSEDO, STABILE; HAMMER

NOES: NONE

ABSENT: IANNI, SHIRAKAWA

SUSAN HAMMER, Mayor

ATTEST:

PATRICIA L. O'HEARN, City Clerk

ORDINANCE NO. 28597

AN ORDINANCE OF THE CITY OF SAN JOSÉ AMENDING PARTS 2 AND 3 OF CHAPTER 15.10 OF TITLE 15 OF THE SAN JOSÉ MUNICIPAL CODE TO STRENGTHEN REQUIREMENTS RELATED TO WATER CONSERVATION AND WATER SHORTAGES

WHEREAS, on June 12, 2009, this Ordinance was found to be categorically exempt from environmental review per the provisions of Section 15061(b)(3) of the California Environmental Quality Act of 1970, as amended, under File No. PP09-134;

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF SAN JOSÉ:

SECTION 1. Chapter 15.10 of Title 15 of the San José Municipal Code is amended by adding a Section to be numbered, entitled, and to read as follows:

15.10.045 Food Service Establishment

"Food Service Establishment" means a user that prepares and/or sells food for consumption either on or off the premises or washes utensils or dishes on premises, including, but not limited to, restaurants, sandwich shops, delicatessens, bakeries, cafeterias, markets, bed and breakfast inns, motels, hotels, meeting halls, caterers, retirement and nursing homes or pizzerias.

SECTION 2. Section 15.10.230 of Part 2 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to be entitled and read as follows:

15.10.230 Food Service Establishments.

A. No person shall provide any water to any customer at any Food Service Establishment unless and until the customer requests water.

B. No person shall use any non-water conserving dish wash spray valve in any Food Service Establishment

SECTION 3. Chapter 15.10 of Title 15 of the San José Municipal Code is amended by adding a Section to be numbered, entitled, and to read as follows:

15.19.235 Hotels, Motels and Other Lodgings

The owner and manager of every hotel, motel, inn, guest house, bed and breakfast facility, and every other short-term commercial lodging shall prominently display a written notice in each bathroom of the facility providing customers or guests with the option of helping to conserve water by not having towels and linens laundered daily.

SECTION 4. Section 15.10.290 of Part 2 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows:

15.10.290 Landscape Irrigation

A. No person shall use, permit or allow the use of potable water to irrigate any outdoor landscaping or other vegetated material at any time between the hours of 8:00 a.m. and 6:00 p.m. during Pacific Daylight Savings Time, or between the hours of 10:00 a.m. and 3:00 p.m. during Pacific Standard Time, unless the person using or allowing the use of the water is using a bucket, hand-carried container, or a hose equipped with an automatic positive self-closing valve.

B. No person shall use, permit or allow the use of potable water to irrigate any outdoor landscaping or other vegetated area more than fifteen (15) minutes per day per station when using a landscape irrigation system or a watering device that is not continuously attended, except for landscape irrigation systems that exclusively use very low-flow drip type irrigation systems when no emitter produces more than two (2) gallons of water per hour and weather-based controllers or stream rotor sprinklers that meet a 70% efficiency standard.

C. The restrictions on landscape irrigation contained in this Section do not apply to the following activities:

1. Syringing of golf course greens, golf course tees, lawn bowling greens or lawn tennis courts;

2. The conduct of a landscape water management audit to provide for the evaluation and adjustment of a landscape irrigation system.

SECTION 5. Section 15.10.300 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.300 Water Shortage Measures

A. The City Council may, by resolution, declare a state of water shortage whenever it finds that water supplies are expected to be inadequate to meet at least ninety percent (90%) of projected water demand, or whenever a minimum conservation level of ten percent (10%) or more has been established by the Santa Clara Valley Water District.

B. In adopting such a resolution, the City Council may declare whether the water shortage is a ten percent (10%) shortage; a twenty-five percent (25%) shortage; a thirty percent (30%) shortage; or a forty percent (40%) shortage. In the event

that a water shortage resolution adopted by the City Council fails to declare the level of water shortage, the resolution shall be deemed to be a resolution of a ten percent (10%) water shortage.

C. In addition to the requirements of Part 2 of this Chapter, the provisions of this Part 3 shall apply to all uses of water for such period of time as a water shortage resolution adopted by the Council remains in effect.

SECTION 6. Section 15.10.320 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.320 Ornamental Lakes and Ponds

Upon adoption by the City Council of a resolution declaring a twenty five percent 25%) or greater water shortage, no person shall cause, permit or allow filling or re-filling ornamental lakes or ponds with potable water, except to the extent needed to sustain aquatic life that is of significant value and which has been actively managed within the water feature prior to declaration of a supply shortage level by the City Council.

SECTION 7. Section 15.10.325 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.325 Car Washing

Upon adoption by the City Council of a resolution declaring a twenty-five percent (25%) or greater water shortage, no person shall cause, permit or allow the use of water to wash or clean a vehicle, except at a commercial car washing facility that utilizes a re-circulating water system to capture or reuse water.

SECTION 8. Section 15.10.330 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.330 Residential Swimming Pools and Outdoor Spas

Upon adoption by the City Council of a resolution declaring a twenty five percent (25%) or greater water shortage, no person shall cause, permit or allow re-filling of more than one (1) foot or initial filling of residential swimming pools or outdoor spas with potable water.

SECTION 9. Section 15.10.340 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows:

15.10.340 Cleaning Of Structures And Surfaces

Upon adoption by the City Council of a resolution declaring a twenty-five percent (25%) or greater water shortage, it shall be unlawful for any person to:

A. Use potable water, to clean sidewalks, driveways, patios, decks, tennis courts, parking lots or any other exterior paved or hard-surfaced areas, except by the use of a bucket or pursuant to a prior approved written exception from the Director.

B. Use potable water, to clean the exterior of any building or structure, except as surface preparation for the application of any architectural coating, or in connection with waxing, except by the use of a bucket or pursuant to a prior approved written exception from the Director. For purposes of this section, "structures" includes mobile homes and manufactured homes.

SECTION 10. Section 15.10.350 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.350 Operation of Decorative Fountains

After the adoption by the City Council of a resolution declaring a twenty five percent (25%) or greater water shortage, it shall be unlawful for any person to operate any decorative fountain with potable water unless such decorative fountain is recirculating, non-misting and fully lined.

SECTION 11. Chapter 15.10 of Title 15 of the San José Municipal Code is amended by adding a Section to be numbered, entitled, and to read as follows:

15.10.355 Leak Repair

A. Upon adoption by the City Council of a resolution declaring a forty percent (40%) or greater water shortage no owner or manager or other person responsible for the day-to-day operation of any premises shall fail to initiate repair of any leaking, broken or defective water pipes, faucets, plumbing fixtures, other water service appliances, sprinklers, watering or irrigation systems within forty eight (48) hours after the owner, manager or other responsible person knew or should have known of such leaks, breaks or defects.

B. Upon adoption by the City Council of a resolution declaring a forty percent (40%) or greater water shortage no owner or manager or other person responsible for the day-to-day operation of any premises shall fail to complete repair of any leaking, broken or defective water pipes, faucets, plumbing fixtures, other water service appliances, sprinklers, watering or irrigation systems, as soon as practical after initiation of such repair.

SECTION 12. Section 15.10.370 of Part 3 of Chapter 15.14 of Title 15 of the San José Municipal Code is amended to read as follows

15.10.370 Prohibition on Landscape Irrigation

Upon adoption by the City Council of a resolution declaring a forty percent (40%) or greater water shortage, it shall be unlawful for any person to use or allow the use of potable water to irrigate any outdoor landscaping, unless the person using or allowing the use of the water is using a bucket, hand-carried container, or a hose equipped with an automatic positive self-closing valve, except for the following purposes: fire protection; soil erosion control; maintenance of rare or protected species; maintenance of public parks, playing fields, day care centers, golf course greens and school grounds provided such irrigation is done in a water efficient manner; and irrigation of environmental mitigation projects.

PASSED FOR PUBLICATION of title this 16th day of June, 2009, by the following vote:

AYES:	CAMPOS, CHIRCO, CHU, CONSTANT, HERRERA, KALRA, LICCARDO, OLIVERIO, PYLE; REED.
NOES:	NONE.
ABSENT:	NGUYEN.
DISQUALIFIED:	NONE.

Chuck Reed

CHUCK REED
Mayor

ATTEST:

LEE PRICE, MMC
City Clerk

Appendix H

San Jose Municipal Water System
2010 Urban Water Management Plan
2009 Declaration of Water Shortage Resolution

RESOLUTION NO. 74917

A RESOLUTION OF THE COUNCIL OF THE CITY OF SAN JOSE DECLARING A FIFTEEN PERCENT WATER SHORTAGE EFFECTIVE JUNE 1 2009 THROUGH DECEMBER 31, 2009

WHEREAS, on February 27, 2009, the Governor declared a state of emergency due to drought and issued a proclamation directing various state agencies to implement a drought emergency plan and provide assistance to those impacted by the drought, and requesting that all urban water users immediately reduce their individual water use by twenty percent (20%); and

WHEREAS, local reservoirs are at roughly sixty-five percent (65%) of capacity, and state reservoirs are below fifty percent (50%), and severe regulatory restrictions on pumping from the Sacramento-San Joaquin River Delta to protect endangered fisheries have sharply reduced the quantity and reliability of imported water supply for the Santa Clara Valley Water District (District); and

WHEREAS, based on the local and state water supply conditions, as well as the Governor's drought proclamation, the District Board on March 24, 2009 adopted a resolution declaring a water shortage and establishing a minimum water conservation level of fifteen percent (15%); and

WHEREAS, as a wholesale water provider, the District does not have direct authority to require residents and businesses to cut water use, and also sent a letter to cities and water retailers asking them to enact ordinances or implement actions according to their Urban Water Management Plans; and

WHEREAS, Chapter 15.10 of Title 15 of the San José Municipal Code provides for the adoption of a resolution declaring a water shortage by this Council whenever a

minimum water conservation level of ten percent (10%) or more has been established by the District; and

WHEREAS, Chapter 15.10 of Title 15 of the San José Municipal Code contains mandatory requirements for water conservation measures that become effective City-wide, upon Council declaration of at least a ten percent (10%) water shortage, with additional mandatory measures applicable upon City Council declaration of water shortages of twenty percent (20%) and above; and

WHEREAS, on April 14, 2009 this Resolution was found to be categorically exempt from environmental review per the provisions of Section 15061(b)(3) of the California Environmental Quality Act of 1970, as amended, under File No. PP09-082;

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF SAN JOSE THAT:

Pursuant to Chapter 15.10 of Title 15 of the San Jose Municipal Code, a fifteen percent (15%) water shortage is hereby declared for the purpose of implementing and enforcing mandatory City-wide water conservation measures applicable to a ten percent (10%) water shortage.

ADOPTED this 19th day of May, 2009, by the following vote:

AYES:	CHU, CONSTANT, KALRA, LICCARDO, NGUYEN, OLIVERIO, PYLE, REED.
NOES:	NONE.
ABSENT:	CAMPOS, CHIRCO, HERRERA.
DISQUALIFIED:	NONE.

CHUCK REED
Mayor

ATTEST:

LEE PRICE, MMC
City Clerk