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2010 Urban Water Management Plan

July 2011

Prepared for

Scotts Valley Water District
P.O. Box 660006
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K/J Project No. 1188010

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Section 1: Introduction

1.1 Overview

This volume presents the Urban Water Management Plan 2010 (Plan) for the Scotts Valley Water District (SVWD or District) service area. This section describes the general purpose of the Plan, discusses Plan implementation, and provides general information about SVWD's service area characteristics. A list of acronyms and abbreviations is also provided.

1.2 Purpose

An Urban Water Management Plan (UWMP) is a planning tool that generally guides the actions of water management agencies. It provides elected officials, managers and the public with a broad perspective on a number of water supply issues. It is not a substitute for project-specific planning documents, nor was it intended to be when mandated by the State Legislature. For example, the Legislature mandated that a plan include a section which "describes the opportunities for exchanges or water transfers on a short-term or long-term basis." (California Urban Water Planning Act, Article 2, Section 10630(d)) The identification of such opportunities, and the inclusion of those opportunities in a general water service reliability analysis, neither commits a water management agency to pursue a particular water exchange/transfer opportunity, nor preclude a water management agency from exploring exchange/transfer opportunities not identified in the plan. When specific projects are chosen to be implemented, detailed project plans are developed, environmental analysis, if required, is prepared, and financial and operational plans are detailed.

In short, this Plan is a management tool, providing a framework for action, but not functioning as a detailed project development or action. It is important that this Plan be viewed as a long-term, general planning document, rather than as an exact blueprint for supply and demand management. Water management in California is not a matter of certainty, and planning projections may change in response to a number of factors. From this perspective, it is appropriate to look at the Plan as a general planning framework, not a specific action plan. It is an effort to generally answer a series of planning questions including:

- What are the potential sources of supply and what is the reasonable probable yield from them?
- What is the probable demand, given a reasonable set of assumptions about growth and implementation of good water management practices?
- How well do supply and demand figures match up, assuming that the various probable supplies will be pursued by the implementing agency?

Using these "framework" questions and resulting answers, the implementing agency will pursue feasible and cost-effective options and opportunities to meet demands. SVWD will explore enhancing basic supplies from sources such as the surface water exchange from the City of Santa Cruz Water Department (SCWD) as well as other options. These include continued groundwater extraction, other water exchanges, recycling, and water banking/conjunctive use.

Specific planning efforts will be undertaken in regard to each option, involving detailed evaluations of how each option would fit into the overall supply/demand framework, how each option would impact the environment, and how each option would affect customers. The objective of these more detailed evaluations would be to find the optimum mix of conservation and supply programs that ensure that the needs of the customers are met.

The California Urban Water Management Planning Act (Act) requires preparation of a plan that:

- Accomplishes water supply planning over a 20-year period in five-year increments. (SVWD is going beyond the requirements of the Act by developing a plan which spans 25 years.)
- Identifies and quantifies adequate water supplies, including recycled water, for existing and future demands, in normal, single-dry, and multiple-dry years.
- Implements conservation and efficient use of urban water supplies.

A checklist to ensure compliance of this Plan with the Act requirements is provided in Appendix A.

In short, the Plan answers the question: *Will there be enough water for the SVWD service area in the future years, and what mix of programs should be explored for making this water available?*

It is the stated goal of SVWD to deliver a reliable and high quality water supply for their customers, even during dry periods. Based on conservative water supply and demand assumptions over the next 25 years in combination with conservation of non-essential demand during certain dry years, the Plan successfully achieves this goal.

1.3 Implementation of the Plan

The SVWD served approximately 10,300 persons in its service area, through 3,898 meters, and supplied approximately 1,390 acre-feet (AF) of water in 2010. This subsection provides the cooperative framework within which the Plan will be implemented including agency coordination, public outreach, and resources maximization.

1.3.1 Joint Preparation of the Plan

Water agencies are permitted by the State to work together to develop a cooperative regional plan. SVWD coordinates with the local governments and water agencies for planning purposes. Water resource specialists with expertise in water resource management were retained to assist SVWD in preparing the details of the Plan. Agency coordination for this Plan is summarized in Table 1-1.

Table 1-1: Agency Coordination Summary

	Participated in UWMP Development	Received Notice of Draft Posted on Website	Commented on Draft	Attended Public Meetings	Contacted for Assistance	Sent Notice of Intent to Adopt	Not Involved
County of Santa Cruz		✓				✓	
City of Scotts Valley		✓				✓	
San Lorenzo Valley Water District		✓					
Lompico County Water District		✓					
Mt. Hermon Conference Center		✓					
City of Santa Cruz Water Department		✓					
Santa Cruz Co. Local Agency Formation Commission		✓					
Soquel Creek Water District		✓					

Note: Columns “Commented on Draft” and “Attended Public Meetings” will be finalized after close of public hearing on June 9, 2011, i.e. date of adoption.

Several agencies had representatives at Santa Margarita Groundwater Basin Advisory Committee (SMGBAC) meeting on May 25, 2011. SVWD’s UWMP schedule was discussed, not specific content, however.

1.3.2 Public Outreach

SVWD encourages community participation in water planning. Interested groups were informed about the development of the Plan along with the schedule of public activities. Notices of public meetings were published in the Scotts Valley Press-Banner, the local newspaper. Copies of the Draft Plan were made available at SVWD’s office, and on the SVWD website. SVWD also conferred with the City of Scotts Valley Planning Department to gather data concerning planned development and the probable implementation of approved development.

SVWD notified the City of Scotts Valley and Santa Cruz County of the opportunity to provide input regarding the Plan. Table 1-2 presents a timeline for public participation during the development of the Plan. A copy of the public outreach materials, including paid advertisements, website postings, and notice letters are attached in Appendix B. A copy of the resolution to adopt the 2010 UWMP will be included as Appendix C after the adoption by the Board and before submittal to the California Department of Water Resources (DWR).

Table 1.2: Public Participation Timeline

Date	Event	Description
April 5, 2011	Public notification to Scotts Valley City and Santa Cruz County	Describe UWMP requirements and process
May 25, 2011	Santa Margarita Groundwater Basin Advisory Committee Meeting	Discuss upcoming availability of Public Review Draft and schedule for adoption.
June 1, 2011	Public Review Draft	Release Draft UWMP and solicit input.
June 9, 2011	SVWD Board Workshop and Public Hearing	UWMP considered for approval by the SVWD Board.

The components of public participation include:

- Local Media:
  - Paid advertisements in local newspapers

- SVWD Public Participation:
  - SMGBAC

  - Board meeting/public hearing

- City/County Outreach:
  - Notification letters
  - Public availability of documents
  - SVWD website
  - SVWD office

Copies of the final document will be made available to the entities listed in Table 1-1 as well as the State of California Library. SVWD will submit the UWMP to DWR no later than 30 days after adoption and will make the UWMP available to public review during normal business hours.

1.3.3 Resources Maximization

Several documents were developed to enable SVWD to maximize the use of available resources including the Final Recycled Water Facilities Planning Report (FPR), the Annual Groundwater Reports, and other planning documents. Section 3 of this Plan describes in detail the water resources available to SVWD for the 25-year period covered by the Plan. Multiple efforts to maximize the water resources of the District are underway. The District operates a comprehensive Groundwater Management Program (GWM Program), an expanding water recycling program, and is participating in the development of an Integrated Regional Water Management Plan (IRWMP). All of these efforts serve as management tools to maximize the water resources in the region. Imported water outside the region is not available to SVWD. Additional discussion regarding documents developed to maximize resources is included in Section 3 and Section 6.

1.4 The SVWD Service Area

1.4.1 Location

SVWD was organized in 1961 as a County Water District under the California Water Code (County Water District Act, Water Code Sections 30000, et seq.) Its boundaries include most of the City of Scotts Valley (Scotts Valley or City) as well as some unincorporated areas north of the City. The District lies in the Santa Cruz Mountains, five miles inland from the Monterey Bay. It is approximately five miles from north to south and one mile east to west with an approximate area of 5.5 square miles.

The District's service area relative to DWR established groundwater basins is shown on Figure 1-1. The District overlies a large portion of DWR Basin 3-27 and a small portion of Basins 3-21 and 3-50. The extent of the locally recognized Santa Margarita Groundwater Basin (Santa Margarita Basin or Basin) is also shown in Figure 1-1. Figure 1-2 illustrates the District's location relative to nearby water suppliers and the Scotts Valley city limits. In accordance with water Code §10620(d) each of these water suppliers has received a draft copy of this document with the opportunity to comment.

Sewer service in the Scotts Valley area is provided by Scotts Valley. SVWD coordinates closely with the Scotts Valley to provide recycled water to SVWD customers as described in Section 4.

Figure 1-1: Groundwater Basin Boundaries

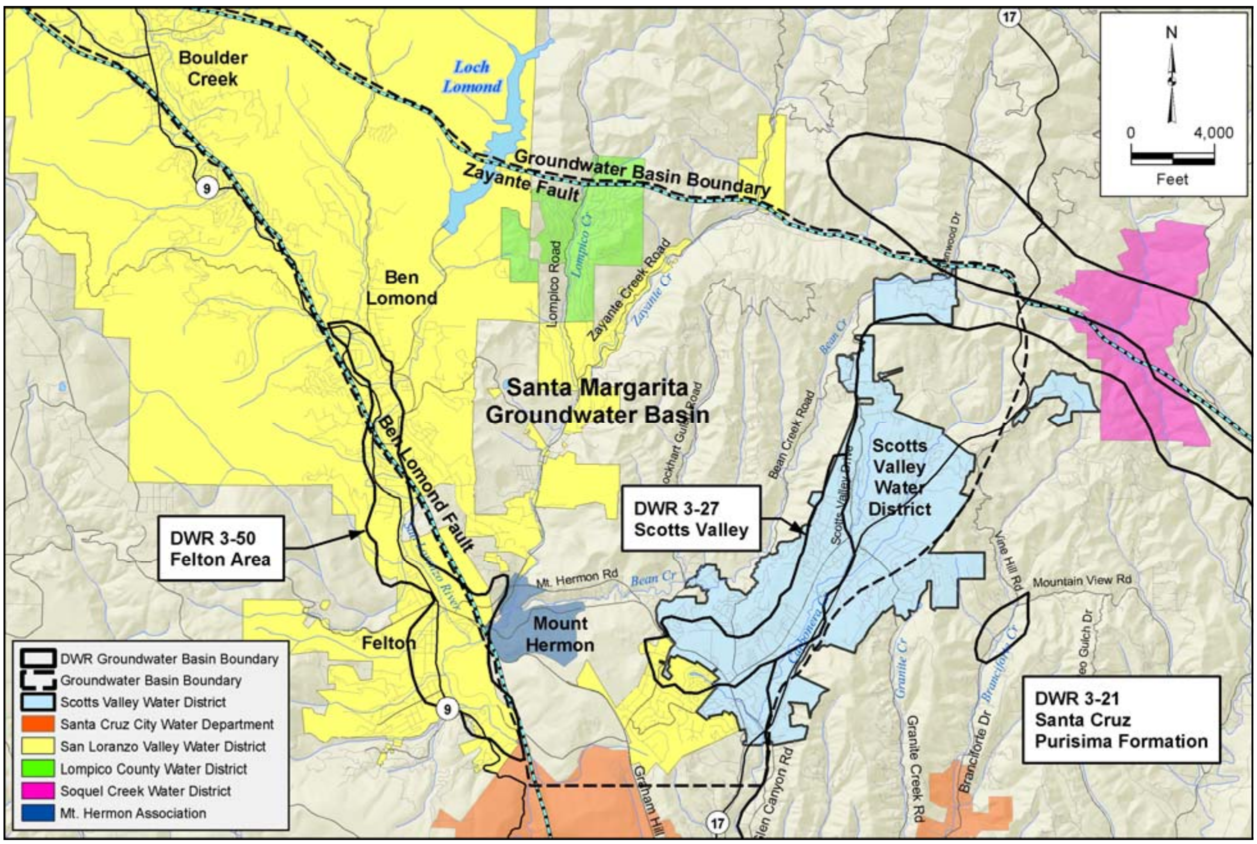
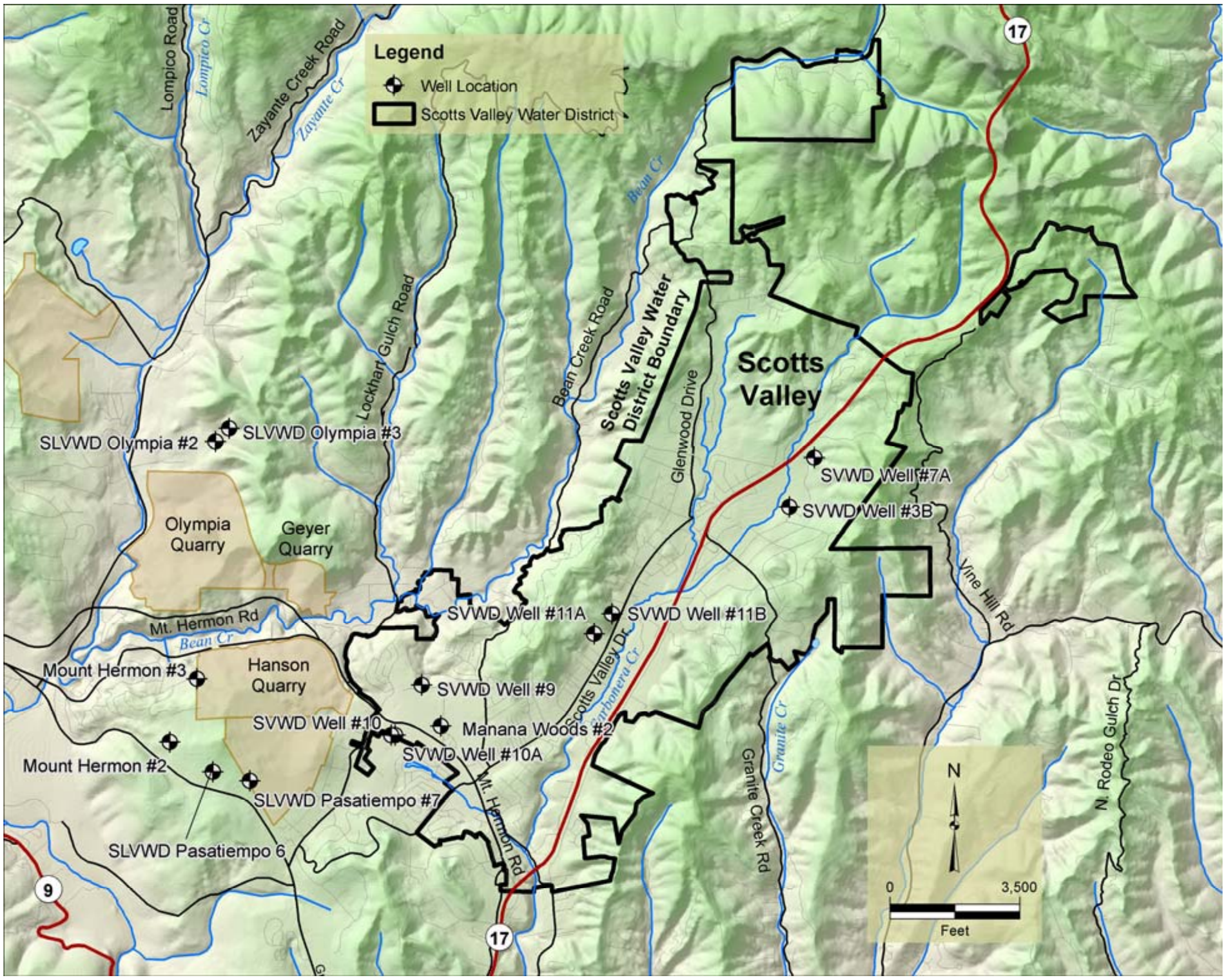


Figure 1-2: Service Area



1.5 Climate

The climate of SVWD's service area is mild. The area is cooled in the summer by early morning and evening coastal fog. Average rainfall is approximately 42.8 inches per year with higher average rainfall of 46 inches seen in the upper watershed of Bean Creek. Table 1-3 presents the region's annual average climate data. Standard Monthly Average Evapotranspiration (ETo) and Average Maximum Temperature data are provided for 1990 – 2010 at CIMIS Station 104 at the De Laveaga Golf Course in the City of Santa Cruz. Although the weather patterns are slightly different at the coastal station than in the Santa Cruz Mountains, the data provide information regarding the regional climate. Evapotranspiration from plants is variable, differing with the type of vegetation cover and with weather and soil conditions. Evaporation in the District is generally low in the winter months and peaks in the summer. Average Monthly Rainfall is from the District's El Pueblo Yard precipitation gauge.

Comparison of the monthly rainfall and evaporation amounts reveal that winter is characterized by a surplus of rainfall over evaporation or ETo. This rainfall is then available for runoff and natural groundwater recharge. Native vegetation ETo is reduced substantially in summer when rainfall is minimal and soil moisture is depleted. At this time, however, landscape irrigation demands become greatest. This contributes to high water demands in the late summer creating a time lag between periods of high demand and high supply.

Table 1-3: Climate Data for the SVWD Service Area

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo[a]	1.36	1.93	3.26	4.70	4.87	5.32
Average Rainfall (inches)[b]	8.66	8.64	6.17	2.60	1.05	0.19
Average Temperature (Fahrenheit)[a]	47.6	48.9	56.2	55.2	57.7	59.2

	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Standard Monthly Average ETo[a]	5.03	4.84	3.60	2.96	1.64	1.30	40.81
Average Rainfall (inches)[b]	0.01	0.04	0.28	1.97	5.05	8.11	42.77
Average Temperature (Fahrenheit)[a]	60.5	61.8	69.9	56.6	51.7	49.9	55.6

Notes:

(a) ETo (evapotranspiration) and temperature data from Station #104 De Laveaga, http://wwwcimis.water.ca.gov/cimis/welcome.jsp

(b) Average Monthly Rainfall data gathered from long-term average precipitation records from El Pueblo Yard during period 1982-2010.

1.6 Potential Effects of Global Warming

A topic of growing concern for water planners and managers is global warming and the potential impacts it could have on California's future water supplies. In June 2005, Governor Arnold Schwarzenegger issued Executive Order S-3-05, which requires biennial reports on climate change impacts in several areas, including water resources. The Climate Action Team (CAT) was formed in response to executive order S-3-05. To help unify analysis across topic areas, the CAT worked with scientists from the California Applications Program's California Climate Change Center to select a set of future climate projections to be used for analysis. For the

2008-2009 assessment of climate change impacts, the CAT selected six (6) different global climate change models, assuming two (2) different greenhouse gas emission levels (a high end and a low end), for a total of 12 scenarios. The results of the study indicated that climate change has already been observed, in that in the last 100 years, air temperatures have risen about 1 degree Fahrenheit, and there has been a documented greater variance in precipitation, with greater extremes both in terms of heavy flooding and severe droughts.

In July 2006, DWR issued "Progress on Incorporating Climate Change into Management of California's Water Resources," as required by Executive Order S-3-05. That report demonstrated how various analytical tools could be used to address issues related to climate change.

In the 2009 update of the DWR California Water Plan, multiple scenarios of future climate conditions are evaluated. These changing hydrological conditions could affect future planning efforts, which are typically based on historic conditions. The California Water Plan identifies the following probable impacts due to changes in temperature and precipitation:

- Decrease in snowpack, which is a major part of annual water storage, due to increasing winter temperatures.
- More winter runoff and less spring/summer runoff due to warmer temperatures.
- Greater extremes in flooding and droughts.
- Greater water demand for irrigation and landscape water due to increased temperatures and their impacts on plant water needs.

Volume 1, Section 4 of the California Water Plan, "Preparing for an Uncertain Future," lists some potential impacts of global climate change, based on more than a decade of scientific studies on the subject:

- Could produce hydrologic conditions, variability, and extremes that are different from what current water systems were designed to manage
- May occur too rapidly to allow sufficient time and information to permit managers to respond appropriately
- May require special efforts or plans to protect against surprises or uncertainties

Should global warming increase over time, it may cause a number of changes impacting future water supplies, including changes in hydrologic patterns that can alter groundwater recharge, sea level, rainfall intensity, and statewide water demand. Computer models have been developed to show water planners how California water management might adapt to climate change. DWR has committed to continue to update and refine these models based on ongoing scientific data collection and to incorporate this information into future California Water Plans.

As DWR and other entities, such as the University of California, Santa Cruz develop more specific assessments of the potential effects of climate change on California hydrology, local water reliability, and water demands, SVWD can update its plans accordingly. The US Geological Survey is currently assessing the potential climate change impacts on Santa Cruz County water resources which is planned for completion in 2011. Preliminary results suggest that recharge rates will be reduced by 30 percent.

1.7 Other Demographic Factors

Water service is provided to primarily residential customers with some commercial, industrial, institutional, recreational, and landscape customers and for other uses, such as fire protection and pipeline cleaning.

Recently, the service area has experienced modest increases in single family residential construction. Although the local population has increased slightly, the demand for potable water has decreased which is most likely linked to recent rate increases, active implementation of water conservation and recycled water programs, and the recent economic downturn. SVWD expects to see some continuing modest development activity in the near-term.

1.8 List of Abbreviations and Acronyms

The following abbreviations and acronyms are used in this report.

1,2-DCE	1,2-dichlorethane
20x2020 Plan	20x2020 Water Conservation Plan
AB	Assembly Bill
ACOE	U.S. Army Corps of Engineers
Act	California Urban Water Management Planning Act
AF	AF
AFY	AF per year
AMBAG	Association of Monterey Bay Area Governments
AWWARF	American Water Works Association Research Foundation
Basin	Santa Margarita Groundwater Basin
BMOs	Best Management Objectives
BMPs	Best Management Practices
CCF	One Hundred Cubic Feet
CCR	Consumer Confidence Report
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CII	Commercial, Industrial, and Institutional
cis-1,2-DCE	cis-1,2-Dichloroethylene
City	City of Scotts Valley
COG	Council of Government
CUWCC	California Urban Water Conservation Council
DBP	Disinfection by-products
DCE	Dichloroethylene
District	Scotts Valley Water District
DMM	Demand Management Measures
DOF	Department of Finance
DPH	Department of Public Health
DTSC	Department of Toxic Substances Control

DWR	California Department of Water Resources
EC	Electrical conductivity
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EPA	Environmental Protection Agency
ETo	Evapotranspiration
FPR	Facilities Planning Report
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
GAC	Granular Activated Carbon
GWM	Groundwater Management Plan
HCD	Housing and Community Development
HCF	Hundred Cubic Feet
HECW	High Efficiency Clothes Washer
HET	High Efficiency Toilet
IRWMP	Integrated Regional Water Management Plan
FPR	Facilities Planning Report
MCL	Maximum Contaminant Level
MF	Multi-Family
M&I	Municipal and Industrial
MGD	million gallons per day
mg/L	milligrams per liter
MOU	Memorandum of Understanding Regarding Water Conservation in California
MTBE	methyl tertiary butyl ether
MWELO	Model Water Efficient Landscape Ordinance
NPDES	National Pollutant Discharge Elimination System
NO3	Nitrates
PCE	tetrachloroethene
PHG	Public Health Goal
Plan	Urban Water Management Plan 2010
ppb	parts per billion
RHNA	Rural Housing Needs Allocation
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SVWD	Scotts Valley Water District
SBX7-7	Senate Bill 7 of Special Extended Session 7
SCWD	City of Santa Cruz Water Department
Scotts Valley	City of Scotts Valley
SF	Single Family
SLVWD	San Lorenzo Valley Water District
TCE	trichloroethylene
TDS	Total Dissolved Solids

TOC	Total Organic Carbon
μg/L	micrograms per liter
UAW	Unaccounted For Water
umhos/cm	Micromhos per centimeter
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
UV	ultraviolet
VOC	Volatile Organic Compound
WRF	Water Reclamation Facility
WSS	WaterSense Specification
WTF	Water Treatment Facility

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Section 2: Water Use

2.1 Overview

This section describes historic and current water usage and the methodology used to project future demands within SVWD's service area. Water usage is divided into sectors such as residential, commercial, industrial, institutional, landscape, and other purposes.

Several factors can affect demand projections, including:

- Land use revisions
- New regulations
- Increases in water rates
- Consumer choice
- Economic conditions
- Transportation needs
- Highway construction
- Environmental factors
- Conservation programs
- Plumbing codes

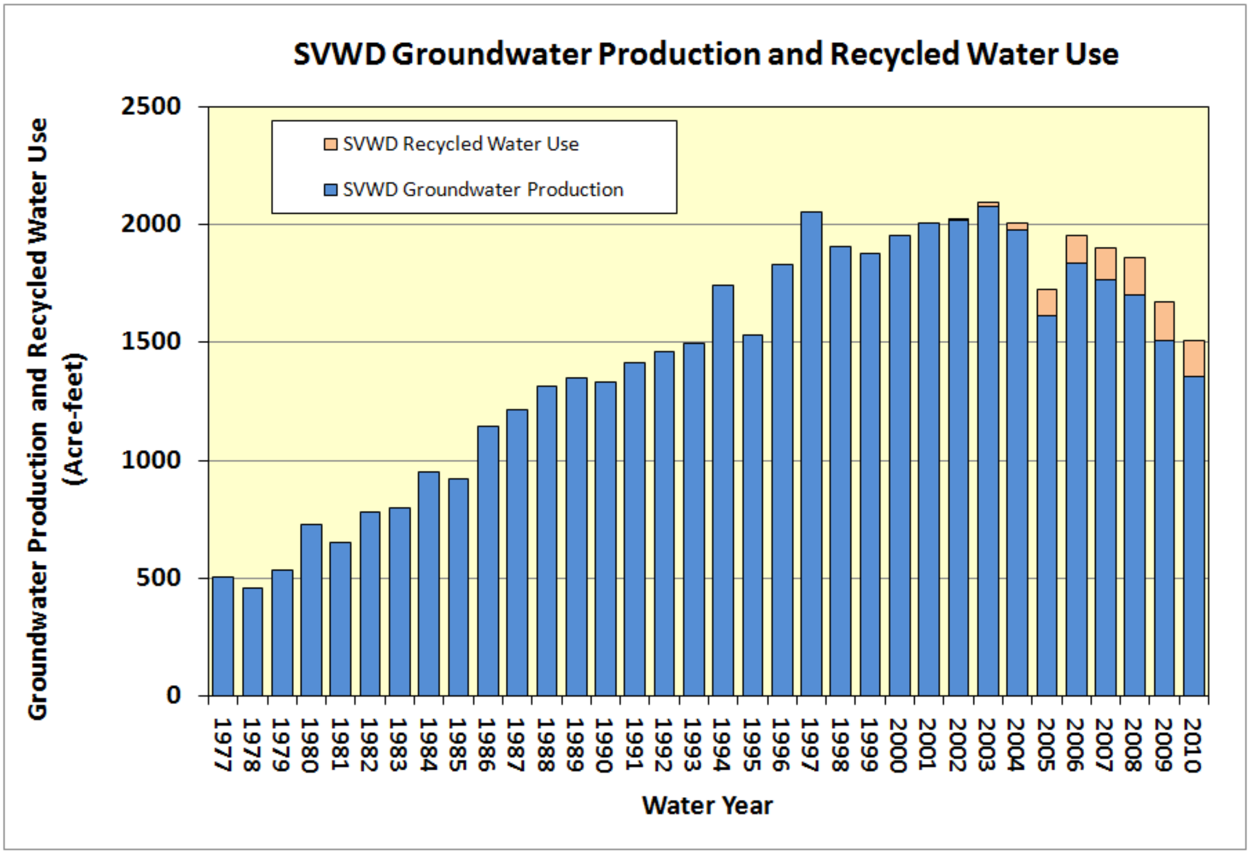
The foregoing factors affect the amount of water needed, as well as the timing of when it is needed. Past experience has indicated that the economy is the biggest factor in determining water demand projections. During an economic recession, there is often a major downturn in development and a subsequent slowing of the projected demand for water. The projections in this Plan do not attempt to forecast recessions or droughts. Likewise, no speculation is made about future plumbing codes or other regulatory changes. However, the projections do include water conservation. There have been, and continue to be, major efforts statewide and locally to conserve water, which have been successful.

2.2 Historic Water Use

Predicting future water supply requires accurate historic water use patterns and water usage records. Both the economy and entitlement process (compliance with the California Environmental Quality Act (CEQA)) are key factors impacting growth in population and demand.

Figure 2-1 presents the historical production of both groundwater and recycled water by SVWD since 1990. The water serves a range of customer types including single family homes, multi-family homes, commercial, industrial, institutional/government, and landscape, much of which is served with recycled water. A more detailed breakdown by customer classification is found in Tables 2-1 and 2-3.

Figure 2-1: Historical Groundwater Production and Recycled Water Production



2.3 Projected Water Use

2.3.1 Projections Based on Service Area Growth

SVWD maintains historical data, as well as works closely with property owners and developers in their service areas, to ensure they have an adequate water supply and the necessary infrastructure to provide water service. Table 2-1 is based on an evaluation of recent historical demand and future proposed projects and summarizes projected water demands in acre-feet per year (AFY) through 2035. Table 2-2 provides an estimate of population projections through 2035 in the SVWD service area which were derived from recent demographic information from the Association of Monterey Bay Area Governments (AMBAG) and demand projections which were adjusted to the 2010 Census estimates (AMBAG, 2011).

Table 2-3 presents the past, current and projected potable water delivery by customer type for the SVWD Service Area.

Table 2-1: Current and Projected Water Demands for Each Customer Class, Potable (AFY)

Projected Demand for Customer Class	2010[a]	2015	2020	2025	2030	2035
Single-family	772	923	912 894		893	916
Multi-family	101	121	119 117		117	120
Commercial	187	224	221 217		217	222
Industrial	63	75	74 73		73	75
Institutional/governmental	48	58	57 56		56	57
Landscape (Potable Irrigation)	68	81	80 78		78	80
Landscape (Recycled Water Irrigation)	149	191	241	290	330	330
Other (Fire Service)	1	1	1	1	1	1
Total Water Demand (AFY)	1,389	1,675	1,705 1,726		1,766	1,802

Note:
[a] Demands from 2010 metered deliveries.

Table 2-2: Current and Projected Population in SVWD Service Area

2010	2015	2020	2025	2030	2035
10,309	10,507 10,698 10,829 11,076 11,303				

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Table 2-3: Current and Projected Water Demands

Water Use Sectors	2005				2010				2015				2020			
	Metered		Unmetered		Metered		Unmetered		Metered		Unmetered		Metered		Unmetered	
	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY
Single family	3014	873	0	0	3085	772	0	0	3611	923	0	0	3676	912	0	0
Multi-family	145	104	0	0	149	101	0	0	174	121	0	0	178	119	0	0
Commercial	191	227	0	0	193	187	0	0	226	224	0	0	230	221	0	0
Industrial	55	104	0	0	56	63	0	0	66	75	0	0	67	74	0	0
Institutional/ governmental	55	79	0	0	40	48	0	0	47	58	0	0	48	57	0	0
Landscape (Potable Irrigation)	77	125	0	0	69	68	0	0	81	81	0	0	82	80	0	0
Landscape (Recycled Water Irrigation)	21	73	0	0	36	149	0	0	55	191	0	0	65	241	0	0
Other (Fire Service)	200	1	0	0	270 1		0	0	270 1		0	0	275	1	0	0
Total	**3758**	**1586**	**0**	**0**	**3898**	**1389**	**0**	**0**	**4,530**	**1675**	**0**	**0**	**4619**	**1705**	**0**	**0**

Water Use Sectors	2025				2030				2035			
	Metered		Unmetered		Metered		Unmetered		Metered		Unmetered	
	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY
Single family	3720	894	0	0	3803	893	0	0	3879	916	0	0
Multi-family	180	117	0	0	184	117	0	0	187	120	0	0
Commercial	233	217	0	0	238	217	0	0	243	222	0	0
Industrial	68	73	0	0	69	73	0	0	70	75	0	0
Institutional/ governmental	48	56	0	0	49	56	0	0	50	57	0	0
Landscape (Potable Irrigation)	83	78	0	0	85	78	0	0	87	80	0	0
Landscape (Recycled Water Irrigation)	74	290	0	0	88	330	0	0	88	330	0	0
Other (Fire Service)	278	1	0	0	284 1		0	0	291	1	0	0
Total	**4684**	**1726**	**0**	**0**	**4800**	**1766**	**0**	**0**	**4896**	**1802**	**0**	**0**

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2.3.2 Methodology

The SVWD service area has experienced limited growth and is, for the most part, built out. The projections are based on population projection rates provided by the AMBAG and proposed developments that have been identified by SVWD and the City of Scotts Valley.

Customer Classification

The 2005-2010 meter data provided by SVWD were used to estimate percent representation across the various classes (Table 2-4). The percentage of each classification was calculated based on both connections and demand. It was found that single family residential represents 79.1 percent of the connections but only 55.5 percent of the water demand. Multi-family connections are estimated at 3.8 percent of total connections and 7.3 percent of the demand. For the purposes of distributing overall demand amongst customer classification, the percent distribution based on demand values not connection values was used.

Table 2-4: Regrouping for UWMP Classifications

Class	SVWD Revenue Code and Description	Percent Representation Based on 2010 Connections	Percent Representation Based on 2010 Demand
Single family	1 - Residential -Unknown Number of Units	79.1%	55.6%
	3 – Residential – Single Family Units		
Multi-family	4 - Residential Duplex	3.8%	7.3%
	5 - Residential Tri-Plex		
	6 – Residential – Four Plex		
	7 – Residential – Multi Units		
Commercial	2 - Commercial – Unknown Type of Business	5%	13.5%
	8 – Commercial – Retail		
	9 - Commercial - Offices		
Industrial	12-Industrial	1.4%	4.5%
Institutional / governmental	13 - School	1%	3.5%
	14 - Park		
	15 – Public Building		
	17- Pools (Swimming Centers)		
Landscape (Potable Irrigation)	10 - LSP - Domestic	1.8%	4.9%
Landscape (Recycled Water Irrigation)	11- Recycled Water	0.9%	10.7%
Other(Fire Service)	16 - Fire Service	6.9%	0.1%

2.4 Water Conservation Act of 2009

2.4.1 SBX7-7

As described in Senate Bill 7 of Special Extended Session 7 (SBX7-7), it is the intent of the California legislature to increase water use efficiency and the legislature has set a goal of a 20 percent per capita reduction in urban water use statewide by 2020. SBX7-7 requires that retail water suppliers comply with its requirements. Consistent with SBX7-7, the 2010 UWMP must provide an estimate of Base Daily Per Capita Water Use. This estimate utilizes information on population as well as base gross water use. For the purposes of this UWMP, population was estimated as described in the previous section. Base gross water use is defined as the total volume of water, treated or untreated, entering the distribution system, excluding recycled water; net volume of water placed into long-term storage; and water conveyed to another urban water supplier.

The UWMP Act allows urban water retailers to evaluate their Base Daily Per Capita Water Use using a 10- or 15-year period. A 10-year to 15-year base period within the range January 1, 1990 to December 31, 2010 is allowed if recycled water made up 10 percent or more of the 2008 retail water delivery. If recycled water did not make up 10 percent or more of the 2008 retail water delivery, then a retailer must use a 10-year base period within the range January 1, 1995 to December 31, 2010. Although recycled water was more than 10 percent of the 2008 delivery in SVWD, the Base Daily Per Capita Water Use in SVWD has been based on a 10-year period. In addition, urban retailers must report daily per capita water use for a 5-year period within the range January 1, 2003 to December 31, 2010. This 5-year base period is compared to the Target Based Daily Per Capita Water Use to determine the minimum water use reduction requirement.

For the population data, available GIS-based analysis provided by AMBAG and census data were used to estimate population for each year between 1994 to 2010, based on the approach described below. Data used for population is consistent with the method found in Appendix A of methodologies for *Calculating Baseline and Compliance Urban Per Capita Water Use* from DWR.

- The 1990 population is based on the AMBAG GIS based analysis of 1990 census block population data.
- The 2000 population is based on the AMBAG GIS-based analysis of 2000 census block population data.
- The 2010 population is based on the AMBAG GIS-based analysis of 2010 census block population data.
- For individual years with no population data, the known population data for the years listed were used to generate annual population estimates. The approach includes using a linear interpolation between the years that the population is known.

Groundwater and recycled water production were provided from the SVWD meter records. Table 2-5 summarizes the gallons per capita per day (gpcd) for compliance with SBX7-7. The calculated 10-year baseline is 179.9 gpcd and the 5-year baseline is 164.7 gpcd. The 2010 estimated water use (for the water year 2009-2010) is 117.6 gpcd, with a 2020 target of 143.9 gpcd based on Option 1 method as described in greater detail below.

Table 2-5: Base Period Ranges

Base	Parameter	Value	Units
10-15 year base period	2008 total water deliveries [a]	1,699.7	AF
	2008 total volume of delivered recycled water[a]	182.4	AF
	2008 recycled water as a percent of total deliveries	10.7	percent
	Number of years in base period	10	years
	Year beginning base period range	1995	
	Year ending base period range	2004	
5-year base period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range	2007	

Note:
[a] Per SVWD meter records.

In addition to calculating base gross water use, SBX7-7 requires that SVWD identify their demand reduction targets for year 2015 and 2020 by utilizing one of four options:

- **Option 1:** 80 percent of baseline gpcd water use (i.e., a 20 percent reduction).
- **Option 2:** The sum of the following performance standards: indoor residential use (provisional standard set at 55 gpcd); plus landscape use, including dedicated and residential meters or connections equivalent to the State Model Landscape Ordinance (80 percent ETo existing landscapes, 70 percent of ETo for future landscapes); plus 10 percent reduction in baseline commercial, industrial institutional use by 2020.
- **Option 3:** 95 percent of the applicable state hydrologic region target as set in the DWR "20x2020 Water Conservation Plan" (20x2020 Plan) (DWR, 2010).
- **Option 4:** Savings by Water Sector: this method identifies water savings obtained through identified practices and subtracts them from the base daily per capita water use value identified for the water supplier.

Option 2 and Option 4 were considered and not selected, because they required data not currently being collected within the SVWD service area.

The SVWD service area is within the Central Coast Hydrologic Region as defined by DWR and this hydrologic region has been assigned a 2020 water use target of 117 gpcd per the DWR 20x2020 Water Conservation Plan (DWR, 2010). Therefore, in order to use Option 3, SVWD's daily per capita water use for the 5-year base period would have to be close to 95 percent of the

117 gpcd target, or 111 gpcd. Since SVWD's 5-year base period is greater than 111 gpcd limit, SVWD did not choose this option to reduce demand.

Option 1 is the simplest of the options provided and requires an 80 percent reduction in baseline per capita water use. Option 1 is also the most conservative of the four Options provided. For these reasons, SVWD selected Option 1 to comply with the SBX7-7 target.

This results in the 2020 target of 143.9 gpcd and the 2015 interim target of 161.9 gpcd for SVWD as shown in Tables 2-6 to 2-8.

Table 2-6: Base Daily Per Capita Water Use 10 to 15-Year Range

Base Period Year		**Distribution System**	**Daily System Gross Water Use**	**Annual Daily Per Capita Water Use**
Sequence Year	**Water Year**	**Population**	**(MGD)**	**(gpcd)**
Year 1	1995	8,797	1.37	155.7
Year 2	1996	8,994	1.63	181.7
Year 3	1997	9,191	1.83	199.3
Year 4	1998	9,388	1.70	181.5
Year 5	1999	9,585	1.68	174.9
Year 6	2000	9,782	1.74	178.1
Year 7	2001	9,835	1.79	182.2
Year 8	2002	9,887	1.80	182.5
Year 9	2003	9,940	1.86	186.6
Year 10	2004	9,993	1.76	176.5
Year 11	2005	10,046	1.44	143.3
Year 12	2006	10,098	1.64	162.2
Year 13	2007	10,151	1.57	155.1
Year 14	2008	10,204	1.52	148.7
Year 15	2009	10,256	1.35	131.2
10-year Average Base Daily Per Capita Water Use				**179.9**

Note: Shaded years indicate data period selected to calculate the Base Daily Per Capita Water Use.

Table 2-7: Base Daily Per Capita Water Use 5-Year Range

Base Period Year		**Distribution**	**Daily System Gross Water Use**	**Annual Daily Per Capita Water Use**
Sequence Year	**Water Year**	**System Population**	**(MGD)**	**(gpcd)**
Year 1	2003	9,940	1.86	186.6
Year 2	2004	9,993	1.76	176.5
Year 3	2005	10,046	1.44	143.3
Year 4	2006	10,098	1.64	162.2
Year 5	2007	10,151	1.57	155.1
5-Year Average Base Daily Per Capita Water Use				**164.7**

The baseline and 2020 target are presented in Table 2-8. Currently, SVWD's water use is approximately 131 gpcd, which is below the 2020 target gpcd. The current low water demand is mainly attributed to drought, rate structure, and the economic downturn. SVWD intends to maintain this target as presented in Section 7.

Table 2-8: Baseline, Target and Current gpcd

Basis	gpcd
Baseline	179.9
Target 2020	143.9
Interim Target 2015	161.9
Current 2010	117.6

2.5 Other Factors Affecting Water Usage

Major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water usage increases. The amount of increase varies according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool-wet years, historical water usage has decreased to reflect less water usage for external landscaping. Water conservation measures employed within the SVWD service area have a direct long-term effect on water usage.

Furthermore, SVWD began using an inclining block rate structure with six tiers for all potable water customers in 1992. From 1992 to 2009, the sixth tier was set for consumption over 50,000 gallons in one month. In 2010, the usage ranges for the last four tiers were shortened to provide a greater economic incentive for conserving. The District also has an inclining block rate for all recycled water customers which is 80 percent of the potable rates. These rate structures have also contributed to reductions in water usage and assure that recycled water is also wisely used.

2.5.1 Conservation Effects on Water Usage

In recent years, water conservation has become an increasingly important factor in water supply planning in California. The California plumbing code has instituted requirements for new construction that mandate the installation of ultra low-flow toilets and low-flow showerheads. SVWD continues to support the development of water conservation measures that include public information and education programs.

Residential, commercial, and industrial usage can be expected to decrease as a result of the implementation of more aggressive water conservation practices. The greatest opportunity for conservation is in developing greater efficiency and reduction in landscape irrigation especially in SVWD’s service area where irrigation can be a high proportion of water used. The irrigation demand can represent as much as 50 percent of the water demand for residential customers depending upon the size of the property and the type of landscape. SVWD also encourages recycled water use on landscape in facilities near the recycled water distribution system.

2.6 Low Income Projected Water Demands

Senate Bill 1087 requires that water use projections of a UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county general plan in the service area of the supplier.

Housing elements rely on the Regional Housing Needs Allocation (RHNA) generated by the State Department of Housing and Community Development (HCD) to allocate the regional need for housing to the regional Council of Governments (COG) (or a HCD for cities and counties not covered by a COG) for incorporation into housing element updates. Before the housing element is due, the HCD determines the total regional housing need for the next planning period for each region in the state and allocates that need. The COGs then allocate to each local jurisdiction its “fair share” of the RHNA, broken down by income categories; very low, low, moderate, and above moderate, over the housing element’s planning period. AMBAG is the COG responsible for preparing the RHNA for the Scotts Valley area. The City of Scotts Valley, in turn incorporated AMBAG’s RHNA into the 2009 update of the housing element of the General Plan.

The housing elements cover the planning period 2009-2014. The allocation for very low and low income classes as defined by the California Health and Safety Code were the following for the AMBAG region (AMBAG, 2008):

- Very Low – 22 percent
- Low – 17 percent

The AMBAG RHNA does not classify the allocation of low income households between single-family and multi-family residential housing types. It has been assumed that, both housing types are included in the projected water use for lower income households. To remain consistent with the intent of the SB1087 legislation and also to comply with the UWMP Planning Act, intent has been made to identify those water use projections for very low- and low- residential income households based on the income category, classification percentage, calculated demand projections as shown in Table 2-9 below.

Note that the current planning period for the RHNA is from January 1, 2007 through June 30, 2014. The next RHNA planning cycle will cover January 1, 2011 to September 30, 2021. Thus, the 2015 UWMP update will need to be updated with the next RHNA planning cycle and allocation of low income category percentages.

SVWD will not deny or condition approval of water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households.

Table 2-9: Low Income Water Demand (AFY)

	2010	2015	2020	2025	2030	2035
Demand[(a)]	1,389	1,675	1,705	1,726	1,766	1,802
Very low income[(b)]	169.8	203.2	193.8	191.2	184.9	178.2
Low income[(b)]	17.1	20.5	19.6	19.3	18.7	18.0
Total	187.0	223.7	213.4	210.5	203.6	196.2

Notes:

(a) Demand from Table 2-1

(b) Draft Regional Housing Need Allocation Plan - Planning Period (January 1, 2007 - June 30, 2014) for Jurisdictions within AMBAG www.co.monterey.ca.us/planning/...2008/.../AMBAG-2008b.pdf

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Section 3: Water Resources

3.1 Overview

This section describes the SVWD's existing and planned sources of water supply for the 25-year period covered by the Plan. Table 3-1 is a summary of the existing and planned water supply sources discussed in this Section, from the present (2010) to 2035 in five-year increments. Sections 3.2 through 3.4 provide details of the water supplies summarized in Table 3-1.

The term "dry" is used throughout this section and in subsequent sections concerning water resources and reliability as a measure of supply availability. As used in this Plan, dry years are those years when precipitation is lower than the long-term average precipitation and results in lower recharge. The impact of low precipitation in a given year may differ based on how low the precipitation is, or whether the year follows a high-precipitation year or another low-precipitation year. Also, dry conditions can differ geographically. For example, a dry year can be local to the Scotts Valley area (thereby affecting local groundwater replenishment and production in the Santa Margarita Basin), local to northern California, or statewide. When the term "dry" is used in this Plan, local drought conditions are assumed, affecting both local groundwater and surface water supplies at the same time. SVWD relies primarily on groundwater sources from the regional Santa Margarita Basin and does not currently rely on local surface water as part of their supply.

Table 3-1: Summary of Current and Planned Water Supplies (AFY)

Water Supply Sources	2010	2015	2020	2025	2030	2035
Wholesale (Imported) Water	0	0	0	0	0	0
SVWD Produced Potable Groundwater from Santa Margarita Basin	1,358	1,484	1,345	1,316	1,315	1,352
Transfer In/Out	0	0	0	0	0	0
Exchange In (Potable projected use) [a]	0	0	120	120	120	120
Recycled Water (Non-potable local use, existing and projected) [b]	149	191	241	290	330	330
Desalination [c]	0	0	0	0	0	0
Total Water Supply	**1,507**	**1,675**	**1,705**	**1,726**	**1,766**	**1,802**
Total Pumping Amount Potentially Available to SVWD and Other Pumpers (Sustainable Yield) [d]	2,600	2,600	2,600	2,600	2,600	2,600

Notes:

[a] This represents potable exchange with the SCWD in exchange for recycled water sale by SVWD to Pasatiempo Golf Club. SVWD's recycled water sale to the Golf Club is used for irrigation in the Golf Club, which is outside of SVWD's service area; thus, not accounted for in this table.

[b] SVWD's Recycled Water Program is anticipated to expand gradually to provide 330 AFY by 2030.

[c] SVWD currently does not have water supply through desalination.

[d] Based on the sustainable yield estimate for the portion of the basin (Scotts Valley portion of the Santa Margarita Basin) underlying Scotts Valley, as provided by the modeling analysis (ETIC, 2006). Sustainable yield is shared with the SLVWD and other small public and private pumpers.

3.2 Wholesale (Imported) Water Supplies

SVWD has no current and future plans to acquire wholesale (imported) water from a wholesale agency. SVWD obtains its potable water supply from the Santa Margarita Groundwater Basin, as shown in Table 3-1. Future exchanges with SCWD may result for recycled water from Scotts Valley to be exchanged for treated surface water from SCWD.

3.3 Groundwater

SVWD relies on groundwater sources from the regional Santa Margarita Basin. Groundwater has been the sole source of potable water supply for SVWD; thus, careful management is necessary to manage the groundwater resource in a sustainable manner. SVWD has been actively managing the groundwater basin since the early 1980's in an effort to increase water supply reliability and to protect local water supply sources. Through the past groundwater management and resource planning activities, SVWD has proven its commitment in progressively embracing activities that will protect groundwater resources and provide reliable water supply. Currently, SVWD operates six production wells (SVWD Wells #3B, #7A, #9, #10A, #11A, and #11B). Locations of the wells are shown on Figure 1-2.

In addition to SVWD, other water purveyors pump groundwater in the Santa Margarita Basin, including the SLVWD, Lompico County Water Department, the Mt. Hermon Association, the Santa Cruz Water Department, Soquel Creek Water District, and other domestic, private production wells.

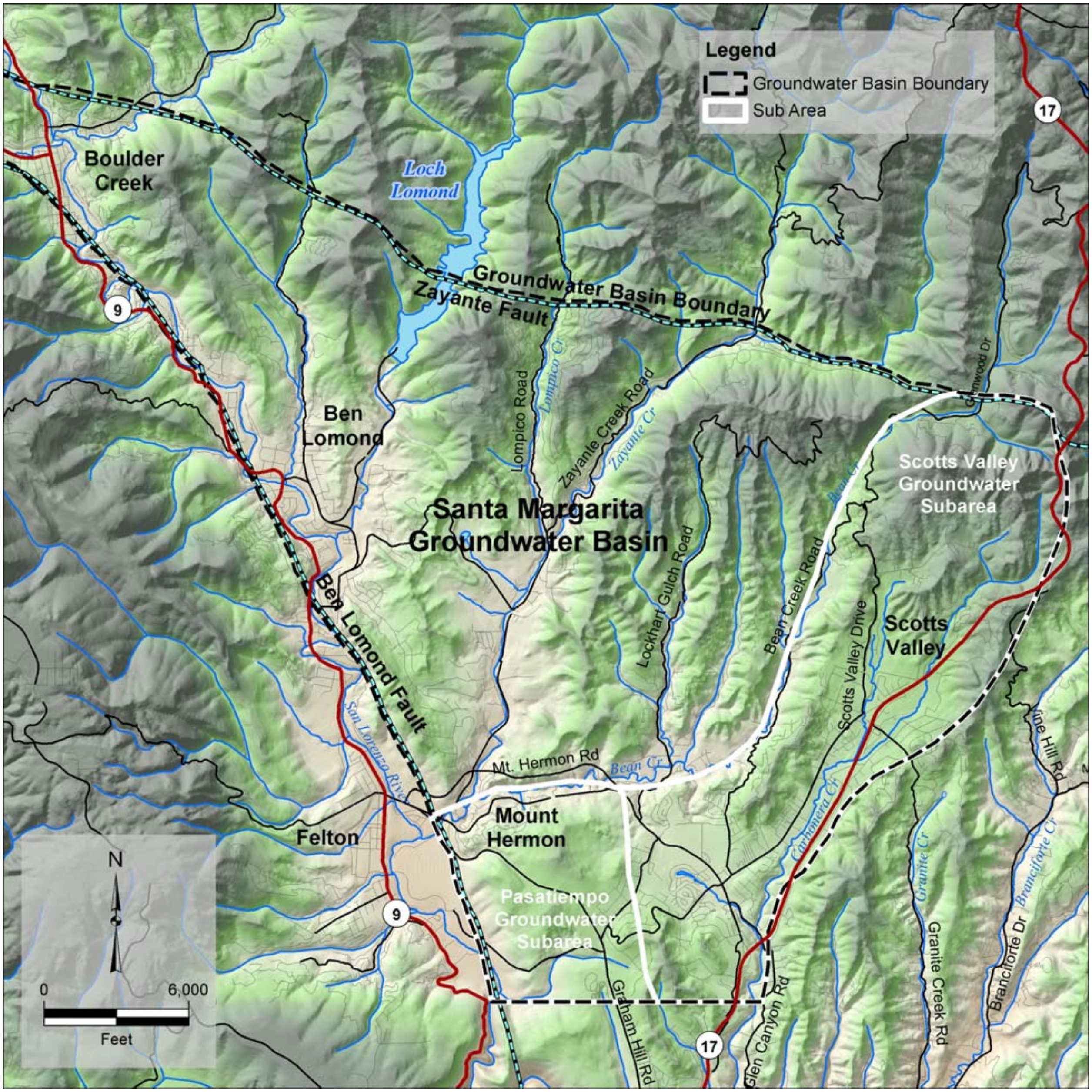
This section presents information about SVWD's groundwater supplies, including a summary of the basin description and historical and projected groundwater pumping from the basin.

3.3.1 Santa Margarita Groundwater Basin

The Santa Margarita Basin covers over 30 square miles in the Santa Cruz Mountains. The basin forms a roughly triangular area that extends from Scotts Valley in the east, to Boulder Creek in the northwest, to Felton in the southwest (Figure 3-1). The Santa Margarita Basin is a geologically complex area that was formed by the same tectonic forces that created the Santa Cruz Mountains. The basin is bounded by two regional faults, the Ben Lomond Fault to the west and the Zayante Fault to the north.

The Santa Margarita Basin includes portions of DWR defined Basins 3-21, 3-27, and 3-50. The DWR has not classified these basins as overdrafted and these basins are not adjudicated as defined by DWR Bulletin 118 (DWR, 2003). SVWD overlies the Scotts Valley Groundwater Basin, designated as Groundwater Basin 3-27 by the DWR (DWR, 2003) and as a Sole Source Aquifer by the USEPA (Figure 3-1). The Scotts Valley Groundwater Basin is defined by DWR as encompassing 1.2 square miles of alluvium in Scotts Valley surrounded by Tertiary sedimentary formations.

Figure 3-1: Santa Margarita Groundwater Basin



3.3.1.1 Geology of the Santa Margarita Basin

The Santa Margarita Basin consists of a sequence of sandstone, siltstone, and shale that is underlain by granite. This sequence of sedimentary rocks is divided into several geologic formations that are defined on the basis of the type of rock and their relative geologic age based on studies by the United States Geological Survey (USGS) in reports by Clark (1966 and 1981), Brabb et al. (1997) and McLaughlin et al. (2001).

In the Santa Margarita Basin, the geologic formations that contain significant sandstone layers are the primary aquifers for water supply. The primary aquifers in the basin include:

- Santa Margarita Sandstone (Santa Margarita),
- Monterey Formation (Monterey),
- Lompico Sandstone (Lompico), and
- Butano Formation (Butano).

Historically, the majority of the water supply in the Scotts Valley area has been derived from the Santa Margarita, Lompico, and Butano.

The Santa Margarita and Lompico have long been recognized as primary aquifers. The Santa Margarita has a long groundwater production history, with several production wells completed within this unit (Muir, 1981). Similarly, the Lompico is currently the primary groundwater-producing horizon with several large production wells completed in this unit.

The Butano had been mapped in surface outcrop by Clark (1966 and 1981). However, it was not recognized as the deep aquifer underlying the northern Scotts Valley until more recently (ETIC, 2006 and 2007) when SVWD Wells #3B and #7A were reinterpreted as being completed primarily within the Butano. The production history of these wells indicates that the Butano is capable of producing significant volumes of groundwater.

The sandstone interbeds and the fractured siltstones in the Monterey can locally produce groundwater; however, the Monterey has limited water supply potential that is typically used for private domestic wells rather than for municipal supply. The SVWD Well #9 is completed across both the Santa Margarita and Monterey. Groundwater production from SVWD Well #9 has significantly decreased from historic production rates now that the well produces almost exclusively from the Monterey.

3.3.1.2 Scotts Valley and Pasatiempo Subbasins

Two subareas in the regional Santa Margarita Basin are defined and reported by SVWD to help facilitate the discussion of local groundwater basin conditions underlying the SVWD service area. These include the Scotts Valley Groundwater Subarea which is the portion of the Santa Margarita Groundwater Basin primarily used by the SVWD and the Pasatiempo Groundwater Subarea which is the portion of the Santa Margarita Groundwater Basin used primarily by the SLVWD. SVWD overlies the Scotts Valley Groundwater Subarea, encompassing 5.5 square miles. Figure 3-1 shows the boundaries of the regional Santa Margarita Basin, the Scotts Valley Groundwater Subarea, Pasatiempo Groundwater Subarea, and the service area for SVWD.

3.3.2 Adopted Groundwater Management Plan

In 1994, SVWD formally adopted its Groundwater Management Plan (GMP) in accordance with the California Groundwater Management Planning Act groundwater legislation (codified in California Water Code Section 10750, et seq). The SVWD GMP (Todd Engineers, 1994) was the third GMP recorded by DWR. A copy of the SVWD's GMP is presented in Appendix D.

The overall purpose of the SVWD GMP is to develop a planning tool that will help guide SVWD in the management of the quantity and quality of the groundwater supply and to comply with the requirements of the California Groundwater Management Planning Act. As stated in the SVWD GMP:

> *"The purpose of this groundwater management plan is to address two major areas of concern in Scotts Valley: (1) management of groundwater supplies to meet present and future demands, and to provide for downstream water rights and in-stream uses; and (2) protection of water quality and remediation of existing groundwater contamination."*

The main goal of the GMP is to better manage the sole source aquifer serving the community's drinking water. The goal of the SVWD GMP is stated as:

> *"By implementation of a groundwater management plan for Scotts Valley, SVWD hopes to preserve and enhance the groundwater resource in terms of quality and quantity, and to minimize the cost of management by coordination of efforts among agencies."*

Prior to the establishment of formalized GMPs, SVWD prepared annual "Water Resources Management Plans". These plans, similar to later GMPs, were prepared from 1984 through 1994. After California Water Code §10700 was enacted, providing authority for local agencies to adopt GMPs, SVWD prepared and adopted its formal GMP in July 1994.

3.3.2.1 Basin Management Objectives

The California Groundwater Mana gement Planning Act requires the development of Basin Management Objectives (BMOs). The BMOs for SVWD's GMP are currently summarized as:

- Encouragement of public participation through an annual report of groundwater management activities at one or more public meetings.
- Coordination with other local agencies.
- Continued monitoring and evaluation of groundwater conditions.

- Implementation of groundwater augmentation projects.
- Investigation of groundwater quality and prevention of groundwater contamination.

These basin management objectives continue to guide the SVWD groundwater management program and serve as the major objectives of groundwater management for SVWD.

3.3.2.2 Groundwater Management Monitoring Program

As part of the GMP, SVWD has conducted a comprehensive Monitoring Program of groundwater conditions in the Scotts Valley area for over 20 years. The primary components of this Monitoring Program are:

- **Groundwater Levels -** Groundwater elevation data collected by SVWD, other local agencies, private entities, and consultants.
- **Groundwater Pumping -** Groundwater pumping compiled by SVWD and nearby groundwater users.
- **Precipitation -** Precipitation data measured by SVWD and other nearby gauges.
- **Water Quality -**Water quality data collected by SVWD production wells, private entities, and environmental compliance sites.

The Monitoring Program is designed to monitor changes in groundwater conditions to provide the basis for making groundwater management decisions. Monitoring and reporting activities are conducted to provide SVWD with necessary data and analyses to meet the Groundwater Management Goals and the BMOs. The monitoring program is reviewed periodically by SVWD to verify that it is providing the appropriate information to meet the Groundwater Management Goals and the BMOs.

3.3.2.3 Groundwater Management Program Annual Report

SVWD prepares an Annual Report each year to provide a summary of groundwater management activities by SVWD and the groundwater conditions in the Scotts Valley area. The results, analysis and interpretation of the Monitoring Program are incorporated into Annual Reports that are intended to provide a summary of the issues and analyses that are most pertinent to the needs and decisions that SVWD is currently facing. The report focuses on the water supply and water quality of the Basin to provide an assessment of groundwater management options and groundwater augmentation goals and options.

Annual Reports from the past several years and SVWD's complete updated databases can be downloaded from the SVWD website (www.svwd.org/index/District_Reports). In addition to the preparation of the Annual Report, SVWD conducts a public presentation annually to provide an update of the groundwater conditions, per the DWR requirement for the GMP.

3.3.2.4 Groundwater Levels

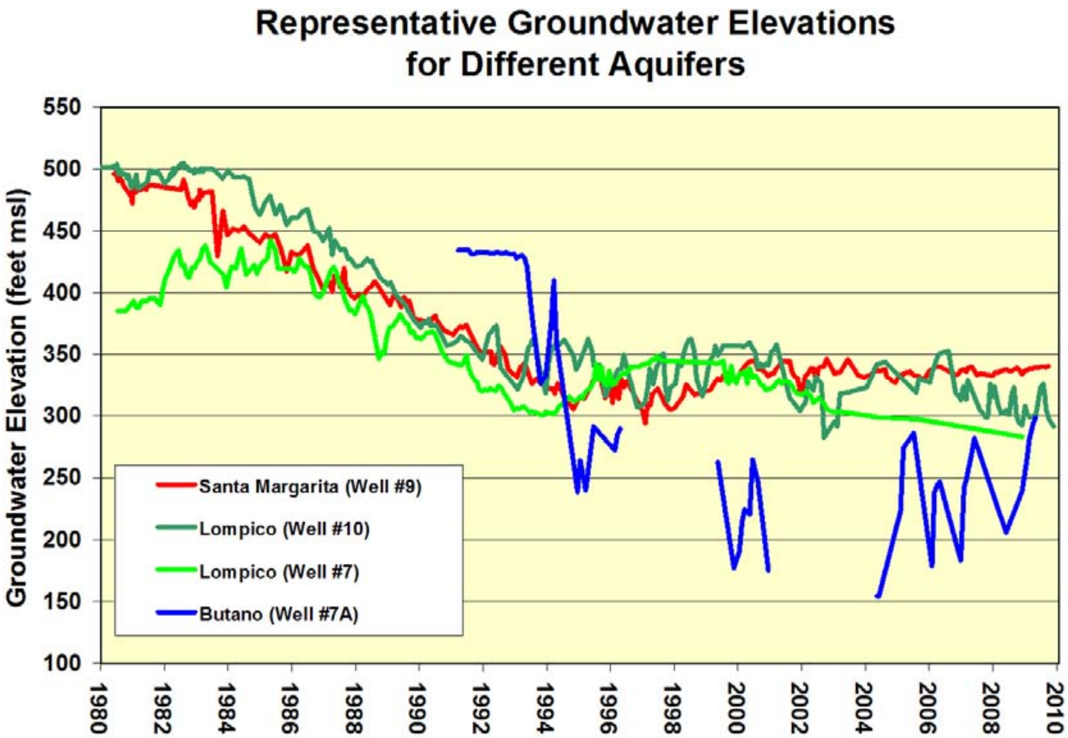
Groundwater flow in the basin is generally westward, toward Bean Creek, in the northern and southern portions of the basin (DWR, 2003). Bean Creek is topographically lower and parallels the basin in the northwest. Precipitation is the primary source of groundwater recharge in the basin in the form of direct percolation of precipitation through the soil to groundwater or infiltration from streams. The major groundwater outflows include discharge to streams and springs and groundwater pumping.

Historically, the majority of SVWD groundwater production has been derived from the major aquifers Santa Margarita, Lompico, and Butano. Groundwater levels in the Santa Margarita and Lompico declined by about 200 feet in the Scotts Valley area between the early 1980s and mid-1990s. Since the mid-1990s, groundwater levels in most Santa Margarita and Lompico wells in the Scotts Valley area have reduced the rapid rate of decline seen earlier. SVWD has conducted special assessments of the drawdown observed in the basin over the past several years to better understand the factors contributing to these trends (Kennedy/Jenks, 2008).

Figure 3-2 shows a hydrograph of groundwater levels since 1980 for representative wells in each of the major aquifers in the Scotts Valley area. The location of these wells is shown on Figure 1-2. The representative wells on Figure 3-2 include:

- The Santa Margarita is represented by SVWD Well #9. This well has not been pumped for several years.
- The Lompico is represented by SVWD Well #10 to represent the western areas and SVWD Well #7 to represent the eastern areas.
- The Butano is represented by SVWD Well #7A.

Figure 3-2: Historical Groundwater Levels from Different Aquifers



Prior to 1980, groundwater levels in the Scotts Valley area were generally higher than those in most of the rest of the Santa Margarita Basin. Therefore, the Scotts Valley area was a major recharge area for the basin, and groundwater flowed outward to the surrounding areas. After 1980, a variety of factors probably contributed to the observed groundwater level declines. The major factors include groundwater pumping increase to meet the water demand of a growing population, reduced recharge from the surface to groundwater due to an increase in paved areas and other land use changes associated with urbanization, and reduced groundwater recharge due to the drought of the late 1980s and early 1990s. A significant portion of the groundwater storage in the Santa Margarita was depleted during this time and has not recovered sufficiently to be considered a viable source of supply for SVWD. Production in other aquifers has been developed to replace the Santa Margarita supply.

Since the mid-1990s, groundwater levels in most Santa Margarita and Lompico wells in the Scotts Valley area have reduced the rapid rate of decline seen earlier. The water levels have generally fallen about 50 feet in the last decade, as shown in Figure 3-2. The most likely factor that has contributed to the observed trend is that lower groundwater levels in the Scotts Valley area allow groundwater from other portions of the basin to flow towards Scotts Valley. The generally above-average rainfall since the drought of the late 1980s and early 1990s may have also contributed to the observed trend in groundwater levels.

Even though total groundwater production from all producers in the Scotts Valley area has steadily declined from 2002 through 2010, as further described below, groundwater levels have not shown any commensurate rise in response to the decline in pumping. Total groundwater pumping in 2010 was 1,358 AF, which is the lowest since 1990. The likely explanation of this pattern is that the potential increase in groundwater storage is spread over a large area so that the groundwater level response is not readily apparent from year to year. In addition, the reduction in recharge from urbanization and other causes has limited the ability of the aquifer to recover. An update to the groundwater model has been approved for funding under Proposition 84 and may provide additional information to understand recharge and aquifer storage and to update the sustainable yield estimate for the Scotts Valley Area.

3.3.2.5 Available Groundwater Supplies

The projected groundwater pumping by SVWD in the Santa Margarita Basin (primarily the Scotts Valley Groundwater Subarea) is summarized in Table 3-2. As the sole source of potable water supply for SVWD, the Santa Margarita Sandstone Aquifer was designated as a "Sole Source Aquifer" by USEPA in 1985 (Federal Register, 1985). The "*Santa Margarita Aquifer, Scotts Valley*" is one of four areas in California designated as a "Sole Source Aquifer". The technical basis for this designation was the USGS report by Muir (1981). The USEPA defines a "Sole Source Aquifer" as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source that can physically, legally and economically supply all those who depend on the aquifer for drinking water (Federal Register, 1985).

Table 3-2 presents SVWD's projected pumping from 2015 through 2035 with projected pumping ranging from 1,315 AFY to 1,352 AFY. The pumping from other producers in the area was about 860 AFY in 2010. If this value is added to the estimated pumping from SVWD, the total is below the estimated sustainable yield. Some increase in pumping from the other producers may occur in the future unless additional water conservation measures are implemented.

Table 3-2: Projected SVWD Groundwater Production (AFY)

Water Supply Sources	2015	2020	2025	2030	2035
Supplier Produced Potable Groundwater from Santa Margarita Groundwater Basin[(a)]	1,484	1,345	1,316	1,315	1,352
Total	**1,484**	**1,345**	**1,316**	**1,315**	**1,352**
Percent of Total Supply	**89%**	**79%**	**76%**	**75%**	**75%**
Total Pumping Amount Potentially Available to SVWD and Other Pumpers (Sustainable Yield)[(b)]	2,600	2,600	2,600	2,600	2,600

Notes:

(a) Projected groundwater pumping.

(b) Based on the sustainable yield estimate for the portion of the basin underlying Scotts Valley, as provided by the modeling analysis (ETIC, 2006). Projected declines in SVWD pumping may offset future pumping increases by other pumpers keeping overall pumping within the sustainable yield. Other pumpers were estimated to pump 860 AFY in 2010.

The regional Santa Margarita and Lompico aquifers have historically presented a significant source of storage in the region as described in Bulletin 118 (DWR, 2003) although not all portions of the aquifers are available to Scotts Valley.. The Butano was not recognized as the deep aquifer underlying the northern Scotts Valley until more recently when this formation was identified as a water-bearing unit by the revised Santa Margarita Groundwater Basin hydrogeologic interpretation (ETIC, 2006 and 2007). The production history of SVWD wells extracting water from the Butano aquifer indicates that the Butano is capable of producing significant volumes of groundwater. In 2010, SVWD started the Butano Formation Groundwater Monitoring Project, funded by the AB303 Local Groundwater Assistance Program administered by DWR. This project will install two groundwater monitoring wells in the Butano and purchase equipment for conducting long-term groundwater monitoring. The purpose of the project is to better characterize groundwater in the Butano, and help guide future decisions about whether to install new production wells in the Butano.

3.3.2.5.1 Sustainable Yield

The sustainable yield of the Basin was initially estimated to be approximately 4,200 AFY (Todd, 1995). This volume was reevaluated in 1998 by Todd Engineers using the basic water balance equation: inflow minus outflow equals change in storage. In brief, the 1998 study confirmed that the 4,200 AFY value for sustainable yield was reasonably accurate and conservative. In 2006, the basin-wide Santa Margarita Basin Groundwater Model was completed. The numerical model was used to produce a sustainable yield volume given the current pumping scheme in the basin and the revised hydrogeologic interpretation.

Based on the numerical model analysis, the sustainable yield for the entire Santa Margarita Basin was estimated at 3,320 AFY (ETIC, 2006). This volume represents the amount of water that is available to the water producers under the current pumping configuration without causing any overall change in storage. Further analysis estimated the sustainable yield in just the Scotts Valley area at 2,600 AFY (ETIC, 2006). The sustainable yield (as defined by ETIC, 2006) represents the annual amount of water that can be taken from the existing wells in a basin over a period of years without “causing adverse impacts” (i.e. depleting storage beyond the ability of the basin to be replenished naturally). Exceeding the sustainable yield for the basin may lead to perennial declines in groundwater levels which over time may result in widespread loss of well production.

Based on the more recent analysis (ETIC, 2006), in this Plan, the sustainable yield of 2,600 AFY is considered to be the available groundwater resource for SVWD and other users of the Scotts Valley and Pasatiempo Subbasins. This amount represents the annual amount of water that can be taken from the existing wells in the basin over a period of years without “causing adverse impacts”. The sustainable yield estimate will be reviewed as part of the update of the groundwater model which is planned for Fall 2011 under a Proposition 84 grant.

SVWD’s projected pumping in Table 3-2 is significantly below the estimated sustainable yield of 2,600 AFY and is expected to decline over time as recycled water is more fully utilized. Therefore, potential increased pumping by other pumpers in the Scotts Valley Groundwater Subarea will likely be within the overall sustainable yield of the basin. As shown in Table 3-2, SVWD’s groundwater pumping is anticipated to decline from 1,484 AFY in 2015 to 1,352 AFY in

2035 as more recycled water becomes available for non-potable irrigation from the Recycled Water Program and water demand reduces as a result of the Water Conservation Program. Given the pumping projections that are below the estimate of sustainable yield, water supply reliability issues are not anticipated to occur in the SVWD service area.

Table 3-3 presents SVWD's historical and current annual total groundwater pumping from 2005 to 2010. On average, about 90 to 94 percent of water historically used in the service area was from groundwater extraction. The remaining was supplied by recycled water that has increased from about 0.2 AF delivery in 2002 to about 149 AF delivery in 2010. Groundwater production of 1,358 AF in 2010, which is less than historical pumping since 1990, is attributed to drought conditions, use of recycled water, implementation of conservation programs, and poor economic conditions.

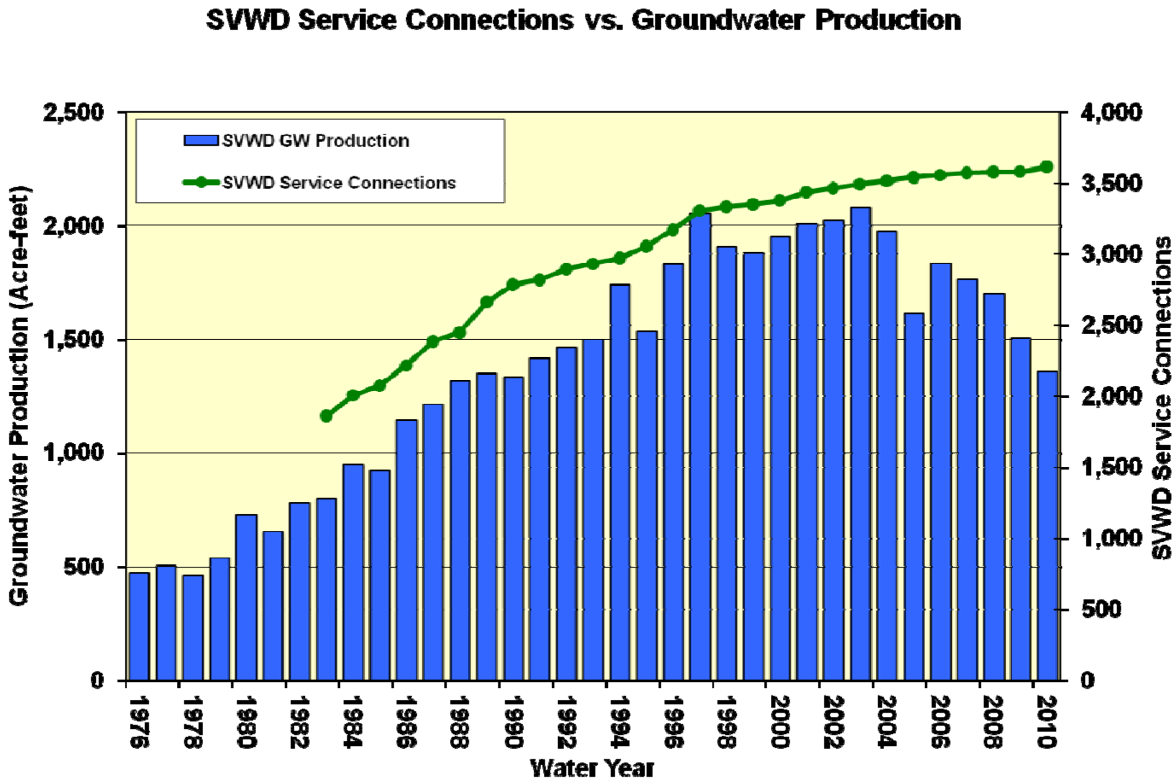
Table 3-3: SVWD Historical Groundwater Production (AFY)

Basin Name	2005	2006	2007	2008	2009	2010
Santa Margarita Basin[(a)]	1,613	1,834 1,764 1,700 1,507				1,358
Total	**1,613**	**1,834**	**1,764**	**1,700**	**1,507**	**1,358**
Percent of Total Water Supply	93%	94% 93% 91% 90%				90%

Note:
(a) Groundwater pumping production provided by SVWD based on metered data.

Historical groundwater pumping data dating back to 1976 show that prior to 2003, groundwater production grew accordingly with the increase in population in Scotts Valley (Figure 3-3). From 1977 through 2003, groundwater production rose steadily from about 500 AF to over 2,000 AF (Figure 3-3). Since 2004, however, SVWD has actively worked to control the growth in the water supply demand primarily through implementing the Recycled Water and Water Conservation Programs, each of which are described in Sections 4 and 7 respectively. The observed decline in groundwater production primarily results from these programs. In the past seven years, groundwater production has steadily declined by an average of about 100 AFY, even though the number of service connections has slightly increased (Figure 3-3). The exception was 2005, when water demand was affected by climatic conditions and an unusually wet spring reduced the outdoor water needs until late into the summer (Kennedy/Jenks, 2008). SVWD's groundwater production over the past six years has averaged 1,629 AFY, which is below the estimated sustainable yield of 2,600 AFY for the Scotts Valley Groundwater Subarea that is available to SVWD and the other pumpers. About 860 AFY was pumped by the other pumpers in 2010.

Figure 3-3: Annual Groundwater Production by SVWD



Currently, SVWD operates six production wells: SVWD Wells #3B, #7A, #9, #10A, #11A, and #11B (Figure 1-1). The total well capacity for SVWD wells is estimated to be 1,995 gallons per minute (gpm). Wells #7A and #3B were completed in the Butano formation and the remaining four wells were completed in the Lompico and Santa Margarita Sandstone. In 2007, Well #10A was installed as a replacement for Well #10. Well #10 is not considered an active production well, but it does retain some limited capacity for production. Table 3-4 provides an annual summary of the total groundwater production for each well from 2005 to 2010. Of the six active production wells, Wells #3B, #7A, #10A, and #11B are the highest producing wells in 2010, whereas production from Wells #9 and #11A is significantly less. Well #10 was not used in 2010 except for water quality testing and maintenance.

Table 3-5 shows estimated pumping volumes by SVWD from each major formation in the basin. In 2010, the majority (99.8 percent) of the groundwater production for SVWD water supply was derived from the Lompico and the Butano. In 2010, the Lompico is the highest producing aquifer with an estimated 894 AF and the Butano is the second highest producing aquifer with 462 AF.

Table 3-4: Groundwater Production By Well (AFY)

SVWD Well	2005	2006	2007	2008	2009	2010
Well #3B	234	280	409	186	235	150
Well #7A	644	595	456	452	504	427
Well #9	55	54	65	68	16	3
Well #10	153	435	60	0	1	1
Well #10A	0	0	92	544	397	357
Well #11A	117	75	132	84	36	20
Well #11B	411	396	550	365	319	400
Total	**1,613**	**1,834**	**1,764**	**1,700**	**1,507**	**1,358**

Table 3-5: Groundwater Production by Aquifer (AFY)

Aquifer	2005	2006	2007	2008	2009	2010
Santa Margarita	11	11	13	14	3	1
Monterey	44	43	52	55 13		2
Lompico	856	1,081	1,007	1,121	900	894
Butano	702	700	692	510 591		462
Total	**1,613**	**1,834**	**1,764**	**1,700**	**1,507**	**1,358**

3.3.2.6 Groundwater Storage Changes

The Santa Margarita Groundwater Basin Model (ETIC, 2006) was used to evaluate the change in groundwater storage. The updated model was recently used to quantify the overall decline in storage from 1985-2010 (based on water year). Over the past 25 years, the change in groundwater storage has varied from an increase of over 600 AF to decreases of nearly 1,900 AF, depending primarily in response to variation in annual precipitation and groundwater pumping. During the period of extended drought in the Scotts Valley area from 1985 to 1992, the basin has experienced the highest storage decline, at an annual rate of 500 AFY to 1,900 AFY. This was also a period of increasing groundwater production both by SVWD and other users. During the period from 1993 to 2004, groundwater storage typically declined at a lower rate, by 300 AFY to 500 AFY even though groundwater production increased to its highest levels. In 1995 and 1998, groundwater storage was estimated in the model to increase due to above-average precipitation resulting in high recharge rates for those years.

The most recent model analysis indicates a significant storage increase of almost 400 AF in 2010 which is not corroborated by the water level data found in Figure 3-2. As described earlier, the groundwater model will be updated under a Proposition 84 grant which will provide a revised estimate of storage. Increases in groundwater storage were greater than 500 AF in 2005 and 2006, due to above average rainfall, combined with continued lower groundwater production by SVWD as a result of the Recycled Water Program and Water Conservation Program. As further explained in Section 4, recycled water deliveries have increased since the Recycled Water Program started in 2002. In 2010, recycled water deliveries were approximately 149 AF. Between 2002 and 2010, approximately 900 AF of recycled water has been delivered for use.

All the current recycled water users are in the Santa Margarita Basin; thus, the entire 900 AF represents an equivalent groundwater savings. In other words, groundwater not pumped is considered as in-lieu recharge in storage and available for future beneficial uses. Recycled water use is anticipated to gradually increase to 330 AFY by 2030, as shown in Table 3-1, for non-potable irrigation. This will further offset some of groundwater pumping currently used for irrigation.

Adequacy of Supply

Although there have been significant years of drought, the overall storage in the basin is apparently sufficient to provide adequate resources for SVWD given the past, current, and anticipated future demand. The long-term adequacy of the supply will rely on improving direct and in-lieu recharge, and reduction in groundwater pumping through improved water use efficiency, recycled water production. The reliability of supply can be also affected by the loss of individual wells resulting from catastrophe, such as an earthquake, or environmental contamination. These scenarios are discussed further in Section 8 of this Plan.

SVWD overlies a significant portion of the Basin which has been estimated to have an overall storage capacity of over 200,000 AF, a portion of which is accessible to SVWD. The very nature of groundwater reduces the short-term impact of drought years because of the absolute availability of supply, but long-term impacts need to be managed by monitoring the condition of storage, water level, and well performance under these conditions.

The ultimate supply of groundwater in the basin is natural recharge resulting from precipitation in the basin. Because the primary supply of water for SVWD, with the exception of recycled water, is the basin, precipitation and the ability for the precipitation to recharge the aquifer defines the supply of SVWD.

The reliability of the recycled water resource of SVWD is unaffected by climactic conditions given that the source of recycled water is wastewater. The recycled water distribution system is susceptible to major catastrophes, such as a seismic event that can disrupt operation.

Sustainability

The primary purpose of SVWD is to provide a safe and reliable drinking water supply to its customers. As mentioned earlier, groundwater is the sole source of potable water supply for SVWD, so careful management is necessary to manage the groundwater resource in a sustainable manner. SVWD has been actively managing the groundwater basin since the early 1980's in an effort to increase water supply reliability and to protect local water supply sources. As mentioned below, recent decline in SVWD pumping is mainly attributed to the SVWD's Recycled Water and Water Conservation Programs. SVWD has increased its commitment to these two programs which will help sustain and recover groundwater levels and long-term groundwater production by reducing potable water demand. Additional emphasis on in-lieu and direct recharge will further improve the long-term sustainability of the local groundwater aquifer.

Since 1983, SVWD has actively managed the basin through establishment of an integrated climatic, surface water, and groundwater monitoring program; regular reporting of water conditions; a safe yield study; implementation of a recycled water program; assessment of artificial recharge and water transfer options; ongoing groundwater exploration studies; development and revision of a regional groundwater numerical model.

SVWD actively participates in the SMGBAC, a forum for discussing regional water issues and developing collaborative solutions. The SMGBAC typically meets twice each year (spring and fall) at noticed, open public meetings.

3.3.3 Potential Supply Inconsistency

Water supplied within the SVWD service area is almost entirely from groundwater. The Santa Margarita Basin is the primary water source to meet potable demand. The basin is a highly reliable source of supply that is monitored regularly by SVWD and other agencies in the region. The Santa Margarita Basin is not anticipated to have supply inconsistencies because of the management of the basin. Therefore, SVWD does not have any inconsistent water sources that may cause reduced deliveries to users within the service area. A potential exception is areas where water quality could limit use as a potable supply. Groundwater quality in the basin is high in iron, manganese, and hydrogen sulfide and therefore, requires treatment to meet the State water quality standards for aesthetics (i.e., Secondary MCLs). SVWD operates three pressure filter treatment plants for the iron and manganese removal and uses chemical treatment for hydrogen sulfide removal. Other water quality concerns include the presence of perchlorate, VOCs and other chemicals associated with environmental cleanup sites. SVWD continues its active role in cleanup sites across the basin.

Overall, water quality issues in the SVWD service area have been addressed by the water treatment facilities and comprehensive monitoring and measurements activities by SVWD. Water quality produced from SVWD facilities is within standards set for acceptable drinking water by the Federal Government and the California Department of Public Health (DPH).

3.4 Transfers, Exchanges, and Groundwater Banking Programs

Additional water supplies can be purchased from other water agencies and sources. An important element to enhancing the long-term reliability of the total mix of supplies currently available to meet the needs of the service area is the use of transfers, exchanges, and groundwater banking programs, and recycled water such as those described below.

3.4.1 Transfers and Exchanges

An opportunity available to SVWD to increase water supplies is to participate in voluntary water transfer and exchange programs. Since the drought of 1987-1992, the concept of water transfer has evolved into a viable supplemental source to improve supply reliability. The initial concept for water transfers was codified into law in 1986 when the California Legislature adopted the “Katz” Law (California Water Code, Sections 1810-1814) and the Costa-Isenberg Water Transfer Law of 1986 (California Water Code, Sections 470, 475, 480-483). These laws help define parameters for water transfers and set up a variety of approaches through which water or water rights can be transferred among individuals or agencies.

One of the most important aspects of any resource planning process is flexibility. A flexible strategy minimizes unnecessary or redundant investments (or stranded costs). The voluntary purchase of water between willing sellers and buyers can be an effective means of achieving flexibility. However, not all water transfers have the same effectiveness in meeting resource needs. Through the resource planning process and ultimate implementation, several different types of water transfers could be undertaken.

3.4.2 Opportunities for Short and Long-Term Transfers and Exchanges

In 2008, SVWD initiated a long-term recycled water and potable water exchange program that involves Pasatiempo Golf Club and the SCWD, as briefly described below.

There is a small (2-inch) emergency intertie with SLVWD for emergencies arising in either district. The intertie is used primarily for water shortage emergencies and is not considered as regular water transfer option for SVWD; thus, it is not considered as part of water supply projections in Table 3-1.The intertie has been used several times to date, each time for flow from SVWD to SLVWD. Plans for increasing the capacity of the intertie have been made and will be implemented when funding becomes available.

3.4.2.1 Pasatiempo Golf Club Recycled Water Exchange

A cooperative effort took place with SVWD, the SCWD, and Pasatiempo Golf Course to plan the infrastructure that would give Pasatiempo Golf Club access to recycled water for course irrigation, thus reducing the demand for SCWD potable water during the summer months. An MOU was signed in 2008 between SVWD and Pasatiempo Golf Club to ensure a long-term availability of recycled water supply to Pasatiempo Golf Club. A copy of the MOU is presented in Appendix E. Currently, the Golf Club is receiving water for irrigation from the SCWD. SVWD's current Recycled Water Program has the production capability to meet a portion of the Golf Club's irrigation needs consistently. In 2007, the SCWD approved a Resolution, expressing desire to participate in this joint effort by providing potable water to SVWD when it is available from surface sources in exchange for an equal volume of recycled water provided by SVWD to the Golf Club to meet the Golf Club's irrigation needs. Through the exchange program, SVWD would provide about 120 AFY of recycled water to the Golf Club beginning in 2020 and in exchange, receive potable water from SCWD when it is available from surface sources, particularly in the winter months.

Both SVWD and the Golf Club recognize the potential for multiple and mutual benefits of this program, including but not limited to improved Golf Club water supply reliability and price stability, reduced SVWD groundwater demand as a result of the potable exchange with the SCWD, lesser peak irrigation season demand on the SCWD potable water system, and overall more efficient use of regional water supplies for long-term sustainability and environmental enhancement.

3.4.3 Groundwater Banking Programs

With recent developments in conjunctive use and groundwater banking, significant opportunities exist to improve water supply reliability in the Santa Margarita Basin. Conjunctive use is the coordinated operation of multiple water supplies to achieve improved supply reliability. Most conjunctive use concepts are based on storing groundwater supplies in times of surplus for use during dry periods and drought when surface water supplies would likely be reduced.

Currently, SVWD is involved in two projects related to groundwater recharge: Conjunctive Use and Enhanced Aquifer Recharge Project and Groundwater Recharge Pilot Project at the Scotts Valley Library, both briefly described below in Section 3.5.

In addition to these ongoing efforts, SVWD will continue to use the numerical model to identify enhanced potential recharge locations to evaluate the long-term sustainability of groundwater production. SVWD has included this item as part of its groundwater management program annual budget and will use the results to identify methods of minimizing potential losses in groundwater storage within the basin.

3.5 Planned Water Supply Project and Programs

SVWD has planned for water supply projects and programs as described in this section. Future planned delivery from each program or project is difficult to quantify, with the exception of anticipated recycled water supply, as noted in Table 3-6. Water supply programs and projects that are not listed in Table 3-6 are briefly described below as these programs and projects will add further reliability to SVWD's existing water supply portfolio and add robustness to its system. SVWD's planning efforts on expanding recycled water use and facilities are presented in Section 4. A detailed description of the current and future projected recycled water use in the SVWD service area and activities undertaken by SVWD on development of recycled water are described in Section 4.

Table 3-6: Planned Water Supply Projects and Programs by SVWD

Name/Type	Planned Delivery (AFY)	Date Supply Available
Recycled Water Distribution System Extensions[a]	330	2030

Note:

[a] These projects and programs will help expand the Recycled Water Program with anticipated recycled water delivery of 330 AFY by 2030.

3.5.1 Recycled Water Facilities Planning

The Recycled Water Program, which was inaugurated in 2002, has increased overall water supply by replacing a significant portion of the landscape irrigation demand in the SVWD service area. In 2010 the recycled water program delivered 149 AF of recycled water to SVWD customers.

SVWD completed a Recycled Water Facilities Planning Report (FPR) in May 2009. The FPR provides an update to the SVWD Recycled Water Master Plan and evaluates future extensions of the existing recycled water distribution pipelines into new areas. The FPR includes a Recycled Water Market Assessment to identify the potential market for additional recycled water use within the SVWD service area and to incorporate a regional element by enlarging the service area to include Pasatiempo Golf Course and parts of the SCWD. The pipeline expansion will allow for potential new customers to be added to the program to further expand recycled water usage. SVWD has also identified customers with the potential to convert from potable water to recycled water for landscaping uses. This potential has been estimated to be at least 330 AFY based on landscaping usage records (Table 3-1).

3.5.2 Recycled Water Distribution System Extensions

The Recycled Water Program continues to expand as funds become available to install infrastructure to support more customers. SVWD received a $705,705 grant under the Proposition 50 IRWMP Implementation Grant to extend recycled water pipelines into new areas within SVWD as identified in the FPR. Three pipeline extensions were installed in 2009. SVWD anticipates submitting future grant proposals to fund additional extensions of recycled water pipelines into other key areas within the SVWD service area. Funding for this construction will be sought through Supplemental Proposition 50 and Proposition 84 (Prop 84) solicitations under the IRWMP.

Through the continuous efforts to expand the Recycled Water Program, SVWD anticipates to increase recycled water delivery from 149 AFY in 2010 to 330 AFY by 2030.

3.5.3 Butano Groundwater Management Project

The Butano Formation Groundwater Monitoring Project is funded by a $250,000 Local Groundwater Assistance Grant from Proposition 84 funds through DWR. This grant proposal was initially submitted in November 2007, but the final award of this grant was postponed until December 2009.

The purpose of the project is to better characterize groundwater in the Butano, and help guide future decisions about whether to install new production wells in the Butano. The project consists of installing two groundwater monitoring wells in the Butano and the purchasing of equipment to conduct long-term groundwater monitoring. During the installation of these wells, additional geologic, geophysical and water quality data will be collected to better characterize the Butano Formation. The installation of monitoring wells will provide groundwater level and water quality data to better evaluate and manage groundwater in the Butano.

The project began in 2010, with efforts consisting primarily of negotiating site access, completing environmental documentation, developing initial monitoring well specifications, and working out project logistics. Installation of the two monitoring wells and completion of the groundwater level monitoring is anticipated in 2011.

3.5.4 New Water Wells

SVWD currently has six active production wells. In 2007, a new Well #10A was installed as a replacement for Well #10. SVWD is currently identifying potential locations for a new production well to augment its potable water supply, and funding for this project has been approved. Three potential sites for a new groundwater production well are currently being evaluated, as shown in Figure 3-4 and briefly described below:

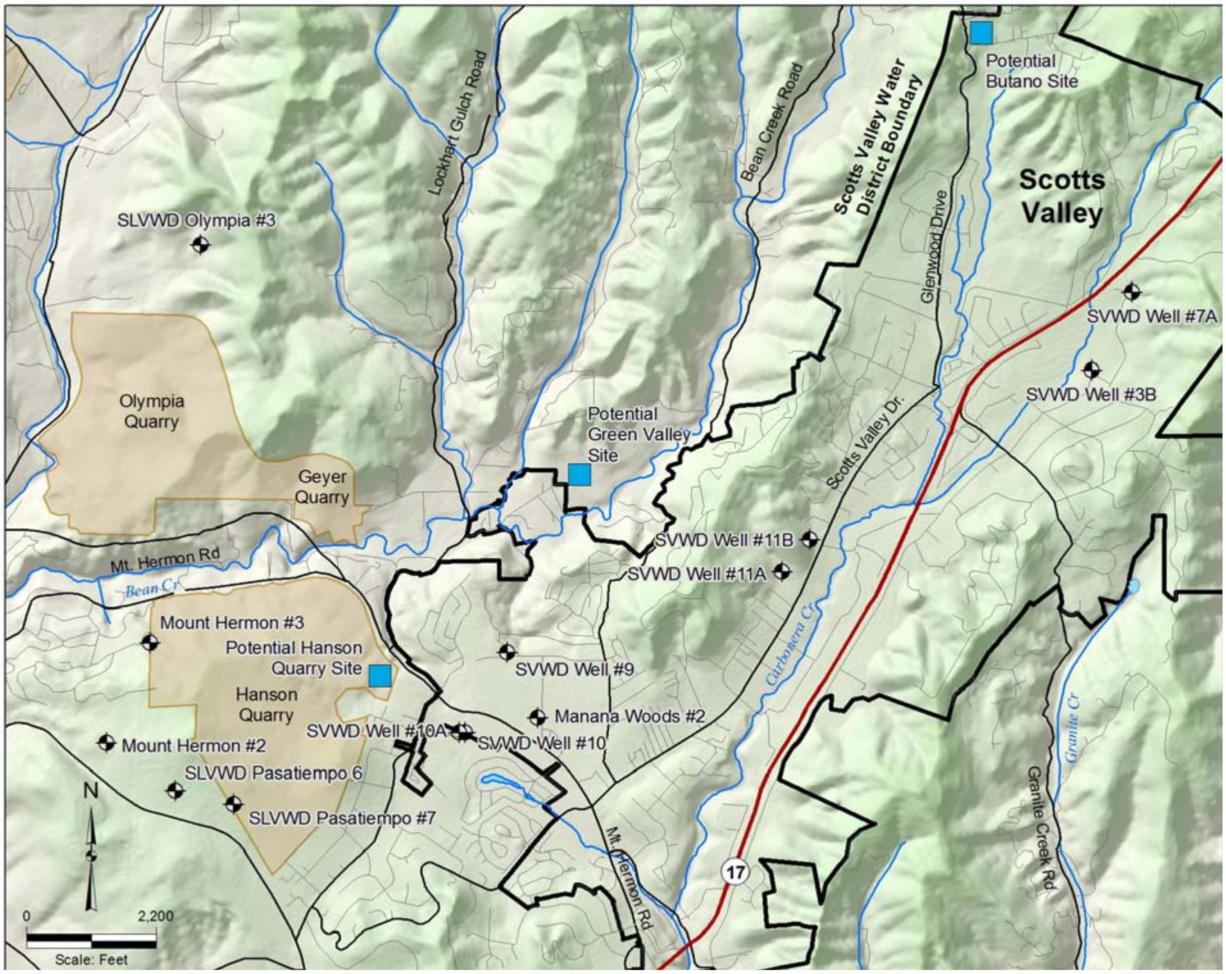
- **Butano Site** – Butano formation may have significant water supply potential; however, limited data is available because the Butano is situated at considerable depths (greater than 1,000 feet deep) which make drilling and well installation expensive. In 2010, efforts were focused on planning for the installation of the deep monitoring wells in the Butano which will provide important data for evaluating the potential for siting a production well in the Butano. No specific production well location has been identified.

- **Green Valley Site** – This area is an open field along Green Valley Road that is located just outside SVWD boundary (Figure 3-4). A potential well would be completed in the Santa Margarita at a depth of about 100 to 150 feet. This site will require additional evaluation of potential impacts to Bean Creek of limiting summer time stream flow. In 2010, updates to the Santa Margarita Basin Groundwater Model were proposed that will improve the analytical tools needed to help address these issues.

- **Well 9 Site** – The existing Well 9 site could be used as a site for a new well completed in the Lompico. The well depth would be approximately 900 feet. SVWD previously explored the possibility of installing a new municipal well at the nearby Hanson quarry site (Figure 3-4). This location offered several advantages over the Well 9 site, but property negotiations with the site owner were discontinued in 2010.

Rehabilitation of old wells and construction of new wells are needed to replace lost capacity and are part of SVWD's capital improvement program and maintenance budgeting. Although the need for an additional well has been reduced as a result of decreasing water demand which has resulted in lower groundwater production, ongoing evaluations are occurring to identify the most viable location for the installation of a new groundwater production well. One method to help mitigate potential future service disruptions is to have additional redundancy in the system so that SVWD can continue to meet water demand, even in high-demand periods, with at least one high-capacity well offline. Therefore, the installation of a new groundwater production well is considered a prudent step to maintain system reliability. The construction of a new well will most likely increase supply capacity and accommodate anticipated growth, although the main purpose is to redistribute pumping and increase the reliability of supply.

Figure 3-4: Potential New Well Sites



3.5.5 Conjunctive Use and Enhanced Aquifer Recharge Project

Under the Proposition 50 IRWMP Implementation Grant, the Phase 1 Conjunctive Use and Enhanced Aquifer Recharge Project is evaluating potential methods to improve groundwater conditions in the Scotts Valley area. This project is a regional evaluation of the feasibility of conjunctive use projects in the Santa Margarita Groundwater Basin with a primary focus on the Scotts Valley area. The project is focused on screening a variety of potential conjunctive use alternatives with the goal of identifying one or more projects to mitigate declines in groundwater levels and provide for a more secure, reliable water supply. The potential benefits of this project are to identify viable projects to increase the amount of groundwater in storage to improve water supply reliability, improve summer baseflow in nearby streams to improve fishery conditions, and reduce stormwater runoff. The project was completed in December 2010 and a final report is anticipated in 2011. The project was being supervised by the Santa Cruz County Environmental Health Services and had a budget of $227,500.

3.5.6 Groundwater Recharge Pilot Project

Under a Proposition 50 IRWMP Implementation Grant, the Enhance and Protect Groundwater Recharge Areas is a groundwater recharge pilot project that is being implemented at the Scotts Valley Library. This project will evaluate utilizing drainage facilities to enhance groundwater recharge. This project will apply low impact development techniques to divert stormwater runoff from the property towards grassy swales or retention ponds. This water would percolate through the soil to improve water quality before it reaches the groundwater. The results of this pilot study will include recommendations for amendment of policies to promote increased groundwater recharge for new and existing development. The Groundwater Recharge Pilot Project is being supervised by the Santa Cruz County Environmental Health Services, and is expected to be completed in 2011.

3.5.7 Groundwater Model Update

The Santa Margarita Basin Groundwater Model was first developed as part of a DWR Local Groundwater Assistance Grant. The groundwater model was completed in 2006 to provide a quantitative tool to help evaluate and manage groundwater resources (ETIC, 2006). The model is a comprehensive numerical groundwater model developed using the U.S. Geological Survey model code MODFLOW2000. The model represents a management tool to be used in the basin to determine the redistribution of pumping centers and to protect the local groundwater resource. The groundwater model was also used to establish sustainable yield values for the basin as well as to evaluate drought impacts and catastrophic outages as described in Section 8.

Initially, the model was set up and calibrated for the 20-year interval from 1985 to 2004 (ETIC, 2006). The groundwater model is updated regularly to support the groundwater supply assessment. Because of the geologic complexity of the basin in the Scotts Valley Groundwater Subarea, the model provides a more effective tool to evaluate the changes in the water supply over time. More recent modeling analyses included the model update with data from 2005 through 2010 to support the water supply assessment.

Further application of the model includes the identification of a new well location and enhanced groundwater recharge locations within the basin. SVWD has included both of these items as part of its groundwater management program annual budget and will use the results to identify methods of minimizing potential losses in groundwater storage within the basin. The reuse of tertiary treated wastewater or recycled water will also provide the added benefit of reduced groundwater pumping from the basin.

As part of the Santa Cruz IRWMP Proposition 84 Planning Grant, SVWD included a project for the comprehensive update and recalibration for the Santa Margarita Groundwater Basin Model. The model would be updated with new geological, groundwater and streamflow data. The proposed update would implement these improvements to the model to help support further evaluations for groundwater management and conjunctive use projects.

3.5.8 Integrated Regional Water Management Plan

SVWD is among the agencies that participated in the development and completion of the Preliminary Northern Santa Cruz County IRWMP administered by the Regional Water Management Foundation, a subsidiary of the Community Foundation of Santa Cruz County. The partner agencies have worked together since at least 1998 on regional water resources issues, and have coordinated on water bond funding since April 2002. In 2007, the Foundation received a $12,500,000 Implementation Grant under Proposition 50. Several of these projects relate to SVWD. The IRWMP was completed in October 2005 and is available online at www.rcdsantacruz.org/Resources/integrated-regional-water-management-plan.php.

3.5.9 Other Opportunities

SVWD continues to look for opportunities for outside funding and support regional grant application efforts to enhance its groundwater management and water conservation efforts, where possible. Outside funding helps to offset the costs of studies and capital improvements necessary for water planning and groundwater management.

Other opportunities that SVWD is pursuing include the recently awarded grants and pending grant applications, as listed below:

- In October 2010, the Regional Water Management Foundation, a subsidiary of the Community Foundation of Santa Cruz County, submitted the Santa Cruz IRWM Integrated Regional Water Management Proposition 84 Planning Grant to DWR. It included several projects for a total request of $999,750 which has been recommended for award. As part of the Santa Cruz IRWMP Proposition 84 Planning Grant, SVWD included a project for the comprehensive update and recalibration for the Santa Margarita Groundwater Basin Model. The model would be updated with new geological, groundwater and streamflow data. The update would implement these improvements to the model to help support further evaluations for groundwater management and conjunctive use projects and is planned to commence in Fall 2011.

- SVWD received an Urban Drought Assistance Grant in November 2008 from DWR; however, the distribution of funds for the grant was delayed due to the state budget crises. DWR notified SVWD on September 17, 2009 that funding was given the go-ahead. This grant provided funds for conducting leak audits of the main lines, funding landscape conservation incentives for two years, and implementing other conservation measures. The SVWD grant proposal was one of 53 proposals recommended for funding under this program out of 283 proposals received.

3.6 Development of Desalination

The California UWMP Act requires a discussion of potential opportunities for use of desalinated water (Water Code Section 10631[i]).

SVWD has limited opportunities for the development of desalinated water, given its geographical location relative to the ocean and lack of a brackish groundwater resource and has no current plans to pursue groundwater or seawater desalination. Therefore, these water supply options are not included in the supply summaries in this Plan (Table 3-1). Other water suppliers in the region such as the SCWD and Soquel Creek Water District are pursuing ocean desalination as an alternative water resource during dry years. SVWD could potentially benefit from this program if a regional intertie project is constructed with future grant and/or local funding.

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Section 4: Recycled Water

4.1 Overview

This section of the Plan describes the existing and future recycled water opportunities available to the SVWD service area. The description includes estimates of potential supply and demand for 2010 to 2035 in five-year increments, as well as SVWD's proposed incentives and optimization plan.

4.2 Potential for Recycled Water Facilities

As discussed in Section 3, the majority of water demand in the SVWD service area is met by water supplies from groundwater pumping in the Santa Margarita Groundwater Basin. Up to 800 AFY of existing and future irrigation demand in the SVWD service area could be supplied by recycled water as discussed in the Recycled Water FPR (Kennedy/Jenks, 2009). Recycled water has been available in Scotts Valley since 2002 and in 2010, 149 AF of recycled water was delivered to 36 existing connections. Recycled water is available for irrigation of a range of facilities including parks, common landscape in commercial and residential properties, medians, and schools. SVWD is also considering interior reuse of recycled water for toilet flushing for some new developments.

As discussed in Section 2, the future water demand in the SVWD service area will increase as development continues; thus, SVWD recognizes that recycled water will continue to be an important and reliable source of additional water. The FPR was prepared under a grant from the State Water Resources Control Board and positions SVWD to obtain other grants to further expand recycled water use in Scotts Valley and the region.

As described in the 2009 FPR, SVWD completed detailed evaluations of existing and future recycled water demands throughout the service area and region. SVWD's unique situation where groundwater is limited and imported water is not available indicate that recycled water is an important element of the District's water portfolio. Some of the potential alternatives developed as part of the recycled water evaluation and key findings are relevant to the future projections of recycled water use.

4.3 Sources of Recycled Water

The City of Scotts Valley is responsible for the collection and safe disposal of wastewater generated within the SVWD service area. Wastewater generated in the SVWD service area is treated at the City Scotts Valley Water Reclamation Facility (WRF) (Figure 4-1).

4.3.1 Existing and Planned Wastewater Treatment Facilities

4.3.1.1 Existing Facilities

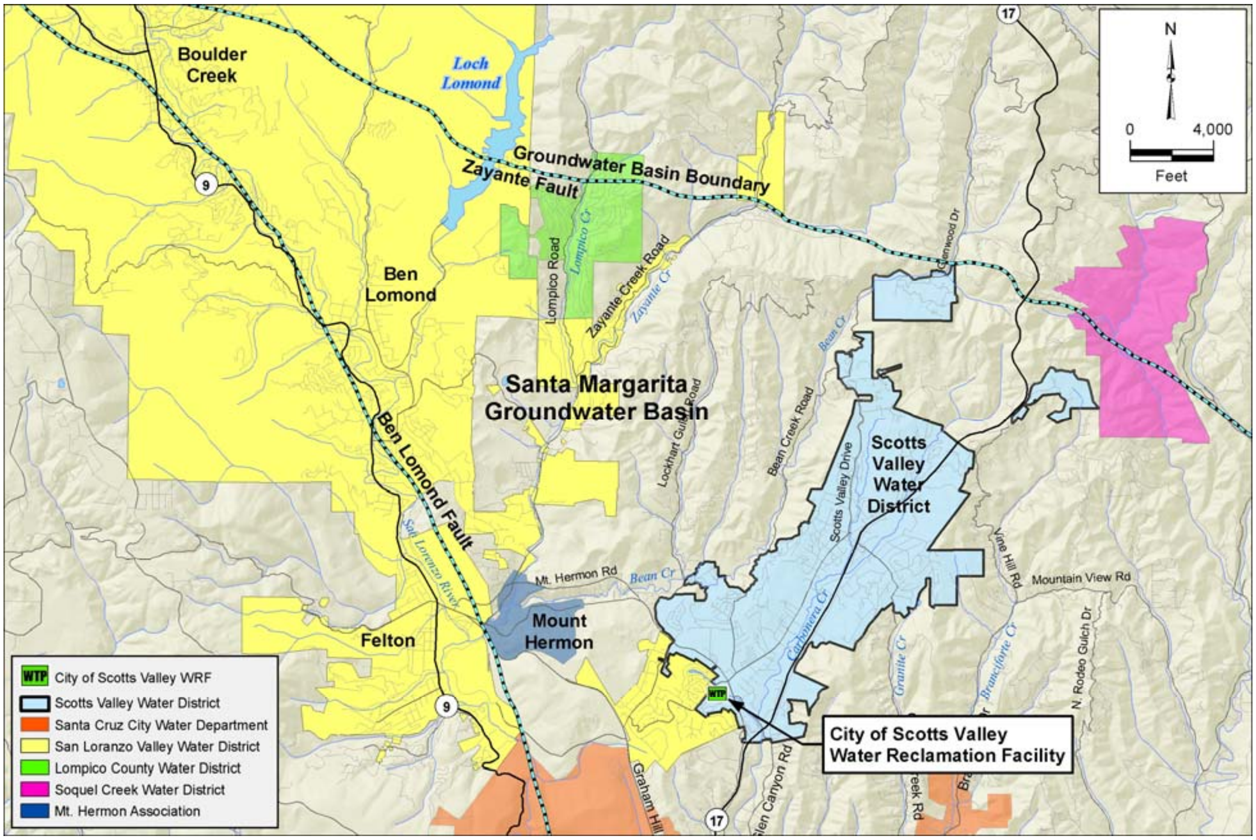
The City has about 5 miles of collection pipelines and eight lift stations to collect and transmit the wastewater flow, as reported in as reported in the Santa Cruz Local Agency Formation

Commission (LAFCO) (Santa Cruz, 2005). The Scotts Valley WRF is a conventional activated sludge wastewater treatment facility with a design dry weather treatment capacity of 1.5 mgd and a design peak wet weather treatment capacity of 5.0 mgd. Major facilities include an influent pump station, a flow equalization structure with 0.9 MG of storage capacity, two aeration basins with fine-bubble diffuser panels, two secondary clarifiers, a chlorine contact tank and an effluent pump station. Disinfected secondary effluent is pumped to Santa Cruz where it is discharged into the Monterey Bay via the existing ocean outfall pipeline shared with Santa Cruz Wastewater Treatment Facility.

The Scotts Valley WRF includes a tertiary treatment facility with a design treatment capacity of 1.0 MGD. The facility is used to treat secondary effluent to a tertiary level using chemical coagulation and flocculation, filtration, denitrification, and ultraviolet (UV) disinfection. The treated effluent meets California DPH Title 22 recycled water standards for unrestricted use (Kennedy/Jenks, 2009).

Current average dry weather wastewater influent flow is approximately 0.85 MGD to the City's WRF (Kennedy/Jenks, 2009). Wastewater flows at ultimate "build-out" conditions may be up to 0.95 MGD (Santa Cruz LAFCO, 2005). Influent wastewater flows have been gradually decreasing in spite of increasing population. One factor in the decreasing flow is the improved efficiency of washers, toilets, sink and shower heads which are using potable water more efficiently As a result, one of the limiting factors in recycled water delivery is the limited dry weather wastewater flows (Kennedy/Jenks, 2009).

Figure 4-1: Recycled Water Facilities



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4.3.2 Proposed Improvements and Expansions

The FPR provided direction on improvements and expansions to both the WRF and to the recycled water distribution system to optimize the recycled water production, distribution, and storage. These improvements and expansions are summarized in Table 4-1 which describes improvement and expansion projects, the quantity of recycled water delivered, and estimated project cost, based on the FPR (Kennedy/Jenks, 2009). Not all of the improvements and expansions are necessary in the near-term but would be beneficial in the long-term to provide reliability as additional customers are brought on-line.

Table 4-1: Proposed Improvement and Expansion Projects

Improvement/ Expansion Projects	Project Description	Recycled Water Delivered (AFY)	Estimated Capital Cost (2009)
Phase 1 SVWD Infill Customers	Expansion of recycled water service to 10 Category A customers along Scotts Valley Drive, Civic Center Drive, and Whispering Pines Drive	20	$80,000
Phase II Scotts Valley Stage 2 WRF Upgrades	Upgrades to optimize recycled water production including modification and replacement of tertiary influent pumps, maximizing the filtration rate during backwash and adjusting the turbidity set-point.	n/a	$280,000
Phase III Additional Recycled Water Storage	Addition of up to 400,000-gallon below-grade storage tank and pump station at WRF to meet future peak demands.	n/a	$2,100,000
Phase IV – Pasatiempo Recycled Water Project	Facilities for delivery of recycled water to Pasatiempo Golf Course in summer including connection to ocean outfall piping and existing irrigation system, satellite treatment, and storage and pumping facilities	189	$3,240,000
Phase V Potable Interconnection with Santa Cruz	Pipeline for delivery of potable water from Santa Cruz to SVWD in winter time including 14,800 linear feet of 10" pipeline and pump station to exchange for Phase IV Recycled water delivery to Pasatiempo Golf Course.		$5,500,000
Total Estimated Capital Cost			**$11,200,000**

Source: Recycled Water Facilities Planning Report, prepared by Kennedy/Jenks Consultants (May 2009) prepared for SVWD.

For future projections of wastewater flow discharge to the City's WRF, future average daily wastewater flows, as reported in the Santa Cruz LAFCO projections, were used as the basis for projections. Table 4-2 provides the existing and future projected wastewater flow contribution to the Scotts Valley WRF. The existing and planned methods of wastewater effluent discharge and use are summarized in Table 4-3. It should be noted that future flows in Table 4-2 reflect average daily dry weather flows, and wet weather and peak flows will be higher than those in the table.

Table 4-2: Wastewater Collection and Treatment

Facility Name	Estimated Existing (2010)	2015[(a)]	2020[(a)]	2025[(a)]	2030[(a)]	2035[(a)]
City of Scotts Valley WRF (MGD)	0.9	0.93	0.95	0.97	0.99	1.01
City of Scotts Valley WRF (AFY)[(b)]	1,008	1,042	1,064	1,085	1,107	1,129

Note:
(a) Source: Santa Cruz LAFCO Countywide Service Review -Wastewater Services, June 2005 for 2015 and 2020. 2025, 2030, and 2035 were escalated at 2 percent per year per LAFCO report. Because of water use efficiency and potentially slower growth than assumed, wastewater flow will likely remain quite low in the future. A conservative summer wastewater flow has been assumed for potential recycled water production.
(b) All wastewater cannot be recycled water because of very low demand in winter.

Table 4-3: Non-Recycled Disposal of Wastewater

Facility Name	Method of Disposal	Treatment Level	Wastewater Discharge and Use (AFY) 2010	2015	2020	2025	2030	2035
City of Scotts Valley WRF [(a)]	Discharge to Monterey Bay	Disinfected, Secondary	859	851 824 795			777	799
Total			**859**	**851**	**824**	**795**	**777**	**799**

Note:
(a) Projected treated wastewater flow discharge to Monterey Bay from the Scotts Valley WRF is projected to gradually reduce as additional summer time recycled water irrigation uses are added per Table 2-1.

4.3.3 Other Potential Sources of Recycled Water

During the preparation of the SVWD's 2009 FPR, SVWD explored and evaluated other potential sources of recycled water that could be utilized for irrigation purposes. One of the potential sources is to increase wastewater flows to the Scotts Valley WRF through sewering areas that are currently on septic tanks in Scotts Valley. No other sources of recycled water exist in the Scotts Valley area.

4.4 Recycled Water Demand

In this section, current recycled water use is discussed, and potential recycled water users within SVWD's service area and in the region are identified as determined from the SVWD's Recycled Water FPR.

4.4.1 Current Use

Currently, recycled water is served by SVWD to landscape irrigation customers in the service area (Table 4-4).

Table 4-4: Actual Recycled Water Uses

Type of Use	Treatment Level	Actual 2010 Use (AF)
Landscape (45 customers)	Disinfected tertiary	149
Total		**149**

4.4.2 Potential Uses

Potential recycled water uses were mainly identified in SVWD's Recycled Water FPR: In the SVWD service area, total estimated existing recycled water demand is 149 AFY and estimated potential recycled water demand of up to 800 AFY. Recycled water delivery is limited by influent wastewater flows. However, some of the recycled water demand is far from existing infrastructure and could be costly to connect. Currently, existing recycled water customers include parks, schools, and multi-family residential and commercial landscape. Future recycled water customers are similar to the existing customers.

Table 4-5: Potential Recycled Water Uses

		Potential Use (AF)				
Type of Use	**Treatment Level**	**2015**	**2020**	**2025**	**2030**	**2035**
Landscape[a]	Disinfected tertiary	191	241	290	330 330	
Total		**191**	**241**	**290**	**330**	**330**

Note:
[a] Additional recycled water customers may be added if influent wastewater flows increase.

4.4.3 Recycled Water Facilities Planning Report

SVWD's 2009 Recycled Water FPR was completed by Kennedy/Jenks with the following objectives:

- Identify the existing and potential recycled water demands throughout the service area and nearby region;
- Determine infrastructure improvements necessary to serve future recycled water customers;
- Determine the limitations on the existing recycled water supply and identify potential improvements to optimize the Scotts Valley WRF recycled water production; and
- Prepare capital and operations and maintenance cost estimates for the various distribution system and treatment optimization options.

As described in Section 4.3.2, a phased approach was developed to implement infrastructure to expand the recycled water system. Several alternatives were described and evaluated for recycled water delivery as summarized below.

- **Alternative A:** Summer Irrigation within SVWD which identified three tiers and five categories of customers based on proximity to existing infrastructure and timing of connection.
- **Alternative B:** Summer Irrigation within Santa Cruz which identified two categories of customers within the Santa Cruz Water Department service area to deliver recycled water through the existing treated effluent export pipeline.
- **Alternative C:** Wintertime Recharge – Groundwater Recharge Reuse Program (GRRP) within SVWD which identified 2 modes of recharge, surface groundwater recharge and subsurface groundwater recharge using recycled water.
- **Alternative D:** Wintertime Recharge – Surface Water Recharge With Potential For Future GRRP which identified conjunctive use with Santa Cruz County as a potential far-term opportunity.

Table 4-6 summarizes the four alternatives, including the location of the potential customer, and the potential recycled water demand that would be served by each alternative. SVWD is actively pursuing near-term elements of Alternatives A and B to expand recycled water use based on available influent wastewater flows.

4.4.4 Recycled Water Comparison

In the 2005 UWMP, it was reported that there were 21 recycled water meters as of October 2005. As of 2010, SVWD reports that there are 36 recycled water meters distributing irrigation water. Although the 2010 recycled water projection in the 2005 UWMP of 350 AFY (Table 4-7) was not met, the number of recycled water users has significantly increased. Recycled water demand may be moderated by the inclining block rate structure that SVWD has on recycled water users. Since SVWD is limited in recycled water availability, efficient use of recycled water is as important as efficient use of potable water.

Table 4-6: Potential Recycled Water Alternatives and Customer Descriptions

Alternative	Sub-alternative	Category/Description	AFY	Timing [a]
Alternative A: Summer Irrigation Within SVWD	A.1	Category A – Infill Customers along Scotts Valley, Civic Center, and Whispering Pines Drives	A – 41.7	Near-Term
		Category C – New infrastructure < ½ mile along Victor Square/Technology Loop, Bean Creek Road, Blue Bonnet Road, and Hacienda Drive	C – 98.9	
	A.2	Category B – Minor Extensions to Glenwood and Scotts Valley Drive and Mt. Hermon Replacement	B – 40.1	Near-Term
	A.3	Category D –New infrastructure > ½ mile to Mt. Hermon Road Extensions and Gateway South	D – 20.4	Far-Term
		Category E – Distant Potential Customers and Future Development	E – 169.7	
Alternative B: Summer Irrigation Within Santa Cruz	B.1	Category F- Satellite tertiary treatment plant to meet demands at Pasatiempo Golf Course	F-188.6	Near-Term
	B.2	Category F – New Recycled Water pipeline to meet demands at Pasatiempo Golf Course		
	B.3	Category G – New Recycled Water pipeline to meet other Santa Cruz customer demands	G - 93.1	Far-Term
	B.4	Category G – Re-use existing ocean outfall pipeline to meet other Santa Cruz customer demands		
Alternative C: Wintertime Recharge –GRRP within SVWD	C.1	Surface GRRP – Surface Spreading at Hanson Quarry	Not determined	Far-Term
	C.2	Subsurface GRRP – Subsurface injection	Not determined	Far-Term
Alternative D: Wintertime Recharge – Surface Water Recharge With Potential For Future GRRP	D.1	Conjunctive Use with Santa Cruz County - Support surface water recharge project in County with plan to future transition to GRRP	Not determined	Far-Term

Note:
[a] Source: Table 1-2 of Recycled Water FPR (Kennedy/Jenks, 2009).

Table 4-7: Recycled Water Uses - 2005 Projection Compared with 2010 Actual

User Type	2005 Projection for 2010 (AF)	2010 Actual Use (AF)
Landscape	350	149
Total	**350**	**149**

4.5 Methods to Encourage Recycled Water Use

Table 4-8 lists actions taken by SVWD to promote recycled water use and other actions that can be taken in the future to further encourage the use of recycled water as a viable water source. SVWD has been involved with public outreach and coordinating with local cities and wastewater agencies, and other planning agencies to discuss the feasibility of using recycled water in lieu of potable groundwater that is currently used for irrigation. In this Plan, it is projected that some level of additional recycled water use will potentially result from these ongoing efforts. This regional planning and coordination effort should continue to the extent possible as a project develops toward implementation.

In the case of SVWD, funding availability, securing grant funding, and financial incentives are among the factors that will play a big role in the future implementation of recommended recycled water projects. As mentioned earlier, SVWD completed detailed evaluations of potential alternatives and projects to use recycled water, but implementation of such alternatives, at this time, is pending funding availability. State and federal funding, if available, could offset the cost imposed during project construction which typically makes the project cost-prohibitive. Obtaining funding, as SVWD has done, also helps build community support for a project because it results in reduced taxpayer contribution.

Table 4-8: Methods to Encourage Recycled Water Use

Actions	Use Projected to Result From This Action (AF)				
	2015	2020	2025	2030	2035
Local/Regional Planning	0	0	0	0	0
Public Outreach	0	0	0	0	0
State and Federal Funding	191	241	290	330	330
Financial Incentives	0	0	0	0	0
Total	**191**	**241**	**290**	**330**	**330**

4.6 Optimization Plan

Production from the existing Scotts Valley WRF is anticipated to be adequate to meet the total demands of recycled water irrigation demand in the SVWD, especially if proposed improvements to optimize production are implemented. As potable water demands increase and, consequently, recycled water production increases, the water available to meet non-potable demands would also increase. As described earlier, SVWD has already completed the necessary studies to identify both existing and future potential recycled water demands that could be potentially supplied by recycled water sources, thus, freeing up potable supplies currently used to meet portion of irrigation demands. Implementation of the identified recycled water projects is currently pending funding assistance.

Phasing implementation of the expansion of the recycled water system is recommended for the following reasons:

- Recycled water storage and distribution facilities are not immediately available.
- Capital requirements would be spread over SVWD's current planning period through 2035.

In general, the following factors were considered in developing a phasing plan:

- Funding availability
- Ease or willingness of customers to connect to recycled water
- Retrofit costs
- Regulatory requirements
- Community impacts and development requirements
- Wastewater utility involvement/cooperation
- Reliability and operational costs considerations
- System flexibility

The implementation phases are prioritized based on the status of the users (existing or future), the anticipated construction schedule of future users, and the proximity of the users to the recycled water source.

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Section 5: Water Quality

This section provides a general description of the water quality of SVWD's water supplies, primarily groundwater as the sole source of water supply for SVWD. A discussion of potential water quality impacts on the reliability of this supply is also provided.

5.1 Overview

The quality of any natural water is dynamic in nature. This is true for the local groundwater of the Santa Margarita Groundwater Basin. During periods of intense rainfall, routes of surface water movement are changed; new constituents are mobilized that are often dependent on local land use and enter the surface and groundwater while other constituents are diluted or eliminated. The quality of water changes over the course of a year. These same basic principles apply to groundwater. Depending on water depth, groundwater will pass through different layers of rock and sediment and leach different materials from those strata. Water depth is a function of local rainfall and recharge. During periods of drought, the mineral content of groundwater increases.

Water quality regulations also change. This is the result of the discovery of new contaminants, changing understanding of the health effects of previously known as well as new contaminants, development of new analytical technology, and the introduction of new treatment technology. All water purveyors are subject to drinking water standards set by the USEPA and the California DPH.

SVWD provides local groundwater to a majority of the residents in and around the City of Scotts Valley. SVWD monitors the active groundwater producing wells for a number of constituents with a frequency that complies with the Safe Drinking Water Act requirements as outlined in the California Code of Regulations, Title 22 requirements. SVWD actively incorporates new constituents into the monitoring program as a result of new regulatory actions or trends in the water quality industry (e.g., methyl-tert-butyl ether (MTBE) was added to the monitoring list in 1987). All water quality results are reported to the California DPH Division of Drinking Water and Environmental Management.

SVWD annually prepares and distributes the "*Scotts Valley Water District Water Quality Report*" to keep customers informed on water quality issues. This report provides the public with detailed results of water-quality testing, a description of the water source, answers to common questions about water quality, and other useful water quality information. SVWD's Water Quality Reports are available at www.svwd.org/index/Water_Quality_Report. Copies of the 2006-2009 Water Quality Reports are found in Appendix F. These reports include detailed information about the results of quality testing of the water supplied during the preceding year (SVWD, 2006-2009). In addition to the annual Water Quality Reports, SVWD describes water quality monitoring data in the Annual Report, prepared each year as part of the Groundwater Management Plan (Kennedy/Jenks, 2011).

The quality of water received by individual customers will vary depending on the groundwater source and level of treatment. Customers may receive water from one well at one time and water from another well at a different time, or blends of well. The source of supply in any single point in the SVWD distribution system may vary over the course of a day, a week, or a year.

5.2 Imported Water Quality

SVWD does not rely on imported water as part of its supply; thus, no water quality impacts from imported water are anticipated.

5.3 Groundwater Quality

SVWD promotes water quality protection by monitoring both groundwater quality and by operating water treatment facilities to ensure that water delivered to customers meets all drinking water standards. SVWD also reviews activities at environmental remediation sites and provides feedback to other agencies responsible for the regulation of these sites with known contamination problems.

The following subsections describe groundwater quality monitoring and groundwater treatment by SVWD and current conditions of groundwater quality in SVWD supply wells with respect to specific constituents of concerns. This section also describes known or potential impacts to active SVWD supply wells by constituents released from the existing environmental remediation sites.

5.3.1 Groundwater Quality Monitoring

SVWD's monitoring program consists of sampling both the raw and treated water from production wells, monitoring of shallow groundwater, and monitoring of surface water in the region. Monitoring raw water quality at the six active SVWD production wells is a key groundwater management objective for SVWD. SVWD also collects and analyzes samples for general minerals, physical characteristics, select metals, and organic chemicals often associated with industrial or commercial sites. Results of SVWD's annual monitoring are reported in the Water Quality Reports, available at the SVWD's website (www.svwd.org/index/Water_Quality_Report). Copies of the Water Quality Reports 2006 through 2009 are presented in Appendix F.

In addition to groundwater quality monitoring, SVWD actively monitors groundwater and surface water as part of Recycled Water Program, as summarized in Section 5.3.5 below.

5.3.2 Groundwater Treatment

Under the Safe Drinking Water Act, the USEPA and the California DPH have set primary maximum contaminant level (MCLs) associated with public health risks as drinking water standards for various chemicals and constituents. Secondary MCLs are not defined as public health risks, but create taste, odor, and other aesthetic issues that are regulated. The California DPH also defines public health goals (PHG) for various parameters that serve as guidelines for water quality.

SVWD monitors water quality at the groundwater production wells for constituents that meet requirements outlined in the Safe Drinking Water Act and under Title 22 of the California Code of Regulations. Groundwater is sampled from SVWD Wells #3B, #7A, #9, #10, #10A, #11A and #11B (Figure 1-2) for major cations, anions, trace metals, total dissolved solids (TDS), pH, volatile organic compounds (VOCs), and MTBE. Results of water quality analysis are reported to the California DPH.

SVWD monitors and samples both raw and treated water. Raw water samples represent native groundwater quality conditions prior to any treatment. SVWD treats groundwater at four water treatment plants (WTP) prior to distribution. These facilities and their operations are listed in Table 5-1. SVWD applies treatment technologies to raw water extracted from wells to compensate for groundwater with concentration levels above or approaching primary and secondary MCLs (Table 5-1). By applying the appropriate treatment technology, SVWD is able to deliver tap water to customers that meets regulatory standards and is safe to drink.

Table 5-1: Summary of Water Treatment Processes

Water Treatment Plant	SVWD Wells	Aquifer Formation	Chemicals of Concerns	Treatment Type
Orchard Run	Wells #3B and #7A	Butano and Lompico	Iron, manganese and hydrogen sulfide	Air stripper, chlorination, dual media filtration, and sequestering agent.
SVWD Well #9	Well #9	Santa Margarita and Monterey	Sulfate, MTBE, VOCs and hydrogen sulfide	Chlorination and granular activated carbon (GAC) filtration
SVWD Well #10	Wells #10 and #10A	Lompico	Iron, manganese, VOCs and hydrogen sulfide	Air stripper, chlorination, dual media filtration, sequestering agent, and standby GAC filtration.
El Pueblo	Wells #11A and #11B	Lompico	Iron, manganese, arsenic and VOCs	pH adjustment, chlorination, dual media filtration, and sequestering agent

5.3.3 Groundwater Quality Conditions

The groundwater in the SVWD is naturally high in iron, manganese, TDS, and hydrogen sulfide, as further described in below. It requires treatment to meet the related federal and state drinking water aesthetic or secondary standards (Table 5-1). In addition, the Scotts Valley area has a number of sites contaminated with VOCs, including petroleum hydrocarbons (benzene, toluene, ethylbenzene and xylenes) and gasoline additives such as 1,2-dichlorethane (1,2-DCA) and MTBE. Solvents such as tetrachloroethene (PCE) and trichloroethylene (TCE) have also been identified in the local groundwater, as described below in Section 5.3.4.

5.3.3.1 Arsenic

Arsenic is a naturally occurring element in groundwater that forms from the erosion and breakdown of geologic deposits; however, arsenic can less commonly be associated with contaminant plumes. The primary MCL for arsenic is 10 micrograms per liter (μg/L).

Arsenic measurements in groundwater indicate that arsenic primarily occurs in the Lompico with the highest concentrations in SVWD's Wells #11A and #11B. Arsenic has been very low or more typically non-detect in wells completed in the Butano and Santa Margarita/Monterey.

5.3.3.2 Iron

Iron is a naturally-occurring constituent in groundwater resulting from the dissolution of minerals within the aquifer. California DPH established a secondary MCL of 300 μg/L due to undesirable conditions including the discoloration of water, laundry, and fixtures, or the buildup of deposits in pipes and plumbing.

Iron measurements in groundwater indicate that iron is primarily occurs in the Lompico with the highest concentrations in SVWD Wells #10A, #11A and #11B. Iron concentrations are above the secondary MCLs for many wells, especially those completed in the Lompico. Iron has typically been near or below the secondary MCL for wells in the Butano and Santa Margarita/Monterey. It is unclear if the variable iron in SVWD Well #3B is from the Lompico or Butano.

5.3.3.3 Manganese

Manganese is naturally-occurring groundwater constituent similar to iron. California DPH established a secondary MCL of 50 μg/L due to undesirable conditions including the discoloration of water, laundry, and fixtures, or the buildup of deposits in pipes and plumbing. Manganese concentrations are above the secondary MCLs for many wells especially those completed in the Lompico.

Manganese measurements in groundwater indicate that manganese is primarily occurs in the Lompico with the highest concentrations in SVWD Wells #10A, #11A and #11B. Manganese has typically been near or below the secondary MCL for wells in the Butano and Santa Margarita/Monterey. It is unclear if the variable manganese in SVWD Well #3B is from the Lompico or Butano.

5.3.3.4 Total Dissolved Solids (TDS)

Total Dissolved Solids is not considered a public health risk but rather relates to the aesthetic quality of water. Depending on the location and water usage, TDS can contribute to the corrosion of metal surfaces or have deleterious effects on sensitive crops. Taste however, is the driving force behind the secondary MCLs from the state. Past customer surveys performed by the US EPA indicated that around 300 miligrams per liter (mg/L) of TDS taste was acceptable and not acceptable around 1000 mg/L. Based on these taste surveys, a threshold of 500 mg/L was established for dissolved solids with an upper limit of 1000 mg/L. In California, a secondary MCL range of 500 to 1,000 mg/L, including a short-term limit of 1,500 mg/L, has been developed for TDS (California Code of Regulations Title 22, §64449).

Measured TDS in groundwater indicates that TDS is highest in SVWD Well #9 with the source most likely derived from the Monterey. Well #9 is not currently actively pumped. TDS is near the secondary MCL in the Butano, and TDS is typically near or below the secondary MCL in the Lompico.

5.3.3.5 Hydrogen Sulfide

Hydrogen sulfide is a naturally-occurring groundwater constituent that exists as a dissolved gas in groundwater. The presence of hydrogen sulfide is usually associated with a “rotten egg” smell and foul taste in water. No MCL or other groundwater standard has been established for hydrogen sulfide in groundwater.

Based on measured data by SVWD, hydrogen sulfide is detected primarily in the Butano. Detections in SVWD Well #9 are most likely from the Monterey. In recent years, hydrogen sulfide has not been detected in wells completed in the Lompico, although treatment for hydrogen sulfide was included with SVWD Well #10 when it was in operation.

5.3.3.6 Nitrate

The California DPH places nitrate into the health risk category of “acute toxicity.” Therefore, a single detection may result in public health concerns. DPH states that “infants below the age of six months who drink water containing nitrate in excess of the MCL may quickly become seriously ill and, if untreated, may die because high nitrate levels can interfere with the capacity of the infant’s blood to carry oxygen. Symptoms include shortness of breath and blueness of the skin. High nitrate levels may also affect the oxygen-carrying ability of the blood in pregnant women.”

Historically, SVWD production wells have reported only sporadic detections of low levels of nitrate that were well below MCLs. Investigations into nitrates occurred in the 1980’s to evaluate potential impacts related to septic tanks and treated wastewater disposal in the Basin. Investigations typically focused on the Santa Margarita as it is typically the high water bearing zone and therefore more likely to be impacted from nitrate releases near the surface. In the early 1980s, treated wastewater disposal was changed from land disposal around Scotts Valley to diversion to an ocean outfall and the wastewater system was expanded to reduce the number of septic tanks. In 2010, nitrate was analyzed for, but was not detected in any of the SVWD production wells. Since 1999, nitrate has not been detected at any SVWD production well.

5.3.3.7 Sulfate

Sulfate is a naturally-occurring groundwater constituent. California DPH has established a secondary MCL of 250 mg/L to account for the aesthetic characteristics of sulfate. Concentrations below the secondary MCL are acceptable barring reports of aesthetic concerns.

Based on measured data by SVWD, sulfate is highest in SVWD Well #9 with the source most likely derived from the Monterey. Sulfate is well below the secondary MCL in the Butano and Lompico.

5.3.4 Environmental Sites

SVWD actively monitors environmental compliance sites where groundwater quality has been impacted by pollution or chemical spills in the Scotts Valley area. Due to the potential impact of these sites to the water supply in the groundwater basin, SVWD has been closely involved with activities in these sites by reviewing monitoring data, status reports, and work plans, and by providing comments to regulatory agencies. These sites may also affect future groundwater augmentation plans because raising groundwater levels in these impacted areas has the potential to re-activate pockets of contamination that may be isolated in the overlying unsaturated sediments.

Table 5-2 below summarizes potential impacts from the existing sites on SVWD wells. Currently, six active environmental compliance sites are known within the SVWD with chemicals of potential concern to groundwater quality. As listed in Table 5-2, the primary chemicals of concern emanating from these sites are MTBE, chlorinated VOCs, including PCE, TCE, and cis-1,2-DCE (Dichloroethylene), and chlorobenzenes. These chemicals are of concern both because of their toxicity and their persistence in groundwater. Two former SVWD supply wells have been taken out of service due to impact from chemicals originating from these sites, including Mañana Woods #2 (see Figure 1-1) and the former Hidden Oaks well (located about 700 feet north/northeast of Mañana Woods #2), both impacted by MTBE from the Camp Evers site.

The clean up of MTBE at SLVWD's Mañana Woods well and SVWD Well #9 continues such that if it appeared that the plume was migrating, the responsible parties would be required to contain the plume.

Table 5-2: Summary of Potential Impacts from Environmental Sites on SVWD Production Wells

Well	Sites with Potential Impact	Chemicals of Concern	Assessment of Potential Impact
Well #3B	None Known	None Known	Impact not expected given well location (~0.5 miles up-gradient from nearest known release site) and screen depth (>700 ft)
Well #7A	None Known	None Known	Impact not expected given well location (>0.75 miles up-gradient from nearest known release site) and screen depth (>700 ft)
Well #9	Camp Evers; Watkins-Johnson; Scotts Valley Dry Cleaners; King's Cleaners	MTBE, PCE, TCE; cis-1,2-DCE	MTBE consistently detected at below MCL concentrations since August 2006, ongoing and apparently increasing impact is a concern; TCE/cis-1,2-DCE detected sporadically at <MCL concentrations and significant increases not expected given cleanup status; PCE not detected to date, however uncertainty in sources presents a potential concern.
Well #10A	Scotts Valley Dry Cleaners	PCE	No impact detected to date, but proximity to site presents ongoing concern until cleanup is completed, which could take many years based on relatively flat concentration trends

Well	Sites with Potential Impact	Chemicals of Concern	Assessment of Potential Impact
Well #11A	Scotts Valley Drive Dichlorobenzene	Chlorobenzenes	Monochlorobenzene present at trace (~100x less than MCL) and generally declining concentrations; given cleanup status, significant increases not expected
Well #11B	Scotts Valley Drive Dichlorobenzene	Chlorobenzenes	Monochlorobenzene present historically but none detected presently, historically generally declining concentrations; given cleanup status, significant increases not expected

5.3.5 Recycled Water Monitoring Program

SVWD actively monitors groundwater and surface water as part of the Recycled Water Program. SVWD has performed monitoring on surface water sampling locations as part of meeting the BMO of monitoring changes in water quality. During 2010, samples were collected from a total of nine surface water sampling locations on Carbonera Creek, Bean Creek, Eagle Creek, and Spring Lakes Park. The key parameters that are evaluated are potential increases in nutrients (primarily nitrate) and salt (primarily TDS), as briefly described below.

5.3.5.1 Nitrate

The presence of nitrate in recycled water has been noted in the effluent samples. Nitrate as N concentrations in surface water samples ranged from <0.1 to 0.64 mg/L during the 2010 sampling. These are similar to trends seen in previous years and below the USEPA primary MCL of 10 mg/L for nitrate (as N).

5.3.5.2 TDS

The presence of elevated TDS in recycled water has been noted in the effluent samples. The 2010 measurements show TDS levels ranging from 70 mg/L to 590 mg/L, except in Spring Lakes where TDS concentration was 730 mg/L, compared to the USEPA secondary MCL of 500 mg/L for TDS. This is similar to results since 2006 and is indicative that recycled water is put into Spring Lakes.

5.4 Water Quality Impacts on Reliability

SVWD's previous and current efforts to manage the basin and comprehensive active monitoring of groundwater quality have contributed to the projection of no changes to water supply as a result of water quality conditions. Therefore, no reductions to supply are expected from any of the constituents listed in this section (Table 5-3).

Table 5-3: Current and Projected Water Supply Changes Due to Water Quality-Percentage Change

Water Source	2010	2015	2020	2025	2030
Santa Margarita Basin	0%	0%	0%	0%	0%

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Section 6: Reliability Planning

6.1 Overview

The Act requires urban water suppliers to assess water supply reliability that compares total projected water use with the expected water supply over the 20 years in five year increments (SVWD is going beyond the requirements of the Act by developing a plan which spans 25 years). The Act also requires an assessment for a single dry year and multiple dry years. This section presents the reliability assessment for SVWD's service area.

It is the stated goal of SVWD to deliver a reliable and high quality water supply for their customers, even during dry periods. Based on conservative water supply and demand assumptions over the next 25 years in combination with conservation of non-essential demand during certain dry years, the Plan successfully achieves this goal.

6.2 Reliability of Water Supplies

Each water supply source has its own reliability characteristics. In any given year, the variability in weather patterns around the region may affect the availability of supplies to the Santa Margarita Basin.

For SVWD, the assessment of water supply reliability under normal or average conditions is best described by the sustainable yield. SVWD overlies a relatively large groundwater basin. Considering the nature of stored groundwater in the basin, the impact of drought years does not affect the absolute availability of shorter term supply, but rather the condition of overall storage, water level, and well performance if groundwater is depleted on a localized basis. Furthermore, the long-term impact on the groundwater basin, specifically additional loss of storage during extended droughts is of significant concern.

The ultimate supply of groundwater in the basin is natural recharge resulting from precipitation in the basin. Because the primary supply of water for SVWD, with the exception of recycled water, is the basin, precipitation defines the supply of SVWD. Precipitation has been measured at the El Pueblo Yard in Scotts Valley since 1982. Prior to 1982, precipitation records date back to 1947 at the Blair Ranch on the outskirts of Scotts Valley in Santa Cruz County. The Blair Ranch precipitation records provide a historical sequence of 63 years. Table 6-1 defines average supply, single dry year supply, and multiple dry years supply as related to precipitation over the 63-year historical sequence. The assessment of water supply reliability, as presented in Table 6-1, is similar to the assessment that was reported in the 2005 UWMP. The 2005 UMWP reliability assessment was based on the results of the numerical groundwater modeling analysis where the model scenarios were developed and used to provide background data for basin management and response criteria during extended drought and also catastrophic conditions. The drought assessment from the numerical modeling analysis is relevant to SVWD today because it reflects the capacity of SVWD to provide water under drought conditions.

Table 6-1: Supply Reliability Based on Precipitation

	Normal Water Year	Single Dry Year	Multiple-Dry Water Years Year 1	Year 2	Year 3	Year 4	Year 5
Year	2002	1990	1987	1988 1989		1990	1991
Inches of Rain	42.33	20.58	23.42	23.81	30.67	20.58 26.64	
Percent of Normal	100%	49%	55%	56%	72%	49% 63%	

Although there have been significant years of drought, the overall storage in the basin is apparently sufficient to provide adequate resources for SVWD given the past, current, and anticipated future demand. The current basin conditions are supported by less rapid decline in groundwater levels as well as model results that indicate increases in groundwater storage. The current basin conditions are mainly attributed to above average rainfall, combined with continued lower groundwater production by other users and SVWD as a result of the Recycled Water Program and Water Conservation Program (Kennedy/Jenks, 2011). While the supply is generally sufficient during a shorter-term drought because the demands are reduced through SVWD action and the reliance on groundwater in storage, the long-term reliability of supply needs to be monitored closely and groundwater storage enhanced through continued attention to water use efficiency, recycled water and enhanced in-lieu and direct recharge. Short-term droughts can also be affected by the loss of individual wells resulting from catastrophe, such as an earthquake, or environmental contamination, which is discussed further in Section 8.

In the context of overall water supply reliability, the expansion of SVWD's Recycled Water Program plays a significant role. As discussed in Section 2, the future water demand in the SVWD service area will increase as development continues; thus, SVWD recognizes that recycled water will continue to be an important and reliable source of additional water. SVWD's unique situation is that when groundwater is limited and potable exchange water is not available, recycled water is an important element of SVWD's water portfolio. As more recycled water customers are anticipated to be added to the recycled distribution system, landscape irrigation with groundwater supply will go down. Therefore, increased use of recycled water will further enhance the reliability of the groundwater source since groundwater that is not pumped will replenish the basin storage and be available for future beneficial uses.

A summary of the factors limiting supplies is found in Table 6-2. The reliability of the recycled water resource of SVWD is unaffected by climactic conditions given that the source of recycled water is wastewater. The recycled water distribution system is susceptible to major catastrophes, such as a seismic event that can disrupt operation. Potable exchange water supply from the SCWD is considered on a regular basis; however, the reliability of this supply may depend on the availability of surface water in the wintertime from the SCWD.

Table 6-2: Factors Resulting in Inconsistency of Supply

Water Supply Sources	Specific Source Name, if any	Limitation Quantification	Legal	Environmental	Water Quality	Climatic	Additional Information
Supplier produced groundwater		None			✓		Groundwater is monitored per California DPH regulatory requirements and the water meets all MCLs.
Recycled water	Scotts Valley WRF	Influent summer wastewater flows					
Future exchange from SCWD	Surface water	Recycled water exchange and surface water availability	✓	✓			This supply depends on the availability of surface water during a dry winter as well as the exchange of recycled water during the summer.

6.3 Normal, Single-Dry and Multiple-Dry Year Planning

Currently, SVWD has groundwater and recycled water supplies available to meet demands during normal, single-dry, and multiple-dry years. In addition to these current sources, potable exchange water from the SCWD is anticipated to become available by 2020 and continue on a regular basis through 2035. The following sections elaborate on the different supplies available to SVWD.

6.3.1 Groundwater

A portion of the local groundwater of up to 2,600 AFY of sustainable yield is theoretically available in both average and dry years to SVWD since deficits can be satisfied with local groundwater and be replenished in wet years. In addition, the sustainable yield estimated will be refined during the update of the groundwater model planned for Fall 2011. It should be noted that of the pumpers over the Scotts Valley groundwater Subarea; SVWD pumps the largest quantity of water of all of the pumpers. However, as discussed in Section 8, SVWD will impose voluntary and mandatory demand reduction measures to account for the reduced precipitation and resulting loss of recharge and storage.

It is assumed that a regional message regarding reduced supplies will also influence customers of the other pumpers. Table 6-3 summarizes SVWD's water supplies available in an average year, in a single-dry year, and multiple-dry water years, based on the current water supply conditions. Table 6-4 summarizes SVWD's water supply projections through 2025 during a single-dry year with an assumed 15 percent demand reduction in response to the drought condition. SVWD supply from recycled water is a defined quantity while projected groundwater supply in Tables 6-3 and 6-4 will vary as local groundwater will be pumped according to the demand.

Single and multiple-dry year demand and supply were assessed in the event that drought conditions occur similar to the past droughts that were experienced in the region. Single-dry year is represented by water year 1990, which is the driest year in the historical sequence. The five multiple sequential dry years used, which is longer than the required three consecutive years, in this analysis are 1987 through 1991 to account for the driest consecutive dry years in the historical sequence. While Tables 6-3 and 6-4 show adjusted, reduced groundwater pumping according to the reduced demand, it does not imply reduced supply.

As mentioned above, the Santa Margarita Basin is considered a reliable supply as the basin is managed through the GWP by SVWD and other members of the SMBAC. In addition, a regional message from SCWD and other agencies regarding water conservation during dry years, which can be reinforced by SVWD, will likely minimize increases in dry year demand throughout the Scotts Valley Groundwater Subarea. Given the large volume of basin storage and the estimated basin sustainable yield of 2,600 AFY, combined with demand reduction measures that can be imposed during droughts, SVWD is anticipated to have sufficient supply to meet the demand in average and single dry years.

Table 6-3: Supply Reliability – Current Water Sources – AFY

Water Supply Sources	Average/ Normal Water Year Supply (2011)	Single Dry Water Year Supply (2011)	Multiple Dry Water Year Supply				
			2011	2012	2013	2014	2015
Wholesale (Imported) Water[a]	0	0	0	0	0	0 0	
SVWD Produced Potable Groundwater from Santa Margarita Basin [b]	1,383	1,152	1,383	1,408	1,273	1,212	1,149
Transfer In/Out [a]	0	0	0	0	0	0 0	
Exchange In (Potable projected use)[c]	0	0	0	0	0	0 0	
Recycled Water (Non-potable local use, existing and projected)[d]	157	157	157	166	174	183 191	
Desalination [a]	0	0	0	0	0	0 0	
Total Water Supply	1,541	1,309	1,541	1,574	1,447	1,395	1,340
Percent of Normal Demand	100%	85%	100%	100%	90%	85% 80%	
Total Pumping Amount Potentially Available to SVWD and Other Pumpers (Sustainable Yield)[e]	2,600	2,600	2,600	2,600	2,600	2,600	2,600

Notes:

(a) SVWD currently does not have water supply through wholesale imported water, transfers, or desalination.

(b) Groundwater pumping during a drought will vary according to the demand projections that account for reduced demand measures.

(c) Potable exchange with the SCWD in exchange of recycled water sale to Pasatiempo Golf Club by SVWD is anticipated to become available by 2020; thus, it is not included in this table.
(d) SVWD's Recycled Water Program is anticipated to expand gradually to provide 191 AFY of recycled water by 2015 for landscape irrigation.
(e) Based on the sustainable yield estimate for the portion of the basin underlying the City of Scotts Valley, as provided by the modeling analysis (ETIC, 2006). This represents an average of water available for pumping without negatively impacting the aquifer or long-term storage volumes.

Table 6-4: Supply Reliability for a Single-Dry Year -Current and Future Supplies – AFY

Water Supply Sources	2010	2015	2020	2025	2030	2035
Wholesale (Imported) Water (1)	0	0	0	0	0	0
SVWD Produced Potable Groundwater from Santa Margarita Basin (2)	1,358	1,233	1,089	1,057	1,051	1,081
Transfer In/Out (1)	0	0	0	0	0	0
Exchange In (Potable projected use) (3)	0	0	120	120	120	120
Recycled Water (Non-potable local use, existing and projected) (4)	149	191	241	290	330	330
Desalination (1)	0	0	0	0	0	0
Total Water Supply	**1,507**	**1,424**	**1,450**	**1,467**	**1,501**	**1,531**
Percent of Normal Demand	85%	85%	85%	85%	85%	85%
Total Pumping Amount Potentially Available to SVWD and Other Pumpers (Sustainable Yield) (5)	2,600	2,600	2,600	2,600	2,600	2,600

Notes:
(1) SVWD currently does not have water supply through wholesale imported water, transfers, or desalination.
(2) Groundwater pumping during a single dry year will vary according to the demand projections that account for reduced demand measures at an assumed 15 percent reduction in demand to reflect the condition of the hydrologic year 1990.
(3) Potable exchange with the SCWD in exchange of recycled water sale by SVWD to Pasatiempo Golf Club is anticipated to become available by 2020 and continue on a regular basis through 2035.
(4) SVWD's Recycled Water Program is anticipated to expand gradually to provide 330 AFY of recycled water by 2030 for landscape irrigation.
(5) Based on the sustainable yield estimate for the portion of the basin underlying the City of Scotts Valley, as provided by the modeling analysis (ETIC, 2006). This represents an average of water available for pumping without negatively impacting the aquifer or long-term storage volumes.

6.4 Supply and Demand Comparisons

Water use patterns typically change during dry years. This is often the result of landscape irrigation demand increasing to compensate for the lack of precipitation. Although increased water demand during dry years is possible in SVWD, it will likely be managed through mandatory demand reductions and does not impact SVWD's water service reliability even if demand reductions do not occur. This is because the groundwater storage beneath SVWD ensures a consistent supply during dry years. In addition, SVWD's Recycled Water Program is primarily marketed to landscape irrigation users to decrease this demand on the aquifer. The result is no disparity between water supply and demand values as described in Water Code §10635 (a-c).

The available supplies and water demands for SVWD's service area were analyzed to demonstrate SVWD's ability to satisfy demands during three scenarios: Normal Water Year, Single-Dry Water Year, and Multiple-Dry Year supplies. The tables in this section present the supplies and demands for these various drought scenarios for the projected planning period of 2010-2035 in five year increments. Table 6-5 presents the base years for the development of water year data. Projected demand during a single dry year presented in Table 6-5 is based on conditions of water year 1990, the driest year in the historical sequence. The five multiple sequential dry years used in this analysis are years 1987 through 1991 that account for the driest consecutive dry years in the historical sequence and also includes the driest three year consecutive as required by the water code.

Supply projections during a normal water year as presented in Table 3-1 have been previously discussed in detailed in Section 3. The changes (i.e., reductions) in demand due to single and multiple dry years are enforced by SVWD to protect the overall groundwater basin health. As mentioned above, supplies from recycled water are defined quantities and assumed to remain the same as in normal water year conditions. Groundwater pumping, however, is assumed to vary from the average/normal water year pumping conditions depending on the demand during Single-Dry and Multiple-Dry Year demand. It is assumed that future potable exchanges from SCWD will not be available during dry years. Tables 6-6, 6-7 and 6-8 at the end of this section summarize, respectively, Normal Water Year, Single-Dry Water Year, and Multiple-Dry Year supplies, based on the demand projections with reduced demand measures.

Table 6-5: Basis of Water Year Data

Water Year Type	Base Years
Normal Water Year	2010
Single-Dry Water Year	1990
Multiple-Dry Water Years	1987-1991

6.4.1 Normal Water Year

Table 6-6 summarizes SVWD's water supplies available to meet demands over the 25-year planning period during an average/normal year.

6.4.2 Single-Dry Year

The water supplies and demands for SVWD's service area over the 25-year planning period were analyzed in the event that a single-dry year occurs, similar to the drought that occurred in California in 1990. Table 6-7 summarizes the existing and planned supplies available to meet demands during a single-dry year. Demand during single dry years was assumed to decrease by 15 percent based on the average year projections. This reduction is due to the imposed voluntary and mandatory demand reduction measures to account for the reduced precipitation and resulting loss of recharge and storage. There is no difference in the supply and the demand as presented in Table 6-7 since the local groundwater supplies will be pumped according to the demand.

6.4.3 Multiple-Dry Year

The water supplies and demands for SVWD's service area over the 25-year planning period were analyzed in the event that a multiple-dry year event occurs, similar to the drought that occurred during the hydrological years from 1987 through 1991. Table 6-8 summarizes the existing and planned supplies available to meet demands during Multiple-Dry Years. Similar with the Single-Dry Year analysis, there is no difference in the supply and the demand since the local groundwater supplies will be pumped according to the demand. While the overall demand volumes increase based on increase in populations, demand decreases throughout the progression of a drought based on SVWD's various stages of action.

For the purpose of the three-year multiple-dry year analysis as presented in Table 6-8, hydrological conditions of years 1989 through 1991 were used since SVWD is not anticipating to impose voluntary or mandatory demand reduction measures in the first two years (1987 and 1988) of the actual five year extended drought. In Table 6-8, demand was assumed to decline 10 percent in the first year, 15 percent in the second year, and 20 percent in the third year, compared to the average year supply and demand projections. These demand reduction measures reflect SVWD's proactive approach to addressing the possibility of an extended drought. Consistent with the water shortage contingency plan discussed in Section 8, the 10 percent to 20 percent demand reduction corresponds to a three stage demand reduction that would be invoked during SVWD's declared water shortages, as listed below:

- 10 Percent Reduction – Stage 1 action with voluntary demand reduction.
- 15 Percent Reduction – Stage 2 action with mandatory demand reduction measures.
- 20 Percent Reduction – Stage 3 action with mandatory demand reduction measures.

The 10 percent to 20 percent reduction decreases the loss of storage associated with a three year drought, and raises public awareness of drought conditions. Although the 20 percent reduction is not absolutely necessary during an extended drought to ensure a continuous water supply, it represents the level of conservation required to protect the health of the aquifer and ensure a long-term sustainable water supply for the future.

Table 6-6: Supply and Demand Comparison-Normal Year – AFY

	2010	2015	2020	2025	2030	2035
Supply Totals	1,507	1,675	1,705	1,726	1,766	1,802
Demand Totals	1,507	1,675	1,705	1,726	1,766	1,802
Difference	0	0	0	0	0	0
Difference as Percent of Supply	0%	0%	0%	0%	0%	0%
Difference as Percent of Demand	0%	0%	0%	0%	0%	0%

Table 6-7: Supply and Demand Comparison-Single Dry Year – AFY

	2010	2015	2020	2025	2030	2035
Supply Totals	1,507	1,424	1,450	1,467	1,501	1,531
Demand Totals	1,507	1,424	1,450	1,467	1,501	1,531
Difference	0%	0%	0%	0%	0%	0%
Difference as Percent of Supply	0%	0%	0%	0%	0%	0%
Difference as Percent of Demand	0%	0%	0%	0%	0%	0%

Table 6-8: Supply and Demand Comparison-Multiple Dry-Year Events – AFY

		2010	2015	2020	2025	2030	2035
Multiple-dry year first year supply	Supply Totals	1,507	1,507 1,535 1,554 1,589 1,622				
	Demand Totals	1,507	1,507 1,535 1,554 1,589 1,622				
	Difference	0	0 0 0 0 0				
	Difference as Percent of Supply	0%	0% 0% 0% 0% 0%				
	Difference as Percent of Demand	0%	0% 0% 0% 0% 0%				
Multiple-dry year second year supply	Supply Totals	1,507	1,424 1,450 1,467 1,501 1,531				
	Demand Totals	1,507	1,424 1,450 1,467 1,501 1,531				
	Difference	0	0 0 0 0 0				
	Difference as Percent of Supply	0%	0% 0% 0% 0% 0%				
	Difference as Percent of Demand	0%	0% 0% 0% 0% 0%				
Multiple-dry year third year supply	Supply Totals	1,507	1,340 1,364 1,381 1,412 1,441				
	Demand Totals	1,507	1,340 1,364 1,381 1,412 1,441				
	Difference	0	0 0 0 0 0				
	Difference as Percent of Supply	0%	0% 0% 0% 0% 0%				
	Difference as Percent of Demand	0%	0% 0% 0% 0% 0%				

6.4.4 Summary of Comparisons

As shown in the analyses above, SVWD has adequate supplies to meet demands during Normal, Single-Dry, and Multiple-Dry years throughout the 25-year planning period. There is no difference in the supply and the demand as presented in Tables 6-6, 6-7, and 6-8 since the local groundwater supplies will be pumped according to the demand. SVWD will impose demand reductions to further extend the groundwater supply. In addition, as shown in Table 3-1, there is more than sufficient production capacity to meet future demands, given the estimated sustainable yield of 2,600 AFY in the basin available to SVWD and the other pumpers. With the large amount of storage in the basin and projected future groundwater pumping that is within sustainable basin yield, SVWD is not concerned with the absolute availability of the dry year supply, but the impact on wells and water level declines during water supply shortages, as further discussed in Section 8. Future UWMP updates will reevaluate this conclusion with updated information the sustainable yield of the basin as well as the potential impacts of climate change on increased demand and reduced supply.

Section 7: Water Demand Management Measures

7.1 Background

SVWD recognizes that conserving water is an integral component of a responsible water management strategy and is committed to providing education, tools, and incentives to help its customers reduce the amount of water they use. This section describes the water Demand Management Measures (DMMs) implemented by the District.

The District became a signatory to the Memorandum of Understanding Regarding Water Conservation in California (MOU) of the California Urban Water Conservation Council (CUWCC) in 2005, establishing a firm commitment to the implementation of the Best Management Practices (BMPs) or DMMs. The CUWCC is a consensus-based partnership of agencies and organizations concerned with water supply and conservation of natural resources in California. By becoming a signatory, the District committed to implement a specific set of locally cost-effective conservation practices in its service area.

The District actively pursues the implementation of the DMMs and as of 2010 the District's water use is currently lower than their SBx7-7 2020 target of 143.9 gcpd as reported in Section 2. The District will continue actively investing in water efficient practices and programs to ensure that it continues to meet its water savings goals and maintain compliance with SBX7-7 in the future.

7.2 Implementation Levels of DMMS/BMPS

The District is subject to the Urban Water Management Planning Act, AB1420 and SBX7-7 requirements, in addition to the commitment of compliance with the BMPs as a signatory to the MOU. In the District service area, demand management is addressed at the local (retail agency) level.

The MOU and BMPs were revised by the CUWCC in 2008. The revised BMPs now contain a category of "Foundational BMPs" that signatories are expected to implement as a matter of their regular course of business. These include Utility Operations (metering, water loss control, pricing, conservation coordinator, wholesale agency assistance programs, and water waste ordinances) and Public Education (public outreach and school education programs). These revisions are reflected in the reporting database starting with reporting year 2009. The new category of foundational BMPs is a significant shift in the revised MOU. Programmatic BMPs include residential, commercical, industrial, institutional (CII), and landscape BMPs. Signatories have the option of implementing each of the programmatic BMP as described below, or implementing measures identified in the Flex Track Menu alternative included in each Programmatic BMP.

Signatories to the MOU are allowed by Water Code Section 10631(j) to include their biennial CUWCC BMP reports in an UWMP to meet the requirements of the DMMs sections of the UWMP Act. The District has been a signatory since 2005. At the time of this Plan preparation, the development of the new CUWCC database is not yet complete. Therefore, the District's BMP activity information is included in this section. Due to delays in development of the CUWCC database, the District will file its 2009 through 2010 CUWCC reports in 2011. The District is currently in progress with submitting these CUWCC reports at the time of publication of this 2010 UWMP. All BMP information is included in the following sections. Once the 2009 and 2010 BMP reports are filed with the CUWCC, copies of the reports will be included in Appendix G.

The following sections describe the various programs and conservation activities implemented by the District and provide an implementation plan for compliance with the UWMP Act, including DMMs and SBX7-7 requirements. SVWD is implementing all of the Foundational BMPs as required in the revised MOU and UWMP Act. The Programmatic BMPs are being implemented through a GPCD approach. The GPCD goals and implementation plan are discussed further in Section 7.5. SVWD plans to meet the proposed 20x2020 water use targets implementing conservation methods that are discussed in this section, as well as with recycled water as described in Section 4. SVWD's water conservation activities reported below represent SVWD's commitment to water conservation. As discussed in Chapter 3, SVWD's water demand has already shown significant decline in recent years, which is attributed to SVWD's ongoing water conservation activities in conjunction with the expansion of the recycled water use for landscape irrigation. SVWD will continue its water conservation efforts towards meeting the 20X2020 water use target.

7.3 Foundational BMPs

7.3.1 Utility Operations – Operations Practices

7.3.1.1 Conservation Coordinator

The District hired a part-time Water Conservation Coordinator in April 2007 which evolved into a 75 percent time position as of 2009. The District's initial Water Conservation Coordinator trained a replacement, who took over in August 2010. The two coordinators have successfully implemented programs that address the requirements established by the CUWCC BMPs.

7.3.1.2 Water Waste Prevention

The District actively pursues incidents of water waste. Incidents of waste are investigated and recommendations for any corrections are provided. Water sources are regulated and can be disconnected in cases of excessive leakage and/or facilities failure.

To enforce the policy, Ordinance 74-83 was adopted by SVWD in 1983 prohibiting the following:

1. The use of water from any fire hydrant unless specifically authorized by permit from the District, except by regularly constituted fire protection agencies for fire suppression purposes.

2. The watering of grass, lawn, groundcover, shrubbery, open ground, crops and trees, including agricultural irrigation, in a manner or to an extent which allows excess water to run to waste.

3. The escape of water through leaks, breaks, or malfunctions within the water user's plumbing or distribution system for any period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight (48) hours after the water user discovers such break, leak, or malfunction, or receives written notice from the District of such condition, whichever occurs first, is a reasonable time within which to correct such condition or to make arrangements for correction.

4. The use of water for washing cars, building exteriors, mobile home exteriors, boats, sidewalks, driveways, or other exterior surfaces, without the use of a quick acting positive shut-off nozzle on the hose.

5. The operation of any ornamental fountain, car wash, or other such structure using water from the District water system, unless water for such use is recycled.

6. The indiscriminate running of water or washing with water not otherwise prohibited above which is wasteful and without reasonable purpose.

A copy of the Ordinance 74-83 is presented in Appendix H. In addition, the Ordinance 150-09, adopted by the District in September 2009, established penalties for violation of water conservation restrictions (attached as Appendix I). The District has also updated its Water Shortage Contingency Plan as described in Section 8. The plan is designed to facilitate implementation of water shortage response measures. The Water Shortage Contingency Plan can be found within the 2005 Urban Water Management Plan available at http://www.svwd.org/index/District_Reports.

7.3.1.3 Water Loss Control

In the Annual Water Supply Report to the Department of Health Services Drinking Water Field Operations Division, a simple system-wide audit of the previous year's water production and water sales quantified the unmetered water usage. Authorized uses such as water used for fire fighting, street cleaning, water sold through portable meters, and water used for filter backwashing at the treatment plants are subtracted from the total to provide an estimate of "unaccounted-for" or "lost" water.

Estimates for unaccounted-for water prior to 2009 did not include several acre feet of water delivered due to a computer programming error. In 2009, it was discovered that approximately 40 customer accounts had been under-billed dating back to 2002. The billing errors had caused an increase in unaccounted-for water estimates by approximately 3.5 percent. After adjusting for billing errors, unaccounted-for water measurements were between 6.2 percent and 18.2 percent for water years 2005-2010 as shown in Table 7-1 below. As described below, SVWD has initiated significant efforts in the past two years that aimed to reduce the amount of unaccounted-for water. These included conducting a full system-wide water audit and full system leak detection, and running the AWWA M36 software. SVWD plans to use the results of these efforts to direct efforts to reduce and maintain the amount future unaccounted-for water estimates less than 10 percent.

Table 7-1: Unaccounted-for Water Estimates WY2005-WY2009

	WY2005	WY2006	WY2007	WY2008	WY2009	WY 2010
Groundwater Produced	1,613	1,834	1,764	1,700	1,507	1,358
Potable Water Delivered	1,512	1,500	1,601	1,532	1,393	1,240
Percent Water Loss	6.2%	18.2%	9.2%	9.9%	7.2%	8.7%

Key: WY: Water Year

In November 2008, the District was awarded a grant to perform a full system wide audit in order to reduce the amount of unaccounted-for water. A full system-wide audit includes testing meter accuracy and detecting water leaks in the distribution system. Meter analysis began in early November 2009. The consultant, Advanced Flow Measurement, initiated the program to establish and maintain maximum flow measurement accuracy and precision from meters used for groundwater extraction, potable water treatment and distribution, recycled water treatment, and recycled water distribution. Twenty-nine meter installations were field tested and catalogued by photo, location, size, brand, model, type, serial number, and year of manufacture. The District has initiated replacement of those meters recommended for replacement and have replaced 2 meters to date with the balance planned for the next several years.

Full system leak detection is scheduled to begin July 2010. The leak detection consultant, Utility Services Associates, will survey for and pinpoint water leaks using highly sophisticated leak detection technology. Utility Services Associates will provide a daily detailed report of leak locations, estimated gallons per minute (gpm) loss, and area covered. The survey indicated some minor distribution leaks that were repaired immediately.

In 2010, District staff used AWWA M36 software to calculate a Water Audit Data Validity Score. The District received 83 out of 100. Worksheets for determining the District's Water Audit Data Validity Score can be found in Appendix J. Given the high score from the District water audit and that the percent water loss is less than 10 percent, the District's efforts in water loss in the past several years are effective and will be continued on an as-needed basis.

In addition to system leaks, the District has operated a leak detection program for customers since 1996. Customers who have spikes in water consumption are sent a leak letter informing them of an increase in water usage and suggesting that there may be a leak at the customer's property. In addition, customers who fix leaks may be eligible for a leak adjustment on their water bill according to the policy below.

> ***Section 4.18 – Leakage Adjustment Policy 1***
> *The General Manager is hereby authorized, upon written request of the Customer, to adjust water billings for documented undetected leaks in an amount not to exceed seventy-five percent (75%) of existing water rates. The General Manager may adjust the Customer's account one time per year for not more than two (2) billing cycles, providing a credit to the Customer in an amount consistent with written District guidelines, approved by the Board of Directors, which are fair and equitable to the Customer and the District and which reflect the nature, extent, and responsible repair of the leak. The Customer must provide the District with a written adjustment request stating the date of repair and the type of repair, together with copies of any receipts. The General Manager shall make the final determination in interpreting the District's written guidelines.*

The District credits approximately $20,000-$30,000 annually for customer leak adjustments.

7.3.1.4 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

All potable water use in the District is metered and customers are billed by volume of usage on a bi-monthly basis. An increasing block rate structure has been in place in the District for several years. Recycled water is also metered and billed by volume of usage on a monthly basis.

The District's billing system keeps record of the following meter data: size, type, year installed, customer class served. An abnormal meter read automatically creates a work order for meter testing and repair or replacement when necessary. An abnormal read would include exceptionally high or low reads, zero reads, or non-reads.

Meter inventory data is compiled according to size, type, customer class and date of installment. The District in September 2010 implemented a meter testing, repair, and replacement plan. The plan includes testing meters prior to installation and replacement of meters over 10 years old.

The largest incentive for retrofitting mixed use accounts is conversion to recycled water. Recycled water costs less than potable water and there is not basic service fee for a recycled water meter. The District continues to pursue this option

7.3.1.5 Retail Conservation Pricing (formerly BMP 11)

The revenue from volumetric rates for the District was approximately 70 percent of total for fiscal year 2008-2009, meeting the requirements for the Conservation Pricing BMP. Based on the fiscal year 2009-2010 data, the proportion of revenue from volumetric charges was approximately 69 percent ($2.724 million of volumetric charges vs. 1.216 million of meter service charges), which is slightly below the threshold requirement of 70 percent. It should be noted that fiscal year 2009-2010 had very low water demand where the groundwater pumping was less than the District's historical pumping that occurred since 1990, as discussed earlier in Section 3 (Figure 3-3). The reduced demand in fiscal year 2009-2010 is partially attributed to implementation of water conservation programs combined with other factors including drought conditions, use of recycled water, and poor economic conditions. It is assumed that given the combined effects of several factors affecting water demand, the fiscal year 2009-2010 data may not reflect the District's representative revenue proportions between volumetric and fixed charges. The District will continue to monitor its volumetric revenues as compared to fixed charges but it should be recognized that declining potable water demands over the last five years are at least, in part, attributable to the rate structure regardless of the actual proportion of volumetric revenues as compared to fixed charges.

The District began using a six-tier inclining block rate structure for all potable water customers in 1992. Currently, the first tier is set at $3.19 per 1,000 gallons for the first 6,000 gallons in a month. The last of six tiers is set at $10.31 per 1,000 gallons for all consumption over 50,000 gallons per month. From 1992 to 2009, the sixth tier was set for consumption over 50,000 gallons in one month. In 2010, the usage ranges for the last four tiers were shortened to provide a greater economic incentive for conserving. Table 7-2 lists water rates before and after the recent rate change.

Table 7-2: Water Rates

Rates for 02/15/2009 - 02/15/2010	
Usage (gallons)	**Rate per 1,000 gallons**
0-6,000	$3.19
6,001-14,000	$5.35
14,001-30,000	$6.50
30,001-50,000	$7.69
50,001-10,000	$9.66
Over 100,000	$10.31

Rates for 02/15/2010 - 02/15/2011	
Usage (gallons)	**Rate per 1,000 gallons**
0-6,000	$3.19
6,001-14,000	$5.35
14,001-24,000	$6.50
24,001-36,000	$7.69
36,001-50,000	$9.66
Over 50,000	$10.31

In February 2010, the District began offering a flat rate to qualifying non-single family residential customers. In order to qualify for the flat rate the customer must fulfill flat rate guidelines which require a water conservation audit. This audit is more thorough than the Green Business Water Conservation Audit in that more data are collected and additional fixtures are checked. Flat rate is granted after the audit verifies compliance with both indoor and outdoor water efficiency criteria, including the use of recycled water where/when feasible.

The District also has an inclining block rate for all recycled water customers with rates 80 percent of the potable rates. The District has no jurisdiction over the sewer rates set by the City of Scotts Valley. However, for billing purposes, SVWD supplies the City with commercial and industrial customer usage data.

7.3.2 Education

7.3.2.1 Public Information Programs

The District has conducted a variety of public education activities over the past five years. Several activities aimed to motivate customers to respond to a drought situation, while others were more general and informational in scope. The following is a list of activities that the District has undertaken:

7.3.2.1.1 Website

The District website existed in minimal form prior to March 2007. At that time the District hired a part-time intern to revamp the website (http://www.svwd.org/index/Water_Conservation) which included the addition of a section dedicated to Conservation and Recycled Water. Currently the District website is used to promote new and existing conservation and recycled water programs. The website is updated weekly.

7.3.2.1.2 Bill Messages and Inserts

Several bill messages and bill inserts promoting water conservation have been delivered to customers. SVWD bills on a bi-monthly basis for potable water customers and monthly basis for recycled water customers. The number of bill messages and bill inserts delivered annually varied year to year. A total of 24 bill inserts and bill messages were delivered from 2007 to April 2011, including six bill messages and three bill inserts in 2010. The 2010 bill messages were typically delivered bi-monthly. The messages and inserts inform customers of drought conditions and promote water conservation and rebate programs. A bill message is printed directly on the front page of the water bill. A bill insert is a separate sheet of paper inserted along with the bill into the bill envelope. The District has also used water bills to conduct customer surveys. The survey is printed in red ink and is located at the top of the water bill. Two surveys have been conducted over the past three years. The first survey inquired about toilet installations and the second survey inquired about landscape irrigation systems.

A log of bill inserts and messages is kept in a spreadsheet to be used for BMP reporting purposes. The bill messages and bill inserts since 2007 included water conservation tips, reminder of water conservation regulations, and drought measures as summarized below:

- "Save Water, Save Money!" for replacing old toilets, free aerators, showerheads, hose nozzles and toilet leak detection tablets.
- "Winterize Your Irrigation System" sent out in winder months for tips on checking system for breaks and leaks.
- Announcement of "Water Awareness Month" of May to raise awareness about water conservation, inspecting irrigation systems and checking for leaks.
- Tips to customers for landscape watering schedule and efficient landscape irrigation
- Announcement and reminder for toilet and landscape rebates
- Announcement of drought conditions and drought measures, penalties for drought measure violations
- 'Water Smart Gardening" in Santa Cruz County for free online gardening tool
- Invitation to grand opening of "Water-Smart demo Garden" and "Water For Tomorrow" magazine

7.3.2.1.3 Print Ads

The District prints bi-weekly advertisements in the local Press Banner newspaper promoting water conservation, rebate programs, contests and more. Ads are selected and/or designed by the Conservation Coordinator. A log describing the date and content of each ad is kept in a spreadsheet to be used for BMP reporting purposes.

7.3.2.1.4 Conservation Presentations

District staff makes presentations to local service clubs and public agencies on water supply and water conservation related topics. This includes the Scotts Valley City Council and Chamber of Commerce, Santa Margarita Groundwater Basin Advisory Committee, Scotts Valley Rotary, Kiwanis, Lions, and Exchange Clubs. More recently, SVWD had a water conservation presentation at the Scotts Valley Rotary Club in May 2011 and intends to have additional public presentationsP in the future.

7.3.2.1.5 Water Conservation Banners

In August 2008, the District hung banners down Scotts Valley Drive and Mt Hermon Road which carried water conservation messages. Each banner contained one of the following three slogans:

1. Water Use it Wisely Conserve it Recycle it
2. Got Water
3. Save Water Year-Round Every Drop Counts

In September 2009, additional banners were made to be displayed in the late summer of 2010. The new banners contain the following slogans:

1. Conserving Together Water Forever
2. Watch Your Waste

7.3.2.1.6 Smart Gardening Faire/The Garden Faire

The District has been sponsoring The Smart Gardening Faire since 2006. The faire is held annually in June at Sky Park in Scotts Valley. The Smart Gardening Faire is a free admission, educational event under clusters of canopies on Skypark's grassy fields, and includes:

- Speakers on aspects of sustainable gardening;
- Expert demonstrations of sustainable gardening practices;
- Vendors of garden plants and garden-related goods and services;
- Informative and educational exhibits and by local groups;
- Vendors of healthful food and entertainment to add to the festive atmosphere;
- Activities for children and families

SVWD has been a Gold Sponsor of this event since the first Smart Garden Faire was held in 2006. In addition, the District co-operates a booth at the event for promoting water conservation.

7.3.2.1.7 Green Gardener Program

The District began promoting the Monterey Bay Green Gardener Program in the summer of 2007. A link to the program can be found on the Outdoor Conservation section of the District website. In addition, Green Gardeners are included on a list of landscaping professionals who are qualified to perform work for the Landscape Rebate Program – also found on the District website. The Monterey Bay Green Gardener Program provides professional training and certification in ecological landscaping. The program goals are to reduce reliance on synthetic fertilizers and pesticides, reduce water pollution and encourage water conservation. The District sponsored one low-income student to take the spring 2010 Green Gardener class series – a $100 value.

7.3.2.1.8 Cooperative Agency Program

The District participates in a cooperative water agency committee, Water Conservation Coalition of Santa Cruz County, consisting of Santa Cruz County, Soquel Creek Water District, Pajaro Valley Water Management Agency, the City of Watsonville Water, and SLVWD. This committee contributes funds for community awareness campaigns to better inform the public about conservation methods and practices. Some of the accomplishments include:

- Sponsored a Green Plumber Workshop - September 20, 2008

- Paid for water conservation advertisements on local radio and in local newspapers

- Presented water conservation materials at local events such as the County Fair and Earth Day Festival

- Created an educational workbook for all 5th grade students in the County which teaches about local water resources

- Created and distributed table cards for restaurants asking that water only served upon request and linen cards for hotels asking that guests reuse linens at least once before washing

- Sponsored the Green Gardener Program, a 10-12 class program which educates gardeners and landscapers about water conservation in the landscape and other sustainable landscape practices

- Maintains a Water Smart Gardening Website – WaterSavingTips.org

The total annual budget for public outreach programs is approximately $10,500.

7.3.2.2 School Education Programs

The District has water conservation promotional materials for grades K-8. Additionally, a booklet was created by the Water Conservation Coalition of Santa Cruz County that promotes water awareness specifically in the local region. This booklet is appropriate for grades 5-8 and is available upon a teacher's request.

In the spring of 2008, the District sponsored its first annual Water Conservation Poster contest for grades 3-5. The contest ran from 2008-2010. In the first poster contest, a dozen entries were received - all of which were from students in the 5th grade. Winning entries received savings bonds and awards certificates. First place received a $100 savings bond, second place received a $75 savings bond, and third place received a $50 savings bond. The results of the first poster contest suggested that in 5th grade, students learn about the water cycle and begin discussing water use more in depth. In 2009, the contest was only offered to 5th grade students and only five entries were received. School officials suggested that low participation was partly due to other poster contests being held concurrently.

The District's annual Water Conservation Print Ad Design Contest has been very successful. This contest, first introduced in the winter of 2008/2009, invites high school students to create an ad promoting water conservation using digital graphic art. Students are encouraged to use the District website and other internet resources to research how to effectively promote water conservation. Winners are awarded scholarships in the amount of $500, $300, and $200. All entrants receive a participation certificate and consolation prizes. Nine ads were received during the first year and 41 ads were received during the second year of the contest as part of the class' assignment.

The annual budget for school outreach programs is approximately $3,000.

7.4 Programmatic BMPS

The District has chosen the implement the Programmatic BMPs through a GPCD approach for complying with the MOU. . The GPCD goals and implementation plan are discussed further in

Section 7.5. The following sections describe the various programs and conservation activities being implemented by SVWD as part of its commitment to water conservation.

Where possible, the District provides an estimate of expected conservation savings and expects to track savings as the water conservation program further develops. Additional conservation efforts are expected to reduce demand as the service area has not achieved saturation of water conserving devices. District programs are represented in Table 7-3.

Table 7-3: Summary of Conservation Rebates and Give-Aways

Year	Residential Audits	SF aerators	SF shower heads	MF aerators	SF shower heads	SF HET	MF HET	SF HECW	MF HECW
2006	0	0	0	0	0	37	4	87	1
2007	0	0	0	0	0	42	8	81	2
2008	19	42	42	2	3	68	3	93	1
2009	33	61	61	4	6	117	1	84	0
2010	44	42	36	2	3	171	3	107	5
TOTAL	**96**	**145**	**139**	**8**	**12**	**435**	**19**	**452**	**9**

Key: SF: Single family; MF: Multi-Family; HET: High Efficiency Toilet; HECW: High Efficiency Clothes Washer.

7.4.1 Residential Programs

The largest customer class in the District service area is residential, accounting for approximately 79 percent of connections and 55 percent of total demand. The District has about 3,085 single-family (SF) and 149 multi-family (MF) residential accounts. The District has focused the majority of its conservation efforts on residential use. The number of rebates offered is found in Table 7-3 above and additional summaries of the programs are found in the following sections.

7.4.1.1 Residential Assistance Program and Landscape Water Surveys (formerly DMMs 1 and 2)

When SVWD signed the MOU in 2005 the Residential BMP was divided into BMP 1 – Residential Water Surveys and BMP 2 Residential Plumbing Retrofits. Those two BMPs are now described as the Residential Assistance Program and Landscape Water Survey. The following describes activities for both the former BMP 1 and the former BMP 2.

SVWD first introduced its Water-Wise House Call program in the spring of 2008. The first house call was on March 28, 2008. Postcards were sent to the top 20 percent of single-family customers and the top 20 percent of multi-family customers, who use the most water, inviting them to schedule a water-wise house call. Each spring thereafter, additional postcards have been mailed to the previous year's top 20 percent residential customers who use the most water. Appointments for water-wise house calls are made over the phone, via email, or at the District office and are scheduled on a spreadsheet shared by staff. A survey of data is taken at each house call which is later entered into a spreadsheet for analysis. A follow-up letter is sent to each customer detailing the results of the survey.

Very few multi-family customers have scheduled house calls. In contacting local multi-family unit managers it appears that scheduling is the number one reason why property managers do not participate in the water-wise house call program. With the new non-single family residential flat rate, the number of multi-family audits has increased.

Table 7-4 presents single-family water-wise house calls for the past three years. the District provides an estimate of expected conservation savings and expects to track savings in the future. The District estimated potential water savings from these surveys, ranging from approximately 0.9 AFY in fiscal year 2008 to 6.9 AFY in fiscal year 2009. Annual savings was estimated by comparing usage the year prior to the house call to usage the year following the house call. The dramatic increase in fiscal 2009 was partly due to high rainfall compared to the year 2008 and may not fully reflect the effect of surveys.

Table 7-4: Water-Wise House Calls

	FY 2008	FY 2009	FY 2010
Number of Surveys	19	33	44
District Expenditures	$1,477	$2,177	$2,744
Percent of Base Year Residential Customers Surveyed	0.6	1.1	1.4

Key: FY: fiscal year

To determine the saturation of other low-flow plumbing fixtures the District uses data gathered during water-wise house calls. It was found that an estimated 98 percent of faucet aerators meet low-flow requirements and 83 percent of showerheads. In July of 2007, the District began offering low-flow aerators and showerheads free of charge to District customers. The devices offered have an even lower flow than required by the Residential Assistance Program BMP. Customers are invited to stop by the District office to pick up the devices they need and a distribution log is kept for tracking purposes. Low-flow aerators and showerheads are also installed as needed during water-wise house calls.

Table 7.5 presents the number of low-flow device distributed by SVWD in the past three years 2008 through 2010. SVWD estimated potential expected water savings from low-flow device distribution program, ranging from 0.9 AFY in fiscal year 2010 to 1.5 AFY in fiscal year 2009.

Table 7-5: Low-Flow Device Distribution

	FY 2008	FY 2009	FY 2010
Number of Single Family Accounts Retrofitting Aerators	42	61	42
Number of Single Family Accounts Retrofitting Showerheads	41	62	36
Number of Multi-Family Accounts Retrofitting Aerators	2	4	2
Number of Multi-Family Accounts Retrofitting Showerheads	3	6	3
District Expenditures	$474.52	$553.09	$341.40

Key: FY: fiscal year.

7.4.1.2 Water Sense Specification for New Residential Development

The requirements of the DMM is that the District provide incentives such as rebates, recognition programs, reduced connection fees, or ordinances requiring residential construction meeting water sense specifications (WSS) for single and multi-family housing until a local, state or federal regulation is passed requiring water efficient fixtures.

For water efficient design in new development, the District relies on the City of Scotts Valley water efficient fixture ordinance described below:

17.51.025 Special water mitigation requirements.

A. All new construction and remodels over 500 square feet in the city limits of the City of Scotts Valley shall install only high efficiency fixtures as follows:

1. All new commercial construction shall install high efficiency fixtures and will be required to rough plumb dual piping to use recycled water when it becomes available in toilet fixtures and for landscaping. Connection to the recycled water system will be governed by the requirements in Chapter 17.47 of the Zoning Ordinance.

2. All new residential construction shall install only high efficiency toilet fixtures.

3. All remodels over 500 square ft for residential, commercial and industrial buildings shall install high efficiency fixtures in the area being remodeled.

(Ord. 16.123.1, § 2, 10-1-2008)

The above ordinance does not specify the type of high efficiency fixtures but provides a guideline for their use. The District supports the City of Scotts Valley ordinance by providing review of the fixtures using standards set by the California Green Building Standard Code and the California Plumbing Code, but the City commonly issues building permits with little or no fixture review.

In addition, the 2010 California Green Building Standards Code (CAL Green Code, CALGreenCode.pdf) addresses these WSS requirements. The CAL Green Code sets mandatory green building measures, including a 20 percent reduction in indoor water use, as well as dedicated meter requirements and regulations addressing landscape irrigation and design. The code also identifies voluntary measures that set a higher standard of efficiency.

7.4.2 Residential and Commercial Assistance Programs

Several of the programs, described below, that SVWD administers benefit both residential and commercial customers.

7.4.2.1 High-Efficiency Clothes Washers (former DMM 6)

The District allows a rebate (or credit) of $100 for each non-Energy Star approved washing machine that is replaced with an Energy Star approved washing machine for residential application and $200 for each commercial application. Approved applications appear as a rebate credit applied directly to the customer account that is participating to the rebate program. Table 7-6 summarizes the outcome of the Waster Rebate Program for the past five years from fiscal year 2006 through fiscal year 2010. SVWD estimated potential water savings from these rebate programs, ranging from 1.5 AFY to 2.1 AFY.

Table 7-6: Clothes Washer Rebate Program

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Number of SF Rebates	87	81	93	84	107
Number of MF Rebates	1	2	1	0	5
Number of CII Rebates	2	0	1	1	0
Total Number of Customers Participating	90	83	95	85	112
District Expenditures	$9,100	$8,100	$9,500	$8,600	$10,700

Key: FY: fiscal year; SF: Single Family; MF; Multi-Family.

Since 2005, the District has seen an annual 3 percent of single-family customers when compared to the number of customers found in Table 2-3 qualify for the HECW rebate. Therefore, the District has already met requirements of this BMP.

7.4.2.2 Water Sense Specification (WSS) toilets (former DMM 14)

The District began a ULFT rebate program in 1999. At that time, customers replacing a toilet flushing greater than 1.6 gallons per flush (gpf) with a toilet that flushes 1.6 gpf or less qualified for up to $100 credit on their water bill. In November 2007, the toilet retrofit credit program was amended that changed the retrofit credit to $200 for replacing with a high efficiency toilet (HET). HETs flush on average 1.28 gpf or less. Customers who replaced a toilet flushing 1.6 gpf with an HET received up to $100 credit on their water bill. Replacing a urinal that uses water with a waterless urinal qualified for a rebate of up to $200 and $100 for one that uses 1.0 gpf or less.

Within a few months of implementing the HET retrofit credit program, the City of Scotts Valley began a rebate program that matched the District's. They offered a cash rebate for the remaining cost of a toilet up to an additional $200 for replacing a toilet flushing greater than 1.6 gpf and up to an additional $100 for replacing a toilet flushing exactly 1.6 gpf. Similarly, the City offered up to an additional $200 for replacing a urinal that uses water with one that is waterless and an additional up to $100 for replacing an old urinal using more than 1.0 gpf with one that uses 1.0 gpf or less.

Effective July 1, 2010, both the District and the City of Scotts Valley reduced the amounts available for each toilet rebate by 50 percent because the price of the fixtures have dropped considerably. The District's credits now range from up to $50 - $100/ toilet or urinal while the

City's rebate is up to an additional $100. The HET rebate program numbers can be found in Table 7.7.

Table 7-7: Toilet Rebate Program

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Number of SF Rebates	37	42	68	117	171
Number of MF Rebates	4	8	3	1	3
Number of CII Rebates	1	1	5	9	2
Total Number of Customers Participating	42	47	76	127	176
Number of Toilets Retrofitted	57	70	145	217	329
District Expenditures	$5,700	$7,000	$20,516	$35,113	$56,534

Key: FY: fiscal year; SF: Single Family; MF; Multi-Family.

In February 2008, a survey was printed on the top of every water bill inquiring about the number of toilets installed, along with dates of installation, at the home, business, institution, etc associated with the customer's SVWD account. Survey results indicated that the average number of toilets per customer is 2.5 and that approximately 35 percent of toilets were installed before 1992. The remaining 65 percent of toilets installed after 1992 meet the requirements of the Residential Assistance Program BMP. Since the time of the survey up through fiscal year 2010, an additional 422 (5 percent) pre-1992 toilets were retrofitted to HETs bringing the total percentage of toilets in compliance with this BMP up to 70 percent.

7.4.2.3 Landscape

Dedicated landscape irrigation meters account for about 16 percent of the District's demand. Of this, about 5 percent of landscape irrigation is supplied by potable water and the remaining 11 percent is currently using recycled water for irrigation. In addition, it is estimated that up to 50 percent of the single family, multi family and commercial industrial, institutional meter demand is for landscape use as well.

The District's primary goal for large landscape water users is conversion to recycled water. The largest irrigators in the District are the Enterprise Business Campus (formerly Borland International), Scotts Valley School District's high school (playing fields) and the City parks – all of which have been converted to recycled water. Currently the largest irrigators still use potable water (e.g., Scottsboro Town Homes, Hidden Oaks HOA, Granite Creek Business Center, and Hilton Santa Cruz/Scotts Valley). Granite Creek Business Center had its irrigation converted to recycled water in the spring of 2010 and discussions for conversion at both Scottsboro Town Homes and Hidden Oaks HOA are under way. The Hilton Santa Cruz/Scotts Valley received a water conservation audit in March of 2009 at which time it was recommended that all irrigation be converted to drip irrigation. The District has a long-term goal to serve the Hilton with recycled water.

The primary incentive for customers to convert to recycled water is the lower cost of the water. Recycled water customers pay 80 percent of potable rates with no basic service fee. Also, California Water Code Section 13551 states that potable water shall not be used for irrigation if recycled water is available.

A conservation incentive built into the recycled water pricing system encourages existing recycled water customers to conserve water. In addition, recycled water use site permits mandate periodic checks and assurances that no water is running offsite.

Large landscape customers still using potable water have a strong incentive to audit themselves due to conservation pricing. The top tier water rate is now $10.31 per 1,000 gallons of water used, compared to $3.19 per 1,000 gallons for the first tier.

The District does not have land use planning jurisdiction and although the District has adopted landscape water conservation ordinance (Ordinance #119-96, amended by Resolution #1-01); the District leaves the implementation to the City of Scotts Valley. The District works closely with the City of Scotts Valley in adopting and implementing water conservation and recycled water ordinances. The City of Scotts Valley has an ordinance (Resolution #1413) mandating use of recycled water if it is accessible to the project to be constructed. All new projects are required to comply for final approval. City of Scotts Valley ordinances are available online via http://www.scottsvalley.org/

The Water Conservation in Landscaping Act of 2006 (Assembly Bill 1881, Laird) required cities and counties, including charter cities and charter counties, to adopt landscape water conservation ordinances by January 1, 2010. In accordance with this law, DWR prepared an updated Model Water Efficient Landscape Ordinance (MWELO) to serve as an example ordinance for local agencies. All local agencies had until January 1, 2010, to adopt DWR's updated MWELO or their own local water efficient landscape ordinance. If a local agency did not adopt its own ordinance on or before January 1, 2010, the updated MWELO applied within the jurisdiction of that local agency as of that date. The MWELO is available for download at http://www.water.ca.gov/wateruseefficiency/landscapeordinance/

The City of Scotts Valley has not adopted a water efficient landscape ordinance. Therefore, the updated MWELO applies within the City limits. At this time, the law is not being enforced due to lack of staff and funding. The District has communicated to the City regarding the creation of a water efficient landscape ordinance within the District boundaries and there is discussion of adopting ordinances in parallel in the near future.

The District introduced a new Landscape Water Conservation Pilot Program funded by the 2008 Urban Drought Assistance Grant Program. The program is offered to all customers and consists of the following rebate offers:

1. Customers who replace existing lawn with artificial turf, drought tolerant plants, and/or qualifying xeriscape may be eligible for a credit of $1 per square foot up to 1,000 square feet of replaced lawn and $0.30 per square foot for additional area. New landscape must not require permanent irrigation unless the irrigation is a temporary drip system required to establish drought tolerant plants.

2. Customers who retrofit an old irrigation controller with an approved weather based irrigation controller (WBIC) or install a rain shut-off device may qualify for a credit of up to $100-$500 on their water bill. The credit amount is based on historical summer water usage. The District offers up to $100 if summer outdoor use is within the range 250-749 gallons per day (gpd); up to $250 if within the range 750-2,999 gpd; up to $500 if 3,000 gpd or greater.

3. Customers who install an approved cistern may qualify for a credit of up to $25 for each 100 gallons of storage up to a maximum of $500.

One of the District's largest potable water users, Bethany University, has taken advantage of the rebate program. Bethany retrofitted four irrigation controllers with weather-based technology and has been approved for three more system retrofits.

Table 7-8 contains information for landscape rebate program. SVWD estimated potential water savings from the landscape rebate program, ranging from 0.7 AFY to 1.0 AFY from lawn replacement rebates, from 0.5 AFY to 0.2 AFY from weather-based irrigation controller rebates, and from 0.1 AFY to 0.3 AFY from cistern installation rebates.

Table 7-8: Landscape Rebate Program Summary

	FY 2009	FY 2010
Lawn Replacement Rebates		
Number of Rebates	9	18
District Expenditures (Reimbursed by Grant)	$7,035	$10,057
Area of lawn replaced (sq ft)	7,466	11,242
Weather-Based Irrigation Controller Rebates		
Number of Rebates	3	3
District Expenditures (Reimbursed by Grant)	$762	$1,296
Cistern Installation Rebates		
Number of Rebates	1	4
District Expenditures (Reimbursed by Grant)	$500	$975

Key: FY: fiscal year.

Currently the District does not create water budgets for dedicated irrigation customers.

7.4.3 Commercial, Industrial and Institutional (CII) BMPs

2009 deliveries to CII customers was 298 AF, 8 percent of total use. The District has been categorizing CII customers for over a decade. CII customers are eligible for the same toilet rebate program as residential customers. The rebate program offers a credit up to $100 for replacing a toilet using over 1.6 gpf with a HET using 1.28 gpf or less.

The District conducts water audits in the CII sector in coordination with the Monterey Bay Area Green Business Program - a partnership of environmental agencies, professional associates, waste management agencies, utilities and concerned public working together to recognize and assist businesses that operate in an environmentally friendly manner. Businesses who apply for Green Business certification are subject to a series of audits, one of which is a water conservation audit. When businesses within Scotts Valley apply for certification, the District is contacted via email and District staff arranges an audit with the applicant. The auditor checks compliance with a list of indoor and outdoor conservation measures. The District provides conservation recommendations and free water saving devices upon request. A follow up written analysis of water use is provided to the business when necessary. If a business is not able to achieve compliance by the end of an audit, a follow-up audit may be necessary.

The District has achieved a significant reduction in water use in the CII sector. Table 7-9 presents CII water consumption data since 2005. The District has added 15 recycled water customers since 2005, most of these were II customers with mixed use meters that converted landscape irrigation to recycled water during the past six years.

Table 7-9: Commercial, Industrial, Institutional Water Consumption (AFY)

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Commercial	227	217	236	234	198	187
Industrial	104	90	102	85	93	63
Institutional	79	70	69	60	56	48
CII Total	**410**	**377**	**407**	**379**	**347**	**298**

Key: FY: fiscal year.

7.5 SVWD AB 1420 and SBX7-7 Compliance

As discussed earlier, the Programmatic BMPs are being implemented by the District through a GPCD approach. The GPCD option for MOU compliance and the SBX7-7 targets are consistent with one another (Table 7-10) and SVWD is currently building on its existing water conservation program to implement activities that meet these goals.

The District's 2020 SBX7-7 compliance goal is 144 gpcd (Table 7-10) and as of 2009 the District's water use is currently lower than both the SBX7-7 2020 target of 144 gpcd and the 2018 MOU target of 151 gpcd with a 2009 per capita demand of 131.2 gpcd and 117.6 gpcd in 2010. Baseline per capita water use was estimated using the guidelines stated by the MOU and Appendix A of DWR's report "*Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use*".

Table 7-10: Compliance Targets

		Target (gpcd) by Year		
	Baseline (gpcd)	**2015**	**2018**	**2020**
MOU/AB 1420	179.9		151	
SBX7-7	179.9	162		144

The District recognizes the need to continue to expand conservation and recycled water programs and efforts in order to continue to meet both its SBX7-7 and gpcd requirements in the future. The adoption of SBX7-7 and the 20 percent reduction goal has increased the urgency for implementation.

The District is in the process of planning programs to maintain the gpcd target. The conservation programs identified to meet future requirements combine financial incentives, and build on the existing activities as part of the SVWD's ongoing water conservation program. Included in the programs considered for implementation are the following that shows SVWD's continuing efforts in water conservation programs to maintain demand reductions.

Financial Incentives

1. High-Efficiency Clothes Washers (HECWs): The District will continue its existing Washer Rebate Program. The District will keep track of potential water savings from the Washer Rebate Program.

2. High-Efficiency Toilets (HETs): The District will continue its existing HET retrofit rebate program. The District began the rebate program in 1999 and amended the program in 2007 to offer a higher credit for replacing old toilets with HETs that flush on average 1.28 gpf or less. The District also has a rebate program in place for replacing an old urinal.

3. Low-Flow Aerators and Showerheads: The District began offering low-flow aerators and showerheads free of charge to its customers in 2007 and will continue to distribute these water conservation devices. Low-flow aerators and showerheads will be also installed as needed during water-wise house calls. The District will keep track of potential water savings from the low-flow device distribution program.

4. Large Landscape Program: The District's primary goal for large landscape water users is conversion to recycled water. The primary incentive to convert to recycled water is the discounted cost of the recycled water as recycled water customers pay 80 percent of potable rates with no basic service fee. In addition, the District has a landscape rebate program that introduced a new Landscape Water Conservation Pilot Program with rebates offered for lawn replacement, weather-based irrigation controller, and cistern installation. The District will continue both expanding recycled water to landscape irrigation and offer rebates.

5. Water Audits and Retrofit Rebates to CII: CII customers are eligible for the same toilet rebate programs as residential customers. In addition, the District will continue to conduct water audits in the CII sector in coordination with the Monterey Bay Area Green Business Program. When a business applies for Green Business certification, the District will be contacted for a water conservation audit and the District staff will arrange an audit with indoor and outdoor conservation measures and will provide conservation recommendations and free water savings devices upon request.

Water-Wise House Calls

SVWD first introduced its Water-Wise House Call program in the spring of 2008 and will continue this program to mainly target the top 20 percent of single-family and multi-family customers who use the most water. The District will continue to send out follow-up letters to each customer participating to the program detailing the results of the survey. The District will also keep track of potential water savings from the Water-Wise House Call program.

Recycled Water for Large Landscape

The District continues to evaluate the use of recycled water for large landscapes to offset potable water use for landscape irrigation. Implementation is expected to continue to achieve a goal of 330 AF of recycled water delivered by 2030. Future plans to expand the recycled water use are discussed in Section 4.

In addition to these programs, the District plans to develop agency coordination to monitor implementation within the service area, program participation and changes in use. The District will then have the capacity to adjust programs based on how well they are meeting projected goals.

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Section 8: Water Shortage Contingency Plan

8.1 Overview

Water supplies may be interrupted or reduced significantly in a number of ways, such as a drought which limits supplies, an earthquake which damages water delivery or storage facilities, a regional power outage, or a toxic spill that affects water quality. This section of the Plan describes how SVWD plans to respond to such emergencies so that emergency needs are met promptly and equitably. This section considers the impact on groundwater supplies of two types of drought and two types of catastrophic interruption of water supply as analyzed using the numerical groundwater model.

Of the current supplies, water from the Santa Margarita Basin is vulnerable to drought due to the reliance on rainfall for recharge. Rainfall varies based on the hydrologic conditions of a given year. The Santa Margarita Groundwater Basin Advisory Committee and implementation of the SVWD's GMP are critical to monitoring the water balance within the basin. The basin serves over 20,000 people amongst various purveyors.

Overdraft of the basin especially in time of drought presents a concern for reliability over extended periods of time. In 2010, the estimated sustainable yield for the Scotts Valley and Pasatiempo Groundwater Sub areas, a portion of the Santa Margarita Basin, was 2,600 AFY and 2,100 AF was pumped by the various users according to the 2010 Annual Groundwater Report (Kennedy/Jenks, 2011). An update of the groundwater model is planned for Fall 2011 which will include review of the sustainable yield estimate. It should be noted that 2009 and 2010 represent the first two years since 1995 that total groundwater pumping has been below the estimated sustainable yield. Safe yields for the basin have been developed through modeling for SVWD and the Santa Margarita Groundwater Basin Advisory Group and serve as the basis for planning and pumping within the Basin. Drought and water shortage conditions ultimately influence the purveyors that utilize water within the Santa Margarita Basin.

A Water Shortage Contingency Plan was prepared and presented in the 2005 UWMP (SVWD, 2005) and is updated in this section. Prohibitions, penalties and financial impacts of shortages have been developed by SVWD and are summarized in this section. SVWD's Water Shortage Contingency Plan and drought related documents, prepared by SVWD, are presented in Appendix K.

8.2 Coordinated Planning

SVWD has coordinated efforts in the past to meet water shortages on several levels which include coordination within the groundwater Basin with adjacent water and emergency services agencies and coordination with the City of Scotts Valley in emergency planning.

SVWD has a 2-inch-diameter emergency intertie with the SLVWD which allows the two agencies to support each other during an emergency. Plans are underway to expand the capacity of this intertie and to construct an additional intertie with the SCWD to provide an additional emergency supply.

SVWD's Water System Emergency Response Plan, of which this water shortage contingency is an element, is consistent with the activities of the City's Office of Emergency Services. The Emergency Response Plan contains procedures for the distribution of potable water in a disaster; which procedures are consistent with guidelines prepared by the California State Office of Emergency Services.

8.3 Stages of Action to Respond to Water Shortages

Stages of action for many water agencies are defined by available storage in a surface water reservoir or by the annual allotment provided by a water wholesaler. The District's distinction from these other agencies is the considerable groundwater storage which the District overlies. The amount of storage enables the District to endure periods of drought without a drastic shortfall in supply. Regardless of the storage capability of the aquifer, the District implements water rationing practices during drought and other emergency conditions to protect the health of the aquifer and ensure acceptable well production rates.

The amount of rainfall in a given year or series of years is the basis for defining the stages of action. Rainfall, the ultimate source of recharge to the Basin, is readily monitored and is recognized as the basis for defining drought. During a shortfall in annual rainfall, the District could take the appropriate response, such as mandating conservation measures near the beginning of the high demand period when such actions are most likely to have a positive impact on water supplies.

SVWD has developed a three stage demand reduction plan to be invoked during declared water shortages including up to 50 percent reduction in supply. The conservation stages vary depending on the causes, severity, and anticipated duration of the water supply shortage. These stages of action were evaluated based on results of the numerical model in support of the overall management of the Basin. Table 8-1 presents the three-stage rationing and demand reduction targets for SVWD.

Table 8-1: Water Supply Condition and Demand Reduction Levels

Stage	Water Supply Condition	Conservation Level[a]	Voluntary/Mandatory
1	Cumulative rainfall over 2 years < 60% of average and/or Single year rainfall < 50% of average	10% demand reduction	Voluntary
2	Cumulative rainfall over 3 years < 60% of average and/or Cumulative rainfall over 2 years < 50% of average and/or Catastrophic loss of > 35% of well capacity	15% demand reduction	Mandatory measures
3	Cumulative rainfall over 4 years < 60% of average and/or Cumulative rainfall over 3 years < 50% of average and/or Catastrophic loss of > 50% of well capacity	20% demand reduction	Mandatory measures

Note:
[a] SVWD Board may require mandatory measures, including rationing, if necessary to achieve the desired conservation level.

Stage one is defined as a precipitation < 60 percent of average for two consecutive years and/or a single year with < 50 percent of average precipitation. The voluntary demand reduction of 10 percent reflects the District's proactive approach to addressing the possibility of an extended drought and to plan for 10 percent shortage of the water supply to maintain water in storage. The 10 percent reduction decreases the loss of storage associated with a two-year drought, and raises public awareness of drought conditions. By raising public awareness, additional voluntary conservation by customers is more likely, and further demand reduction increases, if needed, will not be unexpected.

Stage two occurs when the District is in its third year of a drought with average precipitation less than 60 percent of normal, and/or its second year of precipitation less than 50 percent of normal, and/or a catastrophic loss of more than 35 percent of well capacity. Stage two is defined by a mix of voluntary and mandatory conservation measures intended to achieve 15 percent demand reduction to reflect a 15 percent shortage in supply. This is also a proactive measure to decrease the loss in storage in the aquifer and ensure a stable supply for the District for the future.

A stage three condition represents emergency conditions in the District which would occur as the result of a four year extended drought with precipitation averaging less than 60 percent of normal and/or a precipitation averaging less than 50 percent of average over a three year period, and/or a loss of more than 50 percent of pumping capacity from the production wells to reflect a 50 percent supply shortage. This stage would trigger a mix of voluntary and mandatory conservation measures intended to achieve 20 percent reduction in consumption from customers. Customer rationing would be considered. Although this is a steep reduction, it is necessary to ensure a continuous water supply in the event of a catastrophe. Although the 20 percent reduction is not absolutely necessary during an extended drought to ensure a continuous water supply, it represents the level of conservation required to protect the health of the aquifer and ensure a water supply for the future.

It should be noted that water shortages in Scotts Valley may not need to be addressed solely through water conservation; for instance, additional potable demand reduction will be accomplished by transfer of more local groundwater producers to recycled water use for landscaping needs. Recycled water conversion is an activity that SVWD has been actively pursuing for almost 10 years.

The potential for additional demand reduction in the District will decrease as more landscape irrigation users convert to recycled water and conservation measures on landscape are permanently implemented. This is considered a demand hardening situation. If this were to occur, a four year drought might justify a 15 percent demand reduction instead of a 20 percent reduction while other alternatives are investigated.

Priorities for use of available water, based on Section 3 of the California Water Code, are:

- Health and Safety: Interior residential, sanitation and fire protection
- Commercial, Industrial, and Governmental: Maintain jobs and economic base
- Existing Landscaping: Especially trees and shrubs
- New Demand: Projects with permits when shortage declared

Based on the California Water Code, priorities specific to SVWD's service area for use of available potable water during shortages were based on input from SVWD and legal requirements set forth in the California Water Code, Sections 350-358. Water allocations are established for all customers according to the following ranking system:

- Minimum health and safety allocations for interior residential needs (includes single family, multi-family, hospitals and convalescent facilities, retirement and mobile home communities, and student housing, and fire fighting and public safety)

- Commercial, industrial, institutional/governmental operations (where water is used for manufacturing and for minimum health and safety allocations for employees and visitors), to maintain jobs and economic base of the community (not for landscape uses)

- Existing landscaping

- New customers, proposed projects without permits when shortage declared.

Water quantity calculations used to determine the interior household gpcd requirements for health and safety are provided in Table 8-2. As developed in Table 8-2, the California Water Code Stages 2, 3, and 4 health and safety allotments are 68 gpcd, or 33 100-cubic feet (CCF) units per person per year. When considering this allotment and the 2010 population of 10,309, as presented in Table 2-2, the total annual water supply required to meet the first priority use during a water shortage is approximately 785 AFY based on a 68-gpcd allotment.

Table 8-2: Per Capita Health and Safety Water Quantity Calculations per California Water Code

	Non-Conserving Fixtures		Habit Changes		Conserving Fixtures	
Toilets	5 flushes x 5.5 gpf =	27.5	3 flushes x 5.5 gpf =	16,5	5 flushes x 1.6 gpf =	8.0
Showers	5 min x 4.0 gpm =	20.0	4 min x 3.0 gpm =	12.0	5 min x 2.0 gpm =	10.0
Washers	12.5 gpcd (1/3 load) =	12.5	11.5 gpcd (1/3 load) =	11.5	11.5 gpcd (1/3 load) =	11.5
Kitchens	4 gpcd =	4.0	4 gpcd =	4.0	4 gpcd =	4.0
Other	4 gpcd =	4.0	4 gpcd =	4.0	4 gpcd =	4.0
Total gpcd		68.0		48.0		37.5
GPC per year [(a)]		24,800		17,500		13,700

Note:
(a) SVWD bills on 1,000 gallons units.

8.4 Shortage Conditions Evaluated and Supply Reliability

Impacts of drought and catastrophe for the District are expressed in terms of water level declines in wells and the loss of storage over the long term. Storage at any given time is predicated on replenishment of groundwater during wet years, and the long-term declines in groundwater levels has decreased since 2005 with recycled water and water conservation efforts. During a drought, with the large amount of storage in the Basin, the District is less concerned with the absolute availability of supply, but more on the impact on wells and water level declines during water supply shortages. The District also focuses on long-term sustainability of the groundwater supply through continued attention to expansion of recycled water, sustaining water conservation efforts and both in-lieu and direct recharge projects.

The assessment of the reliability of the District's groundwater supply has been evaluated previously during the development of safe yield volumes and recharge relative to precipitation. The Basin numerical model was applied in the 2005 UWMP to evaluate reliability based on the redistribution of pumping centers, the expansion of the water recycling program, and potential increases in demand on the aquifer. The discussion that follows incorporates the modeling prepared for the 2005 UWMP in the context of the water supply situation in 2011.

8.4.1 Overview of Drought and Catastrophic Conditions Evaluated

The 2005 UWMP presented some drought and catastrophic conditions that were evaluated using the numerical groundwater model under 2004 demand and aquifer conditions which are a conservative assumption since 2004 was amongst the higher demand years within the last 10 years. Two drought conditions and a catastrophic outage, and environmental/water quality outage were simulated as follow.

- Drought conditions were identified using a single extreme drought year where rainfall is reduced to 50 percent of normal, and an extended drought where the average rainfall is at less than 60 percent of normal for three or more years. The major implication of these conditions to the District would be: production well capacity, groundwater storage decline, and the potential loss of a well(s) if water levels drop below well production zones.

- A catastrophic interruption of water supply that could occur in Scotts Valley is analyzed in the numerical model by shutting down the potentially effected wells. Given an earthquake condition the model applies the loss of two of the District's largest producing Wells #7A and #3B.

- The potential for environmental contamination is most significant in the south Scotts Valley area, where past experiences with gasoline contaminants near the District's Well #9, and chlorinated solvent contaminants near Wells #10 and #10A have increased the potential for closure of a key production well. The likelihood of such occurrences without prior warning has been reduced considerably through preparation and implementation of the District's Drinking Water Source Assessment and Protection Program. Currently, Wells #9 and #10 are minimally used because of water quality and limited production. When in use, the wells have wellhead treatment prior to delivery as described in Section 5. The District's 2004 well ordinance also provides the District with the ability to regulate activities surrounding private wells in the Scotts Valley area; however, these considerations necessitate ongoing vigilance in the area of groundwater protection and are considered in the District's Water Shortage Contingency Plan.

8.4.2 Shortage Scenarios

In the 2005 UWMP, the model was applied to drought and catastrophe scenarios for the purpose of developing a water shortage contingency plan. The scenarios were designed to simulate water shortage emergencies under 2004 aquifer storage, extraction volumes, and conditions as evaluated by the numerical model. 2004 was amongst the higher demand years and 2010 demands are about 600 AFY lower. Precipitation values and recharge conditions are based on actual drought years experienced by the region based on the 57-year precipitation record and provide insight into how the aquifer system would support SVWD under current and projected future conditions.

In alignment with anticipated supply curtailments, the scenarios modeled in the 2005 UWMP included:

- An extreme one-year drought when rainfall is reduced to 50 percent of normal;
- A severe, prolonged (five-year) drought with rainfall averaging less than 60 percent of normal;
- The same severe, prolonged (five-year) drought with demand reduced by mandatory conservation. Mandatory conservation practices are applied on an increasing scale throughout drought progression;
- Catastrophic interruption of water supply due to the sudden loss of Wells #7A and #3B as the result of an earthquake;
- Catastrophic loss of water supply due to the sudden loss of Well #9 and Well #10 as a result of environmental contamination, and;
- The same catastrophic interruptions with demand reduced through emergency, mandatory water conservation.

8.4.3 Summary of Numerical Modeling Results

The results of the model scenarios were used to provide background data for basin management and response criteria. Considering the large volume of stored groundwater in the Basin, the ability to access the water resource in a drought or catastrophe situation is of particular concern. A secondary consideration is the long-term impact on the groundwater basin, specifically loss of storage as well as the reduced baseflow discharge to local streams resulting from declining water levels.

Table 8-3 summarizes the drought and catastrophe scenarios modeled in the numerical groundwater model. The 2005 UWMP provides more detailed description of the modeling results. The model results are relevant to SVWD today because they reflect the capacity of SVWD to provide water even under drought and catastrophic conditions.

In the scenario simulating a catastrophe, the 20 percent mandatory conservation measure is necessary since the District is currently capable of providing only 80 percent of its supply from existing wells. Although this is often considered an unrealistic percentage, the modeling exercise is only intended to simulate the interruption of service for six months under normal aquifer and precipitation conditions.

During the preparation of the 2005 UWMP, Well #10 was operational as it was considered in the numerical modeling analysis. Well #10 experienced a casing failure in 2007 and was rehabilitated with the lower screens destroyed. Currently, it is maintained for emergency backup purposes only and production capacity is significantly reduced, due to the loss of the lower screens. Well #10A was constructed approximately 50 feet away and became operational in late 2007. It now serves the same function and purpose that Well #10 served at the time of the 2005 UWMP preparation. With Well #10A replacing Well #10, SVWD has essentially the same maximum production capacity as in 2005.

8.5 Minimum Water Supply Available During Next Three Years

As discussed in the 2005 UWMP, the most significant impact of the drought scenarios is the increased loss of storage predicted during particular scenarios and the dewatering of Well #9.The loss of storage impact remains today while the dewatering of Well #9 is no longer significant as it does not currently represent a significant SVWD supply. These scenarios continue to address Water Code §10632(b) by presenting the minimum water supply available over the next five years. The model scenarios were performed using the driest five-year sequence, which also includes the driest three year sequence as required by the water code. Overall, the District has the storage capacity and production ability to withstand drought conditions as defined by Water Code §10632 (b). The sustainable yield of 2,600 AFY for the Scotts Valley and Pasatiempo Subbasins of the Santa Margarita Basin is shared between the SVWD and SLVWD (Kennedy/Jenks, 2011) and is augmented by the SVWD recycled water projected for use in the Basin. As shown in Table 8-4, the total supplies range from approximately 2,766 AFY to 2,783 AFY during the next three years (2012 – 2014). When comparing these supplies to the demand projections provided in Sections 2 and 6 of this Plan, SVWD has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

Table 8-4: Three-Year Estimated Minimum Water Supply (AFY)

Water Supply Sources	2012	2013	2014
Santa Margarita Basin, Scotts Valley and Pasatiempo Subbasins[a]	2,600	2,600	2,600
Recycled Water (projected use)	166	174	183
Total	**2,766**	**2,774**	**2,783**

Note:
[a] SVWD and SLVWD together pumped approximately 1,700 AFY while other pumpers accounted for another 300 AFY from the Scotts Valley and Pasatiempo Subbasins in WY 2010.

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Table 8-3: Summary of Numeric Modeling Results Under Drought and Catastrophic Conditions from 2005 UWMP

Scenario	Description	Key Assumptions	Results	Applicability to 2010
Drought Scenario 1	1-year drought with precipitation < 50 percent of normal	WY 1990 precipitation (49 percent of average) resulting in 50 percent supply reduction for one year under WY 2004 (high demand) operating conditions	2004 pumping rates were sustained in all SVWD wells	Indicates that high pumping rates to meet high demands, with commensurate loss of storage is still hydrogeologically feasible in SVWD.
Drought Scenario 2	5-year drought with precipitation < 60 percent of normal	WY 1987-1991 precipitation (5-year drought) under WY 2004 (high demand) operating conditions	2004 pumping rates could not be sustained at Well #9 while other wells maintained production without dewatering.	Well #9, the oldest in SVWD, has had reduced production since 2005 because of both diminished water quality and reduced production. Other wells can be used to meet demand.
Drought Scenario 3	5-year drought with precipitation < 60 percent of normal and gradually increased demand reduction	Same as Scenario 2 with reduced pumping/ demand as follows: Drought Yr 1 – 0% reduction Drought Yr 2 – 10% reduction Drought Yr 3 – 15% reduction Drought Yr 4 – 15% reduction Drought Yr 5 – 20% reduction	2004 pumping rates could not be sustained at Well #9 while other wells maintained production without dewatering. Other wells could increase production to offset loss of production from Well #9.	Well #9, the oldest in SVWD, has had reduced production since 2005 because of both diminished water quality and reduced production. Other wells can be used to meet demand.
Catastrophe Scenario 4	Catastrophic interruption of supply resulting from environmental contamination	Average precipitation and recharge conditions with WY 2004 (high demand) operating conditions without Wells #9 and #10/#10A for first 6 months of 1-year simulation.	2004 pumping rates can be sustained in remaining SVWD wells within planned operating levels	With Well #10A replacing Well #10, current SVWD facilities can be used to meet expected loss of supply.
Catastrophe Scenario 5	Catastrophic interruption of supply resulting from earthquake	Average precipitation and recharge conditions with WY 2004 (high demand) operating conditions without Wells #3B and #7A (50 percent loss of supply for 6 months).	2004 pumping rates were reduced by 15 percent even with remaining wells at maximum capacity with Well #9 dewatering within first 3 months of simulation reducing maximum capacity by an additional 6 percent	With Well #10A now replacing Well #10, SVWD has essentially the same maximum production capacity as in 2004 in the event of loss of Wells #3B and #7A.
Catastrophe Scenario 6	Catastrophic interruption of supply resulting from earthquake with reduction in demand	Average precipitation and recharge conditions with 20 percent reduction in WY 2004 (high demand) operating conditions without Wells #3B and #7A (50% loss of supply for six months).	2004 pumping rates in remaining wells were reduced by 20 percent to reflect reduced demand. Remaining wells can meet catastrophic outage under reduced demand.	With Well #10A now replacing Well #10, SVWD has essentially the same maximum production capacity as in 2004 in the event of loss of Wells #3B and #7A.

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8.6 Actions to Prepare for Catastrophic Interruption

As described in Section 8.4, SVWD evaluated shortage conditions under both drought and catastrophic conditions. The District's Emergency Response Plan (ERP) provides the District with a standardized response and recovery protocol to prevent, minimize, and mitigate injury and damage resulting from emergencies or disasters of man-made or natural origin. The ERP describes how the District will respond to potential threats or actual terrorist scenarios identified in the vulnerability assessment, as well as additional emergency response situations. The goals of this ERP are to:

- Rapidly restore water service after an emergency.
- Ensure adequate water supply for fire suppression.
- Minimize water system damage.
- Minimize impact and loss to customers.
- Minimize negative impacts on public health and employee safety.
- Provide emergency public information concerning customer service.

A copy of the District's ERP is presented in Appendix L.

8.6.1 General

As described earlier, the greatest catastrophic threats to SVWD's water supply are a major seismic event resulting in a regional power outage and/or an environmental/water quality emergency, either of which could take wells out of service and damage distribution and storage facilities.

As a contingency to this scenario, SVWD has implemented back-up power at Orchard Run and El Pueblo Water Treatment Plants and has mobile generators available for use at all wells, booster pumps, and other key facilities. However, if there are significant pipeline breakages, operation of the full water system will be limited by the location and the extent of pipeline damage. It is likely that smaller service areas served by individual wells can be valved off and served while more extensive pipeline repairs are performed. Furthermore, SVWD's reservoirs totaling 4.32 million gallons of storage provide dedicated emergency water supply equal to 240 percent of maximum day demand (maximum daily demand in 2010 was 1.8 MGD), in addition to supply reserved to meet fire flow, and peak demands. During a catastrophic interruption, the public would be asked to reduce consumption until groundwater production facilities can be restored.

8.6.2 Water Sources

The SVWD currently has seven production wells, four of which provide the primary supply for the service area leaving three wells for redundancy. All existing water supply storage, treatment, and distribution facilities are now inspected daily in preparation for emergencies. Generators are tested monthly for preparedness. In addition, a canvassing to identify specific water-critical customers (including individual customers with medical conditions dependent on continuous water availability) was performed; distribution of water to these water-critical facilities will occur on a priority basis.

SVWD has a 2-inch emergency intertie to the SLVWD as an additional source of water. This intertie is identified for upgrade and an additional intertie with SCWD is also in the planning phases. Water storage facilities are capable of serving each of the pressure zones within the service area if groundwater pumping becomes unavailable. Redundancies including generators, multiple pressure zones, storage reservoirs, and interties within the service region will facilitate the delivery of water to customers in cases of power outages and earthquakes.

In addition to an intertie and storage, Table 8-5 summarizes the actions SVWD has discussed in preparation for a water supply catastrophe. Coordination with other agencies and emergency response teams are key elements to the preparative actions SVWD has undertaken.

Table 8-5: Preparative Actions for Catastrophic Interruption

Action	Actions taken
Determined what constitutes a proclamation of a water shortage	✓
Stretch existing water storage	✓
Obtain additional water supplies	✓
Develop alternative water supplies.	✓
Determine funding sources	✓
Contact and coordinate with other agencies	✓
Created an Emergency Response Team/Coordinator	✓
Created a catastrophe preparedness plan	✓
Put employees/contractors on-call	✓
Developed methods to communicate with the public.	✓
Developed methods to prepare for water quality interruptions	✓

8.7 Mandatory Prohibitions During Shortages

In 1983, SVWD enacted Ordinance 74-83 (attached as Appendix H), which lists mandatory prohibitions against specific water activities at all times. Additional measures are adopted during times of water shortages, especially during droughts. Ordinance 149-09, adopted by SVWD in July 2009, established recycled water use only for construction, as noted in Table 8-6 (attached as Appendix M). The potential prohibitions include specific changes in water use. The levels are additive and the higher levels of drought response are inclusive of the lower levels requirements (Table 8-6)

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Table 8-6: Drought Shortage Plan Prohibitions

Prohibition	Stage When Prohibition is Mandatory		
	Stage 1	Stage 2	Stage 3
Consumption Reduction Measures in Effect at All Times			
Unauthorized use of water from any fire hydrant.	X	X	X
Adjust sprinklers and irrigation systems to avoid overspray, runoff, and waste.	X	X	X
Repair leaks within 48 hours	X	X	X
Use bucket and a hand-held hose with a positive shut-off nozzle, mobile high-pressure/low-volume wash system to wash vehicles	X	X	X
Use re-circulated water to operate decorative fountains, ponds, lakes	X	X	X
Indiscriminate running of water or washing with water not otherwise prohibited which is wasteful and without reasonable purpose	X	X	X
Recycled water only for construction (requirement established in 2009 by Ordinance 149-09)	X	X	X
Additional Consumption Reduction Measures in Declared Stages of Action			
Notification of all customers of the water shortage	X	X	X
Water Shortage Pricing	Ongoing program		
Provision of Technical Information to customers on means to promote water use efficiency	X	X	X
Development of a media campaign to promote water conservation		X	X
Development/expansion of efficiency programs such as toilet rebates	Ongoing program		
Use of recycled water for irrigation whenever possible	Ongoing program		
Additional Measures For Consideration by SVWD Board			
Irrigate residential and commercial landscape before dawn		X	X
Prohibit operating of non-water conservation pre-rinse nozzle in a food preparation establishment such as a restaurant or cafeteria			X
No filling of pools or aesthetic water features			X
Landscape irrigation restricted to designated watering days		X	X
Time limits on automatic irrigation systems		X	X
Require large landscapes to adhere to water budgets.			X
Require large users to audit premises and repair leaks			X
Pool and spa cover installation		X	X
No washing down of paved or impervious outdoor surfaces	X	X	X
Display by restaurants and hotels of water conservation signs	X	X	X
Water served upon request at restaurants		X	X
Per capita allotment by customer type			X

Penalties for violation or non-compliance are described in Section 8.9.

8.8 Consumptive Reduction Methods During Restrictions

Once a water shortage stage has been declared, consumption reduction measures will be implemented to meet water conservation goals which are summarized in Table 8-5 above. The District's actual response to a water shortage emergency will require specific action by the Board of Directors. Nothing in this plan is intended to limit the District's available options in defining a specific response to any future water shortage.

The District will provide suggested water saving measures to its customers. Water conservation measures should be directed toward conserving potable water supplies. Use of recycled water need not be curtailed, although waste is never encouraged.

8.8.1 Supply Shortage Triggering Levels

Water agencies manage water supplies to minimize the social and economic impact of water shortages. The Plan is designed to provide a minimum 50 percent of normal supply during a severe or extended water shortage as described in Section 8.4 above. As the water purveyor, SVWD must provide the minimum health and safety water needs of the community at all times. The Stages of Action triggering levels described in Table 8-1 were established to ensure that this goal is met.

Stages of Action levels may be triggered by a shortage in one water source or a combination of sources. Although an actual shortage may occur at any time during the year, a drought shortage (if one occurs) is usually forecasted by the SVWD on or about April 1st each year.

SVWD's potable water sources are groundwater and an emergency intertie with an adjacent agency. Stages of Action levels may be triggered by a supply shortage or by contamination in one source or a combination of sources as described in Table 8-1. Triggers automatically implement the more restrictive demand reduction level.

SVWDs supply is reliable because of the number of wells providing a number of sources of supply.

8.8.2 Consumption Limits

If rationing is determined necessary by the Board, SVWD may use the following allocation method for each customer type, as presented in Table 8-7.

Table 8-7: Rationing Allocation Method

User Type	Allocation Method
Single Family	Hybrid of Per-capita and Percentage Reduction
Multi-Family	Hybrid of Per-capita and Percentage Reduction
Commercial	Percentage Reduction
Industrial	Percentage Reduction
Governmental/Institutional	Percentage Reduction
Agricultural/Landscape-Permanent	Percentage Reduction - vary by efficiency
Agricultural/Landscape-Recycled Water	Percentage Reduction - vary by efficiency
Recreational Percentage	Reduction - vary by efficiency
New Customers	Per-capita (no allocation for new landscaping during a declared water shortage.)

Based on current and projected customer demand, water will be allocated to each customer type by priority and rationing level during a declared water shortage. Individual customer allotments are based on a five-year period or as much data are available. This gives SVWD a more accurate view of the usual water needs of each customer and provides additional flexibility in determining allotments and reviewing appeals. However, no allotment may be greater than the amount used in the most recent year of the five-year base period or as many years as data are available.

The General Manager shall classify each customer and calculate each customer's allotment according to the Sample Water Rationing Allocation Method seen in the above table. The allotment shall reflect seasonal patterns. Customers shall be notified of their classification and allotment by mail before the effective date of the Water Shortage Emergency. New customers will be notified at the time the application for service is made. In a disaster, prior notice of allotment may not be possible; notice will be provided by other means. Any customer may appeal the General Manager’s classification on the basis of use or the allotment on the basis of incorrect calculation.

8.8.3 New Demand

During any declared water shortage emergency requiring mandatory rationing, SVWD recommends that City and County building departments continue to process applications for grading and building permits, but not issue the actual permits until mandatory rationing is rescinded. In Stage 3, it may be necessary to ban all use of water for non-essential uses, such as new landscaping and pools.

8.9 Penalties for Excessive Use

If excessive use (water leaks and/or waste pursuant to Ordinance 74-83 or other Board actions) is detected from any water user, the following enforcement plan instituted in 2009 through Ordinance No. 150-09 will apply.

Any customer found repeatedly violating District water conservation restrictions in a given calendar year shall be assessed penalties to be applied to the customer's next water bill as set forth below.

- First offense: Explanation of restrictions is provided to customer
- Second offense: Written notice of violation
- Third offense: One hundred dollar ($100.00) penalty.
- Fourth offense: Two hundred and fifty dollar ($250.00) penalty.
- Fifth offense: Five hundred dollar ($500.00) penalty.

Noncompliance with Ordinance 74-83 may be enforced by discontinuing service to the property at which the violation occurs with 48-hour written notice.

8.10 Financial Impacts of Actions During Shortages

Successful implementation of water conservation measures results in a decrease in water demand, with the unintended effect of reducing a water purveyor's revenues. Accordingly, the water code requires analysis of fiscal impacts of the water shortage contingency plan on revenues and expenditure, and discussion of measures to reduce impacts.

For the District, effective implementation of the Water Shortage Contingency Plan would result in a decline in potable water sales by as much as 10 to 20 percent in terms of numbers of gallons of demand. Because of the steep tiers for usage charges, the impacts on revenues would be even greater. In addition, recycled water sales during a water shortage could also decline slightly, reflecting the community's overall reaction to the water shortage. This impact could be minimized through public information.

Revenues from connection fees would also decline, but only if a moratorium were placed on new service connections during the water shortage.

Revenues derived from penalties for excessive water use or water wasting during the water shortage would not effectively offset lost revenues. These presumably limited revenues should be applied toward administration of the water shortage contingency plan.

Declining water demands would be offset to a small degree by a decline in operating expenses related to the amount of water provided, such as pumping (energy) and water treatment chemicals. Nonetheless, to offset short-term revenue decline without raising water rates, the District would need to rely on financial reserves and/or decrease its expenditures. A decrease in expenditures could entail deferring planned capital improvements

8.11 Mechanism to Determine Reductions in Water Use

The Urban Water Management Planning Act requires a mechanism for determining if reductions in water use are actually being achieved in response to conservation measures. Regular monitoring during a Stage 1, Stage 2, or Stage 3 shortage would include reporting of weekly production figures to the General Manager. In addition, water usage by customers from bimonthly billings would be reported to the General Manager. The General Manager would provide a monthly status report to the District Board on the status and effectiveness of the conservation program. If reduction goals are not met, the General Manager would inform the District Board so that corrective action can be taken in a timely manner.

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