Section 2: Region Description

2.1 Introduction and Overview

The purpose of this section is to discuss why preparation of an IRWMP for this Region is appropriate, describe the physical and environmental characteristics of the Region, describe social and demographic characteristics of the Region, describe the sources of water and estimated water demand, and identify water quality issues.

As described in Section 1, the Region for this IRWMP is the Upper Santa Clara River Watershed. The Upper Santa Clara River Watershed consists of the portion of the Santa Clara River Watershed located within Los Angeles County. The approximately 654 square miles of the Region is bounded by the San Gabriel Mountains to the south and southeast, the Santa Susana Mountains to the southwest, the Liebre Mountains and Transverse Ranges to the northeast and northwest, and extends westward to the Ventura County Line. Elevations range from about 800 feet on the valley floor to about 6,500 feet in the San Gabriel Mountains. The headwaters of the Santa Clara River are at an elevation of about 3,200 feet at the divide separating the Region from the Mojave Desert. This IRWMP Region is adjacent to, but does not overlap other IRWMP planning regions.

The major water bodies in the Region include the Santa Clara River and its tributaries. The principal tributaries are Castaic Creek, San Francisquito Creek, Bouquet Creek, and the South Fork of the Santa Clara River. Additionally, the Santa Clara River receives tertiary-treated reclaimed water discharged from the Saugus and Valencia water reclamation plants, which are operated by the SCVSD. Figures 1.1-1 and 1.1-2 provide a map of the Region boundaries and the key hydrologic features. As shown in Figure 2.1-1, the Santa Clara River is divided into various reaches; within the Upper Santa Clara River there are four defined reaches (as defined by the Los Angeles RWQCB Basin Plan):

- <u>Reach 5 (Blue Cut)</u>. Upstream of the USGS Blue Cut Gauging Station to the West Pier Highway 99 (now the Old Road Bridge)
- <u>Reach 6 (Highway 99)</u>. Upstream of Highway 99 (now Old Road Bridge) to Bouquet Canyon Bridge
- <u>Reach 7 (Bouquet Canyon)</u>. Upstream of Bouquet Canyon to Lang Gauging Station
- <u>Reach 8 (Above Lang Gauging Station)</u>. Lang Gauging Station to headwaters

The upper portion of the Santa Clara River and its tributaries are typically ephemeral streams, having intermittent surface flows only during, and immediately after, periods of intense precipitation. The geologic characteristics of the alluvial sediments in the riverbed in this section of the river provide excellent percolation, and flowing water quickly recharges to the underground aquifers below the river. Perennial flows begin near the Old Road Bridge, due to both reclaimed water discharges and unique geologic conditions that force groundwater to rise to the surface. However, downstream of Blue Cut a “dry gap” from near Blue Cut to Piru Creek exists for much of the year, making the Upper Santa Clara River a hydrologically independent system from the Lower Santa Clara River for much of the year. Because of these characteristics and others as discussed in Section 1, and due to its history of cooperative water management, the topography and geography of the Region and the similarity of water issues facing agencies within the Region, the Upper Watershed is a logical region for integrated regional water management.

This Page Intentionally Left Blank.

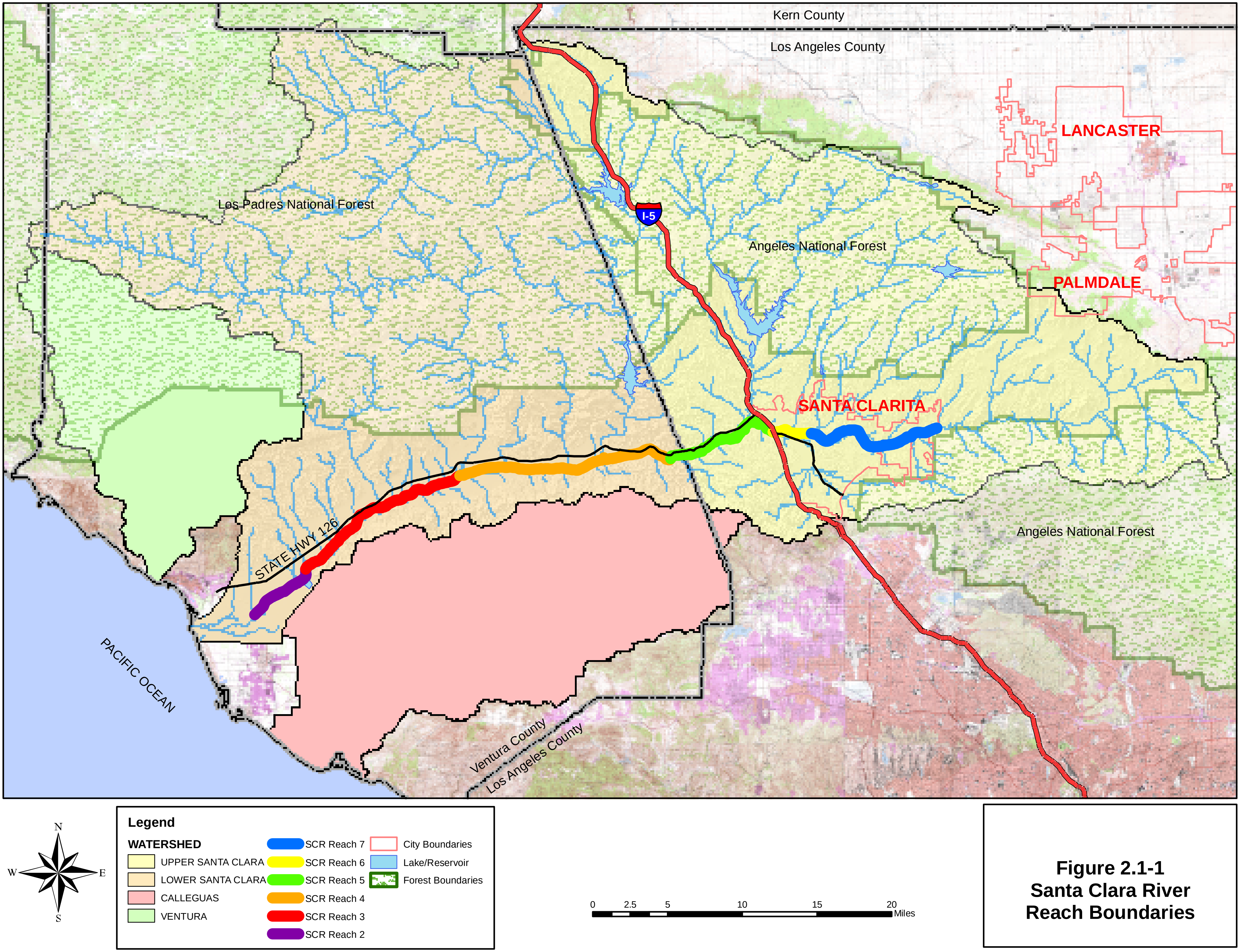
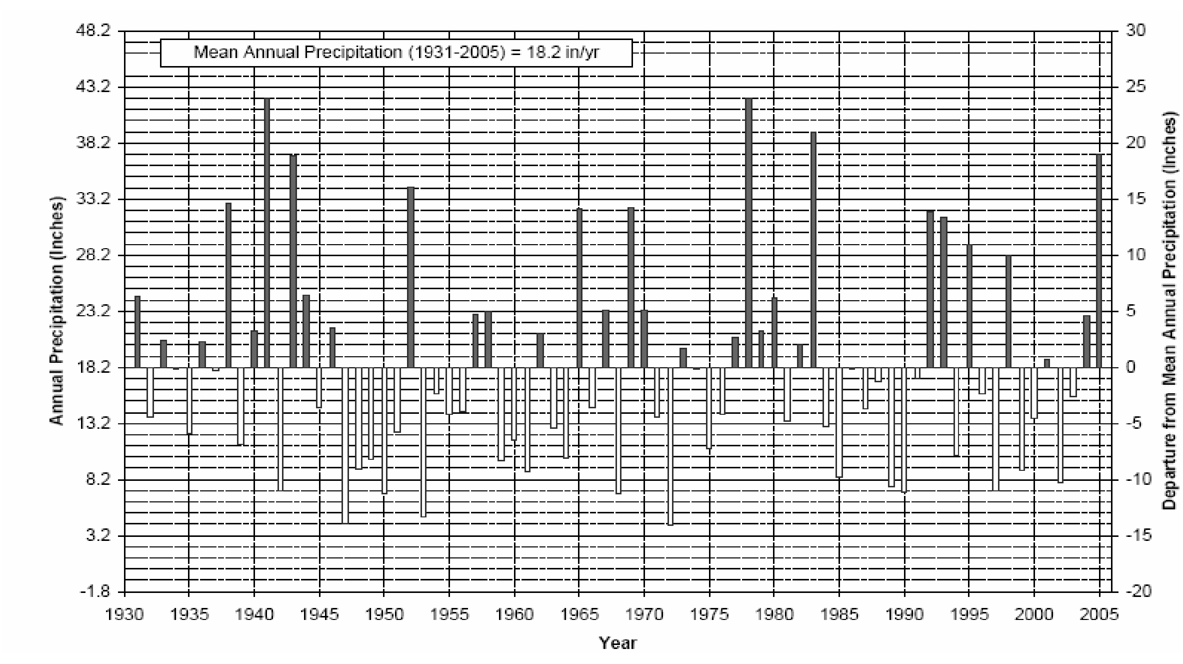


Figure 2.1-1
Santa Clara River
Reach Boundaries

2.2 Climate

The watershed is characterized by an arid climate. Intermittent periods of less-than-average precipitation are typically followed by periods of greater-than-average precipitation in a cyclical pattern, with each wetter or drier period typically lasting from one to five years. The long-term average precipitation is 18.16 inches (1931-2005), as shown in Figure 2.2-1 for the Newhall-Soledad 32c gage. The National Climatic Data Center (NCDC) and LADPW have maintained records for the Newhall-Soledad 32c gage since 1931. In general, periods of less-than-average precipitation are longer and more moderate than periods of greater-than-average precipitation. Recently, the periods from 1971 to 1976, 1984 to 1991, and 1999 to 2003 have been drier than average; the periods from 1977 to 1983 and 1992 to 1996 have been wetter than average. Year 2004 was a slightly wet year, with total precipitation of approximately 23 inches, or about five inches above average. Wet conditions that began in late 2004 continued into early 2005. Significant storm events in January 2005 produced over 13 inches of measured precipitation, or more than 70 percent of average annual precipitation in the first month of the year. Significant storm events continued in February, resulting in nearly 17 inches of additional measured precipitation, or 93 percent of average annual precipitation in February alone. In total, 2005 had about 37 inches of measured precipitation, or slightly more than 200 percent of long-term average precipitation. Both 2006 and 2007 were extremely dry years, with annual precipitation in 2006 of less than 14 inches, and less than 1 inch of precipitation measured at the Newhall-Soledad gauge in 2007 (Elowitt 2008).

FIGURE 2.2-1
ANNUAL PRECIPITATION



Source: 2006 *SVC Water Report*.

In the recent update of the *California Water Plan* (2005), an assessment of the impacts of global warming on the State's water supply was conducted using a series of computer models that incorporated decades of scientific and historic research. Model results indicate increased temperature, reduction in Sierra Nevada mountain snow depth, early snow melt, and a rise in sea level. These changing hydrological conditions could affect future planning efforts, which are typically based on historic conditions. Difficulties that may arise include:

- Hydrological conditions, variability, and extremes that are different than current water systems were designed to manage;
- Changes occurring too rapidly to allow sufficient time and information to permit managers to respond appropriately; and
- Special efforts or plans required to protect against surprises and uncertainties.

In July 2006, DWR issued "*Progress on Incorporating Climate Change into Management of California's Water Resources*," as required by Executive Order S-3-05, which instituted biennial reports on potential climate change effects on several technical resource areas, including water resources. This report describes the progress made in incorporating current climate change data and information into existing water resources planning and management tools and methodologies. The report, whose purpose is to demonstrate how various analytical tools currently used by DWR could be used to address issues related to climate change, focuses on assessment methodologies and preliminary study results from four climate change scenarios.

Potential impacts of climate change are presented for the State Water Project (SWP) and for the Sacramento-San Joaquin Delta (Delta), which are both related to the Upper Santa Clara River Region's imported water supplies. Since the Region is reliant on imported SWP supplies as part of its overall supply mix, any reduction or change in the timing of availability of those supplies could have negative impacts on the water supply of the Region. Reductions in the quantity of SWP water available would force the Region to rely more heavily on local groundwater and local surface flows, or other sources of imported water. It is possible that local surface flows could also be reduced by changes in snow pack altitude levels and/or quantity of snow pack in the San Gabriel Mountains and other regional mountain ranges, which would reduce natural recharge, thus exacerbating groundwater availability problems.

The SWP analysis presents potential impacts on SWP operations, including reservoir inflows, delivery reliability, and average annual carryover storage, as well as many other operational parameters. The analysis uses forecast levels of climate change in year 2050, with 2020 land use levels. Some of the main impacts include: changes to south of Delta Table A[1] Amount deliveries (from an increase of about 1 percent in a wetter scenario to about a 10 percent reduction for a drier climate change scenario); increased winter runoff and lower Table A allocations in the three driest climate change scenarios; lower carryover storage in drier scenarios; and higher carryover storage in a wetter scenario.

The Delta analysis of the four climate change scenarios included the operational impacts to the SWP and other water delivery systems, as well as meeting Delta water quality standards. The analysis indicated that meeting these water quality standards will be a "larger challenge" due to climate change. Using assumed climate change scenarios and a sea level increase of one foot,

[1] Table A is a schedule of annual water amounts as set forth in long-term SWP delivery contracts. Table A defines the annual volume of water that could be delivered to a SWP contractor in a given year under regular contract provisions without consideration of surplus SWP water deliveries or other supplies available to a SWP contractor.

the ability to meet chloride standards for municipal and industrial uses would be more difficult and may cause water supply impacts which DWR could not quantify at this time.

Future studies will include DWR working with other agencies to incorporate climate change information into the management of the State's water resources. Additional climate change scenarios will be developed and analyzed, with the goal of providing them to water resource planners to utilize in making water operations and management decisions. DWR states that the preliminary results in this current report are not sufficient by themselves to make policy decisions regarding water resources.

2.3 Land Use

Major existing land use categories identified in the 2004 *Santa Clarita Valley General Plan Technical Background Report* encompass most of the Region and have been compared with the land use categories of the Los Angeles County General Plan and the City of Santa Clarita General Plan. The categories include:

- Residential: Residential uses include a mix of housing developed at varying densities and types. Residential uses in the Region include single-family, multiple-family, condominium, mobile home, low-density "ranchettes," and senior housing.
- Commercial/Office: This category includes commercial uses that offer goods for sale to the public (retail) and service and professional businesses housed in offices (e.g., doctors, accountants, regional offices/headquarters, office complexes, etc.). Retail and commercial businesses include those that serve local needs, such as restaurants, neighborhood markets and dry cleaners, and those that serve community or regional needs, such as entertainment complexes, auto dealers, and furniture stores.
- Industrial: The industrial category includes heavy manufacturing and light industrial uses found in business, research, and development parks. Light industrial activities include warehousing and some types of assembly work. This category also includes oil and gas and mineral extraction and wholesaling.
- Public Services/Special Use Facilities: Government buildings, libraries, schools, and other public institutions are found in this category. Uses in this category support the civic, cultural, and educational needs of residents. Special uses such as correctional facilities are also grouped in this category.
- Transportation, Communication, and Utilities: This category includes freeways and major roads, railroads, park and ride lots, truck terminals, airports, communication facilities, electrical power and natural gas facilities, solid waste and liquid waste disposal, transfer facilities, and maintenance yards.
- Open Space: This category encompasses the Angeles National Forest and land used for agriculture, private and public recreational open spaces, and local and regional parks. Recreational areas, including golf courses and water bodies and water storage, and some agricultural use within unincorporated Los Angeles County areas also contribute to open space uses in the Region.

2.3.1 Land Use Policies

There are two (2) jurisdictions: 1) the City of Santa Clarita and 2) the unincorporated areas of Los Angeles County, within the Santa Clara River Watershed. The land use policy documents that govern the region within the Santa Clara River Watershed include the City of Santa Clarita General Plan, the Los Angeles County Santa Clarita Valley Area Plan, and the Los Angeles County Antelope Valley Areawide Plan. Both the Santa Clarita Valley Area Plan and the Antelope Valley Areawide Plan are components of the Los Angeles County General Plan with more focused polices on these individual planning areas. The City of Santa Clarita and its four communities include Newhall, Canyon Country, Valencia, and Saugus. The Santa Clarita Valley Area Plan includes the communities of Castaic, Agua Dulce, San Francisquito Canyon, Val Verde, West Ranch, Stevenson Ranch, Westridge, Violin Canyon, Hasley Canyon, Hillcrest, and the future Newhall Ranch. Several Antelope Valley Areawide Plan communities within the Santa Clara River Watershed include Gorman, Acton, Three Points, The Lakes, and Green Valley. In addition, a large portion of the watershed includes the Angeles National Forest and the Los Padres National Forest.

City of Santa Clarita City Hall

"One Valley, One Vision" (OVOV) is a joint effort between the County, the City of Santa Clarita, and Santa Clarita Valley (Valley) residents and businesses to create a single vision and defining guidelines for the future growth of the Valley, and the preservation of natural resources. The result of the OVOV will be a long-range General Plan document and Environmental Impact Report (EIR) for the entire Valley Planning Area.[2] Day-to-day implementation of this General Plan, based on the Guiding Principles, will be administered by both the City of Santa Clarita and County for lands within their respective jurisdictions. The OVOV project will result in consistent plans between these agencies, better planning for resource management, and an enhanced quality of life for all who live and work in the Valley.

Los Angeles County Hall of Administration

The individual General Plans of the County and City of Santa Clarita (and eventually the OVOV General Plan) contain policies which govern the decision-making entity as to how they review and condition individual development projects and formulate their future improvements. Typically, such policies are grouped together into elements including "Air Quality" and "Transportation." Water management has typically been included in the "Open Space and Conservation" section.

[2] In the initial planning phases of the One Valley, One Vision process, the community of Acton was included within the planning area. The 2004 Technical Background Report was prepared assuming inclusion of Acton in the planning area. However, since 2004 Acton has joined the Antelope Valley Planning Area.

One of the results of this IRWMP will be an inventory of water-related policies and programs created in order to assist each jurisdiction in planning its water management efforts. Such an inventory will be collected, discussed, and redistributed to these jurisdictions. By heightening the awareness of those directly responsible for the jurisdictions' General Plans, it is expected that additional and more effective policies and programs will be introduced into their decision-making/review processes.

For example, the County and the City of Santa Clarita in their General Plans, and the Santa Clarita Valley Area Plan have a number of adopted programs, policies and procedures which affect water management including:

- The Los Angeles County General Plan under its "General Goals and Policies" and in the "Conservation and Open Space Element" contains specific goals and policies governing water supply, water conservation, water quality, and natural watershed processes and protection.
- The County's Santa Clarita Valley Area Plan in its "Environmental Resources Management Element" provides for the protection of surface water, and contains policies specific to water quality, water supply, and flood protection.
- The City of Santa Clarita's General Plan "Open Space and Conservation Element" specifies multiple policies focused on water resources preservation, with the overall goal being "to protect quality and quantity of local water resources, including the natural productivity of all surface and groundwater, and important watershed and recharge areas."

While these planning documents contain some strategies for water management, it is recognized that additional strategies may be available to further water management. The information compiled by, and contained in, this IRWMP will help the jurisdictions working together to better manage water resources.

In addition to the authority vested in public land use planning agencies, other entities including water agencies, LAFCO, and the Southern California Association of Governments (SCAG) also influence land use. Under State law (Senate Bills 610 and 221), land use planning agencies must consult with local water agencies to determine if adequate supplies of water are available to serve proposed land developments. Additionally, water agencies must coordinate with land use planning agencies in the development of their urban water management plans, which include projections of future water demand and water supply availability during normal and dry periods. Water agencies and land use planning agencies within California are working closely together to ensure adequate management and planning for water supplies to meet the needs of growing communities.

The Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000 establishes procedures for local government changes of organization, including city incorporations, annexations to a city or special district, and city and special district consolidations. Under this Act, a LAFCO has numerous discretionary powers, but those of primary concern are the power to act on local agency boundary changes and to adopt spheres of influence for local agencies. Among the purposes of LAFCO and the Cortese-Knox-Herzberg Act are the promotion of orderly development (avoidance of overlapping and duplicative urban services) and balancing such development with sometimes competing interests of discouraging urban sprawl, preserving open space and prime agricultural lands, and efficiently extending government services. The Los Angeles County LAFCO has county-wide jurisdiction.

The 2008 Regional Comprehensive Plan, developed by SCAG, is a holistic, strategic plan for defining and solving inter-related housing, traffic, water, air quality, and other regional challenges. The Regional Comprehensive Plan was specifically developed to:

- Respond to the SCAG Regional Council's direction to develop a comprehensive plan that addresses the region's economic, social and environmental future and emphasizes the interdependence of nine resource areas.
- Inform local, subregional, and county economic and resource plans that are often limited by geography or scope. For example, a county-wide resource plan for open space may fail to recognize the habitat value of linking to adjacent county open space plans.
- Help meet federal transportation planning requirements that call for more integrated resource planning, particularly more integration of environmental concerns into transportation plans through expanded consultation.
- Offer recommendations to local governments from a regional, comprehensive perspective for consideration into the development of local General Plans and the design and review of major development through the region's Intergovernmental Review process.
- Provide a regional response and strategy for meeting climate change mandates that call for reductions in greenhouse gases.
- Offer a comprehensive, integrated policy plan that helps position Southern California to get its fair share of revenue from federal and state funding programs, such as the traffic, housing, water, and park infrastructure bonds approved in 2006.
- Help stakeholders make the most of their limited resources by highlighting priority policies for future implementation that maximize benefits both locally and regionally.

The Regional Comprehensive Plan is divided into nine resource chapters that identify the regional challenges, plan, goals and outcomes envisioned to help communities and decision-makers achieve a sustainable future:

1. Land Use and Housing
2. Open Space and Habitat
3. Water
4. Energy
5. Air Quality
6. Solid Waste
7. Transportation
8. Security and Emergency Preparedness
9. Economy

The Regional Comprehensive Plan identifies the regional challenges, with respect to water resources, as follows:

> "Recent projections indicate that nearly half of the state's population will reside within the SCAG region by 2030. This underscores the importance of questions about Southern California's future water supply, and of reliably meeting our urban water demands in a way that is sensitive to both ecological imperatives and the evolving emphasis on sustainable development. We also face challenges in how we assure a high quality water supply for consumption, recreational, habitat, and other needs.
>
> Eliminating water quality impairments throughout the region's urban watersheds is a major challenge. These impairments (usually caused by "non-point" source pollutants) are largely caused by urban and stormwater runoff and must be cleaned up under the Clean Water Act. As a result, water quality regulators are imposing significant and costly pollution control measures on local agencies with compliance deadlines."

The Regional Comprehensive Plan focuses on three strategies and goals for addressing these water supply and water quality issues.

First, is the development of sufficient water supplies to meet the water demands created by continuing regional growth through promoting policies that encourage environmentally sustainable imports, local conservation and conjunctive use, and reclamation and reuse.

Second, is to improve water quality by implementing land use and transportation policies and programs that promote water stewardship and eliminate water impairments and waste through more concentrated and clustered developments.

Third, the region needs to improve comprehensive and collaborative watershed planning that yields water wise programs and projects.

This IRWMP directly helps to meet the first and third strategies.

Preparation of this IRWMP was coordinated with local land use agencies; details of this coordination appear in Section 8 of this IRWMP.

2.4 Ecological Processes and Environmental Resources

This section describes the basic environmental resources and ecological process of the Watershed, and also describes relevant issues and existing and potential venues for resolution of these issues.

The Upper Santa Clara River is home to a range of endangered, threatened and rare species, including fish species such as unarmored three-spine stickleback (*Gasterteus williamsoni*). The principal natural features of the Upper Santa Clara River Region include the Santa Clara River, Aliso Canyon, Soledad Canyon, the Santa Clarita Valley, Castaic Valley, San Francisquito Canyon, Bouquet Canyon, Placerita Canyon, and Hasley Canyon. This complex topography provides a natural setting that supports a diverse assemblage of biotic communities.

The natural ecosystem, comprised of a wide variety of biological resources (plant and animal species), as well as physical attributes (land, water, air and other important natural factors), is a vital resource contributing to the economic and physical well being of the communities of the Upper Santa Clara River. Disruption of one factor may intrinsically affect another due to its inter-relationship, and the significance of those effects is difficult to determine without consideration of the whole system. All native species and ecosystems are of aesthetic, ecological, educational, historic, recreational and scientific value.

Ecological processes in the Region which are influenced and improved by water management measures are numerous. Of major concern in the Upper Santa Clara River Region is natural water production and watershed protection, which is critical to maintaining a healthy and balanced ecosystem, one which protects plant and wildlife species and provides for regionally valuable recreational uses (e.g., hiking, camping, hunting, and many forms of outdoor recreation).

NATURAL FEATURES OF THE UPPER SANTA CLARA RIVER

- Angeles National Forest
- Aliso Canyon
- Bouquet Canyon
- Castaic Valley
- Hasley Canyon
- Placerita Canyon
- San Francisquito Canyon
- Santa Clara River
- Santa Clarita Valley
- Soledad Canyon
- Vasquez Rocks

The Upper Santa Clara River system is largely defined as an ephemeral stream with highly variable flows, depending on precipitation levels. It can also be prone to flooding, as was observed during the 2004-05 rainy season, which resulted in damage to many agricultural and urban properties. However, some flood control and prevention measures can have negative impacts on natural habitat, particularly riparian habitat.

Water reclamation, aerial deposition, imported water use, as well as urban and agricultural land practices can create pollutants which impact water quality (see Section 2.8). Most of the Impaired Waterbodies listed in Section 2.8.1 of this IRWMP resulted from these sources. Implementation of programs such as the TMDL program, National Pollutant Discharge Elimination System (NPDES) and the Nonpoint Source Pollution Control Program are key to integrated water management.

Part of the intent of both Propositions 50 and 84 is to create a framework and a collaborative process whereby conflict between different water uses can be avoided or reduced. In the past, development of water supply for human use was done without due regard for habitat preservation or restoration. However increasing priority is being given to changing the process of water resource development and human use to conduct these activities in ways which will not damage natural resources and to restoring damaged natural habitats so that they not only survive but thrive. A large and growing preservation and restoration movement is underway in the Region which has local jurisdictions working in conjunction with habitat preservation advocacy groups, in an attempt to restore balance and improve water quality of one of the last large, natural riparian ecosystems in Southern California.

2.4.1 Sensitive Biological Resources

The Region is host to at least 26 special status plant species and 46 special status wildlife species. These are species of plants and animals that are designated endangered, threatened or rare by the California Fish and Game Commission or the U.S. Department of the Interior and Department of Commerce. A federally listed endangered species is one facing extinction throughout all, or a significant portion of, its geographic range. A federally listed Threatened species is one likely to become endangered within the foreseeable future throughout all or a significant portion of its range. The State of California considers an endangered species as one whose prospects of survival and reproduction are in immediate jeopardy; and a Threatened species as one present in such small numbers throughout its range that it may become endangered if its present environment worsens. The Rare species designation applies only to California native plants.

Additionally, there are many species whose survival and reproduction in the wild are in immediate jeopardy and are considered to be sensitive to further intrusion upon their habitat. Species that are not listed under the Federal Endangered Species Act or the California Endangered Species Act, but which nonetheless are declining at a rate that could result in a designation of Endangered, Threatened or Rare, are classified as Species of Special Concern.

The vegetation and habitat types in the Region that merit "special status" because they are considered unique, are limited in distribution in the Region, or provide particularly high wildlife value include: native grassland, coast live oak riparian forest, southern willow scrub, big-cone spruce-canyon oak forest, southern sycamore-alder woodland, southern cottonwood-willow riparian woodland and forest, freshwater marsh, alluvial fan sage scrub, and vernal pool (CLWA 2006). In addition, coastal and desert biomes meet in this Region, allowing breeding and cross pollination of otherwise isolated species. Following are descriptions of these significant plant communities:

- **Native grassland** communities consist of low herbaceous vegetation dominated by grasses, often mixed with native bulbs and other herbaceous species. Representative native grasslands in the Region include the significant patches of needlegrass and melic grass species.
- **Coast live oak riparian forest** consists of dense overstory formations of coast live oak generally occurring in narrow formations along water channels. Common understory species include the willow, California bay, and other riparian understory species common to Southern California.
- **Southern willow scrub** occurs along seasonal or permanent water courses and is comprised of dense thickets of broad-leafed winter-deciduous riparian species. This community's 'scrub' formation is maintained by frequent heavy over-flooding.
- **Big-cone spruce-canyon oak forest** generally consist of shade-loving species such as big-leaf maple and California bay, and occur in higher elevations on north-facing slopes. Chaparral species generally dominate the understory.
- **Southern sycamore-alter woodlands** in the Region are generally found on broad plains with heavy alluvial substrates along creaks and streams with permanent flows. This community only occurs in the upper reaches of the watershed, in areas within Bear, Sand, Placerita and Aliso Canyons.
- **Southern cottonwood willow riparian natural areas** are dominated by Fremont cottonwood and provide broad-leafed deciduous habitat. This community forms mature overstory areas along many reaches of the Santa Clara River and its main tributaries.

Extensive formations occur just west of Acton in Upper Aliso Canyon and lower San Francisquito Canyon.

- **Freshwater marsh communities** in the watershed are dominated by the perennial, emergent cattail or bulrush, which often grows dense enough to form a closed canopy. Freshwater marsh generally develops in areas of still or slow-moving permanent freshwater.
- **Alluvial fan sage scrub** is made up of a variety of shrubs that can establish themselves and persist within floodplains, alluvial plains, or alongside seasonal streams, where infrequent flooding occurs. Dominant shrubs vary depending on location but include scalebroom, Great Basin sage brush, rabbitbrush and foothill yucca.
- **Vernal pools** are seasonal bodies of standing water, and are very rare in the Los Angeles County and the Upper Santa Clara River Watershed. The one small seasonal pond with vernal pool characteristics known to exist in the Region occurs on the Golden Valley Ranch (near the Placerita Canyon-Sand Canyon divide) and is surrounded by coastal sage scrub and fringed with native needlegrass and melic grass.

Extensive patches of high quality riparian habitat, including southern cottonwood-willow riparian forest and mulefat scrub are present along the length of the Santa Clara River and its tributaries. These plant communities provide nesting and foraging habitat for many sensitive bird species including the endangered least Bell's vireo (*Vireo bellii pusillus*), the southwestern willow flycatcher (*Empidonax traillii extimus*), the yellow-breasted chat (*Icteria virens*), and the yellow warbler (*Dendroica petechia brewsteri*). They are also habitat areas for the federally and state-listed endangered fish species unarmored three-spine stickleback. The riparian scrub habitats in Mint Canyon and other tributaries to the Santa Clara River may also support the slender-horned spineflower (*Dodecahema leptoceras*) (VCWPD 2005).

Yellow Warbler

The Angeles National Forest, a large portion of which is located within the watershed, is also occupied by approximately 45 known species that are deemed sensitive by the US Forest Service, and provides shelter for at least 16 federally listed threatened and endangered plants and animals. Many of these are found in few other places. The forest is a critical habitat for the arroyo toad (*Bufo californicus*), mountain yellow-legged frog (*Rana muscosa*), California red-legged frog (*Rana aurora draytonii*), and several species of fish. Sensitive species such as the California spotted owl (*Strix occidentalis*) and Nelson bighorn sheep (*Ovis canadensis nelsoni*) are also found there (US Forest Service 2003).

California red-legged frog

Pressures for growth and recreational activities in the Region have been linked to significant declines in sensitive species. Growth of urban areas results in loss of available or suitable habitat for sensitive species. Besides loss of habitat, proximity to human development can be harmful to sensitive species. Human development introduces roadway traffic, pesticides, urban runoff and non-native species, which degrade habitat and food sources for sensitive species.

Land use practices, such as cattle and sheep grazing and mining are also considered harmful to many species. Recreational uses, such as off-highway vehicle use are known to conflict with sensitive species habitat. Improper disposal of food wastes and trash by recreational users often attracts predators of the sensitive species, such as common ravens. Dogs brought onto public lands by recreation can also disturb, injure, or kill sensitive species.

2.4.2 Wetland Habitat

Wetland habitats are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water due to underlying soils, geography and topography. Wetlands include, but are not limited to, marshes, bogs, sloughs, vernal pools, wet meadows, river and stream overflows, mudflats, ponds, springs, ephemeral springs, and seeps. Wetlands may also include open water habitats like lakeshores.

Important wetland systems found in the Region include, but are not limited to, freshwater marshes, vernal pool systems and other perennial overflow areas. Freshwater marsh develops in areas of still or slow-moving permanent freshwater, and therefore occurs in scattered pond areas and slow-flow portions of the Santa Clara River and its tributaries. Vernal pools are seasonal bodies of standing water that typically form from spring runoff, dry out completely in the hotter months, and often refill in the autumn. Vernal pools range from extensive, densely vegetated lowland bodies to smaller, isolated upland bodies with little permanent vegetation. The small seasonal pond located in the Placerita Canyon-Sand Canyon divide is a biotic community unique to the Region and represents one of only three known vernal pools in the County.

The variety of riparian and wetland vegetation types that exist within the Region provide habitat for a diverse assemblage of plant and animal species. Supported species include vascular plants, vertebrates and invertebrate communities. Slope wetlands in the region support native grasslands such as needlegrass species and melic grasses, and seeps found in chaparral areas frequently support stands of giant rye. Vernal pools provide important breeding habitat for many terrestrial or semiaquatic species such as frogs, salamanders, and turtles. Wetlands found throughout the Region support communities of invertebrates such as native fairy shrimp, cranefilies, stoneflies, water boatmen, and various beetle species. The health of the more sensitive of these invertebrate species serves as an important indicator of the overall integrity of the riverine, riparian and wetland ecosystems.

Many of the Region's special status species are dependent upon wetland habitats for their survival. The Biological Resources Assessment for the Proposed Santa Clara Significant Ecological Area (SEA)[3] provides a list of animal species known to occur or potentially occurring within the Santa Clara SEA that have been federally listed or highlighted by the state as endangered, threatened, protected, or of special concern. Listed wetland species include vascular plants such as the spreading navarretia (*Navaretia fossalis*), found in the Newhall area, and California Orcutt grass (*Orcuttia californica*). The riverside fairy shrimp (*Streptocephalus woottoni*) is the only listed sensitive invertebrate species, and is known to occur in the vernal pools and swales near the Golden Valley Ranch. The southwestern pond turtle (*Clemmys marmorata pallida*) is found in Ben Canyon and Vasquez Rocks, and several records indicate

[3] For more information on Significant Ecological Areas, see Section 2.4.5.

the presence of the two-striped garter snake (*Thamnophis hammondii*) in perennial waters of the Upper Santa Clara River. Sensitive bird species reliant on wetland habitat and known to occur or commonly migrate to the area delineated by the boundaries of the Santa Clara SEA include the western least bittern (*Ixobrychus exilis hesperis*), northern harrier (*Circus cyaneus*), and the merlin (*Falco columbarius*).

2.4.3 Wildlife Corridors

Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization creates isolated "islands" of wildlife habitat. In the absence of habitat linkages that allow movement to adjoining open space areas, various studies have concluded that some wildlife species, especially the larger and more mobile mammals, will not likely persist over time in fragmented or isolated habitat areas because they prohibit the infusion of new individuals.

In addition, such islands often provide the only available habitat for species that occupy the corridor area. Biologists have identified areas that experience recurrent aquatic, riparian, or terrestrial species movement that are crucial to these species as wildlife "corridors" or habitat linkages. These corridors encourage preservation of plant and animal populations by allowing greater access to food and water and a larger gene pool.

The river corridor acts as a landscape linkage and escape route, providing for wildlife movement between and among habitat patches from the San Gabriel Mountains to the Pacific Ocean. The Region hosts a wide diversity of wildlife including mammals, birds, amphibians, reptiles, fish and invertebrates, as described above. Some of these species migrate along ridgelines in the mountainous terrain where there are fewer interfaces with urban uses. Other species migrate along the arroyos, rivers and other riparian and wetland corridors, where urban development is nearer, and the potential for adverse impacts much greater, when these natural habitats are encroached upon.

The River is a Valuable Wildlife Corridor

Habitat loss and fragmentation are the leading threats to biodiversity. This highlights the need to conserve well-connected networks of large wildland areas where natural ecological and evolutionary processes can continue operating over large spatial and temporal scales. Adequate landscape connections allow these ecosystems to respond appropriately to natural and unnatural environmental perturbations, such as fire, flood, climate change, and invasions by non-native species.

Within the Region, a Conservation Area Protection Plan (CAPP) is proposed as part of partnership involving representatives from CDFG, US FWS, US Forest Service, Bureau of Land Management (BLM), Southern California Wetlands Recovery Project, Caltrans, Los Angeles RWQCB LADPW Watershed Division, Rivers and Mountains Conservancy, Santa Monica Mountains Conservancy, The Nature Conservancy, Trust for Public Land, Friends of the Santa Clara River, South Coast Wildlands, and others. The principle goal of the proposed CAPP is to preserve essential open space and viable connections for wildlife movement between two core habitat areas, the San Gabriel Mountains and the Castaic area Ranges (including the Sierra

Pelona), both part of the Angeles National Forest managed by the US Forest Service. The land between these two core habitat areas encompasses a unique ecological transition zone between coastal and desert habitats. Coastal sage scrub and chaparral blankets the hillsides in the western part of the proposed CAPP, with dense coast live oak woodlands in canyons, and high quality riparian scrub and woodlands at lower elevations. The easternmost part of the linkage has a strong desert influence dominated by desert scrub, with scattered juniper and Joshua tree woodlands (Penrod et al. 2004). Within this proposed CAPP, a system of mostly unaltered natural hydrological features currently supports these vegetation types in the upper watershed; the demand for housing and infrastructure development poses a threat to this resource and to wildlife movement. A main feature of the proposed CAPP is the Santa Clara River as it acts as a natural linkage.

The proposed CAPP would secure a functional landscape level connection between the San Gabriel and Castaic core areas and help to ensure the ecological integrity of areas already protected in the linkage. There is a number of existing conservation investments (e.g., BLM, County Parks, City of Santa Clarita, etc.) in the linkage, covering 1,514 acres, which are protected from habitat conversion. The proposed CAPP encompasses a total of 8,697 acres on 392 parcels, which are targeted for acquisition or conservation easements in the County.

2.4.4 Locally Important Species and Communities

The diverse topography and climate of the Upper Santa Clara River Watershed and environs provide an environment that sustain certain plant and animal species or communities not found elsewhere; these are considered locally important as they are characteristic of or unique to the Region. Locally important communities identified for the Region include types of coastal sage scrub and oak and riparian woodlands, among others. Certain species found within these habitat types are considered candidates for designation by the California Fish and Game Commission or the U.S. Secretary of Commerce, if they are not already so designated.

Important habitats and biological resource areas within the Region include (City of Santa Clarita 1999):

- Land within the Angeles National Forest, and wildlife corridors between the Santa Susana Mountains and the San Gabriel Mountains
- Canyon areas, including San Francisquito Canyon, which provide important habitat (water, food and shelter) and biological resources, and add to the viewshed of the Valley
- Habitat for federally and state-listed endangered, threatened or rare plant and wildlife species associated with riparian woodlands in the Santa Clara River, and in chaparral and coastal sage scrub vegetation
- Open water habitat provided by Castaic Lake, Castaic Lagoon, Bouquet Reservoir, and isolated locations along the Santa Clara River
- Oak trees located within and outside the City of Santa Clarita

- Habitat and associated biological resources in the five SEAs designated by the County, and described below in Section 2.4.5

The Angeles National Forest has some unique topography that also affects its plant and animal life. Lower elevations of the forest are covered with dense chaparral, while the high mountains are blanketed by evergreen forests of pine, fir, and cedar (US Forest Service 2003).

2.4.5 Significant Ecological Areas

SEAs are defined by the County and generally encompass areas that are valuable as plant or animal communities and often important to the preservation of threatened or endangered species. Preservation of biological diversity is the main objective of the SEA designation. SEAs are neither preserves nor conservation areas, but areas where the County requires development to be designed around the existing biological resources (Los Angeles County 2006). Design criteria in SEAs include maintaining watercourses and wildlife corridors in a natural state, set-asides of undisturbed areas, and retaining natural vegetation and open space.

SEAs in the region include the following (see Figure 2.4-1):

- *Santa Clara River (Area #23).* This is the largest SEA (currently 41,344, acreage may change during the Los Angeles County General Plan Update) in the Santa Clarita Valley, extending through the City of Santa Clarita and along the entire Santa Clara River. It supports a variety of natural habitats including freshwater marsh, coastal sage scrub, oak woodland and riparian woodlands. A great portion of the river channel remains dry for most of the year. In scattered areas, however, the water table under the stream bed is high, and lush riparian vegetation provides refuge for birds and wildlife. For example, the red-shouldered hawk (*Buteo lineatus*), which is becoming increasingly uncommon in southern California due to habitat destruction, is restricted to this community. This assemblage of vegetation (a broad wash association in the SEA descriptions) is unlike that found in steeper mountain canyons and is rare in the Los Angeles basin. It is the only major river drainage from the San Gabriel Mountains that remains un-channelized for most of its length. This area was designated as an SEA primarily because of the threat of loss of suitable habitat for unarmored three-spine stickleback (*Gasterteus williamsoni*), a federally and state-listed endangered species. This species formerly occurred in the Los Angeles, San Gabriel, and Santa Ana rivers, but is now restricted to San Francisquito Canyon, three areas in the Santa Clara River, and San Antonio Creek on Vandenberg Air Force Base. The stickleback requires clean, free-flowing perennial stream and ponds surrounded by natural vegetation. The adjacent floodplain of the Santa Clara River is included in this SEA in order to preserve this habitat. The natural vegetation along the intermittent portion of the stream slows heavy runoff during rainy seasons and thus decreases destruction and siltation of stickleback habitats downstream.

- *Santa Susana Mountains (Area #20).* This SEA encompasses 12,000 acres. These mountains are one of several relatively small ridges (dominated by Oat Mountain at elevation 3,840 feet) that form the western end of the transverse ranges and blend eastward into the larger San Gabriel and San Bernardino mountains. The Santa Monica Mountains are also part of this system. Vegetation within the SEA consists of coastal sage scrub on the south facing sunlit slopes and dense chaparral on the north facing slopes. Riparian and oak woodland vegetation are found along stream drainages and within canyons, along with big-cone spruce (*Pseudotsuga macrocarpa*), bigleaf maple (*Acer macrophyllum*), and California walnut (*Juglans californica hindsii*). The oak woodland habitat is extremely diverse containing six species of oaks, one of which is found only in this area of the County (the Dunn Oak, *Quercus dunnii*). The interior portions of this SEA are largely undisturbed by the urbanization that has occurred both to the south (San Fernando Valley) and north (Santa Clarita). These wilderness areas are important for maintaining gene flow and wildlife movement between the Santa Monica and San Gabriel mountains, which are now largely isolated from one another by urban development.

This Page Intentionally Left Blank.

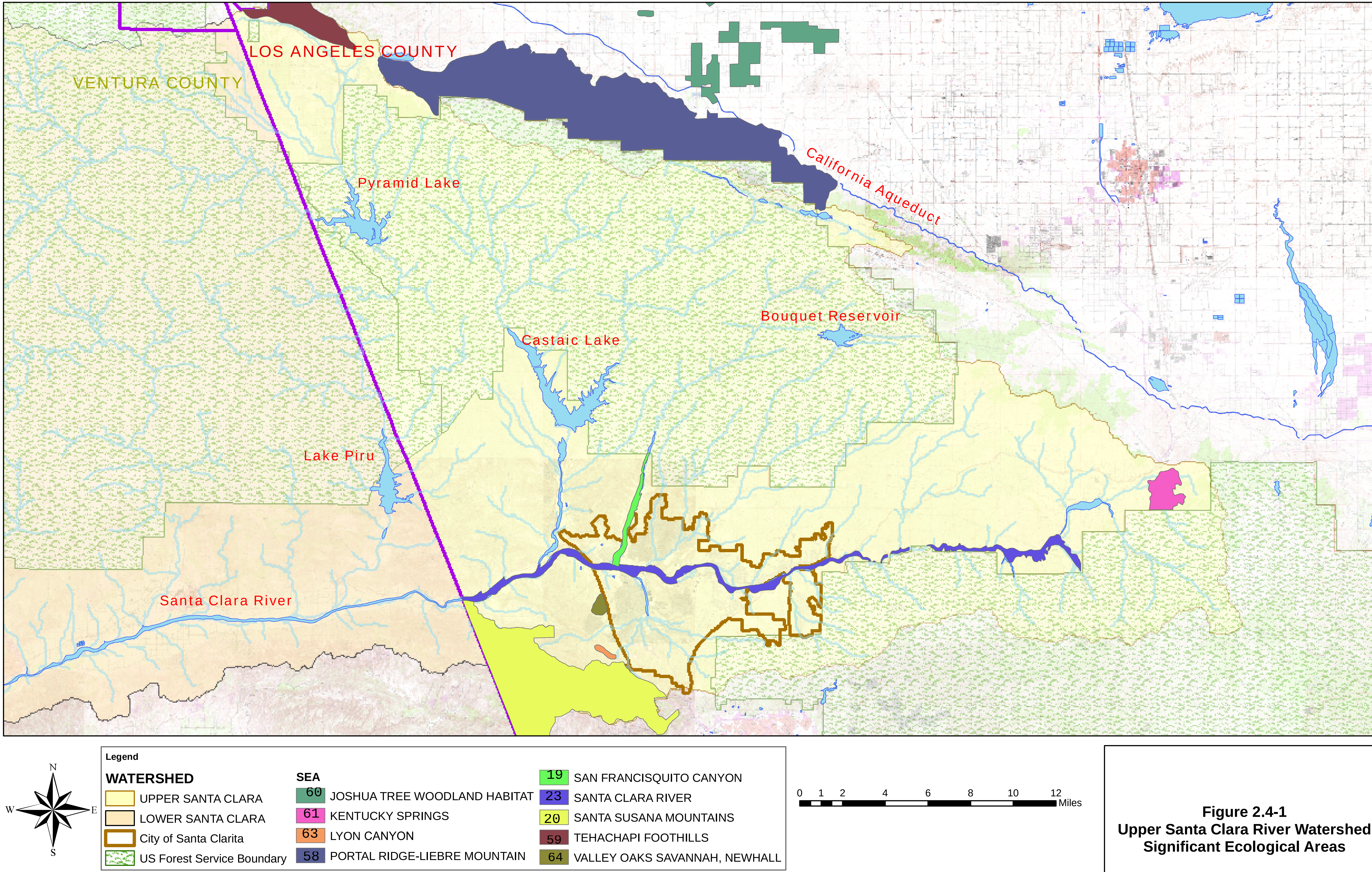


Figure 2.4-1
Upper Santa Clara River Watershed Significant Ecological Areas

- *San Francisquito Canyon (Area #19).* This SEA (currently 1,220 acres, acreage may change during the Los Angeles County General Plan Update) contains an intermittent stream that drains the hillsides in the Angeles National Forest. Riparian vegetation is located in the canyon bottom along the stream channel, while grasslands and chaparral are found on the walls. This SEA was designated because it supports populations of unarmored three-spine stickleback. The SEA is currently maintained to prevent downstream siltation of the Santa Clara River and provide constant water flows to preserve designated critical habitat for the stickleback. The floodplain is included in the SEA to preserve downstream stickleback habitats. Unfortunately this SEA is considered "severely degraded" and has been encroached upon by nearby residential and commercial developments in the canyon (City of Santa Clarita and Los Angeles County 2004).

Valley Oak

- *Valley Oak Savannah (Area #64).* The SEA covers approximately 320 acres and is located west and east of Interstate-5, just south of the Valencia interchange. This area contains one of the last remaining stands of valley oak in the Valley, and it represents the southernmost limit of large, contiguous valley oak savannah in California. The vegetative land cover consists mainly of weed dominated grasslands. Scattered coast live oak occurs throughout the site as well. Construction of the Westridge complex removed some of the habitat from this SEA, although considerable open space set-asides have been provided within and around the periphery of the development.

- *Lyon Canyon (Area #63).* The Lyon Canyon SEA is located in the southwest Valley, west of Interstate-5 and covers approximately 150 acres. This SEA is a relatively narrow canyon that contains both an oak woodland community and a substantial chamisal chaparral community. The oak woodland, found in the southern portion of the SEA, contains both coast live oak (*Quercus agrifolia*) and valley oak (*Quercus lobata*). The northern region contains the chaparral community consisting of sugarbush (*Protea sp*.), *Ceanothus sp.*, black sage (*Salvia mellifera*), mulefat (*Baccharis salicifolia*), and chamise (*Adenostoma fasciculatum*), which is the dominant shrub.

- *Portal Ridge/Liebre Mountain (Area #58).* This SEA is located on the northeastern edge of the Region, in close proximity to the Mojave Desert, the San Gabriel Mountains, and Tehachapi Foothills. This SEA is a transition area between desert, foothill, and montane environments. Foothill woodland, an uncommon plant community, occurs only in this area of Los Angeles County. The lower slope areas of the SEA are vegetated by southern oak woodland, valley grassland, riparian woodland, and coastal sage scrub. Higher slopes and ridge tops in this SEA are covered by chaparral and yellow-pine forest. North-facing slopes, which are under desert influences have pinyon-juniper woodland habitat. Joshua tree woodland and sagebrush scrub cover the lower desert hillsides. This area is considered valuable because it possesses a concentrated diversity of vegetation types.

- *Tehachapi Foothills (Area #59).* This area is in the northernmost tip of the Region. The grassy, south-facing slopes of this area are considered some of the best wildflower sites in Southern California. The area is located at the junction of the Mojave Dessert, transverse ranges, and the Tehachapi Mountains and possesses plants and wildlife for each of these environments. Characteristic plan species include buttercup, poppy, owl's clover, and many species of sunflower.

- *Kentucky Springs (Area #61).* This SEA is located in the eastern edge of the Region. This SEA contains what is considered to be the best stand of great basin sage (*Artemisia tridentata*) remaining in Los Angeles County and one of the best in Southern California. This stand supports a distinct subspecies of great basin sage (*A. t. parishii*).

(Los Angeles County 2006, Santa Clarita 1999, City of Santa Clarita and Los Angeles County 2004)

2.5 Social and Cultural Characteristics

2.5.1 Demographics and Population

2.5.1.1 Los Angeles County

The County is a diverse and thriving region. Based on 2005 American Community Survey General Demographics Statistics (http://planning.lacounty.gov/doc/stat/LA_PopulationEthnicity.pdf), the County had a total population of approximately 9.8 million people. In the County approximately 51 percent are white, while Hispanics (or Latino of any race) represent the largest minority community with 47 percent of the total as of 2005. Asians and African Americans represent about 13 percent and 9 percent of the County population, respectively.

2.5.1.2 Santa Clarita Valley

The Valley is one of the fastest growing areas of the County. According to the *Santa Clarita Valley General Plan Technical Background Report* (City of Santa Clarita and County of Los Angeles 2004), from 1990 to 2000, the average annual growth rate was 3.4 percent for the Valley compared to 0.7 percent for the County. Figure 2.5-1 depicts the boundaries of the Santa Clarita Valley Planning Area, its census tracts, and relationship to the City of Santa Clarita as well as unincorporated County. As of 2000, approximately 212,000 individuals resided within the Santa Clarita Valley Planning Area. While the Valley may not be as ethnically diverse as the County, the Hispanic, African American, and Asian populations increased as a percentage of the total population from 1990 to 2000. In contrast, the White population decreased from 72.8 percent in 1990 to 61.5 percent in 2000. The Valley is much more affluent than the County as a whole or the incorporated City of Santa Clarita. The Valley's average annual household income in 2000 was $83,901 with the unincorporated areas of the Valley driving the household income higher for the Valley ($89,302 in 2000). For population, household, and employment projections in the Valley, please see Table 2.5-1 (City of Santa Clarita and County of Los Angeles 2004). The unincorporated County areas are anticipated to grow at particularly high rates in all categories, while more moderate rates are anticipated for the City of Santa Clarita.

2.5.1.3 City of Santa Clarita

City of Santa Clarita Residential Development

The City of Santa Clarita's population was 162,900 in 2003, and falls into the category of one of the ten largest cities within the County. However, Santa Clarita differs from the rest of the County in general in almost every statistic. According to the City's website (http://www.santa-clarita.com), while the growth rate of the County was 1.7 percent as of 2003, Santa Clarita saw a higher population growth rate of 3 percent. During the 1990's the City of Santa Clarita's population grew by 35.5 percent. The mix of the City's population is not as diverse as the County's population. Based on 2005 American Community Survey General Demographics Statistics, close to 70 percent of Santa Clarita's population describes itself as White. Approximately 27 percent of the City of Santa Clarita's population is Hispanic compared to approximately 47 percent of the County. Santa Clarita is a more affluent city compared to the County as a whole. The 2005 median household income for Santa Clarita was estimated at $74,759. In comparison, the median household income for the County was estimated at $48,248. (Source: City of Santa Clarita, 2004 estimates, http://www.santa-clarita.com/cityhall/cd/ed/community_profile /demographics.asp). Table 2.5-1 shows projections regarding the City's population growth, employment growth, and household growth.

This Page Intentionally Left Blank.

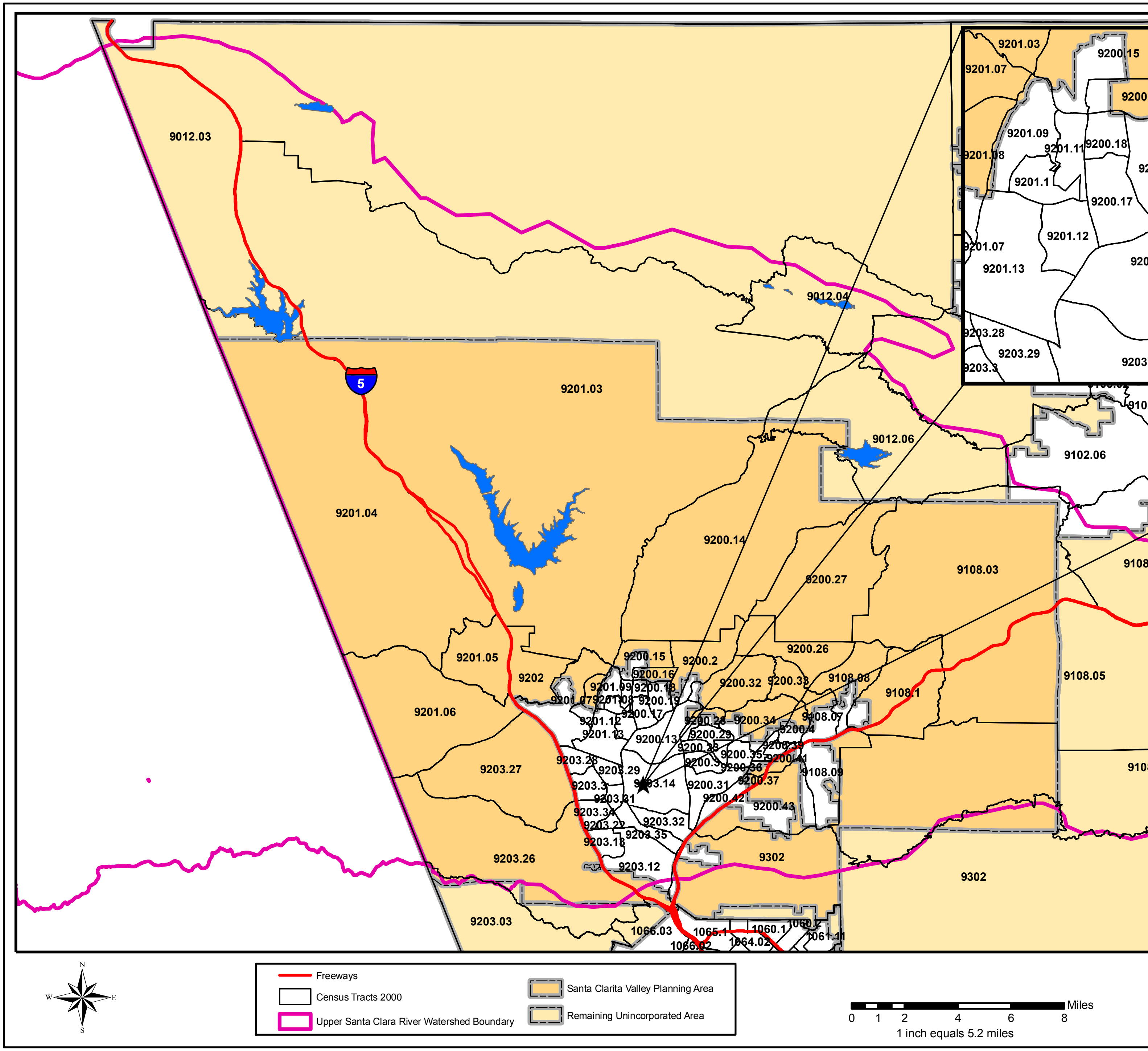


Figure 2.5-1
Census Tracts in the
Upper Santa Clara River Watershed

TABLE 2.5-1
ADJUSTED SANTA CLARITA VALLEYWIDE GENERAL PLAN[(a,b)]

(SCAG 2004 RTP, PROJECTS: YEARS 2000 TO 2030)

Jurisdiction	2000	2005	2010	2015	2020	2025	2030	Change	Average Annual Growth
City of Santa Clarita									
Population	151,088	171,290	196,680	210,280	222,290	232,830	242,620	91,532	1.6%
Households	50,787	55,614	62,837	67,832	72,883	77,868	82,806	32,019	1.6%
Employment	51,380	59,640	68,820	73,240	77,490	81,460	85,190	33,810	1.7%
Jobs/Households ratio	*1.01*	*1.07*	*1.10*	*1.08*	*1.06*	*1.05*	*1.03*	*0.02*	
Persons per Household	*2.97*	*3.08*	*3.13*	*3.10*	*3.05*	*2.99*	*2.93*	*-0.04*	
Valley Unincorporated Area									
Population	61,523	78,053	105,094	128,850	146,401	166,557	185,589	124,066	3.7%
Households	17,973	20,645	28,108	34,609	41,154	47,941	54,630	36,657	3.8%
Employment (estimated)	10,790	13,900	18,830	23,190	27,980	33,080	38,240	27,450	4.3%
Jobs/Households ratio	*0.60*	*0.67*	*0.67*	*0.67*	*0.68*	*0.69*	*0.70*	*0.10*	
Persons per Household	*3.42*	*3.78*	*3.74*	*3.64*	*3.56*	*3.47*	*3.40*	*-0.03*	
Valley Planning Area									
Population	212,611	249,343	301,774	336,130	368,691	399,387	428,209	215,598	2.4%
Households	68,760	76,259	90,945	102,441	114,037	125,809	137,436	68,676	2.3%
Employment (estimated)	62,170	73,540	87,560	96,430	105,470	114,540	123,430	61,260	2.3%
Jobs/Households ratio	*0.90*	*0.96*	*0.96*	*0.94*	*0.92*	*0.91*	*0.90*	*-0.01*	
Persons per Household	*3.09*	*3.27*	*3.32*	*3.28*	*3.23*	*3.17*	*3.12*	*0.02*	

Notes:
Source: Stanley R. Hoffman Associates, Inc.; Southern California Association of Governments, 2004 Regional Transportation Plan (RTP). The SCAG population and household projections are used as control totals for the entire "One Valley, One Vision" (OVOV) planning area while the allocation between the City and unincorporated areas is based on 2000-2003 Department of Finance (DOF) population and household trend data. The 1998-2003 Employment Development Department data is used to calibrate the 2005 base year for employment. However, the employment totals for the unincorporated area are allowed to exceed SCAG RTP 2004 forecast based on local information from the County of Los Angeles Planning staff.
2000 Population and Household data is based on DOF estimates benchmarked to the 2000 U.S. Census Figures.
The Santa Clarita Valley Planning Area estimates are the sum of the City and unincorporated areas.
On May 11, 2005, the OVOV Team agreed to use these adjusted RTP data for the OVOV General Plan Update.

2.5.1.4 Unincorporated Areas of Watershed

To some extent, the outermost unincorporated areas of the watershed overlap with the Santa Clarita Valley Planning Area described in the Technical Background Report for the OVOV project (City of Santa Clarita and County of Los Angeles 2004). However, it appears that the planning area identified in that report does not reach the far eastern and northern portions of the watershed (see Figure 2.5-1). Unincorporated areas of the watershed are likely best characterized by summarizing 2000 Census data (see Table 2.5-2). From evaluation of five (5) census tracts located outside the Santa Clarita Valley Planning Area, but within the watershed, these areas are generally sparsely populated, rural communities of non-Hispanic white individuals. The total population of these five (5) census tracts is approximately 13,000 people. Hispanics are the largest minority population in the outlying areas, but exist in relatively low percentages compared to the City of Santa Clarita and the County. Median household income for these census tracts ranges from approximately $40,391 to $75,503.

TABLE 2.5-2
DEMOGRAPHICS OF OUTLYING AREAS OF WATERSHED (CENSUS 2000)

Census Tract	Total Number of Households	Total Population	Median Household Income	Percentage (%): Total Non- Hispanic/Hispanic/ White/Other Races
9201.03	941	2,861	$51,080	74/ 26/ 61/ 13
9012.06	430	1,182	$75,503	89/ 11/ 80/ 9
9012.04	807	2,408	$40,391	84/ 16/ 77/ 7
9012.03	555	1,467	$40,391	86/ 15/ 76/ 10
9108.05	1,673	5,074	$64,750	87/ 13/ 81/ 6

Source: Census 2000
Note: These five census tracts were included in the Region and analyzed in this section because the majority of their areas fell outside of the Santa Clarita Valley Planning Area boundary, but within the overall watershed boundary. Census tracts with the majority of their areas within the Santa Clarita Valley Planning Area were included in the Santa Clarita Valley analysis above. Those census tracts which partially fell within the watershed boundary, but with most of their areas beyond the watershed boundary, were not included in any of the analyses above and were not considered part of the Region.

2.5.2 Economic Factors

2.5.2.1 Los Angeles County

According the economic indicators located on the County's website, the County has a labor force of approximately 4.8 million with an estimated 4 million of those individuals working wage and salary jobs as of 2004. The unemployment rate was estimated at about 5.3 percent for that year and the poverty rate in 2005 was estimated at 13.9 percent. Services, retail and wholesale trade, and manufacturing dominate the County's employment sectors, collectively representing approximately 70 percent of jobs. Construction, mining, transportation, and public administration, are major sectors comprising the other 30 percent.

2.5.2.2 Santa Clarita Valley

The dominant job sectors in the Valley include services, retail trade and manufacturing, which accounted for 54 percent of the job growth in the area from 1992 to 2000 (City of Santa Clarita and County of Los Angeles 2004). The rate of job growth during that period far outpaced Los Angeles County. Total employment grew by 49.4 percent from 1992 to 2000 while in the County total employment grew by only 8.5 percent. The unincorporated County areas of the Valley saw the highest numbers over the City of Santa Clarita. The Valley has a higher percentage of jobs in the agriculture and mining, construction, manufacturing, and retail trade sectors than the rest of the County, and is becoming a significant employment center for the County.

2.5.2.3 City of Santa Clarita

Although the City of Santa Clarita's unemployment rate peaked in 1993 at 4.8 percent, it has consistently been in the 2.5 percent to 4.0 percent range. The poverty rate in Santa Clarita is also substantially lower than the County with an estimated 4.9 percent of families living in poverty as of 2003. In that same year, approximately 14.7 percent of families were living in poverty in the County. However, increasing housing costs are recognized as a potential problem, with some households paying a high percentage of their income toward housing or households with limited resources living in smaller housing units or sharing housing.

2.5.2.4 Unincorporated Areas of Watershed

Employment and economic factors are difficult to succinctly summarize for these areas. The projections from the *Santa Clarita Valley Technical Background Report* would apply to most of the Watershed. However, 2000 Census data for five census tracts that lie outside of the Santa Clarita Valley Planning Area, but within the Watershed, best describes these outlying areas (see Table 2.5-3). There are many different job sectors within which individuals are employed and there is a range of incomes. Yet overall, these areas can be characterized as affluent as previously indicated and the major job sectors include construction, retail trade, educational, health, and social services, and manufacturing.

TABLE 2.5-3
JOB SECTORS, UNEMPLOYMENT RATES, AND TOTAL POPULATIONS OF OUTLYING AREAS OF WATERSHED

Census Tract	Major Job Sectors	Unemployment Rate (%)	Total Population
9201.03	Construction, Retail Trade, Educational, health, and social services	3.2	2,861
9012.06	Construction, Manufacturing, Educational, health, and social services	1.3	1,182
9012.04	Construction, Manufacturing, Education, health, and social services	3.0	2,408
9012.03	Construction, Manufacturing, Education, health, and social services	3.9	1,467
9108.05	Construction, Professional/scientific/management/administrative, Manufacturing	3.0	5,074

Source: Census 2000

Note: These five census tracts were included in the Region and analyzed in this section because the majority of their areas fell outside of the Santa Clarita Valley Planning Area boundary, but within the overall watershed boundary. Census tracts with the majority of their areas within the Santa Clarita Valley Planning Area were included in the Santa Clarita Valley analysis above. Those census tracts which partially fell within the watershed boundary, but with most of their areas beyond the watershed boundary, were not included in any of the analyses above and were not considered part of the Region.

2.5.3 Disadvantaged Communities

As defined by DWR, a disadvantaged community is a municipality, including, but not limited to a city, town or county, or a reasonably isolated and divisible segment of a larger municipality, that has an average median household income (MHI) that is less than 80 percent of the statewide annual median household income. None of the communities within the geographic areas described above including the County, the City of Santa Clarita, the Valley, and the outlying areas of the watershed meet this standard. All areas had reported average median household incomes greater than 80 percent of the statewide annual median household income, according to Census 2000 data. In 2000, 80 percent of the state of California's MHI was $37,994 (MHI=$47,493). The County had a reported MHI of $42,189 that year. The City of Santa Clarita had a reported MHI of $66,717 in 2000; the Santa Clarita Valley Planning area had a reported average annual household income of $83,900 (City of Santa Clarita and County of Los Angeles 2004). While no disadvantaged communities that met the strict state definition were identified, both the City of Santa Clarita and the County have identified areas where particular outreach efforts are merited, due either to substandard infrastructure, substandard housing, or similar concerns. These outreach efforts are detailed in Section 8 of this IRWMP.

2.5.4 Social and Cultural Values

One vision of the Valley for the next two decades is a young but maturing network of communities balancing rural and suburban neighborhoods, with areas that offer urban lifestyles. The Valley is a mosaic of family-oriented communities, each with individual identities, yet unified by a common environmental setting, a vibrant economy, a rich history, and a high quality of life. The Valley provides residents varied housing opportunities and offers multiple employment opportunities that result in a dynamic economy and appropriate job-housing balance. It also offers residents a broad range of quality employment opportunities. The Valley has developed excellent public services, all of which support a high quality of life.

Melody Ranch Motion Picture Studio

The communities of the Valley include Castaic, Val Verde, Valencia, Saugus, and Newhall. They have a lot of character and history, and they each have their own unique identities. However, common threads throughout these communities include the results of the influence of the old West on the area. These communities were mostly characterized as rustic and rural, and were ranching or mining communities that still maintain pride in those traditions. The influence of motion picture filming has been noted especially in Newhall with the use of Melody Ranch in movie making. The natural setting of the Valley, including its open space and surrounding canyons and trees, is closely associated with the identities of these communities according to residents. Valencia, while considered the most urban of these communities, still maintains a rural sense of place without the trappings of a large metropolitan area. All are characterized as tight-knit and family-oriented and supportive of a high quality of life (City of Santa Clarita 2002).

Unincorporated areas in the upper parts of the watershed (tributary canyon areas, Acton, Agua Dulce) tend to be rural in character, with large lot sizes. Many properties have small ranching or farming operations, and include equestrian properties. Agua Dulce has a private small general aviation airport - the only such facility located in the Upper Santa Clara River Watershed.

2.6 Water Supply

This section describes the water resources available to the Region through 2030. The sources are as summarized in Table 2.6-1[4,5,6] and discussed in more detail below. Both the currently available and planned supplies are discussed.

As used in this IRWMP, dry years are those years when supplies are the lowest, which occurs primarily when precipitation is lower than the long-term average precipitation. The impact of low precipitation in a given year on a particular supply may differ based on how low the precipitation is, or whether the year follows a high-precipitation year or another low-precipitation year. For the SWP, a low-precipitation year may or may not affect supplies, depending on how much water is in SWP storage at the beginning of the year. Also, dry conditions can differ geographically. For example, a dry year can be local to the Region (thereby affecting local groundwater replenishment and production), local to northern California (thereby affecting SWP water deliveries), or statewide (thereby affecting both local groundwater and the SWP). When the term "dry" is used in this IRWMP, statewide drought conditions are assumed, affecting both local groundwater and SWP supplies at the same time.

2.6.1 Groundwater

This section presents information about the Region's groundwater supplies, including a summary of the adopted Assembly Bill (AB) 3030 Groundwater Management Plan (CLWA 2003a). DWR delineates two groundwater basins in the Santa Clara River Floodplain: Acton Valley Basin and Santa Clara River Valley Basin, but locally additional groundwater areas are recognized:

- Acton Valley Groundwater Basin
  - Agua Dulce Groundwater Basin

[4] In February 2006, the California Water Impact Network and Friends of the Santa Clara River ("petitioners") filed a lawsuit challenging the adequacy of the 2005 Urban Water Management Plan ("2005 UWMP") on multiple grounds, *California Water Impact Network v. Castaic Lake Water Agency* (Los Angeles County Superior Court). Petitioners' main arguments were that the 2005 UWMP allegedly overstated the reliability of both groundwater and surface water supplies, failed to provide an adequate discussion of perchlorate contamination, failed to adequately address the reliability of the 1999 SWP Table A permanent transfer of 41,000 AFY from Wheeler Ridge-Maricopa Water Storage District to CLWA, relied on a flawed model for predicting SWP deliveries, failed to address the effect of global warming and regulatory water quality controls on water deliveries from the SWP, and failed to identify the impact of private wells on the Santa Clarita River watershed. On August 22, 2007, Judgment was entered in favor of CLWA and the purveyors. On October 19, 2007, the Petitioners appealed this Judgment to the 2nd District Court of Appeal. In the meantime, the 2005 UWMP must be assumed legally adequate, unless and until it is set aside by a court of competent jurisdiction. (Water Code § 10651; *Barthelemy v. Chino Basin Water Dist.* (1995) 38 Cal. App.4th 1607, 1609 [agency actions are presumed to comply with applicable law, until proof is presented to the contrary].) That has not occurred.

[5] CLWA's approval of its 2002 Groundwater Banking Project with the Semitropic Water Storage Districts Groundwater Banking Program and CLWA's negative declaration for the project was challenged under the California Environmental Quality Act ("CEQA") by California Water Impact Network and Friends of the Santa Clara River ("petitioners") first in the Ventura County Superior Court, *California Water Impact Network v. Castaic Lake Water Agency* (Ventura County Superior Court) ("*Ventura Action*."). The trial court in the Ventura Action found that CLWA's approval of the project and its negative declaration did not violate CEQA, and entered judgment in favor of CLWA. The Judgment was upheld by the Court of Appeal, Second Appellate District and the litigation has ended.

[6] In November 2006, a complaint and petition for writ of mandate seeking to set aside CLWA's certification of its Environmental Impact Report ("EIR") for the 2006 Water Acquisition Project with Buena Vista Water Storage District and Rosedale-Rio Bravo Water Storage District Banking and Recovery Program was filed by California Water Impact Network in the Los Angeles County Superior Court. In November 2007, the trial court filed its Statement of Decision finding that in certifying the EIR and approving the project CLWA proceeded in a manner required by law, and that its actions were supported by substantial evidence. Judgment was entered in favor of CLWA in December 2007. Petitioners filed a notice of appeal of the Judgment in January 2008. This appeal is pending.

TABLE 2.6-1
PROJECTED WATER SUPPLIES IN THE REGION (AFY)[a]

Water Supply Sources	2005	2010	2015	2020	2025	2030
Existing Supplies						
Wholesale (Imported)	*73,280*	*87,660*	*89,660*	*90,280*	*92,280*	*92,280*
SWP Table A Supply (CLWA)[b]	65,700	67,600	69,500	71,400	73,300	73,300
SWP Table A Supply (AVEK)[b]	2,900	3,000	3,100	3,200	3,300	3,300
Buena Vista-Rosedale[c]	0	11,000	11,000	11,000	11,000	11,000
Flexible Storage Account (CLWA)[d]	4,680	4,680	4,680	4,680	4,680	4,680
Flexible Storage Account (Ventura County)[d][e]	0	1,380	1,380	0	0	0
Local Supplies[h]	*74,000*	*80,000*	*80,000*	*80,000*	*80,000*	*80,000*
Acton Groundwater	34,000	34,000	34,000	34,000	34,000	34,000
East Subbasin-Alluvial Aquifer	35,000	35,000	35,000	35,000	35,000	35,000
East Subbasin-Saugus Formation	5,000	11,000	11,000	11,000	11,000	11,000
Recycled Water	*1,700*	*1,700*	*1,700*	*1,700*	*1,700*	*1,700*
Total Existing Supplies	**148,980**	**169,360**	**171,360**	**171,980**	**173,980**	**173,980**
Existing Banking Programs[d]						
Semitropic Water Bank[f]	50,870	50,870	0	0	0	0
Rosedale-Rio Bravo	0	20,000	20,000	20,000	20,000	20,000
Total Existing Banking Programs	**50,870**	**70,870**	**20,000**	**20,000**	**20,000**	**20,000**
Planned Supplies						
Local Supplies	*0*	*10,000*	*10,000*	*20,000*	*20,000*	*20,000*
Restored wells (Saugus Formation)	0	10,000	10,000	10,000	10,000	10,000
New Wells (Saugus Formation)	0	0	0	10,000	10,000	10,000
Recycled Water [g]	0	0	1,600	6,300	11,000	15,700
Total Planned Supplies	**0**	**10,000**	**11,600**	**26,300**	**31,000**	**35,700**
Planned Banking Programs[d]						
Additional Planned Banking	0	0	20,000	20,000	20,000	20,000
Total Planned Banking Programs	**0**	**0**	**20,000**	**20,000**	**20,000**	**20,000**

Source: CLWA 2005. Urban Water Management Plan Table 3-1 and personal communication J. Ford, CLWA, 2007.

Notes:

(a) The values shown under "Existing Supplies" and "Planned Supplies" are supplies projected to be available in average/normal years. The values shown under "Existing Banking Programs" and "Planned Banking Programs" are either total amounts currently in storage, or the maximum capacity of program withdrawals.

(b) SWP supplies are calculated by multiplying the Table A Amounts available to the Region (95,200 AF for CLWA and 141,400 * 3 percent = 4,200 AF for AVEK) by percentages of average deliveries projected to be available, taken from Table 6-5 of DWR's "*Final 2005 State Water Project Delivery Reliability Report*" (May 2005).

(c) CLWA has acquired this supply, primarily to meet the potential demands of future annexations to the CLWA service area. This acquisition is consistent with CLWA's annexation policy under which it will not approve potential annexations unless additional water supplies are acquired. Currently proposed annexations have a demand for about 4,000 AFY of this supply which, if approved, would leave the remaining 7,000 AFY available for potential future annexations. Unless and until any such annexations are actually approved, this supply will be available to meet demands within the existing CLWA service area.

(d) Supplies shown are total amounts that can be withdrawn, and would typically be used only during dry years. During an average water year any surplus SWP water not used to meet demand would be used for banking.

(e) Initial term of the Ventura County entities' flexible storage account is ten years (from 2006 to 2015).

(f) Supplies shown are the total amount currently in storage, and would typically be used only during dry years. Once the current storage amount is withdrawn, this supply would no longer be available and in any event, is not available after 2013.

(g) Recycled water supplies based on projections provided in CLWA 2005 Urban Water Management Plan Chapter 4, Recycled Water and is a non-potable water source.

(h) Values provided here are the average of the ranges provided in Table 2.6-1.

- Soledad Canyon Alluvial Channel
- Santa Clara River Valley Basin, East Subbasin
  - Alluvial Aquifer
  - Saugus Aquifer

2.6.1.1 Acton Valley Groundwater Basin

The Acton Valley Groundwater Basin encompasses an area of approximately 12.9 square miles (DWR 2002a). It is bounded by the Sierra Pelona on the north and the San Gabriel Mountains on the south, east and west. It is drained by the Santa Clara River. The Acton Valley Groundwater Basin is an alluvial basin consisting of two water bearing geologic units: the Holocene age undifferentiated alluvium and the Pleistocene age stream terrace deposits. Groundwater in these deposits is unconfined.

2.6.1.1.1 Hydrogeology

Alluvial deposits are encountered in the town of Acton and its vicinity, and along upper Soledad Canyon, beginning just southwest of Soledad Pass. They are thickest in the Santa Clara River channel, and reach their maximum thickness of 225 feet near Acton, thinning east and west of the town. Alluvial deposits consist of unconsolidated, poorly bedded, poorly sorted to sorted sand, gravel, silt and clay with some cobbles and boulders. Specific yield in the alluvium ranges from ten to 19 percent (DWR 2002a).

Terrace deposits occur in the northern part of the basin, north of Acton, where they reach the maximum thickness of 210 feet (Slade 1990). They consist of crudely stratified, poorly consolidated, only locally cemented, angular to subangular detritus of local origin (DWR 2002a). Specific yield in terrace deposits ranges from three to five percent (DWR 2002a).

The Acton Valley Groundwater Basin is transected by numerous faults. Three of the principal faults are the northwest-trending Kashmere Valley and Acton faults, and the northeast-trending Soledad fault system. The geologic history and seismic activity of these faults are not known. Although these faults offset the basement rocks, they have not been shown to offset younger alluvial and terrace deposits (UWCD and CLWA 1996). No groundwater measurements data are available to determine whether these faults form barriers to groundwater flow in the basement complex. DWR does not consider these faults to be barriers to groundwater flow in the alluvium (DWR 1993).

2.6.1.1.2 Groundwater Flow

The groundwater within the basin flows toward the channel of the Santa Clara River. It then flows in the southwest direction toward Soledad Canyon at an average gradient of 64 to 91 feet per mile. The gradient varies seasonally, with the lowest gradient during dry seasons, and the highest during wet seasons. The Soledad Canyon forms the only outlet for groundwater underflow and for surface water outflow from the basin.

2.6.1.1.3 Recharge (Replenishment) Areas

The basin is recharged largely by deep percolation of direct rainfall and rainfall runoff captured in the Acton Valley, Santa Clara River and its tributaries. Deep percolation of water from excessive irrigation of lawns and agricultural areas, and from private onsite septic tanks and leachfield systems, provide additional amounts of replenishment (UWCD and CLWA 1996; DWR 2002a).

2.6.1.1.4 Groundwater Quantity

The total storage capacity of the basin is estimated at approximately 40,000 to 45,000 acre-feet (AF) (UWCD and CLWA 1996; DWR 2002a). Historically, the estimated amount of groundwater in storage ranged from 14,883 AF for a relatively dry period (1965) to 34,395 AF for a relatively wet period (1945) (UWCD and CLWA 1996). There are several water-supply wells that extract groundwater from the alluvium at rates greater than 100 gallons per minute (gpm), and numerous small-volume domestic water supply wells scattered throughout the basin region. The major water pumpers are the Los Angeles County Water Works District No. 37 (LACWWD No. 37), Acton Camp, a trailer park, and a few large private wells installed in the southern part of the basin (UWCD and CLWA 1996). Since 2000, LACWWD No. 37 pumping has ranged between 977 and 2,118 AFY.

Historical groundwater elevations within the main alluvial channel of the Upper Santa Clara River have ranged from about 2,570 feet above mean sea level (AMSL) at Acton Camp to 2,997 feet AMSL in the northern portion of the basin during a relatively dry hydrologic period (1964-65), and from 2,616 feet AMSL at Acton Camp to 3,085 feet at the Vincent Fire Station during the 1984-85 wet period (UWCD and CLWA 1996, Slade 1990). In general, groundwater levels declined during the 1950s through the mid 1970s, rose during the late 1970s to the mid 1980s, and continued to decline after the 1980s (Slade 1990).

2.6.1.2 Agua Dulce Groundwater Basin

Although not formerly recognized as a groundwater basin by DWR until 2003, and then only as a portion of the Acton Valley Groundwater Basin, the Agua Dulce groundwater basin consists of potentially water-bearing alluvial type sediments over an area of approximately 4,620 acres within Sierra Pelona Valley (Slade 2004).

2.6.1.3 Soledad Canyon Alluvial Channel

The Soledad Canyon Alluvial Channel is approximately nine miles long. It is bordered by the Acton Valley Groundwater Basin on the east, and by the Santa Clara River Valley Groundwater Basin on the west (UWCD and CLWA 1996). DWR does not designate the Soledad Canyon Alluvial Channel as a groundwater basin. The water-bearing formation of the Soledad Canyon Alluvial Channel consists of alluvium deposited in the Santa Clara River bed. Twenty-one (21) private water-supply wells extract groundwater throughout the channel. Groundwater extraction data, groundwater storage, and yield data are not currently available (UWCD and CLWA 1996).

2.6.1.4 Santa Clara River Valley East Subbasin

The groundwater basin generally beneath the Valley is identified in DWR's Groundwater Bulletin 118 as the Santa Clara River Valley Groundwater Basin, East Subbasin (Basin No. 4-4.07). The Santa Clara River Valley East Groundwater Subbasin encompasses an area of approximately 103 square miles (DWR 2002b). It is bordered by the Piru Mountains on the north, on the west by impervious rocks of the Modelo and lower Saugus Formations, and a constriction in the alluvium, by the San Gabriel Mountains on the south and east, and by the

Santa Susana Mountains on the south. It is drained by the Santa Clara River, Bouquet Creek, and Castaic Creek (DWR 2002b).

2.6.1.4.1 Hydrogeology

The Santa Clara River Valley East Groundwater Subbasin consists of two aquifer systems, which are the Alluvium associated with the Santa Clara River and it tributaries and the Saugus Formation. There are also some scattered outcrops of Terrace deposits in the basin that likely have the capacity to contain limited amounts of groundwater. However, since these Terrace deposits are located in limited areas that are situated at elevations above the regional water table and are also of limited thickness, they are of no practical significance as aquifers and have consequently not been developed for water supply.

The Holocene age Alluvium consists of stream channel and flood plain deposits of the Santa Clara River and its tributaries. Alluvial deposits generally form a relatively thin veneer of sediments toward the eastern and western boundaries of the basin. A maximum thickness of about 200 feet along the center of the present river channel is reported near Saugus (CLWA 2003a). The Alluvium is the most permeable of the aquifer units, with transmissivity values in the range of 50,000 to 500,000 gallons per day per foot (gpd/ft), based on well yields and aquifer testing, with the higher values where the Alluvium is thickest in the center of the valley and generally west of Bouquet Canyon (Slade 1986 and 2002).

The Saugus Formation is divided into two stratigraphic units; the geologically older Sunshine Ranch member (of mixed marine to terrestrial origin) and the upper portion (entirely of terrestrial origin). The Sunshine Ranch member has a maximum thickness of 3,000 to 3,500 feet in the central valley; however, it is not considered a viable source of groundwater supply due to its marine origin and fine-grained nature. The upper portion is of coarser grain consisting of lenticular beds of sandstone and conglomerate and lesser amounts of sandy mudstone. The sand and gravel units of the upper portion are generally located at depths between 300 and 2,500 feet. Although the Saugus formation is thicker and more extensive than the Alluvium, transmissivity values are generally lower (between 80,000 and 160,000 gpd/ft).

2.6.1.4.2 Groundwater Flow

The groundwater within the Alluvial aquifer flows toward the channel of the Santa Clara River, and then follows the river course southward and westward. Average gradient of groundwater in the alluvium is 46 feet per mile based on the 1985 water level data in the river from the Lang gage to the Ventura County Line. It generally varies from 25 to 55 feet per mile in the subbasin. The gradient varies seasonally, with the lowest gradient during dry seasons, and the highest during wet seasons (UWCD and CLWA 1996).

The groundwater flow in the Saugus aquifer, based on the measurements in the wells screened entirely in the Saugus Formation in the Santa Clara River-South Fork area, is to the north-northwest. There is no data outside of that area (UWCD and CLWA 1996).

2.6.1.4.3 Recharge (Replenishment) Areas

The subbasin is recharged largely by infiltration of surface water in the Santa Clara River channel and deep percolation of precipitation and runoff in its tributaries. Surface water flows percolate through the alluvial deposits along the stream channels, recharging the Alluvial aquifer, and the underlying Saugus aquifer. The highland areas surrounding the alluvial valley represent an additional source of recharge through direct precipitation and deep percolation of rainfall on the outcrops of the Saugus Formation (UWCD and CLWA 1996).

2.6.1.4.4 Groundwater Quantity

2.6.1.4.4.1 Alluvial Aquifer

The amount of groundwater in storage can vary considerably because of the effects of recharge, discharge, and pumping from the aquifer. The maximum storage capacity of the Alluvium has been estimated to be about 240,000 AF (Slade 1986; Slade 2002). Since the inception of SWP deliveries in 1980, total pumpage from the Alluvium has ranged from a low of about 20,000 acre-feet per year (AFY) (in 1983) to slightly more than 43,000 AFY (in 1999). Over the last two decades there has been a trend of decreasing agricultural pumping and increasing municipal pumping consistent with general land use changes in the area (CLWA 2003a). Since the inception of SWP deliveries, groundwater levels have sustained generally high levels for much of the last 30 years, with two dry-period exceptions (mid 1970s and late 80's-early 90's). There is no evidence of any recent trends toward permanent water level or storage decline.

2.6.1.4.4.2 Saugus Aquifer

Storage capacity was recently estimated at approximately 1.65 million AF in the upper portion of the Saugus (Slade 2002). Since the inception of SWP deliveries in 1980, total pumpage from the Saugus has ranged from about 3,850 to nearly 15,000 AFY, with an average of 6,900 AFY. A majority of pumping is for municipal supply with an average of about 500 to 1,000 AFY for agricultural use. Limited data exists regarding groundwater levels in the Saugus, however, the existing data indicates that there is no trend toward a sustained decline in water levels or storage indicative of overdraft.

2.6.1.5 Adopted AB 3030 Groundwater Management Plan

CLWA prepared a groundwater management plan in accordance with the provisions of Water Code Section 10753, which was originally enacted by AB 3030, for its wholesale service area. The general contents of CLWA's groundwater management plan (GWMP) were outlined in 2002, and a detailed plan was drafted and adopted in 2003. The plan both complements and formalizes a number of existing water supply and water resource planning and management activities in CLWA's service area, which effectively encompasses the East Subbasin of the Santa Clara River Valley Groundwater Basin.

The GWMP contains four management objectives, or goals, for the basin including:
(1) development of an integrated surface water, groundwater, and recycled water supply to meet existing and projected demands for municipal, agricultural, and other water uses;
(2) assessment of groundwater basin conditions to determine a range of operational yield values that use local groundwater conjunctively with supplemental SWP supplies and recycled water to avoid groundwater overdraft; (3) preservation of groundwater quality, including active characterization and resolution of any groundwater contamination problems; and
(4) preservation of interrelated surface water resources, which includes managing groundwater to not adversely impact surface and groundwater discharges or quality to downstream basin(s).

Prior to preparation and adoption of the GWMP, a local MOU process among CLWA, Los Angeles County Waterworks District No. 36 (LACWWD No. 36), NCWD, SCWD, VWC and United Water Conservation District (UWCD) in neighboring Ventura County had initiated local groundwater management, now embodied in the GWMP. In 2001, out of a willingness to seek opportunities to work together and develop programs that mutually benefit the region as well as their individual communities, those agencies prepared and executed the MOU. The agreement is a collaborative and integrated approach to several of the aspects of water resource management included in the GWMP. UWCD manages surface water and groundwater resources in seven groundwater basins, all located in Ventura County, downstream of the East Subbasin of the Santa Clara River Valley (East Subbasin). UWCD is a partner in cooperative management efforts to accomplish the objectives (goals) for the East Subbasin, particularly as they relate to preservation of surface water resources that flow through the respective basins. As a result of the MOU, the cooperating agencies have undertaken the following measures: integration of database management efforts; development of a numerical groundwater flow model for analysis of groundwater basin yield and containment of groundwater contamination; and, monitoring and reporting on the status of East Subbasin conditions, as well as on geologic and hydrologic aspects of the overall stream-aquifer system.

The adopted GWMP includes 14 elements intended to accomplish the East Subbasin management objectives listed above. In summary, the plan elements include:

- Monitoring of groundwater levels, quality, production and subsidence
- Monitoring and management of surface water flows and quality
- Determination of East Subbasin yield and avoidance of overdraft
- Development of regular and dry-year emergency water supply
- Continuation of conjunctive use operations
- Long-term salinity management
- Integration of recycled water
- Identification and mitigation of soil and groundwater contamination, including involvement with other local agencies in investigation, cleanup, and closure
- Development and continuation of local, state and federal agency relationships
- Groundwater management reports
- Continuation of public education and water conservation programs
- Identification and management of recharge areas and wellhead protection areas
- Identification of well construction, abandonment, and destruction policies
- Provisions to update the groundwater management plan

Work on a number of the GWMP elements had been ongoing for some time prior to the formal adoption of the GWMP and continues on an ongoing basis.

2.6.1.6 Available Groundwater Supplies

The groundwater component for the East Subbasin groundwater supply in the Region derives from a groundwater operating plan for the East Subbasin developed over the last 20 years to meet water requirements (municipal, agricultural, small domestic) while maintaining the East Subbasin in a sustainable condition (i.e., no long-term depletion of groundwater or interrelated surface water). This operating plan also addresses groundwater contamination issues in the East Subbasin, all consistent with both the MOU and the GWMP described above. The groundwater operating plan is based on the concept that pumping can vary from year to year to allow increased groundwater use in dry periods and increased recharge during wet periods and to collectively ensure that the groundwater East Subbasin is adequately replenished through various wet/dry cycles. As described in the MOU and subsequently formalized in the GWMP, the operating yield concept has been quantified as ranges of annual pumping volumes.

The ongoing work of the MOU has produced two formal reports. The first report, dated April 2004, documents the construction and calibration of the groundwater flow model for the Valley (CH_2M Hill 2004a). The second report, dated August 2005, presents the modeling analysis of the purveyors' groundwater operating plan. The primary conclusion of the modeling analysis is that the groundwater operating plan will not cause detrimental short or long term effects to the groundwater and surface water resources in the Valley and is therefore, considered sustainable (CH_2MHill and Luhdorff and Scalmanini 2005).

The groundwater operating plan, summarized in CLWA's 2005 Urban Water Management Plan (UWMP) and Table 2.6-2, is as follows:

- Alluvium: Pumping from the Alluvial Aquifer in a given year is governed by local hydrologic conditions in the eastern Santa Clara River watershed. Pumping ranges between 30,000 and 40,000 AFY during normal and above-normal rainfall years. However, due to hydrogeologic constraints in the eastern part of the subbasin, pumping is reduced to between 30,000 and 35,000 AFY during locally dry years.
- Saugus Formation: Pumping from the Saugus Formation in a given year is tied directly to the availability of other water supplies, particularly from the SWP. During average-year conditions within the SWP system, Saugus pumping ranges between 7,500 and 15,000 AFY. Planned dry-year pumping from the Saugus Formation ranges between 15,000 and 25,000 AFY during a drought year and can increase to between 21,000 and 25,000 AFY if SWP deliveries are reduced for two consecutive years and between 21,000 and 35,000 AFY if SWP deliveries are reduced for three consecutive years. Such high pumping would be followed by periods of reduced (average-year) pumping, at rates between 7,500 and 15,000 AFY, to further enhance the effectiveness of natural recharge processes that would recover water levels and groundwater storage volumes after the higher pumping during dry years.

TABLE 2.6-2
AVAILABILITY OF GROUNDWATER FOR THE REGION

	Groundwater Production (AF)			
Aquifer	**Normal Year**	**Dry Year 1**	**Dry Year 2**	**Dry Year 2**
East Subbasin				
Alluvium	30,000 to 40,000	30,000 to 35,000	30,000 to 35,000	30,000 to 35,000
Saugus	7,500 to 15,000	15,000 to 25,000	21,000 to 25,000	21,000 to 35,000
Acton Basin	34,400	14,900	14,900	14,900
Total	**71,900 to 89,400**	**59,900 to 74,900**	**65,900 to 74,900**	**65,900 to 84,900**

Source: CLWA 2005. UMWP Table 3-6 plus UWCD and CLWA 1996.

Additionally, availability of groundwater from the Acton Groundwater Basin is estimated to range from 14,883 AF for a relatively dry period to 34,395 AF for a relatively wet period (UWCD and CLWA 1996).

Within the Groundwater Operating Plan, three factors affect the availability of groundwater supplies: sufficient source capacity (wells and pumps); sustainability of the groundwater resource to meet pumping demand on a renewable basis; and protection of groundwater sources (wells) from known contamination, or provisions for treatment in the event of contamination. The first two factors are briefly discussed below.

For reference to the Groundwater Operating Plan, recent historical and projected groundwater pumping by the retail water purveyors is summarized in Tables 2.6-3 and 2.6-4, respectively.

The Groundwater Operating Plan recognizes ongoing Alluvial pumping for both municipal and agricultural water supply, as well as other small private domestic and related pumping. This pumping was estimated in CLWA's 2005 UWMP from information submitted by the Santa Clarita Valley Well Owners' Association about the nature and magnitude of private well pumping. This included a detailed estimate of private well pumping in the San Francisquito Canyon portion of the East Subbasin: a total of 85 AFY by 73 individual private pumpers, or nearly 1.2 AFY per private well pumper. As a result of that input, it is now better recognized that total private pumping is likely well within the 500 AFY estimates of small private well pumping in recent annual Water Reports, or about one (1) percent of typical Alluvial Aquifer pumping by the purveyors and other known private well owners (e.g., agricultural pumpers) combined. Thus, while the small private wells are not explicitly modeled in the East Subbasin yield analysis described herein because their locations and operations are not known, their operation creates a pumping stress that is essentially negligible at the scale of the regional model. Ultimately, the intent to maintain overall pumping within the operating plan, including private pumping, will result in sustainable groundwater conditions to support the combination of municipal (purveyor), agricultural, and small private groundwater use on an ongoing basis.

TABLE 2.6-3
HISTORICAL GROUNDWATER PRODUCTION BY THE RETAIL WATER PURVEYORS[(a)]

Basin Name	Groundwater Pumped (AF)[(b)]						
Santa Clara River Valley East Subbasin	2000	2001	2002	2003	2004	2005	2006
CLWA Santa Clarita Water Division	*11,529*	*9,896*	*9,513*	*6,424*	*7,146*	*12,408*	*13,156*
Alluvium	11,529	9,896	9,513	6,424	7,146	12,408	13,156
Saugus Formation	0	0	0	0	0	0	0
LA County Waterworks District No. 36	*0*	*0*	*0*	*0*	*380*	*343*	*0*
Alluvium	0	0	0	0	380	343	0
Saugus Formation	0	0	0	0	0	0	0
Newhall County Water District	*3,694*	*4,073*	*4,376*	*3,779*	*5,321*	*4,824*	*5,572*
Alluvium	1,508	1,641	981	1,266	1,582	1,389	2,149
Saugus Formation	2,186	2,432	3,395	2,513	3,739	3,435	3,423
Valencia Water Company	*13,186*	*11,353*	*12,568*	*12,775*	*11,824*	*14,741*	*14,333*
Alluvium	12,179	10,518	11,603	11,707	9,862	12,228	11,884
Saugus Formation	1,007	835	965	1,068	1,962	2,513	2,449
Total	*28,409*	*25,322*	*26,457*	*22,978*	*24,671*	*32,316*	*33,061*
Alluvium	25,216	22,055	22,097	19,397	18,970	26,368	27,189
Saugus Formation	3,193	3,267	4,360	3,581	5,701	5,948	5,872
Acton Groundwater Basin							
Sierra Pelona Mutual Water Company(c)	NA	57	57	57	47	47	47
LA County Waterworks District No. 37	NA	2,118	1,180	977	1,008	1,587	1,759

Notes:
(a) From 2007 *Santa Clarita Valley Water Report* (May 2005) and LACWWD No. 37 water records
(b) Pumping for Municipal and industrial uses only. Does not include pumping for agricultural and miscellaneous uses.
(c) Estimate from Slade 2004.

TABLE 2.6-4
PROJECTED GROUNDWATER PRODUCTION (NORMAL YEAR)

Basin Name	Range of Groundwater Pumping (AF)[(a)(b)(c)] 2010	2015	2020	2025	2030
Santa Clara River Valley East Subbasin					
CLWA Santa Clarita Water Division					
Alluvium	6,000-14,000	6,000-14,000	6,000-14,000	6,000-14,000	6,000-14,000
Saugus Formation	3,000	3,000	3,000	3,000	3,000
LA County Waterworks District No. 36					
Alluvium	0	0	0	0	0
Saugus Formation	500-1,000	500-1,000	500-1,000	500-1,000	500-1,000
Newhall County Water District					
Alluvium	1,500-3,000	1,500-3,000	1,500-3,000	1,500-3,000	1,500-3,000
Saugus Formation	3,000-6,000	3,000-6,000	3,000-6,000	3,000-6,000	3,000-6,000

Basin Name	Range of Groundwater Pumping (AF)[a][b][c] 2010	2015	2020	2025	2030
Valencia Water Company					
Alluvium	12,000-20,000	12,000-20,000	12,000-20,000	12,000-20,000	12,000-20,000
Saugus Formation	2,500-5,000	2,500-5,000	2,500-5,000	2,500-5,000	2,500-5,000
Acton Groundwater Basin					
Sierra Pelona Mutual Water Company4	47	47	47	47	47
LA County Waterworks District No. 375	2,700	3,100	3,500	3,900	4,400

Notes:

(a) The range of groundwater production capability for each purveyor varies based on a number of factors which include each purveyor's capacity to produce groundwater, the location of its wells within the Alluvium and Saugus Formation, local hydrology, availability of imported water supplies and water demands.

(b) To ensure sustainability, the purveyors have committed that the annual use of groundwater pumped collectively in any given year will not exceed the purveyors' operating plan as described in the *Basin Yield Study* and reported annually in the *Santa Clarita Valley Water Report*. As noted in the discussion of the purveyors' operating plan for groundwater in Table 3-6 of the CLWA 2005 UWMP the "normal" year quantities of groundwater pumped from the Alluvium and Saugus Formation are 30,000 to 40,000 AFY and 7,500 to 15,000 AFY, respectively.

(c) Groundwater pumping shown for purveyor municipal and industrial uses only.

(d) Estimate from Slade 2004.

(e) *Acton-Aqua Dulce Conceptual Master Plan for Water Facilities* 2004. Assumes build-out would occur in 2030 with an even growth rate throughout the planning period.

2.6.1.6.1 Alluvium

Based on a combination of historical operating experience and recent groundwater modeling analysis, the Alluvial Aquifer can supply groundwater on a long-term sustainable basis in the overall range of 30,000 to 40,000 AFY, with a probable reduction in dry years to a range of 30,000 to 35,000 AFY. Both of those ranges include about 15,000 AFY of Alluvial pumping for current agricultural water uses and an estimated pumping of up to about 500 AFY by small private pumpers. The dry year reduction is a result of practical constraints in the eastern part of the basin, where lowered groundwater levels in dry periods have the effect of reducing pumping capacities in that shallower portion of the aquifer (CLWA 2005).

2.6.1.6.1.1 Adequacy of Supply

For municipal water supply in the Valley, with existing wells and pumps, the three retail water purveyors with Alluvial wells (NCWD, SCWD, and VWC) have a combined pumping capacity from active wells (not contaminated by perchlorate) of 36,120 gpm, which translates into a current full-time Alluvial source capacity of approximately 58,000 AFY (CLWA 2005). Alluvial pumping capacity from all the active municipal supply wells is summarized in Table 2.6-5. These capacities do not include one Alluvial Aquifer well that has been periodically inactivated due to perchlorate contamination, the SCWD Stadium well. This well represents another 800 gpm of pumping capacity, or full-time source capacity of about 1,290 AFY.

TABLE 2.6-5
ACTIVE MUNICIPAL GROUNDWATER SOURCE CAPACITY — ALLUVIAL AQUIFER WELLS

Wells	Pump Capacity (gpm)	Max Annual Capacity (AF)	Normal Year Production[a] (AF)	Dry-Year Production (AF)
NCWD				
Castaic 1	600	960	385	345
Castaic 2	425	680	166	125
Castaic 4	270	430	100	45
Pinetree 1	300	480	164	N/A
Pinetree 3	550	880	545	525
Pinetree 4	500	800	300	N/A
NCWD Subtotal	**2,645**	**4,230**	**1,660**	**1,040**
SCWD				
Clark	600	960	782	700
Guida	1,000	1,610	1,320	1,230
Honby	950	1,530	696	870
Lost Canyon 2	850	1,370	741	640
Lost Canyon 2A	825	1,330	1,034	590
Mitchell 5A	950	1,530	400	20
Mitchell 5B	700	1,120	557	N/A
N. Oaks Central	1,000	1,610	822	1,640
N. Oaks East	950	1,530	1,234	485
N. Oaks West	1,400	2,250	898	N/A
Sand Canyon	750	1,200	930	195
Sierra	1,500	2,410	846	N/A
SCWD Subtotal	**10,525**	**16,920**	**9,860**	**6,350**
VWC				
Well D	1,050	1,690	690	690
Well E-15	1,400	2,260	N/A	N/A
Well N	1,250	2,010	620	620
Well N7	2,500	4,030	1,160	1,160
Well N8	2,500	4,030	1,160	1,160
Well Q2	1,200	1,930	985	985
Well S6	2,000	3,220	865	865
Well S7	2,000	3,220	865	865
Well S8	2,000	3,220	865	865
Well T2	800	1,290	460	460
Well T4	700	1,120	460	460
Well U4	1,000	1,610	935	935
Well U6	1,250	2,010	825	825
Well W9	800	1,290	600	600
Well W10	1,500	2,410	865	865
Well W11	1,000	1,610	350	350
VWC Subtotal	**22,950**	**36,950**	**11,705**	**11,705**
Total Purveyors	**36,120**	**58,100**[b]	**23,225**[b]	**19,095**[b]

Source: CLWA 2005. UWMP Table 3-9.
Notes:
(a) Based on recent annual pumping.
(b) Historically active wells only; capacity will slightly increase by restoration of contaminated wells.

In terms of adequacy and availability, the combined active Alluvial groundwater source capacity of municipal wells is approximately 58,000 AFY. This is more than sufficient to meet the municipal, or urban, component of groundwater supply from the Alluvium, which is currently 20,000 to 25,000 AFY of the total planned Alluvial pumping of 30,000 to 40,000 AFY. The balance of Alluvial pumping in the operating plan is for agricultural and other, including small private, pumping.

> **PERCHLORATE**
>
> Ammonium perchlorate is an inorganic chemical that is used in solid rocket propellants, fireworks and explosives.
>
> It interferes with the ability of the thyroid gland to utilize iodine to produce thyroid hormones. Thyroid hormones are needed for normal prenatal and postnatal growth and development in children, and for normal metabolic function in adults.
>
> Since 1997, perchlorate has been found to be a drinking water contaminant in about 284 water sources throughout California. Perchlorate has been found in wells within the Santa Clarita Valley. Local water agencies have developed a groundwater cleanup plan for perchlorate.

2.6.1.6.1.2 Sustainability

Until recently, the long-term renewability of Alluvial groundwater was empirically determined from approximately 60 years of recorded experience. Generally, it consists of long-term stability in groundwater levels and storage, with some dry period fluctuations in the eastern part of the Subbasin, over a historical range of total Alluvial pumpage from as low as about 20,000 AFY to as high as about 43,000 AFY. Those empirical observations have now been complemented by the development and application of a numerical groundwater flow model, which has been used to predict aquifer response to the planned operating ranges of pumping. The numerical groundwater flow model has also been used to analyze the control of perchlorate contaminant migration under selected pumping conditions that would restore, with treatment, pumping capacity inactivated due to perchlorate contamination detected in some wells in the Subbasin.

To examine the yield of the Alluvium or, the sustainability of the Alluvium on a renewable basis, the groundwater flow model was used to examine the long-term projected response of the aquifer to pumping for municipal and agricultural uses in the 30,000 to 40,000 AFY range under average/normal and wet conditions, and in the 30,000 to 35,000 AFY range under locally dry conditions. To examine the response of the entire aquifer system, the model also incorporated pumping from the Saugus Formation in accordance with the normal (7,500 to 15,000 AFY) and dry year (15,000 to 35,000 AFY) operating plan for that aquifer. The model was run over a 78-year hydrologic period, which was selected from actual historical precipitation to examine a number of hydrologic conditions expected to affect both groundwater pumping and groundwater recharge. The selected 78-year simulation period was assembled from an assumed recurrence of 1980 to 2003 conditions, followed by an assumed recurrence of 1950 to 2003 conditions. The 78-year period was analyzed to define both local hydrologic conditions (normal and dry), which affect the rate of pumping from the Alluvium, and hydrologic conditions that affect SWP operations, which in turn affect the rate of pumping from the Saugus. The resultant simulated pumping cycles included the distribution of pumping for each of the existing Alluvial Aquifer wells, for normal and dry years respectively, as shown in Table 2.6-2.

Simulated Alluvial Aquifer response to the range of hydrologic conditions and pumping stresses is essentially a long-term repeat of the historical conditions that have resulted from similar pumping over the last several decades. The resultant response consists of: (1) generally constant groundwater levels in the middle to western portion of the Alluvium and fluctuating groundwater levels in the eastern portion as a function of wet and dry hydrologic conditions; (2) variations in recharge that directly correlate with wet and dry hydrologic conditions; and (3) no long-term decline in groundwater levels or storage. The Alluvial Aquifer is considered a sustainable water supply source to meet the Alluvial portion of the operating plan for the groundwater subbasin. This is based on the combination of actual experience with Alluvial Aquifer pumping at capacities similar to those planned for the future and the resultant sustainability (recharge) of groundwater levels and storage, and further based on modeled projections of aquifer response to planned pumping rates that also show no depletion of groundwater.

2.6.1.6.2 Saugus Formation

Based on historical operating experience and extensive recent testing and groundwater modeling analysis, the Saugus Formation can supply water on a long-term sustainable basis in a normal range of 7,500 to 15,000 AFY, with intermittent increases to 25,000 to 35,000 AF in dry years. The dry-year increases, based on limited historical observation and modeled projections, demonstrate that a small amount of the large groundwater storage in the Saugus Formation can be pumped over a relatively short (dry) period. This would be followed by recharge (replenishment) of that storage during a subsequent normal-to-wet period when pumping would be reduced.

2.6.1.6.2.1 Adequacy of Supply

For municipal water supply with existing wells, the three retail water purveyors with Saugus wells (NCWD, SCWD, and VWC) have a combined pumping capacity from active wells (not contaminated by perchlorate) of 14,900 gpm, which translates into a full-time Saugus source capacity of 24,000 AFY. Saugus pumping capacity from all the active municipal supply wells is summarized in Table 2.6-6. These capacities do not include the four Saugus wells contaminated by perchlorate, although they indirectly reflect the capacity of one of the contaminated wells, VWC's Well 157, which has been sealed and abandoned, and replaced by VWC's Well 206 in a non-impacted part of the Subbasin. The three remaining contaminated wells, one owned by NCWD and two owned by SCWD, in addition to the VWC well, represent a total of 6,400 gpm of pumping capacity inactivated due to perchlorate contamination.

TABLE 2.6-6
ACTIVE MUNICIPAL GROUNDWATER SOURCE CAPACITY — SAUGUS FORMATION WELLS

Wells	Pump Capacity (gpm)	Max Annual Capacity (AF)	Normal Year Production[a] (AF)	Dry-Year Production (AF)
NCWD				
12	2,300	3,700	1,315	2,044
13	2,500	4,030	1,315	2,044
NCWD Subtotal	**4,800**	**7,730**	**2,630**	**4,088**
VWC				
159	500	800	50	50
160	2,000	3,220	1,000	1,330
201	2,400	3,870	100	3,577
205	2,700	4,350	1,000	3,827
206	2,500	4,030	1,175	3,500
VWC Subtotal	**10,100**	**16,270**	**3,325**	**12,284**
Total Purveyors	**14,900**	**24,000[b]**	**5,955[b]**	**16,372[b]**

Source: CLWA 2005. UWMP Table 3-10.
Notes:
(a) Based on recent annual pumping.
(b) Currently active wells only; additional capacity to meet dry-year operating plan would be met by restoration of contaminated wells and new well construction.

In terms of adequacy and availability, the combined active Saugus groundwater source capacity of municipal wells of 24,000 AFY, is more than sufficient to meet the planned use of Saugus groundwater in normal years of 7,500 to 15,000 AFY. During the currently scheduled two-year time frame for restoration of impacted Saugus capacity, this currently active capacity is more than sufficient to meet water demands, in combination with other sources, if both of the next two years are dry. At that time, the combination of currently active capacity and restored impacted capacity, through a combination of treatment at two of the impacted wells and replacement well construction, will provide sufficient total Saugus capacity to meet the planned use of Saugus groundwater during multiple dry-years of 35,000 AF, if that third year is also a dry year.

2.6.1.6.2.2 Sustainability

Until recently, the long-term sustainability of Saugus groundwater was empirically determined from limited historical experience. The historical record shows fairly low annual pumping in most years, with one four-year period of increased pumping up to about 15,000 AFY that produced no long-term depletion of the substantial groundwater storage in the Saugus. Those empirical observations have now been complemented by the development and application of the numerical groundwater flow model, which has been used to examine aquifer response to the operating plan for pumping from both the Alluvium and the Saugus and also to examine the effectiveness of pumping for both contaminant extraction and control of contaminant migration within the Saugus Formation.

To examine the yield of the Saugus Formation or its sustainability on a renewable basis, the groundwater flow model was used to examine long-term projected response to pumping from both the Alluvium and the Saugus over the 78-year period of hydrologic conditions using alternating wet and dry periods as have historically occurred. The pumping simulated in the model was in accordance with the operating plan for the Subbasin. For the Saugus, simulated pumpage included the planned restoration of recent historic pumping from the perchlorate-impacted wells. In addition to assessing the overall recharge of the Saugus, that pumping was analyzed to assess the effectiveness of controlling the migration of perchlorate by extracting and treating contaminated water close to the source of contamination.

Simulated Saugus Formation response to the ranges of pumping under assumed recurrent historical hydrologic conditions is consistent with actual experience under smaller pumping rates. The response consists of: (1) short-term declines in groundwater levels and storage near pumped wells during dry-period pumping; (2) rapid recovery of groundwater levels and storage after cessation of dry-period pumping; and (3) no long-term decreases or depletion of groundwater levels or storage. Given the combination of actual experience with Saugus pumping and recharge up to about 15,000 AFY, now complemented by modeled projections of aquifer response that show long-term utility of the Saugus at 7,500 to 15,000 AFY in normal years and rapid recovery from higher pumping rates during intermittent dry periods, the Saugus Formation can be considered a sustainable water supply source to meet the Saugus portion of the operating plan for the groundwater subbasin.

2.6.1.6.3 Acton Groundwater Basin

There is limited data available for the Acton Groundwater Basin; however, as previously mentioned the total storage capacity of the Basin is estimated at approximately 40,000 to 45,000 AF with approximately 14,883 AF available in dry periods and 34,395 AF available in wet years. There are several water-supply wells that extract groundwater from the alluvium at rates greater than 100 gpm, and numerous small-volume domestic water supply wells scattered throughout the basin region. The major water pumpers are the LACWWD No. 37, Acton Camp, a trailer park, and a few large private wells installed in the southern part of the basin (UWCD and CLWA 1996). Since 2000, LACWWD No. 37 pumping has ranged between 977 AFY and 2,118 AFY. Additional pumping occurring within the Agua Dulce portion of the groundwater basin includes pumping for the Agua Dulce Winery and Vineyards, the Sierra Pelona Mutual Water Company (which serves the Sierra Colony Ranch Estates Tract 34038) and six other small water systems (Slade 2004). These wells are regulated by the Los Angeles County Environmental Health Department.

2.6.1.7 Potential Supply Inconsistency

A small group of wells that have been impacted by perchlorate represent a temporary loss of well capacity within CLWA's service area. However, CLWA and the purveyors have developed an implementation plan that would restore this well capacity. The implementation plan includes a combination of treatment facilities and replacement wells. Treatment facilities for one of the impacted wells became operational in 2006; additional treatment for the other wells is anticipated by December 2008. Additional information on the treatment technology and schedule for restoration of the impacted wells is provided in Section 2.8.7. Additional information concerning water quality issues and replacement capacity is also provided in Section 2.8.7.

2.6.2 Imported Water Supplies

Imported water supplies in the Region consist primarily of SWP supplies, which were first delivered to CLWA in 1980. More detail on the SWP is provided in Section 2.11.1. In addition to their SWP Table A Amount, CLWA has developed other imported water supplies. CLWA has purchased an imported surface supply from the Buena Vista Water Storage District and Rosedale-Rio Bravo Water Storage District in Kern County. CLWA wholesales these imported supplies to each of the local retail water purveyors. Additionally, a small amount of SWP water is available to a portion of the eastern part of the Region through deliveries from the Antelope Valley-East Kern Water Agency (AVEK).

Castaic Lake

In the early 1960s, DWR began entering into individual SWP Water Supply Contracts with urban and agricultural public water supply agencies located throughout northern, central, and southern California for SWP water supplies. CLWA and AVEK are two (2) of 29 water agencies (commonly referred to as "contractors") that have an SWP Water Supply Contract with DWR. Each SWP contractor's SWP Water Supply Contract contains a "Table A," which lists the maximum amount of water an agency may request each year throughout the life of the contract. Table A is used in determining each contractor's proportionate share, or "allocation," of the total SWP water supply DWR determines to be available each year. The total planned annual delivery capability of the SWP and the sum of all contractors' maximum Table A amounts was originally 4.23 million AF. The initial SWP storage facilities were designed to meet contractors' water demands in the early years of the SWP, with the construction of additional storage facilities planned as demands increased. However, essentially no additional SWP storage facilities have been constructed since the early 1970s. SWP conveyance facilities were generally designed and have been constructed to deliver maximum Table A amounts to all contractors. After the permanent retirement of some Table A amount by two (2) agricultural contractors in 1996, the maximum Table A amounts of all SWP contractors now totals about 4.17 million AF. Currently, CLWA's annual Table A Amount is 95,200 AF.[7,8] AVEK's annual Table A Amount is 141,400 AF but only approximately 3 percent (or 4,242 AF) is available to the eastern parts of the Region.

While Table A identifies the maximum annual amount of water a SWP contractor may request, the amount of SWP water actually available and allocated to SWP contractors each year is dependent on a number of factors and can vary significantly from year to year. The primary factors affecting SWP supply availability include hydrology, the amount of water in SWP storage at the beginning of the year, regulatory and operational constraints, and the total amount of water requested by SWP contractors. Urban SWP contractors' requests for SWP water, which were low in the early years of the SWP, have been steadily increasing over time, which increases the competition for limited SWP dry-year supplies.

Consistent with other urban SWP contractors, SWP deliveries to CLWA and AVEK have increased as its requests for SWP water have increased. Tables 2.6-7 and 2.6-8 present historical total SWP deliveries to CLWA and AVEK municipal purveyors and AVEK and CLWA SWP demand projections provided to DWR, respectively.

The "*State Water Project Delivery Reliability Report,"* prepared by DWR assists SWP contractors in assessing the reliability of the SWP component of their overall supplies. DWR prepared an updated version of this report in 2005 and is in the process of completing another update. In the 2005 update, DWR provided a recommended set of analyses for SWP contractors to use in preparing their 2005 Urban Water Management Plans. These analyses indicate that the SWP, using existing facilities operated under then current regulatory and operational constraints, and with all contractors requesting delivery of their full Table A Amounts in most years, could deliver 77 percent of total Table A Amounts on a long-term average basis. These analyses also project that SWP deliveries during multiple-year dry periods could average

---

[7] CLWA's original SWP Water Supply Contract with DWR was amended in 1966 for a maximum annual Table A Amount of 41,500 AF. In 1991, CLWA purchased 12,700 AF of annual Table A Amount from a Kern County water district, and in 1999 purchased an additional 41,000 AF of annual Table A Amount from another Kern County water district, for a current total annual Table A Amount of 95,200 AF.

[8] Of CLWA's 95,200 AF annual Table A Amount, 41,000 AFY was permanently transferred to CLWA in 1999 by Wheeler Ridge-Maricopa Water Storage District, a member unit of the Kern County Water Agency. CLWA's Environmental Impact Report ("EIR") prepared in connection with the 41,000 afy water transfer was challenged in Friends of the Santa Clara River v. Castaic Lake Water Agency (Los Angeles County Superior Court) ("Friends"). On appeal, the Court of Appeal held that since the 41,000 AFY EIR tiered off the Monterey Agreement EIR that was later decertified, CLWA would also have to decertify its EIR as well and prepare a revised EIR. CLWA was not prevented from using any water that is part of the 41,000 AFY transfer. Under the jurisdiction of the Los Angeles County Superior Court, CLWA prepared and circulated a revised Draft EIR for the transfer. CLWA approved the revised EIR in late 2004 ("2004 EIR") and lodged the EIR with the Los Angeles Superior Court. Thereafter, the case was dismissed with prejudice (permanently).
In January 2005, two new challenges to CLWA's 2004 EIR were filed in the Ventura County Superior Court by the Planning and Conservation League ("PCL") and by the California Water Impact Network ("CWIN"); these cases were consolidated and transferred to Los Angeles County Superior Court, Planning and Conservation League v. Castaic Lake Water Agency (Los Angeles County Superior Court,) ("PCL Action"). In May 2007, a final Statement of Decision was filed by the trial court in the PCL Action. It included a determination that the transfer is valid and cannot be terminated or unwound. The trial court did find one defect in the 2004 EIR, requiring Judgment to be entered against CLWA. The defect, however, did not relate to the environmental conclusions reached in the 2004 EIR. CLWA has been ordered to set aside its certification of the 2004 EIR, correct the defect and report back to the Court. The Writ issued by the Court as part of the Judgment specifically states that the Judgment does not call for CLWA to set aside the transfer. In July 2007, Petitioners filed a Partial Notice of Appeal.

about 25 to 40 percent of total Table A Amounts and could possibly be as low as 5 percent during an unusually dry single year. During wetter years, or more than 25 percent of the time, 100 percent of full Table A Amounts is projected to be available. A draft update of the *State Water Project Delivery Reliability Report* was released for public review in late January 2008. A final report is anticipated after April 2008.

TABLE 2.6-7
HISTORICAL TOTAL SWP DELIVERIES TO PURVEYORS

Year	Deliveries (AF)	Year	Deliveries (AF)
1980	1,125	1993	15,287
1981	5,816	1994	14,611
1982	9,659	1995	16,996
1983	9,185	1996	18,093
1984	10,996	1997	22,148
1985	11,823	1998	20,254
1986	13,759	1999	27,320
1987	16,285	2000	32,731
1988	19,033	2001	35,875
1989	21,618	2002	44,954
1990	21,647	2003	46,997
1991	8,368	2004	50,327
1992	15,175	2005	39,964

TABLE 2.6-8
DEMAND PROJECTIONS PROVIDED TO WHOLESALE SUPPLIER (DWR) (AF)

Wholesaler (Supply Source)	2010	2015	2020	2025	2030
DWR (SWP)-CLWA	95,200	95,200	95,200	95,200	95,200
DWR (SWP)- AVEK	4,200	4,200	4,200	4,200	4,200
Region Total	**99,400**	**99,400**	**99,400**	**99,400**	**99,400**

The SWP supplies projected to be available for delivery to the Region were determined based on the total SWP delivery percentages identified by DWR in its 2005 analyses. Table 2.6-9 shows SWP supplies projected to be available to the Region in average/normal years (based on the average delivery over the study's historic hydrologic period from 1922 through 1994) (i.e., long-term average basis). Table 2.6-9 also summarizes estimated SWP supply availability in a single dry year (based on a repeat of the worst-case historic hydrologic conditions of 1977) and over a multiple dry year period (based on a repeat of the worst-case historic four-year drought of 1931 through 1934). Table 2.6-9 does not include the 11,000 AFY available from the Buena Vista-Rosedale transfer in an average, single-dry, or multiple-dry year (see Section 2.6.2.1 below).

As part of its water supply contract with DWR, CLWA has access to a portion of the storage capacity of Castaic Lake. This Flexible Storage Account allows CLWA to utilize up to 4,684 AF of the storage in Castaic Lake. Any of this amount that CLWA borrows must be replaced by CLWA within five (5) years of its withdrawal. CLWA manages this storage by keeping the account full in normal and wet years and then delivering that stored amount (or a portion of it) during dry periods. The account is refilled during the next year that adequate SWP supplies are available to CLWA to do so. CLWA has recently negotiated with Ventura County water agencies to obtain the use of their Flexible Storage Account. This allows CLWA access to another 1,376 AF of storage in Castaic Lake. CLWA access to this additional storage is available on a year-to-year basis for 10 years, as of 2006. AVEK does not have access to SWP flexible storage.

TABLE 2.6-9
WHOLESALER SUPPLY RELIABILITY (AF)

Wholesaler (Supply Source)	2010	2015	2020	2025	2030
Average Water Year					
DWR (SWP)					
Table A Supply	68,600	70,600	72,600	74,600	76,600
% of Table A Amount[(a)]	71%	73%	75%	77%	77%
Single Dry Year					
DWR (SWP)					
Table A Supply	4,000	4,000	4,000	5,000	5,000
% of Table A Amount[(a)]	4%	4%	4%	5%	5%
Multi-Dry Year					
DWR (SWP)					
Table A Supply	31,800	31,800	31,800	32,800	32,800
% of Table A Amount[(a)]	32%	32%	32%	33%	33%

Note:
(a) Percentages of Table A Amount from DWR's "2005 *SWP Delivery Reliability Report*."

While the primary supply of water available from the SWP is allocated Table A supply, SWP supplies in addition to Table A water may periodically be available, including "Article 21" water, Turnback Pool water, and DWR dry-year purchases. Article 21 water (which refers to the SWP contract provision defining this supply) is water that may be made available by DWR when excess flows are available in the Delta (i.e., when Delta outflow requirements have been met, SWP storage south of the Delta is full, and conveyance capacity is available beyond that being used for SWP operations and delivery of allocated and scheduled Table A supplies). Article 21 water is made available on an unscheduled and interruptible basis and is typically available only in average to wet years, generally only for a limited time in the late winter. The Turnback Pool is a program where contractors with allocated Table A supplies in excess of their needs in a given year may turn back that excess supply for purchase by other contractors who need additional supplies that year. The Turnback Pool can make water available in all types of hydrologic years, although generally less excess water is turned back in dry years. As urban contractor demands increase in the future, the amount of water turned back and available for purchase will likely diminish. In critical dry years, DWR has formed Dry Year Water Purchase Programs for contractors needing additional supplies. Through these programs, water is purchased by DWR from willing sellers in areas that have available supplies and is then sold by DWR to contractors

The Sacramento-San Joaquin Delta

willing to purchase those supplies. Because the availability of these supplies is somewhat uncertain, they are not included as supplies in this IRWMP. However, CLWA's and AVEK's access to these supplies when they are available may enable them to improve the reliability of their SWP supplies beyond the values used throughout this report.

In addition to climate change and variability, imported water is also subject to regulatory and legal challenges. The Delta is the focal point for water management, ecosystem restoration, land use planning, and other major initiatives in California and is the "hub" for SWP water (SWP water is the primary source of imported water in the Region). Because this IRWMP region is dependent upon imported water coming from the Delta, it is very important to the IRWMP process that stakeholders and the general public have an understanding of the key issues affecting the Delta. These issues include: water supply reliability, water quality, ecosystem restoration, levee system integrity, and recreation.

Water quality in the Delta is negatively affected by multiple constituents such as salinity, mercury, dissolved oxygen, organic carbon, selenium, pesticides, and toxicity of unknown origin. Further complications are apparent when considering the declining health of the Delta ecosystem and the reduction of aquatic and terrestrial habitat. Water diversions, toxic pollutants, and the introduction of exotic species continue to degrade the quality of the habitat that remains. Some solutions, such as conversion of agricultural land to accommodate ecosystem improvements and programs that provide water flow and timing requirements, place constraints upon farmers who rely upon the land for economic survival, as well as on the contractors who must meet the water demand of the southern part of the state. The need to balance multiple competing uses is apparent when evaluating this issue. The integrity and maintenance of the complex levee system in the Delta is another major concern. Levee failures lead to inundation and destruction of agricultural lands and result in increased salinity necessitating the shut down of export pumps. Finally, the use of the Delta for recreational purposes has increased in popularity coincident with the growing state population. The estimates of recreation use (over 12 million recreational user days per year) indicate that this factor is a key component in the management of Delta resources.

A December 2007 federal court decision requires that DWR curtail pumping from the Delta to protect the endangered Delta Smelt. DWR estimates that, depending on Delta smelt migration patterns and precipitation, pumping could be reduced by 25 to 30 percent until new federal biological permits are obtained. Future water deliveries out of the Delta will depend on conditions in those new federal permits.

2.6.2.1 Transfers and Exchanges

CLWA has executed a long-term transfer agreement for 11,000 AFY with the Buena Vista Water Storage District and Rosedale-Rio Bravo Water Storage District. These two districts, both located in Kern County, joined together to develop a program that provides both a firm water supply and a water banking component. Both districts are member agencies of the Kern County Water Agency (KCWA), a SWP contractor, and both districts have contracts with KCWA for SWP Table A Amounts. The supply is based on existing long-standing Kern River water rights, which would be delivered by exchange of SWP Table A Amount.

This acquisition is consistent with CLWA's annexation policy under which it will not approve potential annexations unless additional water suppliers are acquired. Currently proposed annexations have a demand for about 4,000 AFY of this supply, which, if approved, would leave the remaining 7,000 AFY available for potential future annexations. Unless and until any such annexations are actually approved, this supply will be available to meet demands within the existing CLWA service area.

2.6.3 Recycled Water

At the current time the necessary infrastructure to produce and utilize recycled water exists within the CLWA service area only. Hence the following section on recycled water focuses on the CLWA service area. The Santa Clarita Valley Sanitation District (SCVSD) of Los Angeles County owns and operates two water reclamation plants, Saugus Water Reclamation Plant (WRP) and Valencia WRP, within the CLWA service area. The water is treated to tertiary standards and discharged to the Santa Clara River. The Newhall Ranch development is also planning to construct a water reclamation facility, and non-potable water from this source may be incorporated into the CLWA recycled water system.

By utilizing the reclaimed water from the WRPs for irrigation and other non-potable purposes, CLWA can more efficiently allocate its potable water and increase the reliability of water supplies in the Valley. Accordingly, CLWA has constructed an initial phase (Phase 1A) of the recycled water system, and proposes to construct an additional phase, according to its 2002 *Draft Recycled Water Master Plan* and 2006 *Recycled Water Master Plan Program Environmental Impact Report (EIR)*.

2.6.3.1 Existing Facilities

SCVSD's Saugus and Valencia WRPs operated independently until 1980, at which time the two plants were linked by a bypass interceptor. The interceptor was installed to transfer a portion of flows received at the Saugus WRP to the Valencia WRP. In order to improve operating efficiencies and because a shortage of space at the Saugus WRP limits future expansion of wastewater facilities in what was then LACWWD No. 26, a joint powers agreement was enacted in 1984, creating the Santa Clarita Valley Joint Sewerage System. Through use of wastewater and sludge connecting lines, future expansions of treatment works, including sludge handling and disposal operations, will be provided at the larger Valencia WRP. Together, the Valencia and Saugus WRPs have a design capacity of 28.1 million gallons per day (mgd). In fiscal year 2002-2003 (FY 02/03), they produced an average of 18.33 mgd, none of which was used for recycled water purposes.

The primary sources of wastewater to the Saugus and Valencia WRPs are domestic. Both plants are tertiary treatment facilities and produce high quality reclaimed water. Historically, the reclaimed water from the two WRPs has been discharged to the Santa Clara River. The Saugus WRP reclaimed water outfall is located approximately 400 feet downstream (west) of Bouquet Canyon Road. Reclaimed water from the Valencia WRP is discharged to the Santa Clara River at a point approximately 2,000 feet downstream (west) of The Old Road Bridge.

The Saugus WRP, completed in 1962, is southeast of the intersection of Bouquet Canyon Road and Soledad Canyon Road. Two subsequent expansions and flow equalization facilities brought its current design capacity to 6.5 mgd. The treatment process was brought up to a tertiary level with the addition of dual-media pressure filters in 1987. However, no future expansions are possible due to space limitations at the site. In FY 02/03, the Saugus WRP produced an average reclaimed water flow of 5.28 mgd (5,914 AFY). Use of recycled water from this facility is permitted under Regional Water Quality Control Board (RWQCB) Order No. 87-49; however, diverting these discharges for recycled water uses may potentially impact downstream habitat within the reach between the Saugus WRP and Valencia WRP. Until more detailed habitat investigations and minimum flow studies are conducted, it is assumed that only recycled water from the Valencia WRP will be utilized in the future to meet the Region's recycled water demand.

The Valencia WRP is located on The Old Road near Magic Mountain Amusement Park. The Valencia WRP was completed in 1967. The existing capacity is 21.6 mgd following three subsequent expansions: construction of a 4.4 MG flow equalization tank in February 1995, the Stage 4 expansion completed in June 1996, and the most recent Stage 5 expansion of 9 mgd. In FY 02/03, the Valencia WRP produced an average reclaimed water flow of 13.05 mgd (14,628 AFY). Use of recycled water from the Valencia WRP is permitted under RWQCB Order No. 87-48. On July 24, 1996, CLWA executed an agreement with SCVSD to purchase up to 1,700 AFY of recycled water from the Valencia WRP. In 2002, CLWA constructed the facilities to utilize this supply and initiated deliveries in 2003 to the Westridge Golf Course. Since 2003, approximately 1,300 AF of recycled water has been used (personal communication, M. Zauner, SCVSD 2007).

Valencia Water Reclamation Plant

Recycled water from Valencia WRP has been used in the past by the City of Santa Clarita for landscape irrigation and by Pacific Pipeline and Oberg Construction for construction applications, delivered via tanker truck. In April 2000, a contract was signed with TransCoast Financial for use of up to 20,000 gpd for dust control at a nearby composting facility. When recycled water is requested, it is transported via tanker truck.

2.6.3.2 Planned Recycled Water Improvements and Expansions

To accommodate anticipated growth in the Valley and to ensure compliance with discharge requirements from the RWQCB, the Valencia WRP will expand as indicated in the *2015 Santa Clarita Valley Joint Sewerage System Facilities Plan and EIR*. The ultimate capacity of the Valencia WRP is planned to be 27.6 mgd. The Stage 5 expansion (9 mgd increase) was completed in 2002. Stage 6 involves an additional 6 mgd increase in design capacity. No expansion is planned at the Saugus WRP. Thus, the ultimate total capacity for both WRPs is 34.1 mgd (38,200 AFY). Table 2.6-10 provides the projected reclaimed water flow for the combined Valencia and Saugus WRP planning area.

TABLE 2.6-10
RECLAIMED WATER CAPACITY (AF)

Description	2002	2005	2010	2015	2020	2025	2030
Reclaimed Water Produced at Saugus and Valencia WRPs	20,542	23,700	28,700	31,700	34,600	27,400	38,200
Recycled Water (Meeting Title 22 Requirements)	20,542	23,700	28,700	31,700	34,600	27,400	38,200

Note: (a) Information collected from SCVSD and Draft 2002 *Recycled Water Master Plan*.

2.6.3.3 Recycled Water Uses

CLWA wishes to enhance its water supply through the use of recycled water. The use of recycled water is constrained by availability of recycled water and various laws, some of which are described in greater detail in CLWA's 2002 *Draft Recycled Water Master Plan (Master Plan)*. CLWA's existing recycled water system permits the use of up to 1,700 AFY and CLWA has entered into an existing agreement with SCVSD for use of its reclaimed water. However, the ultimate recycled water use will be governed by availability of recycled water from the SCVSD WRPs and consideration of other requirements including Water Code Section 1210 (giving SCVSD, as owner of the Valencia and Saugus WRPs exclusive rights to the treated water from the reclamation plants against anyone who has supplied the water); Water Code Section 1211 (requiring approval from the SWRCB prior to making any change in the point of discharge, place of use, or purpose of use); and any other regulatory requirements that may require continued discharges to the Santa Clara River to maintain fishery, wildlife, recreational or other beneficial uses, among others.

The Master Plan identified recycled water users that would account for a total of 17,400 AFY of recycled water use in the year 2030 (see Section 2.6.3.7 below). The Draft Program Environmental Impact Report (EIR) for the Master Plan (2006) concluded that all of the reclaimed water required for the full development of the Master Plan could be supplied by just the anticipated growth in reclamation plant effluent through the year 2030.

The ability of CLWA to use recycled water is constrained by its rights to use the water available. While there are few regulatory limitations on the use of oilfield produced water, the use of reclaimed water is limited by various state water laws, codes, and court decisions. These regulatory limitations are described in greater detail in the 2002 Master Plan.

CLWA has been approved to use 1,700 AFY, but the ultimate recycled water use is governed by the availability of native versus foreign water as shown in Table 2.6-11. According to the Water Code Section 1211, downstream water rights holders are protected if the source of return flow is "native water." Native water is water that under natural conditions would contribute to a given stream or other body of water (i.e., surface water or percolating groundwater). Thus, if the source of water is "foreign" (e.g., imported or SWP water), downstream water rights holders are not protected under the code. Groundwater extracted from and used in the Valley and then discharged to the Santa Clara River as wastewater effluent may be considered "native water" to the river; whereas, SWP water imported into and used in the Valley and then discharged to the Santa Clara River as wastewater effluent may be considered "foreign water." Furthermore, while existing discharges may have a permanent public use (i.e., habitat), only the "foreign water" percentage within the effluent flows can be diverted for recycling purposes.

In 2005, the Valley's potable water supply consisted of approximately 36 percent groundwater (native water) and 64 percent imported water (foreign water). Projected potable water demand for the year 2030 is approximately 133,700 AF, 57 percent derived from foreign water and 43 percent derived from native sources. The projected recycled water component would consist of approximately 57 percent (76,600 AF foreign/133,700 total) of projected wastewater generation. Therefore, CLWA's future recycled water system is limited to the foreign water portion of wastewater. This volume is determined by multiplying the percentage of foreign water by the wastewater flow. As shown in Table 2.6-11, the future foreign water portion of wastewater is 21,890 AFY (57 percent times 38,200 AFY). It is important to note that these percentages are of potable water demand (i.e., they do not include the use of recycled water in the calculation) and as such are not percentages of total water demand. Although the foreign water percentage of potable water demand decreases by seven percent from 2005 to 2030, actual use of foreign water increases.

TABLE 2.6-11
USE OF NATIVE WATER VS. FOREIGN WATER

	Native Water Demand (AFY)	Foreign Water Demand (AFY)[a]	Recycled Water Demand (AFY)	Potable Water Demand Total (AFY)	Wastewater Flow[b] (AFY)	Foreign Water Percentage of Potable Water Demand	Foreign Water Portion of Wastewater (AFY)
Projected (2005)	25,500	46,100	800	71,600	31,500	64%	20,100
Future (2030)	57,100	76,600	17,391	133,700	38,200	57%	21,890

Note:
(a) Foreign water includes SWP water, water transfers, and desalination.
(b) From Table 2.6-10.

In order to maintain native water rights, and assuming the ultimate capacities and recycled water demand, the existing and planned methods of reclaimed water discharge and use are as summarized in Table 2.6-12.

TABLE 2.6-12
DISCHARGE OF RECLAIMED WATER (NON-RECYCLED)

Method of Discharge	Treatment Level	Wastewater Discharge and Use (AF)					
		2005	2010	2015	2020	2025	2030
Discharge to Santa Clara River	Disinfected, tertiary	30,700	36,600	34,900	30,200	25,500	20,800
Recycled Water Users	Disinfected, Tertiary	800	1,600	3,300	8,000	12,700	17,400
	Total	**31,500**	**38,200**	**38,200**	**38,200**	**38,200**	**38,200**

Source: CLWA 2005.

2.6.3.4 Other Potential Sources of Recycled Water

2.6.3.4.1 Newhall Ranch Water Reclamation Plant

A third Valley reclamation plant is proposed as part of the Newhall Ranch project. This proposed facility would be located near the western edge of the development project along the south side of State Route 126. The plant will be constructed in stages, with an ultimate capacity of 6.8 mgd. Effluent from the proposed water reclamation plant would be used to meet non-potable water demand within the development area. According to the *Newhall Ranch Draft Additional Analyses*, this plant is projected to produce 5,344 AFY of recycled water on average (CLWA 2005). During the dry months, all of the recycled water would be used for non-potable uses within Newhall Ranch, supplemented by additional recycled water from CLWA. During the wet winter months when demands are low, the Newhall Ranch WRP would, on average, have approximately 286 AFY of excess recycled water. In order for the WRP to be non-discharging (i.e., have production equal to demand), this recycled water would be transferred into CLWA's recycled water system for use and/or storage. Any excess demand would need a National Pollutant Discharge Elimination System (NPDES) permit from the Los Angeles RWQCB prior to discharge. NPDES permits could place stricter regulatory limitation on the reclaimed water, which may increase treatment costs. Furthermore, the discharge could be subject to additional environmental review prior to approval.

2.6.3.4.2 Oilfield Produced Water

Oilfield produced water is a by-product of oil production generated when oil is extracted from the oil reservoir. It is generally of poor quality and unsuitable for potable, industrial, or irrigation use without treatment. Because of the poor water quality, re-injection has often been the most cost-effective disposal option.

Treatment processes can produce potable quality water; yet, because of the poor initial water quality and the organic constituents, it is often more appropriate for treated oilfield produced water to be used for irrigation or industrial purposes to offset potable water demand. Pilot studies performed at the Placerita Oilfield have indicated that, even with reverse osmosis (RO) treatment, some organic compounds such as naphthalene, 2-butanone, and ethylbenzene, can be detected in the RO effluent.

The economics of oil production are market-driven and are different from those of drinking water supplies. As oil prices rise or drop, oilfields go into and out of production depending on the costs of production. Also, oilfields are eventually depleted of supply and abandoned. Therefore, while oilfield produced water should be considered long-term, it is not a completely firm supply and is not permanent.

Studies of the potential reuse of treated oilfield produced water from the Placerita Oilfield have indicated that approximately 44,000 barrels per day (1.8 mgd) of treated oilfield produced water may be available. For irrigation reuse, the produced water would need to be cooled and treated to remove hardness, silica, total dissolved solids (TDS), boron, ammonia, and total organic carbon (TOC).

2.6.3.5 Summary of Available Source Water Flows

As discussed previously, the non-potable water system has four potential sources of water. The flows projected to be available are shown in Table 2.6-13. These are not estimates of projected recycled water use but of potential recycled water supply available. For planning purposes, only recycled water from SCVSD is considered available to meet the projected recycled water demands due to the level of evaluation still needed on the alternative sources.

2.6.3.6 Recycled Water Demand

In this section, current recycled water use is discussed, and potential recycled water users within CLWA's service area are identified as determined from the 2002 Master Plan. For each potential user, estimates are provided for annual demand, peak monthly demand, peak daily demand, and the hourly distribution of water demand during peak months. The requirements for potential users to convert their existing water potable systems to recycled water are also discussed.

TABLE 2.6-13
SUMMARY OF AVAILABLE RECYCLED WATER SOURCE FLOWS

Source	Current Capacity (mgd)	Projected Capacity (mgd)	Projected to be Available for Non-Potable Use (AFY)
SCVSD Total	28.1	34.1	19,995
Valencia WRP	*21.6*	*27.6*	*19,995*
Saugus WRP	*6.5*	*6.5*	*0*
Oilfield Produced Water	0	1.8	1,980
Newhall Ranch WRP	0	6.8	5,344
	Total		**27,319**

Source: CLWA 2005.

2.6.3.6.1 Current Use

Currently, recycled water is served to landscape irrigation customers, including the Westridge Golf Course. Table 2.6-14 provides a summary of existing recycled water use.

TABLE 2.6-14
ACTUAL RECYCLED WATER USES

Type of Use	Treatment Level	Actual 2004 Use (AF)
Landscape	Disinfected tertiary	419
Total		**419**

Source: 2006 *Santa Clarita Valley Water Report*.

2.6.3.6.2 Potential Users

Potential recycled water users were identified through a number of sources including:

- 1993 *Recycled Water Master Plan*
- Water consumption records for LACWWD No. 36, NCWD, SCWD, and VWC
- Land use maps
- General Plans and Specific Plans for the City of Santa Clarita and County
- Discussions with City of Santa Clarita, County, water purveyor, and land developer staff
- "Windshield" survey of CLWA service area
- Draft 2002 *Recycled Water Master Plan*

In order to be considered as a potential recycled water user, the user had to be located within CLWA's service area and have a potential non-potable water demand of at least 4 AFY. A total potential demand for existing and future recycled water users is 34,500 AFY as identified in the 2002 Master Plan for 2015. As this volume is already greater than the anticipated source of recycled water supply, additional future recycled users were not identified at this time. However, CLWA may reevaluate the list of recycled users after 2015 to consider future users not included in the 2002 Master Plan. Table 2.6-15 provides a summary of the demands by user type.

TABLE 2.6-15
POTENTIAL RECYCLED WATER USES IN REGION

Type of Use	Treatment Level	Potential Use (AF)				
		2010	2015	2020	2025	2030
Landscape	Disinfected tertiary	34,500	34,500	34,500	34,500	34,500
Total		**34,500**	**34,500**	**34,500**	**34,500**	**34,500**

Source: CLWA 2002

The initial list of potential recycled water users was reduced by evaluating the potential users that would be most expensive to serve until potential uses were approximately 17,000 AFY. The unit cost to serve each user was calculated using the capital costs for pipelines, reservoirs, and pump stations as well as operational costs for pumping. The areas retained for recycled water service have costs per AF ranging from $120 to $5,000. Areas eliminated from service had costs as high as $13,000 per AF. However, only two of the proposed phases in the 2002 Master Plan had costs above $1,000 per AF. The resulting proposed recycled water service area encompasses a large portion of CLWA's western service area.

2.6.3.7 Potential Recycled Water Demand

Potential annual recycled water demands were estimated from historical water use records for existing users (and the proposed irrigated area), and expected water use per acre for future users. Demands for recycled water are seasonal, with the highest demands occurring during the hot, dry summer months when irrigation requirements are greatest.

The total potential annual recycled water demand that is cost effective to serve is approximately 17,400 AFY. Implementation of the recycled water system is expected to occur over the next 25 years. Table 2.6-16 summarizes the projected future use by user type.

TABLE 2.6-16
PROJECTED POTENTIAL FUTURE USE OF RECYCLED WATER IN SERVICE AREA

Type of Use	Projected Use (AF)				
	2010	2015	2020	2025	2030
Landscape	1,600	3,300	8,000	12,700	17,400
Total	**1,600**	**3,300**	**8,000**	**12,700**	**17,400**

Source: CLWA 2002

2.6.4 Groundwater Banking

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

Groundwater banking programs involve storing available surface water supplies during wet years in groundwater basins in, for example, the San Joaquin Valley. Water would be stored either directly by surface spreading or injection, or indirectly by supplying surface water to farmers for their use in-lieu of their intended groundwater pumping. During water shortages, the stored water could be pumped out and conveyed to the banking partner, or used by the farmers in exchange for their surface water allocations, which would be delivered to the banking partner. At the current time CLWA, the Region's wholesaler, has evaluated groundwater banking as part of its overall water supply reliability.

In 2003, CLWA produced a *Draft Water Supply Reliability Plan*. The plan outlines primary elements that CLWA should include in its water supply mix to obtain maximum overall supply reliability enhancement. These elements include both conjunctive use and groundwater banking programs, as well as water acquisitions. The plan also contains a recommended implementation plan and schedule.

The reliability plan recommended that CLWA obtain total banking storage capacity of 50,000 AF, with pumpback capacity of 20,000 AF per year, by 2005. For the long-term, CLWA should obtain a total of 183,000 AF of storage capacity, with total pumpback capacity of 70,000 AF per year by 2050. Table 2.6-17, taken from the 2003 *Draft Water Supply Reliability Report*, presents an implementation schedule recommended for both storage and pumpback capacity beginning in 2005 and incrementally increasing through 2050.

TABLE 2.6-17
RECOMMENDED SCHEDULE FOR WATER BANKING CAPACITY[(a)]

Year	Total Pumpback (AFY)	Total Storage (AFY)
2005	20,000	50,000
2010	20,000	50,000
2020	40,000	100,000
2030	60,000	150,000
2040	70,000	183,000
2050	70,000	183,000

Source: CLWA 2003b.

2.6.4.1 Semitropic Water Banking

Semitropic Water Storage District (Semitropic) provides SWP water to farmers for irrigation. Semitropic is located in the San Joaquin Valley in the northern part of Kern County immediately east of the California Aqueduct. Using its available groundwater storage capacity (approximately 1 million AF), Semitropic has developed a groundwater banking program, which it operates by taking available SWP supplies in wet years and returning the water in dry years. As part of this dry-year return, Semitropic can leave its SWP water in the Aqueduct for delivery to a banking partner and increase its groundwater production for its farmers. Semitropic constructed facilities so that groundwater can be pumped into a Semitropic canal and, through reverse pumping plants, be delivered to the California Aqueduct. Semitropic currently has six banking partners: the Metropolitan Water District of Southern California (Metropolitan), Santa Clara Valley Water District, Alameda County Water District, Alameda County Flood Control and Water Conservation District Zone 7, Vidler Water Company, and The Newhall Land and Farming Company. The total amount of storage under contract is approximately 1 million AF.

In 2002, CLWA stored an available portion of its Table A Amount (24,000 AF) in an account in Semitropic's program. In 2004, 32,522 AF of available 2003 Table A Amount water was stored in a second Semitropic account.[9] In accordance with the terms of CLWA's storage agreements

[9] No legal challenge was made to CLWA's approval of this project or to the negative declaration for this project.

with Semitropic, 90 percent of the banked amount, or a total of 50,870 AF, is recoverable through 2013 to meet CLWA water demands when needed. Each account has a term of ten years for the water to be withdrawn and delivered to CLWA.[10] Current operational planning includes use of the water stored in Semitropic for dry-year supply. Accordingly, it is reflected in the available supplies delineated in this section, and it is also reflected in contributing to short-term (prior to 2013) water supply reliability in Table 2.6-1.

2.6.4.2 Rosedale-Rio Bravo Water Storage District Water Banking

Also located in Kern County, immediately adjacent to the Kern Water Bank, Rosedale-Rio Bravo Water Storage District has completed environmental documentation for a Water Banking and Exchange Program. The initial offering from the program is storage and pumpback capacity of 20,000 AFY, with up to 100,000 AF of storage capacity. This banking program would meet the total pumpback and exceed the total storage capacity in 2010 recommended in the implementation schedule provided in CLWA's 2003 *Draft Water Supply Reliability Report*. In 2004, CLWA signed an MOU with Rosedale-Rio Bravo Water Storage District to begin preliminary non-binding negotiations on the possible terms for participation in the program. In April 2005, CLWA and Rosedale-Rio Bravo Water Storage District executed a deposit agreement for the exclusive right to negotiate, and CLWA approved an EIR in October 2005. Upon completion of the California Environmental Quality Act (CEQA) documentation, this program became operational. The banking program allows the storage of up to 20,000 AFY of CLWA's water supplies when they are available, and up to 20,000 AFY of recovered or exchange water delivered to CLWA in years when supplies are limited. This project is a water management program designed to improve the reliability of CLWA's existing dry-year supplies.

2.6.5 Other Opportunities

In addition to the programs identified above, the following programs are proposed within the Region to enhance reliability and meet demands.

The *Draft Water Supply Reliability Plan* recommends water banking storage and pumpback capacity both north and south of CLWA's service area, the latter of which would provide an emergency supply in case of catastrophic outage along the California Aqueduct. CLWA is assessing southern water banking opportunities including potential programs with the Chino Basin Watermaster (with whom CLWA signed an MOU in 2003), Calleguas Municipal Water District, and San Gorgonio Pass Water Agency.

Groundwater banking and conjunctive-use programs enhance the reliability of both the existing and future supplies. Table 2.6-18 summarizes CLWA's future reliability enhancement programs.

[10] Thereafter, the remaining amount of project water is forfeited from the account.

TABLE 2.6-18
FUTURE RELIABILITY ENHANCEMENT PROGRAMS

Project Name	Year Available	Proposed Quantities (AF) Average/Normal Year	Single Dry Year	Multiple Dry Years
Additional Planned Banking Programs	2014	0	20,000	20,000

Source: CLWA 2005. UWMP Table 3-12.
Note:
(a) Supplies shown are maximum withdrawal capacity for each of four consecutive dry years.

2.7 Summary of Major Water Issues and Problems

Over the course of the series of Stakeholder meetings, many issues and topics were discussed. However, many of the issues raised can be summarized into five themes:

- Continued growth in water demand while imported water supplies become less reliable. The Stakeholders expressed a need for a comprehensive picture of available water supplies and the desire to find alternative water sources
- Difficulty in maintaining open space and habitat areas given population growth and increased urbanization
- Variety of water quality issues, including perchlorate contamination, and TMDLs for chloride and nitrate compounds
- Runoff and drainage issues in the more rural areas that result in negative effects to the rural areas and areas downstream
- Runoff and drainage issues related to urbanizing areas in the floodplain

2.8 Water Quality

2.8.1 Impaired Water Bodies

There are many tools, regulatory, voluntary, or incentive based, currently available for preventing pollution. The US EPA, SWRCB, and RWQCBs have permitting, enforcement, remediation, monitoring, and watershed-based programs to prevent pollution. Pollution can enter a water body from point sources like wastewater treatment plants and/or other industries that directly discharge to the river, and from nonpoint sources over a broad area, such as runoff from a city and/or agricultural farmland or grazing areas located adjacent to stretches of the river reach. Preventing pollution from most point sources relies on a combination of source control and treatment, while preventing nonpoint source pollution generally involves the use of best management practices (BMPs), efficient water management practices (EWMPs), and source control. Nonpoint source pollution is not typically associated with discrete conveyances. The SWRCB and RWQCBs are adopting TMDLs to control both point and nonpoint source pollution in those water bodies that are not attaining their water quality standards.

The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. SDWA applies to every public water system in the United States. SDWA authorizes the US EPA to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. Originally, SDWA focused primarily on treatment as the means of providing safe drinking water at the tap. Amendments in 1996 greatly enhanced the existing law by recognizing source water protection, operator training, funding for water system improvements, and public information as important components of safe drinking water. Under the SDWA, technical and financial aid is available for certain source water protection activities.

The Federal Clean Water Act (CWA) contains two strategies for managing water quality including, (1) a technology-based approach that envisions requirements to maintain a minimum level of pollutant management using the best available technology; and (2) a water quality-based approach that relies on evaluating the condition of surface waters and setting limitations on the amount of pollution that the water can be exposed to without adversely affecting the beneficial uses of those waters. Section 303(d) of the CWA bridges these two (2) strategies. Section 303(d) requires that the States make a list of waters that are not attaining standards after the technology-based limits are put into place. For waters on this list (and where the US EPA administrator deems they are appropriate) the States are required to develop TMDLs. A TMDL must account for all sources of the pollutants that caused the water to be listed. Federal regulations require that the TMDL, at a minimum, account for contributions from point sources (Federally permitted discharges) and contributions from nonpoint sources.

A TMDL is a number that represents the assimilative capacity of receiving water to absorb a pollutant. A TMDL is the sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources plus an allotment for natural background loading, and a margin of safety as well as some accounting for seasonal variation. TMDLs can be expressed in terms of mass per time (the traditional approach) or in other ways such as toxicity or a percentage reduction or other appropriate measure relating to a state water quality objective. A TMDL is implemented by reallocating the total allowable pollution among the different pollutant sources (through the permitting process or other regulatory means) to ensure that the water quality objectives are achieved. The Region currently has two adopted TMDLs, one for nitrogen compounds and one for chlorides.

The Nitrogen Compounds TMDL was established due to the listing of various reaches of the Santa Clara River on the 303(d) list of impaired water bodies in 1998. The source analysis for the Nitrogen Compound TMDL found discharge of reclaimed water to be one of the sources of nitrogen compounds in the river, along with aerial deposition, agricultural runoff, stormwater runoff, and groundwater discharge. Given these sources, wasteload allocations for nitrogen compounds were assigned to the various sources. The Nitrogen Compounds TMDL was included as a Los Angeles RWQCB Basin Plan Amendment in August 2003.

The Chloride TMDL was established due to the listing of Reaches 5 and 6 of the Upper Santa Clara River for chloride on the 303(d) list of impaired water bodies in 1998. Sources of chloride include water softeners, SWP water, and wastewater effluent. The Chloride TMDL includes a number of special studies to provide scientific certainty over the appropriate wasteload allocations and objectives for chloride that are necessary to support various beneficial uses, including salt-sensitive agriculture, groundwater and endangered species. Several compliance options for the Chloride TMDL are under consideration. Option 1 would target a 100 mg/L chloride concentration. Under this option various levels of advance treatment would be implemented at the Saugus and Valencia water reclamation plants, in combination with a 43-mile brine line and/or effluent ocean outfall. Option 2 would target a range of 100 to 150 mg/L in chloride concentration depending on imported water quality. Under this second option advance treatment would be implemented at the Saugus and Valencia water reclamation plants and brine would be disposed of in abandoned well fields. Dilution water would be added to discharged water as necessary to meet chloride goals.

2.8.1.1 Section 303(D) List of Water Quality Limited Segments

The Section 303(d) Impaired Waterbodies List for the Upper Santa Clara River Watershed was approved by the SWRCB on October 25, 2006 and was approved by the US EPA on June 26, 2007, but was followed by reconsideration of some listings (none affecting Southern California).[11] There are a number of constituents that are on the 2006 303(d) list for Reaches 5, 6 and 7 of the Santa Clara River, and for Lake Hughes, Lake Elizabeth and Munz Lake, which are also within the Region. Table 2.8-1 provides a summary of the current listings of impaired water bodies of the Upper Santa Clara River Watershed.

2.8.2 Potable Water Quality

Section 2.8.1 discussed water quality as it pertained to pollution and the natural environment. This section identifies water quality regulations related to potable water delivered to customers.

The quality of any natural water is dynamic in nature. This is true for the SWP and the local groundwater. During periods of intense rainfall or snowmelt, routes of surface water movement are changed; new constituents are mobilized and enter the water while other constituents are diluted or eliminated. The quality of water changes over the course of a year. These same basic principles apply to groundwater. Depending on water depth, groundwater will pass through different layers of rock and sediment and leach different materials from those strata. Water depth is a function of local rainfall and snowmelt. During periods of drought, the mineral content of groundwater increases. Water quality is not a static feature of water, and these dynamic variables must be recognized.

Water quality regulations also change. This is the result of the discovery of new contaminants, changing understanding of the health effects of previously known as well as new contaminants, development of new analytical technology, and the introduction of new treatment technology. All water purveyors are subject to drinking water standards set by the US EPA and the California Department of Public Health (DPH). Additionally, investor-owned water utilities, such as VWC, are also subject to water quality regulation by the Public Utilities Commission. CLWA provides surface water from the SWP while local retail water purveyors combine local groundwater with treated SWP water from CLWA for delivery to their customers (LACWWD No. 36 is an exception and during most years receives water from SWP). An annual Consumer Confidence Report (CCR) is provided to all residents who receive water from CLWA and one of the four retail water purveyors. That report includes detailed information about the results of testing of the water supplied during the preceding year (e.g., 2005 *Santa Clarita Valley Water Report*).

[11] See http: www.waterboards.ca.gov/water_issues/programs/TMDL/303d_lists2006_epa.shtml

TABLE 2.8-1
2006 303(D) LIST OF IMPAIRED WATER BODIES – UPPER SANTA CLARA RIVER WATERSHED

Name	Pollutant/ Stressor	Potential Sources	Typical Data Range	Basin Plan Objective	Est. Size Affected (acres)	Proposed/ Approved TMDL Completion
Elizabeth Lake	Eutrophication	Nonpoint	NA	NA	123	2019
	Organic Enrichment/ Low Dissolved Oxygen	Nonpoint	0.8 – 11.0 mg/L	Annual mean > 7.0 mg/L; No sample < 5.0 mg/L	123	2019
	pH	Nonpoint	7.3 - 9.6	6.5 – 8.5	123	2019
	Trash	Nonpoint	NA	NA	123	2019
Lake Hughes	Algae	Nonpoint	NA	NA	21	2019
	Eutrophication	Nonpoint	NA	NA	21	2019
	Fish Kills	Nonpoint	NA	NA	21	2019
	Odor	Nonpoint	NA	NA	21	2019
	Trash	Nonpoint	NA	NA	21	2019
Munz Lake	Eutrophication	Nonpoint	NA	NA	6.6	2019
	Trash	Nonpoint	NA	NA	6.6	2019
Santa Clara River, Reach 5 (Blue Cut to West Pier Hwy 99)	Chloride	Nonpoint/ Point	10 – 138 mg/L	80 – 100 mg/L	9.4	2005
	Coliform	Nonpoint/ Point	20 -24,000 MPN/100 mL	30-day log mean < 200 MPN/100 mL; no more than 10% of samples > 400 MPN/100mL	9.4	2019
Santa Clara River, Reach 6 (West Pier Hwy 99 to Bouquet Cyn Rd)	Chloride	Nonpoint/ Point	10 – 138 mg/L	80 – 100 mg/L	5.2	2005
	Chlorpyrifos	Unknown	NA	NA	5.2	2019
	Coliform	Nonpoint/ Point	20 -24,000 MPN/100 mL	30-day log mean < 200 MPN/100 mL; no more than 10 % of samples > 400 MPN/100mL	5.2	2019
	Diazinon	Unknown	NA	NA	5.2	2019
	Toxicity	Unknown	NA	NA	5.2	2019
Santa Clara River, Reach 7 (Bouquet Cyn Rd to Lang Gaging)	Chloride	Nonpoint/ Point	10 – 138 mg/L	80 – 100 mg/L	21	2005
Santa Clara River, Reach 8 (above Lang Gaging)	None	NA	NA	NA	NA	NA

The quality of water received by individual customers will vary depending on whether they receive SWP water, groundwater, or a blend. Some will receive only SWP water at all times, while others will receive only groundwater. Others may receive water from one well at one time, water from another well at a different time, different blends of well and SWP water at other times, and only SWP water at yet other times. These times may vary over the course of a day, a week, or a year.

The Los Angeles RWQCB Basin Plan includes water quality objectives for the entire Santa Clara River Watershed.

This section provides a general description of the water quality of both imported water and groundwater supplies. A discussion of potential water quality impacts on the reliability of these supplies is also provided.

2.8.3 Surface Water Quality

Surface water quality data for the Upper Santa Clara River in the County are based on the DWR investigation of water quality and beneficial uses conducted for the Upper Santa Clara River Hydrologic Area (DWR 1993). The investigation found that Elizabeth and Hugh Lakes, which are both closed basin lakes, tend to have very saline characteristics due to seasonal variations in runoff. Castaic Lake and Lagoon water quality is influenced by its thermal stratification and biochemical processes. Additionally, Castaic is sodium chloride in character from its deliveries of SWP water. Bouquet Canyon has ranged from sodium-calcium bicarbonate to sodium bicarbonate in character from its deliveries of water from the Los Angeles Aqueduct (Mono-Owens water).

The surface water quality data in the Upper Santa Clara River are obtained from continuous sampling records at two (2) gaging stations: 1) the Old Highway Bridge and 2) the Los Angeles - Ventura County Line and historical records at two stations near Ravenna and Lang. The period of water quality records for these stations is from 1951 to 1990 (UWCD and CLWA 1996). Table 2.8-2 provides a summary of the available TDS and chloride data for surface water locations in the Region since 1980.

TABLE 2.8-2
SURFACE WATER QUALITY SUMMARY

Location	TDS			Chloride		
	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
04N16W17SW1	1/30/80 to 11/27/00	699.0 – 1,090.0	11	1/30/80 to 11/27/00	60.0 – 118.0	11
04N17W14SW1	3/18/97	370.0	1	3/18/97	59.0	1
403STC004	--	--	--	10/30/01 to 2/25/03	73.3 – 112.0	2
403STC019	--	--	--	10/31/01 to 2/25/03	81.2 – 117.0	2
403STC027	--	--	--	11/13/01 to 2/24/03	23.3 – 30.6	2
403STC068	--	--	--	2/25/03	64.3	1
403STCCTC	--	--	--	11/13/01	187.0	1
403STCSFO	--	--	--	10/31/01	26.5	1
Castaic Creek	9/24/90	907.0	1	9/24/90	138.0	1
OF101	8/31/05	770.0	1	--	--	--
OS101	8/30/05	930.0	1	--	--	--
Potrerro Road	6/19/96 to 9/11/96	888.0 -905.0	2	6/19/96 to 9/11/96	101.0 – 107.0	2
Saugus WRP	1/01/80 to 7/17/05	141.0 – 874.0	313	1/17/80 to 7/17/05	84.0 – 200.0	322
SCR-Hwy 99	9/21/92 to 9/11/96	739.0 – 897.0	4	9/21/92 to 9/11/96	87.0 – 108.0	4
SCR- Old Hwy 99	5/11/88 to7/07/94	78.0 – 1,136.0	69	5/11/88 to7/07/94	9.8 – 137.0	69
SCR –Old Hwy Bridge	1/30/80 to 7/27/94	608.0 – 1,090.0	49	1/08/80 to 8/28/00	9.8 – 540.0	235
SCR-RA	3/12/93 to 4/13/05	364.0 – 655.0	6	5/21/98 to 4/13/05	21.6 – 133.0	6
SCR-RB	3/12/90 to 7/20/05	452.0 – 1,530.0	73	11/06/95 to 7/22/05	88.3 – 336.0	77
SCR-RC	3/12/90 to 7/20/05	604.0 – 1,850.0	71	11/06/95 to 6/15/05	31.3 – 170.0	50
SCR-RD	3/12/90 to 7/20/05	0.0 – 1,980.0	73	11/06/95 to 7/22/05	30.5 – 190.0	94
SCR-RE	3/12/90 to 7/20/05	0.0 – 1,496.0	73	9/24/90 to 7/20/05	47.1 – 140.0	57
SR101	8/30/05	390.0	1	--	--	--
SR102	8/30/05	430.0 – 490.0	2	--	--	--
SR103	8/30/05	570.0	1	--	--	--
SR104	8/31/05	760.0	1	--	--	--
SR105	8/31/05	760.0	1	--	--	--
Valencia WRP	1/01/80 to7/17/05	371.0 – 961.0	916	1/17/80 to 7/17/05	67.5 – 341.0	328

Source: CH2M Hill 2004b

This Page Intentionally Left Blank.

Two trends observed in the water quality data collected in the Upper Santa Clara River are indicated in UWCD and CLWA (1996):

1. An increase in concentration of the TDS and sulfate downstream, with the maximum concentrations of TDS and sulfate at the County Line station (the most downstream) are about ten times higher than that at Lang station (the most upstream).

2. A general decrease in concentrations of TDS and sulfate at the stations over their periods of record. Unfortunately, these data do not reflect recent changes in the surface water quality conditions that, in turn, would reflect changes in the hydrologic conditions in the watershed.

Nitrate ranged from 9 to 35 milligrams per liter (mg/L) nitrate at Blue Cut near the County line but it generally occurs in very low concentrations in the undeveloped drainages north of the Santa Clara River. Chloride concentrations tend to also be relatively low in undeveloped portions of the watershed and higher in developed areas. Sources of chloride include water softeners, SWP water, and wastewater effluent. In 2000, chloride concentrations ranged from 80 to 137 mg/L at Blue Cut and averaged 148 and 170 mg/L in effluent from the Saugus and Valencia WRPs, respectively (Los Angeles RWQCB 2006).

The State's Surface Water Ambient Monitoring Program (SWAMP) analyzed 30 random and eight (8) discrete sites throughout the watershed (includes both Upper and Lower Santa Clara River Basins) beginning in 2001 and continuing in 2003. All sites were sampled for field measurements (dissolved oxygen, pH, depth, temperature, velocity, conductivity, and turbidity), conventional water chemistry, nutrients (ammonia, chlorophyll-a, nitrate, nitrite, and phosphate), salts (sulfate, chloride, TDS, and boron), toxicity, and bioassessment. The discrete sites were also sampled for trace organics, bioaccumulation, water column and sediment metals, sediment grain size, and enzyme-linked immunosorbent assays for chlorpyrifos and diazinon (Kamer 2005).

Results from this sampling indicated:

- Dissolved oxygen saturation of <90 percent at 15 of 38 sites
- High pH at four sites
- Inorganic nitrogen concentrations exceeding Basin Plan objectives at seven sites
- Total and un-ionized ammonia at three sites
- Total ammonia at one site
- Un-ionized ammonia at one site, and nitrate at two sites
- Phosphorus concentrations exceeding US EPA recommendations in 13 sites
- TDS concentrations exceeded Basin Plan objectives at 12 sites
- Sulfate exceeding Basin Plan objectives at 10 sites
- Elevated chloride in seven sites
- Elevated boron at three sites

(Source: Kamer 2005)

Of the sites analyzed for metals in sediment, tissue and water, four sites had exceeded US EPA criteria for aluminum in water, seven sites had arsenic levels in tissue above Office of Environmental Health Hazard Assessment (OEHHA) screening values and US FWS guidelines, and one site had elevated copper levels in tissue. Additionally, three sites had elevated sediment metals levels above sediment quality guidelines: cadmium in Piru Creek, copper and lead in Castaic Creek, and a suite of metals in San Francisquito Canyon (Kamer 2005).

Analysis of organic compounds at tributary sites, showed, Dichloro-Diphenyl-Trichloroethane (DDT) and Polychlorinated Biphenyls (PCBs) levels exceeding established criteria at all sites, elevated chlordane at three sites, elevated chlorpyrifos and diazinon at Bouquet Canyon and Castaic Creek, elevated Polycyclic Aromatic Hydrocarbons (PAHs) at Blue Cut, and elevated DDE and DDT in sediments in the estuary (Kamer 2005). Toxicity occurred at 13 of the randomly-selected sites and in Bouquet Canyon and the estuary.

The bioassessment data indicate that ecological condition ranged from poor or very poor for one half to at least fair in the other half of the sites. Index of Biological Integrity (IBI) scores were “Good” at six sites, “Fair” at 13 sites, “Poor” at 11 sites and “Very Poor” at seven sites (Kamer 2005).

2.8.4 Imported Water Quality

CLWA provides SWP water to the Valley. The source of SWP water is rain and snow of the Sierra Nevada, Cascade, and Coastal mountain ranges. This water travels to the Delta through a series of rivers and various SWP structures. There it is pumped into a series of canals and reservoirs, which provide water to urban and agricultural users throughout the San Francisco Bay Area and central and southern California. The most southern reservoir on the West Branch of the SWP California Aqueduct is Castaic Lake. CLWA receives water from Castaic Lake and distributes it to the retail water purveyors following treatment.

Rio Vista Water Treatment Plant

Perhaps the most important difference in quality between surface water and groundwater is the presence of microbes in surface water. Surface water is exposed to a variety of microbial contaminants while groundwater in general is not. As a result, there are considerably more water quality regulations for surface water providers. CLWA has two surface water treatment plants, the Rio Vista Water Treatment Plant and the Earl Schmidt Water Filtration Plant, whose function is to ensure the safety of the water by eliminating microbial contaminants. Both of these plants have a multi-barrier strategy. The first barrier is the application of ozone, a powerful disinfectant, which has the ability to kill a broad range of microbes. The second barrier is the addition of chemicals to remove particles from the water, which can hide and protect microbes. Removing particles improves the anti-microbial action of the disinfectants. The water is then passed through two sets of filters, and chloramines are then added to the water. Chloramines are similar to chlorine and prevent the growth of bacteria in the distribution system, which delivers water from the treatment plants to the retail water purveyors.

An important property of SWP water is the chemical make up caused by its passage through the Delta. The Delta is basically a very large marsh (or estuary) with large masses of plants and peat soils. These contribute organic materials (TOC) to the water. Salt water can also move into the Delta from San Francisco Bay and the Pacific Ocean. This brings in salts, notably bromide and chloride. None of these chemicals are harmful in and of themselves; however, when bromide and TOC react with disinfectants such as ozone, chlorine, or chloramines, a reaction occurs forming substances known as disinfection by-products (DBPs). A variety of health-based concerns are associated with DBPs (2005 *Santa Clarita Valley Water Report*).

Another important property of SWP water is the mineral content. SWP water is generally low in dissolved minerals, such as calcium, magnesium, sodium, potassium, iron, manganese, nitrate, and sulfate. Most of these minerals do not have health based concerns, but “hard” water (water high in calcium, magnesium, and iron) can cause a number of problems for consumers, such as the formation of white crusts in plumbing fixtures, water spots, damage to water heaters, and excess use of soaps. Nitrate is the main exception, as it has significant health effects for infants; however, the nitrate content of SWP water is very low. Also of significance is the chloride content. Although not a human health risk, chloride can have a negative impact on agricultural activities and regulatory compliance for local sanitation agencies. The chloride content of SWP water varies widely from well over 100 mg/L to below 40 mg/L, depending on Delta conditions.

All surface waters can have taste and odor problems caused by the growth of algae in reservoirs, such as Castaic Lake. Under certain conditions, algae can grow in large mats, which then die, releasing foul smelling chemicals. Although harmless, the taste and odor causing chemicals can generally be very unpleasant for consumers.

2.8.5 Groundwater Quality

In a 2006 data gap analysis for water quality monitoring, conducted by AMEC, the Upper Santa Clara River Watershed ranked as “data moderate” to “data rich” for conventional parameters, metals (with the exception of aluminum), nitrates, and organic compounds. The data sets for these constituents was spatially biased to the lower third (downstream) portions of the watershed, with no or poor data for the uppermost portion.

2.8.5.1 Agua Dulce Groundwater Basin

The water quality in the Agua Dulce groundwater basin is generally calcium bicarbonate in character with a mixed calcium magnesium bicarbonate character deeper down. TDS ranges from 330 to 520 mg/L and total hardness ranges from 230 to 330 mg/L (Slade 2004). Although some random inorganic compounds have been detected, all levels have been well below the allowed Maximum Contaminant Levels (MCLs). The major water quality issue for the basin is the presence of nitrate. Nitrate has been detected as high as 69.1 mg/L in one well in the basin, which exceeds the MCL of 45 mg/L for this constituent. More typical ranges for nitrate in the basin are between 20 and 40 mg/L (Slade 2004).

2.8.5.2 Acton Valley Groundwater Basin

Groundwater in this basin is generally classified as calcium-bicarbonate (DWR 2002a), although groundwater in the broad valley north of Acton exhibited calcium-magnesium bicarbonate to calcium-magnesium-sulfate character (Slade 1990). Based on sampling of 5 public water-supply wells, DWR reported TDS concentrations ranging from 424 to 712 mg/L, with an average concentration of 579 mg/L (DWR 2002a). During June 1988 to June 1989, the concentrations of TDS ranged from 279 to 480 mg/L, total hardness (TH) ranged from 172 to 271 mg/L, and nitrate concentrations ranged from 3.9 to 24.7 mg/L (Slade 1990, UWCD and CLWA 1996). The TDS content is greatly influenced by deep percolation of the rainfall runoff; it increases as rainfall declines and vice versa (UWCD and CLWA 1996).

DWR evaluation (DWR 2002a) indicated high concentrations of TDS, sulfate and chloride in 75 wells in the northern part of the basin, with some concentrations exceeding drinking water standards (Slade 1990; DWR 1993). Nitrate concentrations in two wells were above drinking water standards as well (DWR 1968).

2.8.5.3 Santa Clara River Valley East Groundwater Subbasin

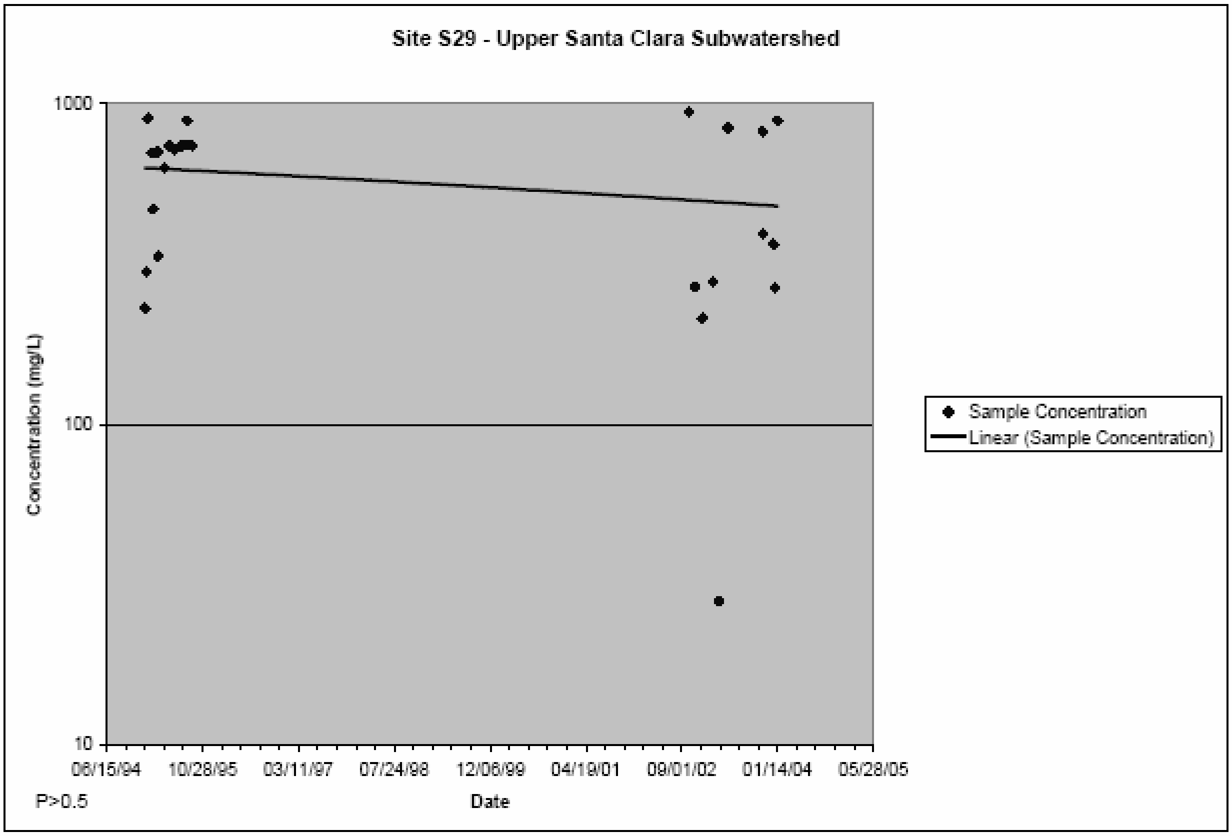
As previously mentioned, this subbasin has two sources of groundwater. Most local wells draw water from the Alluvial Aquifer. A smaller portion of the Valley's water supply is drawn from the Saugus Formation, a much deeper aquifer than the Alluvial Aquifer. The quality components of these aquifers differ with changing rainfall conditions. The two aquifers' water quality changes at different rates and much more slowly than surface water.

Local groundwater generally does not have microbial water quality problems. Parasites, bacteria, and viruses are filtered out as the water percolates through the soil, sand, and rock on its way to the aquifer. Even so, disinfectants are added to local groundwater when it is pumped by wells to protect public health. Local groundwater has very little TOC and generally has very low concentrations of bromide, minimizing potential for DBP formation. Taste and odor problems from algae are not an issue with groundwater.

The mineral content of local groundwater is very different from SWP water. The groundwater is very "hard," in that it has high concentrations of calcium and magnesium (approximately 250 to 600 mg/L, as developed in the CLWA et al 2005 *Annual Water Quality Report*). Groundwater may also contain higher concentrations of nitrates and chlorides when compared to SWP water. However, all groundwater meets or exceeds drinking water standards.

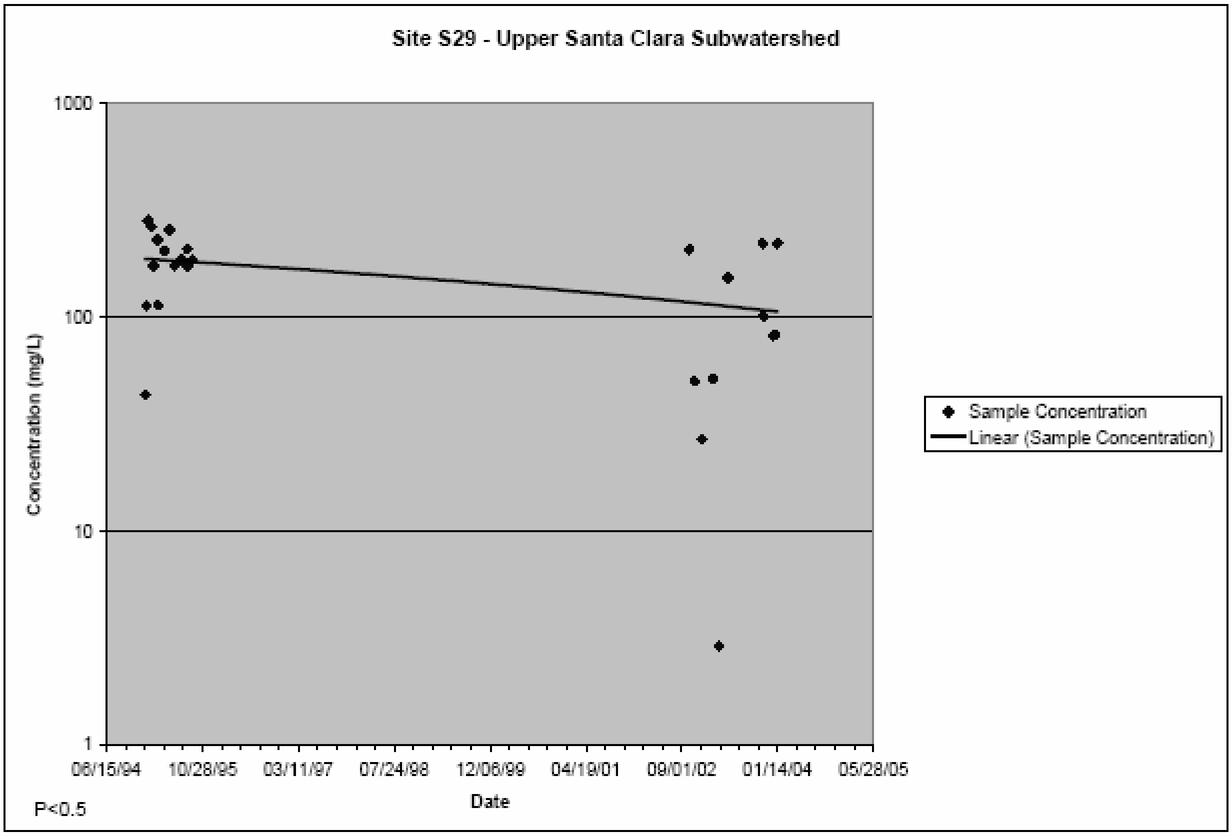
The following sections describe the groundwater quality of the Alluvium and Saugus formations. Figures 2.8-1a through 2.8-1d are plots of constituents over time for the Upper Santa Clara Watershed as presented in the AMEC Earth & Environment 2006 *Comprehensive Water Quality Monitoring Plan for the Santa Clara River Watershed*.

FIGURE 2.8-1a
SUMMARY OF TDS CONCENTRATIONS OVER TIME



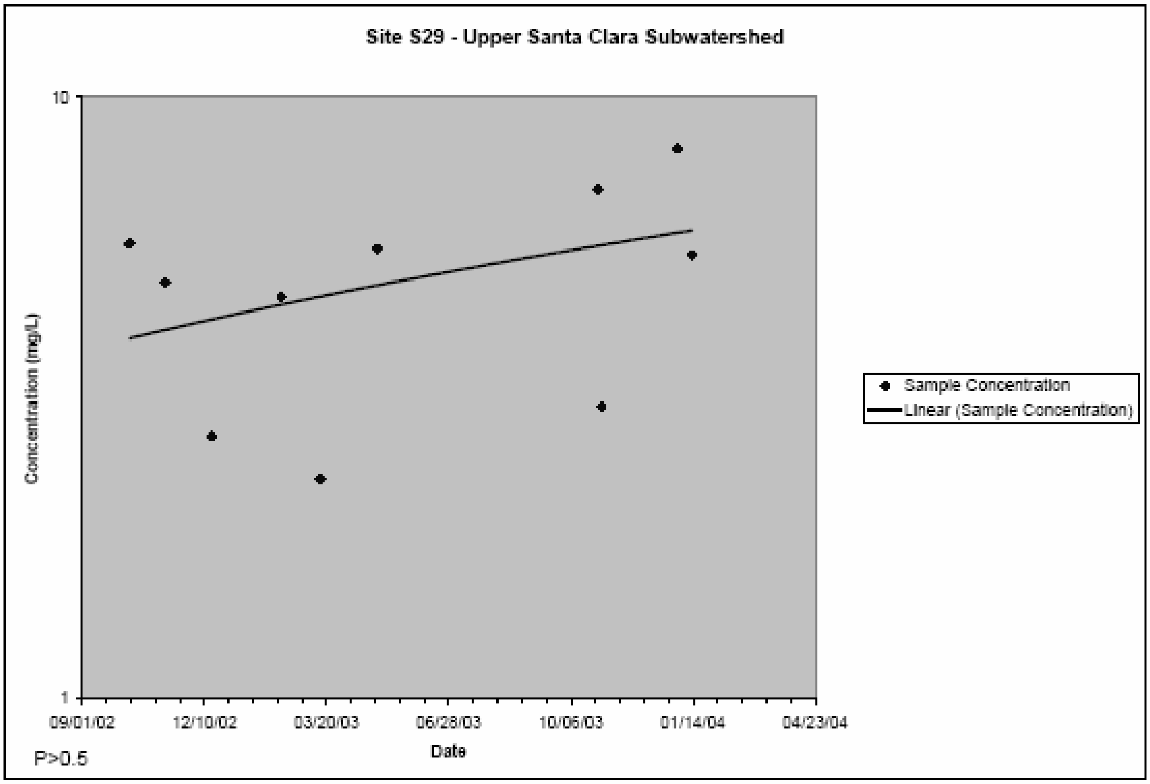
Source: AMEC 2006.

FIGURE 2.8-1b
SUMMARY OF SULFATE CONCENTRATIONS OVER TIME



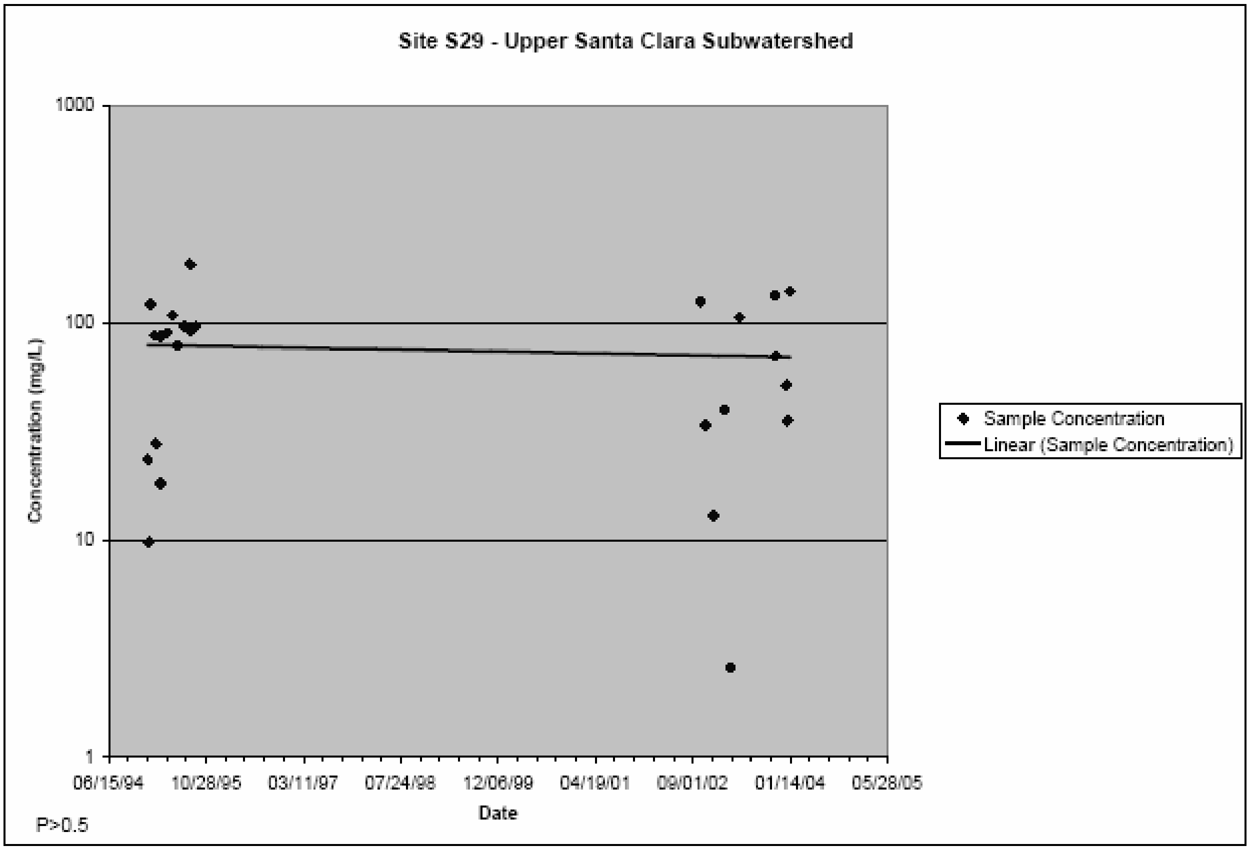
Source: AMEC 2006.

FIGURE 2.8-1c
SUMMARY OF NITRATE CONCENTRATIONS OVER TIME



Source: AMEC 2006.

FIGURE 2.8-1d
SUMMARY OF CHLORIDE CONCENTRATIONS OVER TIME



Source: AMEC 2006.

2.8.5.3.1 Groundwater Quality – Alluvial Aquifer

Groundwater quality is a key factor in assessing the Alluvial Aquifer as a municipal and agricultural water supply. In terms of the aquifer system, there is no convenient long-term record of water quality (i.e., water quality data in one or more single wells) that spans several decades and continues to the present. Thus, in order to examine a long-term record of water quality in the Alluvium, individual records have been integrated from several wells completed in the same aquifer materials and in close proximity to each other to examine historical trends in general mineral groundwater quality throughout the subbasin. Based on these records of groundwater quality, wells within the Alluvium have experienced historical fluctuations in concentrations of TDS, as well as corresponding fluctuation of individual constituents of TDS. In general, however, there has been no long-term trend toward groundwater quality degradation.

Water quality in the Alluvium generally exhibits an inverse correlation with precipitation and streamflow, with a stronger correlation in the easternmost portion of the subbasin, where groundwater levels fluctuate the most. Wet periods have produced substantial recharge of higher quality (low TDS) water, and dry periods have resulted in declines in groundwater levels, with a corresponding increase in TDS (and individual contributing constituents) in the deeper parts of the Alluvium. The aquifer varies from calcium bicarbonate character in the east to calcium sulfate character in the west. Nitrate levels decline in the west and TDS levels increase (Los Angeles RWQCB 2006).

2.8.5.3.2 Groundwater Quality – Saugus Formation

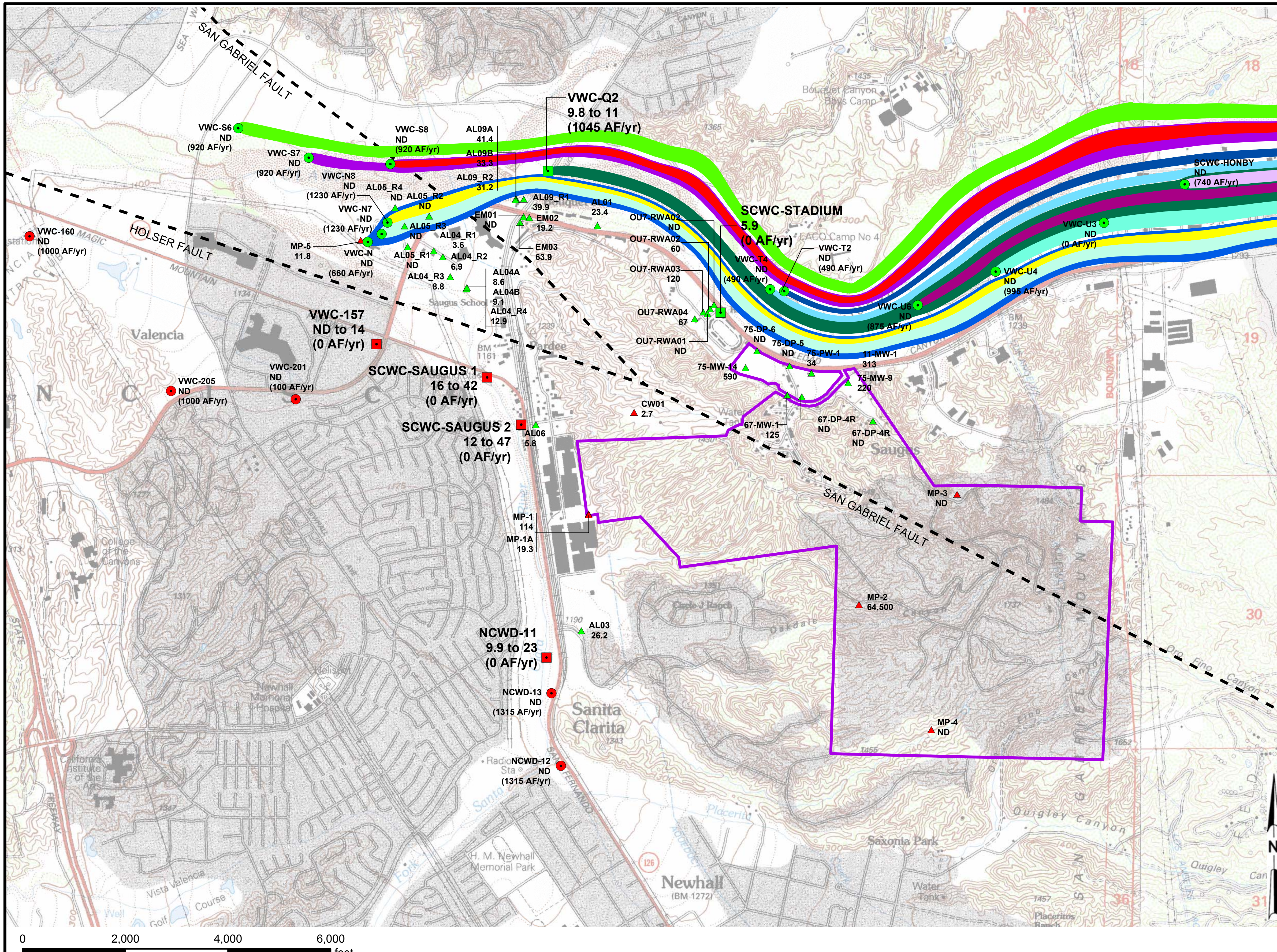
Due to the much more limited number of wells and the limited spatial extent of groundwater development in the Saugus Formation, long-term groundwater quality data are not sufficiently extensive to permit any sort of basin-wide analysis or assessment of pumping-related impacts on quality. Based on the most complete historical record (over the last 35 years) however, groundwater quality in the Saugus has remained generally constant. The Saugus Formation is, on a groundwater quality basis, a viable agricultural and municipal water supply (CLWA 2003a). The aquifer varies from calcium bicarbonate character in the southeast to calcium sulfate character in the center, and calcium bicarbonate in the west. TDS ranges from 500 to 900 mg/L (Los Angeles RWQCB 2006).

2.8.5.3.3 Groundwater Contamination (Perchlorate)

The most notable groundwater quality issue in the basin centers around the detection and impact of perchlorate on several Saugus and one Alluvial well in the central part of the basin near the location of the former Whittaker-Bermite facility. Perchlorate was originally detected in four Saugus wells operated by the retail water purveyors in the eastern part of the Saugus Formation in 1997. Since then, the four Saugus municipal supply wells have been out of water supply service. While the inactivation of those wells does not limit the ability of the purveyors to meet water demands, there is an ongoing effort to restore impacted pumping capacity and contain potential perchlorate migration in the Saugus Formation.

In 2002, one Alluvial well located near the former Whittaker-Bermite facility was inactivated for municipal water supply due to detection of perchlorate slightly below the Notification Level. In early 2005, perchlorate was detected in a second Alluvial well, VWC's Well Q2. In response, VWC removed the well from active service and commissioned an analysis and report assessing the impact of, and response to, the perchlorate contamination of that well. In 2006, a perchlorate removal treatment facility was installed and became operational, and the well was returned to service. Another well, VWC Well V-157 was permanently closed and replaced with the construction of new Saugus Well V-206 located in an area of the Saugus Formation not impacted by perchlorate. Currently, four wells (Saugus 1 and 2, NC-11, and Stadium well) remain temporarily offline due to perchlorate contamination. Locations of the impacted wells, and other nearby non-impacted wells, relative to the Whittaker-Bermite site are shown on Figures 2.8-2 and 2.8-3. The local retail water purveyors continue to test for perchlorate in active water supply wells near the Whittaker-Bermite site, and there has been no additional detection of perchlorate in any other municipal well.

This Page Intentionally Left Blank.



LEGEND

CONTAMINATED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

UNCONTAMINATED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELL

- ALLUVIUM
- SAUGUS

TWO-YEAR GROUNDWATER CAPTURE ZONE

- SCWC-HONBY
- VWC-N
- VWC-N7
- VWC-N8
- VWC-Q2
- VWC-S6
- VWC-S7
- VWC-S8
- VWC-T2
- VWC-T4
- VWC-U4
- VWC-U6
- WHITTAKER-BERMITE PROPERTY BOUNDARY

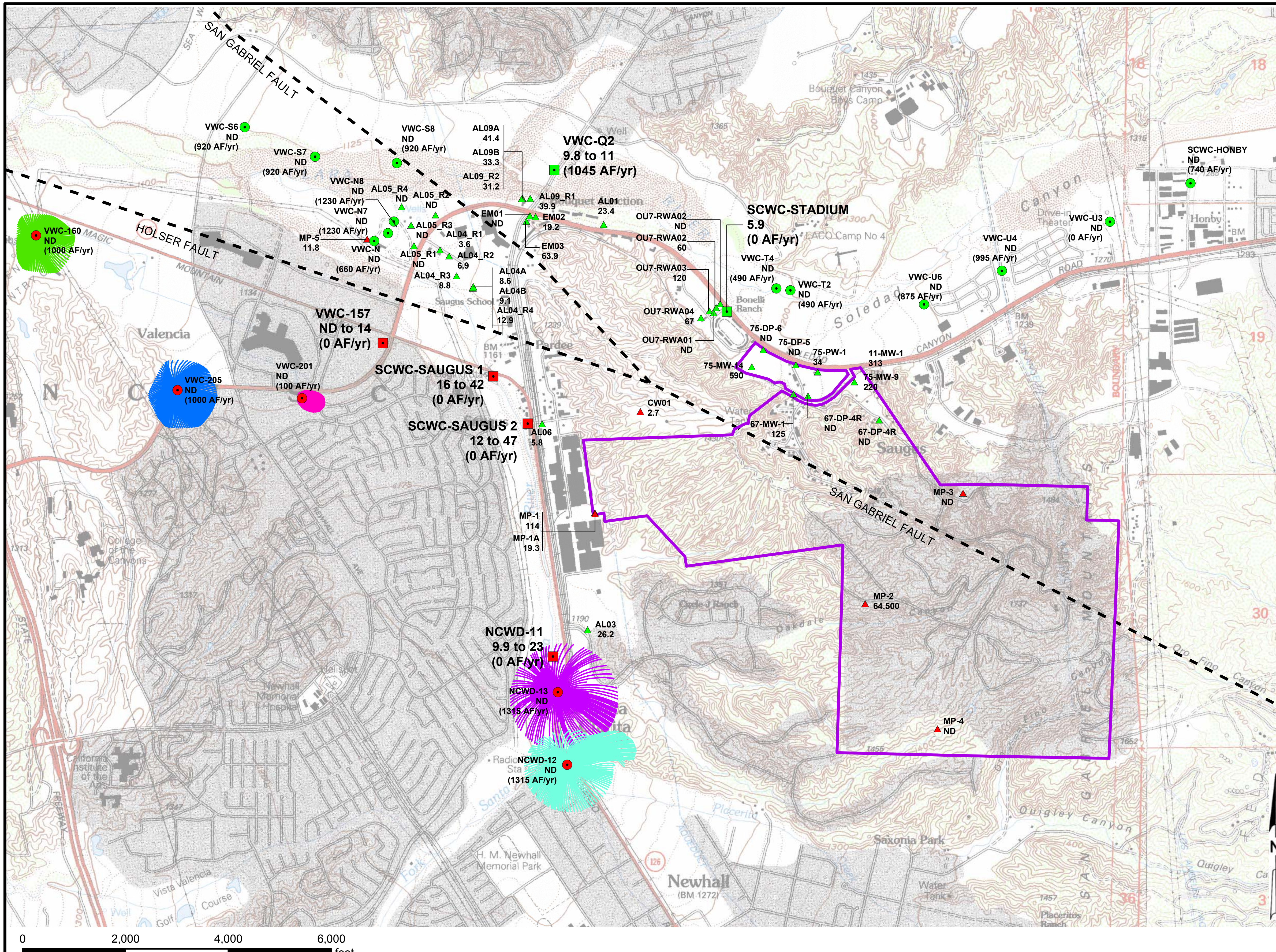
NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. PUMPING VALUES IN PARENTHESES ARE ANNUAL PUMPING VOLUMES
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; AF/yr = acre feet per year
5. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND 0.05 IN THE SAUGUS FORMATION.

FIGURE 2.8-2
FORECASTED TWO-YEAR GROUNDWATER CAPTURE ZONES FOR ACTIVE ALLUVIAL PRODUCTION WELLS LOCATED CLOSEST TO THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

CH2MHILL

RDD \\ODIN\PROJ2\55\SANTACLARITA_MOU\FIGURES\MXD\OCT2005\FIG5-01.MXD FIG05-01.PDF 10/7/2005 09:38:39



LEGEND

CONTAMINATED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

UNCONTAMINATED PRODUCTION WELL

- ALLUVIUM
- SAUGUS

MONITORING WELL

- ALLUVIUM
- SAUGUS

TWO-YEAR GROUNDWATER CAPTURE ZONE

- NC-12
- NC-13
- VWC-160
- VWC-201
- VWC-205
- WHITTAKER-BERMITE PROPERTY BOUNDARY

NOTES:

1. VALUES PRESENTED UNDER WELL SYMBOLS REPRESENT PERCHLORATE CONCENTRATION IN GROUNDWATER (µg/L).
2. PUMPING VALUES IN PARENTHESES ARE ANNUAL PUMPING VOLUMES.
3. ND = PERCHLORATE NOT DETECTED IN GROUNDWATER SAMPLE.
4. µg/L = MICROGRAMS PER LITER; AF/yr = acre feet per year
5. FLOWPATHS ARE DELINEATED USING AN EFFECTIVE POROSITY OF 0.10 IN THE ALLUVIAL AQUIFER AND 0.05 IN THE SAUGUS FORMATION.

FIGURE 2.8-3
FORECASTED TWO-YEAR GROUNDWATER CAPTURE ZONES FOR ACTIVE SAUGUS PRODUCTION WELLS LOCATED CLOSEST TO THE WHITTAKER-BERMITE PROPERTY
SANTA CLARITA, CALIFORNIA

CH2MHILL

2.8.6 Water Quality Impacts on Reliability

The detection of perchlorate in Valley groundwater supplies has raised concerns over the reliability of those supplies, in particular the Saugus Formation, where four wells have been removed from active service as a result of perchlorate. Planning for remediation of the perchlorate and restoration of the impacted well capacity is substantially underway. While that work is being completed, non-impacted production facilities can be relied upon for the quantities of water projected to be available from the Alluvial Aquifer and Saugus Formation during the time necessary to restore perchlorate-impacted wells. CLWA, the local retail water purveyors, the California Department of Toxic Substances Control (DTSC), and the US ACE continue to work closely on the perchlorate contamination issue.

2.8.6.1 Restoration of Perchlorate Impacted Water Supply

Since the detection of perchlorate in 1997, CLWA and the retail water purveyors have recognized that one element of an overall remediation program would most likely include pumping from impacted wells, or from other wells in the immediate area, to establish hydraulic conditions that would control the migration of contamination from further impacting the aquifer in a downgradient (westerly) direction. Thus, CLWA and the retail water purveyors expect that the overall perchlorate remediation program could include dedicated pumping from some or all of the impacted wells, with appropriate treatment, such that two objectives could be achieved. The first objective is control of subsurface flow and protection of downgradient wells, and the second is restoration of some or all of the contaminated water supply. Not all impacted capacity is required for control of groundwater flow. The remaining capacity would be replaced by construction of replacement wells at non-impacted locations.

In cooperation with state regulatory agencies and investigators working for Whittaker-Bermite, CLWA and the local retail water purveyors developed an off-site plan that focuses on the concepts of groundwater flow control and restored pumping capacity and is compatible with on-site and possibly other off-site remediation activities. Specifically relating to water supply, the plan includes the following:

Perchlorate Treatment Project

- Constructing and operating a water treatment process that removes perchlorate from two impacted wells such that the produced water can be used for municipal supply.
- Hydraulically containing the perchlorate contamination that is moving from the Whittaker-Bermite site toward the impacted wells by pumping the wells at rates that will capture water from all directions around them.
- Protecting the down gradient non-impacted wells through the same hydraulic containment that results from pumping two of the impacted wells.

- Restoring the annual volumes of water pumped from the impacted wells before they were inactivated and also restoring the wells' total capacity to produce water in a manner consistent with the retail water purveyors' operating plan for groundwater supply described above.

Under the current schedule for implementation of the plan to restore contaminated water supply (wells), construction started in 2007 and treatment should start in December 2008. Included in the schedule is a planned extended test of the wells that will be returned to service as part of restoring contaminated water supply, and that will also be operated to extract contaminated water and control the migration of contamination in the aquifer. Concurrent with the testing of the wells, several specific ion exchange resins will also be tested to evaluate their performance and longevity.

In light of the preceding, with regard to the adequacy of groundwater as the local component of water supply in this plan, the impacted capacity will remain unavailable through 2008, during which time the non-impacted groundwater supply will be sufficient to meet near-term water requirements. Afterwards, the total groundwater capacity will be sufficient to meet the full range of normal and dry-year conditions as provided in the operating plan for groundwater supply.

Returning the contaminated Saugus wells to municipal water supply service by installing treatment requires issuance of permits from DPH before the water can be considered potable and safe for delivery to customers. The permit requirements are contained in DPH Policy Memo 97-005 for direct domestic use of impaired water sources. Before issuing a permit to a water utility for use of an impaired source as part of the utility's overall water supply permit, DPH requires that studies and engineering work be performed to demonstrate that pumping the wells and treating the water will be protective of public health for users of the water. Policy Memo 97-005 requires that DPH review the local retail water purveyor's plan, establish appropriate permit conditions for the wells and treatment system, and provide overall approval of returning the impacted wells to service for potable use. Ultimately, the implementation of the plan and the DPH requirements are intended to ensure that the water introduced to the potable water distribution system has no detectable concentration of perchlorate.

The DPH Policy Memo 97-005 requires, among other things, the completion of a source water assessment for the impacted wells intended to be returned to service. The purpose of the assessment is to determine the extent to which the aquifer is vulnerable to continued migration of perchlorate and other contaminants of interest from the Whittaker-Bermite site. The assessment includes the following:

- Delineation of the groundwater capture zone caused by operating the impacted wells
- Identification of contaminants found in the groundwater at or near the impacted wells
- Identification of chemicals or contaminants used or generated at the Whittaker-Bermite facility
- Determination of the vulnerability of pumping the impacted wells to these contaminant sources

CLWA is currently working directly with the retail water purveyors and consultants on development of the DPH Policy Memo 97-005 permit application. Two coordination workshops have already been held. Drafts of all six elements of Policy Memo 97-005 have been submitted to DPH and the retail purveyors for review, including: the Source Water Assessment; Raw Water Quality Characterization; Source Protection Plan; Effective Monitoring and Treatment Evaluation; Human Health Risk Assessment; and the Alternatives Sources Evaluation. The CEQA process for the *CLWA Groundwater Containment, Treatment, and Restoration Project*, for which the 97-005 process is being conducted, was completed in August 2005.

CLWA's efforts have included the development of a model used to simulate the capture and control of perchlorate by restoring impacted wells, with treatment. The modeling analysis indicates that the pumping of impacted wells SCWD-Saugus 1 and SCWD-Saugus 2 on a nearly continual basis will effectively contain perchlorate migrating westward in the Saugus Formation from the Whittaker-Bermite property. The analysis also indicates that (1) no new production wells are needed in the Saugus Formation to meet the perchlorate containment objective, (2) impacted well NCWD-11 is not a required component of the containment program, and (3) pumping at SCWD-Saugus 1 and SCWD-Saugus 2 is necessary to prevent migration of perchlorate to other portions of the Saugus Formation.

The perchlorate containment report also includes the general design of a sentinel groundwater monitoring network and program required by DPH as part of its Policy Memo 97-005 permitting process. The perchlorate containment report was approved by DTSC in November 2004. With that approval, the model is now being used to support the source water assessment and the balance of the DPH permitting process.

2.9 Water Demand

A summary of the Region's historical water demand, as summarized in the CLWA 2005 UWMP, is provided in Figure 2.9-1. The Figure illustrates the steady increase in water demand since 1980. This figure does not include private pumping within the County because private pumping data is not available.

Table 2.9-1 presents the historical accounts and deliveries by retail purveyor since 1990 for the Region. The type of customer accounts included in the table are single family homes, multi-family homes, commercial, industrial, institutional/government, and landscape.

FIGURE 2.9-1
HISTORICAL ANNUAL TOTAL DEMAND
(includes Agricultural Demand/Private Uses)

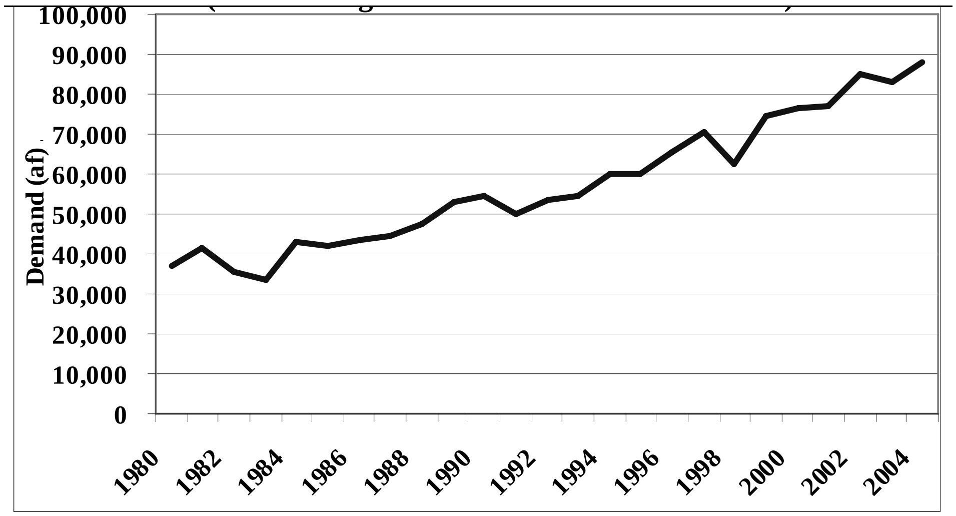


TABLE 2.9-1
HISTORICAL ACCOUNTS AND DELIVERIES BY RETAIL PURVEYORS (AF)

Purveyor		1990	1992	1994	1996	1998	2000	2002	2004
CLWA	No. accounts	18,550	19,000	19,400	19,650	20,300	21,970	24,175	26,161
SCWD	Deliveries (AF)	18,503	17,551	19,911	22,006	20,319	25,280	28,434	29,191
LACWWD	No. accounts	706	736	752	768	774	972	1,200	1,300
No. 36	Deliveries (AF)	513	456	500	533	578	758	1,071	1,302
	No. accounts	6,039	6,230	6,373	6,475	6,726	7,434	7,941	8,970
NCWD	Deliveries (AF)	7,813	7,973	7,754	8,916	8,782	9,623	9,869	10,555
	No. accounts	13,965	14,520	15,359	17,009	19,389	21,661	24,453	27,238
VWC	Deliveries (AF)	16,572	15,338	17,390	19,721	19,874	25,190	28,360	30,682
LACWWD	No. accounts	818	913	949	979	1,010	1,097	1,155	1,312
No. 37	Deliveries (AF)	1,355	1,369	1,655	1,880	1,718	2,423	2,773	2,613
	No. accounts	**39,260**	**40,486**	**41,884**	**43,902**	**47,189**	**52,037**	**58,924**	**63,669**
Total	**Deliveries (AF)**	**43,401**	**41,318**	**45,555**	**51,176**	**49,553**	**60,851**	**70,507**	**71,730**

2.9.1 Projected Demand

The CLWA 2005 UWMP utilized existing land use data and new housing construction information to project water demands in the CLWA service area. Table 2.9-2 summarizes the projected water demands for the CLWA service area. It is anticipated that these projected demands can be met using the water supplies described above, in both wet and dry years. Because private pumping data is not available, this table includes an estimate of private pumping based on the Census data population and the projected per capita demands in Table 2-9.3.

2.9.2 Comparison to City and County Planning

Comparison of the purveyor-projected growth in water demand was made against the growth projections provided by local land use planning agencies. Table 2.9-2 provides the projected water demand estimates for the Region to 2030. Table 2.5-1 (provided earlier) shows growth projections resulting from the joint OVOV planning effort by the City of Santa Clarita and the Los Angeles County Department of Regional Planning.

TABLE 2.9-2
PROJECTED WATER DEMANDS (AF)

	Water Demand (AFY)					
Purveyor	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
CLWA SCWD	30,400	35,000	39,100	43,100	47,100	51,100
LACWWD No. 36	1,3000	1,600	1,800	2,000	2,400	2,800
NCWD	11,800	14,400	16,000	17,700	19,300	21,000
VCW	30,200	35,100	40,200	43,700	50,600	54,400
LACWWD No. 37[(a)]	2,300	2,700	3,100	3,500	3,900	4,400
SPVMWC[(d)]	50	50	50	50	50	50
Total Purveyors	**87,750**	**88,850**	**100,250**	**110,050**	**123,350**	**133,750**
Acton Private Users[(a)]	1,500	1,900	2,300	2,700	3,100	3,500
Agua Dulce Private Users[(a)]	1,800	2,100	2,400	2,700	3,000	3,300
Agua Dulce Winery and Vineyard[(a)]	60	60	60	60	60	60
Other Private Users[(b)]	2,300	2,300	2,300	2,300	2,400	2,400
Other Agricultural Users[(b)]	9,940	7,590	5,240	2,890	440	0
Total (w/out Conservation)	**103,350**	**102,800**	**112,550**	**120,700**	**132,350**	**143,000**
Conservation[(c)]	(8,800)	(8,900)	(10,000)	(11,000)	(12,300)	(13,400)
Total (w/Conservation)	**94,550**	**106,010**	**102,550**	**109,700**	**120,050**	**129,600**

Source: CLWA 2005
Notes:
(a) Source: Acton-*Aqua Dulce Conceptual Master Plan for Water Facilities* 2004. Assumes build-out would occur in 2030 with an even growth rate throughout the planning period.
(b) Ag/Private pumping are estimates based on Census data and the CLWA 2005 UWMP.
(c) Conservation assumed to be 10 percent of total purveyor demand.
(d) Estimate from Slade 2004.

The OVOV task force used data provided by the SCAG Regional Transportation Plan, the State Department of Finance, and the Employment Development Department. The annual rate of growth was then examined to determine if the projected water demand was in accordance with the purveyors' projected growth.

In Table 2.5-1, the OVOV projections indicate a 1.6 percent annual growth rate of population and households for the City of Santa Clarita, and 3.7 to 3.8 percent annual growth rate for the Valley Unincorporated Area. This results in a combined growth rate of 2.3 to 2.4 percent, which is comparable to the purveyors' projected annual growth rate in water demand of 2.1 percent shown in Table 2.9-2.

Table 2.9-3 summarizes the projected Valley water use per household in AF and in gallons per capita per day (gpcd). The data developed in this table is derived from the total annual demand projections provided in Table 2.9-2 divided by the projected annual populations and by the projected annual households provided in Table 2.5-1. Since the forecast growth is based on households and population, it is not possible to obtain a direct match to number of service connections and water use per connection. However, based on 2005 population and water demand, the current estimated water use is 264 gpcd. The projected water use of 270 gpcd in 2030 remains very close to the 2005 water use of 264 gpcd, thus demonstrating that water demand and projected growth track closely. The term “household” is a term used by OVOV and does not equate to a single family residence.

TABLE 2.9-3
PROJECTED HOUSEHOLD WATER USE

Projected Water Use	2005	2010	2015	2020	2025	2030
Water Use (AF/household)[a]	0.97	0.95	0.95	0.93	0.95	0.94
Water Use (gpcd)[b]	264	255	258	258	267	270

Notes:
(a) Based on dividing the total annual demand projections provided in Table 2.9-1 by the projected annual households provided in Table 2.9-2.
(b) Based on dividing the total annual demand projections (converted from AF to gpd) provided in Table 2.9-1 by the projected annual populations provided in Table 2.5-1.

Table 2.9-4 presents a summary of the comparison between the purveyors and OVOV demand projections. The projected demand by the purveyors varies from -0.20 percent to 5.62 percent of the water demand determined based on the OVOV population projections. This demonstrates that the purveyors’ projections track closely with the anticipated growth projected by OVOV.

TABLE 2.9-4
COMPARISON OF PURVEYOR AND OVOV DEMAND PROJECTIONS

	Demand (AF)					
Projection	2005	2010	2015	2020	2025	2030
Purveyor[a]	73,700	86,100	97,100	106,500	119,400	129,300
OVOV[b]	75,136	90,936	101,288	111,100	120,350	129,035
Difference	1,436	4,836	4,188	4,600	950	(264)
Percent Difference	1.95%	5.62%	4.31%	4.32%	0.80%	-0.20%

Source: CLWA 2005.
Notes:
(a) Demand projections based on total purveyor projections provided in Table 2.9-2.
(b) Demand projections based on 269 gpcd multiplied by OVOV population projections provided in Table 2.5-1.

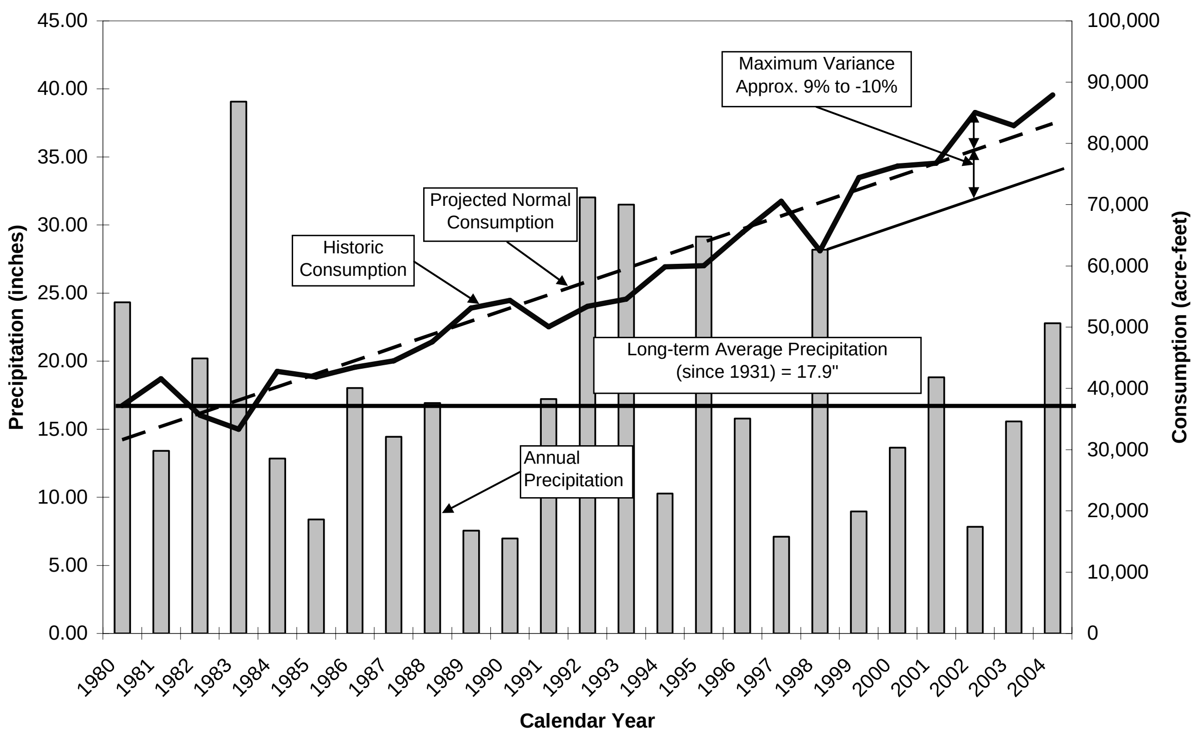
2.9.3 Other Factors Affecting Water Demands

Two major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water usage increases. The amount of increase varies according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool-wet years, historical water usage has decreased to reflect less water usage for external landscaping. Water conservation measures employed within the CLWA's and purveyors' service areas have a direct long-term effect on water usage. Both of these factors are discussed below in detail.

2.9.3.1 Weather Effects on Water Usage

Historically, about 605 to 1,110 gallons of water are consumed daily for urban uses for every household in the CLWA's and purveyors' service areas. Most of this range in water use is due to seasonal weather variations. As presented on Figure 2.9-2, the historical water use from 1980 to 2004 fluctuated principally due to weather, with the maximum variance around the projected normal of approximately nine percent higher use in hot, dry years to approximately 10 percent lower use in cool, wet years.

FIGURE 2.9-2
WEATHER EFFECTS ON WATER USAGE



2.9.3.2 Conservation Effects on Water Usage

In recent years, water conservation has become an increasingly important factor in water supply planning in California. The California plumbing code has instituted requirements for new construction that mandate the installation of ultra low-flow toilets and low-flow showerheads. CLWA and the purveyors have developed water conservation measures that include public information and education programs. CLWA funds a toilet replacement program and, through its connection fee program, has provided financial incentives to developers for good water management practices.

During the 1987 through 1992 drought period, overall water requirements due to the effects of hot, dry weather were projected to increase by approximately 10 percent. As a result of extraordinary conservation measures enacted during the period, the overall water requirements actually decreased by more than 10 percent.

Residential, commercial, and industrial usage can be expected to decrease as a result of the implementation of more aggressive water conservation practices. As previously discussed, the greatest opportunity for conservation is in developing greater efficiency and reduction in landscape irrigation. The irrigation demand can represent as much as 50 percent of the water demand for residential customers depending upon lot size and amount of irrigated turf and plants. It is assumed that conservation will result in a long-term 10 percent reduction of demand from residential, industrial, and commercial uses.

2.10 Watershed Flood Management Problems and Issues

The Upper Santa Clara River is a large ephemeral stream that comprises the headwaters for the Santa Clara River system. The morphology of the river changes along its course.

The river originates as a typical mountain stream with a relatively narrow channel incised into hard bedrock that formed the local mountains. It has a straight to meandering channel pattern, and characteristic channel bedforms represented by a sequence of bars, riffles and pools. The bars are accumulations of the bed material positioned successfully downriver on the opposite sides of the channel. The pools are deep zones located directly opposite the bars, and the riffles are the shallow zones between the pools. The coarsest material is deposited in the bars. In alluvial channels, often a coarse-grained lag is left on the riffle, and fine-grained material is deposited in the pool.

As the river exits the confinement of the mountains, it has a typical braided stream geomorphology characterized by the frequently shifting network of channels and the intervening bars, the broad floodplain area, and typical braided stream deposits composed of coarse sediment ranging in size from coarse sand to boulder. In arid and semiarid climates, the morphology of such streams is controlled by stormwater flows originating in highland areas and due to storms of short duration and great intensity in rainfall usually considered as flash floods in this area (UWCD and CLWA 1996). Such braided rivers typically transport large volumes of bedload. It is believed by fluvial geomorphologists that bank erosion is the most necessary factor in creating braided stream systems.

As the Upper Santa Clara River enters the mountains, it narrows down into a single channel, and as it exits, it becomes distinctly braided. The following detailed narrative is modified from the 1996 *Water Resources Report* (UWCD and CLWA 1996). In the area where the river system exits Aliso Canyon and Soledad Pass, the morphology of the river is broad and flat. In Aliso Canyon the width of the 500-year floodplain ranges from 400 to 600 feet and drains to the north. As the river exits Aliso Canyon, it abruptly turns to the west and the floodplain widens to a width of approximately 2,000 feet near Acton. At Acton, the river channel abruptly turns south, and the floodplain narrows down to a width ranging between 600 and 800 feet across as it enters Soledad Canyon near Ravenna. Leaving the canyon just east of State Highway 14 at Soledad, the river traverses across the Santa Clara River Valley East Subbasin. There, it becomes broad and shallow, and displays typical braided stream geomorphological features, such as point bar deposits, gravelly stream bottoms, and broad wide washes that contain an abundant coarse-size material (sand, gravel, cobble and boulder). The 500-year floodplain formed along this reach of the river contains mostly fine sediment (silt and clay) and varies from about 1,000 to 2,000 feet wide. As the river enters the main Santa Clarita Valley at Bouquet Canyon Road, it is joined by the tributary in San Francisquito Canyon that displays a similar morphology. As the river passes through the west-northwest trending valley, the width of the floodplain abruptly narrows to about 500 feet before reaching Interstate-5. Castaic Creek enters the Santa Clara River from the north at the Castaic Junction area, and the river course continues in the southwestern direction. The width of the floodplain ranges between about 800 feet and 3,000 feet along this reach to the Los Angeles-Ventura County Line (VCWPD and LACDPW 2005). Major drainage infrastructure is shown on Figure 2.10-1.

Major flood events occurred during the winters of 1969 and 1983. Two storm events occurred in January and February 1969 (Los Angeles County Flood Control District 1969). During January 18 through January 26 there was a two-phase storm event. The other storm occurred from February 23 through 25. During the January 18 through 26 storm events, peak flow of 14,800 cubic feet per second (cfs) was recorded at F92-R, Santa Clara River at Old Highway Bridge which was considerably less than February peak flow. During the February storm event, the associated rainfall in the Santa Clara River Valley caused peak flows which exceeded the maximum of record. In the Santa Clara River drainage, at Station F92-R below the Golden State Freeway, the peak flow of 31,800 cfs exceeded all previous peaks of record, including the maximum of 24,000 cfs set in 1938. Problems encountered in the Valley were much greater during the February storm event than the January event, and the damage was caused mostly by degradation rather than debris deposition. In this area, high flows caused severe erosion of watercourses and the destruction of many bridges and improvements along these watercourses. Serious erosion at the south abutment of the Golden State Freeway (Interstate-5) Bridge at the Santa Clara River forced the closure of the freeway.

Los Angeles County Flood Control District Facility

During the February storm, damage in the Valley was due mainly to erosion which occurred in the unimproved drainages. Significant among these damages was the destruction of the Africa-USA zoological compound located in the Santa Clara River floodplain near the eastern end of the Valley. The facilities of this private firm were badly damaged and 12 valuable animals that were faced with imminent drowning had to be destroyed. The total damage to Africa-USA was estimated to be $250,000. Considerable damage was caused in the Iron Canyon and Sand Canyon drainages as debris deposition blocked roads, plugged culverts, and damaged bridges. Throughout the rest of the Valley, miscellaneous flooding and erosion caused minor damage, including the destruction of 2,000 feet of waterline which served as the sole source of domestic water for the community of Val Verde.

This Page Intentionally Left Blank.

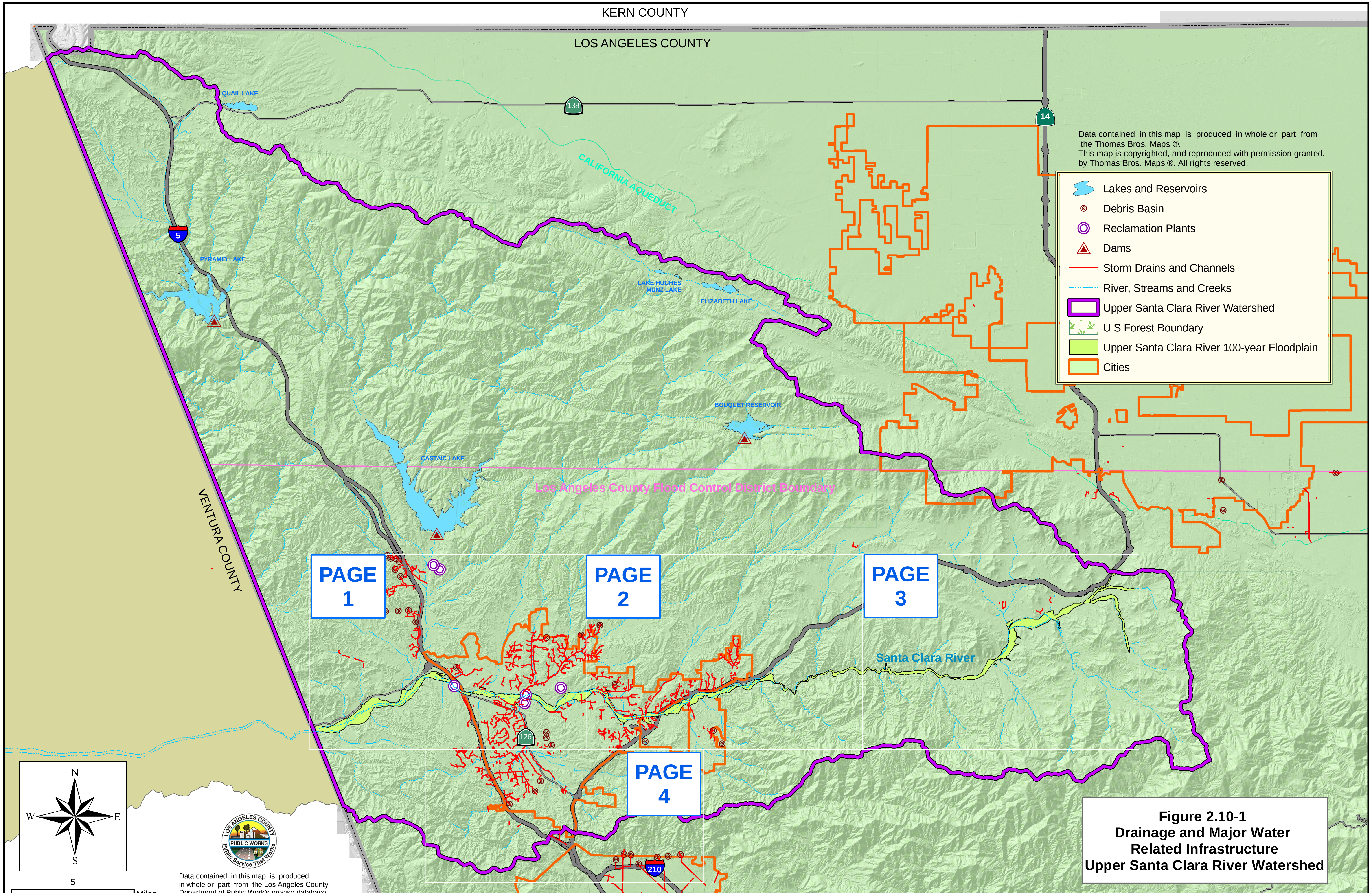


Figure 2.10-1
Drainage and Major Water Related Infrastructure
Upper Santa Clara River Watershed

PAGE 1

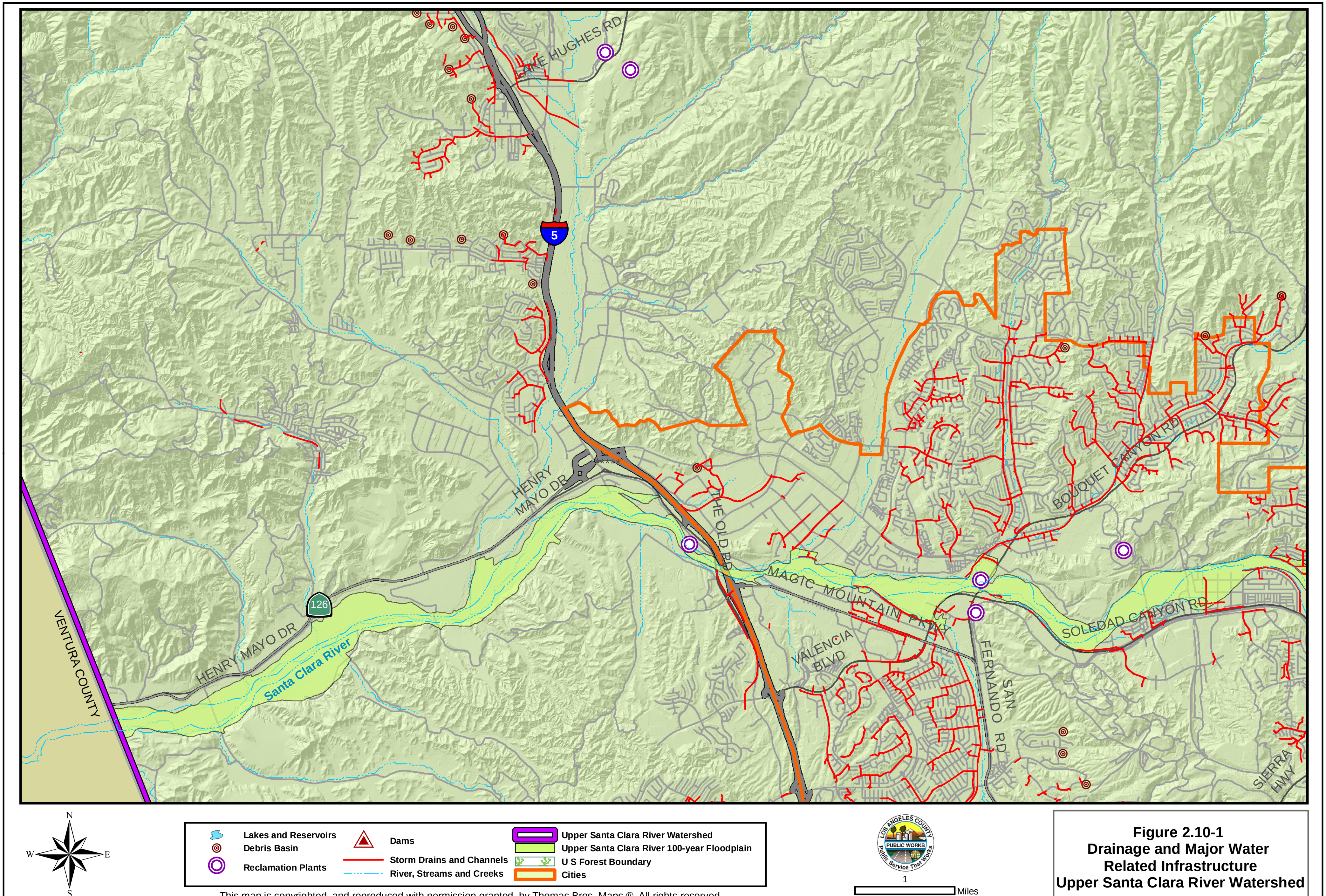
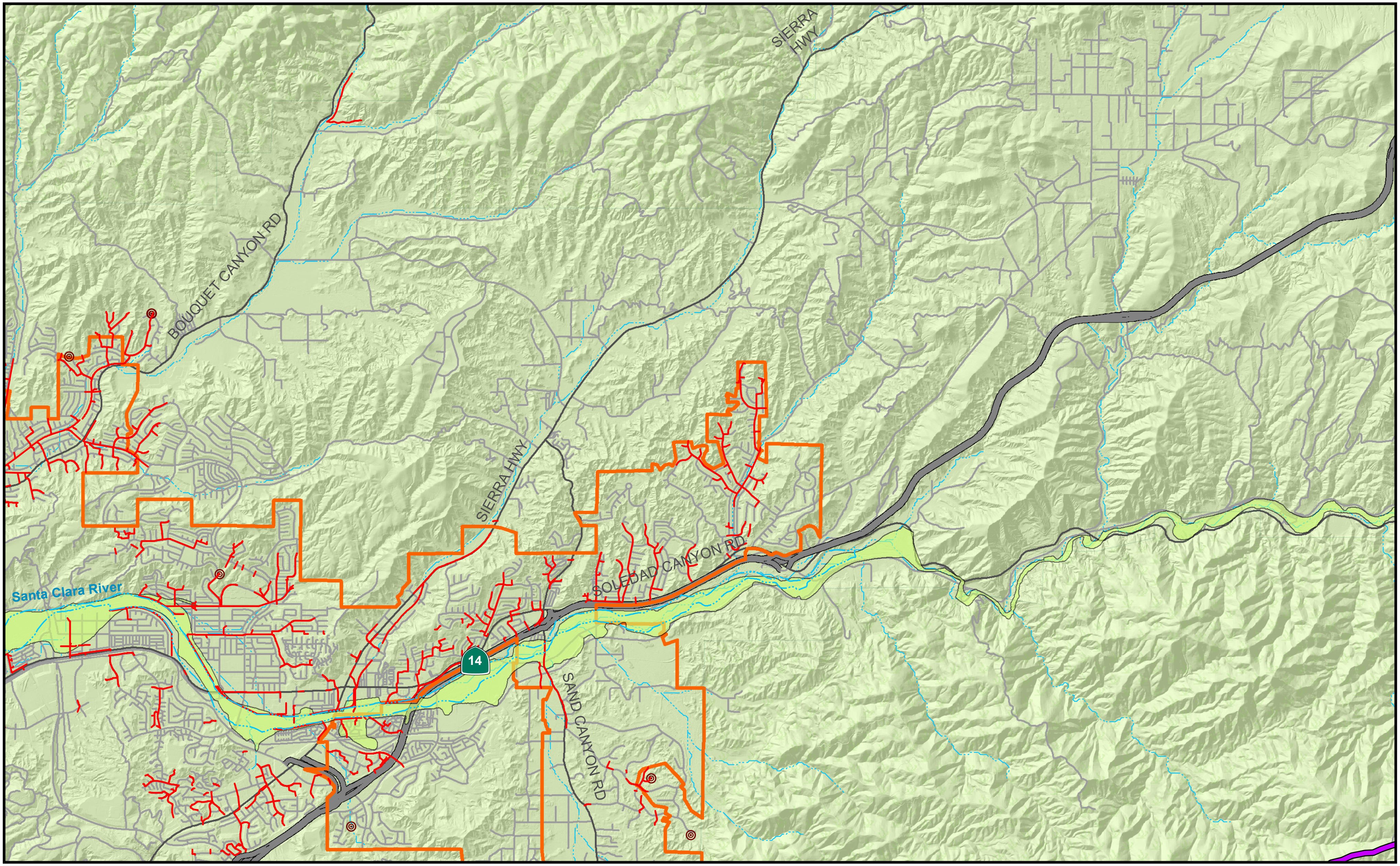


Figure 2.10-1
Drainage and Major Water Related Infrastructure
Upper Santa Clara River Watershed

PAGE 2



N
W
E
S

Lakes and Reservoirs
Debris Basin
Reclamation Plants
Dams
Storm Drains and Channels
River, Streams and Creeks
Upper Santa Clara River Watershed
U S Forest Boundary
Upper Santa Clara River 100-year Floodplain
Cities

1 Miles

Figure 2.10-1
Drainage and Major Water Related Infrastructure
Upper Santa Clara River Watershed

PAGE 3

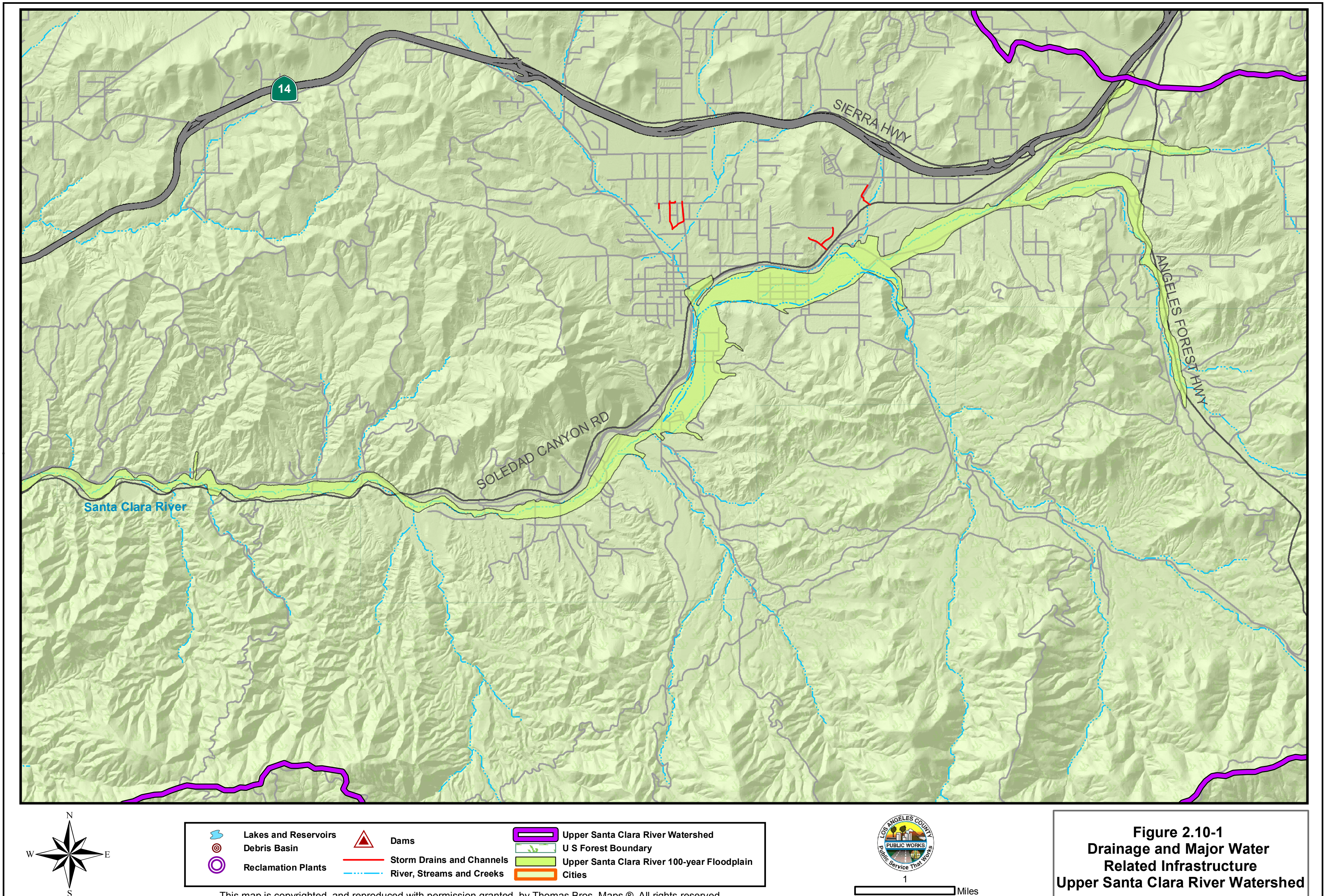


Figure 2.10-1
Drainage and Major Water Related Infrastructure
Upper Santa Clara River Watershed

PAGE 4

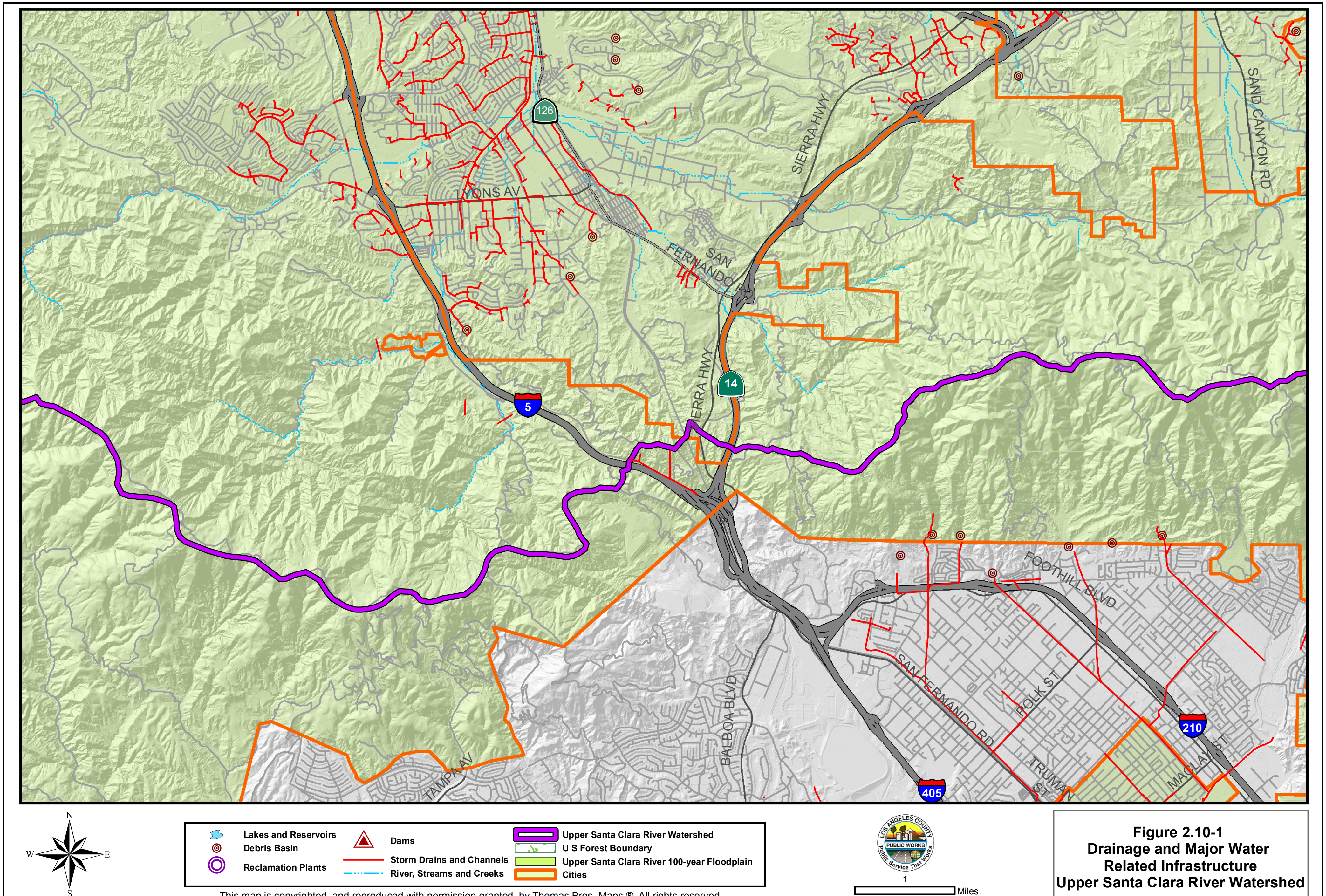


Figure 2.10-1
Drainage and Major Water Related Infrastructure
Upper Santa Clara River Watershed

The storm event of 1983 took place from February 26 to March 6 (Los Angeles County Flood Control District 1983). The County was hit by a series of storms which deluged more than 8 inches of rain on downtown Los Angeles and up to 26 inches in the San Gabriel Mountains. At the time, these events ranked that winter season as the city's fourth wettest in 110 years. While extensive flooding did not occur, several new records for rainfall and runoff were produced. The storm received added attention because of high surf which battered the coast and the $40 million in property damage to the County, along with the loss of six (6) lives. Many lowland and coastal areas were inundated with water, while the mountainous areas of the County experienced landslides and debris runoff. The damages occurred along natural watercourses, in canyons where no flood protection existed, to waterfronts, and to existing flood control facilities. Areas protected by the flood control system received insignificant damage. Damage to facilities along the Santa Clara River included: erosion of a reach of gunite lining in the vicinity of Landgard Road adjacent to the Southern Pacific Railroad tracks at a 90 degree curve which prevented use of the tracks; street and trunk sanitary sewer in Lost Canyon Road were severely damaged by meandering flows upstream of Sand Canyon Road; south approach to the Sand Canyon Road Bridge above the Santa Clara River was completely washed out, and flows destroyed underground and overhead utilities; the south approach to the Sierra Highway Bridge and some utilities were damaged; a carport and the utilities in a trailer park located on the north side of the river west of Sierra Highway were destroyed, and the parking area behind the pipe and wire revetment washed out; Soledad Canyon Road and Southern California Edison Company's main power lines (upstream of Bouquet Canyon Road) were damaged; the large structural steel power transmission tower west of the Golden State Freeway on Magic Mountain Parkway was toppled over by flows; the east approach to the Magic Mountain Parkway Bridge west of San Fernando Road was completely washed out; and a portion of the Bouquet Canyon concrete channel wall in the vicinity of Alamogordo Road and Bouquet Canyon Road was washed away, requiring emergency restoration work.

Figure 2.10-2 provides a summary of total runoff for the Santa Clara River at Old Road Bridge.

2.11 Major Water Related Infrastructure

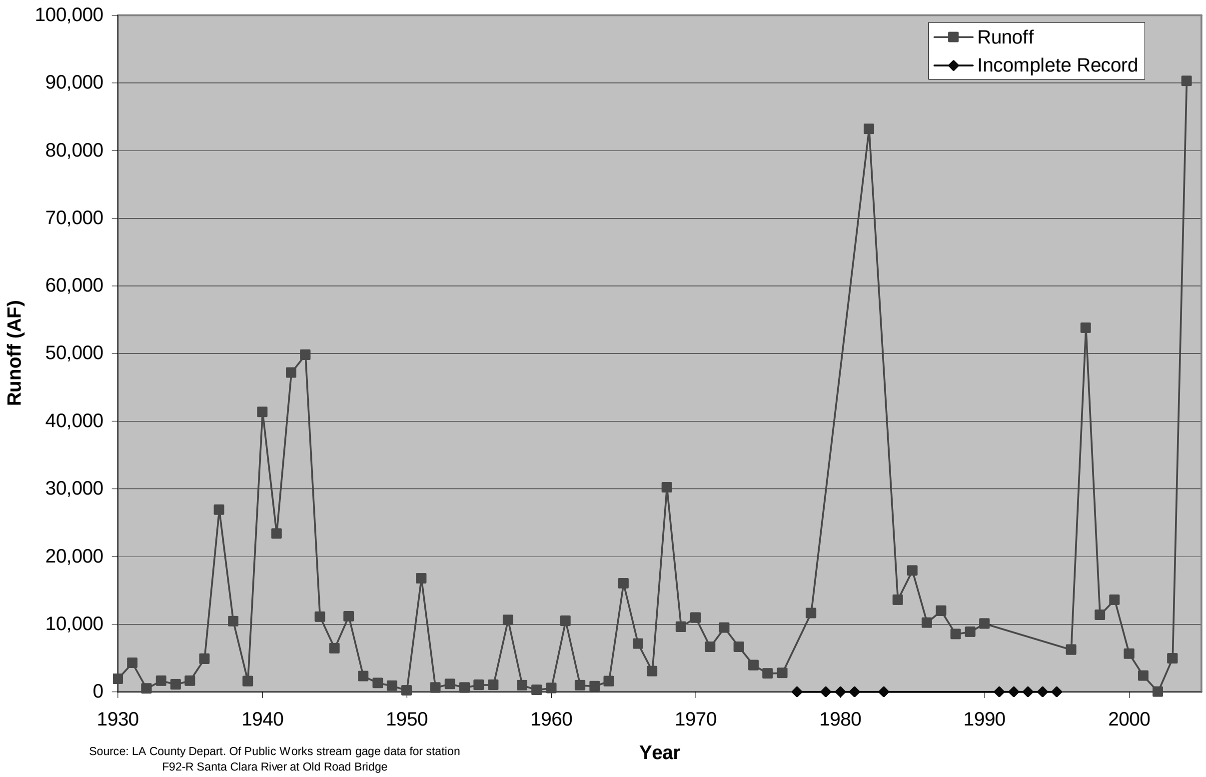
The following includes a discussion of the major water related infrastructure in the Region, shown in Figure 2.10-1.

2.11.1 State Water Project

The SWP is the largest state-built, multi-purpose water project in the country. It was authorized by the California State Legislature in 1959, with the construction of most initial facilities completed by 1973. Today, the SWP includes 28 dams and reservoirs, 26 pumping and generating plants, and approximately 660 miles of aqueducts. The primary water source for the SWP is the Feather River, a tributary of the Sacramento River. Storage released from Oroville Dam on the Feather River flows down natural river channels to the Sacramento-San Joaquin River Delta (Delta). While some SWP supplies are pumped from the northern Delta into the North Bay Aqueduct, the vast majority of SWP supplies are pumped from the southern Delta into the 444-mile-long California Aqueduct. The California Aqueduct conveys water along the west side of the San Joaquin Valley to Edmonston Pumping Plant, where water is pumped over the Tehachapi Mountains and the aqueduct then divides into the East and West branches. CLWA takes delivery of its SWP water at Castaic Lake, a terminal reservoir of the West Branch.

From Castaic Lake, CLWA delivers its SWP supplies to the local retail water purveyors through an extensive transmission pipeline system.

FIGURE 2.10-2
HISTORICAL RUNOFF FOR THE SANTA CLARA RIVER



2.11.2 Bouquet Reservoir and Los Angeles Aqueduct

Bouquet Reservoir is a reservoir about 15 miles west of Palmdale in the County. It is at an elevation of 2,993 feet in the Sierra Madre Mountains. The reservoir has a capacity of 36,500 AF and is formed by the Bouquet Canyon Dam on Bouquet Creek, which is a tributary of the Santa Clara River. The dam was built by the City of Los Angeles in 1934. The reservoir is apart of the Los Angeles Aqueduct system, which is what supplies most of its water. The Los Angeles Aqueduct system moves water from the Mono Basin and Owens Valley to the City of Los Angeles.

2.11.3 Metropolitan Water District Foothill Feeder

The Metropolitan Foothill Feeder is a pipeline that conveys SWP raw water from Castaic Lake to its terminus at the Joseph Jensen Filtration Plant in Granada Hills, located near the intersection of Balboa Boulevard and Interstate 5. The plant and feeder began operation in 1972. The feeder is capable of conveying up to 1,800 cfs of water, while the plant can treat up to 750 mgd. At the filtration plant, the Foothill Feeder control structure contains two hydroelectric power plants at 4.5 megawatts each. As the structure controls the water flow into the plant, the energy is harnessed and electricity is generated. Along the feeder, there are several blow-off structures that can release water into the Santa Clara River, Placerita Creek, San Francisquito Canyon, Charlie Canyon, and Castaic Lagoon.

2.11.4 Purveyor Water Infrastructure

CLWA owns and operates water conveyance pipelines and water treatment facilities to supply water delivered through the SWP to the four retail purveyors within its boundaries. DWR transports water via the California Aqueduct to Castaic Lake and releases water to the Agency through the outlet tower at Castaic Lake. The reservoir is a multiple use reservoir that is the terminal point of the west branch of the California Aqueduct, and it stores approximately 320,000 AF of water. The Agency's major facilities consist of the Earl Schmidt Intake Pump Station (ESIPS), the 56 mgd Earl Schmidt Filtration Plant (ESFP), the Rio Vista Intake Pump Station (RVIPS), the 30 mgd Rio Vista Water Treatment Plant (RVWTP), and a system of pipelines and ancillary facilities which convey treated water to the four (4) retail purveyors.

CLWA treats the imported water stored in Castaic Lake at either the ESFP or the RVWTP and delivers it to the water purveyors through a transmission system. The main transmission line, the Castaic Conduit, is located east of the Golden State Freeway, generally paralleling the Freeway and Magic Mountain Parkway from Castaic Lake to a point just north and west of Bouquet Junction where two (2) laterals begin. The Honby Lateral roughly follows the north side of the Santa Clara River to the east, where it crosses to the south to serve Saugus. Headed in a southerly direction, the Newhall Lateral parallels San Fernando Road to serve Newhall and Valencia. At the present time, CLWA delivers water to the purveyors through 11 turnouts, including those to SCWD.

This Page Intentionally Left Blank.