Santa Clara Valley Water District

UWMP 2005

Urban Water Management Plan 2005

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Acronyms

ABAG	Association of Bay Area Governments
ACWA	Association of California Water Agencies
ADWF	Average Dry Weather Flow
af	Acre Foot
afY	Acre-feet per year
AG	Agricultural
AWWARF	American Water Works Association Research Foundation
BARWRP	Bay Area Regional Water Recycling Program
BAWAC	Bay Area Water Agencies Coalition
BAWSCA	Bay Area Water Supply and Conservation Agency
BMP	Best Management Practices
CCF	Hundred Cubic Feet (748.05 gallons)
CEC	California Energy Commission
CEO	Chief Executive Officer
CEQA	California Environmental Quality Act
CFS	Cubic Feet per Second
CII	Commercial, Industrial and Institutional
CIMIS	California Irrigation Management Information System
CIP	Capital Improvement Plan
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CVSP	Coyote Valley Specific Plan
CWAC	California Water Awareness Campaign
DHS	California Department of Health Services
DMMs	Demand Management Measures
DOF	California Department of Finance
DSOD	Division of Safety of Dams (California)
DWR	Department of Water Resources
DWSAP	Drinking Water Source Assessment and Protection
EBMUD	East Bay Municipal Utility District
EDC	Endocrine Disrupting Compounds
EPA	Environmental Protection Agency
EPM	Environmental Programs and Management
ESA	Endangered Species Act
ETo	Evapotranspiration
EWA	Environmental Water Account
FAHCE	Fisheries and Aquatic Habitat Collaborative Effort
FY	Fiscal Year
GIS	Geographic Information Systems
GRU	Government Relations Unit
HAZMAT	Hazardous Materials
HET	High Efficiency Toilet
INAAP	In-field Nutrient Assessment Assistance Program

Acronyms

ISMP	Information Systems Management Plan
ITAP	Irrigation Technical Assistance Program
IWRMAIN Needs	Institute for Water Resources -- Municipal and Industrial Needs
IWRP	Integrated Water Resources Plan
KAF	Thousand Acre Feet
LOS	Level of Service
LTA	Long-term average
LUSTOP	Leaking Underground Storage Tank Oversight Program
Maf	Million Acre-Feet
MCL	Maximum Contaminant Level
MEC	Metcalf Energy Center
mgd	Million Gallons per Day
mg/L	Milligrams per Liter
MtBE	Methyl Tertiary Butyl Ether
M&I	Municipal and Industrial
MOU	Memorandum of Understanding
MWD	Metropolitan Water District of Southern California
NCTLC	Northern Turf and Landscape Council
NEPA	National Environmental Policy Act
NTNC	Nontransient-Noncommunity
O&M	Operations and Maintenance
PARWQCP	Palo Alto Regional Water Quality Control Plant
PCAs	Possible Contaminating Activities
PCE	Perchloroethylene
PEIR	Preliminary Environmental Impact Report
PHG	Public Health Goal
PVWMA	Pajaro Valley Water Management Agency
PWTP	Penitencia Water Treatment Plant
RO	Reverse Osmosis
RDP	Regional Desalination Project
RWQCB	Regional Water Quality Control Board
RWQCP	Regional Water Quality Control Plant
RWTP	Rinconada Water Treatment Plant
SB	Senate Bill
SBA	South Bay Aqueduct
SBCWD	San Benito County Water District
SBWR	South Bay Water Recycling
SCADA	Supervisory Control and Data Acquisition
SCRWA	South County Regional Wastewater Authority
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SFPUC	San Francisco Public Utility Commission
SF-WSIP	San Francisco Public Utility Commission's Regional Water System Improvements Program

SJ/SC WPCP	San José/Santa Clara Water Pollution Control Plant
SJWC	San José Water Company
STAG	State and Tribal Assistance Grants
STWTP	Santa Teresa Water Treatment Plant
SWP	State Water Project
SWPCP	Sunnyvale Water Pollution Control Plant
TDS	Total Dissolved Solids
T&D	Transmission and Distribution
µg/L	Micrograms per Liter
ULFT	Ultra-low-flush Toilets
USBR	United States Bureau of Reclamation
UST	Underground Storage Tank
UTC	United Technologies Corporation
UWMP	Urban Water Management Plan
UV	Ultra Violet
WBIC	Weather Based Irrigation Controller
WET	Water Efficient Technologies
WSA	Water Service Areas
WTIP	Water Treatment Improvement Project
WTP	Water Treatment Plant
WSIP	Water System Improvements Program

Glossary of Terms

Provided below are definitions of selected terms used in the Santa Clara Valley Water District's 2005 Urban Water Management Plan.

acre-foot (af) The amount of water needed to cover an acre one foot deep (325,851 gallons). An acre-foot can support the annual indoor and outdoor needs of between one and two households per year, and, on average, three acre-feet are needed to irrigate one acre of farmland.

all-weather supplies Water that is available in dry, normal, and wet years; includes conservation, recycling, and desalination.

appropriation The right to withdraw water from its source.

aquifer A geologic formation of sand, rock and gravel through which water can pass and which can store, transmit and yield significant quantities of water to wells and springs.

available supply The maximum amount of reliable water supply, including surface water, groundwater, and purchases under secure contracts.

average-day demand A water system's average daily use based on total annual water production.

baseline Existing water supplies (local surface water and groundwater, imported water, SFPUC supplies), infrastructure (treatment plants, distribution facilities, reservoirs, recharge facilities, groundwater basin), programs that protect water supplies and infrastructure (groundwater protection, treated water improvement project, asset management, water supply reliability report), agreements and contracts (water rights, imported water contracts, treated water contracts).

Bay-Delta The region of the Sacramento River and San Joaquin River Delta confluence. The watershed drainage supplies about 55 percent of the fresh water used in California.

beneficial use A use of water resources that benefits people or nature as defined by regional water quality control plans.

best management practice (BMP) A measure or activity that is beneficial, empirically proven, cost-effective, and widely accepted in the professional community.

building blocks Feasible projects and programs for meeting future water demands.

CALFED A partnership of state and federal agencies working with stakeholders to restore the ecosystem of the Sacramento-San Joaquin Bay-Delta and improve the reliability and quality of water supplies for over 20 million Californians.

CALSIM A generalized water resources simulation model developed by the California Department of Water Resources for evaluating operational alternatives of large complex river systems. CALSIM II is the latest application of the generic CALSIM model to simulate SWP/CVP operations.

Glossary of Terms

conjunctive use A water management strategy for the coordinated use of groundwater and surface water resources.

demand forecast A projection of future water demand that can be made on a system-wide or customer-class basis.

demand management Measures, practices, or incentives deployed by water utilities to permanently reduce the level or change the pattern of demand for a utility service.

dry year response actions Dry year response actions include spot market transfers, dry year option transfers, and drought response actions.

Ends Policy A policy category of Santa Clara Valley Water District Board with qualitative yet specific outcomes or expectations.

end use Fixtures, appliances, and activities that use water.

evapotranspiration Water losses from the surface of soils and plants.

imported water Water that has originated from one hydrologic region and is transferred to another hydrologic region.

integrated water resource planning An open and participatory planning process emphasizing least-cost principles and a balanced consideration of objectives, infrastructure risk, supply, resources and demand management options for meeting water needs.

multiple dry-year period The average annual supply that could be expected if the 1987-1992 hydrology were repeated.

normal year A year in the historical sequence that most closely represents median runoff levels and patterns. This is the average supply available over the period from 1967 forward, given currently existing facilities and institutional arrangements.

recycled water Wastewater that becomes suitable for a specific beneficial use as a result of treatment.

single dry year A year with the minimum usable supply. The hydrology of 1977 is the driest year of record.

ultra-low-flush toilet (ULFT) A toilet that uses not more than 1.6 gallons per flush.

unaccounted-for water The amount of water not accounted for following a comparison of production and billing, less known or estimated losses and leaks.

water right A property right or legal claim to withdraw/divert a specified amount of water in a specified time frame for a beneficial use.

water use efficiency Refers to actions or activities that lead to sustainable or renewable uses of water and includes water conservation, water recycling and desalination.

wet-year supply The hydrologic year that the most water can be captured by local facilities. 1983 best represents wet-year supply.

Executive Summary

Water is a vital element of our everyday lives. We depend on it not only for our personal use, but also for our business, farm, and recreational needs, and for sustaining ecosystems that create the natural beauty of our creeks and rivers. The Santa Clara Valley Water District (District) acts as the steward for all of Santa Clara County's water resources by ensuring that creek ecosystems are healthy, safeguarding valley residents from devastating floods and ensuring that there is enough clean, safe water for homes and businesses. The District also works to preserve water quality by protecting groundwater subbasins and reservoir watersheds.

The mission of the District is a healthy, safe and enhanced quality of living in Santa Clara County through watershed stewardship and the comprehensive management of water resources in a practical, cost effective and environmentally sensitive manner.

As the primary wholesale water supplier in Santa Clara County, the District is dedicated to ensuring a reliable supply of healthy, clean drinking water now and into the future. To do this, the District must continue to protect its existing water supply sources and infrastructure and implement a number of currently planned water system improvements. Additionally, future demands cannot be met without maximizing water conservation efforts, expanding recycled water use and investing in new water supplies. The challenge is securing funding to implement all of these elements.

As part of the District's financial planning process, water rates and other funding sources have been projected into the future. However, this plan acknowledges that current revenue projections are not adequate to fund many of the investments needed in an era of uncontrollable rising costs, increased regulatory requirements and ageing infrastructure. To meet this funding challenge, the District must partner with communities, cities, water retail agencies and developers to maximize water conservation, expand recycled water use and fund development of new supplies.

Land use agencies, property developers and water retail agencies all play a vital role in reducing the water demands of new developments. As competition for water supplies increases, residents and businesses throughout the county will also need to embrace a stronger ethic of water conservation.

Water is a vital element of our everyday lives.

The District has a diverse mix of water supplies and a strong commitment to water use efficiency. The District's water supply system is a complex interdependent system comprised of storage, conveyance, treatment, and distribution facilities that include water treatment plants, local reservoirs, the groundwater subbasins, imported water supply facilities, and raw and treated water conveyance facilities. The District supplies water to local water retail agencies which in turn provide it to their customers in Santa Clara County. Water supply comes from a variety of sources, maintaining maximum reliability and flexibility.

The intent of the District's 2005 Urban Water Management Plan (UWMP 2005) is to meet the requirements of the California Urban Water Management Planning Act and to present important information on water supply, water usage, recycled water and water use efficiency programs in Santa Clara County. It also serves as a valuable resource for planners and policy makers, and supports a secure and sustainable water supply future for Santa Clara County over the next 25 years. The UWMP 2005 updates all previous such plans.

Water Use and Future Demand Projections

In 2000, the population in the county was 1,682,585. The Association of Bay Area Governments (ABAG 2005) projects that this population will increase to 2,267,100 by the year 2030, almost a 35 percent increase. Although ABAG 2005 projects fewer jobs in 2005 than in 2000 and slower job increases to year 2015, significant job growth was projected for the years 2015 to 2030. This increasing population and an improving economy will increase demand for water. Water use over the next five years is expected to increase by 0.3 percent per year on average and increase by 1 percent a year on average after year 2020. Overall, countywide water demand is projected to increase by about 70,000 acre-feet (af) or 18 percent over the next 25 years, even with increases in new water conservation efforts. The District and most major water retail agencies partner in regional implementation of a variety of water use efficiency programs to permanently reduce water use in the county. Demand with conservation programs in place in 2030 is projected at approximately 450,000 af. The conservation efforts planned between now and 2030 will offset about half the additional water supplies needed to meet increased demand. Using 1992 as a baseline, the county will be permanently conserving an additional 100,000 af per year by the year 2030.

Conjunctive Water Management

The District's water supply comes from a variety of sources. The District stores water in the groundwater basin for later use by actively replenishing the basin when water is plentiful. This "conjunctive" water management program optimizes the use of groundwater and surface water, and prevents groundwater overdraft, land surface subsidence, and saltwater from infiltrating groundwater aquifers. Water from reservoirs and pipelines (surface water) is purified for distribution (reducing direct demands on groundwater) and is also stored in local groundwater subbasins through managed recharge so that groundwater can be withdrawn when needed. Conjunctive use is a critical part of meeting water needs in all years. Storing surplus water in the groundwater subbasins enables part of the county's supply to be carried over from wet years to dry years.

Long-Term Water Supply Planning and Water Supply Reliability

The District's long-term water supply planning combines integrated water resource planning with watershed stewardship. This provides a robust long-term and sustainable water supply planning approach that is designed to meet the diverse water resource needs of communities across Santa Clara County. Watershed stewardship plans that incorporate water supply goals and objectives as key planning elements have been developed for four of the five watersheds in Santa Clara County.

This plan concludes that the District cannot meet demands through 2030 without significant investments to preserve and protect the District's current mix of water supplies. In addition to protecting these sources, the District also must make investments in new water supplies and maximize opportunities for water conservation.

The District's Integrated Water Resources Planning (IWRP) process is used to make water supply investment decisions under a variety of different risk scenarios. The framework is designed to identify and actively manage risk and uncertainty so that the risk of the future water supply falling short of the actual water demand is reduced.

Water Supply System and Components

The District also works to ensure supply reliability by managing the groundwater subbasins and maximizing its influence over other components of water supply. Each of the water supply components described in this document is discussed separately for purposes of assessment. However, it must be emphasized that no component can function effectively in isolation; they are inextricably linked. The overall reliability of the water supply system is greatly enhanced when all of the components are combined to complete the water supply picture. Water supply diversity also helps reduce the county's exposure to the risk of problems with any one supply component. Locally developed surface water, water conservation, groundwater recharge, recycling and local surface storage decrease overall vulnerability to risk.

Demands from each of the major water retail agencies can be met by treated surface water, groundwater or recycled water. Treated water sources include imported water and local surface water. Groundwater is replenished by natural recharge and managed recharge of imported water and local surface water. Imported water is used as source water for the District's three water treatment plants and is also delivered by the District's raw water conveyance system to streams and ponds for groundwater recharge. In addition, the San Francisco Public Utilities Commission (SFPUC) meets about 16 to

19 percent of the total water demand in the county with Hetch-Hetchy water conveyed through its own facilities. Recycled water has become an important additional source of supply and its role in offsetting demand for potable water will be more significant in the future.

A number of District activities and programs have improved the reliability of District supplies and reduced the risk of shortages during drought periods. Storing water locally or outside the county (banking) and establishing agreements to buy or sell water to other agencies (transfers) help increase District water supplies in years of shortage, as do District programs aimed at maintaining and maximizing local groundwater storage. Recycled water projects provide a water supply source that is largely independent of weather patterns. Advanced treated recycled water is under consideration for groundwater recharge and increasing stream flows thereby enhancing the District's conjunctive water management. The District maintains a drought management plan to guide the District's actions in years of water supply shortage, including those more severe than have been observed in the past. Water use efficiency programs, such as water conservation and recycling, must be maximized—they are key strategies to minimize overall demand.

Significant Investment Required to Continue Providing Clean, Safe Water

The District has been a leader in employing conjunctive water management practices since the 1930s. The construction and development of the water supply storage, conveyance, delivery, and treatment infrastructure were the result of thoughtful planning and significant capital investment over the past 75 years. To ensure a reliable water supply into the future, the District will need to continue to invest in maintaining its existing water supply, infrastructure, and programs. The District must invest in the following key programs to protect our existing water supplies and infrastructure and advance our planning efforts:

- Maintaining and expanding water conservation efforts
- Investing in additional groundwater recharge capacity
- Protecting groundwater subbasins through effective groundwater management programs
- Expanding water recycling to meet projections in accordance with District Board policies
- Sustaining local water supplies by maintaining local water rights
- Implementing the recommendations from the District's 2005 Water Infrastructure Reliability Project Report
- Investing in infrastructure projects identified in the Infrastructure Master Planning Process
- Meeting water quality standards through aggressive source water protection, ongoing improvements to treatment facilities and additional infrastructure

- Protecting imported water supplies by resolving contract and policy issues, supporting Bay-Delta system improvements, addressing system vulnerabilities (e.g., the San Luis Reservoir low-point problem), and supporting SFPUC efforts to implement a Capital Improvement Program (CIP)

Specific funding requirements for many of these elements have not yet been identified and their costs are not included in the District's long-term water rate forecast or its CIP. In addition to significant investment needed to protect and safeguard existing supplies, the District recognizes that new investment is also necessary to meet additional future demand. During normal rainfall years, the District does not rely on groundwater reserves to meet demand. However, beyond 2020, the county would need to start dipping into groundwater reserves, even during years of normal precipitation, unless new supplies are secured. By 2030, analysis shows that approximately 31,000 af per year of additional supply is needed during a normal year. During dry years and multiple dry years, significant pumping from groundwater reserves is necessary to meet demand. Since these reserves are replenished during wet and to some extent during normal years, approximately 14,000 af per year of additional supply is needed to meet demand during multiple dry years in 2030. The investments needed to secure the normal year additional supplies also help to increase supplies available in dry years.

The District has a planning process to evaluate future water supply options to address additional water supply needs under a variety of weather scenarios. These options include various combinations of new supplies such as additional water recycling, new surface storage, additional water banking, and dry-year transfer options. The process considers various risk scenarios such as climate change, unexpected increases in demand, and reduced imported water.

Not all of the specific sources and strategies for funding the needed investments are currently identified. Implementation of key water supply investments identified as part of UWMP 2005 is essential to meet the water needs of the residents and businesses in Santa Clara County into the future.

1 Introduction

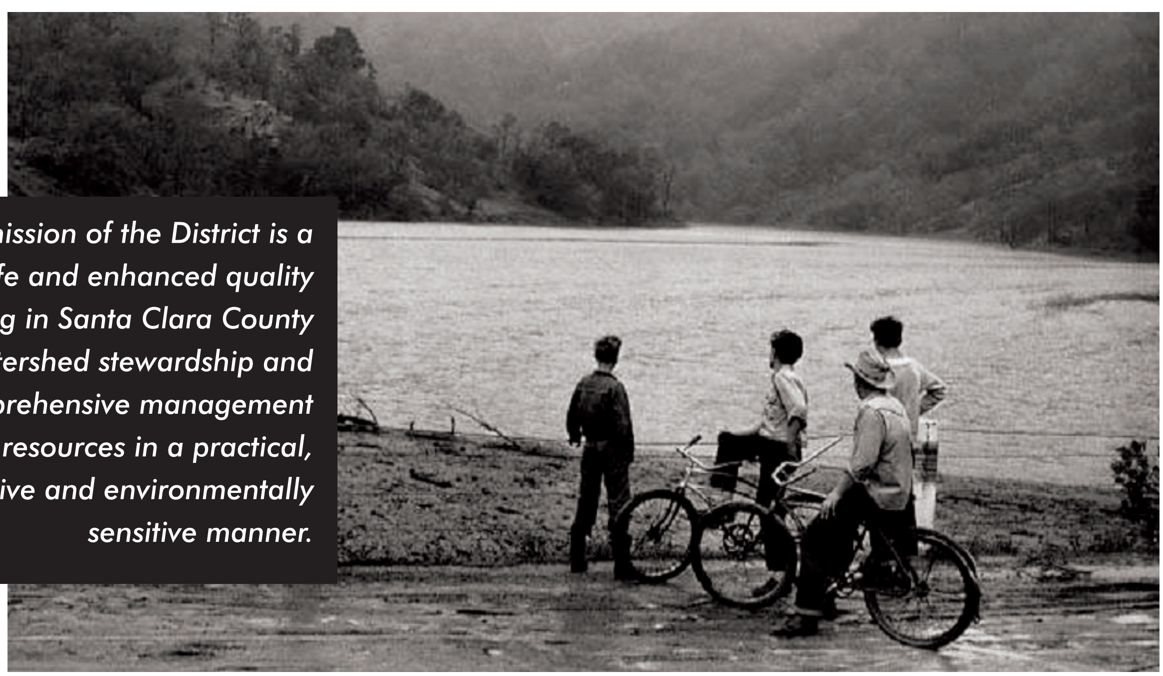
This 2005 Urban Water Management Plan (UWMP) has been prepared in response to the California Urban Water Management Planning Act (Act), Water Code Division 6, Part 2.6, Sections 10610 through 10657. The Act requires publicly- and privately-owned urban water suppliers to prepare and adopt a UWMP every five years. As the principal wholesale water supplier for all of Santa Clara County, the Santa Clara Valley Water District is required to prepare a UWMP. This UWMP updates and supersedes all previous UWMP's prepared by the District.

1.1 The Santa Clara Valley Water District

1.1.1 Overview

The Santa Clara Valley Water District (District) is an independent special district with jurisdiction throughout Santa Clara County and is the county's primary water resources agency. First formed as the Santa Clara Valley Water Conservation District in 1929, it now acts not only as the county's principal water wholesaler, but also as its flood protection agency and is the steward for its watersheds, streams and creeks, underground aquifers and District-built reservoirs.

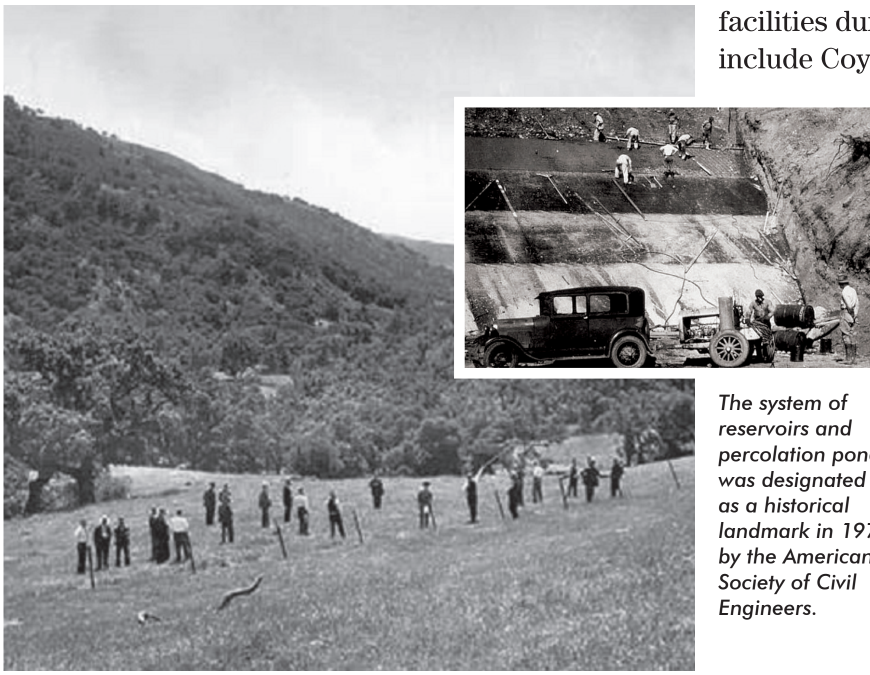
The District owns and manages 10 local surface reservoirs and associated creeks and recharge facilities, manages the county's groundwater subbasins and three water treatment plants, imports water from the Central Valley Project and the State Water Project, and delivers recycled water to parts of the county. The District is also responsible for flood protection within the county. Its stewardship responsibilities include creek restoration and wildlife habitat projects, pollution prevention efforts and a commitment to natural flood protection.



The mission of the District is a healthy, safe and enhanced quality of living in Santa Clara County through watershed stewardship and the comprehensive management of water resources in a practical, cost effective and environmentally sensitive manner.

1.1.2 History

In the late 1920s, serious groundwater overdraft and significant land surface subsidence (totaling approximately 13 feet in northern San José) led to the formation of the District as Santa Clara Valley's groundwater management agency. The first function of the District in 1929 was to develop a reliable water supply, build reservoirs to store water, and recharge the underground aquifer to halt subsidence. By 1935, the District had completed the construction of Almaden, Calero, Guadalupe, Stevens Creek, and Vasona dams to impound winter waters for recharge into its percolation facilities during the summer. Dams completed later include Coyote in 1936, Anderson in 1950, and Lexington in 1952. The Gavilan Water Conservation District in the South County built Chesbro Dam in 1955 and Uvas Dam in 1957.



With their livelihood threatened, farmers and business leaders took action and hired engineer Fred Tibbets to survey the valley's streams, geology, water tables and average rainfall.

The system of reservoirs and percolation ponds was designated as a historical landmark in 1976 by the American Society of Civil Engineers.

As the valley's population and economy grew, so did the need for water. In 1950, most of the valley's water requirements were met by groundwater. The 1950s were a period of rapid growth for the county, with the population doubling between 1950 and 1960. To supply this growth, groundwater pumping continued to increase and groundwater levels continued to decline. In 1952, the first imported water had been delivered to the county: SFPUC supplies water directly to several North County cities. By the early 1960s it was evident that the combination of SFPUC supplies, and local water supplies could not meet the water demands of the growing county.

In 1965, the District began receiving deliveries of water imported from the California State Water Project (SWP) through the South Bay Aqueduct (SBA). The District also began building water treatment plants to treat a portion of the imported water and reduce the need for groundwater pumping. In 1967, the District started delivering treated water to residents in the northern part of the county from the Rinconada Water Treatment Plant (WTP) in Los Gatos. With the addition of the SWP imported water and the Rinconada WTP to treat it, groundwater levels recovered and the rate of subsidence significantly slowed.

The 1960s and 1970s were again decades of rapid growth for Santa Clara County's population and employment, including the semiconductor and computer manufacturing industries. To meet the continuing need for water, Penitencia WTP began operations in 1974. By the mid-1980s, groundwater pumping accounted for just half of the total water use in the county. The rate of subsidence was reduced to about 0.01 foot per year, compared to one foot per year in 1961.

To further increase the reliability of the county's water supply, the District contracted with the United States Bureau of Reclamation for the delivery of water from the Central Valley Project (CVP) through the San Felipe Project. The first delivery of CVP water took place in 1987, and in 1989 the Santa Teresa WTP began operations, giving the District the ability to fully utilize this additional source of imported water.

In the early 1990s, local wastewater agencies increased the production of recycled water and developed a market for recycled water. Under the guidelines of state and county health departments, appropriately treated recycled water is suitable for park land, school yard and landscape irrigation including residential lawns. The South Bay Water Recycling Project began in 1995 with the cities of San José, Santa Clara, and Milpitas funding the construction of 100 miles of pipeline in a 30 square mile area within their jurisdictions.

Recycled water pumps

In 1997, the District completed its first Integrated Water Resources Plan (IWRP 1997), as part of its long term planning process for water supply. Also in that year, the District initiated the Water Treatment Improvement Project, a multi-year project to upgrade all three treatment plants to continue to meet increasingly stringent state and federal water quality standards. The upgrades included changing the primary disinfectant to ozone, increasing the treatment capacity of Rinconada WTP, and performing seismic upgrades. In the late 1990s the District took a lead role in the fight against MtBE contamination that had begun to affect District reservoirs and groundwater quality. In 1999, the District entered into an agreement with South County Regional Wastewater Authority (SCRWA) to become the recycled water wholesaler in south Santa Clara County. Over 10 miles of recycled water pipeline serves customers within the SCRWA service area.

In 2002, the completion of the construction of the Milpitas Intertie Pipeline connected SFPUC's Hetch-Hetchy and Santa Clara Valley Water District treated water systems. The intertie pipeline's four pumps have the capacity to deliver 40 million gallons of water a day from either system to the other. This partnership affords both agencies the flexibility to perform scheduled maintenance without outages and it provides additional protection in the event of a natural disaster.

1.1.3 Board Governance

A seven-member Board of Directors governs the District. Five directors are elected; one from each Santa Clara County supervisorial district; two are appointed by the County Board of Supervisors. The Board sets policy and provides direction to the District's Chief Executive Officer (CEO). The Board has adopted governance policies providing direction and vision for the District, and goals and executive limitations for the CEO (latest revision December 2005). One category of governance policies is devoted to goals known as Ends Policies. These Ends Policies direct the CEO as to the following: intended results; organizational products; impacts; benefits; outcomes; recipients; and, their relative worth (what good for which recipients at what costs). Accordingly, the District's Board adopted the following set of Ends Policies to secure a healthy and safe environment:

1.1.4 District Authority

The District manages groundwater and provides comprehensive water management as authorized by the Santa Clara Valley Water District Act (District Act). The District was created by the California legislature and is incorporated into the California Water Code. The complete text of the District Act is included as Appendix C.

Ends Policy No. E-2 - There is a healthy and safe environment for residents and visitors.

2.1. There is a reliable supply of healthy, clean drinking water.

2.1.1. The water supply meets or exceeds all applicable water quality regulatory standards in a cost-effective manner.

2.1.1.1. Local drinking water source quality is protected and improved in a cost-effective manner.

2.1.2. The water supply is reliable to meet current demands.

2.1.3. The water supply is reliable to meet future demands in Santa Clara County, consistent with the County's and cities' General Plans and other appropriate regional and statewide projections.

2.1.3.1. Baseline water supplies for Santa Clara County are safeguarded and maintained.

2.1.3.1.1. Local water supplies are sustained.

2.1.3.1.2. The integrity of the District's existing water utility infrastructure is maintained.

2.1.3.1.3. Imported water supplies and quality are protected and maintained.

2.1.4. There are a variety of water supply sources.

2.1.4.1. The District's variety of water supply sources is protected.

2.1.4.2 The District's water supply sources are further diversified by making new investments in a mix of all weather supplies, storage, and dry year transfers or option agreements.

2.1.5 Groundwater resources are sustained and protected for water supply reliability and to minimize land subsidence.

2.1.6. The groundwater basins are aggressively protected from contamination and the threat of contamination.

2.1.7. Water recycling is expanded within Santa Clara County in partnership with the community, reflecting its comparative cost assessments and other Board policies.

2.1.7.1. Target 2010, water recycling accounts for five percent of total water use in Santa Clara County.

2.1.7.2. Target 2020, water recycling accounts for ten percent of total water use in Santa Clara County.

2.1.8. Water conservation is implemented to the maximum extent that is practical.

2

Water Supply Planning

2.1 Urban Water Management Plan 2005

2.1.1 The Urban Water Management Planning Act

Publicly and privately owned urban water suppliers are required to prepare and adopt an UWMP every five years. Urban water suppliers are defined in the Act as those who provide water for municipal purposes either directly or indirectly to more than 3,000 customers, or those who supply more than 3,000 acre-feet (af) of water annually. This includes the District which is the principal wholesaler of water in Santa Clara County. The District prepared its first UWMP in 1985, with updates prepared in 1990, 1996, and 2001. The act also applies to the large public and private water retail agencies in the county and the San Francisco Public Utilities Commission.

The Act requires that UWMPs describe the supplier's service area; water use by customer class; water supply and demand; water service reliability and shortage response options; water transfer and exchange opportunities; water recycling efforts; and conservation measures.

2.1.2 Senate Bill 610 and Senate Bill 221

Since the District's last UWMP, dated April 2001, eight amendments, including two notable bills, SB 610 and SB 221, have been added to the Urban Water Management Planning Act. The current UWMP Act legislation is included in Appendix B.

SB 610 (Costa) and SB 221 (Kuehl) include required procedures to advance water supply planning efforts in the state of California. They focus on comprehensive water policies and the coordination of local water supply and land use decisions to help California's cities, farms, and rural communities ensure new developments have adequate water supplies. Both of these statutes identify the adopted local UWMP as an important source document to be used to fulfill these requirements. The UWMP is also identified as an important source to be considered when local agencies are updating their General Plans.

SB 610 requires that cities and counties address the sufficiency of the projected water supply in the environmental documentation for an applicable development project. Specifically, SB 610 requires that applicable projects subject to CEQA and supplied with water from a public water system receive a "water supply assessment" from the water service provider on the adequacy of available supplies over a 20-year projection. The water supply assessment must consider supplies under three hydrologic conditions: normal, single-dry and multiple dry years. Where current water sources are not sufficient, the water agency must provide its plans for acquiring additional water supplies. SB 610 also makes changes to the UWMP Act to require additional information if groundwater is identified as a source.

SB 221 prohibits approval of subdivisions consisting of more than 500 dwelling units unless there is verification of sufficient water supplies for the project over a 20-year projection. The written verification must include the following information: historical record for at least 20 years; Urban Water Shortage Contingency Analysis; supply reduction for "specific water use sector" during times of shortage; and the amount of water that can be reasonably relied upon from specified supply projects.

These requirements for written verifications (under Gov. Code § 66473.7) do not directly affect the requirements under the UWMP Act. However, the written verification must be based on substantial evidence, and SB 221 expressly provides that substantial evidence may include the most recent UWMP.

2.1.3 District Responsibilities Under the Urban Water Management Planning Act

As the agency with statutory authority for management of the groundwater subbasins and the principal wholesale water supplier in Santa Clara County, the District is required to prepare an UWMP. The District's UWMP is prepared every five years to comply with the Water Code. This plan represents a significant update to and supersedes earlier documents. In addition, as the principal water wholesale agency, the District has the responsibility to provide information to its water retail agencies to help in the preparation of their UWMPs.

2.1.4 UWMP Format

This UWMP presents important information on water resources management in Santa Clara County. It is designed to present information in a format that will be useful to land use planning agencies, cities, water retail agencies, and community members who are interested in understanding water supply issues in Santa Clara County. The report is organized to also address the Urban Water Management Planning Act requirements as follows:

Chapter 1 Introduction:

This chapter describes the Santa Clara Valley Water District including a brief overview and history of the District, Board Governance Policies, and the District Authority.

Chapter 2 Water Supply Planning:

This chapter focuses on the coordination, District responsibilities, and assumptions related to the development of the UWMP 2005. Also, the District's Integrated Water Resources Planning (IWRP) process, and the findings from the IWRP Study 2003 are discussed. District efforts related to Integrated Regional Water Management Planning are included in this chapter. (Water Code §10620 (d)(1)(2), §10621(b), §10642, §10643)

Chapter 3 Water Supply:

This chapter provides an overview of the District water supply system followed by more detailed information on each of the water supply sources including groundwater, local surface water, water recycling, and imported water. IWRP key findings and recommendations for each of the water supply sources is also summarized. Water banking, water transfer and exchanges are discussed under imported water. (Water Code §10620 (f), §10631 (b), (1-4), §10631 (c), §10631 (d), §10631 (h), §10631 (i), §10633, §10634)

Chapter 4 Water Supply Reliability:

This chapter provides general information on water supply reliability and water supply reliability of each of the water supply sources. The chapter also describes District activities to reduce uncertainties and risk. (Water Code §10631 (c))

Chapter 5 Water Demand Forecast and Demand Management Measures:

This chapter describes the climate, demographics and economy of Santa Clara County. It also includes information on historic water use, demand projections and demand management measures. (Water Code §10631 (a))

Chapter 6 Water Supply Projection and Demand Comparison:

This chapter examines the water supply outlook in the County under different hydrologic conditions in accordance with DWR guidelines. Specifically, supply and demand comparisons in five year increments to 2030 under normal, dry year and multiple dry year conditions are presented. (Water Code §10631 (c), §10631 (f), §10631 (j), §10635 (a))

Chapter 7 Water Shortage Contingency Analysis:

This chapter describes the District's contingency planning for actions that can be taken should shortage occur. A strategy for early drought recognition and response is presented, and shortage response levels and stages of action are described. (Water Code §10632)

2.1.5 Public Participation and Review Process

The District has actively encouraged public participation in the development of this UWMP. The District's website has included information on urban water management planning efforts of the District since May 2005. The District released the public draft of the UWMP on the District's website on September 22, 2005 which began a 30-day formal comment period. Notices of the availability of the public draft and notice of a public meeting held on October 6 were provided in the San José Mercury News and in two local newspapers serving the southern portion of Santa Clara County. The draft UWMP was also placed in the main branch of the San José, Morgan Hill, and Gilroy city libraries.

The formal public hearing was opened on November 15, 2005 at the District's Board of Directors meeting and continued through to the December 20 Board meeting. The public hearing was also noticed in local newspapers. Notices were also sent via mail and email to all cities and the County of Santa Clara, local water retail agencies, local community groups, and various local agencies and interested parties. In addition, the District has had extensive stakeholder and public participation as part of its IWRP process.

The UWMP was modified where appropriate to address comments received from the public and various agencies and retailers.

2.1.6 Plan Development and Coordination

District staff met with water retail agencies to discuss the preparation of the UWMP 2005 beginning in January 2005 as part of the District's water retailer committee and various subcommittees. A list of the retailer meetings where District and retailer urban water management planning efforts were discussed is provided below.

Table 2-1 Water Retailer Meeting Summary

Water Supply and Groundwater Subcommittee Meeting	Recycled Water Subcommittee	Water Conservation Meeting	Water Retailer Meeting
January 5, 2005 March 30, 2005 May 11, 2005 July 28, 2005 August 25, 2005	June 15, 2005 August 24, 2005	June 16, 2005	January 19, 2005 October 19, 2005

On July 28 District staff shared a preliminary draft of the UWMP with retailers and responded to their comments. In addition to the retailer committee meetings, District staff coordinated information exchange, held meetings, phone conversations, and communicated by email with various water retailers on specific water management issues and items such as water use data, billing categories, water use assumptions, and growth projections. District staff also met with representatives of all of the land use planning agencies to discuss growth projections and water supply issues associated with new growth and development. These retailers and land use planning agencies are summarized in Table 2-2.

Table 2-2 Water Retailers and Planning Agencies

Water Retailers	Planning Agencies
San José Water Company San José Municipal Water System Santa Clara Water Mountain View Water Milpitas Water Sunnyvale Water Palo Alto Water Gilroy Water Morgan Hill Water California Water Service Company Great Oaks Water Company	Santa Clara City Planning Mountain View City Planning Milpitas City Planning Sunnyvale City Planning Palo Alto City Planning Gilroy City Planning Morgan Hill City Planning Cupertino City Planning Campbell Town Planning Los Altos City Planning Los Gatos Town Planning Saratoga Town Planning Monte Sereno City Planning Santa Clara County Planning City Of San José Planning

All of the above agencies were notified in advance of the availability of the public draft of the UWMP, the public meeting held on October 6, 2005 at the District, and the public hearing held on November 15 and December 20 during the District's Board meeting. The retailers listed above, with the exception of Great Oaks Water Company, openly shared information with District staff and most shared their draft Urban Water Management Plans with the District. The District also shared information and coordinated with the San Francisco Public Utilities Commission and the Bay Area Water Supply and Conservation Agency.

2.2 District's Integrated Water Resources Planning Process

An Integrated Water Resource Planning (IWRP) process is used by the District to make sound long-term water supply investment decisions. The IWRP process approaches water supply issues broadly and inclusively, incorporating community involvement and flexibility to respond to changing and uncertain future conditions. The District's first IWRP document was finalized in 1997 (IWRP 1997). The majority of the actions described in the 2000 UWMP were implemented as part of the IWRP 1997 preferred strategy which was established to guide the District's water resource planning through year 2020.

The IWRP 1997 preferred strategy outlined three action levels: minimum, intermediate, and maximum. These levels correspond to a range of potential future shortages. When the District's Board accepted the IWRP preferred strategy in December of 1996, staff finalized the report (IWRP 1997) and implemented the intermediate action program. Actions included:

- Continued implementation of the core elements, including establishing an M&I Shortage Policy for CVP supplies. Core elements are activities that: (1) ensure the validity of the baseline assumptions employed during the IWRP process; (2) monitor or evaluate resource options; or (3) help meet IWRP objectives
- Expansion of a water banking agreement with Semitropic Water Storage District
- Development of water recycling partnerships and changes to the District's water recycling policy to allow for increased financial participation
- Board approval of nine guidelines to follow in pursuing future water transfer opportunities

Periodic updates are scheduled as part of the IWRP process to monitor and react to changing conditions. The IWRP Study 2003 is the most recent update. The basic work of this study was to develop a planning framework and supporting modeling tools that enable the District to fairly compare investment options in an environment of continual change and emerging opportunities. That framework is designed to provide a consistent and thorough planning process and modeling tools to help the District identify and select specific water resource investments. The IWRP Study 2003 culminated with the production of a draft study document. The IWRP Study 2003 updates the water demand and water supply outlook of the initial IWRP 1997. The evaluation is based on a best estimate of the water demand and water supply outlook through 2040. Future water demand is estimated based on a combination of data from the Association of Bay Area Governments, the California Department of Finance and the general plans from cities and the County.

2.2.1 Key IWRP Study 2003 Findings

The key findings from IWRP Study 2003 are (1) it pays to be reliable, (2) securing baseline supplies and infrastructure is the top priority for ensuring reliability, (3) a mix of investments in all weather supplies, storage, and dry year response best meets planning objectives, and (4) local supplies decrease vulnerability to risk. The study looked at the cost of shortages to the community and determined that through the planning horizon, the cost of available options to meet 95 percent of water supply needs is less than the cost of not meeting water demand (a 5 percent shortage was assumed to be manageable through demand reduction programs and voluntary cutbacks). The District's baseline includes existing water supplies, infrastructure, and programs, including the groundwater subbasins, reservoirs, imported water supplies, water rights, water use efficiency programs, and water utility infrastructure.

Additional investments will be necessary to meet future projected demands—these investments should be a mix of all-weather supplies, storage, and dry-year response actions. Dry year response actions include spot market transfers, dry year option transfers, and drought response actions.

2.2.2 IWRP Study 2003 Study Recommendations

Based upon the findings above, the IWRP Study 2003 provides three recommendations to ensure reliability through 2040.

Secure the Baseline

The District's baseline water supply serves as the foundation for future water resource investments. The IWRP Study 2003 recommends that the District take steps to secure this baseline. The key steps and the District's progress are summarized below.

Improve infrastructure reliability

The District recently completed facilities assessment and reliability response evaluation of its water storage, transmission, pumping, and treatment and distribution system. Improving local infrastructure and emergency preparedness are vital to ensuring reliability of the water supply systems during and after hazard events.

Expand groundwater management

Local groundwater subbasins supply nearly half of the water used annually in the county under average conditions and also provide emergency reserve for droughts or outages.

The District is in the process of developing a pilot groundwater extraction facility in Campbell, known as the San Tomas Well Field to increase flexibility for greater conjunctive use and for use during emergencies—particularly during outages to the treated water system.

Sustain existing supplies

The District is committed to protecting imported water supplies by resolving contract and policy issues, supporting Bay-Delta system improvements, resolving the San Luis Reservoir low-point problem, and supporting SFPUC efforts to implement a Regional Water System Improvement Program. Local water supplies can be sustained by maintaining local water rights and protecting the local groundwater subbasins.

Reaffirm commitments to water conservation and recycling

The District will continue its commitments to conservation which will result in almost 100,000 af per year savings by year 2030. The District is also continuing to progress toward achieving the Board's adopted Ends Policies and recycled water targets for expanding water recycling within Santa Clara County in partnership with the community. This potentially includes advanced recycled water treatment and use of that water for groundwater recharge and streamflow augmentation.

Continue to provide clean, safe drinking water

The District aggressively protects source water to meet water quality standards. The District is also conducting ongoing improvements to treatment facilities and re-operations for blending. The District board is also considering the adoption of a new Ends Policy to protect and continuously improve imported and local drinking water source quality.

Implement the "No Regrets" Portfolio for Near-Term Reliability (Phase I)

IWRP Study 2003 identified a "No Regrets" investment portfolio that helps ensure reliability through about 2010, depending on how risk factors continue to unfold. With these investments, potential shortages through 2010 are reduced to levels that can be managed through contingency planning and response including spot market transfers or demand management measures. This portfolio was dubbed "No Regrets" because its implementation is unlikely to cause anyone to regret it later. The elements are cost-effective, environment-friendly, and flexible, with no major capital construction. IWRP Study 2003 stakeholders endorsed the "No Regrets" portfolio, which calls for the following three near-term investments:

- 28,000 af of additional annual savings from agricultural, and municipal & industrial conservation (full implementation by 2020).
- 20,000 af of additional groundwater recharge capacity consisting of approximately 13,000 af/year in South County and 7,000 af/year in North County.
- 60,000 af of additional capacity in the Semitropic Water Bank (implemented 2005).

Prepare for the Long Term—Flexible Options for Long-Term Planning

The District recognizes that it must prepare now to make the difficult decisions that will be needed to meet dry-year water demands beyond year 2020. When planning for uncertainties more than a decade away, there is not a single simple solution to managing risk and ensuring water supply reliability. IWRP Study 2003 recommends a decision tree approach where different response strategies (investment portfolio options) are built for different risk scenarios. For instance, response strategies to future shortages generally include investment options such as re-operations and dry-year transfers; whereas strategies in response to different risks may also include other options such as additional recycling, advanced recycled water treatment, banking, or desalination for instance. This decision tree allows the District to keep water supply options open while providing a planning framework appropriate to the water supply risks.

2.3 Long-Term Water Supply Planning and Sustainability

The District is also integrating sustainability concepts and watershed stewardship with its IWRP approach to water resources planning. The intent is to provide a robust long term and sustainable approach to water supply planning that is designed to meet the diverse water resource needs of communities across Santa Clara County. In addition, watershed stewardship plans are being developed for Santa Clara County watersheds and these new plans are incorporating water supply goals and objectives as key planning elements.

The District has developed watershed stewardship plans for four watersheds in Santa Clara County. The plans facilitate a systematic approach to watershed stewardship and the comprehensive management of water resources on a watershed-by-watershed basis, foster partnerships with others, and form a joint policy framework for use by cities, the County, and the District in meeting mutual water resource, ecosystem, and community goals.

In 2002, the District developed its first stewardship plan for the Coyote Valley Watershed. In 2005, three additional plans were developed for Lower Peninsula, West Valley, and Guadalupe watershed management areas. Sponsored in part by the CALFED Bay-Delta Watershed Program, the later plans describe shared water resources interests and provide tools for better management of complex water resource issues. This includes promoting coordination among flood protection, water supply, water quality, stream restoration, and parks, trails, and open space projects. The stewardship plans translate the District's policies into specific goals and objectives at the watershed level. The integration of the IWRP process with watershed stewardship planning allows water supply planning to be economically, socially, and ecologically sound and yet responsive to changing and uncertain future conditions.

As part of the water demand update and preparation of UWMP 2005, the IWRP framework and portfolio options were reviewed. IWRP Study 2003 (Phase II - 2011 to 2020) outlined several possible response strategies to address various likely scenarios to meet future demand through the year 2020. Six different scenarios were analyzed in the IWRP Study 2003 process, and the response strategies that would be required to achieve a high level of reliability for each scenario to the year 2020 were presented. Based upon analyses performed for UWMP 2005 and re-evaluation of risk scenarios and assumptions, it appears that some of these strategies could be deferred. The direction that the District will pursue will reflect responses to how risks actually unfold over the next five years.

2021 to 2040 (Phase III): Because the impacts of risks 15 to 35 years out are uncertain, and because actions and decisions in the near term can significantly affect the future water supply outlook, IWRP Study 2003 does not present specific recommendations for investments beyond the year 2020. Rather, it presents general descriptions of the types of investments that may be needed to manage these risks in the more distant future.

Throughout the planning horizon, other critical steps to ensure long-term water supply reliability include the following:

- Monitoring for risks (including climate change), new opportunities, and technology improvements
- Investigating desalination feasibility and recycled water acceptance and marketability
- Exploring potential water management and water quality improvement alternatives
- Developing and maintaining regional and statewide partnerships
- Maximizing support for new investments through statewide and regional partnerships

The District also periodically updates water demands. Changes in demand projections, in addition to other risks, affect water supply investment decision making under the IWRP Study 2003 planning framework.

2.4 Long-Term Water Supply Planning Assumptions

Given the uncertainty associated with planning for future water supply needs, various assumptions regarding the future have been developed by District staff in order to formulate a water supply plan. The following section documents the water supply planning assumptions used in the UWMP 2005 which update those developed as part of the IWRP Study 2003.

2.4.1 UWMP 2005 Baseline Water Supply Assumptions

New investments are built upon a foundation of the District's baseline water supply. This baseline water supply is by far the largest share of future supplies. Therefore, actions are needed to safeguard and maintain this vital water supply baseline. These actions will help ensure that the assumptions made in the District's long term water supply analysis remain valid throughout the planning horizon.

The risk analysis performed under IWRP Study 2003 highlighted the importance of the planning assumptions regarding the baseline. Strategies and actions are necessary to ensure that these assumptions remain valid. Without these measures to secure the baseline, the significance of shortages under the different risk scenarios increases. The assumptions utilized in the UWMP 2005, which are an update to those in IWRP Study 2003 and previous planning documents, include the following:

- Local infrastructure will be reliable. (The District is currently evaluating infrastructure reliability. The level of funding necessary to ensure that infrastructure remains reliable has not been determined. The funding in the Capital Improvement Plan [CIP] and long-term water rate forecast is not sufficient to ensure infrastructure reliability.)
- The Water Treatment Improvement Project will be completed. (This project is funded and completion is expected by 2013.)
- Usable reservoir storage will decrease over time as reflected by observed siltation rates. (No funding implications are anticipated.)
- Existing water supply wells will be able to provide emergency backup supply when sufficient groundwater is available. (Funding implications not evaluated; potential to be significant.)
- The Fisheries and Aquatic Habitat Collaborative Effort settlement will be implemented. (Funding is addressed in the CIP and long-term water rate forecasts.)
- Local recharge facilities and creeks will be maintained at their current capacity. Additional “No Regrets” recharge is considered part of the baseline. (This has significant funding implications—funding for additional recharge is not in the District CIP or long-term water rate forecast.)
- The long-term viability of the groundwater subbasins will be protected through groundwater management programs. (Some funding is addressed in long-term rate forecast—additional funding is necessary.)
- Local surface water rights will be maintained. (No significant funding implications are anticipated.)
- Contracts for imported water supplies will continue in the future. (Significant funding implications are anticipated—costs associated with maintenance of imported water infrastructure are uncertain.)
- The San Luis Reservoir low-point issue will be resolved. (Funding depends on selection of preferred solution and federal, state and water user support.)
- CALFED Stage 1 programs will be implemented. (Currently the implementation schedule for CALFED Stage I programs has been delayed and their completion is uncertain. Potential for significant increase in costs exists—funding is not identified.)
- The SFPUC contractors in Santa Clara County will extend or renew their contracts beyond the current expiration date of 2009 and SFPUC will complete its Regional Water System Improvement Program by 2015. Contract quantities will be those formally requested by the contractors in 2005. (SFPUC supplies are outside the control of the District. Retailers are expected to pump additional groundwater

or request treated water from the District if SFPUC supplies are curtailed during drought—UWMP 2005 assumes additional demands from SFPUC customers during drought periods. Potential for significant increase in costs exist if District is to meet this additional demand.)

- The most recent SWP and CVP draft allocation factors[1] are reasonably valid. (Allocation factors are subject to change and are outside the control of the District.)
- The District's banking capacity in the Semitropic Water Storage District will be maintained. The District is currently vested in Semitropic at approximately 283,000 af. The total storage capacity available to the District is 350,000 af. (No significant additional funding implications are anticipated.)

2.4.2 UWMP 2005 Water Demand Assumptions

- Water demand was projected using data provided by the Association of Bay Area Governments (ABAG 2005) through 2030, land use agencies, and major water retail agencies.
- Information on planned developments received from local planning agency staff and contained in local city and county General Plans is reasonably valid.
- The District and its water retail agencies will continue planned water conservation commitments throughout the planning horizon. This includes baseline conservation programs and additional water conservation savings from IWRP Study 2003 "No Regrets" building blocks. By 2030, total annual water conservation savings are estimated to reach 98,500 af using 1992 as a baseline. (Funding for water conservation efforts includes funds identified in the ten year water rate forecast together with additional grant funds.)
- Countywide recycled water projections from recycled water producers are reasonably valid (16,800 af by 2010 to 31,200 af by 2030). Additional recycled water use over and above these projections will be needed to meet District Board Ends Policies. (Funding for meeting water recycling projections or to meet District targets has not been identified.)
- Projections assume development of Coyote Valley as called for in the Coyote Valley Specific Plan (April 2005) and Vision North San José as described in the General Plan Amendment and development policy adopted by the San José City Council in June 2005. (A Water Supply Assessment for Coyote Valley has not been completed—funding for additional infrastructure and for Coyote Valley water supply has not been identified.)
- Meeting less than 95 percent of the demand (a 5 percent or greater shortage) in any given year is assumed to result in significant economic loss to Santa Clara County. Less than a 5 percent shortage in any given year can be managed by demand reduction programs and voluntary cutbacks, spot market transfers, and use of reserves. (The analysis conducted for this UWMP assumes meeting 100 percent of the demand.)

[1]The SWP and CVP allocation factors are fractional quantities that are multiplied by the contractors' maximum quantities to calculate the quantity of water that will be provided to the contractors in a particular year. In any given year, there is one final allocation factor set for the SWP and one final allocation factor for the CVP. The allocation factors start low and are updated as the water year progresses. Allocation factors produced by CALSIM modeling runs are factors calculated for hydrological conditions that occurred from about 1922 to about 1993.

2.5 Integrated Regional Water Management Planning

The District championed regional planning through the creation of the Bay Area Water Agencies Coalition (BAWAC) in 2002. The member agencies recognized the need for coordination and mutual support in planning for water supply and water resources in the Bay Area region and decided to formalize their ad-hoc efforts by creating BAWAC as a forum and a framework to discuss water management planning issues and coordinate projects and programs that would meet the regional objectives to improve water supply reliability and water quality. The BAWAC members collectively serve a population of 5.5 million people residing within the greater Bay Area region that includes the counties of Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara.

In 2003, BAWAC collaborated to document historic achievements and ongoing aggressive implementation of water conservation programs in the BAWAC region. In 2004, BAWAC collaborated with water agencies in the North Bay to document innovative water management strategies and regional cooperation to protect the quality and reliability of existing supplies. In 2003-05, BAWAC led the effort to develop a comprehensive Integrated Regional Water Management Plan that encompasses all aspects of water management including: water supply, water quality, wastewater, storm water, watershed and aquatic habitat protection and restoration. Grant applications were submitted to the Proposition 50, Chapter 8, Integrated Regional Water Management Grant Program to further the planning and implementation efforts.

The District also champions regional planning with water agencies in the Pajaro River watershed. In 2004, the District, San Benito County Water District, and Pajaro Valley Water Management Agency entered into an agreement to coordinate water resources planning. The collaborative effort is coordinating and collaborating on water conservation programs, water recycling and desalination projects, and groundwater basin management. In addition, the agencies are discussing water banking, conjunctive use, and transfer arrangements. These projects and programs help achieve the agencies' common interests in improving water supply reliability and water quality. The agencies have made significant progress on a Pajaro River Watershed Integrated Regional Water Management Plan and also submitted Proposition 50 Chapter 8 grant applications to further the planning and implementation efforts.

The District's foresight and leadership in regional planning was reinforced by the 2005 California Water Plan. The first of two key initiatives promoted by the Water Plan is to continue implementing integrated regional water management. Together with the second initiative of maintaining and improving statewide water management systems, the Water Plan projects that Californians will have enough clean and affordable water through the year 2030.

3 Water Supply

3.1 The Water Supply System

3.1.1 System Overview

The District's water supply system is comprised of storage, conveyance, recharge, treatment, and distribution facilities that include local reservoirs, the groundwater subbasins, groundwater recharge facilities, treatment plants, a treated water transmission system, imported supply, and raw and treated water conveyance facilities.

The District supplies water to local retail water agencies which in turn provide it to their retail customers in Santa Clara County. In order to maintain maximum reliability and flexibility, the water supply comes from a variety of sources. The District has an active conjunctive water management program to optimize the use of groundwater and surface water, and to prevent groundwater overdraft and land subsidence. Nearly half is from local groundwater aquifers and more than half is imported from Northern California watersheds through State Water Project and Central Valley Project pumping stations in the Sacramento-San Joaquin Delta. Both groundwater and imported water are sold to retailers. Sixteen to 19 percent of the water used in the county is purchased directly from SFPUC by eight of the north county water retail agencies. The District also manages the groundwater basin to the benefit of agricultural users and individual well owners who pump groundwater.

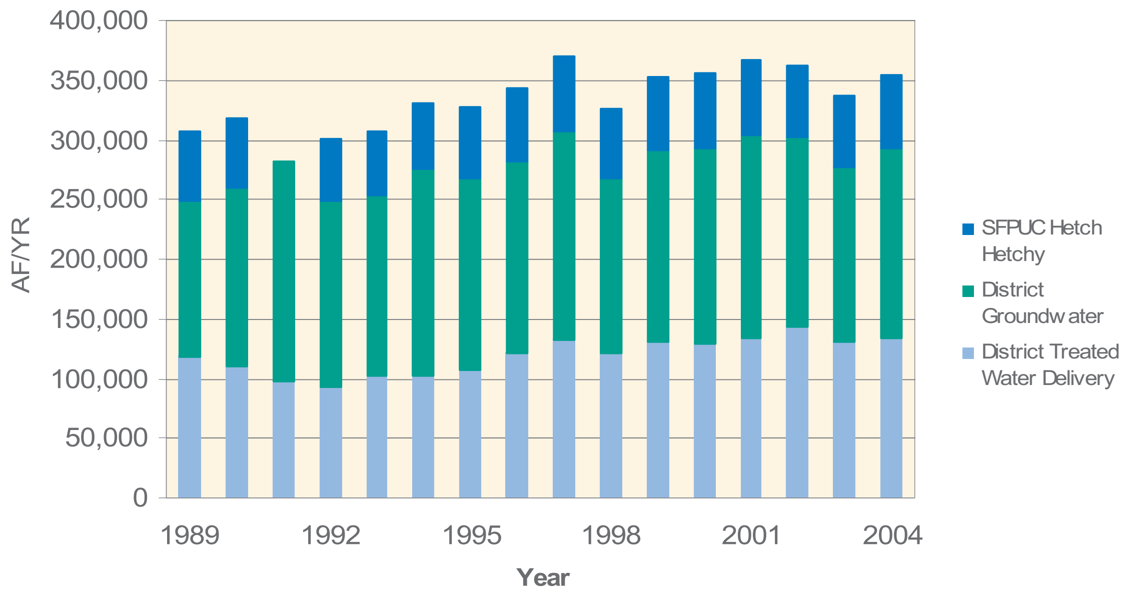
Santa Teresa Water Treatment Plant

The major sources of supply for Santa Clara County are shown on Figure 3-1. The District's water distribution system is schematically represented in Figure 3-2, and the facilities to store, treat, and distribute water are shown in map format in Figure 3-3.

3.1.2 Historical Supply Sources and Future Trends

Since 1989, when the last of the three District water treatment plants came on line, the various sources of water for Santa Clara County have remained relatively constant as a percentage of total supply, as illustrated in Figure 3-1. Groundwater represents the biggest share of total use, ranging from 41 to 51 percent of total water use. Treated water represents the second largest share from 30 to 38 percent of total water use. SFPUC supplies (from the Hetch-Hetchy system) represent the third largest share ranging from 16 to 19 percent of total water use. Other sources not shown in the figure include recycled (less than 3 percent) and other local surface water (non-District 4 to 5 percent).

Figure 3-1 Major Sources of Supply



While the distribution of these sources has remained relatively constant over the past 15 years, it may not be representative of future years. Several important and sometimes dynamic factors play a role in affecting the use of a particular water source. Hydrology is probably the most important and dynamic of these factors. In subsequent dry years, there may be less imported and local surface water to distribute to the treatment plants and thus groundwater use may increase.

District and retailer operations also play a key role in determining the percent allocations of water demands for specific sources. While these demands cannot be adequately predicted, water prices significantly influence a retailer's choice in selecting a particular source of supply. For example, the District has the legislative authority to set non-contract treated water prices, which influence retailer demands on treated water beyond contracted allotments. This may result in an increase or decrease in groundwater demands.

Changes in demand, where location of demand changes, will also affect supply choices. As population increases in a given area from new housing developments, consideration must be made as to the best source of supply, both from an economical standpoint of building infrastructure to meet those demands and a water resources planning perspective for meeting countywide demands. Some geographic and retail service areas do not currently have access to a particular source of supply. The District works closely with local planning authorities and retailers to provide information on treated water, groundwater pumping, water conservation and recycled water for proposed developments.

The District's mission includes providing comprehensive management of water resources in a practical, cost-effective, and environmentally sensitive manner. To this end, the District's Water Utility Enterprise master planning efforts, launched in the fall of 2005, will provide a tool for looking closer at in-county water distribution and infrastructure. This entails pulling together groundwater hydrologic modeling and transmission system hydraulic modeling to better understand the interactions of each of these supply sources. Future changes in infrastructure (District and retailer) will affect how a particular source of supply is used.

3.1.3 Summary of District Water Supply Facilities

The District's water supply system and infrastructure are the key components of the District's water supply baseline. The groundwater system in the county performs multiple functions: treatment, transmission, and storage. Water enters the groundwater basin through recharge areas generally located at or near the basins' perimeter, and is transmitted into the deeper confined aquifer of the central part of the valley. Eventually the groundwater reaches pumping zones, where it is extracted for municipal, industrial, and agricultural uses. The groundwater basin has generally sufficient storage capacity, enabling supplies to be carried over from wet years to dry years. The District's physical water treatment, storage, and distribution system is shown in Figure 3-3.

Camden Groundwater Recharge Ponds

The District operates and maintains 18 major recharge systems, which consist of both in-stream and off-stream facilities. Most of this local supply is recharged into the groundwater subbasins, either through natural stream channels, through canals, or through in-stream and off-stream ponds. Local runoff is captured in local reservoirs for recharge into the groundwater subbasins or treatment at one of the District's water treatment plants. The total storage capacity of these reservoirs is about 170,000 af. Table 3-1 lists their significant features.

The District operates and maintains several local pipelines to transport imported raw water and locally conserved water to various locations for treatment and distribution or for groundwater recharge. This conveyance system consists of the Central Pipeline, the Rinconada Force Main, the Almaden Valley Pipeline, the Calero Pipeline, the Cross Valley Pipeline, the Penitencia Force Main, the Santa Teresa Force Main, the Vasona Canal, Kirk Ditch, the Anderson Force Main, the Coyote/Madrone Pipeline, Madrone Channel, the Almaden-Calero Canal, the Main Avenue Pipeline, the Greystone Pipeline, and Page Ditch. Another facility, the Stevens Creek Pipeline, taps off the Rinconada Force Main and conveys raw water to recharge facilities on the county's west side. The District is also under agreement with the U.S. Bureau of Reclamation to operate and maintain the Santa Clara Conduit and the Pacheco Conduit (San Felipe Unit).

Recycled water is a local water source developed by the county's four wastewater treatment plants. The District works with the wastewater authorities in the county on partnerships to promote water recycling for non-potable uses such as irrigation and industrial uses through financial incentives and technical assistance. In south Santa Clara County, the District is the recycled water wholesaler and is responsible for the recycled water distribution system. The existing recycled water infrastructure is shown in Figure 3-4.

Imported water comes to the county from Northern California watersheds via the Sacramento-San Joaquin Delta. This water is delivered by the State Water Project (SWP) and the Central Valley Project (CVP). Imported water is conveyed to Santa Clara County through two main conveyance facilities: the South Bay Aqueduct, which carries SWP water from the South Bay Pumping Plant; and the Santa Clara Conduit and Pacheco Conduit, which bring CVP water from the San Luis Reservoir. The San Francisco Public Utilities Commission conveys its water into Santa Clara County and other counties through its own facilities.

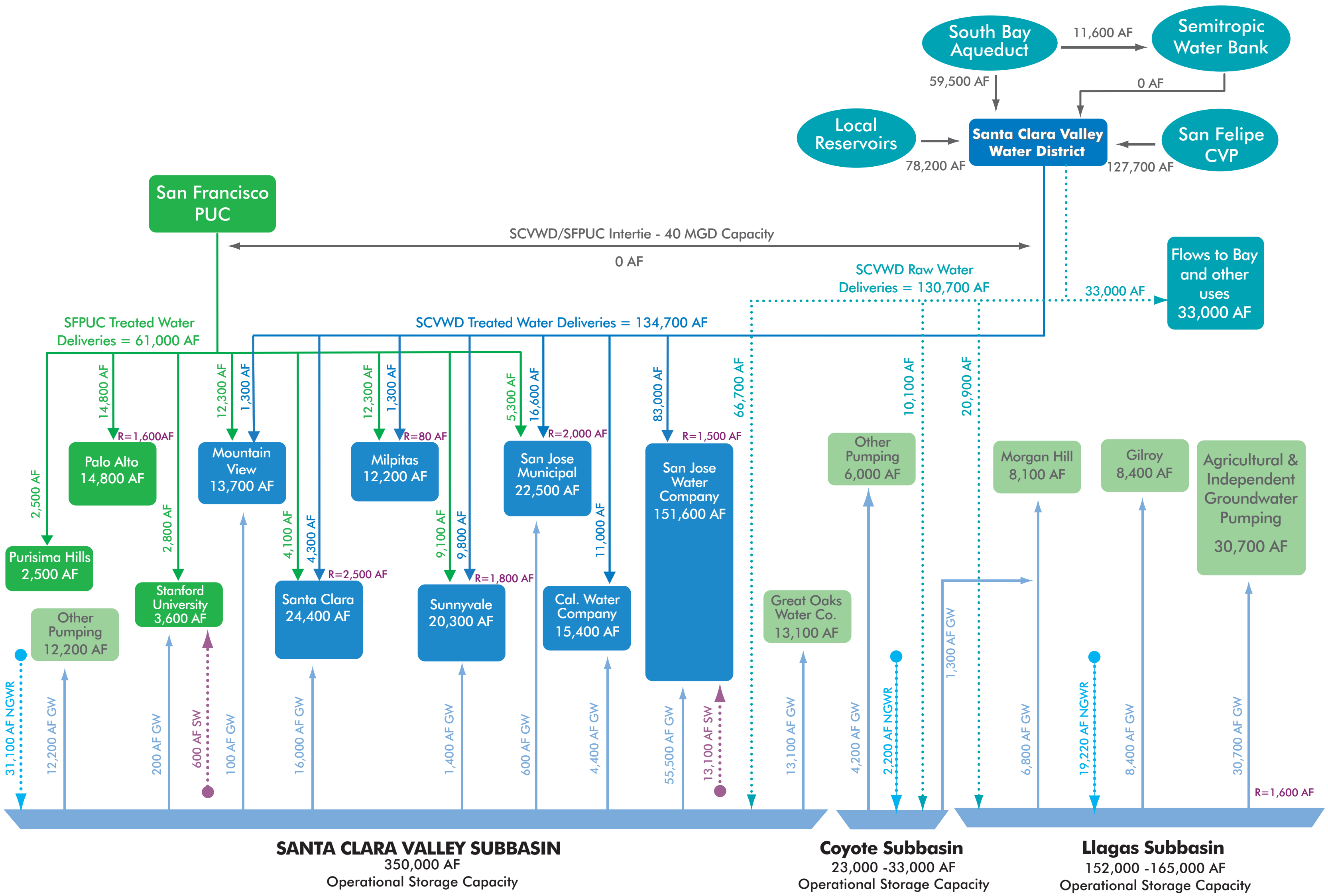
The Rinconada WTP was constructed in 1967 and can sustain a maximum flow rate of 75 mgd. Upgrades are in the planning stage to increase production at Rinconada to 100 mgd. The Penitencia WTP was constructed in 1974 and can sustain a maximum flow rate of 42 mgd. The Santa Teresa WTP was constructed in 1989 and can sustain a maximum flow rate of 100 mgd.

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

3.2 Groundwater

Local groundwater supplies up to half of the county's water supply during average years and nearly all of the water demand in south Santa Clara County. The District's active conjunctive water management program uses surface water in conjunction with groundwater to optimize the use and management of water supply sources. Surface water is treated for distribution (reducing direct demands on groundwater) and is also banked in local subbasins through managed recharge so that groundwater can be withdrawn when needed. Conjunctive use also helps protect local subbasins from overdraft, land subsidence, and saltwater intrusion and provides critical groundwater storage reserves for use during droughts or outages. Conjunctive use management is an important tool that allows the groundwater basin to be pumped more in drier years and then replenished (or recharged) during wet and average years. Groundwater is replenished both naturally from rainfall and augmented by District-operated recharge facilities and streams.

Figure 3-2 Santa Clara County Water Supply and Use Schematic



Note: All water quantities rounded to nearest 100 AF.
Inter-basin exchanges are not shown.
Unaccounted water losses average 6%.
Water use based on 2004 data.
Recycled water is 3% of total supply.

LEGEND:
- Raw Water Deliveries
- Groundwater (GW) Pumping
- SF PUC Treated Water Deliveries
- Natural Groundwater Recharge (NGWR 2004)
- SCVWD Treated Water Deliveries
- SW = Surface Water
- R= Recycled Water

Figure 3-3 District Water Supply Facilities Map

Figure 3-4 Recycled Water Network Currently in the County

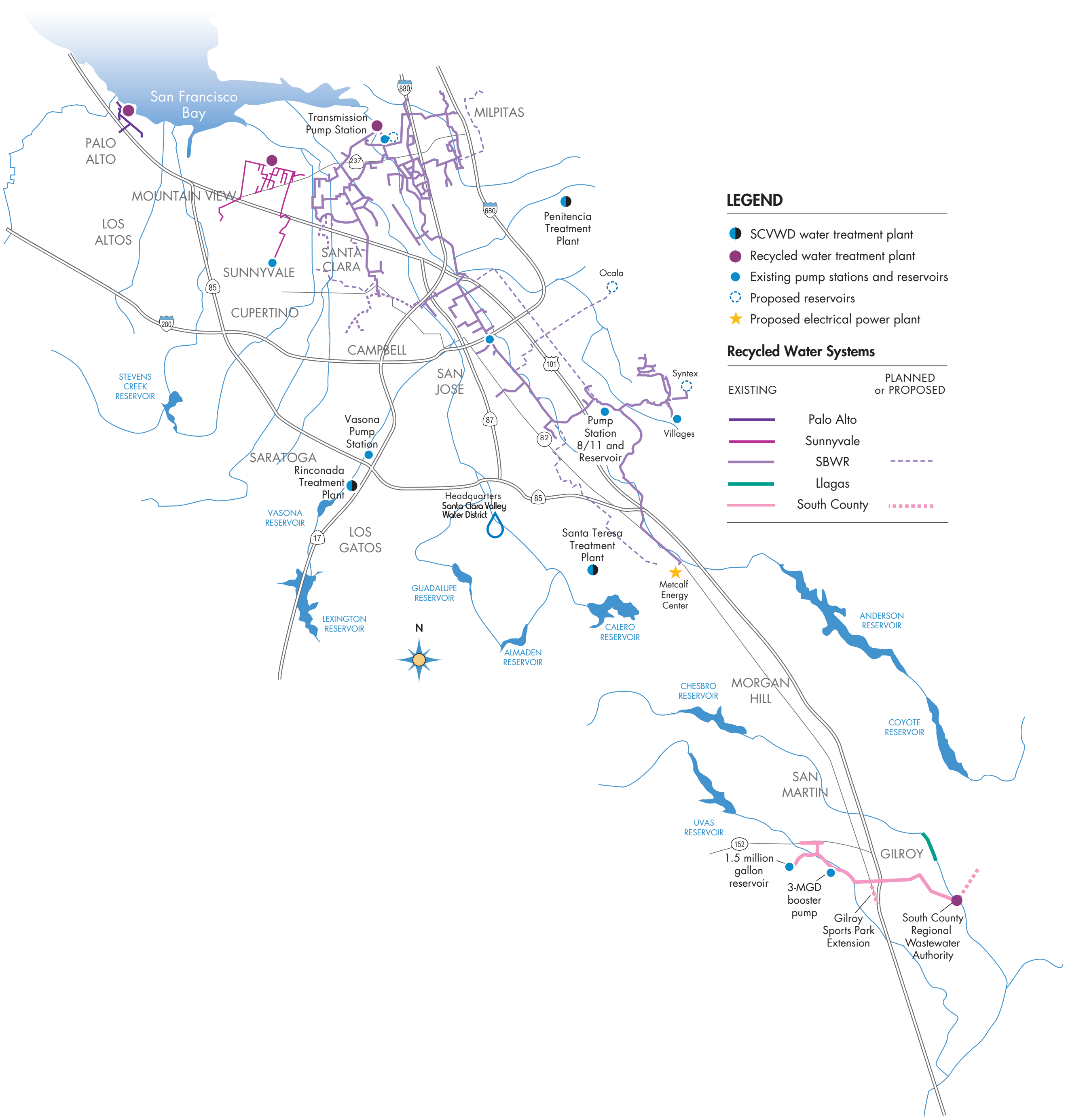


Table 3-1 District Reservoirs, Significant Features

Reservoir	Capacity1 (af)	Year Completed	Surface Area (acres)	Dam Height (feet)
Almaden	1,586	1935	59	105
Anderson	90,373	1950	1,244	240
Calero	9,934	1935	347	98
Chesbro	7,945	1955	265	95
Coyote	23,244	1936	638	120
Guadalupe	3,415	1935	79	129
Lexington	19,044	1952	404	195
Stevens Creek	3,138	1935	92	120
Uvas	9,835	1957	286	118
Vasona	400	1935	58	30
Totals	168,914 af		3,472 acres	

Note: (1) Capacity at Spillway – reservoir storage values based upon most recent surveys

3.2.1 Long-term Water Supply Strategies for Groundwater

The District has identified the following strategies as part of the IWRP process related to groundwater to ensure the long-term protection of this key component of the District's water supply.

Expand Groundwater Recharge Capacity

Implement the "No Regrets" Portfolio for near-term reliability. This includes 20,000 af/year of additional groundwater recharge capacity, consisting of approximately 13,000 af/year in South County and 7,000 af/year in North County.

Aggressively Protect and Sustain Groundwater Resources

The District relies on groundwater for a significant portion of its water supply. Continuation of the District's proactive groundwater management programs is critical to sustaining and protecting groundwater resources from land subsidence and contamination.

Expand Conjunctive Water Management

The local groundwater subbasins provide an emergency reserve for droughts or outages. Development of additional facilities must be undertaken to better utilize this resource during emergencies, particularly outages to the treated water system.

Safeguard existing supplies:

Sustain water supplies and infrastructure by maintaining and protecting the local groundwater subbasins.

3.2.2 General System Description

The District has been a leader in conjunctive use in California for decades, utilizing imported and local surface water to supplement groundwater and maintain reliability in dry years. The District augments natural recharge with a managed recharge program to offset groundwater pumping, sustain storage reserves, and minimize the risk of land subsidence.

The groundwater subbasins perform multiple functions including; transmission, treatment and storage. Eventually the groundwater reaches pumping zones, where it is extracted for municipal, industrial, and agricultural uses. The District works to keep the groundwater subbasins "full," banking water locally to protect against drought or emergency outages. Storing surplus water in the groundwater subbasins enables part of the county's supply to be carried over from wet years to dry years. In addition to providing water for municipal and industrial uses, the District also manages the groundwater basin to the benefit of agricultural users and other independent groundwater users, providing water directly to the agricultural community and others who have private wells.

Recharge Facilities

Groundwater subbasins are replenished naturally and through managed recharge areas. Since natural recharge alone is insufficient to balance pumping, the District operates and maintains 18 major recharge systems. The systems include over 70 off-stream ponds with a combined surface area of more than 320 acres, and over 30 local creeks. Runoff is captured in the District's reservoirs and released into both in-stream and off-stream recharge ponds for percolation into the groundwater subbasin. In addition, imported water is delivered by the raw water conveyance system to streams and ponds for the District managed groundwater recharge program. The total recharge capacity of these systems is approximately 138,000 af per year.

Groundwater Subbasins

Within Santa Clara County, the District manages three groundwater subbasins that transmit, filter, and store water: the Santa Clara Valley, Coyote Valley, and Llagas subbasins. These subbasins contain young alluvial fill formation and the older, underlying Santa Clara Formation. Both formations are similar in character and consist of gravel, sandy gravel, gravel and clay, sand, and silt and clay. The coarser materials are usually deposited along the elevated lateral edges of the subbasins, while the flat subbasin interiors are predominantly thick silt and clay sections inter-bedded with smaller beds of clean sand and gravel. A general discussion of each subbasin is provided below.

Santa Clara Valley Subbasin

The Santa Clara Valley Subbasin is located in a structural trough that is bounded by the Santa Cruz Mountains to the west and the Diablo Range to the east. The subbasin, which is approximately 22 miles long, narrows from a width of 15 miles near the county's northern boundary to about half a mile wide at the Coyote Narrows, where the two ranges nearly converge. The subbasin has a surface area of 225 square miles. The Santa Clara Valley Subbasin is approximately 15 square miles smaller than the Santa Clara Subbasin (Basin 2-9.02) as defined by the DWR in Bulletin 118, Update 2003. Although hydraulically connected, the District refers to the Coyote Subbasin separately (see description below).

The District estimates the long-term operational storage capacity of the Santa Clara Valley Subbasin to be 350,000 af. In any given year the amount of groundwater that can be withdrawn depends on current groundwater conditions and hydrology. However, to avoid re-initiation of land subsidence the District has determined that groundwater withdrawals in the Santa Clara Valley Subbasin should not exceed 200,000 af in any one year. The District defines operational storage capacity as the volume of groundwater that can be stored in a basin or subbasin as a result of District management measures. Operational storage capacity is generally less than total storage capacity as it accounts for the avoidance of land subsidence and high groundwater conditions, as well as available pumping capacity. Replenishment of groundwater withdrawn from operational storage depends on local hydrology and extra supply for additional recharge which could take many years.

Coyote Subbasin

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

Llagas Subbasin

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

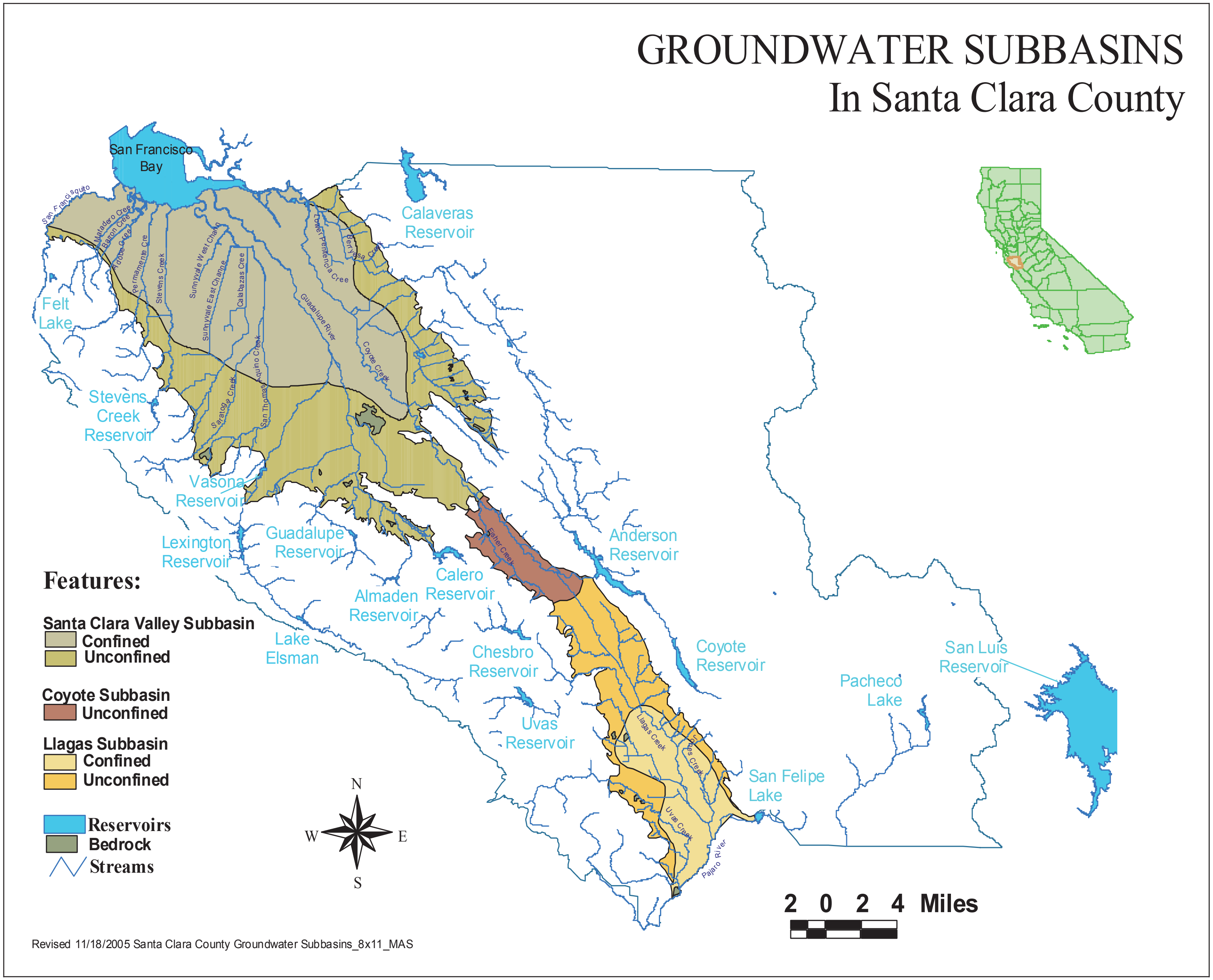


Figure 3-5 Groundwater Subbasins

Similar to the Santa Clara Valley subbasin, the Llagas subbasin is generally divided into three hydrostratigraphic units. The northern portion and elevated lateral edges of the subbasin constitute the recharge area, or forebay, which is mainly comprised of aquifer materials with discontinuous aquitards. As its name implies, this is the principal recharge area for the subbasin, and recharge sources include local surface and imported water recharged through District recharge facilities, percolation from rainfall and runoff, and irrigation return flows. Groundwater in the recharge area is unconfined. Upper and lower aquifer zones occur in the flat southern interior portion of the subbasin and continue southerly past the county line into the Hollister Basin. The District estimates the operational storage capacity of the Llagas subbasin to be between 150,000 and 165,000 af.

Natural Groundwater Recharge

Recharge to the groundwater basin consists of both natural groundwater recharge and managed recharge of local surface water and imported water. Natural groundwater recharge includes recharge from rainfall, net leakage from pipelines, seepage from the surrounding hills, seepage into and out of the groundwater basin, and net irrigation return flows to the basin. Estimates of the natural groundwater recharge (based upon the most recent groundwater basin modeling performed in 2005) for the three subbasins are shown in Table 3-2.

The natural recharge for the Santa Clara Valley subbasin is calculated using the District's three-dimensional groundwater flow model which is used to estimate the short- and long-term yield of the subbasin and to evaluate groundwater management alternatives. South County natural groundwater recharge is calculated using known pumping, recharge and change in storage from groundwater elevation maps. Because the period of record for groundwater pumping in the Llagas basin dates only from the late 1980s and a groundwater model is not yet fully functional, there is a lower level of confidence in the estimates of natural recharge and operational storage for the Llagas subbasin.

Table 3-2 Natural Groundwater Recharge (acre-feet/year)

	Santa Clara Subbasin	Coyote Subbasin	Llagas Subbasin	Total
Average	32,000	2,600	19,000	53,600
Wet	52,000	4,000	31,000	87,000
Single Dry	25,000	1,600	7,000	33,600
Multiple Dry Year	29,000	2,400	19,000	50,400

Managed Groundwater Recharge

Because natural recharge is not sufficient to replenish the amount of groundwater withdrawn annually, the District conducts an managed or managed recharge program. In addition to local water, these facilities also percolate imported water into the aquifer. The total recharge capacity of these systems is approximately 138,000 af.

Table 3-3 shows estimated managed recharge determined from by the District's water system model utilizing historic hydrology with 2005 demands and current system conditions.

Table 3-3 Managed Groundwater Total Recharge for all Subbasins (acre-feet/year)

Source	Normal Year	Single Dry Year	Multiple Dry Years
Total Managed Recharge: Local and Imported Sources	116,000	49,000	92,000

The Santa Clara Valley subbasin underlies the northerly portion of the Santa Clara County and includes the majority of the streams and recharge facilities operated by the District. In 2004, it is estimated that the District replenished this subbasin with approximately 66,700 af of locally conserved and imported water. The Coyote and Llagas subbasins in the southerly portion of the county were replenished with approximately 31,000 af of locally-conserved and imported water.

Groundwater Management Plan 2001

Protecting the local groundwater subbasins is critical to maintaining water supply reliability in the county, especially when random risks are considered. The subbasins supply nearly half of the water used annually in the county and also provide emergency reserve for droughts or outages.

The goal of the District's groundwater management programs is to ensure that local groundwater resources are sustained and protected. Groundwater management encompasses activities and programs that prevent contamination, identify and mitigate contamination threats to the groundwater basin, replenish and recharge groundwater supplies, prevent groundwater overdraft and land subsidence, and sustain storage reserves. District programs to sustain and protect groundwater resources, are described in detail in the District's Groundwater Management Plan of 2001 included as Appendix D of this document.

With regard to groundwater management, the District Act authorizes the District to:

- Provide comprehensive water management for all beneficial uses within Santa Clara County (Section 4)
- Protect, conserve, and manage waters from any sources within or outside the watershed for beneficial and useful purposes, including the percolation of waters into the soil within the District (Section 4)
- Store water in surface or underground reservoirs and to manage water for present and future use (Section 5)
- Prevent the diminution or contamination of surface or subsurface water (Section 5).
- Require the sealing of abandoned or unused wells (Section 5)

- Determine that an abandoned or unused well endangering public health and safety by creating a water contamination hazard is a public nuisance and take action to abate the nuisance (Section 6)
- Establish zones and to levy and collect a groundwater charge for the production of water from groundwater supplies (Section 26)
- Use groundwater charges to further District activities to protect and augment water supplies (Section 26)

Historic Groundwater Pumping

Table 3-4 below summarizes the total groundwater pumped from each of the three subbasins within the county for the years 1999 through 2004. The groundwater elevations in the principal aquifers, the source of the majority of the groundwater used in the county, is within the District's targets based on operational storage capacity. The District manages the groundwater resource in accordance with the District's Ends Policy E.2.1.3, "The water supply is reliable to meet future demands."

The District supplements the natural recharge that occurs through rainfall over the land surfaces and through stream flow. The District manages the subbasins by supplementing recharge through controlled releases of local water and imported water as well as with other programs that reduce the quantity of groundwater pumped by providing treated water deliveries, facilitating recycled water use, and promoting water conservation, as described elsewhere in this plan. The groundwater supply contributed to an overall water supply portfolio in the county that was sufficient to meet water retailer and other water users' needs over this period.

Table 3-4 Historical Groundwater Pumping (acre-feet)

Year	Subbasin			Total (acre-feet)
	Coyote	Llagas	SCV	
1999	8,387	45,198	106,805	160,390
2000	7,894	44,285	112,647	164,826
2001	6,892	47,052	115,358	169,302
2002	6,721	44,602	104,659	155,982
2003	6,796	41,616	96,485	144,897
2004	7,290	45,876	105,715	158,881

Wells

The District does not currently operate groundwater wells and is not able to directly substitute groundwater for surface water due to a lack of District-owned water supply wells and related infrastructure. However, the District is currently pursuing well fields that will tie directly to the treated water distribution system for increased operational flexibility and system reliability. A pilot facility, the San Tomas Well Field, is currently being developed in Campbell.

Existing water supply wells owned and operated by retailers will be able to provide emergency backup supply when sufficient groundwater is available. The District will continue to explore opportunities to re-operate the water supply system to improve the integration of surface water and groundwater resources. The District intends to work with local retailers to ensure that backup groundwater supplies are ready and available from retailers' wells when needed to supplement treated surface water supplies during a catastrophic event affecting the District's water supply system.

Water Quality Monitoring and Protection

Groundwater quality in Santa Clara County is very good. Cleanup is ongoing at a number of contamination sites and elevated nitrate concentrations have been observed in some areas. However, these problems are being managed. Public water supply wells throughout the county deliver high quality water to consumers, almost always without the need for treatment.

Groundwater quality monitoring wells are monitored for a variety of parameters depending on their location in the groundwater basin. Most wells are monitored for common groundwater constituents such as calcium, sodium, and iron. Other wells are monitored primarily for nitrate or chloride. Additional constituents, such as organic solvents or gasoline additives, are monitored in some areas also. The type and frequency of monitoring depends on the well location, historic and current land use, and the availability of groundwater data in the area.

The District is not the only organization that conducts groundwater quality monitoring in Santa Clara County. Public water suppliers monitor their wells regularly to ensure the water meets applicable water quality standards. In addition, responsible parties and property owners conduct groundwater monitoring at contamination sites to evaluate the extent and severity of contamination, and to monitor the effectiveness of their cleanup efforts. Potential threats to groundwater quality are discussed below in greater detail.

Nitrate

Nitrate in the environment comes from both natural and anthropogenic sources. Small amounts of nitrate in groundwater (less than 10 mg/L) are normal, but higher concentrations suggest an anthropogenic origin. Common anthropogenic sources of nitrate in groundwater are fertilizers, septic systems, and animal waste. The drinking water maximum contaminant level (MCL) for nitrate is 45 mg/L. Since the Santa Clara Valley has a long history of agricultural production and septic systems are still in use in the unincorporated areas of the county, monitoring for nitrate contamination is an essential groundwater management function in this valley.

The nitrate concentration range in the principal aquifer of the Santa Clara Valley subbasin is 13 to 16 mg/L, and nitrate concentrations in this subbasin appear to be stable. Nitrate concentrations are more of a concern in south Santa Clara County. The nitrate concentration range for the Coyote subbasin is 10 to 47 mg/L, with the wells with nitrate concentrations above the drinking water standard located in the southern half of the subbasin. The nitrate concentration range for the upper aquifer zone of the Llagas subbasin is 16 to 46 mg/L. The nitrate concentration range for the lower principal aquifer zone is 25 to 34 mg/L.

Drinking water standards in areas of high nitrate are met through blending or treatment by the well owner. In addition, the District has implemented a nitrate management program since 1992. The current program consists of nitrate monitoring and efforts to reduce exposure and nitrate loading. To reduce exposure to nitrate, the District offers a free nitrate analysis to all private water supply well owners.

The District conducts public outreach and education, works with other agencies, and provides direct technical assistance to growers through the Irrigation and Fertilizer Management Program. This program provides free testing of agricultural pumps and irrigation systems, irrigation scheduling consultation, and testing and consultation in plant nutrient status and fertilizer management for three years. The program's objectives are to increase water and nutrient use efficiencies and reduce nitrogen fertilizer loading to groundwater. These efforts, combined with the fact that most of the nitrogen loading is from historic operations, will likely result in reductions or stabilization of nitrate concentrations.

Arsenic

Arsenic is a naturally occurring element in some soils and is an agricultural contaminant. The U.S. EPA has lowered the MCL from 50 to 10 ug/L, with all community and nontransient-noncommunity (NTNC) water systems required to meet the new requirements beginning in January 2006. Although the California Department of Health Services (DHS) was to adopt a new MCL by June 2004, the state regulation is still under review and may not be finalized for another year or two. The state MCL cannot be less stringent than the federal MCL, and state law requires the state to set the MCL as close to the Public Health Goal (PHG) as is technically and economically feasible. The state's PHG for arsenic is 0.004 micrograms per liter (ug/L). Currently, no wells within the District's groundwater subbasins have arsenic greater than the U.S. EPA MCL. The impact of changing state regulations depends on the final MCL that is adopted. One alternative that is being evaluated is for a state MCL of 5 ug/L; three wells register arsenic concentrations above this level within the groundwater subbasins.

The majority of public water systems have multiple sources and the water delivered to the customers is usually a blend of these sources. The water supply sources can be operated in a way so as to not exceed MCLs and maintain long term reliability. Private well owners are encouraged to have the water in their wells tested frequently to be aware of the quality of their drinking water.

Perchlorate

Perchlorate is an oxidizing salt used in solid rocket motors, safety flares, explosives, and fireworks. A former highway safety production plant operated for 40 years by Olin Corporation in Morgan Hill, South Santa Clara County, caused a ten-mile long plume of perchlorate in groundwater. Perchlorate has been found above California's perchlorate Public Health Goal (PHG) and notification level of 6 parts per billion in nearly 250 private and public wells, including several municipal wells in Morgan Hill and several mutual water company wells. More than 500 private wells are contaminated with perchlorate at levels below the Public Health Goal. The California Regional Water Quality Control Board, Central Coast Region, has issued a Cleanup and Abatement Order to Olin, and has ordered Olin to provide an alternate water supply to those with wells showing perchlorate at or above the PHG. Another perchlorate site in Santa Clara County is at a major rocket motor production facility outside the groundwater subbasins but upstream of the District's Anderson Reservoir. That site is also under a Cleanup and Abatement Order and the cleanup is being managed on-site; no perchlorate has been detected in Anderson Reservoir.

Testing a South County well for perchlorate

The District is continuing to work with the Regional Water Quality Control Boards to ensure that perchlorate does not impact the current or future water supply in Santa Clara County. In addition, the District has partnered with the cities of Morgan Hill and Gilroy and the County of Santa Clara to form the Perchlorate Working Group. The goal of the Perchlorate Working Group is prompt, comprehensive corrective action for the Olin case that protects the community and beneficial uses of water. To this end, the Perchlorate Working Group developed a conceptual corrective action plan that provided a framework for the Regional Water Quality Control Board's Cleanup and Abatement Order. The PWG is continuing to monitor and provide input to the Regional Board on the Olin case.

Emerging Contaminants

Emerging contaminants that threaten groundwater include 1,4-dioxane, a solvent stabilizer; 1,2,3-trichloropropane, a fumigant and solvent; nitrosodimethylamine, an ingredient of liquid rocket fuel and a disinfection by-product; trichloroethylene, whose preliminary remediation goal for cleanup sites was lowered 70-fold in light of new toxicological studies; perchloroethylene, a dry cleaning and electronics solvent whose Public Health Goal was lowered to 0.06 ppb in 2001; and several others. A group of chemicals found in personal care products and pharmaceutical residues in recycled wastewater are attracting growing attention as potential endocrine disruptors for aquatic organisms, but do not appear likely to pose a significant drinking water quality issue.

Over 600 solvent contamination sites and approximately 2,500 fuel leak sites have released contaminants to soil and/or groundwater. Most of these sites have affected the shallow aquifer above the aquitard zone and have been managed so that the contaminants have not migrated to the principal water supply aquifers. While a threat to the county's water supply still exists, it has been reduced through better material and waste management practices including reducing the number and size of releases to the environment, aggressive clean-up of past releases by the responsible parties, and active oversight of site clean-up activities by local, state, and federal regulatory agencies. Although these sites may pose a threat to individual water supply wells, the number and distribution of water supply wells located throughout the county and the variety of sources in the water supply portfolio limit the overall impacts to the county's water supply reliability.

3.2.3 Projects and Programs

The following table summarizes District projects and programs to sustain and protect groundwater supplies.

Table 3-5 District Projects and Programs

Project/Program	Brief Description
Conjunctive Water Management	To optimize the use of groundwater and surface water resources, the District implements an active conjunctive use program as a key element of its overall water management strategy. Surface water is treated for distribution (reducing direct demands on groundwater) and is also banked in local subbasins through managed recharge. Conjunctive use helps to protect against groundwater overdraft and land subsidence, prevent saltwater intrusion, and enhance natural recharge. The District is currently investigating potential recharge sites to increase groundwater recharge capacity. The potential for using advanced treated recycled water for groundwater recharge is also being considered.
Groundwater Resources Planning and Development	As groundwater is a critical local resource for Santa Clara County, the District is involved in groundwater resources planning and development to ensure long-term sustainability of the resource. Related planning efforts include the Integrated Water Resources Plan and the Groundwater Management Plan. The District also reviews land use planning documents as appropriate to ensure groundwater resources are protected. A pilot District-owned well field capable of tying directly into the treated water distribution system is currently being developed. The District is investigating the feasibility of additional well fields to improve overall water supply reliability and increase operational flexibility.
Groundwater Resources Protection	Groundwater protection programs include a comprehensive nitrate management program and well construction and destruction programs. The District provides peer review to regulatory agencies on solvents, toxics, perchlorate, and other contamination cases that threaten groundwater quality. The District also monitors legislation, regulations, and projects related to groundwater, including water recycling and storm water management. Groundwater resources protection also involves community outreach efforts including workshops and educational outreach materials. Through the In-field Nutrient Assessment Assistance Program, the District provides free technical assistance to local farmers and promotes more efficient water and fertilizer use.

Groundwater Monitoring	Groundwater monitoring data is essential to understanding current groundwater conditions and discovering adverse trends before they become intractable. The District actively monitors groundwater elevations, groundwater quality, and land subsidence. Monitoring results are summarized in an annual groundwater conditions report. The District works to continuously improve the groundwater monitoring network through the construction of new depth-specific monitoring wells, by acquiring wells no longer used by other entities as appropriate, and by securing monitoring access to additional wells.
Groundwater Analysis and Modeling	The District uses groundwater models as a management tool to support conjunctive use programs and water supply planning efforts. Special studies and analyses also help the District to continually improve our understanding of local groundwater resources.

3.3 Local Surface Water

Water stored in District reservoirs provides up to 25 percent of Santa Clara County's water supply. Reservoir operations are coordinated with imported Bay-Delta water received from the State Water Project and the federal Central Valley Project. Reservoir water can be treated at drinking water treatment plants or recharged into the local groundwater subbasins.

The management of stored water is adjusted as seasonal conditions change. Most stored water is released in the spring after the rainfall season and allowed to percolate into the underground aquifers, or it is sent to District treatment plants. Reservoirs typically fall to their lowest levels in the late fall, but rarely are empty. To protect fish habitat, minimum water levels have been established.

During the winter, in addition to overflow from the reservoirs when their capacity is exceeded, some water is released for groundwater recharge. When reservoirs fill early in the winter season, water may be released to provide more storage capacity for later-season storm runoff and to improve stream habitat. During a dry winter, releases are usually reduced to conserve the amount of stored water and to ensure habitat protection throughout the year. Guidelines for winter operations, which balance water conservation and the need to keep space available for runoff as winter progresses, are called "rule curves." The District has been a leader in conjunctive use in California for decades, and the use of local surface water to supplement groundwater and maintain reliability in dry years is a critical component of our overall water management strategy.

3.3.1 Long-term Water Supply Strategies for Local Surface Water

The District has identified the following strategies as part of the IWRP process related to local surface water to ensure the long-term protection of this key component of the District's water supply.

Water storage

Local groundwater storage, surface storage, or water banking programs such as the Semitropic Water Bank allow surplus water in wet years to be carried over to years when it is needed.

Local supply development decreases vulnerability to risk
Local water supplies minimize dry-year dependence on the Sacramento-San Joaquin Delta, which is susceptible to the impacts of global warming, earthquake and levee failure, more stringent water quality standards, and limits on Delta pumping.

Safeguard existing supplies
Sustain local water supplies and infrastructure by maintaining local water rights and protecting streams, fisheries, and natural habitat through a science-based watershed approach to new environmental issues.

Continue to provide clean, safe drinking water
Water quality standards should be met through aggressive source water protection, ongoing improvements to treatment facilities, and re-operations for blending.

3.3.2 General System Description

Uvas Reservoir

The District has numerous water rights to divert and store water from local creeks and streams. Most of this local supply is recharged into the groundwater subbasins, either through natural stream channels, through canals, or through in-stream and off-stream ponds. The total recharge capacity of these creek and pond facilities is 138,000 af per year.

The District works to keep the groundwater subbasins "full," banking water locally to protect against drought or emergency outages. This strategy allows the District to store surplus water in the groundwater subbasins and enables part of the county's supply to be carried over from wet years to dry years. The District's Operation Plan provides projections of how District-managed water (locally conserved and imported water) will be distributed to efficiently use recharge facilities and provide treated water to meet demands.

Local Reservoirs
The District operates ten reservoirs that conserve water for later recharge into the groundwater subbasins or treatment at one of the District's three water treatment plants. The total storage capacity of these reservoirs is approximately 170,000 af. Figure 3-5 lists reservoir capacities and other significant features.

Reservoir Operations
The District's local reservoirs were built as water supply facilities, however reservoir operating rules have been established at all District reservoirs to reduce flood probability

to the extent that the impact on their water supply function will be minimal. These strategies recognize that if the reservoir storage approaches full early enough in the rainfall season; some stored water will be released to create increased flood protection without significantly reducing the probability of filling the reservoir by the end of the season.

Operating reservoirs with rule curves to provide flood protection and to minimize limiting factors for salmonid habitat requires a significant facility management effort. Storage levels and release rates must be continuously monitored and evaluated to ensure compliance with the operational strategies and to avoid aggravating or compounding downstream problems. The program was developed to use National Weather Service Quantitative Precipitation Forecasts to predict flow rates in the uncontrolled watershed downstream of the reservoirs. Reservoir releases are discontinued when predicted flow rates exceed a safe level.

Non-District Local Supplies

Other agencies in the county also develop water locally. The San José Water Company (SJWC) and Stanford University both hold surface water rights. Stanford's local water development is small. SJWC, however, has developed an average yield of 9,500 af from diversions and storage in the Upper Los Gatos Creek watershed and a run-of-the-river treatment facility on Saratoga Creek. These projects are considered part of the local surface water supply available to the county.

3.3.3 Projects and Programs

The following table summarizes the projects and programs performed by the District related to local surface water and groundwater recharge.

Table 3-6 Local Surface Water and Recharge Projects and Programs

Project / Program	Brief Description
Hydrologic Data Management	The District supports numerous data collection and analysis efforts covering rainfall, stream flows, reservoir storage, water use, groundwater levels, and other information that is essential to planning and operating the District's water distribution and delivery system.
Water Supply Operations Planning	This program includes analyzing water supply conditions, developing water supply operations strategies, and coordinating schedules for imported and local water utilization in treatment plants and in recharge facilities.
Local Water Supply Operations	This program includes monitoring, reporting, and managing reservoir inflow, yield, capacity, and other data. Development and maintenance of operations models and operations analysis software are also included.
Water Rights	Activities performed in this project include determining annual appropriations of local water, monitoring and reporting water rights appropriations, and compliance with terms and conditions of water rights licenses to the State Water Resource Control Board.

Recharge and Raw Water Field Facility Operations	This program provides for operating groundwater recharge and other raw water facilities to process local and imported water supplies at a rate of up to 150 mgd for recharge of the three major groundwater subbasins. Activities include daily monitoring and regulation of flows and inspection of facilities, operation of diversion facilities and capacity restoration at percolation ponds (pond cleaning).
Recharge and Raw Water Field Facility Maintenance and Asset Management	This comprehensive program includes development and management of asset inventory, condition standards, best management practices, good neighbor practices, maintenance manuals, record drawing management system, preventive and corrective maintenance programs, work order management processes and work tracking systems, facility histories, long term cost projection methods for replacement and restoration of facilities, regulatory reporting and compliance plans, and performance metrics.
Hydrologic Data Collection and Management	The program includes collecting and analyzing hydrologic data (precipitation, stream flow, reservoir, evaporation, and general weather related data), and operation and maintenance of 43 rainfall stations, 70 stream flow and stream stage stations, and 11 reservoir stations. This program also manages the ALERT program which provides for real time data from most stations to be displayed on the District's internet site.
Water Supply Accounting	This program prepares a reconciliation of all the water supply distribution and flow data, and collects data from the hydrologic data management program, the raw water distribution system, recharge and raw water field facility operations, treated water operations, imported water operations and untreated surface water management.

3.4 Water Recycling and Desalination

3.4.1 Long-term Water Supply Strategies for Water Recycling and Desalination

The District has identified the following strategies as part of the IWRP process related to water recycling and desalination to ensure the long-term protection of this component of the District's water supply.

A mix of investments in all-weather supplies, storage, and dry-year response best meets long-term planning objectives

Although supply reliability can be achieved in many different ways, the IWRP Study 2003 analysis showed that new investments in a combination of the following three elements will meet the District's multiple water supply planning objectives in an efficient and flexible manner. Conservation, recycling, and desalination are available in every year, regardless of weather.

Local supply development decreases vulnerability to risk

Local water supplies minimize dry-year dependence on the Sacramento-San Joaquin Delta, which is susceptible to the impacts of global warming, earthquake and levee failure in the region, more stringent water quality standards, and limits on Delta pumping.

Meet water recycling targets

The District is committed to meet the District Board's recycled water targets of 5 percent of total water use by 2010 and 10 percent of total water use by 2020. Current projections from recycled water producers are 31,200 af per year of recycled water by the year 2030. The District is considering options for additional recycling to meet targets including advanced recycled water treatment and use of that water for groundwater recharge and stream flow augmentation to further expand water recycling within Santa Clara County.

3.4.2 General System Description

Recycled water is a local water source developed by the county's four wastewater treatment plants. The District works with the wastewater authorities in the county through partnerships to promote water recycling for non-potable uses such as irrigation and industrial uses through financial incentives and technical assistance. In FY 04/05 approximately 11,000 af of non-potable recycled water was used in the county thereby conserving potable supplies. Water recycling involves the collection of wastewater discharged within the county, treating and purifying the water to the standards set forth by the California Department of Health Services (DHS), and using the recycled water for non-potable uses in lieu of potable supplies. All recycled water used in Santa Clara County is tertiary treated recycled water, which means it has undergone three stages of treatment; i.e., the primary, secondary and tertiary stages. The second stage of treatment is sufficient for landscape irrigation according to DHS. In Santa Clara County recycled water providers go above that standard, and provide a higher quality of recycled water. The following section describes the wastewater treatment plants in the county used to produce recycled water.

The four wastewater treatment plants located within the county are the San José/Santa Clara Water Pollution Control Plant (SJ/SC WPCP), South County Regional Wastewater Authority (SCRWA), Sunnyvale Water Pollution Control Plant (SWPCP) and the Palo Alto Regional Water Quality Control Plant (RWQCP). Table 3-7 shows existing and projected wastewater flows and volume that meets recycled water standards.

Table 3-7 Wastewater Treatment

Wastewater Facility	2000	2005	2010	2015	2020	2025	2030
SJ/SC WPCP	131	120	122	127	134	140	147
SCRWA	6	6.5	9	10	12	14	16
SWPCP	15	12	15	15	15	15	15
PARWQCP	27	24	28	29	30	30	30

The San José/Santa Clara Water Pollution Control Plant (SJ/SC WPCP)

The SJ/SC WPCP is a jointly-owned regional wastewater treatment plant with a design flow capacity of 167 mgd and treats the wastewater of over 1.5 million people that live and work in the 300-square mile area encompassing San José, Santa Clara, Milpitas, Campbell, Cupertino, Los Gatos, Saratoga, and Monte Sereno. The plant is located in Alviso, at the southernmost tip of the San Francisco Bay. Constructed in 1956, the plant had the capacity to treat 3.6 million gallons per day and only provided primary treatment. In 1964, the plant added a secondary treatment process to its system. In 1979, the plant upgraded its wastewater treatment process to a tertiary system. In 1984, the capacity was expanded to 167 mgd. Most of the final treated water from SJ/SC WPCP is discharged as fresh water through Artesian Slough and into South San Francisco Bay. About 10 percent is recycled for landscaping, agricultural irrigation, and industrial needs around the South Bay.

As shown in Table 3-8, the South Bay Water Recycling (SBWR) program produces the majority of the recycled water delivered within Santa Clara County. In FY 04-05, SBWR produced 57 percent of the total recycled water used in the county.

SBWR was created to reduce the environmental impact of freshwater effluent discharged into the salt marshes of the south end of San Francisco Bay, and to help protect two endangered species: the California clapper rail and the salt marsh harvest mouse. The WPCP is under a San Francisco Bay Regional Water Quality Control Board regulatory mandate to limit average dry weather effluent flows to the bay to 120 mgd in order to prevent salt water marsh conversion, and limit the mass of copper and nickel discharged to the Bay. Between 13 and 18 million gallons of recycled water are produced and distributed to over 500 customers per day in the cities of Milpitas, Santa Clara and San José.

The District has been working with the City of San José on recycled water programs since 1994 providing financial and technical support for system expansion, participating as a partner on the Silver Creek pipeline, and acting as a liaison with water retail agencies. In January 2002, the San José City Council and District Board of Directors agreed to develop an institutional framework for the long-term ownership, operation, maintenance, and future expansion of South Bay Water Recycling that most effectively meets the needs of the community. This collaborative effort helps to define the relationship between the District and SBWR, and helps balance the water recycling efforts between water supply and wastewater discharge needs of the South Bay community. Key findings of the collaborative include: (1) identifying that the District is best suited to lead the expansion of recycled water in the county to meet Board End's policies and to maximize efficient use of the resource, and (2) some advanced treatment of the recycled water is necessary to ensure existing recycled water markets are maintained and to expand them.

Sunnyvale Water Pollution Control Plant (SWPCP)

The city of Sunnyvale's wastewater management program emphasizes three areas: (1) industrial pretreatment to lower the pollutant load prior to entering the municipal system, (2) using recycled wastewater for industrial and landscape needs to help to alleviate the fresh water shortages in this area and send less fresh water into the predominantly saltwater bay, and (3) improving the quality of the effluent.

Tertiary treatment was added to SWPCP in 1978 and the total capacity was increased to 22.5 million gallons of treated wastewater each day. The final upgrade to increase the plant to its present capacity of 29.5 mgd was completed in 1984, for the treatment of wastewater from the city of Sunnyvale. Treated wastewater effluent from the plant is discharged through an outfall into Moffett Channel, a tributary to Guadalupe Slough and South San Francisco Bay. From 1999-2001, the average dry weather effluent flow was approximately 12.7 mgd.

SWPCP Water Recycling

In 1992, Sunnyvale initiated design of facilities for the production and distribution of recycled water used mainly for irrigation purposes. In 1997, the District entered into a Joint Participation Agreement with the City of Sunnyvale for the development and utilization of non-potable recycled water. During the highest-use months of 2001, the program delivered an average of 820,000 gallons per day to over 70 sites.

The City of Sunnyvale has significantly increased the recycled water delivery from 317 af in 2000 to 1,786 af in 2004. This has included the recently connected customer, Twin Creeks, a large sports complex. In addition, the City has experienced a meaningful decrease in potable water consumption, primarily due to a combination of water recycling, water conservation and economic downturn. Reimbursement by the District helped the City to offset the deficit between revenues and expenses and enabled the City to invest in additional capital improvements to increase system reliability and expand system capacity. The Sunnyvale WPCP is planning to expand its water recycling systems in order to meet state and federal discharge requirements.

Table 3-8 Countywide Total Recycled Water Use (af/yr)

Fiscal Year	South Bay Water Recycling Program	Sunnyvale Water Pollution Control Plant	South County Regional Wastewater Authority	Palo Alto Regional Water Quality Control Plant	Total	Percent of Total Water Supply
98-99	2,357	-	-	-	2,357	0.4%
99-00	5,002	439	898	63	6,400	0.6%
00-01	5,409	944	708	63	7,124	1.6%
01-02	6,037	1,210	487	66	7,800	1.7%
02-03	6,177	1,602	536	53	8,368	2.1%
03-04	7,246	1,816	619	200	9,881	2.6%
04-05	6,320	1,786	1,616	1,600	11,322	3.0%

The District and City of Sunnyvale have had preliminary discussions on developing a long-term comprehensive operating strategy and on near-future recycled water expansion opportunities. The near-term expansion could include improvements to the reliability of the system, and provide improved hydraulic stability by "looping" the system for greater versatility. Other possible future expansion could include serving recycled water to Moffett Field Golf Course and a proposed new development on the NASA Ames facility. Serving these new customers may require a collaborative effort between the District, the City of Sunnyvale, the City of Mountain View, the City of Palo Alto, and San Francisco Public Utilities Commission.

South County Regional Wastewater Authority (SCRWA)

SCRWA provides wastewater treatment for the cities of Gilroy and Morgan Hill. In 1994, a new 7.5 mgd secondary wastewater treatment facility was constructed with 3 mgd of the secondary effluent undergoing tertiary treatment. The wastewater treatment plant is located approximately two miles southeast of Gilroy. The current average dry weather flow (ADWF) is approximately 6.5 mgd. In July 2003, average diurnal flow range at the WWTP ranged from a low of approximately 2.8 mgd to a peak of 8 mgd with average daily flow during this period of 6 mgd. SCRWA plans to expand the recycled water tertiary treatment system capacity to 9 mgd by the end of 2005. SCRWA intends to continue expanding tertiary treatment facilities as demand for recycled water increases.

SCRWA Water Recycling

In 1977, the Santa Clara Valley Water District, the City of Gilroy, and the Gavilan Water Conservation District (which was merged with the District in 1989) began a partnership to construct and operate an advanced primary recycled water system extending from the SCRWA treatment plant to several customers along Hecker Pass Road. The system operated sporadically for about 20 years. In 1999, recycled water partnership agreements were signed designating SCRWA as the producer, the District as the wholesaler, and the cities of Gilroy and Morgan Hill as the retailers of recycled water. Currently, recycled water is only delivered in the Gilroy service area.

The agreements included an upgrade of the 25-year-old system to provide recycled water to golf courses, parks and farmland along the eight-mile pipeline. In summer 2002, the District started the operation of the booster pump station at Christmas Hill Ranch Park and the 1.5 million gallon concrete reservoir above Eagle Ridge Golf Club. In spring 2003, the District also completed the rehabilitation of the 25-year-old pipelines. In FY 04/05 the system delivered 616 af of recycled water to irrigators.

The District and SCRWA have prepared a South County Recycled Water Master Plan, which identifies short- and long-term capital improvement projects for recycled water expansion. In 2005, the District and SCRWA are jointly implementing the first phase of the Master Plan recommended project to expand the tertiary treatment capacity from 3 to 9 mgd. In addition, the expansion project will construct foundational facilities to facilitate the next two phases of expansion. The expansion is expected to increase recycled water delivery by an additional 800 af per year. Both agencies also jointly applied and were preliminarily awarded an implementation grant from the state of California for $2.2 million.

Palo Alto Regional Water Quality Control Plant (RWQCP)

In 1968, the cities of Mountain View and Los Altos became partners with the City of Palo Alto to construct a regional secondary treatment plant establishing Palo Alto as the operator of the plant, and requiring Palo Alto, Los Altos and Mountain View and their sub-partnering sewer agencies, East Palo Alto Sanitary District, Stanford University, and Los Altos Hills to share in the proportionate costs of upkeep. Since 1972, the plant has provided complete secondary treatment of wastewater and complete incineration of the sewage sludge. The treated water is discharged to an unnamed slough near the Palo Alto Airport and to the San Francisco Bay. In 1978 the RWQCP was upgraded to a tertiary wastewater treatment facility. In 1987, a capacity expansion project was completed to assure that the treatment plant effluent standards could be met during periods of heavy rainfall. The plant has a wastewater treatment and disposal capacity of 38 mgd.

Palo Alto RWQCP Water Recycling

In 1975, the Santa Clara Valley Water District constructed a reclamation facility and operated it for a time before selling it to the RWQCP. Currently, the District is pursuing greater involvement with Palo Alto RWQCP, participating in planning meetings to help develop a long-term master plan for the future of recycled water in its service area. Once this plan is developed, the District will define its role in supporting Palo Alto RWQCP's recycling goals, which include a possible system expansion and grant applications for feasibility studies to confirm potential uses, quantities, public acceptance and costs. The District is also working with the RWQCP and the City of Mountain View to expand recycled water use.

In FY 04/05, Palo Alto RWQCP delivered approximately 1600 af/year of recycled water that offset potable water used in the cities of Palo Alto and Mountain View. Water produced by the plant is also helps support wetland habitat and is used within the RWQCP—uses which do not replace potable water. Based on the future alternatives for recycled water use recommended in their master plan, up to 3,400 af/year of recycled water could be reasonably developed within the plant's service area by 2020. This recycled water does not directly displace District supplies since the entire service area is supplied from the SFPUC system.

Encouraging Increased Use through Financial Incentive, Technical Assistance, and the Establishment of Targets

The District is committed to increasing recycled water use in the county. In 1997, the Board passed Resolution No. 97-60, which updated previous resolutions in support of the expanded use of recycled water and increased the District's financial incentive for the use of recycled water from $93 per af to $115 per af. This financial assistance applies to recycled water used to supplement the county's water supply and replace supplies met by the District. This financial assistance may be renewed by mutual consent of the District and recycled water purveyors up to a maximum total term of 25 years.

The commitment to recycled water is also reflected in the adopted Board of Directors governance policies. District governance policies call for the expansion of water recycling in Santa Clara County, while at the same time ensuring that groundwater subbasins are protected from threat of contamination. The Board first adopted the following water recycling Ends Policies in December 1999 and they are as follows:

2.1.6. Water recycling is expanded within Santa Clara County in partnership with the community, reflecting its comparative cost assessments and other Board policies.

2.1.6.1 Target 2010, water recycling accounts for five percent of total water use in Santa Clara County.

2.1.6.2 Target 2020, water recycling accounts for ten percent of total water use in Santa Clara County.

To meet these targets, the District is working to identify new markets and uses for recycled water. This includes potential advanced treatment of recycled water and possible use for groundwater recharge and stream flow augmentation. The District is conducting research to evaluate the effects that existing and planned recycled water projects may have on long-term groundwater quality. The District's primary approach to recycled water expansion is to develop partnerships with the cities and publicly-owned agencies that produce and/or distribute recycled water.

On January 22, 2002, the San José City Council and the District Board of Directors held a joint meeting and approved the "Agreement between the City of San José and the District relating to Management and Operation of the South Bay Water Recycling (SBWR) system, including the Silver Creek Pipeline." This agreement has been commonly referred to as the "Silver Creek Pipeline Agreement." The agreement requires the parties to jointly lead a multi-party collaborative effort with the guiding principle of developing a framework for ownership, operation, maintenance and future expansion of SBWR that most effectively meets the needs of the community in terms of water supply and wastewater discharge.

The agreement required the City and the District to jointly construct a 15 mgd ten-mile pipeline that delivers recycled water to the Metcalf Energy Center (MEC), a new Calpine power plant built in the north end of Coyote Valley, with 5 mgd excess capacity paid for by the District. The power plant is now in operation and is expected to use up to 4,000 af of recycled water per year. The District may use the 5 mgd excess capacity for wholesale recycled water use south of the pipeline, including Coyote Valley.

3.4.3 Recycled Water Projections

Table 3-9 shows projected recycled water use to 2030 by recycling facility. In 2004, approximately 11,000 af per year of recycled water was used throughout the county for landscape irrigation, commercial and industrial use. This exceeds the recycled water use projection for 2005 of approximately 10,000 af per year that was included in the District's 2000 UWMP. Recycled water producers indicate up to 31,200 af of potential use by 2030.

Recycled water can be used in a variety of ways. Typical industrial uses include cooling tower makeup water, boiler feed water, paper manufacturing, and process water. Industrial users are high-demand, continuous-flow customers that operate without extreme seasonal and diurnal flow variations. The irrigation of agricultural crops, golf courses, parks, schoolyards, and cemeteries is a key component of recycled water use. Using recycled water for irrigation reduces the need for imported water during the critical summer months and in drought situations when water supplies are most scarce. While recycled water is currently used for large landscape irrigation, agriculture, and some industrial processes, it may also have uses for environmental purposes, such as stream flow augmentation, and supporting wetlands. Future potential large scale recycled water uses exist for new development including the City of San José's Vision North San José project and for the Coyote Valley Specific Plan development. Recycled water used in sensitive groundwater protection areas like the Coyote subbasin and for groundwater recharge will require advanced treatment to ensure no significant long-term groundwater impacts.

Recycled water for agricultural use

Recycled Water Use Projections and District Targets

As described in other sections of this document, the District draws on a variety of sources—groundwater, surface water, and recycled water—to meet water needs. Because treatment processes and water quality requirements differ for each supply source, a multi-pronged approach is needed that addresses source water quality, treatment processes, re-operations, and matches water quality to type of use.

The District target for recycled water use as established in Board Policy is to reach 5 percent of total water use or 19,100 af by 2010 and 10 percent or 40,500 af by 2020 (based on the updated demand projections included in this plan). Projected recycled water deliveries were provided by the recycled water producers and retailers for each recycling facility. These projections are summarized in Table 3-9 together with the District targets for recycled water use in 2010 and 2020. The difference shown between recycled water projection and the District target in 2010 and 2020 will potentially be achieved by additional investments in recycled water projects including advanced treatment of recycled water, groundwater recharge and stream flow augmentation.

Table 3-9 Recycled Water Projections by Facility to 2030 (af)

Projections for Recycling Facilities	2010	2015	2020	2025	2030
SJ/SCWPCP					
City of Santa Clara[1]	3,700	4,000	4,300	4,500	4,500
San José Municipal Water[2]	3,500	5,900	8,400	10,800	13,200
San José Water Company[3]	1,700	2,000	2,300	2,600	3,000
City of Milpitas[4]	1,200	1,400	1,600	1,800	2,000
SJ/SCWPCP subtotal	10,100	13,300	16,600	19,700	22,700
SCRWA	2,500	3,200	3,200	3,200	3,200
SWPCP	1,700	1,800	1,800	1,900	1,900
PARWQCP	2,500	2,800	3,400	3,400	3,400
Total:	16,800	21,100	25,000	28,200	31,200
SCVWD Target*	19,100	29,700	40,500		
Difference (Projections — SCVWD Target)	-2,300	-8,600	-15,500		

Notes: Current use is for fiscal year 04/05.
1. City of Santa Clara 30-year projection is based on the draft 2005 City of Santa Clara UWMP.
2. San José Municipal Water System 30-year projection is based on the draft 2005 UWMP.
3. San José Water Company 30-year projection is based on the draft 2005 UWMP.
4. City of Milpitas 30-year projection is based on the draft 2005 City of Milpitas UWMP.
* SCVWD Target of 5% 2010; and 10% for 2020. 2015 shown at 7.5%.

As with any projections there are issues and risks associated with the increased use of recycled water that could impact the projections presented above. Recycled water projects and their implementation schedules depend on cost, financing, public acceptance, water quality, regulatory actions and water supply demands. These issues are discussed in the following sections.

Recycled Water Quality

Water quality is a critical issue when evaluating whether recycled water will be acceptable for its intended use. The District is exploring the feasibility of using advanced treated recycled water to ensure that recycled water is more suitable for new markets and use in sensitive areas of the groundwater subbasin. The Coyote subbasin is a very sensitive, unconfined aquifer. The District requires recycled water to be advanced treated to avert a contamination threat to this sensitive aquifer. In addition, the District continually monitors groundwater quality and is expanding its monitoring network to target areas where recycled water is used for irrigation. The monitoring data will be used to detect and correct potential problems early on, before they have a chance to develop. In the long term, it will be important to track research and regulations related to the use of recycled water and in particular concerns related to water quality such as endocrine disrupting compounds (EDCs) and NDMA.

Indirect Potable Reuse

The District is also considering indirect potable reuse alternatives. One potential concern with the use of recycled water for groundwater recharge is the potential for adverse impacts to groundwater quality from a variety of organic contaminants, metals, and salts. Groundwater recharge projects require review by the DHS. The feasibility of advanced treatment of recycled water for indirect potable reuse is being studied in many areas across the state.

Implementation Costs

Recycled water systems are separate from the potable system, so projects require significant capital investments for treatment and distribution facilities. The uncertainty of market demands creates a risk to cost recovery. Although this large capital risk may deter agencies from undertaking recycled water projects, the long term benefits of recycled water are significant. Indirect potable reuse holds promise of reducing overall implementation costs when considered as a key component in the District's conjunctive water management program. The means to fund achievement of the target of 10 percent by 2020 has not yet been identified.

Public Acceptance

Recycled water users and the general public need to be informed of recycled water benefits and reassured on the safety of recycled water. The District is currently working with recycled water purveyors to develop a countywide recycled water outreach plan and establish a citizens' task force with the principal goal of increasing public knowledge and public acceptance.

Conjunctive Water Management Planning for Optimal Water Recycling

Recycled water is one of the key components of the District's water supply mix offsetting the total demand for potable water supplies. The District's overall conjunctive management of water resources integrates recycled water as a reliable all-weather component of overall supply. Advanced treatment of recycled water offers additional flexibility particularly when used for groundwater recharge—the groundwater subbasin in effect provides additional treatment, distribution, and storage. The District works in partnership with recycled water producers and land-use planning agencies in planning optimal water recycling now and into the future.

Table 3-10 Recycled Water Projects and Programs

Project / Program	Brief Description
Water Softener Pilot Project	This program encouraged Santa Clara County residents to upgrade their water softeners to conserve water, energy and salt usage. Based on the results from this program, more than one million gallons of water per year (enough to fill two Olympic-size swimming pools), an estimated 1,700 kilowatt hours of electricity (enough to power 30,000 60-watt light bulbs for an hour), and approximately 240,000 pounds of salt per year have been saved by replacing 400 older-model water softeners with new technology-efficient models. The District's Water Softener Replacement Rebate Pilot Program won the 2005 Acterra Business Environmental Awards under the Susanne Wilson Award for Pollution Prevention and Resource Conservation. This program also won a finalist award of the Association of California Water Agencies (ACWA) 2005 Clair A. Hill Water Agency Award.
Industrial Application of Recycled Water	The District partnered with Applied Materials to investigate the feasibility of treating industrial wastewater to a level suitable for use within a semiconductor chip manufacturing facility. Further, it will provide an innovative approach for on-site water reclamation and conservation by dynamically measuring metals, TDS, and suspended solids levels in various waste streams, and then diverting the streams to the necessary treatment equipment for water reclamation and subsequent reuse within the process.
Electro-dialysis Reversal/Reverse Osmosis Pilot Work	The District partnered with the City of San José to perform a pilot study comparing the Electro-Dialysis Reversal versus Reverse Osmosis for partial desalination of tertiary-treated recycled water. The City of San José was the lead agency for the project. The District provided the CEC grant and in-kind contributions to the project for approximately 30 percent of the total project cost. The project was completed in 2004.
Advanced Treated Recycled Water Feasibility Study	In 2004, the District completed the three-year feasibility study that evaluated the feasibility and need of improving the recycled water quality through advanced treatment technology. Advance treating recycled water will expand the marketability and users of recycled water in Santa Clara County, especially in the Coyote Valley.
South County Recycled Water Master Plan	The District and SCRWA jointly developed a master plan for the near- and long-term recycled water implementation projects in South Santa Clara County. The project started in 2003 and the Master Plan was adopted by both boards in 2004. An implementation grant of $2.2 million has been preliminarily awarded by the State Water Resources Control Board for phase 1 of the master plan.

Project / Program	Brief Description
Stream Flow Augmentation Pilot Project	This research-scale study will examine the use of de-chlorinated recycled water produced at the San José/Santa Clara Water Pollution Control Plant to augment stream flows in Coyote Creek. The study proposes to add from 2 to 3 times base flow of recycled water to Coyote Creek. Water quality sampling will be conducted at various sites between the discharge point at the Yerba Buena Pump Station and the San Francisco Bay. The objective of this project is to assess the potential impact of large-scale augmentation of the Coyote Creek flow with tertiary treated water on the water quality of the creek and the underlying groundwater. If results indicate adverse effects, appropriate treatment methods will be evaluated. Participants of this study include the Santa Clara Valley Water District, Stanford University and the South Bay Water Recycling. This project builds upon the City of San José's multi-year effort in earlier years. Funding for this study is from a $300,000 DWR grant, administered through the Metropolitan Water District of Southern California, and from $270,000 in in-kind funding by the District. Sources for supplemental funding are also being pursued.
Solutions Project	This research study is to understand existing soils in the Mountain View, Santa Clara and San José area planted with redwoods and to develop suitable strategies and BMPs so that recycled water can be successfully utilized there for landscape irrigation. The District partnered with South Bay Water Recycling, and the cities of Mountain View and Palo Alto. South Bay Water Recycling will contribute financial assistance to this project. The project commenced in 2005 with consultant contracts with UC Davis and three other UC research centers.
Project characterizing salinity contributions in sewer collection and reclaimed water distribution system to develop salinity management strategies	This is an AWWARF project with CH2M Hill as the consultant for this project. The District co-sponsored this $705,000 project. The District collected wastewater samples from the City of Morgan Hill's service area. Analysis and preparation of this data for computer modeling was performed by the consultant. The final report was released by AWWARF in 2005.
Low Fouling Membrane Pilot Study	The District is the recipient of an EPA grant to perform a pilot study to evaluate the performance of low fouling reverse osmosis membranes with varied pretreatment on tertiary treated recycled water. If the pilot is successful, this may open the door to significant savings in advanced treatment processes to improve recycled water quality. The District will partner with the City of San José and conduct the pilot work at the Transmission Pump Station. The project is expected to commence in the second half of 2005.

Partnering with Wastewater Agencies

Wastewater agencies understand that beneficial reuse of their wastewater can be a cost-effective alternative to regulatory and disposal options. Project partnerships between water supply and wastewater treatment agencies have led to projects in which both entities contribute financial resources and share multiple benefits. Expansion of recycled water is critical during drought years when demand for recycled water is likely to increase. Using recycled water for irrigation and other non potable uses allows potable, surface, and groundwater to be available for drinking purposes.

Determining the technical and economic feasibility of a recycled water project requires a comparison of alternative water supply options. This comparison involves a detailed analysis of the costs and benefits of each alternative. The relative cost effectiveness of alternative supply options is sensitive to assumptions used in the analysis and identifying recycled water project benefits and alternative supplies is equally important.

The District is engaging in pre-master-plan activities for recycled water countywide, taking into consideration water quality, costs, customer uses and needs, and other drought-proof and locally controlled supplies.

Bay Area Regional Water Recycling Program (BARWRP)

The District participates in BARWRP which is a partnership of 17 Bay Area water and wastewater agencies, the California DWR, and the U.S. Bureau of Reclamation. This partnership is committed to maximizing the beneficial reuse of highly treated wastewater to provide a safe, reliable, and drought-proof new water supply. The product of the BARWRP efforts is a comprehensive regional water recycling master plan released in 1999. Current activities of BARWRP include pursuit of federal and state grants for projects and programs identified in the BARWRP Master Plan. Future activities of BARWRP may include an update to this master plan.

3.4.4 Projects and Programs

By laying the groundwork for new programs and studying recycled water uses and issues, the District has and will continue to create partnerships and systematically expand countywide water recycling. Table 3-10 below summarizes the projects and programs performed by the District related to recycled water. More detailed information on water recycling projects and programs is available in the Water Use Efficiency Program Annual Reports posted on the District's website.

Background and Need for Desalination

Historically, Northern California has been susceptible to long periods of drought. San Francisco Bay Area water agencies are vulnerable to a water supply disruption in the event of a major catastrophe or unplanned facility outages. For example, a levee failure in the Sacramento-San Joaquin Delta could result in seawater intrusion and high salt levels, precluding use of the Delta for up to six months. An earthquake could damage water delivery systems that convey water from the Sierra Nevada across the Delta to the

Bay Area, such as EBMUD's Mokelumne Aqueduct. In addition, agencies have identified the need to diversify their water supply portfolio to meet long-term water supply needs. Desalination provides a potential "new" reliable water supply source that meets the collective needs of the agencies.

Each Bay Area agency is taking steps to secure its own systems and implementing additional measures to provide continuous water supply; however, a major disruption could result in emergency water demands that exceed the capacity of existing Bay Area storage facilities. Bay Area water districts evaluated cooperative projects to meet their water supply reliability and drinking water quality objectives through the Bay Area Regional Water Quality and Supply Reliability Program (formerly known as the Bay Area Blending/Exchange project) and included desalination concepts including the Bay Area Regional Desalination Project.

Bay Area Regional Desalination Project

The Bay Area's four largest water agencies, East Bay Municipal Utility District, the San Francisco Public Utilities Commission, Contra Costa Water District and the Santa Clara Valley Water District, are jointly exploring developing the feasibility of regional desalination facilities that could directly or indirectly benefit 5.4 million San Francisco Bay Area residents and businesses served by these agencies. The Bay Area Regional Desalination Project (RDP) may consist of one or two desalination facilities, with an ultimate total capacity of up to 80 million gallons per day. By pooling resources under the umbrella of a single project, the RDP would maximize benefits and efficiencies and minimize potential environmental impacts associated with pursuing independent desalination projects within a small geographic area along the California coastline. A regional desalination plant would serve as a new, safe and reliable water supply source that can be used to meet diverse water needs including supplemental water during emergencies and unplanned facility outages, relief during periods of drought, and full-time supplemental water to increase the diversity of the existing water supply portfolio. The RDP would provide a new potable water source.

The project schedule is as follows:

- Phase 1 Pre-Feasibility Study, Completed (October 2003)
- Phase 2 Pre-Feasibility Study (December 2005)
- Detailed Feasibility Study and Environmental Screening (September 2005 - December 2006 – Proposition 50 Grant Funded)
- Pilot testing and Environmental Impact Report – dependent on Feasibility Study Findings
- Final Design and Construction – 3 years (Preliminary Planning level number)
- Public outreach will commence with the Feasibility Study phase of the project.

The Phase 1 Pre-Feasibility Study, completed in 2003, concluded that there are at least three locations in the Bay Area where a regional desalination facility could be located without any fatal flaws. The three sites that ranked the highest were: Mirant Pittsburg power plant site, Pittsburg; Near Bay Bridge site, Oakland; and Oceanside site, San Francisco. Sighting a regional desalination plant presents many regulatory and technical challenges. Cooperation of the four partner agencies in this effort will enhance the project's chances of success.

A Phase 2 Pre-Feasibility Study is underway to further analyze the three sites identified in the Phase 1 Pre-Feasibility Study, and to better define the desalination project facilities. The planned uses of the product water or exchange water by each of the agencies and the institutional arrangements among the agencies are key efforts of the Phase 2 work.

While the agencies have made significant progress over the past two years and continue to advance the RDP, the Feasibility Study Phase will complete additional tasks that will be critical to the long-term success of the RDP. First, the feasibility study will provide an analytical and comprehensive decision-making system for assessing and testing the viability of a complex regional project in which stakeholders have different needs, priorities, and constraints. Second, the feasibility study will incorporate an assessment of site and infrastructure configuration options based on environmental, permitting, cost and design implications. Third, the feasibility study will include a site layout plan(s) for the RDP. Fourth, the feasibility study will provide a scope of work for detailed environmental analysis for the full-scale RDP. Finally, the study will provide important information to decision-makers and water users on the costs and benefits of a centralized regional project. The recent announcement of Proposition 50 state funding demonstrates the state's commitment to a project that strives to use innovative solutions to solve regional water challenges in California.

Brackish Groundwater

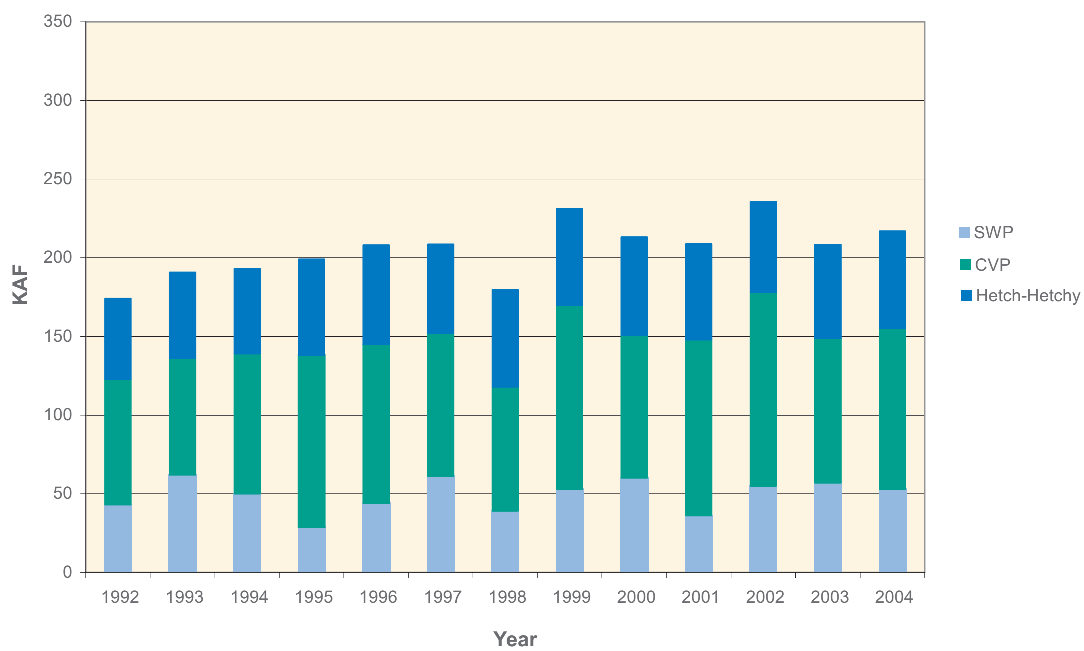
Santa Clara Valley Water District and San Benito County Water District are about to embark on a joint feasibility study to evaluate the potential for treating brackish groundwater in the Pajaro Watershed for potable uses. The Pajaro Watershed Groundwater Desalination Feasibility Study applies a centralized regional approach to developing desalination that offers numerous benefits such as forming complementary goals and objectives, reducing capital outlays for each participating agency, reducing infrastructure development, minimizing environmental effects, and providing effective and coordinated redundancy/backup facilities to be shared by both agencies. The recent announcement of the state's Proposition 50 grant for 50 percent of costs for this feasibility effort highlights the importance of seeking new M&I water solutions from brackish water.

The feasibility study will:

- Evaluate the feasibility and cost-effectiveness of treating site-specific brackish Pajaro groundwater for potable use.
- Assess different treatment technologies and brine management methods to provide the highest level of benefits possible to the two partner agencies.
- Identify benefits and mechanisms to transfer or exchange equitable benefits to local project partners as well to the State and Bay-Delta system.
- Quantify the amount of water that can be produced to complement CVP water served and improve CVP operational flexibility.
- Provide the basis for future demonstration and full-scale project implementation, if feasible.

The Feasibility Study is an 18-month effort with stakeholder outreach an integral part of the effort.

Figure 3-6 Imported Water Supplies



3.5 Imported Water Supplies

District Imported water is conveyed to the county through three main pipelines: the South Bay Aqueduct, which carries water from the SWP, and the Santa Clara Conduit and Pacheco Conduit, which bring water from the CVP. The San Francisco Water Department conveys water from the Hetch-Hetchy reservoir into Santa Clara County through its own facilities.

3.5.1 Long-term Water Supply Strategies for Imported Water

The District has identified the following strategies as part of the IWRP process related to the District's imported water supplies to ensure the long-term protection of this component of the District's water supply.

Safeguard Existing Supplies

The District must protect imported water supplies by resolving contract and policy issues, participating in processes and cultivating relationships to develop transfer and exchange agreements supporting Bay-Delta system improvements, resolving the San Luis Reservoir low point problem, and supporting SFPUC efforts to implement a Regional Water System Improvement Program and to secure the long-term reliability of SFPUC supplies in the county.

Water storage

Local groundwater storage, surface storage, or water banking programs such as the Semitropic Water Bank allow surplus water in wet years to be carried over to years when it is needed.

Dry-year response

Spot market transfers, dry year options transfers, and drought response actions can efficiently supplement supply in critically dry years.

3.5.2 General System Description

Management of the imported water program includes protecting the District's assets (CVP, SWP, and other contract rights); meeting current year operational needs for imported supplies; developing water transfers, exchanges and banking agreements to support the IWRP Study 2003; and controlling costs.

Imported water supply is used for treated water and is also delivered by the District's raw water conveyance system to streams and ponds for groundwater recharge. Water is pumped from the Sacramento-San Joaquin Delta and delivered to the county by the State Water Project (SWP), operated and maintained by the DWR, and by the Central Valley Project (CVP), operated and maintained by the U.S. Bureau of Reclamation. Imported water is conveyed to the District through the South Bay Aqueduct (SBA), which carries water from the SWP; and the Santa Clara Conduit and Pacheco Conduit, which convey water from the CVP.

The District has a contract for 100,000 af per year from the SWP. The District's contract for CVP supply is 152,500 af per year, of which 130,000 af is for M&I needs and 22,500 af is for agricultural needs. Actual deliveries from imported sources vary significantly depending on hydrology, regulatory constraints to protect water quality as well as fish and wildlife, and other factors.

SFPUC conveys its supplies into the county through its own facilities. The District does not control or administer SFPUC deliveries to the county; however, it is expected that many of the SFPUC retailers would pump additional groundwater if there was a shortfall in SFPUC deliveries. Historic imported deliveries by source are shown in Figure 3-6.

Table 3-11 summarizes the contract amount, historic normal year, multiple dry year and single dry year for each of the three sources of imported water for the county based upon 2005 system conditions.

Table 3-11 Santa Clara County Imported Water Supplies (acre-feet/year)

Source	Contract Amount	Normal Year (1985)	Multiple Dry Years (1987-1992)	Single Dry Year (1977)
SWP	100,000	83,000	42,000	5,000
CVP	152,500	114,400	99,600	83,600
SFPUC supplies	-	60,000	48,000	45,000

Transfers and Exchanges

Water transfers can be an important asset to system operational flexibility when used in combination with groundwater, surface water storage and treated water. Transfers combined with other water supply sources can result in increased value over and above the sum of each. The District considers and evaluates transfer opportunities as they become available. Water transfers can generally be categorized as long-term or short-term. The two primary types of long-term transfers are: (1) water rights or water entitlement transfers; and (2) dry-year option transfers.

Long-Term Transfers

Water rights or entitlement transfers involve purchasing an appropriative water right or contract entitlement from another SWP or CVP contractor. Some amount of imported supply would be available from the water transfer in every year, usually more in wet years and less in dry years. Such water right or entitlement transfers can be permanent assignments or can be for a defined period of time with options to renew. In addition, transfers can be subject to lengthy environmental review and documentation processes that could impact the ability to receive the water.

Dry-year option transfers

These transfers include entering into a contract with another party or parties to purchase additional imported water over a number of years. These agreements often include an option payment due every year, with an additional amount payable in the years that the water is actually delivered.

Short Term Transfers

Short-term, or spot-market, water transfers usually involve an agreement to purchase water within a one to two year period. Short-term water transfers may be provided through the State Drought Water Bank, if one exists in the year water is needed, from other CVP or SWP contractors, or from independent water rights holders. Dry-year transfers are often low in cost, as the majority of costs are only incurred when the supply is used.

Short-term transfers are recognized as a possible contingency action to be used in response to trigger events. The Water Shortage Contingency Plan described in Chapter 7 also recognizes that hydrologic droughts worse than historic drought conditions are possible, and calls for short-term transfers to help make up the supply shortfall during such events.

Historic District Transfers

The District has made use of water transfers to increase water supplies in times of shortage several times in the past.

The State Drought Water Bank demonstrated the effectiveness of transfers to meet short-term water needs, and it is likely that a modified form of the bank will continue in the future as a mechanism to facilitate short-term transfers during drought years. For future banks, it is likely DWR will have to complete additional environmental documentation, since concern over the potential for cumulative impacts of short-term transfers has been expressed.

There is the risk that the bank may not be in existence during a year in which the District needs to buy water or may not be able to purchase sufficient supplies to meet all of the needs. The bank may not be operated if statewide hydrologic conditions are normal, and yet, if local conditions are dry or the District wants to rebuild groundwater storage, these may be years in which the District may still wish to supplement its imported water supplies.

Exchanges and Options

San Benito Water District

In recent years, the District has exchanged CVP allocations with San Benito Water District to improve water management by taking advantage of a difference in each district's contract year. This agreement allows the District to "hedge" against the CVP allocating a reduced supply in the following contract year. The District also works with exchange partners in the San Joaquin Valley who are CVP contractors. In 2004, a total of 7,000 af was exchanged.

Pajaro Valley Water Management Agency and Westlands Water District
In 1998, the District and two other agencies (Pajaro Valley Water Management Agency and Westlands Water District) jointly participated in the permanent assignment of 6,260 af from Mercy Springs Water District, an agricultural CVP contractor. Under the agreement, the District has an option for dry-year supplies totaling at least 20,000 af over a 20-year period. The dry-year option may continue for subsequent terms depending on the future plans of Pajaro Valley Water Management Agency.

Banking Available Supplies for Future Use
In May 1996, the District took the first step in implementing the banking strategy when it approved an agreement with Semitropic Water Storage District to store 45,000 af of State Water Project water in Semitropic Water Storage District's groundwater basin. In 1997, the District approved a long-term agreement with Semitropic. Under the terms of this agreement, the District has banked water in years 1997 through 2005. Although the agreement with Semitropic does not provide additional water yield, it does allow the District to divert some of its imported supplies in wet years to storage for use in future dry years.

The District primarily banks SWP water in Semitropic Water Storage District's Groundwater Bank in Kern County but has banked CVP water at the San Justo Reservoir in San Benito County in the past. The District's current vesting level is 283,000 af. The total storage capacity available to the District is 350,000 af and the District must decide its permanent level of investment in Semitropic, and make any capital payment necessary to reach that level by January 1, 2006.

The Semitropic Water Bank is an "in lieu" storage program, meaning that the District does not retrieve its stored water directly from the groundwater basin at Semitropic. Rather, the District receives its water from Semitropic's SWP contract deliveries from the Delta, while Semitropic meets its water needs by increased groundwater pumping. The District's ability to take water from the Semitropic Water Bank is, by contract, proportional to SWP allocation percentages for the year. During drought years, this can significantly limit how much of its water bank balance the District can withdraw. The quality of water delivered to the District is the same as the District's SWP contract water, diverted from the Delta and conveyed through the SBA.

3.5.3 Projects and Programs
Imported water provides over half the supplies used annually in the county, and the District works to safeguard access to these supplies. Maintaining reliable access to high-quality supplies of imported water is essential in meeting current water needs and in implementing the District's IWRP Study 2003 strategy for future water supplies. Both Board and staff members devote considerable time to the projects and programs discussed below.

Water Quality Protection

The District is responsible for protecting surface and groundwater resources in the county. Water quality programs include: treating local and imported surface water for sale to retailers; participating in regional and statewide coalitions to safeguard source water quality protection; and investigating opportunities for water quality improvements through partnership in regional facilities or exchanges. Water treatment is necessary to ensure that the water the District provides meets or exceeds all federal and state drinking water standards. More detailed discussion of surface and treated water quality is presented in Section 4.2.

Support Bay-Delta System Improvements

The District is an active participant in resolving Bay-Delta issues through the CALFED Program and implementation of the Central Valley Project Improvement Act (CVPIA). The CALFED Bay-Delta Program is a partnership of state and federal agencies working with stakeholders to restore the ecosystem of the Sacramento-San Joaquin Delta and improve the reliability and quality of water supplies for over 20 million Californians.

The District supports and participates in the CALFED Bay-Delta Program to help maintain the imported water baseline. Key elements of the Bay-Delta Program include the following:

- Develop Bay-Delta science
- Restore the Bay-Delta ecosystem
- Improve the integrity of Delta levees
- Improve South Delta water quality and water levels
- Expand the State Water Project's Delta pumping to 8,500 cfs
- Construct an Intertie between the California Aqueduct and Delta-Mendota Canal
- Resolve the San Luis Reservoir low-point delivery constraint
- Develop water-use efficiency programs

In addition, certain CALFED projects may directly or indirectly affect IWRP Study 2003 investments in water quality or reliability improvements. These potential projects include modification of the levee system around Frank's Tract in the Delta, expansion of Los Vaqueros Reservoir, enlargement of Shasta Reservoir, and construction of a new reservoir in the Sacramento Valley.

The District is a leader in garnering broad support for the CALFED Bay-Delta Program. A successful Bay-Delta resolution is essential to address California's water problems and to maintain the public welfare and the economic viability of the state. In October 2004, that effort resulted in the passage of a $395 million federal funding authorization for the CALFED Program and other California water projects. Included in the legislation is language authorizing planning and implementation of the San Luis Reservoir Low-Point Improvement Project. The project will protect the reliability of CVP deliveries to the District and other San Felipe Division contractors, and make available up to 200,000 af of additional storage in the San Luis Reservoir.

The District also supports the Environmental Water Account (EWA) as an important component of the CALFED Bay-Delta Program. The purpose of the EWA is “to provide water for the protection and recovery of fish beyond water available through existing regulatory actions…at no uncompensated water cost to [CVP and SWP] water users.” As long as the EWA has the prescribed level of “assets” (water supplies) available to it each year, CVP and SWP water users gain assurances from regulatory agencies that protect them from additional water supply losses under the state and federal endangered species acts.

CALFED is moving forward with its first major package of Delta infrastructure improvements. The “Delta Improvements Package” approved in August 2004 by the California Bay-Delta Authority contains projects to improve Delta water quality and increase Delta water supplies, improve conditions for fish, and protect in-Delta water users. Some elements of the package, including actions to increase the permitted pumping at the SWP’s Banks Pumping Plant to 8,500 cfs must still complete the environmental review process. Still, the Authority’s adoption of the package represented a significant milestone for the CALFED Program. Potential benefits of the package to the District include: more reliable CVP and SWP supplies; near-term protections against the San Luis Reservoir low point; improved Delta water quality, and an extension of the EWA.

The California Bay-Delta Authority is currently undertaking a three-point plan to revitalize the CALFED Program and focus on addressing the highest priority issues associated with the conflicts of the Delta. The plan includes an independent review and fiscal review of the CALFED Program, a public process to refocus the efforts of the Authority and implementing agencies and a 10-year action plan for financing the program. Implementation of planned Delta improvements is dependent on outcomes from this CALFED revitalization process.

Manage Contract and Policy Issues

The District monitors a wide range of administrative, legislative, regulatory, operational, and other issues that could impact the reliability of imported water supplies. The District's SWP and CVP water service contracts require ongoing interpretation and occasional amendments or letter agreements to resolve operational and financial issues. The District is currently negotiating a long-term renewal of its CVP water service contract, including basic reliability and cost provisions. The District is also resolving point-of-delivery issues with DWR related to banking water at Semitropic. As a contractor of the SWP and CVP, the District promotes efficient, coordinated operations of these two projects, under both existing and expanded permitted pumping limits at Banks Pumping Plant.

The District's contract with DWR for supplies from the SWP is also being amended to address a wide range of water supply and financial issues (the "Monterey Amendment"). While some provisions of the amendment reduce the reliability of the District's SWP supplies, these are offset by others that allow more efficient, cost-effective management of SWP water through transfers and banking. A settlement over litigation regarding the Monterey Amendment was approved by the Sacramento Superior Court on May 20, 2003.

Resolve San Luis Reservoir Low-Point Problem

Currently, state and federal water projects cannot fully utilize water stored in San Luis Reservoir without impacting the reliability of water deliveries to south-of-Delta water contractors. The location of the San Felipe Division intake, Delta operations, system wide demands and diminished water quality together reduce project water supplies south of the Delta. These constraints are collectively known as the San Luis low-point problem.


San Luis Reservoir

In coming years, growing demands of other CVP and SWP contractors will increase pressure to fully utilize all available storage in San Luis Reservoir. Through the San Luis Reservoir Low-Point Improvement Project, the District and other CVP and SWP contractors are working to increase the operational flexibility of storage in San Luis Reservoir, and to ensure a high-quality, reliable water supply for south of Delta contractors.

Supply Diversity and Import Minimization

The District currently benefits from a diverse water supply, including local surface supplies and groundwater, SWP and CVP imported water contracts, and recycled water. However, the District continues to pursue local options, such as expanded conservation, groundwater recharge, expanded groundwater emergency pumping, water recycling, desalination, and local and regional storage to promote greater resource diversity.

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Pursuing such supply diversity helps to minimize risk by reducing the reliance on imported supplies. The District's baseline imported water supplies, outside-county water banking, and water transfer agreements all rely on the Bay-Delta system, and there are several potential risks that relate to Bay-Delta issues. Imported supplies are much more susceptible to impacts from global warming, levee failure in the Delta, more stringent water quality standards, and the fate of CALFED program improvements such as the Banks Pumping Plant expansion.

Re-operation of supplies and interconnecting infrastructure as a means to stretch existing supplies and maximize their efficient use has been and continues to be evaluated by the District. For example, re-operations could involve the construction of a raw water pipeline from Lexington Reservoir to the Vasona pumping plant, allowing the District to store imported water to serve as a backup for Rinconada WTP. Also included in the re-operations are District-owned well fields, providing the District groundwater pumping capability to back up raw and treated water systems. The integration of District groundwater pumping and surface water supplies could help to optimize management of local supplies and provide emergency back-up supply.

In addition, local sources and demand management measures such as water conservation and groundwater recharge go a long way toward increasing reliability, especially in South County.

4 Water Supply Reliability

Water supply reliability includes the availability of the water itself as well as the reliability and integrity of the infrastructure and systems that transport, treat and store it. As the principal wholesale water manager for Santa Clara County, the District strives to meet water demand under all hydrologic conditions, including satisfying its treated water contracts for deliveries to the water retail agencies. The District also works to ensure supply reliability by managing the groundwater subbasins and maximizing its influence over sources of water supply and operations.

Supply reliability is presented below in two parts; the first part (Sections 4.1 and 4.2) discusses reliability in terms of the principal water supply sources. The second part (Section 4.3) discusses supply reliability in the context of the IWRP Study 2003 evaluation. Chapter 6 presents a supply and demand comparison in five year increments to 2030 under normal, dry year and multiple dry year conditions.

4.1 Local Water Supply Reliability

Managing the local water supply to provide a reliable source of water requires complex analyses that incorporate the multiple sources of water of varying hydrology and availability, with available facilities to meet a range of uses, while accommodating regulatory constraints and institutional issues. All activities related to the management of the groundwater subbasins and the operation and maintenance of the District's dams, reservoirs, recharge facilities, canals, creeks, pipelines, pump stations and treatment plants are directly related to providing water supply in Santa Clara County.

Camden Groundwater Recharge Ponds

The District's IWRP Study 2003 recommends investments in new local water sources to decrease vulnerability to risk and minimize dry-year dependence on the Bay-Delta ecosystem. The District continues to pursue local options, such as expanded conservation, groundwater recharge, expanded groundwater emergency pumping, water recycling, desalination, and local and regional storage to promote supply reliability and a greater variety of water sources.

Hydrology

Since water supplies available to the county are obtained from both local and imported sources, the District's water supply is a function of the amount of precipitation that falls both locally and in the watersheds of Northern California. Hydrologic uncertainties influence the projections of both local and imported water supplies and the anticipated reliability of those supplies. The analysis performed and summarized in this report is

Figure 4-1 Historic North County Water Supply

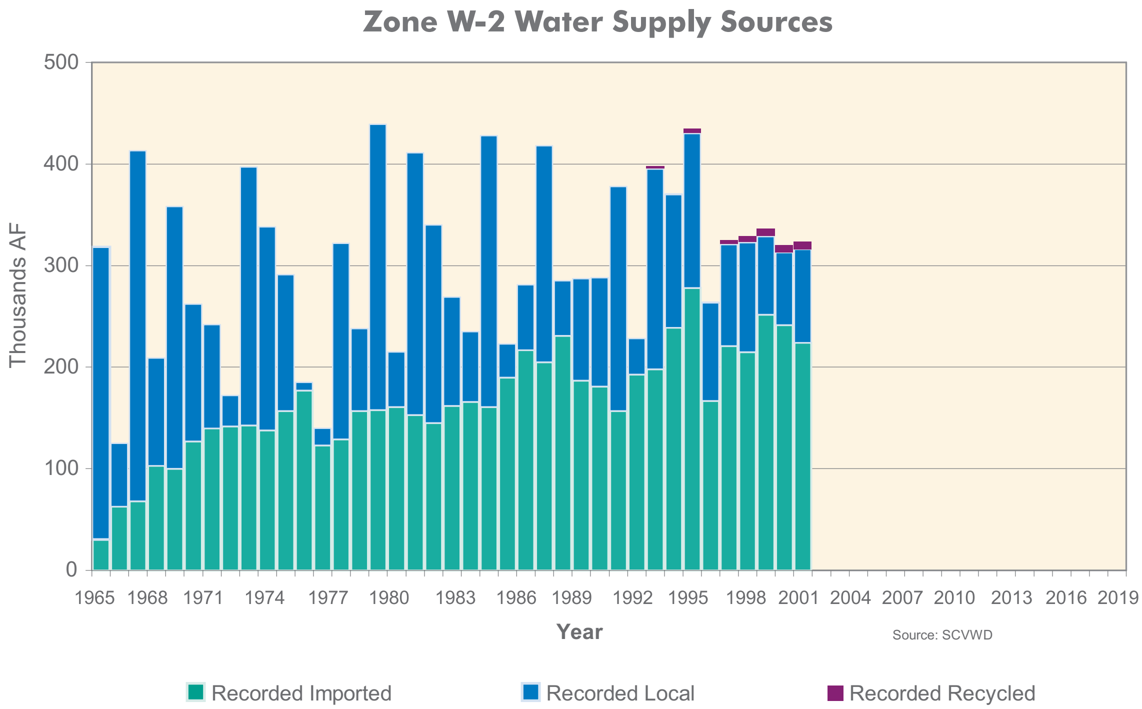
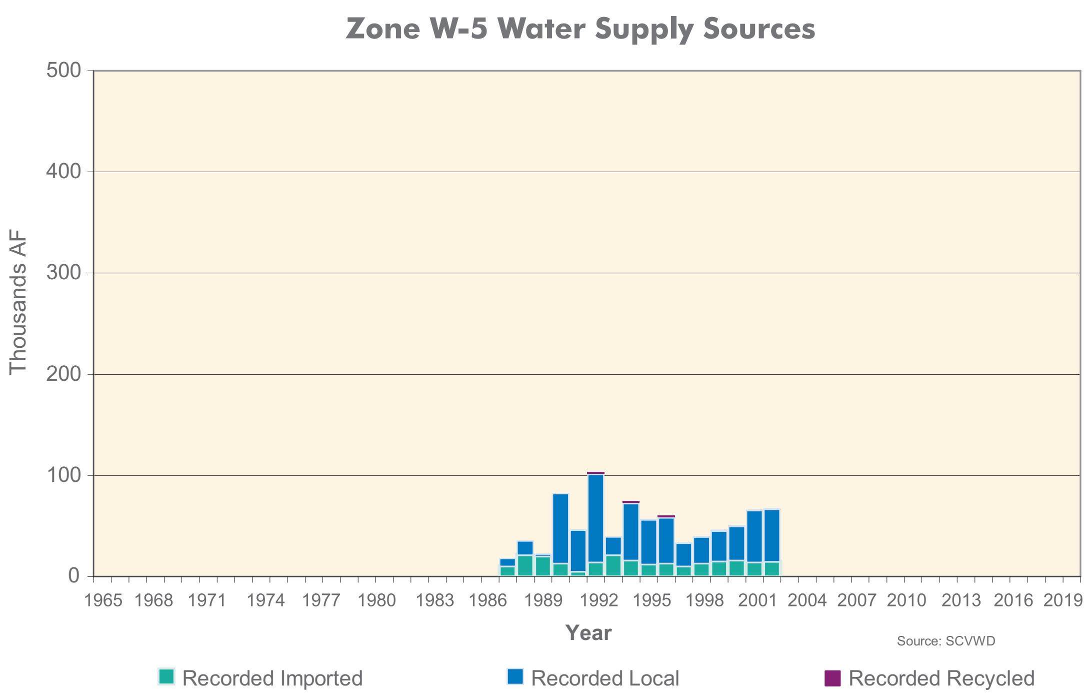


Figure 4-2 Historic South County Water Supply (includes Coyote Valley)



based on the assumption of historic patterns of precipitation. Recorded local and imported water supplies for both the North and South County are shown in Figures 4-1 and 4-2. The annual water supplies reported in these figures include only volumes managed by the District and others that are readily estimated. Therefore, out-of-county banking and natural groundwater recharge are not included.

Quality

An analysis on water supply reliability would not be complete without an evaluation and discussion of potential water quality impacts on reliability. District staff and IWRP Study 2003 stakeholders agreed that ensuring water quality is critical to overall water supply reliability, as reflected in the top-tier ranking of the water quality planning objective.

Overall groundwater quality in Santa Clara County is very good, and water quality objectives are achieved in almost all wells. The most significant exceptions are nitrate and perchlorate, which have impacted groundwater quality predominantly in South County. In the future, new and more stringent drinking water quality standards could also affect the amount of groundwater pumped from the subbasin.

No single risk factor can substantially impact the suitability of the entire groundwater resource in Santa Clara County. However, there are factors that can impact the water supply within a portion of a groundwater subbasin, requiring additional treatment or other measures if it is to be used. Water utilities face new challenges when new contaminants are identified as a result of advances in laboratory analysis or when new and lower thresholds for health effects and regulatory compliance are established for existing contaminants. Santa Clara County has experienced both circumstances in recent years.

The District continues to identify potential management practices that could improve source water quality and reduce the impact of potential contaminant sources. The District completes a Watershed Sanitary Survey every five years, as required by the California Department of Health Services (DHS), that examines possible sources of drinking water contamination and recommends how to protect water quality at the source.

The following sections describe the District's efforts to ensure surface water quality and reliability in more detail.

Operations

Advantages of local reservoir storage include the ability to operate for water quality benefits. For example, one way to address occasional increases in bromide concentration in imported water is to blend the source water for the water treatment plants with other source waters, such as local surface water or groundwater. Given the right opportunity, existing local water storage can also be operated for water quality benefits by releasing water when quality is better than imported water during dry years or dry seasons, when imported water quality is poorer. Regional alternatives for water quality improvements are also being monitored and evaluated to determine the costs and benefits of District participation. CALFED currently is supporting research into how different water treatment technologies can address high total dissolved solids and bromides.

Source Water Assessment and Protection

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

DHS developed the Drinking Water Source Assessment and Protection (DWSAP) Program, to evaluate the vulnerability of water sources to contamination and prioritize activities for protective measures. Assessments of the drinking water sources for the District were completed in 2002. The South Bay Aqueduct DWSAP report was completed by Archibald & Wallberg Consultants, under contract to the District, Alameda County Water District, and Zone 7 Water Agency. The San Luis, Anderson and Calero reservoirs' DWSAP reports were prepared by the District, based on a detailed sanitary survey of the watersheds and the District's Comprehensive Reservoir Watershed Management Plan.

Each report presents the possible contaminating activities within the source drainage area, ranked as being of high, medium, or low significance based on the potential of the activity to contribute to water quality challenges at the water treatment plants. The reports also present existing management and protection activities. The steps involved in a source water assessment include the following:

- Delineation—The area that contributes water to the well or surface water intake is determined, and source water protection zones are defined
- Inventory—An inventory is conducted of the types of Possible Contaminating Activities (PCAs) within the source protection zones that may affect the water supply
- Vulnerability Analysis—A susceptibility analysis of the located potential sources of contamination is conducted. This will alert the public water system to the contaminant sources that have the greatest likelihood of affecting the water supply

The assessment reports summarize all the information gained during the assessment. They include maps of the source water area, lists of potential sources of contamination, and summaries of the susceptibility analyses. This information is provided to public water systems and is available to the public on the District's website.

Treated Water Quality

As a voluntary member of the Partnership for Safe Water, a program of the U.S. Environmental Protection Agency, the District is committed to scrutinize its current water treatment practices, make improvements where necessary, have its water operations examined by independent experts, and report the findings to its customers. The Partnership for Safe Water is a unique cooperative effort between EPA, American Water Works Association, Association of Metropolitan Water Agencies, National Association of Water Companies, and Association of State Drinking Water Administrators. The Partnership encourages and assists United States water suppliers to voluntarily enhance their water systems performance, for greater control of cryptosporidium, Giardia and other microbial and inorganic contaminants.

Water Treatment Improvement Project (WTIP)

The District is in the middle of major renovations at each of the District's three water treatment plants. The first phase of WTIP is complete and phase 2 (WTIP2) will be completed by 2013. The project is the District's response to the federal Safe Drinking Water Act and the EPA's call for more stringent water quality regulations. Specifically, the first phase of the project provides changes to assist compliance with the first stage of the EPA's new Disinfectant/Disinfection Byproducts Rule and Interim Enhanced Surface Water Treatment Rule, while maintaining a safe and reliable system and aesthetically pleasing water. With the addition of ozonation, the District will reduce trihalomethanes (THMs), a byproduct of chlorination. During the warmest times of the year when algae can cause unpleasant tastes and odors, ozonation will also enhance the flavor of the finished water.

Water diverted from the Sacramento-San Joaquin Delta contains relatively high concentrations of salts (bromide) and organic compounds. These constituents are precursors to the formation of disinfection byproducts, a major concern for the District. Delta water will only be able to meet current and anticipated drinking water standards through advanced treatment technologies and source water quality improvements.

Possible changes to the bromate standard may require UV treatment at the water treatment plants. The degree to which UV treatment augments the treatment plant improvements currently underway (WTIP2) will be much better understood after WTIP2 is online at two of the three plants in 2006. Relatively simple actions such as pH suppression combined with ozonation go a long way toward improving the treatability of high-bromide water, but how this figures in with recent cryptosporidium inactivation requirements is less clear, making it difficult to identify a complete response portfolio to the more stringent water quality standards. Other strategies may be required, such as a reservoir for blending or source water protection projects.

Infrastructure

Maintaining the integrity of the District's existing infrastructure is essential to ensuring the reliability of the District's water supply. This includes maintaining the existing capacity of recharge facilities and ensuring that other facilities, such as reservoirs, treatment plants, and conveyance and distribution infrastructure are safeguarded. For example, the four-year construction phase of WTIP2 for RWTP (tentatively to begin as early as winter of 2008) will be scheduled such that committed water deliveries remain uninterrupted during summer seasons (peak flow).

Asset Management Plan

Asset management is critical to ensure that the water supply systems, such as treatment plants and reservoirs, are well maintained and preserved in order to deliver an optimum level of service. Development of the Asset Management Program Plan was started in January 2002 to provide a better basis for identifying long-term capital rehabilitation and replacement needs. The Program Plan was completed in September 2003 and implementation is ongoing.

This program's goal is to lower the cost of asset ownership and improve system reliability by establishing a life-cycle preventative and corrective maintenance schedule for each of the District's assets.

Operations

Both the District and San José Water Company own and operate facilities in the Los Gatos Watershed and are exploring options to coordinate the optimal use of water resources and existing facilities for water supply management. San José Water Company owns and operates Elsman Reservoir in the upper Los Gatos Watershed and the Montevina Treatment Plant located on the banks of the District's Lexington Reservoir. There are times when the District could recharge the groundwater subbasin with other water sources and send Lexington water to the Montevina Treatment Plant. This would optimize groundwater recharge while meeting current water demands. Further, the Montevina Plant service area overlaps the RWTP service area so these facilities could also provide back-up services to each other in emergencies and a back-up option during scheduled maintenance shutdowns.

Hydraulic analyses of the District's raw water and treated water conveyance systems are ongoing to identify opportunities to increase pipeline capacities and to identify any increased potential to convey additional water supplies.

Regulatory, Institutional, Political

District facilities are subject to regulations regarding seismic performance of dams, reservoir landslide monitoring and evaluation, and periodic field inspections. Consequently, maintenance activities include continuing liaison and data exchange with the California Division of Safety of Dams and the Federal Energy Regulatory Commission with regard to the safety of District dams.

Several factors that can impact the District's reservoir operations and its use of surface water rights include maintaining storage levels for environmental or recreation purposes, dam safety requirements, and managing total District supplies for reliability. Existing recharge capability can also be a limiting factor in the District's ability to fully utilize its surface water supplies. Some of the factors that can impact groundwater recharge pond operations and cleaning include fisheries and habitat concerns, aesthetics, recreation, and local residents' concerns. District staff takes these sometimes competing factors into consideration when developing facility operations plans.

Fisheries and Aquatic Habitat Collaborative Effort

Since 1996, the District has been working to address a complaint related to its water rights. The complaint, filed before the State Water Resources Control Board, claimed that District water supply operations harmed local fisheries in violation of California Fish and Game Code Section 5937 and failed to satisfy the Public Trust Doctrine. Through a multiparty dispute resolution process called the Fisheries and Aquatic Habitat Collaborative Effort (FAHCE), the District is working collaboratively with state and local resource agencies, local environmental interests, and the City of San José to finalize a settlement agreement and thereby resolve the challenge. Completion of the environmental review under CEQA/NEPA is anticipated in 2006.

The plan will improve local fisheries while serving as the basis for dismissal of the water rights complaint and provide the District with assurances that its water rights are protected from future challenges. The terms of the settlement will require managing water supply operations to tight standards designed to protect fisheries resources while meeting water supply management objectives. To ensure success, the District will implement a range of actions that include habitat restoration, fish passage, and capital improvement projects consistent with its watershed stewardship program. Furthermore, additional studies will be undertaken in areas such as stream flow augmentation using advanced treated recycled water, geomorphologic restoration of stream channels, and groundwater basin management in the Coyote subbasin.

Security

Santa Clara Valley Water District, and all the private and publicly owned retail water agencies in the county are working with national, state and local intelligence and law-enforcement agencies to safeguard water supply. Specifically, the Water District has instituted the following measures:

- Around-the-clock presence of security guards at all Water District treatment plants.
- Video monitoring at all key facilities
- Intrusion detection and alarm systems at all key facilities
- Daily inspection of key facilities
- A general increase in already heightened security procedures such as identification for employees and visitors
- A suspension of public tours at key facilities
- Continuing emphasis on security at staff briefings
- Revised security procedures, including District response to bomb threats
- Testing to ensure that water quality continues to meet or exceed required federal and state standards

Although intelligence information shows that the reservoirs are not likely targets for terrorism, the District has increased its reservoir security patrols. The reservoirs are primarily used to replenish underground aquifers, so damage to them would have no immediate impact on customers. The large volume of water in each reservoir would require an enormous amount of contaminant to cause any significant harm making this scenario unlikely. In the event of an emergency, the District and the water companies would immediately contact law enforcement, local health officials and the local news media to notify the public of any troubles and, if appropriate, inform residents what they need to do.

4.2 Imported Water Supply Reliability

The evaluation of imported water supply reliability requires complex analysis including multiple sources of water, a range of competing beneficial uses, varying hydrology and future weather patterns, complex statewide and Delta operations, regulatory restraints and institutional issues.

Hydrology

Since water supplies available to the county are obtained from both local and imported sources, the District's water supply is a function of the amount of precipitation that falls both locally and in the watersheds of Northern California. Hydrologic uncertainties influence the projections of both local and imported water supplies and the anticipated reliability of those supplies. The analysis performed and summarized in this report is based on the assumption of historic patterns of precipitation.

The DWR operates and maintains the State Water Project and plans for future statewide water needs. DWR also collects and manages hydrologic data from which annual SWP supply allocations are determined. Annual allocations are based on precipitation, snow pack, the Sacramento Valley and San Joaquin 8-river runoff index and reservoir storage.

The DWR determines the long-term SWP water delivery reliability by analyzing "baseline" 2001 conditions and for conditions projected to exist 20 years in the future (2021). These analyses describe current conditions and make predictions about three factors: (1) the availability of water at the source, (2) the ability to convey water from the source to the desired point of delivery, and (3) the level of demand.

The availability of water at the source:

This factor depends on the amount of rain and snow there will be in any given year and on the level of development (that is, the use of water) in the source areas. The SWP supply reliability analyses are based upon 73 years of historical records (1922-1994) for rainfall and runoff that have been adjusted to reflect the current and future levels of development in the source areas. These series of data are then used to forecast the amount of water available to the SWP under current and future conditions.

The ability to convey water from the source to the desired point of delivery:

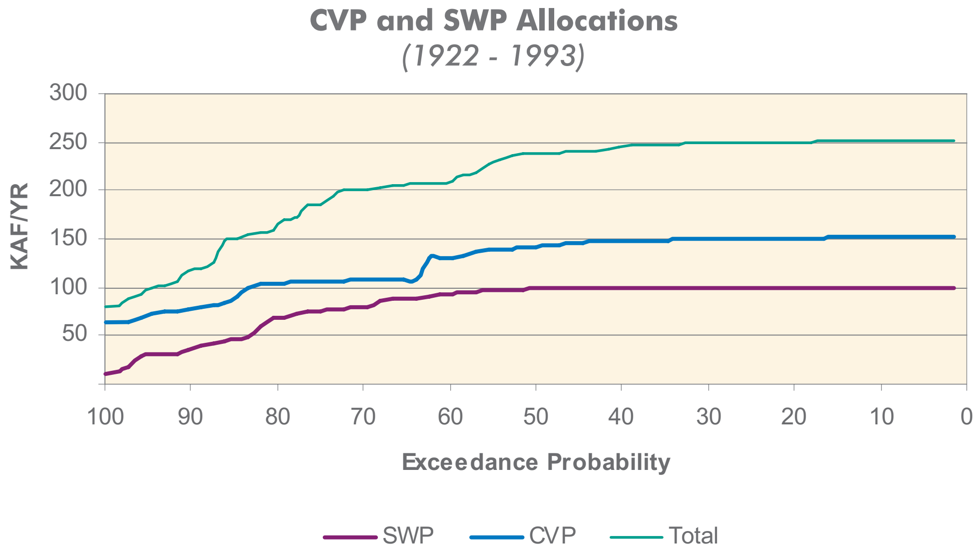
This factor describes the facilities available to capture and convey surface water or groundwater and the institutional limitations placed upon these facilities. Assumptions made about the institutional limitations to operation—such as legal, contractual, or regulatory restrictions—often are based upon existing conditions. Future changes in conditions that affect the ability to convey water usually cannot be predicted with certainty, particularly the regulatory and other institutional constraints on water conveyance.

The level of demand:

This factor includes the amount and pattern of demand upon the water system. Demand on the SWP is nearing the full Table A amount, the total of all contractors' maximum per year amount, of 4.173 million acre-feet (Maf). Table A is used to define each contractor's proportion of the available water supply that the DWR will allocate and deliver to that contractor. For the year 2021, the demand is estimated two ways. The first is to assume the demand depends upon weather conditions and produces a demand that varies from 3.3 to 4.1 Maf per year. The second estimation method is to assume that the contractors' demands will be at their maximum Table A amount, 4.1 Maf per year, regardless of the weather in the demand areas.

The DWR and the U.S. Bureau of Reclamation have jointly developed an operations model, CALSIM II, to simulate the SWP and CVP systems under different conditions. The IWRP Study 2003 and this plan look to output from CALSIM II for estimating future contract delivery allocations. To determine allocation factors, the model is run under future demand conditions and an assumed future level of infrastructure for each year in the historic hydrology.

Figure 4-3 SWP and CVP Allocations to the District



There are several sources of imported water allocation factors with new ones becoming available from time to time. The exceedance probability curves above in Figure 4-3 show the allocation factors used in this plan. The exceedance probability curve is constructed by sorting the projected supplies or allocations from greatest to lowest and determining the plotting position based on the total number of years used in the analysis. Based on the curves above, 90 percent of the time, the SWP and CVP allocations will be above 36,000 af and 80,000 af, respectively. Similarly, 50 percent of the time, the SWP and CVP allocations will be above 99,000 af and 140,000 af, respectively. This type of information is utilized in the District's operations planning efforts. The District will continue to evaluate and update allocations and projects as part of the ongoing effort to monitor the baseline water supply resources.

CVP

The ability of the CVP to meet contract deliveries is dependent on hydrology, water quality and environmental regulations. Also, the District's use of CVP water is affected by many other factors, including water quality and the availability of alternate supplies in normal and wet years.

M&I Water Shortage Policy Draft (EA) March 05

The M&I Water Shortage Policy Draft Environmental Assessment (EA) March 05 was prepared to evaluate alternatives considered by the USBR to implement a Municipal and Industrial (M&I) Water Shortage Policy for the CVP. The purposes of the policy are to: (1) define water shortage terms and conditions applicable to all CVP M&I contractors, as appropriate; (2) establish CVP water supply levels that, together with the M&I contractors' drought water conservation measures and other water supplies, (a) would sustain urban areas during droughts, and (b) during severe or continuing droughts would assist the M&I contractors in their efforts to protect public health and safety; and (3) provide information to M&I contractors for development of drought contingency plans.

Water Reallocation Agreement: In 1997, the District executed a Water Reallocation Agreement with the USBR and agricultural districts in the San Luis and Delta-Mendota Water Authority that establishes the basic level of reliability for the District's CVP M&I water supplies. This 25-year agreement resolved disputes related to the USBR's M&I Water Shortage Policy that provides CVP M&I water allocations of no less than 75 percent of historic use under most shortage conditions. In addition, Westlands and San Luis water districts agreed to augment the District's supplies in certain years to bring District CVP M&I reliability up to 75 percent of contract amount. In return, the District has reallocated 100,000 af of CVP water to the agricultural districts, and will continue to optimize water supplies to reallocate more water if possible over the term of the agreement.

San Francisco Public Utilities Commission (SFPUC) Supplies

Role of SFPUC supplies in water resources mix in Santa Clara County

SFPUC provides water supply to the City and County of San Francisco and 29 agencies in the counties of San Mateo, Alameda and Santa Clara. Of the total annual SFPUC purchases among the 29 suburban customers, purchases in Santa Clara County account for roughly one third.

About 85 percent of the water delivered to SFPUC's customers through the regional water system originates from Sierra Nevada snowmelt stored in the Hetch-Hetchy Reservoir. The Hetch-Hetchy water travels 160 miles via gravity from Yosemite to the San Francisco Bay Area. The remaining 15 percent of the water originates from runoff in the Alameda and Peninsula watersheds. This local water is captured in reservoirs located in San Mateo and Alameda counties. The sale of Hetch-Hetchy supplies is governed by the 1913 Raker Act that prohibits SFPUC from selling or conveying the water to any private corporation or individual. There is no such restriction on the sale of water captured in local watersheds.

Historically, SFPUC supplies constitute 15 to 20 percent of the total use in Santa Clara County. SFPUC water use in Santa Clara County has remained stable for the last decade at about 60,000 af per year.

One of the major recommendations from the IWRP Study 2003 is to protect the baseline water supplies, including those from SFPUC. SFPUC supplies constitute a significant portion of the overall water supply in Santa Clara County and contribute to the diversity of water supply sources. If the quantity of SFPUC supplies in the county were to diminish in the future, the District or the retailers would likely need to make up the lost supply through additional investments in new supply options or demand management. It is, therefore, in the District's and the retailers' interest to ensure that SFPUC supplies in Santa Clara County are not diminished.

It is expected that some of the SFPUC retailers in the county would make up for a diminished SFPUC supply by pumping additional groundwater or using more of the District's treated water. Increased pumping from the groundwater basin would affect the reliability of other users. Some SFPUC retailers may pump from sensitive areas of the groundwater subbasin (with known water quality issues or hydrogeologic restrictions).

Switching from SFPUC supplies to groundwater would not be a viable long-term option in these cases. Additionally, not all the SFPUC retailers in Santa Clara County currently have access to the District's treated water and additional infrastructure would be needed. Either way, the District may need to implement financial incentives and disincentives, groundwater pumping control measures, and place restrictions on new deliveries of treated water to maintain system reliability if the quantity of SFPUC supplies is significantly diminished.

Furthermore, SFPUC supplies are often the preferred source of water for residents and the high-tech industry that currently receive those supplies, because of their high quality compared to imported water from the State Water Project or the Central Valley Project that originate from the Delta. It is difficult to find replacement water at a comparable level of quality if SFPUC supplies were to diminish in the future.

Roles and responsibilities among SFPUC, Bay Area Water Supply and Conservation Agency (BAWSCA), the District and retail agencies

SFPUC is a department of the City and County of San Francisco that provides water; wastewater collection, treatment, and disposal services; and municipal power to San Francisco. Under contractual agreements, SFPUC also provides water to 29 suburban water agencies located in San Mateo, Alameda and Santa Clara counties. The 1.6 million people served by the 29 suburban agencies constitute two-thirds of the total number of people served by SFPUC. As a wholesale water provider, SFPUC's mission is to deliver high quality, affordable water to retail and wholesale customers in a reliable and sustainable manner.

Eight of the 29 suburban water agencies that hold contracts with SFPUC are located in Santa Clara County. The eight retailers are: cities of Palo Alto, Mountain View, Sunnyvale, Santa Clara, San José and Milpitas; plus the Purissima Hills Water District and Stanford University. Their dependency on SFPUC's supplies ranges from 17 to 100 percent. Five of the eight retailers hold treated water contracts with the District and some also pump groundwater. The water retail agencies manage their supplies from SFPUC and the District to meet the needs of their retail customers.

The Bay Area Water Supply and Conservation Agency (BAWSCA) was created through the passage of AB 2058 in 2002 and was subsequently established in May 2003. BAWSCA represents the interests of 26 cities and water districts and two private utilities, in Alameda, San Mateo and Santa Clara counties that purchase water on a wholesale basis from SFPUC. BAWSCA's predecessor was the Bay Area Water Users Association (BAWUA). BAWSCA itself does not hold any water supply contracts nor does it provide any water supply, although it could develop those assets and services in the future.

The District does not hold any water supply contracts with SFPUC although staff coordinates their water supply planning and operations activities with SFPUC and with the retailers. Representatives from SFPUC and subsequently BAWSCA participated in both the 1996 and IWRP Study 2003 processes as stakeholders and advisors to District staff.

As formal recognition of the merits of coordination between SFPUC and the District, the two wholesale water providers entered into a Memorandum of Understanding (MOU) in 2004 for coordination of water supply planning. The MOU focuses on coordination of water supply planning and management activities in the areas of: demand management, water recycling, desalination, banking and transfer, storage development, coordination of planning data and operations. The MOU is intended to address the broad area of water supply planning coordination while providing for additional agreements in specific areas or projects to be developed in the future with the appropriate involved parties. The MOU was developed with the support of the eight common SFPUC contractors in Santa Clara County and with BAWSCA.

SFPUC's Regional Water System Improvements Program (SF-WSIP)

In February 2005, SFPUC concluded workshops to review options in improvements to be made on the regional water system and selected a recommended program to meet level of service goals for seismic and delivery reliability, water supply and water quality. The SF-WSIP was submitted to the San Francisco Planning Department for the preparation of a Program Environmental Impact Report. San Francisco hosted information meetings in May 2005 on the environmental review process.

Projected demands, estimated purchases from SFPUC and drought reduction

In 2004, SFPUC staff concluded their planning studies to assess future water demands, water conservation potential and recycled water potential in the SFPUC retail (city) and wholesale (suburban) customer service areas. This information was considered by each SFPUC wholesale customer in developing their best estimates of the SFPUC water purchases in the year 2030.

Projected 2030 demand[2] among the eight SFPUC wholesale customers (or "retailers" in District terminology) in Santa Clara County is estimated to increase by 23 percent from the base year of 2001. The estimated 2030 SFPUC purchases in Santa Clara County are estimated to increase to 73,000 af, from a base year 2001 purchase of 60,000 af.

The target delivery reduction during an 8.5 years design drought[3] described in the SF-WSIP is to "provide the equivalent of 254 mgd during the design drought with no more than 20 percent rationing while continuing to improve conservation; incorporate the use of recycled water; maximize groundwater use; acquire water through transfers; and investigate additional surface storage." The 254 mgd delivery target equates to 85 to 90 percent of the estimated range of 2030 purchases from SFPUC. The current SFPUC regional water system delivers an annual average of 260 mgd.

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2 Projected demand for the City of San José only pertains to the northern portion of the city served by the northern portion of San José Municipal Water System. This projected demand for SFPUC does not include the demand from Vision North San José.

3 The 8.5 years design drought is based on the worst long-term drought experienced by the SFPUC system from 1987 to 1992, coupled with an additional 2.5-year drought experienced from 1976 to 1977.

District Integrated Water Resources Planning (IWRP Study 2003) and baseline assumptions

The IWRP Study 2003 used a countywide projected demand[4] through the year 2040 and analyzed the existing baseline water supplies from both District and SFPUC sources under various hydrologic conditions, including repeats of the 1987-92 multi-year drought as well as the very dry 1977 year. The SFPUC supplies assumed to be available under those drought conditions and with existing facilities and agreements were 42,000 af/year and 36,000 af/year, respectively. These baseline assumptions were consistent with the historical levels of delivery cutbacks during those drought periods.

Unknowns and uncertainties re: SFPUC supplies

The SF-WSIP describes a set of program goals and an initial set of programs and projects that could accomplish those goals. The upcoming environmental review process will disclose, influence and determine the preferred set of alternative programs and projects, and it might influence SFPUC to adopt alternative goals. As of this writing, SFPUC is considering to broaden its PEIR scope to include impacts from a wider range of shortages during the design drought.

The SF-WSIP will require 10 years to complete, without any intervening delays or interruptions. In the interim, SFPUC provides a lower level of service than the enumerated goals. Some of the “uncertainties” that could cause distractions, as a minimum, include the 2009 contract expiration and external efforts to restore Hetch-Hetchy Valley.

The current SFPUC contracts or Master Sales Agreement expires in 2009. It is not clear how the contract renewal process would interact with implementation of the SF-WSIP, future SFPUC purchases and shortage allocation.

The 2015 projected SFPUC water rate is expected to cost more than $1,300/acre-foot, compared to 2005 rate of about $460/acre-foot. It is currently unknown if and how new contract terms and conditions will be imposed and negotiated. It is therefore unknown if retailers in Santa Clara County would change their supply mix in the future between SFPUC and District supplies, in reaction to new pricing and contract terms. Any changes from those listed in the preceding section on “projections demands and estimated purchases” will adversely affect the retailers reliability and will require additional expenditure to mitigate.

Both the cities of San José and Santa Clara hold “interruptible” contracts currently although the expectation is that new contract terms and conditions will be developed in this renewal process. Both cities are currently under an interim water shortage allocation plan in which San José and Santa Clara would incur a larger percentage of cutbacks during shortage conditions compared to the other SFPUC wholesale agencies but would not be completely cut off, unless SFPUC system shortages exceed the provisions contained in the plan. The interim water shortage allocation plan expires in 2009 with the current contracts.

The SF-WSIP has not considered any of the proposed options or scenarios entertained by the Restore Hetch-Hetchy movement. If those efforts continue to gain momentum, SFPUC might need to consider revising its long-term water supply programs and plans.

Global Warming and Climate Change

One of the largest unknowns affecting California's long-term water supply is the water management impact of global warming. Effects on precipitation are hard to predict, with some models forecasting less rainfall for the state and some models forecasting more rainfall. Regardless of the impacts on the total amount of precipitation, rises in average temperature will increase sea level and decrease the snow pack—by far the largest water "storage" facility in California. Decreased snow pack and projected earlier spring melts will reduce the amount of water available to meet peak demands in late spring and summer. These changes could decrease imported water and possibly local water supplies, while increasing salinity in the Delta—thus adversely impacting water quality and Bay-Delta ecosystems.

The development of District projects and programs to meet future needs must take into account the evidence of global warming and its impacts on water quality and potential salt water intrusion, imported and local water supplies and the water transfer market, and federal and state legislative, regulatory, and project responses. Under any climate-change-impacted scenario, the District may need to consider additional treatment options to respond to water quality impacts such as increased salinity in the Delta, additional storage to take advantage of more wet-season water, additional all-weather supply to replace reduced water supply from existing sources, and additional water transfers (depending on water market impacts).

Infrastructure

The Central Valley has 2,600 miles of levees that are vital to flood protection and water quality. Yet the integrity of those levees has been neglected for decades. DWR warned that California's major levee system "is deteriorating and, in some places, literally washing away." Professor Jeffrey Mount of UC Davis calculates that there is a 2-in-3 chance of a massive levee collapse in the next 50 years. An earthquake that affects the Sacramento-San Joaquin Delta could reduce the District's ability to take its imported water supplies from both the CVP and SWP, either from conveyance system outage or saltwater intrusion due to Delta island levee failure. In addition to disrupting contract supply deliveries, outages to this conveyance system would also impact the District's ability to put water into or take water from the Semitropic Water Bank, or to take delivery of water transfers from most sources.

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[4] The District's countywide demand projections used in UWMP 2005 include future demands from Coyote Valley, Vision North San José, and Evergreen East Hills Vision strategy.

SWP Infrastructure

As its infrastructure ages, the SWP becomes increasingly vulnerable to natural disasters. This is particularly true of the Delta levee system, the South Bay Aqueduct, and the California Aqueduct, which are susceptible to floods and earthquakes. In June 2004, a levee in the Jones Tract of the Delta failed, resulting in total inundation of the island and disrupting SWP operations. Catastrophic loss of either the Delta levee system or the aqueducts would shut down the project, affecting the welfare of millions.

Projections of water available to the District from the SWP assume that DWR's current efforts to obtain permits to expand the pumping limits to 8,500 cfs at its Harvey O. Banks Pumping Plant proceeds successfully.

Conclusions of the "The South Bay Aqueduct Improvement and Enlargement Study" found that the existing capacity of the South Bay Aqueduct is approximately 260 cfs and the existing reliable capacity of the South Bay Pumping Plant is approximately 270 cfs, with one 45 cfs unit identified as a spare. Design and construction activities to increase the capacity of this system to 430 cfs are scheduled to be completed in 2008.

SFPUC Infrastructure

The SFPUC-SCVWD intertie was constructed to provide emergency back-up supply or to serve as an interconnection between the two systems for exchange of water during planned maintenance. This intertie was utilized during the recent construction projects at two of the District's plants.

Regulatory Actions

The District imports water through the Sacramento-San Joaquin Delta (Delta) under contracts with the SWP and the federal CVP. The Delta is the largest estuary on the west coast and supports more than 750 species of plants and wildlife. The Delta also provides water supply to more than two-thirds of the population in the state and to agriculture in the Central Valley and the San Felipe Division. However, decades of competing demands have taken a toll on the Delta and today it no longer functions as a healthy ecosystem or as a reliable source of water. Regulatory actions to protect threatened or endangered fish have reduced the reliability of Delta water supplies.

In the last 15 years, major changes have been made in operating the SWP and CVP as a result of State Water Resources Control Board regulations to protect Delta water quality, and as a result of required actions under the Endangered Species Act to protect and restore endangered and threatened fisheries species. These regulations have required substantial increases in Sacramento Valley stream flows and Delta outflow, as well as reduced Delta exports at certain times of the year. More than $1 billion in environmental restoration has been invested through the CALFED Bay-Delta Program, and under the authority of the 1992 Central Valley Project Improvement Act. As a contractor of both the SWP and the CVP, the District contributes both water and restoration funds to safeguarding the Delta ecosystem.

There also is the potential for a halt in Delta export pumping to protect endangered fisheries. The "take" of listed endangered species is regulated under the Endangered Species Act. The operation of export pumps in the Delta may result in the incidental take of fish such as the delta smelt, a listed species. When take limits are exceeded, the export pumping is reduced or halted to protect endangered fisheries, potentially reducing export deliveries. As more is learned about the impacts of water system operations on fisheries, operations of water facilities statewide as well as locally may change, further altering the water supply outlook

The listings of the winter run Chinook salmon and the delta smelt under the ESA have already had significant impacts on SWP and CVP pumping from the Delta. Pumping capabilities are restricted in months when resident fish populations are most vulnerable or migrating fish may be adversely impacted. For example, in the summer of 1999, the U.S. Fish and Wildlife Service ordered a reduction in pumping in the Delta to protect a threatened fish, the delta smelt.

The Delta pumping restriction in June resulted in San Luis Reservoir storage being 400,000 af lower than expected, causing serious concern that in later summer months the reservoir would be too low to allow pumping to serve Santa Clara County. When reservoir levels drop below 200,000 af, the quality is unacceptable for treatment and consequently, the District suffers a CVP supply interruption.

Institutional, Political and other Uncertainties

Institutional and political uncertainties are risks due to changing institutional structures or political climates. To stay abreast of institutional and political changes, the District coordinates with other agencies and coalitions and advocates for District water supply and quality interests in regulatory and political arenas.

The District's Government Relations Unit coordinates timely communication and advocacy of the community's water-related interests with the U.S. Congress, state Legislature, state and federal regulatory agencies, and local governments. In addition, the District's Imported Water Unit acts as a liaison with the DWR and the State Water Contractors regarding SWP issues and operations and with the USBR regarding CVP issues and operations. The District plays an active role in resolving Bay-Delta issues, improving source water quality, and strengthening agreements among state and federal agencies and various water users to increase overall reliability of supply. The District is actively participating in the CALFED process and other related processes.

An earthquake that affects the Sacramento-San Joaquin Delta could reduce the District's ability to take its imported water supplies from both the CVP and SWP, either from conveyance system outage or saltwater intrusion due to Delta island levee failure.

4.3 IWRP Study 2003—Water Supply Reliability

Many different types of water resources are available to meet the county's long-term water needs. Choosing wisely among future options, however, is getting increasingly difficult, as multiple water supply issues, risks, and financial challenges complicate the water supply picture.

The IWRP Study 2003 developed a planning framework and supporting modeling tools to enable the District to compare investment options in an environment of continual change and emerging opportunities. This framework allows for a fair and consistent comparison of water supply investment alternatives. IWRP Study 2003 stakeholders assisted the District in developing the planning framework and utilized it to characterize the District's water outlook, assess risks to the water supply, identify and analyze new water resource options, and develop near-term (to year 2010) and long-term (to year 2020 and 2040) water supply recommendations. Reliability, diversity of supply, water quality, and environmental objectives were identified as the most important objectives by the IWRP Study 2003 technical team and stakeholders.

Risk Factors

IWRP Study 2003 identified risks and uncertainties that could affect the District's water outlook. Risks evaluated include random occurrences of hazards and extreme events, climate change, more stringent water quality standards, no expanded capacity of the Banks pumping plant to 8,500 cfs, and demand growth greater than projected. The IWRP Study 2003 risk analysis model was used to evaluate water shortage impacts to the baseline under different risk scenarios.

If the District were to plan to meet all the shortages possible under future risk and those risks did not come to pass, the District would have over invested unnecessarily and placed undue economic burden on the community. To meet future needs efficiently requires looking at different futures (or scenarios), each corresponding to a different combination of risk factors, and identifying what actions are required to meet each possible future should it arise.

Planning Phases

The three phases investigated in IWRP Study 2003 are summarized in Table 4-1 below. The UWMP 2005 planning horizon intersects Phase III which extends to 2040.

Table 4-1 IWRP Study 2003 Planning Phases

Phase	Name	Time Period	Description
I	Near-Term Water Supply Investments and Actions	2003-2010	The IWRP Study 2003 presents specific recommendations for investments and other actions to ensure reliability through 2010, where risks and opportunities are better understood.
II	Flexible Water Resource Strategies	2011-2020	Using the tool of scenario planning, the IWRP Study 2003 provides a detailed analysis of potential water resource projects and possible strategies to meet demands further in the future, where risks are less understood.
III	The Long-Term Outlook	2021-2040	The IWRP Study 2003 presents a general description of the types of investments that may be needed to ensure water quality and reliability in the long term, where uncertainty is the greatest.

Building Blocks

To help formulate recommendations to ensure near-term reliability, water supply building blocks were identified. These included option transfers, groundwater recharge, agricultural conservation, M&I conservation, and re-operations. The District maximizes those supply investments that are flexible, modular, and scalable to adapt to changes in future water demands. This helps minimize the risk of over- or under-investing capital, or overbuilding.

Phase I—Near-Term Water Supply Investments and Actions

The IWRP Study 2003 risk analysis revealed that shortages are relatively small and infrequent through 2010. If the District does not implement any new water resource projects, the chance of shortage per year is 4 to 8 percent by year 2010, depending upon how risk factors unfold.

Using the building blocks, a "No Regrets" portfolio was developed to help ensure reliability through 2010 and perhaps 2020 to levels that could be managed through contingency planning and response, depending on how risk factors unfold. The "No Regrets" portfolio calls for the following new near-term investments:

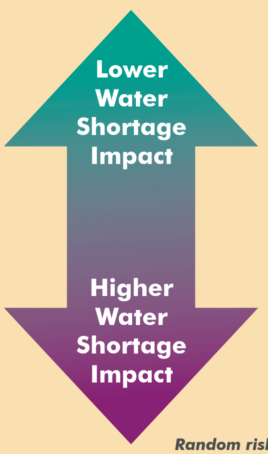
- 28,000 af of additional annual savings from agricultural and M&I conservation.
- 20,000 af of additional groundwater recharge capacity.
- 60,000 af of additional capacity in the Semitropic Water Bank.

The District costs for this improved supply reliability are expected to total $42 million (in real dollars), which includes improved capital infrastructure, operations and maintenance (O&M) expenditures, and program implementation. As the "No Regrets" portfolio is implemented, the District will continuously monitor for trends, risks, and opportunities that could trigger the need for longer-term supply investments.

Phase II—Short-term Flexible Water Resource Strategies

For years 2011 or so to 2020, with the "No Regrets" portfolio in place, the range of shortages in the scenarios varies from less than 1 percent chance of shortage in any given year, with an average shortage of 45,000 af (when shortage occurs) to a 27 percent chance of shortage with an average magnitude of 95,000 af. The Phase II risk scenarios including frequency and expected shortage are shown in Figure 4-4 below.

Figure 4-4 Shortage in Risk Scenarios for Years 2011 through 2020



Risk Scenario	Frequency of Shortage (%)	Average Expected Shortage in Acre-feet (when shortage occurs)
Random Occurrences	Less than 1%	45,000
Climate Change	2%	50,000
More Stringent Water Quality Standards	3%	60,000
No Expanded Banks Permit	5%	65,000
Demand Growth Greater than Projected	6%	80,000
No Expanded Banks Permit and Climate Change	7%	75,000
All Risk Events	27%	95,000

Random risks are included in every scenario.

For all the risk scenarios, the response beyond 2020 will require some additional all-weather supplies, storage, or other investments and the necessary additional funding to meet needs and ensure water supply reliability.

Phase III—The Long-Term Outlook: 2020 and beyond

Planning for a broad range of risk requires flexible solutions. Since it is unknown at this time what responses will be implemented before 2020, IWRP Study 2003 does not present portfolio investments beyond year 2020. Rather, it presents general descriptions of the types of investments that may be needed to manage these risks in the more distant future.

Additional supplies will be required, but it is premature to identify the proportional components of the supply mix. Beyond 2020, potential supplies include additional all-weather supplies that will be necessary and additional building blocks above those identified in IWRP Study 2003, such as advanced treatment of recycled water for groundwater recharge or possibly aggressive development of desalination. IWRP Study 2003 also identified the need for additional storage or a corresponding incremental increase in all-weather supplies by 2030. An expanded banking participation, a new 100,000 af reservoir, desalination, or recycling could all reduce shortages through 2030 to negligible levels.

Risks such as climate change, changes in water quality standards, issues in the Delta, and demand growth greater than projected all have the potential to impact District supplies in the long term, although the degree of impact is unknown at this time. In addition, raw water and treated water conveyance systems may not have appropriate capacity to transport larger quantities in shorter timeframes. The capacity of these systems and infrastructure to address future water conveyance needs is to be addressed as part of the District's Water Infrastructure Master Plan. The District will continue to monitor risks that can change the water supply outlook and will work to influence key external decisions that have the potential to impact baseline and potential water supplies.

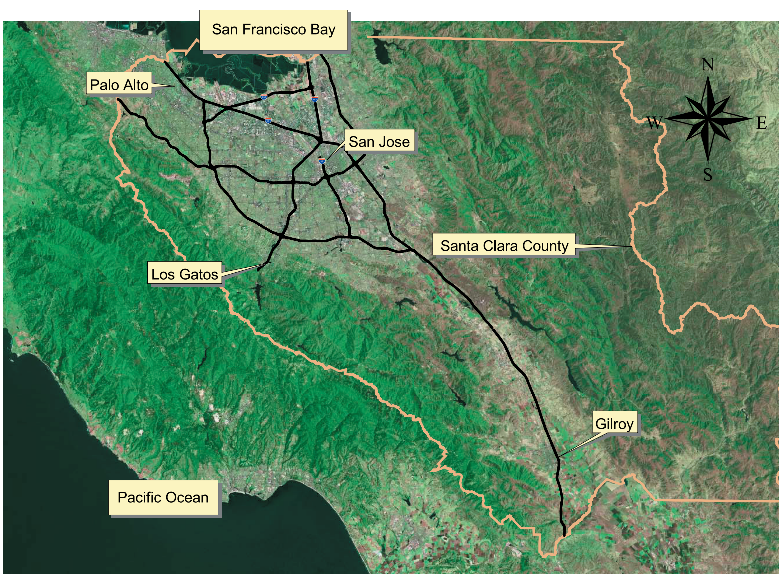
5

Water Demand Forecast and Demand Management Measures

This chapter includes a description of the District's water demand planning, the methods behind these projections, the projected water demand to the year 2030 and a description of District demand management measures. Also included is a discussion of Santa Clara County climate, demographics and economy. Past and current water uses are identified, including an estimate of water use by different customer segments.

5.1 Climate

The county's Mediterranean semi-arid climate is temperate year-round, with warm and dry weather lasting from late spring through early fall. Average annual precipitation ranges from 14 inches on the valley floor to 45 inches along the crest of the Santa Cruz Mountains. As shown in Figure 5-1, most precipitation occurs between the months of December and March. The county's temperature is generally moderate with the average maximum annual temperature for San José of 71 degrees Fahrenheit, the average minimum annual temperature is 49.5 degrees F and average annual evapotranspiration (ETo) is 49.35 inches.



Based on the 125 years of recorded rainfall in the county, the average annual rainfall in downtown San José is about 14 inches and ranges from a low of 4.8 inches to a high of over 30 inches. Figure 5-2 shows the variability in historical rainfall that has occurred in downtown San José. During very wet years like 1983, in which 32.5 inches of rain fell and generated more water supply than could be put to beneficial use, the excess water created flooding throughout the county and was lost to the Bay. But in very dry years such as 1976, when only 5.77 inches of rain fell, the water supply generated was extremely low and did not produce enough water to meet demands.

Table 5-1 provides climate data for four weather stations in Santa Clara County. San José represents the center of the county, while Los Gatos represents the wetter western portion, Palo Alto represents the northern cooler bayland portion and Gilroy represents the southern inland warmer portion.

Figure 5-1 Historical San José Monthly Rainfall Averages

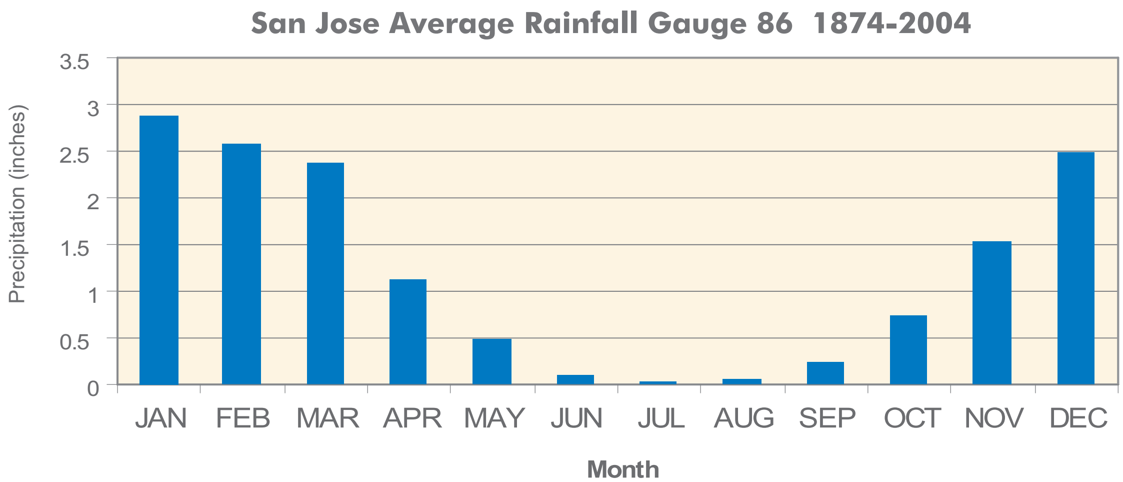


Figure 5-2 Historical San José Yearly Rainfall Averages

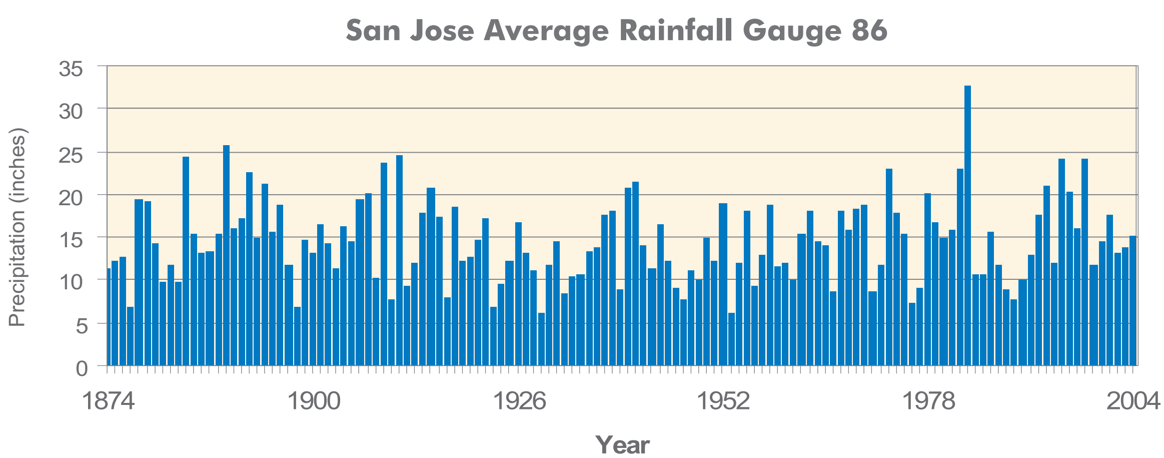


Table 5-1 Historical Average Monthly Climate Data Period of Record 7/1/1948 to 9/30/2004

San Jose, CA (047821)	Jan	Feb	Mar	Apr	May	Jun	
Average Max Temperature (F)	58	62.1	65.6	69.8	74.4	79.3	
Average Min Temperature (F)	41.5	44.2	45.7	47.6	51.2	54.8	
Average Total Precipitation (in.)	2.95	2.51	2.23	1.08	0.4	0.09	
EvapoTransportation (ETo)[1]	1.35	1.87	3.45	5.03	5.93	6.71	
	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max Temperature (F)	82.1	81.8	80.7	74.6	65.1	58.1	71
Average Min Temperature (F)	56.9	57	56.2	51.9	46	41.7	49.5
Average Total Precipitation (in.)	0.03	0.08	0.2	0.74	1.75	2.44	14.49
EvapoTransportation (ETo)[1]	7.11	6.29	4.84	3.61	1.8	1.36	49.35
Los Gatos, CA (045123)	Jan	Feb	Mar	Apr	May	Jun	
Average Max Temperature (F)	58	61.9	65.5	70.5	75.9	81.6	
Average Min Temperature (F)	38.3	40.5	41.9	43.7	47.5	51.2	
Average Total Precipitation (in.)	5.39	4.6	3.69	1.64	0.48	0.08	
	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max Temperature (F)	85.7	85.1	83	75.8	65.2	58.2	72.2
Average Min Temperature (F)	54	53.8	52.7	48.3	42.6	38.5	46.1
Average Total Precipitation (in.)	0.03	0.06	0.23	1.11	2.94	4.48	24.73
Palo Alto, CA (046646)	Jan	Feb	Mar	Apr	May	Jun	
Average Max Temperature (F)	57.5	61.3	64.1	68.4	72.8	77.4	
Average Min Temperature (F)	38.6	41.3	43.2	44.8	48.5	52.5	
Average Total Precipitation (in.)	3.23	2.88	2.22	0.99	0.37	0.08	
	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max Temperature (F)	78.2	78.5	78.2	73.1	64.5	58	69.3
Average Min Temperature (F)	54.8	54.7	52.8	48	42.5	38.2	46.7
Average Total Precipitation (in.)	0.02	0.05	0.18	0.71	1.86	2.69	15.28
Gilroy, CA (043417)	Jan	Feb	Mar	Apr	May	Jun	
Average Max Temperature (F)	59.7	63.5	67.2	72.4	77.8	83.6	
Average Min Temperature (F)	37	40.3	42.5	44.3	48.2	51.9	
Average Total Precipitation (in.)	4.44	3.89	3.23	1.44	0.37	0.11	
	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max Temperature (F)	88.1	87.9	85.7	78.8	67.4	60.1	74.4
Average Min Temperature (F)	54	54.2	52.6	47.9	41.6	36.8	45.9
Average Total Precipitation (in.)	0.05	0.06	0.38	0.86	2.56	3.38	20.76

[1]Period unknown CIMIS Station 69
Source: National Weather Service, except for ETo: CIMIS

5.2 Demographics and Economy of Santa Clara County

Santa Clara County is home to a very dynamic economy and approximately 1.7 million people (U.S. Census Bureau, 2002 Census). Urbanization has replaced the orchards of North County over the past several decades, while agriculture remains an important part of the South County area.

The county's economy is a key element in the Northern California Bay Area, providing almost 30 percent of all the jobs in the region. Nicknamed "Silicon Valley," historically about one of every five of the county's jobs was in high technology.

The economic recession over the last few years has led to a loss of jobs, particularly in the technology sectors. The technology sector recovery has lagged coming out of the recent recession. Layoffs and slow economic recovery in the recent years is estimated to result in the net loss of more than 140,000 jobs in the region. Due to this economic decline and slow recovery, Association of Bay Area Governments (ABAG) Projections 2005 projects fewer jobs in 2005 than in 2000. The job losses are most pronounced in the manufacturing and financial/professional/retail services. The result of this recession and movement of oversees manufacturing is a significant reduction in the number of high water using industries such as chip manufacturing. Many service areas in the county saw a reduction in water use from 2001 to 2003, particularly in the non-residential sectors. Total county water use declined by almost 5 percent from 2001 to 2003. ABAG Projections show a decrease in jobs from 2000 to 2005, with some job sectors not recovering to 2000 levels until at least 2010. The 2000 to 2004 job losses are shown in Figures 5.3 and 5.4. According to ABAG, the long-term trend for the county's economy is expected to become more stable with slow job recovery from 2005 through 2015, with some job sectors growing while others shrink. Health, education and recreational job sectors are expected to grow the most. ABAG began using Smart Growth [Urban Densification] principals in the 2003 projections. According to ABAG, smart growth policies will result in more growth in the urban Santa Clara County as planned interconnecting transit systems become reality. Significant job growth is expected in the years 2015 to 2030.

Figure 5-3 Manufacturing, Wholesale and Transportation Jobs

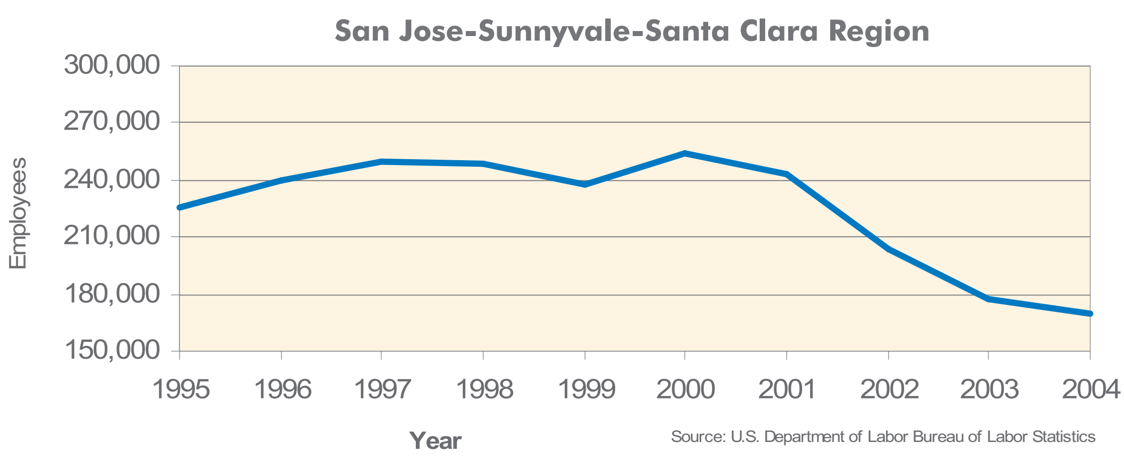
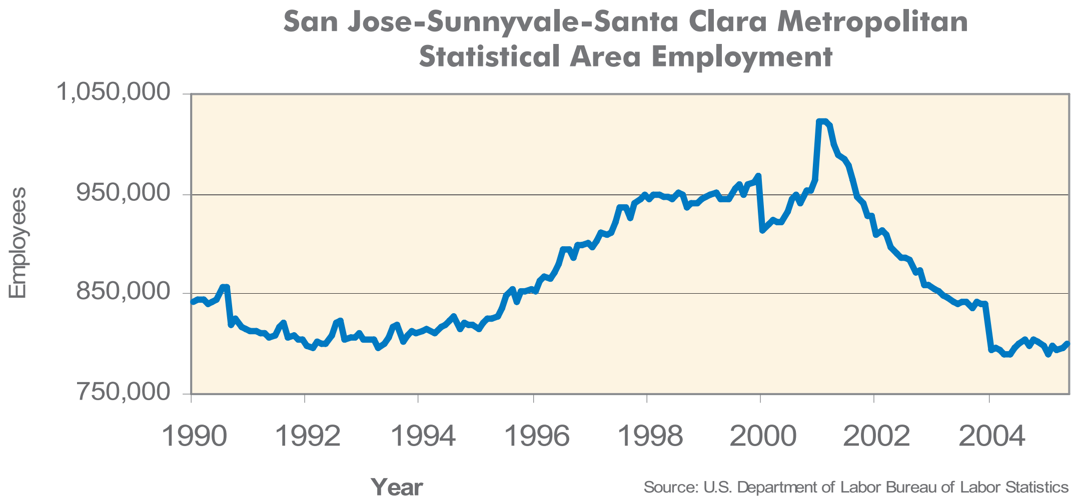


Figure 5-4 All Jobs



The total county population in 2000 was 1,682,585. ABAG projects that the county population will rise to 2,267,100 by the year 2030, almost a 35 percent increase. San José, the largest city in the county, recently ranked as the tenth largest city in the nation with an estimated population of 904,522 residents. By 2030, San José's share of the county's population is expected to increase to 59 percent of residents, from a current share of 56 percent.

ABAG projects the county will add almost 200,000 new households, from 565,863 in 2000 to 762,720 by 2030. The number of persons per household is expected to continue to be higher than the historical average, and an increasing number of those employed here will not be residents of the county. This job/housing imbalance is expected to keep housing costs in the area among the highest in the nation. Median home prices are up from $400,000 in 1999 to a spring of 2005 median price of $705,000.

The demographic projections for Santa Clara County from ABAG Projections 2005 are summarized in Figure 5-6. Figure 5-7 illustrates the historic and projected population.

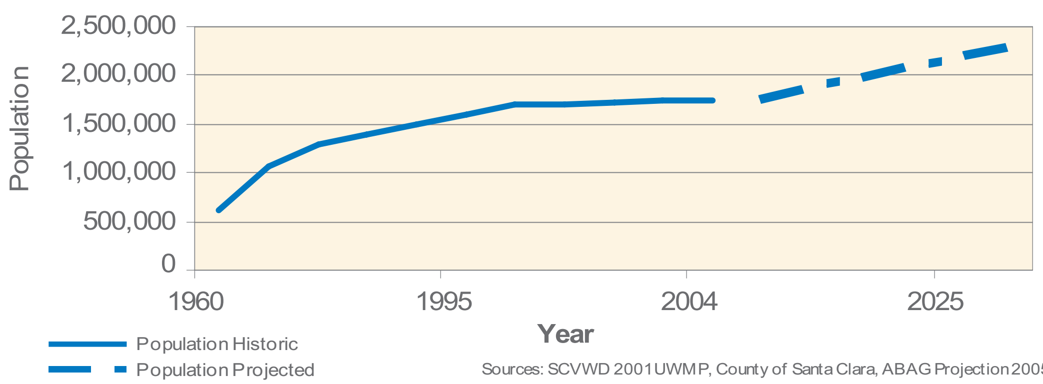
ABAG projects the total number of households and jobs, among other indicators. For water demand projections, it is important to further refine the household sectors by residential subsector (single-family residential versus multifamily residential). This was done for each water service area, where possible, by evaluating water sales data and 2000 U.S. Census Data.

Table 5-2 and Figures 5-5 through 5-8 show the projected number of households, jobs and household income used in the demand projections.

Table 5-2 Santa Clara County Demographics from ABAG Projections 2005

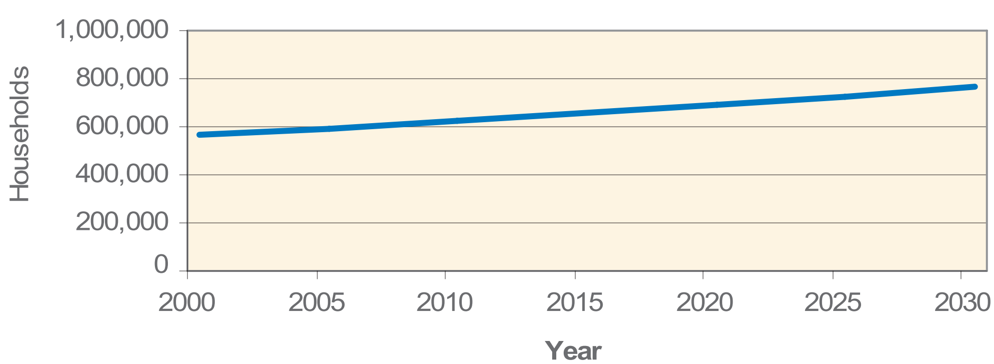
	2000	2005	2010	2015	2020	2025	2030
Jobs	1,044,130	903,840	992,420	1,077,050	1,161,930	1,249,090	1,339,970
Population	1,682,585	1,750,100	1,855,500	1,959,100	2,073,300	2,165,800	2,267,100
Persons Per Household	2.92	2.89	2.90	2.92	2.95	2.94	2.93
Households	565,863	595,550	628,670	660,850	692,440	725,090	762,720
Employed Residents	863,432	734,000	803,200	874,300	944,200	1,019,210	1,086,300
Mean Household Income	$105,300	$94,500	$101,800	$109,700	$116,200	$122,700	$129,000

Figure 5-5 Santa Clara County Population



Sources: SCVWD 2001 UWMP, County of Santa Clara, ABAG Projection 2005

Figure 5-6 Santa Clara County Projected Households



Source: ABAG Projections 2005

Figure 5-7 Projected Jobs

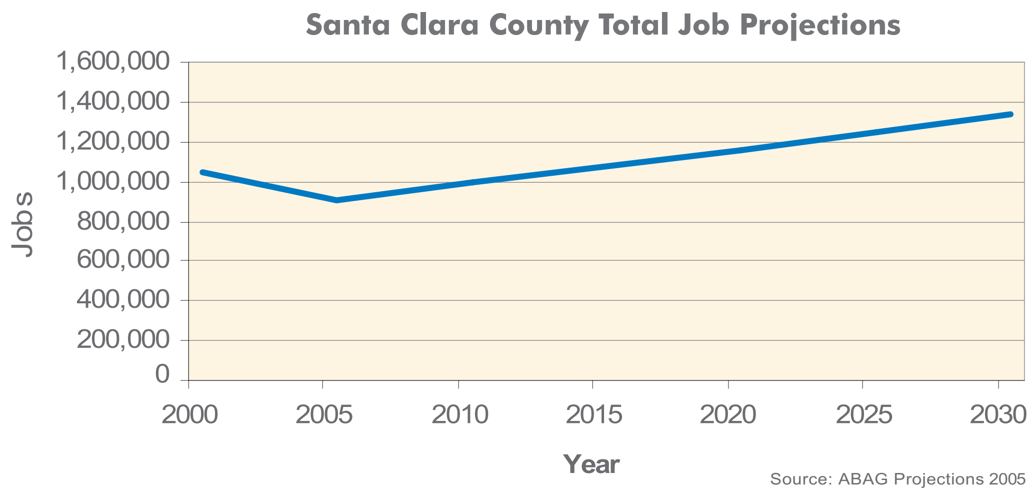
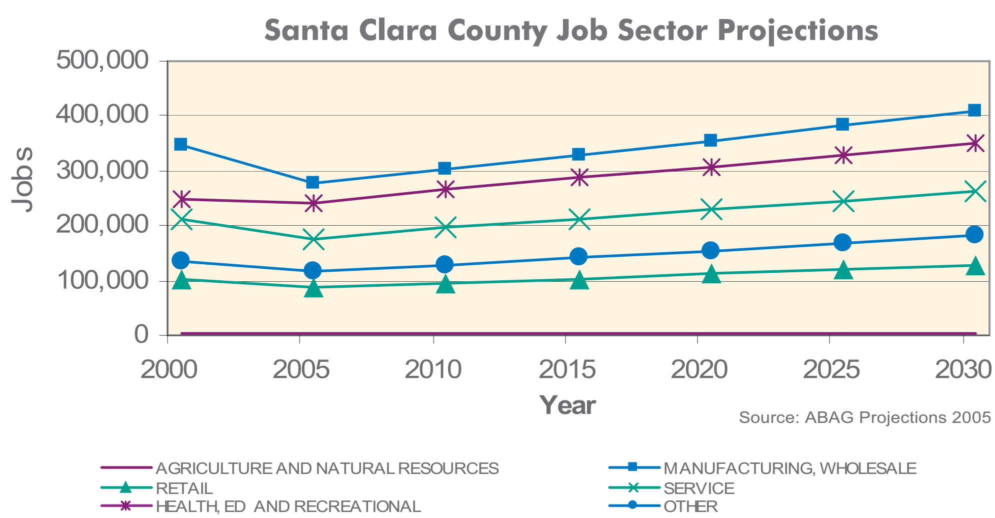


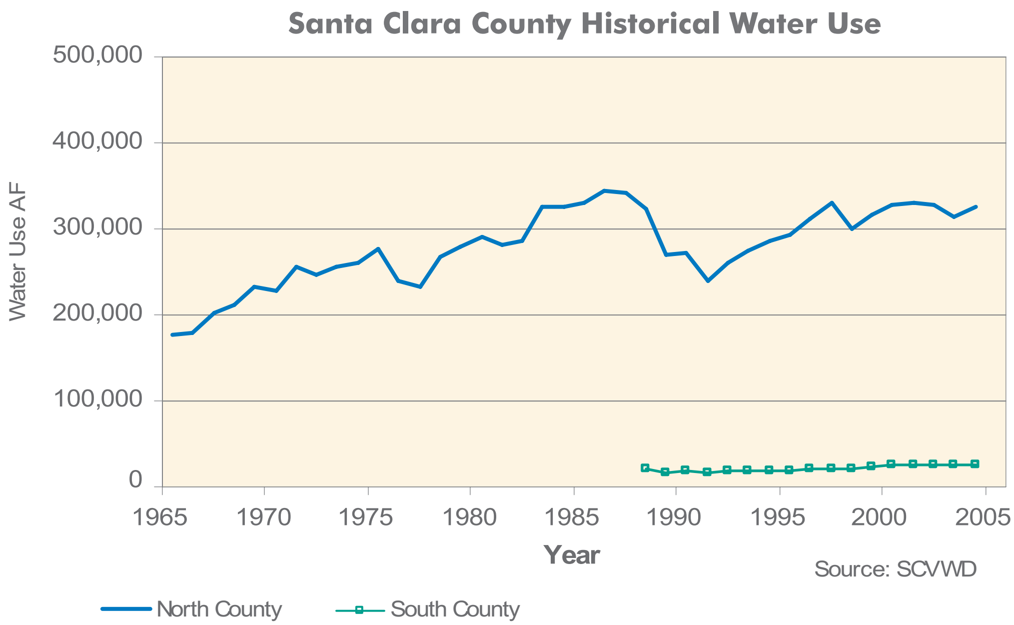
Figure 5-8 Projected Jobs by Sub-sector



5.3 Historical Water Use

Municipal and industrial (M&I) water use, which includes residential, commercial, industrial, and institutional water use, has grown in Santa Clara County as a result of urbanization. Conversely, agricultural water use has declined as irrigated agricultural land has been converted to other uses. Environmental demands, such as water required to meet downstream fishery needs, have been minimal in the past but may become more significant in the future. The District has been recording water use in North County since 1964, but its records for South County water usage are relatively short, beginning in July 1987. For the North County, water use has varied from a low of about 175,000 af in 1965 to a high of about 349,000 af in 1987. In 2000, North County water use was 329,000 af, of which less than 2,000 af was agricultural use. South County total water for the past decade has ranged from about 42,000 af in the drought year 1989 to 56,000 af in 1997. In 2000, the South County water use was 53,000 af, of which 28,000 af was agricultural water use. Figure 5-9 shows the M&I water use for both areas of the county.

Figure 5-9 Santa Clara County Municipal and Industrial Water Use



The most dramatic variations in Figure 5-9 are the drops in use during the droughts of 1976-1977 and 1987-1992. Due to supply limitations, either voluntary or mandatory use reduction measures were enacted in these years. After a drought ends, water demands may return to previous levels as people replace lost landscape and return to previous water use habits. The years after the 1977 drought show this effect. The rebound from the most recent drought is more complicated. Given its multi-year duration, there is some indication that some of the water use changes made during the drought have led to permanent water savings. In addition, water conservation programs implemented since 1992 have been the largest influence in continued demand reduction. It is estimated that water conservation measures implemented since 1992 may have reduced demand by more than 35,000 af. This can be seen in the lack of increased demand since the late 1990s, even though population increased during the same period. Additional demand reduction in recent years has been observed in the non-residential sector. This reduction can be attributed to conservation efforts, the recent economic recession in the region and shifts in technology and relocation of manufacturing. This may represent a permanent loss of water demand in this formerly high water use sector. Residential water use increases also have been minimized as a result of water conservation, a weak job economy and high housing costs which caused a migration of people out of the Bay Area.

5.4 UWMP 2005 Demand Projection

As part of the UWMP 2005 the District updated the water demand forecast from the IWRP Study 2003. The intent of these forecasts is to determine emerging trends in water use to determine if the projected water demands compare to our planned long term water supply program. The updated water demand projection for the county is based on the most current demographic projections available by census tract at the time the analysis was performed (ABAG Projections 2005). The exception to this is the demand projections for the specific common SFPUC customers that are based upon the 2003 SFPUC Demand Study Report. In that study, ABAG 2002 projections were used for the end use model developed for SFPUC by URS Corporation. In order to ensure consistency with the District's overall demand projections, the SFPUC projections for the common SFPUC customers were compared to the District projections using ABAG Projections 2005. The District demand projection for the common SFPUC customers and all the retailers as a whole was within an acceptable tolerance of 1 percent.

5.5 District Water Demand Projection Methodology

The District chose to use regional growth projections prepared by ABAG to predict future water demand. Land-use considerations are used by ABAG to develop its demographic projections and thus are factored into the District's water demand projections. Land use methods are commonly used by city and county planning departments since water use impacts from general plans and zoning changes can be more easily quantified. Such methods are more difficult for wholesale water agencies like the District, since over a dozen general plans are within the District's service area and water use data by land-use-zoning type for Santa Clara County is not readily accessible.

The District's water demand projections used the IWRMAIN (Institute for Water Resources—Municipal and Industrial Needs) forecasting model, a tool developed in the 1980s under the direction of the U.S. Army Corps of Engineers Institute of Water Resources to improve water use forecasting within the Corps. In addition to the Corps, IWRMAIN has been applied to major water utilities throughout the United States, including many in the West such as the City of San Diego Water Utilities Department and the Metropolitan Water District of Southern California. The latest version of the software model, Version 6.1, was utilized for this demand projection. Input data included regional growth projections (ABAG 2005) which were allocated to the water retail agencies' customer classes. Other data was obtained from the U.S. Census Bureau, California Department of Finance, water master plans, urban water management plans, general plans and discussions with water retailer and city planning staff.

IWRMAIN uses base year water use and demographic, housing, and business statistics to estimate existing water demands together with the official projections (provided by regional planning agencies like ABAG) of population, housing, and employment to derive projections of water use in future years. The data required by the model is more readily available than GIS-based models, relying on socio-economic data generally available from the U.S. Census and demographic projections available from ABAG. In developing their demographic projections, ABAG looks carefully at local governments' plans and policies while factoring in the regional economic and demographic conditions, giving a more balanced view of the future of the region than can be achieved from analyzing general plans alone.

The District refers the reader to the retailers' UWMPs for discussion of their individual projection methods.

5.6 Water Demand Model

As a wholesaler, the District does not have detailed billing/sales data by customer class. In an effort to project demand by customer class (i.e., residential, business, irrigation), monthly/bimonthly billing data was obtained from the water retail agencies for years 2000 to 2003. Each water agency has different billing categories which makes countywide sector use difficult to project in a fine level of detail. However, the data was sufficient for most agencies to at least differentiate between residential and non-residential water use. The 2000 water sales data was used as the base year, which coincides with a census year and near average weather.

The countywide demand was calculated as was the demand for distinct geographic and hydrologic areas. The District's demand projection approach, based on the IWRMAIN demand forecasting modules, disaggregates total urban water use into spatial and temporal components (spatially by District Water Service Areas [WSA]; temporally by monthly variation, and sectorally by the variations of water use among the various customer classes and sectors).

Projecting water use by WSA helps in groundwater basin management and facilities planning. In addition, since each WSA has a different demographic makeup and different growth rates, spatially disaggregating the water use projection forecasts by WSA gives a more accurate total water demand projection result.

The water demand is further categorized by the customer sectors that are using the water: residential, non-residential, public, and unaccounted-for uses. Residential water use is that used in a household environment, either indoors for toilet flushing, cooking, or washing, or outdoors for landscape watering. Non-residential water use is that associated with commercial, industrial, school and government uses. In the District's modeling, public water use is that water used for public large landscapes. Unaccounted-for water use includes un-metered uses, for example, fire hydrants, distribution system maintenance, and system losses.

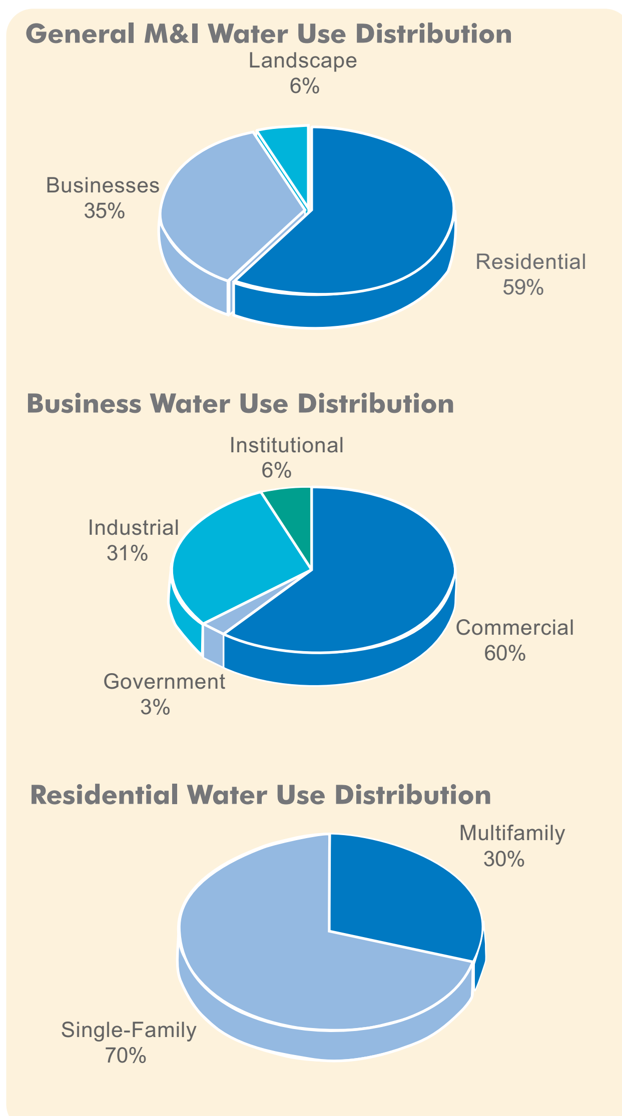
The water demands for each sector in a given WSA are expressed as a product of (1) the number of users (i.e., demand drivers such as the number of housing units, employees, etc.) and (2) the water use per unit (e.g., per household or per employee) as derived from the 2000 base year water use by sector and housing and employment demographics. Other demand driver variables employed in the model include climate (average monthly precipitation and high temperature), household size and household income.

5.7 Use by Sector

Currently, District records show that the water use in the county is about 91 percent municipal and industrial and about 9 percent agricultural. As a wholesaler, the District does not have water use data segregated by class. However, the estimated breakdown by sector, based on water retailer sales data, appears in Figure 5-10.

Figure 5-10 County Water Use by Sector

Note:
Landscape represents only metered landscape uses. Landscape irrigation would represent a much larger use.



Although the District collects and analyzes water use patterns based on retailer use-by-class data, each of the retailers in the county also uses a different classification breakdown, making compilation or analysis of the information difficult. This breakdown does not include all water use in the county, as some retailer data does not distinctly separate all residential uses from non-residential uses, and was therefore not included in the analysis. Therefore, the following figures should be used as a rough countywide estimate of customer classes.

5.8 Water Demand Projection Results

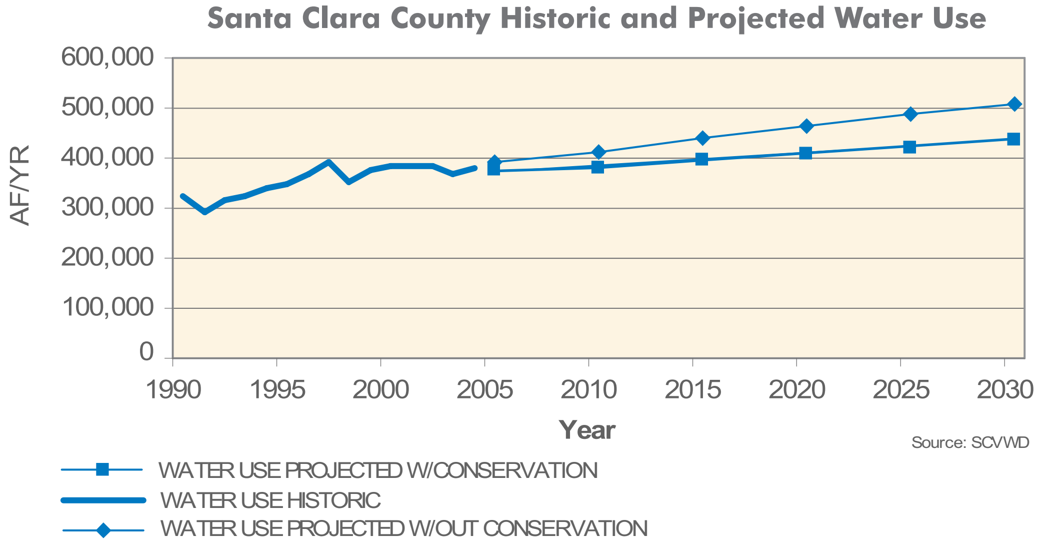
Table 5-3 tabulates the countywide M&I and agricultural water demand projections as well as the conservation projections, resulting in the water demand. Figure 5-13 shows the historical and projected county water demand.

Table 5-3 Projected Water Demand and Conservation Projections (af/year)

Year	2004 Actual[1]	2005	2010	2015	2020	2025	2030
M&I Demand[2]	351,600	360,600	385,200	414,600	441,400	466,600	492,400
Agricultural Demand[3]	29,000	30,000	30,000	30,000	30,000	30,000	30,000
Subtotal All Demand	380,600	390,600	415,200	444,600	471,400	496,600	522,400
2000 Baseline Conservation Programs[4]	N/A[5]	13,000[6]	23,200[6]	30,100[6]	38,000[6]	42,800[6]	46,200[6]
Added Conservation 2003 Draft IWRP No Regrets Option[7]	N/A	0	9,300	18,600	28,000	28,000	28,000
Total Water Conservation Savings-2000 Base year	N/A	13,000	32,500	48,700	66,000	70,800	74,200
Total Countywide Demand	380,600	377,600	382,700	395,900	405,400	425,800	448,200

1 2004 Calendar Year Recorded Use by SCVWD for reference and not used in modeling.
2 SFPUC Customer Demand + SCVWD Demand for Non-SFPUC Retailers (ABAG Projections 2005) using 2000 as a base year.
3 Agricultural demand projections are based upon metered and reported use of 2004 agricultural water. They were held constant to 2030.
4 District Baseline Water Conservation Savings using existing programs and regulations post 2000. Savings from 1992-2000 were not included for modeling puposes (base year of model is 2000).
5 Previous Water Conservation Savings are captured in the 2004 actual water use numbers.
6 Projected Savings using 2000 as a base year. Does not inlcude 24,300 af of savings that occurred between 1992-2000.
7 District Additional Water Conservation Savings from IWRP Study 2003 "No Regrets" Building Blocks.

Figure 5-11 Historical and Projected Water Demand



Figures 5-12 to 5-14 present localized demand projections for the Santa Clara Valley groundwater subbasin, the Llagas subbasin and Coyote Valley Specific Plan. (A major development is being planned by the City of San José in the Coyote Valley subbasin. Due to the size and uniqueness of this development, it is presented separately.)

Figure 5-12 Santa Clara Valley Subbasin 2030 M&I Water Demand

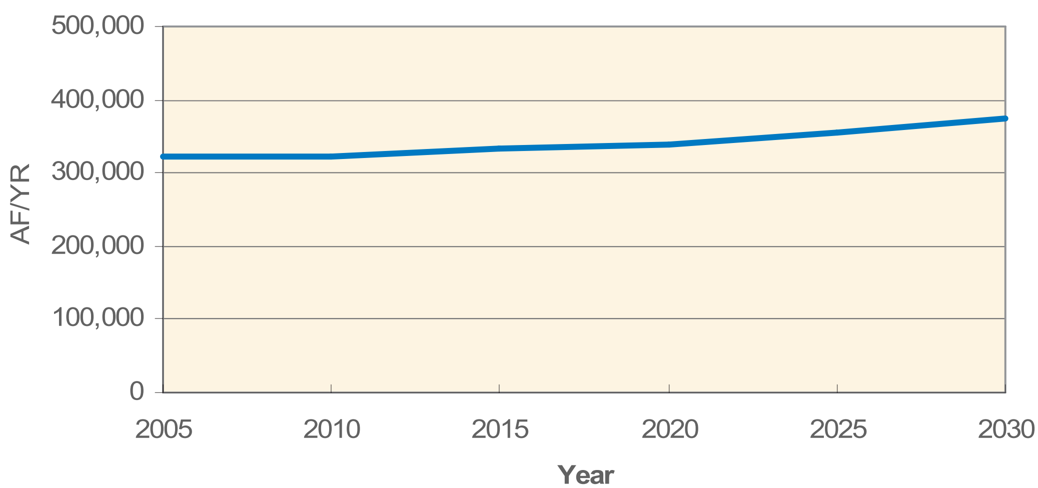


Figure 5-13 Llagas/Coyote Subbasin 2030 M&I Water Demand

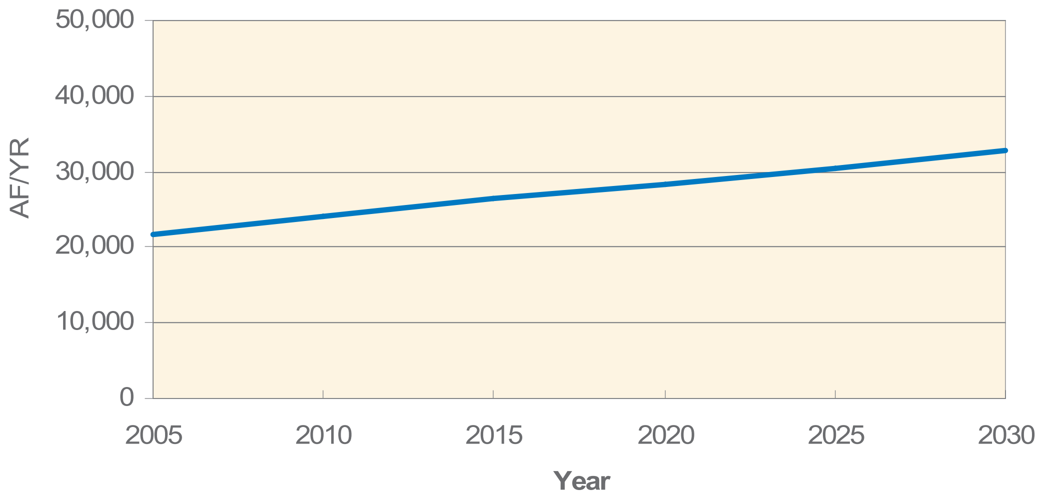
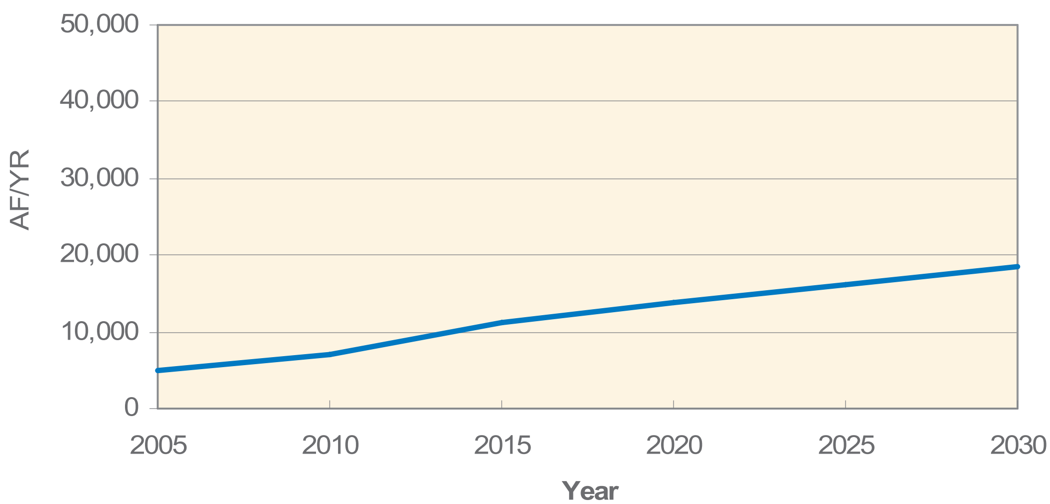


Figure 5-14 Coyote Specific Plan 2030 M&I Water Demand



5.9 Demand Management Measures

5.9.1 Background

The District has been and continues to be a leader in water conservation with programs that are innovative and comprehensive in scope. As one of the initial signatories to the California Urban Water Conservation Council's (CUWCC) 1991 Memorandum of Understanding Regarding Urban Water Conservation Best Management Practices (MOU), the District is firmly committed to the implementation of the Best Management Practices (BMPs) or Demand Management Measures (DMMs).

Besides meeting long-term water reliability goals, water conservation programs help meet short-term demands placed on supply during critical dry periods. The District's IWRP Study 2003 identifies maintaining a diversified water portfolio as an important element in meeting long-term water reliability, and recommends local programs such as water conservation to diversify future investments.

Using 1992 as a baseline, the District expects to save 37,300 af per year by 2005 and 70,500 af per year by 2030 from both passive and active water conservation. These savings do not include an anticipated extra active savings of 28,000 af per year by 2030 that are identified as "building blocks" in the District's IWRP Study 2003. Table 5-4 illustrates the projected savings in five year increments.

Table 5-4 Summary of Water Conservation Program Water Savings from 1992 to 2030

Year	2005	2010	2015	2020	2025	2030
2003 IWRP Baseline Conservation Program Savings (af/yr)	37,300	47,500	54,300	62,300	67,100	70,500
Additional 2003 IWRP Conservation Savings (af/yr) - "No Regrets" Option[1]	0	9,300	18,600	28,000	28,000	28,000
Total Water Conservation Savings (af/yr)	**37,300**	**56,800**	**72,900**	**90,300**	**95,100**	**98,500**

[1]Additional Water Conservation Savings from IWRP Study 2003 "No Regrets" Building Blocks
(Note: Conservation Savings in this table represent total savings using 1992 as the base year, and therefore differ from Figure 5-3 which used 2000 as the base year for modeling demand.)

5.9.2 Implementation of DMMs

The District and its major water retail agencies enjoy a special cooperative partnership in the regional implementation of a variety of water conservation programs in an effort to permanently reduce water use in Santa Clara County.

In addition to the nine water agencies which participate under the umbrella of the District, five agencies have independently signed the MOU. As the water wholesaler for Santa Clara County, the District is responsible for the implementation of six of the DMM's (Appendix F). However, as described in this section, the District has taken the lead in implementation of many of the other DMMs for both the water retail agencies that are signatories and those that are not (Appendix F).

DMM 1 Water Survey Programs for Single-Family and Multi-Family Residential Customers

As the administrator of this program, the District is required to develop and implement a strategy to target and market water-use surveys to single-family and multi-family residential customers. By July 1, 2008, the District should have completed residential surveys for 15 percent, approximately 80,000 surveys, of all single-family and multi-family customers (there are approximately 355,000 single-family dwellings and 195,000 multi-family residential units countywide). Including partial credit for previously completed residential water surveys (audits) performed by San José Water Company, an average of approximately 8,000 surveys per year countywide are needed to stay on track to meet the overall coverage requirement. It should be noted that the annual target will ramp up each year. Since 1998, the District has performed over 18,000 residential audits (See Table 5-5).

To work towards attaining this goal, staff developed a pilot program in July of 1998 targeting the top 20 percent of residential customers within the five participating water retail agencies (the cities of Milpitas, Morgan Hill, Mountain View, Santa Clara, and the San José Municipal Water System). Water savings per survey ranged from 43 to 78 gallons per day from a sample of survey participants. Surveys include educating the customer on how to read a water meter; checking flow rates of showerheads, faucet aerators and toilets; checking for leaks; installing low-flow showerheads, aerators and/or toilet flappers if necessary; checking the irrigation system for efficiency (including leaks); measuring landscaped area; developing an efficient irrigation schedule for the different seasons; and providing the customer with evaluation results, water savings recommendations, and other education materials. In 2004, the District began programming a homeowner's controllers as well (i.e., if allowed by the homeowner, the surveyors will input the recommended schedules into the controller).

The District's largest retailer, the San José Water Company (SJWC), offers water surveys for customers who call regarding a high water bill and/or in response to District marketing efforts. The District supports SJWC's residential survey program by providing free water conservation supplies, such as showerheads and faucet aerators. SJWC began performing residential audits at the end of 1991 and is estimated to have completed well over 9,000 audits since the program began. Water meters are tested for accuracy, and an examination is performed throughout the household to identify any water leaks. In addition to the indoor residential audits, SJWC further developed the landscape component of their audit program in 1994 to provide an extensive evaluation of the resident's landscape irrigation system. Through this program, residents are also trained on how to efficiently program their irrigation controllers.

In fiscal year 04/05, the District in cooperation with its retailers, offered surveys to 61,000 single-family accounts and 10,926 multi-family accounts via letters mailed to the highest 30 percent of water users within the participating retailer's service area. Countywide, each year this program is also promoted through a summer media campaign which typically includes television, radio, and print ads.

Table 5-5 Number of Residential Water Surveys Completed

	1998-2001	FY 2001/02	FY 2002/03	FY 2003/04	FY 2004/05
SCVWD SF Surveys	2,167	2,125	2,530	1,567	1,306
SCVWD MF Surveys	2,007	3,273	958	824	2,414
SCVWD SF Surveys	7,430	227	1,128	1,597	1,206
SCVWD MF Surveys	2,336	204	1,733	570	470

DMM 2 Residential Plumbing Retrofit

Beyond surveys, another DMM calls for high-quality, low-flow showerheads to be distributed to not less than 10 percent of single-family connections and multi-family units every two years until a 75 percent saturation of pre-1992 residences is obtained. The District makes low-flow showerheads and aerators available to residents free of charge through the water retail agencies, residential water surveys, and public events. Since program inception in 1992, over 215,000 low-flow showerheads and aerators have been distributed throughout the county (See Table 5-6).

Based upon a study recently completed by the District, Santa Clara County Residential Water Use Baseline Study (August 2004), the county is nearing the 75 percent saturation threshold and completion of this BMP. The study found saturation rates of 59 percent for pre-1992 constructed single-family homes and 51 percent of pre-1992 constructed multi-family units. A CUWCC report, Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices, estimates the average lifespan of a showerhead to be 3-7 years, and the average lifespan of an aerator to be 1-

3 years. Given that 13 years have passed since the efficiency standard was enacted, the District's study suggested the effects of natural replacement will move the county to the 75 percent threshold in the near future (2006 for single-family and 2010 for multi-family).

The District does plan to continue offering free showerheads and aerators through its Water-Wise House Call Program and its limited outreach events.

Table 5-6 Number of Showerheads and Aerators Distributed

	1998-2001	FY 2001/02	FY 2002/03	FY 2003/04	FY 2004/05
Showerheads	96,630	13,696	8,025	6,060	3,595
Aerators	33,099	22,463	17,275	10,095	4,610

DMM 3 System Water Audits, Leak Detection and Repair

The District has fulfilled this DMM by operating a distribution system survey and leak detection program since 1991. The Leak Detection Program is in the operation and maintenance of its wholesale treated water distribution and groundwater recharge systems. All facilities are 100 percent metered or gauged. The District's Leak Detection Program includes: 24-hour-per-day monitoring of meters on all major conveyance facilitates; daily flow records; monthly inspections; and water balances. Meters are calibrated regularly as part of the District's preventive maintenance program.

Flows in major facilities are monitored continuously with a SCADA system in the District's Operations Center, located at the Rinconada Water Treatment Plant and at each of the District's other two water treatment plants. Technicians and operators perform daily and monthly inspections. Daily they record metered and gauged flows to verify system integrity. Monthly, the right-of-ways—in which facilities are buried—are inspected by helicopter for signs of leakage. Also monthly, an overall water balance and a treated water supply balance are conducted to establish and identify errors such as possible meter problems or distribution leakage. An error of greater than 5 percent will result in an investigation.

The District operates a facility for meter testing. Smaller meters up to 24 inches are tested based upon volume or time period. The program follows AWWA standards. Larger meters are periodically tested volumetrically where feasible. All meters are regularly calibrated to manufacturer's specifications as part of the District's preventive maintenance program.

Table 5-7 Leak Detection Program Audit Results

	FY 2000/01	FY 2001/02	FY 2002/03	FY 2003/04
Metered sales (af)	136,516	133,937	140,510	139,142
Other system uses (af)	63,881	51,994	54,045	53,810
Total supply (af)	203,804	187,707	190,156	197,047
Percent of total production	98	99	102	98

DMM 4 Metering with Commodity Rates, for all New Connections and Retrofit of Existing Connections

This DMM requires water meters for all new connections and billing by volume of use, as well as establishes a program for retrofitting any existing un-metered connections. The District implements this BMP in accordance with the MOU by metering and billing by volume of use all retail agency potable water supply deliveries. All municipal and industrial water users in the county are currently metered and were metered prior to the adoption of the MOU.

The District operates an aggressive water measurement program for both treated water deliveries and groundwater users. The current water measurement system measures 100 percent of all treated water deliveries, 95 percent of surface-delivered raw water deliveries, and 95 percent of all groundwater pumping. The remaining 5 percent (by volume) of groundwater pumping is done by small water users such as residential well owners. Although these residential wells are not metered, an estimate of water pumping or usage is made to determine the pumping fees. Metering small users such as these residential well owners is (a) indirectly measured, (b) constitutes approximately 115 af and is also (c) the supply used by small landscape irrigators. Because the cost of metering these customers would far outweigh the benefits, these customers' usage is estimated and they pay accordingly.

Additionally, the District, believing there is potential for significant water savings in commercial landscapes, undertook a pilot study of the water used in smaller, commercially designed landscapes. For this study, the District provided sub-meters to three pilot sites and gathered water-use data to determine if a dedicated landscape meter would promote water savings. This pilot program started near the end of 2000. Staff initiated this pilot study as no such study was known at the time (in terms of the result of water savings and the cost-effectiveness of commercial landscapes). Although this study is not the same as a dedicated landscape meter study, one possible outcome is that a less expensive alternative may be for small- to medium-size sites to have commercial landscapes with irrigation sub-meters. Three sites were chosen and are as follows:

Table 5-8 Irrigation Sub-Meter Pilot Program

	City	No. of Sub-meters	Date Installed
Homeowners Association	San Jose	9	Oct/Nov 2000
Homeowners Association	San Jose	9	Oct/Nov 2000
Commercial	Cuperino	2	February 2001

The District provided the meters (at no charge). Each site was responsible for all installation costs. The District collects monthly water use data from each site. This is achieved through the landscapers (as they read the sub-meters and send the data to the District). The District is currently analyzing the sub-meter data to determine whether the program merits expansion.

Finally, the District received grant funding in 2004 to implement a dedicated meter retrofit program. This pilot project attempts to overcome institutional and customer hurdles surrounding the retrofit of dedicated landscape meters. The District has enlisted the support of its retail agencies to integrate more accurate measurement practices in ongoing meter replacement programs. To lower or eliminate customer hurdles, Mountain View and Palo Alto have agreed to contribute funds toward installation costs for those sites identified as having the largest conservation potential.

The total cost of the program, including in-kind contributions from agencies is approximately $202,000 ($100,000 coming from grant funding). The total estimated benefit to participating agencies is $1.8 million with 1750 af of water savings over 20 years.

The District will use the results of this study to determine the feasibility of a large-scale program.

DMM 5 Large Landscape Conservation Programs and Incentives

This DMM calls for agencies, to start assigning reference evapotranspiration-based (ETo) water use budgets to those accounts with dedicated irrigation meters and to start providing water-use surveys to accounts with mixed-use meters by July 1, 1999.

Since 1995, the District has offered and provided large landscape water audits to sites in the county with one acre or more of landscaping. Landscape managers have been provided water-use analyses, scheduling information, in-depth irrigation evaluation, and recommendations for affordable irrigation upgrades. Each Irrigation Technical Assistance Program (ITAP) site receives a detailed report upon completion of the audit. (These reports are also available to the appropriate retailer.) An annual report is generated to recap the previous year's efforts. To generate several reporting and monitoring options, water use history, meter numbers, account numbers, and site contacts and addresses are captured for each site in a specialized database.

ITAP reaches the community through advertising in Tri-County Apartment Association's monthly Apartment Management magazine, colorful flyers at the biannual Home & Garden Show, NCTLC Turf & Landscape Expo, the San José Mercury News, and retailer outreach through direct mailing of personalized letters to high water use customers (over 2,000 are sent annually) and also through city newsletters and business newsletters.

This highly successful and well-received program has conducted 660 (See Table 5-9) audits through 2004. This program is identifying potential water savings of 3,372 af per year.

Table 5-9 ITAP Surveys Completed

	1995-2001	2002	2003	2004	2005 (projected)
Quantity	452	49	86	73	80

The District's staff is currently working on a comprehensive program to develop ETo-based water-use budgets for all large landscape sites by using aerial images and GIS techniques. The project will acquire multi-spectral images of over 900 square miles of Santa Clara County, perform image analysis (classification) to identify the areas of turf, other landscaping, water features, bare ground and hardscape for each parcel (site) and prepare a database of these areas to support Landscape Water Budgets as well as support ITAP.

The District will routinely update each budget using ETo data from the California Irrigation Management Information System (CIMIS) so that the budgets reflect actual site irrigation demands during the most recent billing cycle. Concurrently, the District is developing a database-backed website (WebITAP) to deliver real-time Landscape Water Budget information to property and landscape managers via the Internet. It is projected that these Landscape Water Budgets will reduce water use for these sites by at least 10 percent (or 5,000 af per year for the entire county).

By offering monthly water budgets to all large landscape sites in the county the District will be in compliance with this BMP. The District will continue to offer surveys (ITAP) to sites that are found to be over-budget. This tool is scheduled to be available in early 2006.

The District recently received grant funding to implement an incentive program for large landscape sites throughout the county. The Targeted Irrigation Retrofit Rebate Program will provide rebates not to exceed 50 percent of retrofitted hardware costs. These rebates will range from $200 to $1,000 for the installation of upgraded irrigation hardware for sites previously identified as having high unrealized conservation potential in the District's ITAP program. By building on the customer information accrued through the ITAP program in the last three years, this program targets difficult-to-attain but cost-effective landscape conservation on sites with greater than one acre of irrigated landscape.

The ITAP reports have already identified equipment needs; thus, quick find-and-fix missions are feasible. Examples of the types of upgrades that are identified in the ITAP reports and which would be funded include:

- Irrigation controllers
- Sub-area controllers
- Sprinkler heads replacement and matching
- Pressure regulator valves

Additionally, the District recently completed a pilot Weather Based Irrigation Controller (WBIC) program. This pilot provided installations of weather based irrigation controllers to residential and commercial sites throughout SCVWD's service area. WBIC, or "smart" controllers, utilize the principals of evapotranspiration or "ET" to automatically calculate a scientifically-based irrigation schedule based on several factors, including plant and soil type. The controller then adjusts the irrigation schedule as local weather changes to regulate unnecessary over-watering.

The WBIC program was marketed to the top water users in the District's service area through direct mail. All participants met minimum program qualification criteria and received professional landscape surveys prior to installation. The program was unique in design in that it incorporated a choice of two methods of installation. Participants had the option of choosing "Direct Install" where the District's consultant installed the controller or they could opt to install the controller themselves through the "Self Install" portion of program. Participants who selected to self install attended a program workshop where a manufacturer's representative discussed the concept of evapotranspiration, reviewed the results of the pre-installation survey and clearly explained how to program and install and the weather based controller.

Through the WBIC pilot, 175 WBICs were installed (119 residential and 56 commercial) on over 1.6 million square feet of irrigated landscape. Of the 175 installations, 90 were real time WBICs and 85 were modified historic WBICs. The District is using the results of the WBIC pilot to design a larger (in terms of number of controllers) grant-funded program that is set to begin in 2005. This new program will install approximately 650 WBICs throughout the county.

DMM 6 High-Efficiency Washing Machine Rebate Programs

The District has offered a washer rebate in conjunction with PG&E since July of 1995. The District has offered a $75 rebate since 1995, and since 1998, has received reimbursement of $25 for each high-efficiency machine installed within the service area of the SJ/SC WPCP. Beginning July 1, 2000, the District increased its rebate to $100 since it began receiving an increased reimbursement of $50 per qualifying machine from the City of San José, which operates the SJ/SC WPCP. By fiscal year 2001-02, District was part of a regional group that was awarded a three year grant from DWR for high-efficiency washing machine rebates. The rebate amount was increased to $150, with $75 coming from grant money. At this point the City of San José reduced their reimbursement amount to $25. While the DWR grant was a three-year grant, the funds were exhausted earlier than expected (due to the program's popularity). For approximately the last year of the program (July 2003 to June 2004) the rebate amount was $75 (which includes both the District's and the City of San José's cost share). In the same fiscal year 2003-04, the District was again part of a regional group that was awarded grant money from DWR for a three-year period: July 2004-July 2007. The current rebate amount is $100 ($25 from DWR and $75 from the District) or $150 ($75 from DWR and $75 from the District), depending on the water efficiency rating of the clothes washer model. The District continues to receive funding from the City of San José as well as the City of Palo Alto.

Starting in FY 2005/06 the District will no longer rebate washing machines with a water factor of 9.5 or greater. In 2007, a new water efficiency standard may be in place in California. If so, the District may decide to rebate only the highest tier (or most water efficient machine) available.

The District has given out over 48,000 rebates since the program began in 1995 (See Table 5-10).

Table 5-10 Rebates Issued

	1995-2001	FY 2001/02	FY 2002/03	FY 2003/04	FY 2004/05
Quantity	18,113	6,176	8,942	8,718	6,333

DMM 7 Public Information Programs

This DMM requires agencies to implement and maintain public information programs to promote water conservation and educate customers about water use. The District considers its public education and school programs to be essential components of a water conservation program.

The District operates an extensive public information program and associated schools program which provide materials, speakers and outreach activities to the general public. The District employs a professional staff of 10 to provide outreach related to water conservation, urban runoff pollution, water recycling, watershed and flood protection and water quality. In addition, Water Use Efficiency Unit staff conducts targeted outreach tailored to individual conservation programs.

Outreach activities include publications and Web site development, public meetings, District participation at community events, multi-media campaigns, inter-agency partnerships, corporate environmental fairs, professional trade shows, water conservation workshops and seminars and a speaker's bureau.

In the spring of each year (and extending through the fall), an extensive campaign emphasizing the importance of water conservation is conducted. In the spring of 2001, the campaign linked water and electricity conservation and in 2002 the campaign's focus was efficient water use in landscaping. Both years utilized radio, television, print and bus ads.

In 2003, the campaign consisted of three phases. The first phase (which included radio, television, print and bus ads) utilized materials from the California Water Awareness Campaign (CWAC) as part of the May Water Awareness Month in both English and Spanish. The second phase built upon the 2002 campaign and promoted the District's Water-Wise House Call program. Finally, the District joined two other water agencies to encourage residents to adjust irrigation systems for the cooler, shorter days of autumn. The ultimate goal of the District's campaign was to encourage the public to implement water efficient technologies and habits to reduce water use.

In 2004, the campaign again complemented the District's water conservation programs with messages focusing on saving water in outdoor use. The campaign included pre-produced print collateral, and a radio spot from the CWAC. Local information was broadcasted on commercial radio. Prior outreach materials, created specifically for the District, were updated and revised, thus minimizing production costs allowing funds for a larger media "campaign buy" maximizing the awareness of the program. This campaign used a balanced approach in reaching ethnic communities through targeted media and allowed major media outlets to carry the campaign in print, television and radio. The advertisement outreach supported the water conservation messages while promoting both efficient outdoor water use and the District's Water-Wise House Call Program.

Public Information Water Conservation programs

Water-Wise Landscape Program

This program targets both single-family homeowners and the green industry professionals that serve them. This multi-element approach was designed to provide assistance at all points in the decision-making process: during the design, purchase of material, and upkeep and maintenance on existing landscape. The program currently consists of the following programs:

Nursery Program

To increase the public's awareness of water-efficient gardening techniques, in 1995 the District developed the Nursery Program. This program distributes a series of educational materials to nurseries throughout the county. To display the materials, the program includes literature racks offering free information about water-wise gardening. The Nursery Program literature is currently being revised and will continue to be distributed to and displayed in these nurseries.

Water Efficient Landscape Workshop Series

Each spring, the District hosts its Water-Efficient Landscape Workshop Series for county residents. The series consists of four consecutive classes addressing topics such as garden design, plant selection, irrigation design, installation and maintenance techniques and gardening with native species. The series draws approximately 100 to 150 attendees each year.

Spanish-Language Irrigation Workshop Series

These biannual workshops provide hands-on training to English- and Spanish-speaking landscape professionals on irrigation controller programming, system scheduling, and irrigation trouble-shooting. This seminar is supported by irrigation manufacturers who donate equipment and materials for the hands-on portion of the class. In each class of approximately 40 landscape professionals are those who collectively maintain around 400 sites in the county.

Landscape Water Management Seminar

This seminar, designed for landscape irrigation professionals, provides training in irrigation system evaluations, water budgeting and water-use tracking. Made possible through a partnership with the Irrigation Training and Research Center of Cal Poly, these ongoing training sessions are typically offered once a year.

Water-Wise Gardening CD-Rom

In 2004/05 the District developed an interactive CD-ROM that showcases over 1,000 native, drought tolerant and water-efficient plants and features the District's landscape design brochure "Rules of Thumb for Water-Wise Gardening." Through features such as the "Garden Tours" and "Garden Gallery," users can view plants in beautiful, well established gardens and click on them to learn about each plant's water, sun, and soil requirements. Users also have the option of searching the "Plant List" database by scientific and common name or by a plant's unique characteristics. Selected plants can be saved in a customized list and compiled into three styles of reports. These reports can be printed (to attain the plant's photo). Then the user can take this specific plant information to local nurseries and make water-efficient choices.

Bill Inserts

In the fall of 1999, the District developed a bill insert promoting the reduction of landscape water use by reminding homeowners to cut back on their watering schedule during the fall and winter months. In collaboration with the District's water retail agencies, this insert has been mailed each year in October/November.

Industry-Specific Workshops

Below are examples of several topic-specific workshops the District holds each year:

- A Commercial-Industrial Water Efficiency Workshop geared for building owners and property/facility managers (2002)
- A Cooling Tower Workshop (2003, in partnership with the CUWCC)
- Several Weather-based or Evapotranspiration (ET) Controller Workshops (2004)

Table 5-11 Public Information

	FY 2000/01	FY 2001/02	FY 2002/03	FY 2003/04
Paid Advertising	3320	1,110	5,440	18,540
Public Service Announcements	1	1	195	375
Bill Inserts, Newsletters, Brochures	82,000	239,000	320,000	340,000
Bill Comparing Water Usage	0, we're the wholesaler	0, we're the wholesaler	0, we're the wholesaler	0, we're the wholesaler
Demonstration Gardens	0	0	0	1
Special Events Media Events	17	18	25	33
Speaker's Bureaus	2	5	0	0

DMM 8 School Education Programs

This DMM requires water suppliers to implement a school education program that includes providing educational materials and instructional assistance. In 1995, the District's Public Information Office hired a full-time, fully credentialed educator who holds life-time teaching and Administrative Services credentials to coordinate the school education programs. This included developing school programs, contracting with the Youth Science Institute for additional instructors, and supervising university student interns as classroom assistants. In 2001, a second, bilingual educator joined the District's full-time staff to assist with the program.

Table 5-12 Educational Class Presentations FY 2000/01 to FY 2003/04

FY 2000/01	No. of Class Presentations	No. of Students Reached	No. of Teacher Workshops
Grades K-3rd	460	10,575	3
Grades 4th - 6th	72	1,954	3
Grades 7th - 8th	3	90	3
High School	26	808	3
FY 2001/02			
Grades K-3rd	504	10,288	5
Grades 4th - 6th	70	1,846	5
Grades 7th - 8th	18	295	5
High School	59	1,636	5
FY 2002/03			
Grades K-3rd	453	8,582	4
Grades 4th - 6th	94	3,028	4
Grades 7th - 8th	396	8,907	4
High School	33	1,032	4
FY 2003/04			
Grades K-3rd	579	11,574	4
Grades 4th - 6th	75	2,257	4
Grades 7th - 8th	345	10,346	4
High School	23	683	4

Table 5-13 Commercial ULFTs Installed

	1992-2001	FY 2001/02	FY 2002/03	FY 2003/04	FY 2004/05
Quantity	6,536	891	1,493	274	700*

*HETs

The District has been continuously active in this area by providing free classroom presentations, puppet plays, and tours of District facilities to schools within the county. The objective is to teach students about water conservation, water supply, watershed stewardship, and flood protection. The District also provides school curricula to area educators, including workbooks and videos, as well as hands-on training for teachers. The goal of the program this year is to reach 30,000 students, ranging from pre-kindergarten through college (See Table 5-12).

Materials distributed to students included topical lessons. All meet state education framework requirements and are grade-level appropriate. All students who participated in the program received materials.

DMM 9 Conservation Programs for Commercial, Industrial and Institutional (CII) Accounts

During FY 1996/97, the District implemented a regional pilot program that provided 24 water-use surveys for large water-using businesses and industries in the county. For the past two fiscal years, the District has offered comprehensive CII surveys—including cost/benefit analysis for all recommendations—to businesses within Santa Clara County. The District's largest retailer, San José Water Company, has been offering commercial water-use surveys since 1994.

In FY 2003/04 and in 2-04/05, 24 comprehensive CII water use surveys were completed by the District bringing the District total to 48 completed surveys. Since 1994, San José Water Company has completed 470 surveys. However, rather than focusing on surveys to meet the requirements of this DMM, the District has been implementing several water-saving programs over the last 10 to 12 years, including:

Water Efficient Technologies Program (WET)

To encourage all commercial and industrial businesses to implement permanent water reduction measures, the City of San José offers financial awards to businesses in San José, offering $4 for every CCF conserved. Rebates range from $400 to $50,000 per site. Since 1997, the District and the City of San José have entered a cost-sharing agreement to jointly fund this program in the treatment area of the San José/Santa Clara Water Pollution Control Plant. Additionally, the District has recently expanded this program countywide. To date, the District has expended and/or reimbursed the City of San José $660,000 for 77 projects saving approximately 625,000 CCF's per year.

Table 5-14 Washers Installed

	1992-2001	FY 2001/02	FY 2002/03	FY 2003/04	FY 2004/05
Quantity	294	535	581	379	400

Commercial Toilet Program

Over 5,000 toilets have been replaced by the District in CII sites since 1992. A rebate program was offered from 1992-1999 then the District switched to a direct installation program. Additionally, the District reimbursed the City of San José for toilets replaced through their CII ULFT programs—approximately 4,000 toilets between 1997 and 2003.

In FY 2004-05, the District replaced over 700 non-efficient toilets with High-Efficiency Toilets, or HETs. These toilets flush at 1.0 gallons per flush and feature a pressure-assisted flushing mechanism. Funding for this program comes from DWR, the City of San José and the City of Palo Alto. The District expects to continue with the HET program, replacing between 700 and 1,000 toilets a year.

Commercial Washer Program

In July, 1999, the District, with funding partners Silicon Valley Power (supplier of electricity to customers within the City of Santa Clara) and the City of San José (administers Santa Clara/San José Water Pollution Control Plant), began offering a rebate for the replacement of high-efficiency clothes washers in Laundromats. Over 2,100 washers have been rebated since 1999.

Beginning in July, 2000, the commercial washer program was expanded throughout the county. Cost-sharing partners included PG&E, Silicon Valley Power, Palo Alto and San José. The program now includes commercial machines installed in multi-family complexes.

In addition to the programs mentioned above (WET, CII ULFTs, CII Washers) the District is implementing or plans to implement multiple CII programs, including:

- **Pre-Rinse Spray Valve Program:** The “Rinse & Save” program, designed to save restaurants water and money, began in FY 02-03, and continued into FY 03-04 and FY 04-05. The CUWCC, with funding from the California PUC and the District (the District also receives funding from the City of San José and the City of Palo Alto), offered restaurants within the PG&E territory a free high-efficiency pre-rinse spray valve and installation. These spray valves save an average of 200 gallons of water per unit per day. Each one of the 1,070 that were installed in FY 02-03 and FY 03-04 is expected to save more than 357,000 gallons over the next five years. For FY 04-05, over 1,400 spray valves have been retrofitted.

- **Innovative CII Retrofits:** In 2003, the District received a Proposition 13 grant from DWR to fund an Innovative High-Efficiency Commercial Equipment Retrofit Program for Santa Clara County (the District also receives some funding from the City of San José and the City of Palo Alto). This program includes a high-efficiency x-ray equipment retrofit program for the health care industry, dry vacuums for dental offices, and high-efficiency plumbing fixtures for commercial establishments. The program has commenced in FY 04-05, with over 800 high-efficiency toilet retrofits completed.

- **Cooling Tower Conductivity Controller Rebate Program:** Staff is developing a program to provide rebates for Commercial, Industrial and Institutional customers that install a cooling tower conductivity controller (or a conductivity /pH controller). These devices lead to the most efficient use of water for cooling towers. This program is under development and should commence in FY 05-06.

DMM 10 Wholesale Agency Assistance Programs

This DMM defines a wholesaler's support role in terms of financial, technical, and programmatic assistance to its retail agencies implementing DMMs. The District continues to provide a high level of support and enjoys the special cooperative partnership with the water retail agencies in the regional implementation of the DMMs. District and water retailer staff have begun discussions on the wholesaler and retailer relationship, especially in light of a possible certification and enforcement process coming from CALFED.

Table 5-15 Estimated Active and Passive Savings (af)

	DMM1	DMM 2	DMM 5	DMM 6	DMM 9	DMM 9a	DMM 14	TOTAL
FY 92-93	0	1,909	0	0	0	248	1,707	3,864
FY 93-94	0	2,942	0	0	0	486	2,804	6,232
FY 94-95	0	3,809	0	0	0	714	3,937	8,460
FY 95-96	0	4,545	400	20	36	936	5,088	11,025
FY 96-97	0	5,175	733	42	102	1,161	6,693	13,906
FY 97-98	0	5,712	1,000	91	332	1,384	7,921	16,439
FY 98-99	146	6,188	1,200	172	581	1,629	9,479	19,395
FY 99-00	157	6,940	1,333	242	733	3,014	11,205	23,622
FY 00-01	256	7,308	1,408	310	1,125	3,202	12,075	25,683
FY 01-02	531	7,660	1,423	388	1,892	3,387	13,021	28,301
FY 02-03	720	7,978	1,443	496	2,615	3,580	13,778	30,610
FY 03-04	912	8,231	1,468	594	3,285	3,738	14,264	32,492
FY 04-05	1,110	8,808	1,759	640	3,930	4,425	15,656	36,329

The District does not provide monetary incentives to the retailers, since the District has a cooperative relationship with them; rather the District provides the resources of the Water Use Efficiency Unit to run many of the MOU DMMs. See each individual DMM section in this report for the programs in place. Additionally, see Appendix F (Figures F-3 through F-6) for funding per DMM and other information.

Table 5-15 summarizes the estimated active and passive savings to date in acre-feet for each of the quantifiable DMMs (it does not include an additional 1,000 af of savings in the agricultural sector):

DMM 11 Conservation Pricing

The District fulfills this DMM by metering and billing by volume of use for all water deliveries to its retail agencies. Although the District has limited authority to set or enforce consumption limits at the retail level, it has worked with water and wastewater agencies to discourage non-conservation pricing and to promote conservation pricing, which provides incentive for customers to decrease their water usage. Conservation pricing methods include uniform water rates and increasing block rates, which increase along with the quantity of water used.

District support has also included testimony before the PUC and funding for the CUWCC rate guidebook project. The water retail agencies utilize water rate structures that conform to conservation pricing definitions as outlined in the MOU.

Table 5-16 Total Revenue from Volumetric Rates

	FY 2000/01	FY 2001/02	FY 2002/03	FY 2003/04
Total	$88,840,408.93	$94,071,487.23	$94,551,550.41	$108,565,845.27

DMM 12 Conservation Coordinator

The District is implementing this DMM in accordance with the MOU by having established the position of Water Conservation Coordinator in 1990.

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Phone: (408) 265-2607, extension 2291
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E-mail: hashktorab@valleywater.org

Number of Conservation Coordinator Staff

There are four full-time staff members that report to the Water Use Efficiency Unit Manager as well as 4 to 6 interns (number varies depending on season and program need).

Staff includes one senior water conservation specialist and three water conservation specialist positions.

DMM 13 Water Waste Prohibitions

The District has limited authority to impose mandatory provisions restricting the wasteful use of water. As a wholesale water supplier, the District developed a set of model water use restrictions in 1989 and 1993 to assist the water retail agencies and cities in the development of their water waste prohibitions. The District works closely with the cities and retailers to encourage adoption and enforcement of the model Water Waste Ordinance. Such restrictions, along with public outreach and education efforts, helped the county reach a water use reduction of over 25 percent in 1991. Water savings continued despite the end of the drought.

§ 26.7. Levy and collection of groundwater charges; rates; new or adjusted charges, reports; notice; hearing; errors

(C) The rate or rates, as applied to operators who produce groundwater above a specified annual amount, may, except in the case of any person extracting groundwater in compliance with a government-ordered program of cleanup of hazardous waste contamination, be subject to prescribed, fixed, and uniform increases in proportion to increases by that operator in groundwater production over the production of that operator for a prior base period to be specified by the board, upon a finding by the board that conditions of drought and water shortage require the increases. The increases shall be related directly to the reduction in the affected zone groundwater levels in the same base period.

In addition, the District Act (Section 26.7) allows the District to develop overproduction charges for groundwater pumping. This provision allows the District the flexibility to provide any necessary incentive required to achieve cooperation on the part of local retail water suppliers, and is quoted left:

Finally, in 2003, the District received a grant from DWR to conduct a pilot water softener rebate program in the county (the District also received some funding from the City of San José). The pilot program was concluded in September 2004 with a total of 400 rebates given to residents in the county.

For the 400 water softeners rebated through this program, the estimated resulting savings is 1.34 million gallons each year. Based on a 20 year equipment life and discounted equipment efficiency, the overall water savings for this program is estimated to be 24 million gallons. Since less water is needed as a result of more efficient softeners, the water providers will need to treat and pump less water for the community, saving an estimated 1,715 kilowatt hours as a result of the program.

After the rebate program was completed, a follow-up survey form was sent to 400 rebate participants for their feedback. Based on 202 participants' responses, District staff found that an estimated 240,000 pounds of salt may be reduced for softener regeneration per year from the pilot study alone, which would otherwise be discharged into the public sewer systems. Other benefits evaluated include customer savings in their water and salt bills.

The District, in partnership with the City of San José and the City of Gilroy, plans on continuing this program in the future.

DMM 14 Residential Ultra Low Flow Toilet Replacement Programs

This DMM calls for the implementation of programs for replacing existing high water using toilets with ULFTs in single-family and multi-family residences. The program must result in water savings equivalent to having an ordinance requiring toilet replacement at time of home resale. From 1992 through June 2003, the District, in conjunction with each of the 13 participating retailers and through a series of cost-sharing agreements with the City of San José and the City of Sunnyvale, has provided incentives for the retrofit of approximately 244,000 residential toilets. Because of this, the District believes it has met the DMM cumulative water savings target. Appendix F (Figure F-7) provides the data used by the District to calculate its DMM target. Appendix F (Figures F-8 and F-9) contains CUWCC coverage calculator verifying the District's completion in implementing this DMM (to fill out tables in coverage calculator, District assumed a 40 percent free-ridership rate for rebate programs and a 25 percent free-ridership rate for distribution and direct installation programs).

In 2004, the District shifted to a rebate program for high-efficiency toilets (HETs), ones that use even less water than conventional ULFTs. By initiating a rebate program for this relatively new technology, the District hopes to increase the market transformation thereby increasing the availability while at the same time decreasing the costs. Although the District only rebated approximately 50 HETs in FY 2004/05 (See Table 5-17 below), the District expects this number will go up in the future.

Table 5-17 Residential ULFTs Installed

	1992-2001	FY 2001/02	FY 2002/03	FY 2003/04	FY 2004/05
SF ULFTs Installed	137,753	17,621	6,891	0	50*
MF ULFTs Installed	77,748	4,514	4,681	0	0

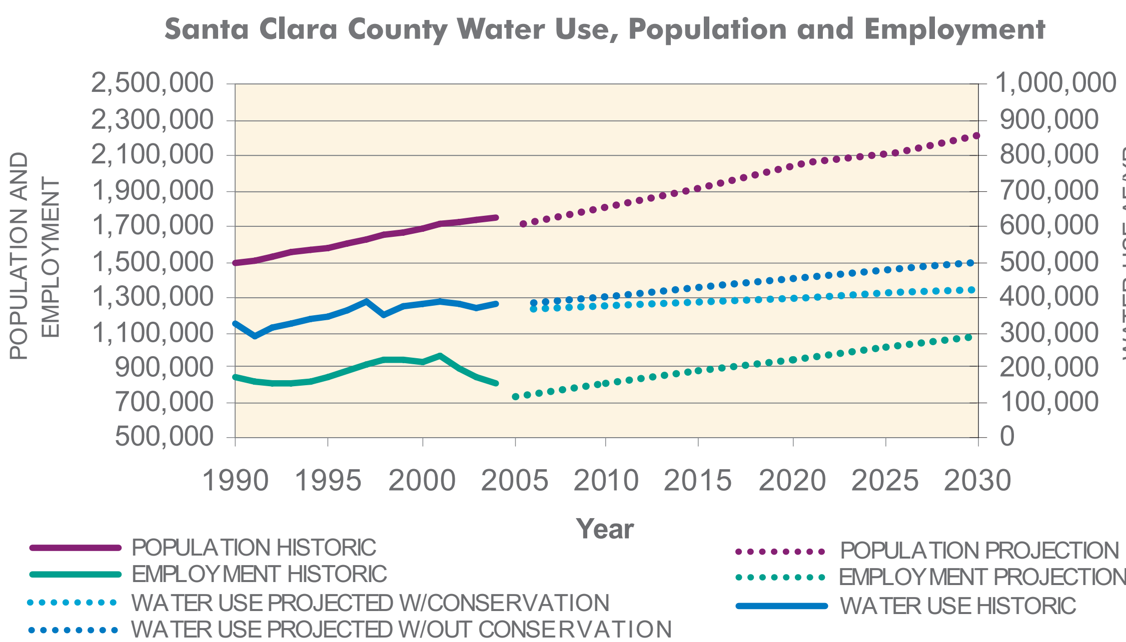
*Estimated number of installations

5.10 Conclusion

The District's current water demand projection, including water conservation savings, is almost 450,000 af at the year 2030, an 18 percent increase from 2004 water use. In comparison, population is expected to increase by 35 percent in the same period (See Figure 5-15). This shows that population alone is not a great predictor of demand, particularly where aggressive and active demand measures are in place to effectively reduce per person demand.

The District's demand management measures are estimated to save almost 100,000 af per year by the year 2030, using 1992 as a base year. That amount of savings accounts for almost 20 percent of pre-savings demand and is a crucial water supply management program, now and into the future.

Figure 5-15 County Water Use, Population and Jobs



SOURCES: HIST POPULATION = COUNTY OF SANTA CLARA; HIST & PROJ WATER USE = SCVWD; HISTORIC EMPLOYMENT = US LABOR BUREAU; POPULATION & EMPLOYMENT PROJECTION = ABAG 2005

6 Water Supply Projection and Demand Comparison

6.1 Water Supply Outlook

This section examines the water supply outlook in the county under different hydrologic conditions in accordance with DWR guidelines. Specifically, supply and demand comparison in five year increments to 2030 under normal, dry-year and multiple-dry-year conditions are presented. Since water supplies available to the county are obtained from both local and imported sources, the District's water supply is a function of the amount of precipitation that falls both locally and in the watersheds of Northern California. The supply available is also a function of the facilities in place to manage the supply.

Evaluating the availability of the county's existing and projected local water supplies requires an understanding of the driest periods that can reasonably be expected to occur. This evaluation considers how often drought events have occurred and whether they are frequent enough to warrant designing the utility's system to withstand them; how much existing supply is available during a drought; and what duration of drought is most critical to the utility's system. Over the more than 120 years of recorded rainfall, seven major drought events have occurred.

The supply severity of a one-year drought would be the worst for a system with no storage because it has the lowest rainfall and generates the least amount of water supply. A system with a large storage capacity could include significant reserves in comparison to water needs and could go through short-term droughts by borrowing from these stored reserves. Santa Clara County's water supply system is more vulnerable to droughts of long duration, which can exhaust the groundwater subbasins' operational storage. The District has developed effective ways to extend the usefulness of its existing supplies, through surface and groundwater storage, both in-county and elsewhere in the state.

Analyzing projected water supplies and demand requires a number of technical assumptions. These assumptions include: the demographic projections and future water use patterns that underlie the water demand projections; and estimates of the groundwater storage capacities and natural groundwater recharge that help characterize the groundwater resource.

6.2 Water Supply Modeling

In order to better understand the water supply outlook, the District utilizes a monthly time step model with detailed raw water and treated water systems, including reservoirs, pipelines, and managed streams. The model has been calibrated and verified using actual operations data. The data requirements are significant, and the required hydrologic data only exists from 1967 forward.

While no model or tool can predict what actual water supplies will be in future years, the record of past water supplies can be used to characterize future water supply. In this way, the performance of different water supply options, and how they can handle the historically observed hydrologic record are compared using the model.

The following ranges are assumed to represent the operational storage capacity in South County to the best accuracy possible at this time.

- Coyote Subbasin: 23,000—33,000 af
- Llagas Subbasin: 152,000—165,000 af
- Total South County: 175,000—198,000 af

The north county operational storage is estimated to be 350,000 af. The total combined operational groundwater storage capacity within the county for planning purposes is estimated at 530,000 af.

For modeling purposes, the Coyote and Llagas subbasins are combined with a maximum pumping limit of 100,000 af per year. A maximum pumping limit of 200,000 af per year is used for the Santa Clara Valley subbasin. It is assumed that subsidence would occur in this subbasin if pumping exceeded this maximum or if the operational storage capacity of the subbasin is depleted. It must be noted that the actual amount of water that can be pumped is highly dependent on how the subbasin is being managed, recent hydrology, and the amount of natural and managed recharge that occurs and these values have been established to be used in the water supply model.

6.3 Wet Year Supply

Wet-year rainfall can be twice that of an average year, but not all of that water can be captured as usable supply. For local supplies, the hydrology of 1983 probably represents the most that can be captured by local facilities. Recharge is an important part of District operations in all years to ensure sufficient groundwater supply to meet annual pumping needs, as well as provide dry year protection. In wet years, the District stores surplus supplies for use during drought periods. Supplies in excess of demand are stored in the groundwater basin and/or banked outside the county (Semitropic Water Bank). This operational strategy is limited by groundwater basin recharge capacity, distribution system capacity, and various contractual and infrastructure restrictions.

6.4 Normal Year Supply

The “normal” year for the purposes of the report, is a year in the historical sequence that most closely represents median runoff levels and patterns. No single year’s hydrology is equivalent to the average for all sources; however, 1985 was a near-average year for both local rainfall and imported water and is the year determined to be most representative of normal year supply.

6.5 Single Dry Year Supply

The single dry year supply is defined as a year with the minimum usable supply. The hydrology of 1977 is the driest year of record and represents the minimum total supply that has been observed in the historical record.

6.6 Multiple Dry Year Period

It is not just the constraints of a single dry year that are important, but also how the system can respond to successive dry years such as those that occurred in 1928-1934 and 1987-1992. The county's water supply system is more vulnerable to these droughts of long duration, which deplete water storage reserves in local and state reservoirs and in the groundwater subbasins. For this analysis the average annual supply that could be expected if the 1987-1992 hydrology were repeated was used for the multiple dry year periods.

6.7 Supply and Demand Comparison

The analysis presented here is based on updated demand projections as described in Chapter 5. The District's projections used for this UWMP include demands submitted by each of the water retail agencies as shown in Table 6-1. These retailer demands are to be included in their respective UWMPs. Review of the updated demands reveal a general decrease in demand after conservation over the planning horizon to 2030 from those utilized in the IWRP 2003 Study and UWMP 2001.

Figure 6-1 Demand Projections

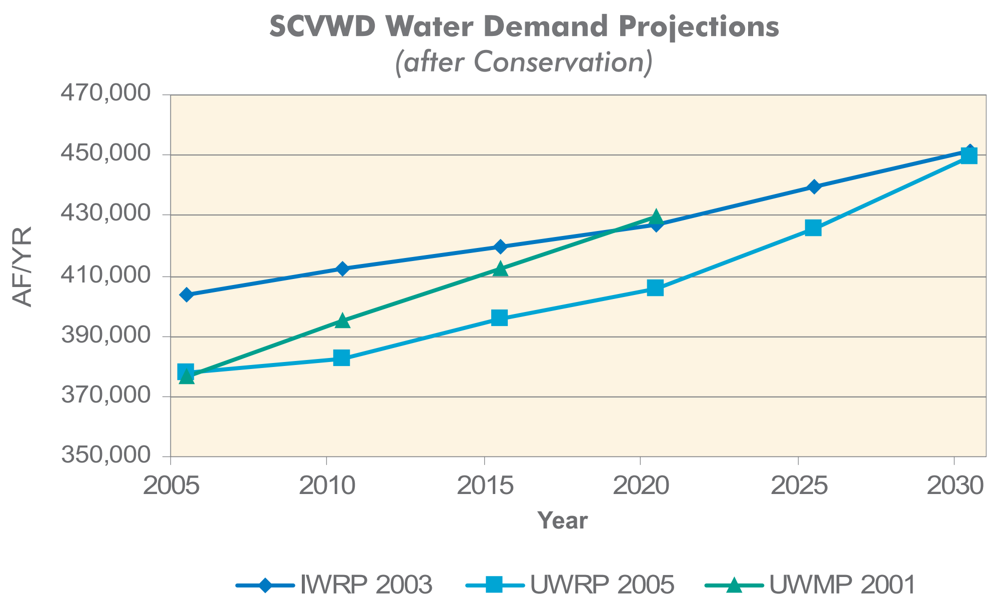


Table 6-1 Retailer/SCVWD Demand Projections

**RETAILER/SCVWD DEMAND PROJECTIONS
IN ACRE-FEET 2030 COMPARISON**

Agency	Retailer Projections 2030 Demand	Reference	SCVWD Projections	
Milpitas, City of	21,600	SFPUC 03[1]		
Mountain View, City of	17,900	SFPUC 03		
Palo Alto, City of	17,900	SFPUC 03		
Purissima Hills Water District	3,700	SFPUC 03		
Santa Clara, City of	40,000	SFPUC 03		
Stanford University	8,000	SFPUC 03		
Sunnyvale, City of	33,000	SFPUC 03		
Gilroy, City of	15,000	Master Plan 04		
Morgan Hill, city of	13,400	Master Plan 02		
San José Water Co	214,500	UWMP 05 Draft		
San José Municipal Water (minus CVSP)	49,800[2]	UWMP 05 Draft		
Great Oaks Water Co. (minus CVSP)	10,700[3]	UWMP 05 Final		
Cal Water Service Co.	15,100	UWMP 04 Final		
Coyote Valley Specific Plan (CVSP)	18,500	SCVWD[4]		
Subtotal	479,100		475,400	99.3%
Countywide				
Independent Groundwater Pumping	17,000		17,000	
Subtotal	496,100		492,400	99.2%
Agriculture	30,000		30,000	
Countywide Conservation	-74,200		-74,200	
Total	451,900		448,200	99.3%

[1] San Francisco Public Utility Commission, SFPUC Wholesale Customer Water Demand Projections (URS 2004). Pre-conservation data obtained from Bay Area Water Supply and Conservation Agency (BAWSCA)

[2] San José Municipal Water demand in their draft UWMP was 68,300af. The CVSP development was included in their demand projections. Since the District is forecasting CVSP demand separately, it was deducted from San José's projections.

[3] Great Oaks Water demand in the UWMP for 2030 was 29,201 af. The CVSP development was included in their population projection. Since the District is forecasting CVSP demand separately, it was deducted from Great Oaks projections.

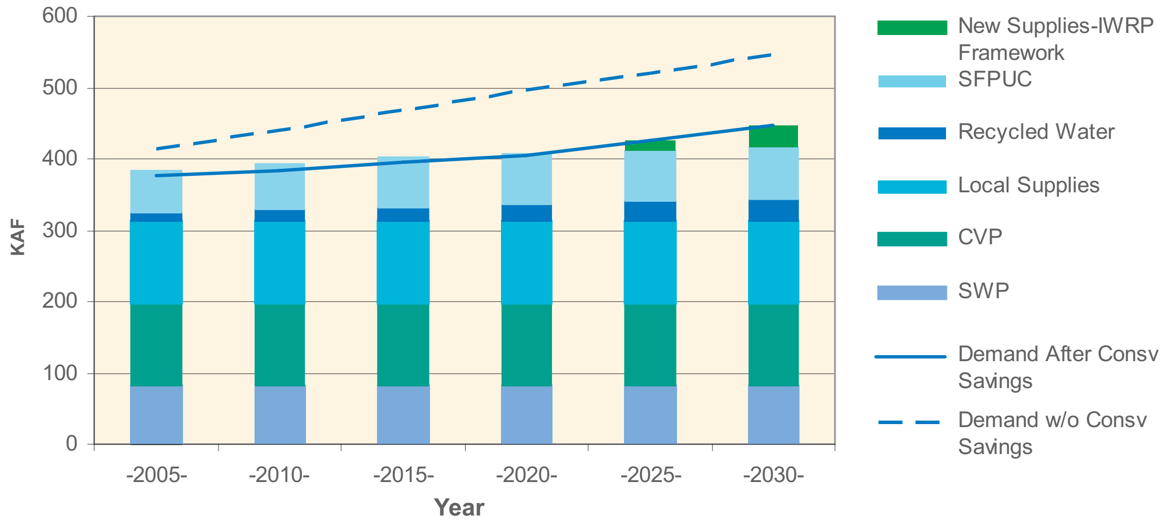
[4] Santa Clara Valley Water District April 2005 Water Supply Availability Analysis for CVSP (projected range of 16,000 to 20,000 af/yr.)

[5] The District's countywide demand projections include future demands Vision North San José, and Evergreen East Hills Vision strategy. Retailers have included these demands in the UWMPs.

Countywide

Supply and demand on a countywide basis under normal, dry-year and multiple-dry-year hydrologic conditions are presented in Figures 6-2 through 6-4 and Tables 6-2 through 6-5.

Figure 6-2 Santa Clara County, Supply and Demand Comparison, Normal Year



District supplies are depicted in Figure 6-2 above and in Figures 6-3 and 6-4 below in bar format with five year increments from 2005 through 2030. Each of the supply elements is stacked so that the total supply can be compared to total demand. The total demand is shown as a solid line in the figures.

As an example, the anticipated total supplies in 2015, (excluding in-county surface storage and groundwater storage reserves, and outside county banked storage) are approximately 402,800 acre-feet under normal hydrologic conditions. This compares to estimated total county demand of 395,900 af. Therefore, in this example supplies exceed demand and there is no need to dip into carryover storage or pull from groundwater reserves. Under a normal year scenario and as part of our conjunctive management of water resources water is not withdrawn from groundwater reserves. Although groundwater is used to meet baseline demand, the extraction of groundwater does not exceed the level of replenishment during a normal year. Use of the groundwater subbasins in this way allows the District to optimize the use of the basins for distribution, storage, and treatment and allows for reserves to be available during dry years.

Figure 6-2 and Table 6-2 show that additional supplies will be needed to meet 2020 demands after 2020 under normal hydrologic conditions. Beyond the year 2020, as demand projections continue to increase at a rate faster than supplies and additional conservation, total supplies under normal hydrologic conditions will begin to fall below demand. As tabulated in Table 6-2, demands in the year 2025 exceed currently projected supplies by approximately 12,200 af. Based on this analysis additional supplies up to 31,100 af after 2020 are needed in order to meet demands through 2030.

Table 6-2 Santa Clara County, Supply and Demand Comparison, Normal Year

Santa Clara County, Supply and Demand Comparison, Normal Year					
Source	-2010-	-2015-	-2020-	-2025-	-2030-
SWP	83,000	83,000	83,000	83,000	83,000
CVP	114,400	114,400	114,400	114,400	114,400
Local Supplies	115,500	115,500	115,500	115,500	115,500
Recycled Water[1]	16,800	21,000	25,000	28,100	31,200
SFPUC[2]	64,600	68,900	71,000	72,600	73,000
New Supplies-IWRP Framework	-	-	-	12,200	31,100
Demand w/o Consv Savings[3]	439,500	469,000	495,800	520,900	546,700
Demand After Consv Savings[4]	***382,700***	***395,900***	***405,400***	***425,800***	***448,200***

Notes:
(1) Recycled water projections based on estimates provided by county recycled water producers.
(2) Assumes SFPUC's Regional Water Supply Improvement Plan will be completed by 2015.
(3) For comparison with Table 5-3 the 1992-2000 conservation savings of 24,300 af should be subtracted from these amounts to obtain the "Subtotal All demand" in table 5-3.
(4) Includes standard conservation (no washer program) and additional 28K IWRP Study 2003 "No Regrets" conservation building block.

Figure 6-3 Santa Clara County, Supply and Demand Comparison, Dry Year

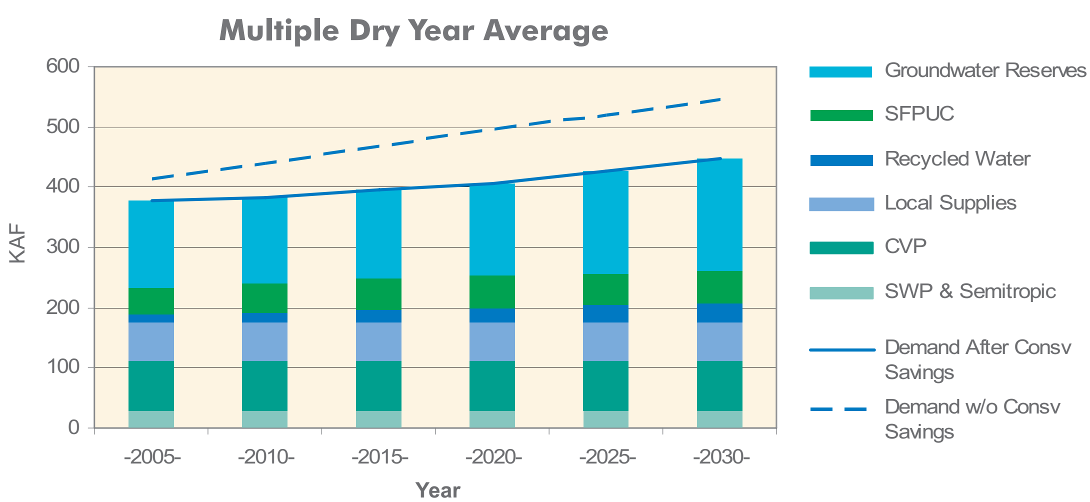


Table 6-3 Santa Clara County, Supply and Demand Comparison, Dry Year

Santa Clara County, Supply and Demand Comparison, Dry Year					
Source	-2010-	-2015-	-2020-	-2025-	-2030-
SWP & Semitropic[1]	28,200	28,200	28,200	28,200	28,200
CVP	83,600	83,600	83,600	83,600	83,600
Local Supplies	64,300	64,300	64,300	64,300	64,300
Recycled Water[2]	16,800	21,100	25,000	28,200	31,200
SFPUC[3]	48,500	51,100	52,200	53,400	54,700
Groundwater Reserves	142,300	148,600	153,100	169,100	187,100
Demand w/o Consv Savings[4]	439,500	469,000	495,800	520,900	546,700
Demand After Consv Savings[5]	***382,700***	***395,900***	***405,400***	***425,800***	***448,200***

Notes:

(1) Assumes 258 KAF Semitropic participation level.

(2) Recycled water projections based on estimates provided by county recycled water producers.

(3) Assumes SFPUC's Regional Water Supply Improvement Plan will be completed by 2015.

(4) For comparison with Table 5-3 the 1992-2000 conservation savings of 24,300 af should be subtracted from these amounts to obtain the "Subtotal All Demand" in table 5-3.

(5) Includes standard conservation (no washer program) and additional 28K IWRP Study 2003 "No Regrets" conservation building block.

Figure 6-4 Santa Clara County, Supply and Demand Comparison, Multiple Dry Year

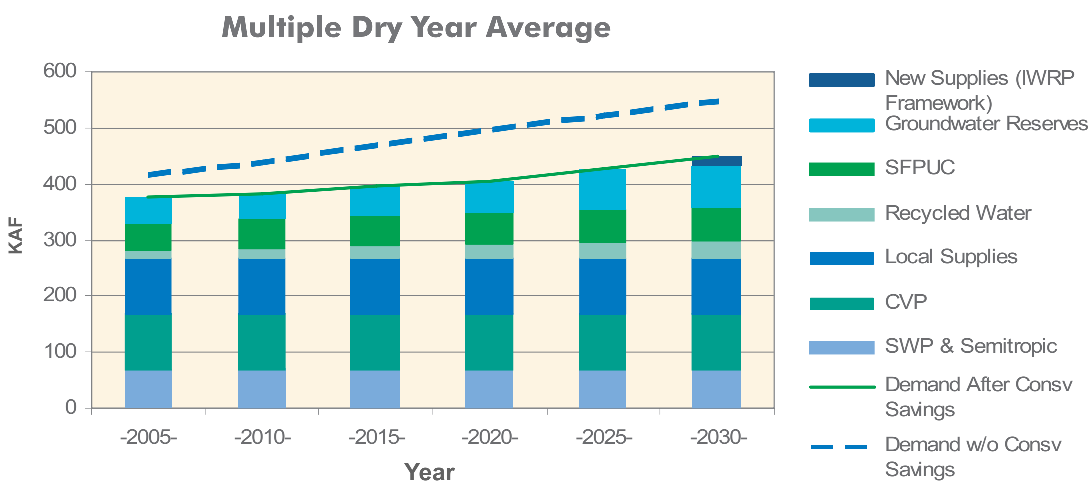


Table 6-4 Santa Clara County, Supply and Demand Comparison, Multiple Dry Year Average

Santa Clara County, Supply and Demand Comparison, Dry Year					
Source	**-2010-**	**-2015-**	**-2020-**	**-2025-**	**-2030-**
SWP & Semitropic[1]	69,200	69,200	69,200	69,200	69,200
CVP	99,600	99,600	99,600	99,600	99,600
Local Supplies	100,100	100,100	100,100	100,100	100,100
Recycled Water[2]	16,800	21,000	25,000	28,100	31,200
SFPUC[3]	51,700	54,500	55,700	57,000	58,400
Groundwater Reserves	45,200	51,400	55,700	71,800	76,000
New Supplies - IWRP Frankwork	-	-	-	-	13,700
Demand w/o Consv Savings[4]	439,500	469,000	495,800	520,900	546,700
Demand After Consv Savings[5]	***382,700***	***395,900***	***405,400***	***425,800***	***448,200***

Notes:
(1) Assumes 258 KAF Semitropic participation level.
(2) Recycled water projections based on estimates provided by county recycled water producers.
(3) Assumes SFPUC's Regional Water Supply Improvement Plan will be completed by 2015.
(4) For comparison with Table 5-3 the 1992-2000 conservation savings of 24,300 af. Should be subtracted from these amounts to obtain the "Subtotal All demand" in table 5-3.
(5) Includes standard conservation (no washer program) and an additional 28 KAF IWRP Study 2003 "No Regrets" conservation building block.

The District will be able to meet the water needs of the county during single dry years even with increasing demand as additional pumping from groundwater reserves is available to meet the shortfall from other sources. Multiple dry years (such as the 1987-1992 droughts) pose the greatest challenge to the District's water supply. Although the total supplies available in each year is greater than in a single very dry year, as drought lingers, groundwater storage reserves are relied on more and more. Under this scenario, as shown in Figure 6-4 and tabulated in Table 6-4 above, additional supplies up to 13,700 af after 2025 are needed in order to meet demands through 2030.

The new supply component identified under both the normal and the multiple dry year scenarios is labeled "New Supplies—IWRP Framework." These supplies are required to meet demands beyond 2020 and are to be developed over time consistent with the IWRP planning framework. These potential new supplies include investment in one or more of the alternatives summarized in Table 6-5.

Table 6-5 New Potential Supply Investments

IWRP Study 2003 - Potential Range of Additional Supplies (2011-2020) (over Baseline and "No Regrets" portfolio)	
Recycling	0 to 26,000 acre-feet/year
Desalination	0 to 10,000 acre-feet/year
Surface Storage	0 to 100,000 acre-feet (total capacity)
New Banking	0 to 150,000 acre-feet (total capacity)
Dry Year Transfers	0 to 40,000 acre-feet/year in dry years

6.7.1 North County Supplies - Santa Clara Valley Subbasin

The following sections present a comparison of water demand projections and supplies for North County, Coyote Valley, and South County, corresponding to the three subbasins shown in Figure 3-5. More detailed information on each of the subbasins is presented in the groundwater section of this report.

The Santa Clara Valley groundwater subbasin is in the North County and water supply sources consist of locally developed water, recycled water, and water imported via the State Water Project (SWP), the federal Central Valley Project (CVP), and the City and County of San Francisco's Bay Division Pipelines (SFPUC). The following tables show the amount of required supplies needed to meet projected demand.

Table 6-6 Santa Clara Valley Subbasin, Projected Supplies, Normal Year

Santa Clara Valley Subbasin, Projected Supplies, Normal Year (Acre-feet, rounded to the nearest hundred)					
Source	-2010-	-2015-	-2020-[2]	-2025-[2]	-2030-[2]
District Supplies[1]	236,300	238,500	241,100	252,300	266,900
SFPUC[3]	64,600	68,900	71,000	72,600	73,000
Other Local	14,200	14,200	14,200	14,200	14,200
Recycled Water[4]	10,100	13,300	16,600	19,700	22,700
Subtotal	***325,200***	***334,900***	***342,900***	***358,800***	***376,800***

Notes:
(1) Includes both groundwater and treated water; SCVWD conservation; and new supplies.
(2) Additional District supplies beyond 2020 to be determined through IWRP framework.
(3) Assumes SFPUC's Regional Water Supply Improvement Program will be completed by 2015.
(4) Recycled water projections based on estimates provided by county recycled water producers.

Table 6-7 Santa Clara Valley Subbasin, Projected Supplies, Dry Year

Santa Clara Valley Subbasin, Projected Supplies, Dry Year (Acre-feet, rounded to the nearest hundred)					
Source	**-2010-**	**-2015-**	**-2020-[2]**	**-2025-[2]**	**-2030-[2]**
District Supplies[1]	264,600	268,500	272,100	283,700	297,400
SFPUC[3]	48,500	51,100	52,200	53,400	54,700
Other Local	2,000	2,000	2,000	2,000	2,000
Recycled Water[4]	10,100	13,300	16,600	19,700	22,700
Subtotal	***325,200***	***334,900***	***342,900***	***358,800***	***376,800***

Notes:
(1) Includes both groundwater and treated water; SCVWD conservation; and groundwater reserves.
(2) Additional District supplies beyond 2020 to be determined through IWRP framework.
(3) Assumes SFPUC's Regional Water Supply Improvement Program will be completed by 2015.
(4) Recycled water projections based on estimates provided by county recycled water producers.

Table 6-8 Santa Clara Valley Subbasin, Projected Supplies, Multiple Dry Year Average

Santa Clara Valley Subbasin, Projected Supplies, Normal Year (Acre-feet, rounded to the nearest hundred)					
Source	**-2010-**	**-2015-**	**-2020-[2]**	**-2025-[2]**	**-2030-[2]**
District Supplies[1]	261,600	265,500	269,100	280,700	294,400
SFPUC[3]	48,500	51,100	52,200	53,400	54,700
Other Local	5,000	5,000	5,000	5,000	5,000
Recycled Water[4]	10,100	13,300	16,600	19,700	22,700
Subtotal	***325,200***	***334,900***	***342,900***	***358,800***	***376,800***

Notes:
(1) Includes both groundwater and treated water; SCVWD conservation; groundwater reserves; and new supplies.
(2) Additional District supplies beyond 2020 to be determined through IWRP framework.
(3) Assumes SFPUC's Regional Water Supply Improvement Program will be completed by 2015.
(4) Recycled water projections based on estimates provided by county recycled water producers.

6.7.2 Coyote Valley Supplies—Coyote Subbasin

The existing water supply is comprised primarily of groundwater, sustained by both natural and managed recharge. Local water captured by the Anderson/Coyote reservoir system and imported water from the Central Valley Project both provide source water for recharge in Coyote Creek. Potential water supply alternatives were defined in the District's Water Supply Availability Analysis for Coyote Valley Specific Plan (April 2005) and include advanced treated recycled water, treated surface water, and additional groundwater pumping or groundwater diversion in conjunction with increased recharge. Table 6-9 shows the amount of required supplies in order to meet the projected CVSP demands under normal, dry and multiple dry years.

Table 6-9 Coyote Valley Subbasin—Coyote Valley Specific Plan, All Year Types

Coyote Valley Subbasin — Coyote Valley Specific Plan, All Year Types (Acre-feet, rounded to the nearest hundred)					
Source	**-2010-**	**-2015-**	**-2020-**	**-2025-**	**-2030-**
District Supplies[1]	7,100	8,000-11,200	8,000-12,000	8,000-13,000	8,000-13,000
Recycled Water and Additional Supplies[2]	-	0-3,200	1,700-5,700	3,200-8,200	5,500-10,500
Total	***7,100***	***11,200***	***13,700***	***16,200***	***18,500***

Notes:
(1) Supplies defined in Water Supply Availability Analysis for Coyote Valley Specific Plan (April 2005) determined through IWRP Study 2003 planning framework.
(2) Amount of recycled water use and additional supplies to be determined in City of San José Water Supply Assessment — due to be finalized in early 2006.

Due to uncertainties in the planning for the areas in Coyote Valley Specific Plan designated "greenbelt," demands areas outside the CVSP development area, are assumed to remain constant at an estimated 4,000 af per year over the long term. In addition, some of the City of Morgan Hill water supply is also met by groundwater pumping from the Coyote subbasin.

It is estimated that the Coyote groundwater subbasin under current District operations would remain in balance with an average annual pumping of about 8,000 af. Based on analysis performed by the District, Coyote Valley can support up to 13,000 af per year of groundwater pumping if additional recharge is developed. Therefore, additional investment in recharge together with additional investment in new supplies and recycled water will be necessary to meet demands. The additional supplies and investments needed are to be determined in the City of San José Water Supply Assessment due to be completed in early 2006. Funding of needed additional investments have not yet been determined.

6.7.3 South County Supplies—Llagas Subbasin

South County is supplied by locally developed water, recycled water, and CVP water. Local and CVP water recharge the groundwater subbasin. Table 6-10 shows supplies needed to meet demand under normal, dry, and multiple dry years. Nearly all the demand is met through groundwater pumping in all year types, although there are some raw surface water or recycled water deliveries. Natural recharge alone is not sufficient to replenish the amount of groundwater pumped. Without the District's managed recharge program, the Llagas Subbasin would be in overdraft. In fact, when the District began managed recharge activities in the late 1980s, groundwater elevations were declining and the basin was in overdraft. Managed recharge plays a significant role in maintaining groundwater storage and groundwater elevations.

Current analysis indicates that existing supplies appear to be reliable to meet demands during normal and wet years in the Llagas Subbasin, now and in the future. This analysis also indicates overdraft of the subbasin occurs following dry and multiple dry years. Maximizing water conservation efforts, expanding recycled water use, and investing in additional recharge, consistent with the IWRP "No Regrets" portfolio, will avoid overdraft. The District has assumed additional conservation, expanded water recycling, and 13,400 acre feet of additional recharge will be in place by 2010. However, the funding for these efforts has not been secured.

Table 6-10 Llagas Subbasin — All Year Types

Llagas Subbasin — All Year Types (Acre-feet, rounded to the nearest hundred)					
Source	-2010-	-2015-	-2020-	-2025-	-2030-
District Supplies(1)	49,300	47,600	45,600	47,300	48,100
Recycled Water(2)	2,500	3,100	3,100	3,100	3,100
Total	51,800	50,700	48,700	50,400	51,200

Notes:

(1) District supplies are primarily groundwater and are equal to subbasin demand less conservation and recycled water. Modeling assumes implementation of IWRP "No Regrets" portfolio, which includes 13,400 acre-feet additional recharge capacity and 6,000 acre-feet of additional agricultural conservation by 2020. Groundwater reserves are used when demand exceeds managed recharge from local and imported water sources during dry and multiple dry years.

(2) Recycled water projections are based on complete implementation of the joint District/SCRWA South County Recycled Water Master Plan Report.

The District has initiated a Joint South County Water Supply Planning project with the cities of Gilroy and Morgan Hill and the County of Santa Clara. The purpose of the project is to ensure the long term reliability of water supply in South County by jointly performing a more detailed evaluation of the Llagas subbasin. This project will also address:

- Groundwater contamination issues including the current perchlorate contamination
- Fisheries and resource management in the Uvas watershed and its impact on recharge operations
- The need to integrate and coordinate Llagas Subbasin water supply management activities with a number of other regional programs and projects, including Habitat Conservation/Natural Communities Conservation and Integrated Regional Water Management planning
- The need for improved communication and coordination on land use and water supply planning
- Unfunded groundwater and water use efficiency programs including expanded recharge and recycling; and
- Managing water rate increases

The joint planning effort will also involve stakeholders in the development of the long-term water supply plan for the Llagas Subbasin.

6.8 Supply and Demand Comparison Summary

A sustainable, high-quality water supply is vital for a prosperous economy, the environment, and quality of life in Santa Clara County. Water supply issues in California are shaped by two major factors—periodic droughts and increasing competition for water. Population growth and competition among urban development, agriculture, and environmental water needs all place increasing demands on this limited resource. Today's challenges revolve around balancing finite and variable water supplies, especially during prolonged drought periods. Now more than ever, water managers like the District must carefully plan for future needs while efficiently managing existing supplies, finding innovative and technical solutions to mounting costs, and protecting the environment.

The updated demand projections developed as part of UWMP 2005 are slightly less than those presented in the District's draft IWRP Study 2003 and those from UWMP 2001. Based upon the updated analysis performed for UWMP 2005, water supplies in Santa Clara County are adequate to meet current and near future demand (out to 2020) given average hydrology and the dry year scenarios analyzed as part of this plan.

Water use over the next five years is expected to increase by 0.3 percent per year on average and increase by 1 percent a year on average after year 2020. Overall, countywide water demand is projected to increase by about 70,000 acre-feet (af) or 18 percent over the next 25 years, even with increases in new water conservation efforts. The District and most major water retail agencies partner in regional implementation of a variety of water use efficiency programs to permanently reduce water use in the county. Demand with conservation programs in place in 2030 is projected at approximately 450,000 af. These conservation efforts planned between now and 2030 will offset about half the additional water supplies needed to meet increased demand. Using 1992 as a baseline, the county will be permanently conserving an additional 100,000 af per year by the year 2030.

In the near term, the District is undertaking "No Regrets" portfolio investments consistent with the IWRP process. This portfolio has already been included as part the District's baseline and the analysis performed for UWMP 2005 assumes implementation according to the following schedule:

- 28,000 af of additional annual savings from agricultural, municipal and industrial conservation (full implementation is needed by 2020—Funding not included in CIP or 10-year water rate forecast)
- 20,000 af of additional groundwater recharge capacity (implementation by 2010—Funding not included in the CIP or 10-year water rate forecast)
- 60,000 af of additional capacity in the Semitropic Water Bank (currently implemented)

To ensure a reliable water supply into the future, the District will need to continue to invest in maintaining its existing water supply, infrastructure, and programs. Key programs to protect our existing water supplies and infrastructure and advance our planning efforts include:

- Maintaining and expanding water conservation efforts
- Investing in additional groundwater recharge capacity
- Protecting groundwater subbasins through effective groundwater management programs
- Expanding water recycling to meet projections in accordance with District Board policies
- Sustaining local water supplies by maintaining local water rights
- Implementing key recommendations from the District's 2005 Water Infrastructure Reliability Project Report
- Investing in infrastructure projects identified in the Infrastructure Master Planning Process

- Meeting water quality standards through aggressive source water protection, ongoing improvements to treatment facilities and additional infrastructure
- Protecting imported water supplies by resolving contract and policy issues, supporting Bay-Delta system improvements, addressing system vulnerabilities (e.g., the San Luis Reservoir low-point problem), and supporting SFPUC efforts to implement a Capital Improvement Program (CIP)

Specific funding requirements for many of these elements have not yet been identified and their costs are not included in the District's long-term water rate forecast or its CIP.

In addition to significant investment needed to protect and safeguard existing supplies, the District recognizes that new investment is also necessary to meet additional future demand past year 2020. During normal rainfall years, the District does not rely on groundwater reserves to meet demand. However, beyond 2020, the county would need to start dipping into groundwater reserves unless new supplies are secured, even during years of normal precipitation. By 2030, the District's water supply analysis shows that 31,100 af per year of additional supply is needed during a normal year. During dry years and multiple dry years, significant pumping from groundwater reserves is necessary to meet demand. Since these reserves are replenished during wet and to some extent during normal years, analysis shows that 13,700 af per year of supply is needed in multiple dry years. The investments made to secure the normal year additional supplies also help increase supplies available in dry years.

A suite of portfolio options presented in IWRP Study 2003 addresses additional water needs under various hydrologic and risk scenarios such as climate change, unexpected increases in demand, reduced imported water, etc. The District will continue to monitor risks that can change the water supply outlook and will work to influence key external decisions that have the potential to impact baseline and potential new water supplies. This flexible water management planning process adjusts as the future projection changes so that the risk of the future water supply falling short of or significantly exceeding the actual water demand is minimized. The District is also in the process of developing a monitoring system to assess water supply baseline protection efforts as well as identify water supply risks. The next update to the IWRP Study 2003 is scheduled to be completed in 2008 and will define the strategy to secure supplies out to 2020 and beyond.

6.9 New Development and Role of SB 610 and SB 221

Legislation authored by Senator Sheila Kuehl (SB 221) and Senator Jim Costa (SB 610) require water retail agencies to demonstrate whether their water supplies are sufficient for certain proposed subdivisions and large development projects subject to the California Environmental Quality Act (CEQA). The preparation of these assessments and verifications is the responsibility of the local water retailer and land use agencies since they usually can provide the most accurate information regarding local demands, system design considerations, and supply sources for site-specific analyses. Retailers, land use agencies and developers should consult with the District regarding regional water supply issues and long-term sustainability of District supplies and groundwater prior to the preparation of water supply assessments and verifications. It is also vital that the District work closely with the retailers, land use agencies and developers to ensure that water conservation is maximized and water recycling is expanded so that water demands of new development are minimized.

Chapters earlier in this report provide more detailed information on each major source of supply and include information on historic use, water rights and contracts which can be used as justifications for supply projections. The District has used the best estimates of water demand available for future development and in determining supplies needed to meet future demand. However, UWMP 2005 includes numerous planning assumptions related to future growth, water supply reliability, and investments needed to maintain and protect existing supplies and infrastructure. Investments are also needed to secure new supplies to meet demand after 2020. The funding for these many of these investments has not been secured and the validity of planning assumptions cannot be guaranteed. Retailers, land use agencies and developers are encouraged to work with the District to verify the implications of UWMP 2005 planning assumptions and new investments needed to ensure a reliable water supply for all new urban development projects.

Changes in land use plans and policies, local climate, and water use practices could result in future water needs that are greater than anticipated. If land use decisions or other factors result in development beyond that included in this analysis, it is likely that increased water use efficiency efforts and new additional all-weather supplies would be necessary to offset the impacts of the additional water demand.

7

Water Shortage Contingency Analysis

7.1 Three Dry Years Scenario

This section presents an estimate of the minimum water supply available during each of the next three years, assuming a repeat of the driest three-year historic sequence. In the 125-year record for the San José rainfall gage #86, the driest consecutive three-year sequence occurred from 1987 through 1989. Table 7-1 summarizes the water supply that could be expected in a repeat of those three years.

Year-to-year decision making is accomplished through annual operations planning activities, which include evaluating annual transfer opportunities, allocating imported water deliveries, setting carryover storage targets, and scheduling facilities maintenance decisions. The District's 2005 Operations Plan provides projections of how District-managed water (locally stored and imported water) will be distributed to efficiently use recharge facilities and provide treated water to meet demands. Developing a resource strategy that balances both cost and risk requires a combination of core and flexible supplies. Examples of flexible supplies include water transfers, banking and reserves.

The groundwater conditions at the beginning of the three-year period were based on the allocations and local condition described below. DWR announced 90 percent of the SWP entitlement of 100,000 af is available to the District for 2005. And, USBR announced allocations of 85 percent of the 33,100 af of CVP agricultural water, and 85 percent of the 119,400 af of CVP M&I water entitlements. This results in a total imported water supply of approximately 219,625 af compared to a five-year average of 189,300 af. In addition to the imported water allocation, the District is also expected to receive 11,800 af of carryover and 6,100 af of transfers or other imported water in 2005. As of March 1, 2005, the District reservoirs had a combined storage of approximately 140,600 af, or about 84.6 percent of capacity. All groundwater subbasins are currently full.

As Table 7-1 shows, the District would be able to meet demand over this three-year sequence without a shortage by utilizing groundwater storage withdrawals from banking reserves, and/or transfers and exchanges. The groundwater basin storage would remain above the end-of-year carryover storage levels described above, so no actions would be necessary during this dry-year sequence. If this three-year sequence were to occur in a future time when storage levels are not as high, this outlook would change.

Table 7-1 Water Supply Estimates for the Driest Three-Year Sequence (af)

Water Supply Sources	Year 1 (1987)	Year 2 (1988)	Year 3 (1989)
	(Acre-feet)		
Imported Water			
SWP[1]	77,000	21,000	77,000
CVP[1]	125,000	93,300	112,100
Semitropic Take	20,700	34,700	34,000
Subtotal:	222,700	149,000	223,100
Local Supplies			
Natural Groundwater Yield	32,800	27,800	29,500
Recharge Activities	40,300	27,800	20,200
SFPUC[2]	47,400	47,400	47,400
Other Local	3,900	3,400	6,400
Recycled Water	14,400	15,600	16,800
Subtotal:	138,800	122,000	120,300
Total Supply	361,500	271,000	343,400
Estimated Demand	388,500	390,000	391,500
Decrease in GW storage or amount of fliexible supplies or demand reduction needed[3]	***27,000***	***119,000***	***48,100***
	Total over Sequence:		194,100

Notes:
[1] Includes entitlement and carryover storage
[2] Estimated based on 85% allocation
[3] Groundwater subbasins at beginning of sequence assumed full

7.2 Water Shortage Contingency Plan

This section describes the District's contingency planning for actions that can be taken should shortages occur. A strategy for early drought recognition and response is presented, and shortage response levels and stages of action are described. The water shortage contingency information presented here is based on the April 2000 Draft Drought Management Plan. Water supply shortages can be caused by a variety of factors including: hydrologic drought, environmental or regulatory cutbacks (sometimes called regulatory drought), or facility outages. This Plan focuses on drought risk, based on the different hydrologic conditions observed in the past.

Risks from water supply shortages include overdrafting the county's groundwater basin and experiencing land surface subsidence. Land surface subsidence can damage infrastructure and lower the land elevation along the county's many rivers and streams, resulting in greater backwater influences from San Francisco Bay and greater flooding risks among densely developed urban areas.

Although the District manages the groundwater basin, the groundwater supplied in the county is pumped by others: major retailers and independent users. The District can influence groundwater pumping through groundwater pumping charges and other management practices, but it does not directly control the amount of groundwater pumped. In addition, the groundwater basin is a very complex and non-homogeneous system and there is some technical uncertainty associated with the ability to predict the natural groundwater yield, groundwater operational storage, and land subsidence threshold, making precise management of the groundwater basin difficult. Consequently, there is some risk that supply shortages to the county can result in overdrafting of the groundwater basin.

An important component of meaningful drought shortage response is the ability to recognize a pending shortage before it occurs, early enough so that several options remain available, and before supplies that may be crucial later have been depleted. Shortage is defined as the amount of water demand that could not be met from existing sources including storage.

7.3 End-of-Year Carryover Storage Indicator

The District has performed operational analysis to determine what parameters (leading indicators) may serve as warnings of potential shortage. Based on this analysis, projected groundwater end-of-year carryover storage was the most successful in anticipating water shortages and is an effective way to evaluate the overall water supply picture. When the operational storage in all the groundwater subbasins combined is projected to drop below 350,000 af, compared to a total operational capacity of 530,000 af, then the following year is considered to be at risk of water shortage. The indicator is quite conservative; it considers about 1 in 5 years to be a potential first year of water shortage, compared to 1 in 20 years that actually can be expected to result in shortages.

7.4 Shortage Response Action Guidelines

By looking at a two-year operations planning horizon, actions can be taken to help reduce the severity of subsequent shortages should the drought continue beyond the first year. By assuming that the water supply in the second year of the planning horizon is equivalent to the supply that would be available if there were a repeat of the worst year of record 1977, the risk of overdrafting the groundwater basin in following years can be minimized. In each year, water supplies and groundwater conditions are monitored. The current year is always the first year in the two-year planning horizon. The District will also be looking more closely at the UWMP three-year drought for operational purposes.

In recognition of the technical uncertainties in determining the land subsidence threshold and the difficulty in managing groundwater elevations precisely, this plan uses a 50,000 af reserve in total groundwater storage as a buffer against uncertainty in ascertaining the risk of subsidence and to protect against fluctuations in groundwater pumping beyond the District's ability to control or to measure in a timely manner.

In April of each year, when the quantities of imported water available under the District's contracts for the year have generally been determined and estimates of local water yields for the water year are fairly reliable, an estimate of the end-of-year carryover storage in the groundwater basin is made. If it is expected that the water year will end with less than 350,000 af of carryover groundwater storage, the coming year is considered to be at risk of being a drought year. The table below summarizes the recommended shortage response guidelines for different expected end-of-year groundwater carryover storage.

Table 7-2 Shortage Response Action Guidelines

Level	Expected End-of-Year Groundwater Basin Carryover Storage	Response	Demand percent assuming 400,000 acre-feet demand
--	350,000 to 530,000	No Action	-
1	320,000 to 350,000	Continue to monitor. Appropriate response (if any) to be determined	-
2	270,000 to 320,000	Implement 50,000 af response	12.5%
3	220,000 to 270,000	Implement 100,000 af response	25%
4	170,000 to 220,000	Implement 150,000 af response	37.5%
5	120,000 to 170,000	Implement 200,000 af response	50%
6	50,000 to 120,000	Implement 270,000 af response	62.5%

7.5 Drought Response

The indicated response is flexible and will be tailored to opportunities available at the time. Potential responses include: voluntary water use reduction/public outreach (including media campaigns, increased water conservation literature and conservation kit distribution), followed by demand reduction measures or increased supplies. The shortage response action guidelines do not specify the form of the drought response. Annual decisions, including whether to participate in the water market or call for demand cutbacks, are made through annual operations planning.

By following these action levels, the groundwater carryover storage at the end of the two-year planning horizon will remain above the 50,000 af minimum considered prudent to protect against subsidence.

7.6 Plan Implementation

The District will work with retailers to build consensus on plan implementation and allocation. Issues to be resolved include the following:

- Water use reduction allocation among retailers and retailer customer classifications
- Consideration of other water sources, such as SFPUC and recycled water as well as demand-side management programs in allocations
- Criteria for demand cutbacks and purchases of additional supplies

7.7 Mandatory Prohibitions

The District does not have the authority to adopt ordinances or impose mandatory provisions restricting the wasteful use of water nor does the District have authority to set or enforce consumption limits at the retail level. As a result, this UWMP does not include per capita allotments, inclining-block rates, penalties, or incentives for demand reduction for any customer class. The development of such mechanisms is within the purview of cities, the County and the local retail water agencies. Instead, the District works with local retail water suppliers to establish water use reduction targets. By working closely with its retail water agencies, the District has effectively set and achieved up to 25 percent mandatory water use reduction levels in the past.

7.8 Penalties or Charges for Excessive Use

The District Act (Section 26.5) was amended in 1989 to allow the District to develop overproduction charges for groundwater pumping. This provision allows the District the flexibility to use pricing as an incentive to achieve cooperation on the part of local water users during a water supply shortage to avoid land subsidence. The District's Board has the ability to define acceptable production levels upon a finding by the Board that conditions of drought and water shortage require increased charges.

7.9 Revenue and Expenditure Impacts

Under a water shortage scenario, water utility expenses will increase to implement water use reduction and additional response efforts, while revenues will decrease due to the effect of these efforts on water demand. Two mechanisms are in place to help the District overcome the financial impacts of water supply shortages. First, the District maintains a Supplemental Water Supply Reserve which sets aside funds that can be used to purchase additional water if needed. Second, the District typically sets wholesale water rates once per year, but has the ability to implement a "mid-year" rate increase if the Board determines that it is necessary. The mid-year rate setting option gives the Board flexibility to address funding needs in an extraordinary year.

7.10 Mechanism for Determining Actual Reductions in Water Use

In times of shortage the District produces a monthly Water Supply and Use Report that contains the following:

- Monthly and season-to-date rainfall at four rainfall stations within the county
- Reservoir storages and capacities
- Monthly recycled water deliveries
- Monthly and year-to-date water use for each major water retailer in the county
- Groundwater basin condition (depth-to-water data)

During times of shortage, the current water use by retailer is compared with water use targets.

The District does not have access to individual water use account data that would enable it to determine the reductions by customer class or by customer unit (per household, for example). This data is only available at a retailer level.

7.11 Catastrophic Interruption Planning

Water Infrastructure Reliability Project

In September 2005, the District released the Water Infrastructure Reliability Project Report. This report unveiled a study to lessen impacts on the county's water supply system during a disaster. The report, developed in coordination with water retailers and other water agencies, concludes that a magnitude 7.9 earthquake along the San Andreas Fault could damage pipes and disable pump stations and treatment plants that purify and deliver drinking water to municipal and private water companies in many areas of the county. Outages could last as long as two months. To minimize those outages, recommendations in the report address short-term actions and longer-range capital improvements. The District is spending $2 million to purchase and store replacement pipes and hardware by June 2006, so that the District always has an adequate supply of replacement pipe. This action cuts in half the time it takes to restore water service during a disaster that damages pipes, such as a major earthquake.

Long-range projects include expansion of well fields on the west and east sides of Santa Clara Valley to take advantage of the county's groundwater subbasins, which would require additional investment. The preliminary cost estimates for this work are up to $150 million and would reduce the outage period down to 7 to 14 days. The District is working collaboratively with its retailers to find opportunities to reduce costs and determine funding options. To evaluate the vulnerability of the county's water supply infrastructure to a catastrophic event, the District led a two-year effort to analyze the system using complex computer models. In addition to determining the District's current level of service in catastrophic events, the report also confirms that improvements to enable the county to better deal with catastrophes will need to be made to the entire county water supply chain, from area imported water suppliers, through the District, and on to water retailers.

The study looked at the implications of large earthquakes, both within Santa Clara County and to the surrounding area. It simulated two earthquake scenarios. For a massive earthquake on the San Andreas Fault—approximately 10 times greater than the 1989 Loma Prieta earthquake—it may take as long as 30 days to restore service to nearly full capacity if replacement pipe is available. Pipelines and pumps used to import water into the county from the Sacramento-San Joaquin Delta could be out of service for three to seven days and it may take as long as 60 days for water to be delivered from SFPUC.

In the second scenario, which includes a smaller magnitude earthquake on either the South Hayward Fault or Central Calaveras Fault, nearly full restoration of service is estimated within seven days.

The risks to Santa Clara County's water delivery system from regional power outages and flooding were not as severe as earthquake events.

Participants in the development of the report included the cities of Gilroy, Milpitas, Morgan Hill, Mountain View, San José, Santa Clara and Sunnyvale; California Water Service Co.; San José Water Co.; Great Oaks Water Co.; California DWR; U.S. Bureau of Reclamation; Alameda County Water District; Bay Area Water Supply and Conservation Agency; City of Palo Alto; Pajaro Valley Water Management Agency; San Benito County Water District; San Francisco Public Utilities Commission, and Zone 7 Water Agency.

Asset Management Program

Development of the Asset Management Program Plan was started in January 2002 to provide a better basis for identifying long-term capital rehabilitation and replacement needs. This program's goal is to lower the cost of asset ownership and improve system reliability by establishing a life-cycle preventative and corrective maintenance schedule for each of the District's assets. The plan that will be generated from this effort will identify projects similar in nature to the inspection and rehabilitation of vaults and air valves on the Santa Clara Distributary, replacement of the 48-inch ball valve at the Piedmont Valve Yard, and the Rinconada Reservoir Roof Rehabilitation. The initial program plan was completed in September 2003.

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