2015
Santa Clarita Valley
Water Report

Castaic Lake Water Agency
CLWA Santa Clarita Water Division
Los Angeles County Waterworks District 36
Newhall County Water District
Valencia Water Company

June, 2016

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

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ES EXECUTIVE SUMMARY

This annual report, which is the eighteenth in a series that began to describe water supply conditions in 1998, provides current information about the water requirements and water supplies of the Santa Clarita Valley (Valley). The report was prepared for the imported water wholesaler, Castaic Lake Water Agency (CLWA), and for the four local retail water purveyors (Purveyors) that serve the Valley: CLWA Santa Clarita Water Division, Los Angeles County Waterworks District 36, Newhall County Water District, and Valencia Water Company. These entities and representatives from the City of Santa Clarita and the County of Los Angeles Department of Regional Planning meet as required as the Santa Clarita Valley Water Committee to coordinate the management of imported water with local groundwater and recycled water to meet water requirements in the Valley.

This report provides information about local groundwater resources, State Water Project (SWP) and other imported water supplies, water conservation, and recycled water. The report reviews the sufficiency and reliability of supplies in the context of existing water demand, with focus on actual conditions in 2015, and it provides a short-term outlook of water supply and demand for 2016.

ES.1 2015 Water Requirements and Supplies

In 2015, total water requirements in the Valley were about 66,600 acre-feet (af), of which about 54,500 af (82 percent) were for municipal use and the remainder (12,100 af) was for agricultural and other (miscellaneous) uses, including individual domestic uses. Total demand in 2015 was almost eighteen percent lower than in 2014, and below what was estimated in the 2014 Water Report and the average projection in the 2010 Urban Water Management Plan (UWMP). Total water requirements in 2015 were met by a combination of about 42,000 af from local groundwater resources (about 29,900 af for municipal and about 12,100 af for agricultural and other uses), about 24,100 af of SWP and other imported water, and about 450 af of recycled water.

Of the 42,000 af of total groundwater pumping in the Valley in 2015, about 30,700 af were pumped from the Alluvium and about 11,300 af were pumped from the underlying, deeper Saugus Formation. Alluvial pumping in 2015 was about 6,200 af less than in 2014, and Saugus pumping was higher than in 2014, by about 700 af. Neither pumping volume resulted in any notable long term, overall change in groundwater conditions (water levels, water quality, etc.)

in either aquifer system. Imported water deliveries to the Purveyors decreased by about 9,000 af from the previous year. Water uses and supplies in 2015 are summarized in the following Table ES-1.

Table ES-1
Santa Clarita Valley
Summary of 2015 Water Supplies and Uses
(acre-feet)

Municipal		
SWP and other Imported Supplies		24,148
Groundwater (Total)		29,893
Alluvium	*19,333*	
Saugus	*10,560*	
Recycled Water		450
Subtotal		**54,491**
Agriculture/Miscellaneous		
SWP and other Imported		-
Groundwater (Total)		12,079
Alluvium	*11,359*	
Saugus	*720*	
Subtotal		**12,079**
Total		***66,570***

In accordance with the California Urban Water Management Planning Act, the Valley-wide UWMP is currently being finalized and the previous version (2010 UWMP) was last adopted in 2011. Both plans extend projected water demands through 2050, and describe the combination of local groundwater, imported water supplies from the SWP and other sources, local recycled water supplies, and other water supplies planned to meet those projected water demands in the Valley. Both the 2010 and draft 2015 UWMP describe the reliability of local groundwater resources and the adequacy of groundwater supplies to meet groundwater demand. Both plans also describe the ongoing efforts leading to integrated control of

perchlorate migration and restoration of perchlorate-impacted groundwater supply along with occurrence of other constituents of concern like volatile organic compounds (VOCs).

Notable details about each component of water supply in the Valley and the water supply outlook for 2016 are included in the following sections.

ES.2 Alluvial Aquifer

Based on an updated evaluation of groundwater basin yield, completed in 2009, the groundwater operating plan in the 2010 UWMP and draft 2015 UWMP includes Alluvial pumping in the range of 30,000 to 40,000 acre-feet per year (afy) following wet/normal years, and slightly reduced pumping (30,000 to 35,000 afy) following dry years. In 2014 and 2015, a temporary redistribution of pumping was developed in response to a severe curtailment of SWP deliveries, a temporary decrease in Saugus Formation well capacity, and drought impacts on groundwater levels in the eastern portion of the subbasin. This redistribution involved a shift of Alluvial pumping from the eastern areas of the Valley, where groundwater levels have shown the most decline, to the central and western areas of the Valley. The average groundwater pumping in 2014 and 2015 combined was consistent with the Operating Plan dry year ranges. Pumping from the Alluvium in 2015 was less than proposed at about 30,700 af, which is at the lower end of the operating plan range for the Alluvium following dry years. There were no adverse effects on groundwater levels and storage in the basin that have not normally occurred during previous dry periods in the basin. On average, pumping from the Alluvium has been about 33,200 afy since supplemental imported water became available in 1980. That average annual amount remains near the lower end of the range of operational yield for a wet/normal year and about mid-range for a dry period.

On a long-term basis, continuing through 2015, there is no evidence of any historic or recent trend toward permanent water level or storage decline. In general, throughout a large part of the basin, Alluvial groundwater levels have generally remained near historic highs during the last 35 years with short-term declines during dry periods followed by rapid recoveries during wet periods. Above-average precipitation in late 2004 and 2005, and more recently in 2010 and early-2011, resulted in significant water level recovery in the eastern part of the basin despite the recent multi-year dry period (2006-2009, 2011-2015), when water levels declined to the low end of the historic range of groundwater levels. This continues the overall trend of fluctuating groundwater levels within a generally constant range over the last 35 years. These

ongoing data indicate that the Alluvium remains in good operating condition and can continue to support pumping in the operating range included in the 2010 UWMP and draft 2015 UWMP, or slightly higher, without adverse results (e.g., long-term water level decline or degradation of groundwater quality.)

Based on an integration of water quality records from multiple wells completed in the Alluvium, there have been historical fluctuations in groundwater quality, typically associated with variations in precipitation and streamflow. However, like groundwater levels, there has been no long-term trend toward groundwater quality degradation; groundwater produced from the Alluvial aquifer remains a viable municipal and agricultural water supply.

In 2002, as part of ongoing monitoring of wells for perchlorate contamination, perchlorate was detected in one Alluvial well (the SCWD Stadium Well) located near the former Whittaker-Bermite facility. The detected concentration was slightly below the then-applicable Notification Level for perchlorate (6 µg/l, which was subsequently established as the Maximum Contaminant Level for perchlorate in October 2007). The Stadium Well was destroyed and the well was replaced (in a different location) to restore that component of municipal water supply that was impacted by perchlorate. In early 2005, perchlorate was detected in a second Alluvial well, VWC's Well Q2. After an interim period of wellhead treatment, that well has now been returned to regular water supply service. All other Alluvial wells operated by the Purveyors continue to be used for municipal water supply service; all Alluvial municipal wells are sampled in accordance with drinking water regulations and perchlorate has not been detected. As summarized in the 2010 UWMP and draft 2015 UWMP, the replacement and reactivation of the formerly impacted wells now adds to the overall ability to meet the groundwater component of total water supply in the Valley. The ongoing characterization and plan for control and cleanup of perchlorate in the Valley has focused on the Saugus Formation. In addition, however, on-site cleanup and control activities that began in 2006, and continued through 2015, include soil and groundwater cleanup on the Whittaker-Bermite site.

ES.3 Saugus Formation

The groundwater operating plan in the 2010 UWMP and draft 2015 UWMP includes pumping from the Saugus in the range of 7,500 to 15,000 afy in normal years; it also includes planned dry-year pumping from the Saugus of 15,000 to 35,000 afy for one to three consecutive dry years. As with the operation plan for the Alluvium, the ranges of Saugus pumping are based on

the updated evaluation of groundwater basin yield, completed in 2009, which found those ranges of pumping to be sustainable on a long-term basis.

Pumping from the Saugus Formation was about 11,300 af in 2015; this included about 3,000 af that were pumped from CLWA's Saugus 1 and Saugus 2 Wells as part of the perchlorate pump and treat program. On average, Saugus pumping has been about 7,200 afy since 1980. Both the 2015 amount and the long-term average rates remain near the mid to lower end of the ranges included in the groundwater operating plan. As a result of long-term relatively low pumping from the Saugus Formation, groundwater levels in that aquifer have remained generally constant to slightly increasing over the last 40 to 45 year time horizon. On a short-term time frame, there have been declining trends in groundwater elevations in the Saugus Formation since 2006 that likely reflect the generally dry climatic conditions that have existed during that time with the exception of 2010 and the early part of 2011 which were generally wet.

In 1997, ammonium perchlorate was discovered in four wells (Saugus 1, Saugus 2, VWC-157 and NC-11) completed in the Saugus Formation in the vicinity of the former Whittaker-Bermite facility located generally toward the east, on the south side of the basin. In 2006, a very low level of perchlorate was detected in another Saugus municipal well (NC-13). And in 2010, it was detected further downgradient in a sixth Saugus well (VWC-201). To date, one of the impacted wells has been destroyed and replaced, three have remained in or been returned to service with treatment as required, one remains out of service with its capacity replaced by an alternate source, and the most recently impacted well remains out of service with plans in development for restoration. As part of regular operation, those wells that remain in service are sampled in accordance with drinking water regulations. All other Saugus Formation wells owned and operated by the Purveyors remain available for municipal water supply service.

Work toward the remediation of perchlorate contamination, including the restoration of impacted groundwater supply, was continued in 2015. The focus of the work was developing a perchlorate restoration and containment plan to continue to pump and treat contaminated water from two of the originally impacted wells (Saugus 1 and 2) and initiate pump and treat operations at VWC-201 to contain the migration of the contaminant plume, and to deliver treated water for municipal supply to partially replace impacted well capacity. Beginning with the restoration of Saugus 1 and 2, Castaic Lake Water Agency's Saugus Perchlorate Treatment

Facility (SPTF) has been online since 2011 and numerous monitoring tests are performed each week in order to ensure the water leaving the SPTF meets drinking water standards. In 2015, 2,961 af of groundwater were pumped from Saugus 1 and 2. After treatment for perchlorate removal, the groundwater is blended with treated imported water and delivered to the Purveyors through the CLWA distribution system. With this additional production at Saugus 1 and 2, the Purveyors continue to have sufficient pumping capacity to meet the planned normal range of Saugus pumping as described in the 2010 UWMP and draft 2015 UWMP. Restoration of VWC Well 201 to service by 2017, along with the resumption to service of VWC Well 205 will also increase available production capacity from the Saugus Formation.

Additionally, low levels of volatile organic compounds (VOCs), Trichloroethylene (TCE) and Tetrachloroethylene (PCE), have been detected at Saugus 1 and Saugus 2. Although the concentrations have always been below the Maximum Contaminant Level, the State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) has set an operational goal in CLWA's Operating Permit of no VOCs above the detection limit for reporting in its distribution system and is working with the purveyors and the California Department of Toxic Substances Control to address the VOC impacts to groundwater.

ES.4 Imported Water

Historically comprised of only its SWP Table A Amount, CLWA's imported water supplies now consist of a combination of SWP water, water acquired from the Buena Vista and Rosedale-Rio Bravo Storage District, in Kern County, and Yuba County Water Agency purchases and banked water. CLWA's contractual Table A Amount is 95,200 af of water from the SWP. Under the 2007 Water Acquisition Agreement with the Buena Vista Water Storage District (Buena Vista) and the Rosedale-Rio Bravo Water Storage District (RRBWSD), Buena Vista's high flow Kern River entitlements (and other acquired waters that may become available) are captured and recharged within the RRBWSD service area on an ongoing basis. CLWA receives 11,000 af of these supplies annually through either exchange of Buena Vista's and Rosedale-Rio Bravo's SWP supplies or through direct delivery of water to the California Aqueduct via the Cross Valley Canal. In 2008, CLWA entered into the Yuba Accord Agreement, which allows for the purchase of water from the Yuba County Water Agency through the Department of Water Resources. Up to 850 af of non-SWP supply is available to CLWA in critically dry years. Also, in addition to these available supplies, CLWA has access to 4,684 af of "flexible storage" in Castaic Lake. In 2015, CLWA negotiated a ten-year extension of an agreement with the Ventura County SWP

contractors (County) to allow CLWA to utilize the County's flexible storage account of 1,376 af. CLWA may withdraw water from the County's flexible storage on an as-needed basis; however any water withdrawn from this storage account must be replaced within five years. The combined flexible storage from CLWA's and the County's accounts provides total flexible storage of 6,060 af, which is maintained in Castaic Lake for use in a future dry period or an emergency.

CLWA has entered into four long-term groundwater banking and water exchange programs and has, in aggregate, more than 140,000 af of recoverable water outside the local groundwater basin at the end of 2015. The first component of CLWA's overall groundwater banking program is with Semitropic Water Storage District whereby, CLWA can withdraw up to 5,000 afy from the current balance of almost 36,000 af of water that was stored in Semitropic to meet Valley demands when needed in dry years. The second component, RRBWSD Water Banking Program in Kern County, has a recoverable total of more than 94,000 acre-feet in storage with an existing withdrawal capacity of 3,000 afy and efforts underway to increase that limit. The third and fourth components are the Two-For-One Exchange Programs that CLWA initiated with RRBWSD and West Kern Water District that now have almost 10,000 af of recoverable water.

Since SWP water deliveries are subject to reduction when dry conditions occur in Northern California, the 2010 UWMP and draft 2015 UWMP include programs, like the Semitropic and Rosedale-Rio Bravo programs, for enhancing water supply reliability during such occurrences. A capital improvement program funded by CLWA has been established to provide facilities and additional water supplies needed to firm up SWP water supplies during times of drought.

CLWA's final allocation of SWP water for 2015 was 20 percent of its Table A Amount, or 19,040 af. The total available imported water supply in 2015 was 51,081 af, comprised of the 19,040 af of Table A supply, 10,995 af purchased from Buena Vista/RRBWSD, 2,998 af withdrawn from Rosedale-Rio Bravo Water Banking Program, and 18,048 af of 2014 carryover available in 2015. CLWA deliveries to the Purveyors were 24,148 af. Following disposition of available water supplies in 2015, carryover of 21,892 af from 2015 and previous years' supplies is available for 2016 water supply. In 2015, 4,339 af was backfilled to Castaic Flexible Storage from 2014 use, leaving 85 af remaining to be refilled; no water was contributed to banking programs in 2015.

ES.5 Recycled Water

Recycled water service was initiated in July 2003 in accordance with CLWA's Draft Reclaimed Water System Master Plan (2002). The amount of recycled water used for irrigation purposes, at a golf course and in roadway median strips, was approximately 450 af in 2015, generally consistent with recycled water deliveries that have ranged between 300-500 afy over the past ten years.

CLWA and the retail water purveyors are currently in the process of updating the Recycled Water Master Plan that will contain revised estimates of projected recycled water use. A draft of the updated RWMP is anticipated in summer of 2016, and is scheduled to be finalized by October 2016, with a new Programmatic EIR completed by December 2016.

ES.6 2016 Water Supply Outlook

In 2016, total water demands are expected to be about 65,000 af, about 22,000 af below the water demand projections (with conservation) in the 2010 UWMP. It is expected that water demands in 2016 will continue to be met with a mix of water supplies that is primarily comprised of local groundwater, SWP Table A and carryover supplies, and recycled water. Ongoing conservation programs that were expanded in 2014/2015 are expected to continue to reduce demands on water supplies in 2016 although some rebounding in demands may occur with the easing of the SWRCB mandatory reductions.

Announced on April 21, 2016, the latest allocation of water from the SWP in 2016 is 60 percent of CLWA's Table A Amount, or 57,120 af. Combined with local groundwater from the two aquifer systems (40,000 af), net carryover of SWP Table A allocation from 2015 (21,892 af), annual acquisition through the Buena Vista Water/Rosedale Rio-Bravo Water Acquisition Agreement (11,000 af), and recycled water (450 af), the total available water supplies for 2016 is over 130,400 af. As a result, CLWA and the Purveyors anticipate having more than adequate supplies to meet all water demands in 2016.

In August 2007, a federal court ruled that certain operational changes were required of the SWP in order to protect the endangered Delta smelt. With the objective of protecting endangered fish such as the Delta smelt and spring-run salmon, the court order resulted in the preparation of new Biological Opinions (BO) requiring DWR to implement mitigation requirements with resultant impacts on SWP water supply reliability. The current SWP Delivery

Capability Report 2015, issued in June 2015, maintains the restrictions on SWP operations according to the Biological Opinions of the U.S. Fish and Wildlife Service and the National Marine Fishery Service issued in December 2008 and June 2009, respectively. In December 2010, a federal judge overruled most of the 2008 federal biological opinion and invalidated several of the criteria that reduced SWP's water supply. These matters were appealed to the U.S. Court of Appeals for the Ninth Circuit. The Ninth Circuit ruling upheld the Biological Opinions of the federal agencies. Therefore, the operational rules defined in these BOs continue to be legally required and were used by DWR in the analyses supporting its SWP Delivery Capability Report 2015.

The SWP Delivery Capability Report 2015 also considers the impacts on SWP delivery capability due to climate change, sea level rise, and multiple Delta-specific concerns. Further, consideration is also given to the major Delta policy planning efforts currently underway; the Delta Plan and the Bay Delta conservation Plan (now called California WaterFix). With these factors, the Capability Report projects under existing conditions, the average annual delivery of Table A water is estimated at 61% (less than 0.1% less than the 2013 estimation). CLWA staff has assessed the impact of the current SWP Delivery Capability Report on the CLWA analysis of projected water supplies contained in the Agency's 2010 UWMP and draft 2015 UWMP concluded that current and planned supplies are available to meet anticipated water supply needs through the year 2050.

CLWA, the four retail water purveyors, Los Angeles County, and the City of Santa Clarita have formed the Santa Clarita Valley Water Committee. The specific purpose of the Committee is to work collaboratively to ensure the progressive implementation of water use efficiency programs and manage the conjunctive use of the water supplies in the Santa Clarita Valley. In terms of short-term water supply availability, the Committee has determined that, while current operational changes of the SWP are in effect, there are sufficient supplemental water supplies in 2016 to augment local groundwater and other water supplies such that overall water supplies will be sufficient to meet projected 2016 water requirements as reflected herein.

In any given year, SWP supplies may be reduced due to dry weather conditions or regulatory factors. During such an occurrence, the remaining water demands are planned to be met by a combination of alternate supplies such as returning water from CLWA's accounts in the

Semitropic Groundwater Storage Program, the Rosedale-Rio Bravo Water Banking Program, and two Exchange Programs (with total banked water at almost 140,000 af), deliveries from CLWA's flexible storage account in Castaic Lake Reservoir, local groundwater pumping, short-term water exchanges, and participation in DWR dry-year water purchase programs.

Drought periods may affect available water supplies in any single year and even for a duration that spans multiple consecutive years. It is important to note that hydrologic conditions vary from region to region throughout the state. Dry conditions in Northern California affecting SWP supply may not affect local groundwater and other supplies in Southern California, and the reverse situation can also occur (as it did in 2002 and 2003). For this reason, CLWA and the retail water suppliers have emphasized developing a water supply portfolio that is diverse, especially in dry years along with water conservations programs. Diversity of supply is considered a key element of reliability, giving CLWA and the Purveyors the ability to draw on multiple sources of supply to ensure reliable service during dry years, as well as during normal and wet years.

ES.7 Water Conservation

The California Urban Water Conservation Council (CUWCC) was formed in 1991 through the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). The urban water conservation Best Management Practices (BMPs) included in the MOU are intended to reduce California's long-term urban water demands. In 2001, the CLWA Board approved signing the CUWCC's MOU on behalf of both the wholesale and retail service areas (CLWA and SCWD). Following that action, Los Angeles County, NCWD, and VWC signed the MOU. In 2009, the CUWCC changed its policy to specify that each signatory had to join individually and that a wholesaler could no longer be a signatory on behalf of its retailers. SCWD therefore signed the MOU independently in 2011. CLWA and the retail water purveyors are subject to the Urban Water Management Planning Act, AB1420 and SBX7-7 requirements, in addition to the commitment of compliance with the BMPs as signatories to the MOU. In the CLWA service area, demand management is addressed at both the local (retail agency) and regional (Santa Clarita Valley-wide) levels.

The MOU and BMPs were revised by the CUWCC in 2008. The revised BMPs now contain a category of "Foundational BMPs" that signatories are expected to implement as a matter of their regular course of business. A key intent of the MOU revision was to provide retail water

agencies with more flexibility in meeting requirements and allow them to choose program options most suitable to their specific needs. Therefore, as alternatives to the traditional Programmatic BMP requirements, agencies may also implement the MOU Flex Track or gallons per capita per day (GPCD) options.

In 2007, VWC coordinated the development and execution of a MOU with CLWA and the other retail water purveyors that led to the preparation of the Santa Clarita Valley Water Use Efficiency Strategic Plan (2008 SCVWUESP). The 2008 SCVWUESP was recently updated in 2015. The purpose of the effort was to prepare a comprehensive long-term conservation plan for the Santa Clarita Valley by adopting objectives, policies and programs designed to promote proven and cost-effective conservation practices. The preparation of the SCVWUESP included input from stakeholders and the community at large. The updated SCVWUESP completed in 2015 incorporated the SBX7-7 targeted reductions of 20 percent by 2020. The updated SCVWUESP was supported by a thorough economic analysis that will guide water conservation efforts planned and implemented by CLWA and the retail water purveyors in the coming years. The economic analysis concluded that water conservation measures were cost effective when compared to other incremental supplies such as recycled water. The updated SCVWUESP is consistent with CLWA's and the retail water purveyors Strategic Plan Objectives including:

- Ensure long-term average water supply meets current and future demand
- Meet local water demands
- Achieve the water conservation target of 20 percent per capita by 2020

CLWA and the retail water purveyors are committed to a water conservation program that is composed of several conservation measures that will lower projected demand by 2020, building on what has already been implemented over the past two decades. The conservation measures incorporate education, incentives, and conservation mandates among all the various customers present in the Valley. As described in the draft 2015 UWMP, each retail purveyor must demonstrate SBX7-7 compliance by an interim 2015 Daily Per Capita Water Use Target; in 2015 the purveyors met their Interim Water Use Target and their 2020 Target.

2015 was the fourth consecutive calendar year of exceptional and extreme drought conditions for most of California, including the Santa Clarita Valley. In July 2014, SWRCB adopted temporary, emergency water conservation regulations that required water agencies to implement the actions of their water shortage contingency plans that imposed mandatory

restrictions on urban water suppliers. The residents, businesses, and city and county government agencies have responded to the calls for conservation by significantly reducing their 2015 water use by 18,969 ac-ft (almost 6.2 billion gallons) compared to 2013 (about a 26 percent reduction). However, with the easing of SWRCB emergency water conservation measures, some portion of this reduced demand is anticipated to rebound.

1 INTRODUCTION

1.1 Background

For most residents of the Santa Clarita Valley (Valley), domestic water service is provided by four retail water purveyors: Castaic Lake Water Agency's Santa Clarita Water Division (SCWD), Los Angeles County Waterworks District 36 (LACWD 36), Newhall County Water District (NCWD), and Valencia Water Company (VWC). Together, the four retail water purveyors (Purveyors) provide water to about 73,100 service connections. Castaic Lake Water Agency (CLWA) contracts for State Water Project (SWP) and other sources of imported water, which are delivered from Castaic Lake, after which it is treated, filtered, and disinfected at two CLWA treatment plants before distribution to the Purveyors; CLWA also contracts with the Santa Clarita Valley Sanitation District for recycled water, which is currently delivered to VWC. Staff of CLWA and the four retail water purveyors meet regularly to coordinate the supply of water in the Valley. Their respective service areas are shown in **Figure 1-1**.

While municipal water supply has grown to become the largest category of water use in the Valley, there remains an agricultural and other small private water demand that is dependent on local groundwater for its water supply. Accordingly, ongoing agricultural water requirements and the use of local groundwater to meet those requirements are considered in analyses of water requirements and supplies as reported herein. Also, in addition to municipal and agricultural water uses in the Valley, water supply for a small fraction of Valley residents is provided by individual private water supply wells. The locations, construction details, annual pumping and other information about these private wells are not currently available. In the absence of detailed information about private wells and associated water use, pumping as reported herein includes an estimate of groundwater pumped from private wells. It is intended that this estimate of private pumping will be refined in the future as more information about the private wells and water use is obtained.

For more than 30 years, CLWA and the retail water Purveyors have reviewed and reported on the availability of water supplies to meet all water requirements in the Valley. Those reports have also addressed local water resources, most notably groundwater, in the region. Past studies have assessed the condition of local groundwater aquifers, their hydrogeologic characteristics, aquifer storage capacity, operational yield and recharge rate, groundwater

quality and contamination, and the ongoing conjunctive use of groundwater and imported water resources.

Other efforts have included developing drought contingency plans, coordinating emergency response procedures and implementing Valley-wide conservation programs. In 1985, NCWD, on behalf of the Purveyors, prepared the area's first report on urban water supplies and water management. Beginning in 1995, formalized versions of Urban Water Management Plans (UWMP) have been developed and have included CLWA. Information in the plans was coordinated among CLWA and the Purveyors to provide accurate, comprehensive and consistent water supply and demand information for long term planning purposes. In accordance with the California Urban Water Management Planning Act, the UWMP is currently being updated (2015 UWMP) to be submitted by CLWA and the Purveyors to the Department of Water Resources (DWR) by July 2016. The 2015 UWMP will include water demand projections through projected build out of the Valley in 2050 and describe the combination of local groundwater, imported water supplies from the SWP and other sources, local recycled water supplies, and other planned water supplies to meet the existing and projected water demands in the Valley. The 2015 UWMP will describe the reliability of local groundwater resources and the adequacy of groundwater supplies to meet that component of overall water supply; and it also will describe the mitigation of perchlorate contamination which had impacted several municipal water supply wells, and the implementation of integrated control of perchlorate migration and full restoration of perchlorate-impacted groundwater supply.

In 2009, primarily in preparation of the 2010 UWMP, an updated analysis of groundwater basin yield was completed to guide the ongoing use of groundwater and the associated distribution of pumping to maintain groundwater use at a sustainable rate while also addressing localized issues such as restoration of groundwater contamination that have impacted local groundwater supplies since 1997. The results of the updated groundwater basin analysis are summarized in the groundwater basin yield discussion (Section 3.1) of this Water Report.

1.2 Purpose and Scope of the Report

The purpose of this report, which is the eighteenth in a series of annual water reports that began to describe water supply conditions in 1998, is to provide current information about water requirements and available water supplies to meet those demands in the Santa Clarita Valley. CLWA and the Purveyors began preparation of this series of reports in response to a

request made by the Los Angeles County Board of Supervisors in 1998. Over the last two decades, this series of reports has also served as an annual summary of groundwater conditions in the Valley in fulfillment of the commitment in the Santa Clarita Valley Groundwater Management Plan (CLWA, 2003), adopted in 2003, to regularly report on implementation of that Plan.

This report was prepared for CLWA, SCWD, LACWD 36, NCWD, and VWC. It continues a format for providing information regarding water uses and the availability of water supplies on an annual basis. It is intended to be a helpful resource for use by water planners and local land use planning agencies. This report is complemented by the 2010 UWMP (and subsequent 2015 UWMP) for the area, which provides longer-term water supply planning over a 35-year period, and by a number of other technical reports, some of which are specifically referenced herein.

1.3 Santa Clarita Valley Water Purveyors

As introduced above, four retail water Purveyors provide water service to most residents of the Santa Clarita Valley. Brief summary descriptions of those four Purveyors are as follows.

Castaic Lake Water Agency Santa Clarita Water Division has a service area that covers 34,700 acres and includes a portion of the City of Santa Clarita and unincorporated portions of Los Angeles County in the communities of Saugus, Canyon Country, and Newhall with about 30,700 service connections. Water has been supplied from both groundwater and imported water sources in varying proportions over the last 35 years, with the majority of supply currently being met by imported sources (69 percent in 2015).

Los Angeles County Waterworks District 36 has a service area that encompasses approximately 6,600 acres in the Hasley Canyon area and the unincorporated community of Val Verde. LACWD 36 has about 1,350 service connections. Prior to 2012, LACWD 36 had typically obtained its full water supply from a connection to the CLWA's Castaic Conduit. However, beginning in 2012 and continuing through 2015, that imported water supply was initially reduced to about one-third of the overall water supply; more recently, it has been temporarily replaced with groundwater pumped from the Saugus Formation.

Newhall County Water District's service area is approximately 24,170 acres and includes portions of the City of Santa Clarita and unincorporated portions of Los Angeles County in the

communities of Newhall, Canyon Country, Valencia, and Castaic with about 9,750 service connections. NCWD supplies water from both groundwater and imported water sources (with groundwater historically being the more predominant source of supply), and in 2015 groundwater accounted for 69 percent of supply.

Valencia Water Company's service area serves about 31,350 service connections in a portion of the City of Santa Clarita and in the unincorporated communities of Castaic, Newhall, Saugus, Stevenson Ranch, and Valencia representing an area of about 18,000 acres. VWC supplies water from both groundwater and imported water sources in generally even proportions historically with slightly more supply generally coming from imported sources (however, in 2015, groundwater was 70 percent of supply). VWC also has a small amount of recycled water for non-potable use.

1.4 The Upper Santa Clara River Hydrologic Area and East Groundwater Subbasin

The Upper Santa Clara River Hydrologic Area (HA), as defined by the California Department of Water Resources (DWR), is located almost entirely in northwestern Los Angeles County (**Figure 1-2**). The area encompasses about 654 square miles comprised of flat valley land (about 6 percent of the total area) and hills and mountains (about 94 percent of the total area) that border the valley area. The mountains include the Santa Susana and San Gabriel Mountains to the south, and the Sierra Pelona and Leibre-Sawmill Mountains to the north. 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 this hydrologic area from the Mojave Desert. The Santa Clara River Hydrologic Area comprises four subareas as shown on **Figure 1-2**. Of the four, the Eastern Hydrologic Subarea has been the study area of prior investigations, and will remain the focus of the Water Report.

The Santa Clara River and its tributaries flow intermittently from Lang Station westward about 35 miles to just west of the Los Angeles-Ventura County line, where the River is the outlet from the HA. The principal tributaries of the Santa Clara River in the Santa Clarita Valley are Castaic Creek, San Francisquito Creek, Bouquet Creek, and the South Fork of the Santa Clara River. In addition to tributary inflow, the Santa Clara River receives treated wastewater discharge from the Saugus and Valencia Water Reclamation Plants, which are operated by the Santa Clarita Valley Sanitation District of Los Angeles County. The Santa Clara River continues westward

through Ventura County to its mouth near Oxnard. Along that route, the River traverses all subbasins of the Santa Clara River Valley Groundwater Basin. There are a total of seven subbasins that span across Los Angeles and Ventura counties: the Santa Clara River Valley East Subbasin, beneath the Santa Clarita Valley and the source of essentially all local groundwater used for water supply in the Santa Clarita Valley, Piru, Fillmore, Santa Paula, Oxnard Forebay, Oxnard Plain, and Mound subbasins as shown in **Figure 1-3**.

There are three precipitation gages in the Santa Clarita Valley. Two gages have long-term records, the Newhall Fire Station #73 gage and the Newhall County Water District gage, while the third gage, #204 Santa Clarita, was established in 2006 and has a short-term record that can be used for comparative purposes (**Figure 1-4**). The Los Angeles County Department of Public Works (LADPW) has maintained records for the Newhall Fire Station #73 gage since 1931. Newhall County Water District has maintained records for the NCWD gage since 1979. The cumulative records from these two gages correlate very closely, with the NCWD gage historically recording approximately 30 percent more precipitation than the Newhall Fire Station #73 gage over the entire NCWD gage period of record (1979-2015). The overall offset is likely due to the differences in location between the two gages, with the NCWD gage situated farther south in the hills rimming the southern edge of the Santa Clarita Valley at an elevation of about 1,390 feet, while the Newhall-Soledad 32c gage is located northwest of the NCWD gage and further away from the hills at an elevation of about 1,330 feet.

The third gage, #204 Santa Clarita, was established in December 2006 near the Rio Vista Treatment Plant (elevation 1,410') near the main Santa Clara River channel and on the north side of the Valley (**Figure 1-4**). This gage is operated by CLWA and is part of the California Irrigation Management Information System (CIMIS) managed by DWR. Daily precipitation data at this location are available beginning in January 2008, and these data correlate well with the other two precipitation gages in the Valley over the period of 2008 through 2015 with the exception of data for the month of December 2010. Comparison of historical data collected from all three gages between 2008 through 2015 indicates that the CIMIS gage located in the central part of the Valley near the river receives about 65% of the rainfall of the 32c gage and about 45% of the NCWD gage.

The Santa Clarita Valley is characterized as having an arid climate. Historically, intermittent periods of below-average precipitation have typically been followed by periods of above-

average precipitation in a cyclical pattern, with each above average or below average period typically lasting from one to five years. The longer-term precipitation records for the Newhall Fire Station #73 gage are illustrated in **Figure 1-5**. Long-term annual (calendar year) average precipitation at that gage is 17.3 inches calculated for the 1931 through 2015 period. **Figure 1-5** also shows the cumulative departure from mean annual precipitation which shows periods of above average rainfall (increasing slope or trend with time) and below average rainfall (declining trend or slope with time). In general, periods of below-average precipitation have been longer and more moderate than periods of above average precipitation. Historically, the periods from 1947 to 1951, 1959 to 1964, 1971 to 1976, 1984 to 1991 and 1999 to 2003 have generally been drier than average; the periods from 1938 to 1946, 1965 to 1970, 1977 to 1983, 1992 to 1996, and 2004 to 2005 have been wetter than average. Recently, the dry or below average period that began in 2006, has generally persisted through 2015 with all but two of those years (2008 and 2010) having below average rainfall totals. 2012 and 2013 were significantly below average with about 9.0 and 3.7 inches, respectively, and 2013 experienced the lowest amount of precipitation that has been recorded since 1931. 2015 precipitation was also significantly low at 6.1 inches for the year which is about 35% of the long-term average. Early year precipitation in 2016 has been slightly below average through April; these conditions combined with other water supply considerations and more aggressive water conservation measures, discussed in Chapters 3 and 4, are expected to result in 2016 water requirements being slightly less than or about the same as the water requirements in 2015.

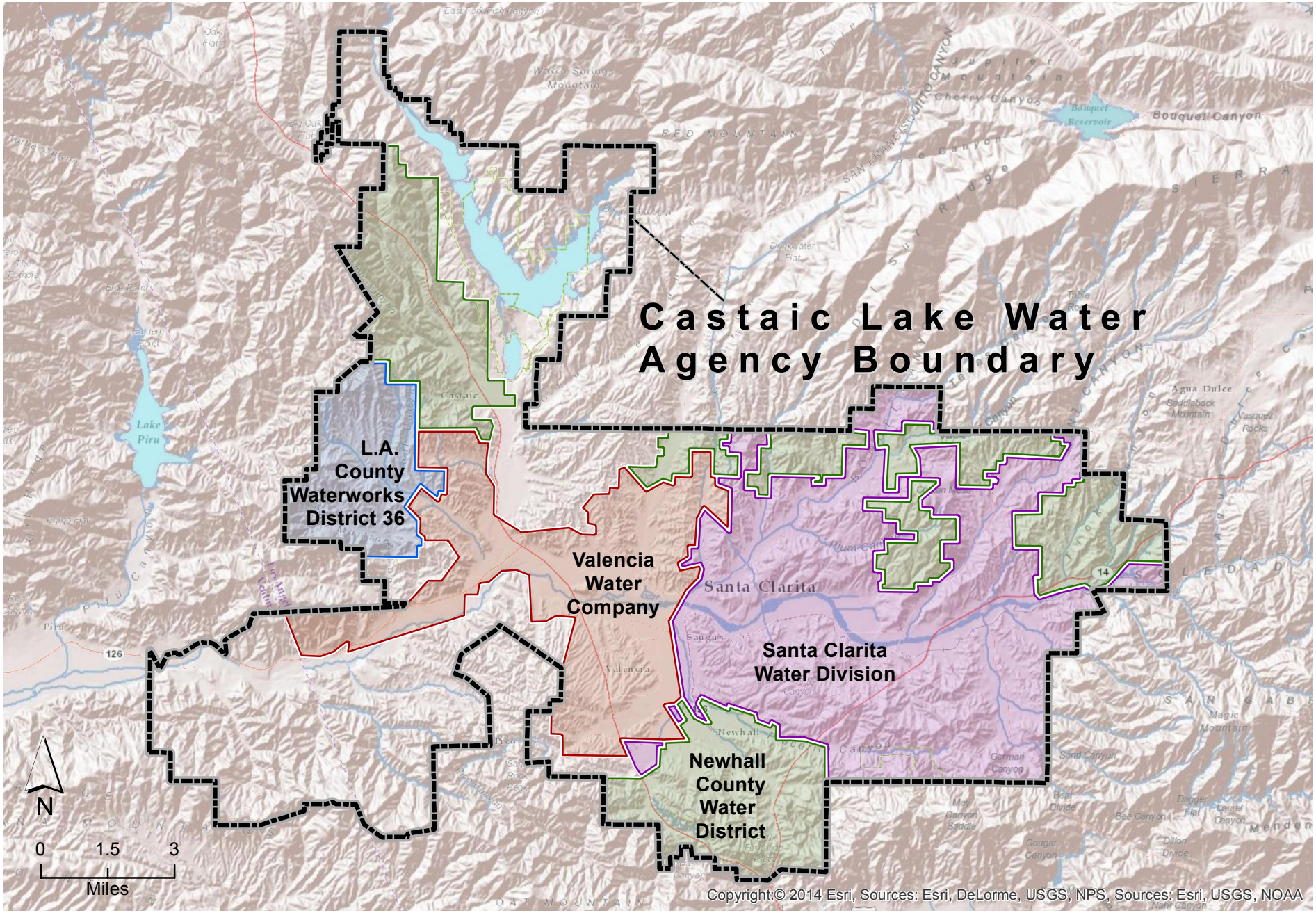

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Figure 1-1
CLWA and Purveyor Service Areas
Santa Clarita Valley Water Report

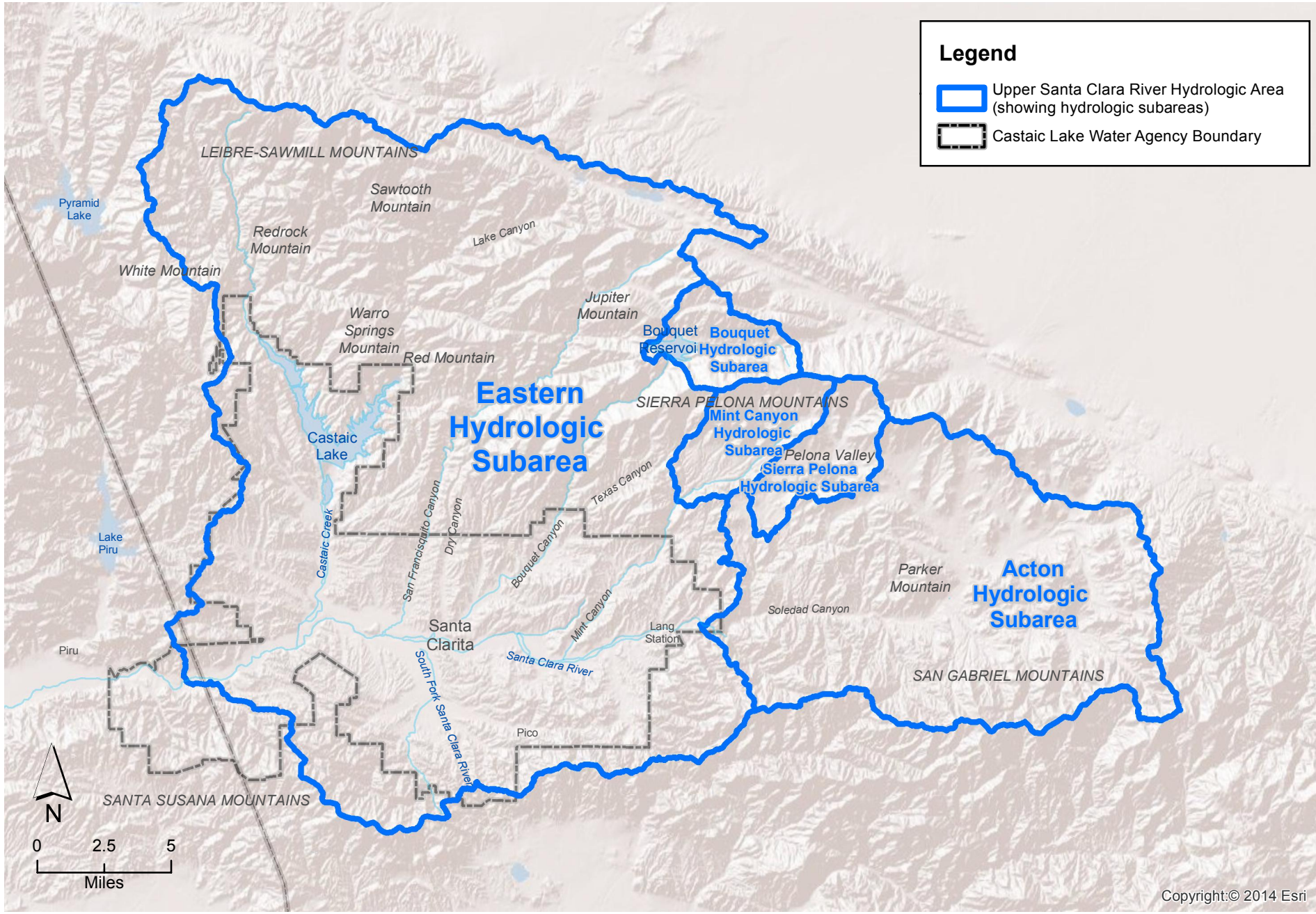

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Figure 1-2
Upper Santa Clara River Hydrologic Area
Santa Clarita Valley Water Report

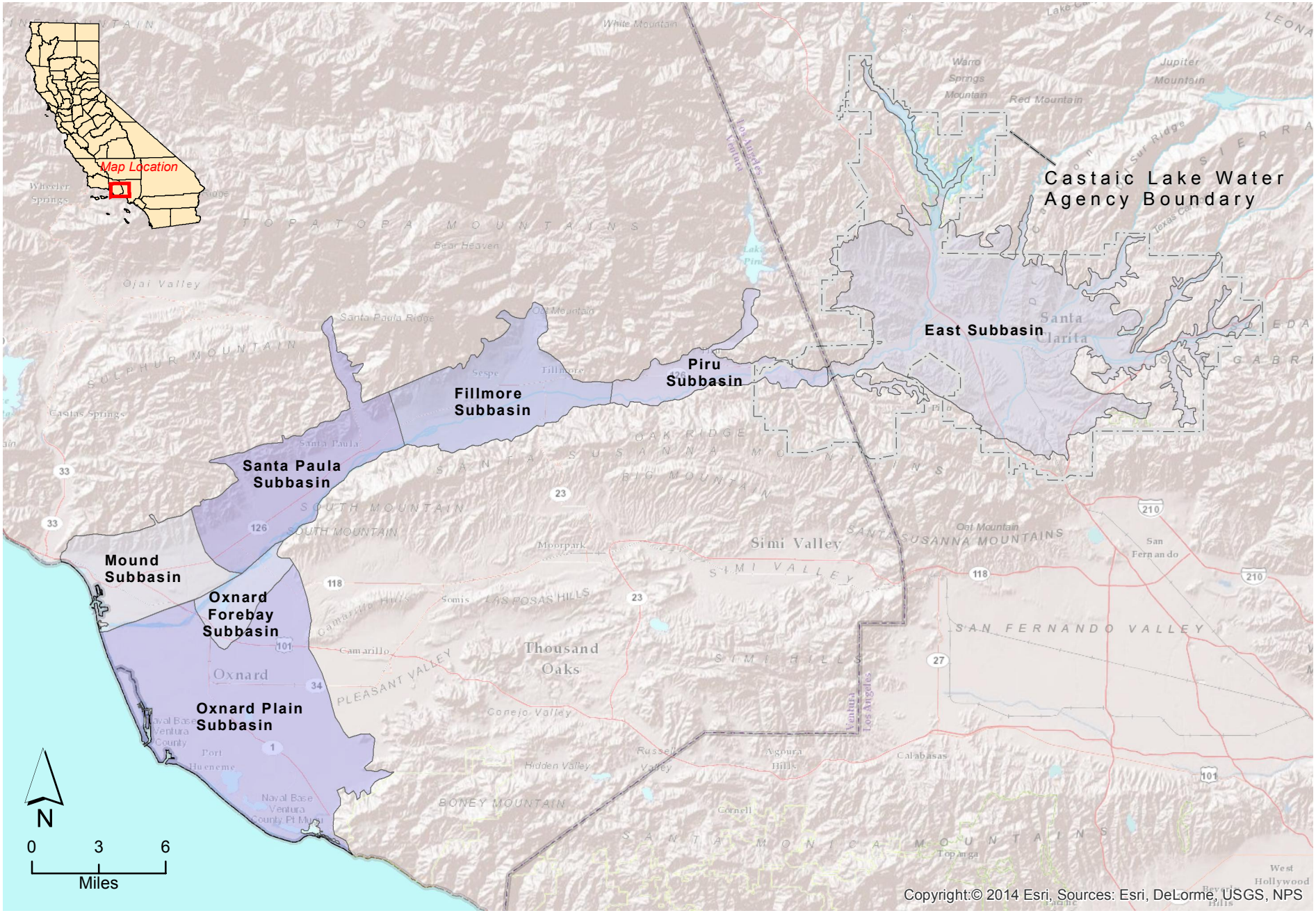

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Figure 1-3
Santa Clara River Valley Groundwater Basin and Subbasins
Santa Clarita Valley Water Report

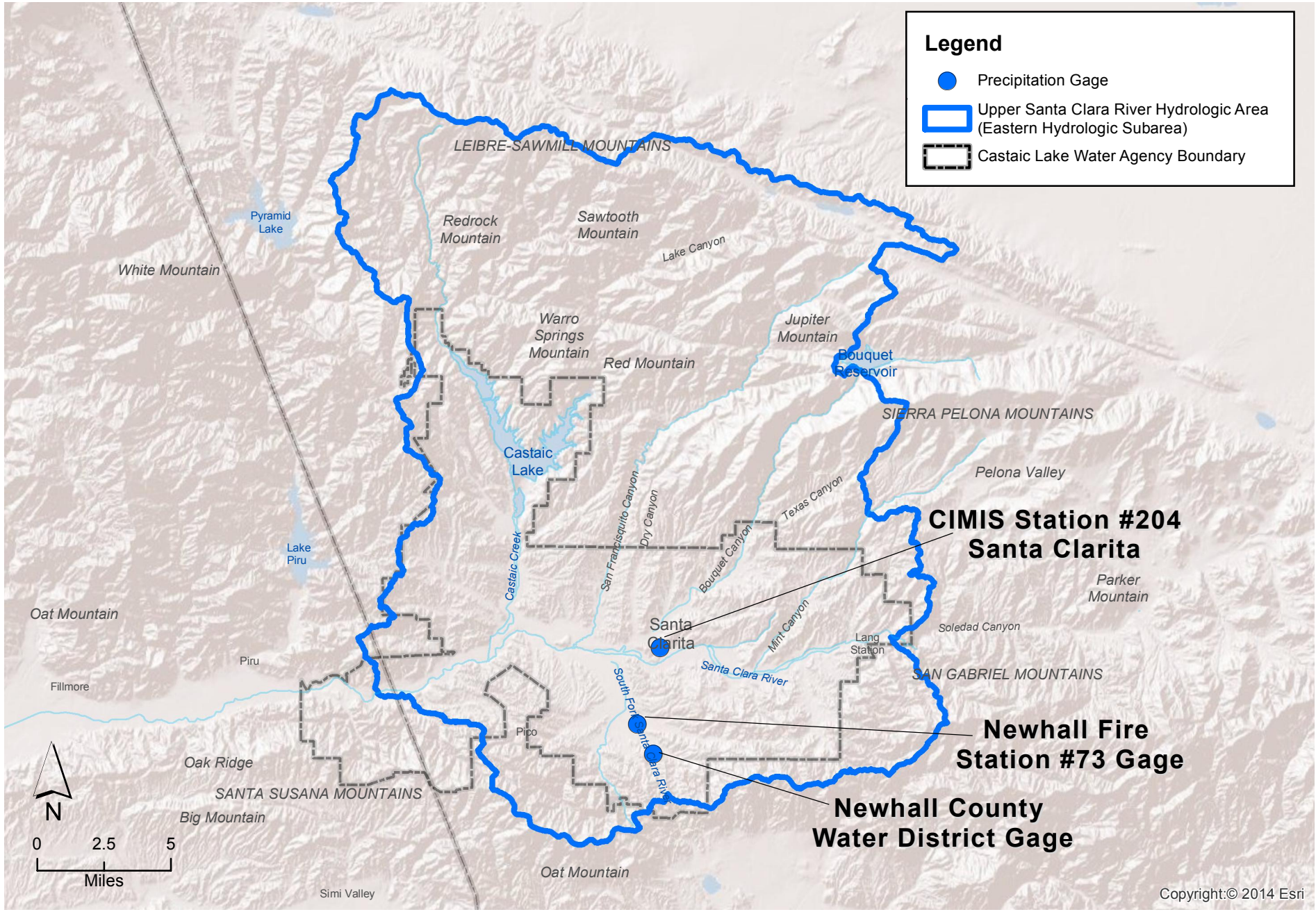

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Figure 1-4
Precipitation Gage Locations
Santa Clarita Valley Water Report

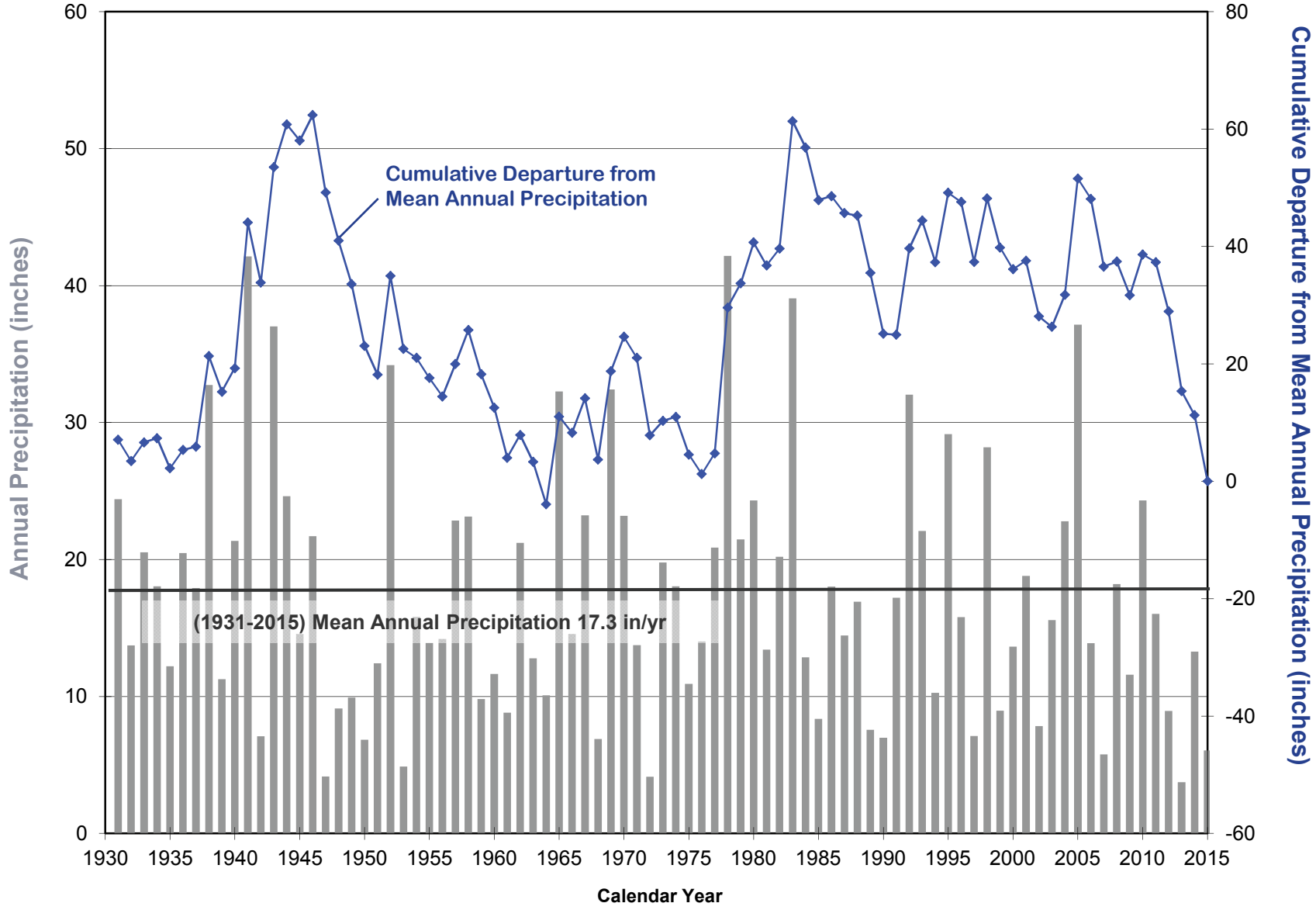

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Figure 1-5
Annual Precipitation and Cumulative Departure from Mean Annual Precipitation at Newhall Fire Station #73 Gage
Santa Clarita Valley Water Report

2 2015 WATER SUPPLIES AND USE

Water supplies in Santa Clarita Valley are utilized for municipal, agricultural, private domestic, and miscellaneous purposes. The sources of water are varied and include imported water from the State Water Project and other sources, along with local supplies from treated groundwater, recycled water, and groundwater.

2.1 2015 Water Supplies

Total water use in the Santa Clarita Valley was 66,600 acre-feet (af) in 2015. Of the total, 54,500 af (about 82 percent) were for municipal use (**Table 2-1**) and the remaining 12,100 af (18 percent) were for agricultural and other (miscellaneous) uses (**Table 2-2**), including estimated individual domestic uses. Total water use was met by a combination of about 42,000 af from local groundwater resources (about 29,900 af for municipal supply and 12,100 af for agricultural and other uses), 24,100 af from SWP and other imported water sources, and about 450 af from recycled water (**Table 2-3**).

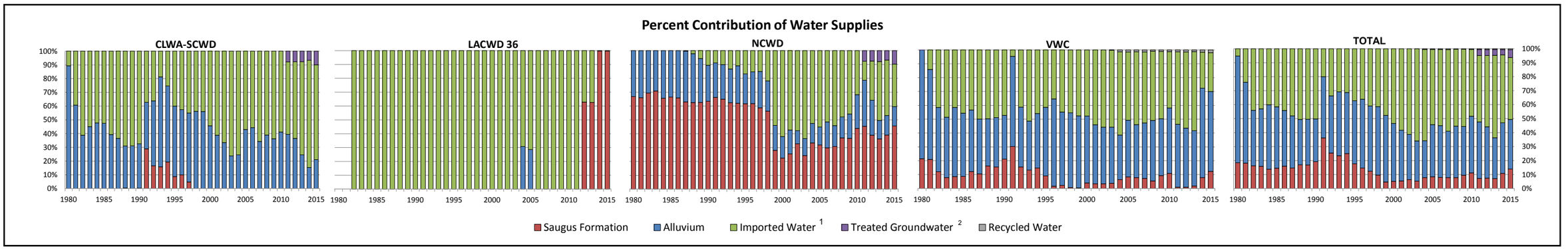
Compared to 2014, total water use in the Santa Clarita Valley in 2015 was almost eighteen percent lower, and it was below the short-term projected water requirement estimated in last year's Annual Water Report. The decrease in water use in 2015 follows the decrease in water use of 10% in 2014 from 2013 and is primarily attributed to aggressive conservation in 2015 as the Purveyors and the local community continue to be aware of ongoing drought conditions and compliance with State-mandated water conservation targets. Conservation efforts from the last two years have seen a total reduction in water use of almost 26% from 2013 use.

2.2 Total Water Use Historical Trends

Water supply utilization for all uses in the Santa Clarita Valley, again for the period 1980 through 2015, is summarized in **Table 2-3**. The trends in utilization of local groundwater and imported water, complemented by the addition of recycled water, are graphically illustrated in **Figure 2-1**. As can be seen by inspection of **Table 2-3** and **Figure 2-1**, total water use in the Valley was nearly linearly increasing from the early 1980's (about 36,000 to 42,000 afy) through 2007 (92,000 af), with some climatic-related fluctuations in certain years. Total water use progressively declined from 2007 through 2010 (80,200 af), followed by an increase in water use in 2012 and 2013 and a decline in 2014 and 2015 back to levels not seen since the 1990s. Overall, since the inception of supplemental SWP supplies, total annual water use has increased from about 37,000 af in 1980 to between 80 to 90,000 af per year from 2002 through 2014, and

Table 2-1
Water Supply Utilization by Municipal Purveyors
Santa Clarita Valley Water Report
(Acre-Feet)

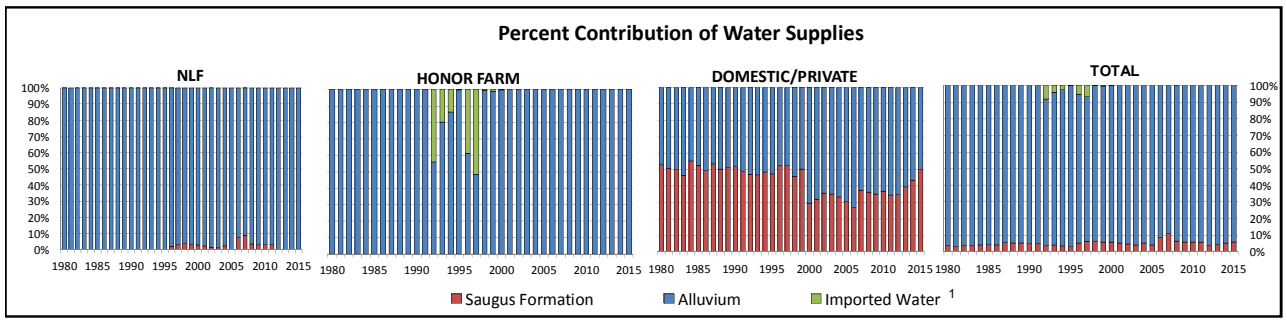
	CLWA Santa Clarita Water Division					Los Angeles County Waterworks District 36				Newhall County Water District					Valencia Water Company					All Municipal Purveyors					
	Purchased from CLWA		Local Production			Purchased from CLWA	Local Production			Purchased from CLWA		Local Production			Purchased from CLWA	Local Production		Other		Purchased from CLWA		Local Production		Other	
Year	*Imported Water*[1]	*Treated Groundwater*[2]	*Alluvium*	*Saugus Formation*	**Total**	*Imported Water*[1]	*Alluvium*[3]	*Saugus Formation*[4]	**Total**	*Imported Water*[1]	*Treated Groundwater*[2]	*Alluvium*	*Saugus Formation*	**Total**	*Imported Water*[1]	*Alluvium*	*Saugus Formation*	*Recycled Water*[5]	**Total**	*Imported Water*[1]	*Treated Groundwater*[2]	*Alluvium*	*Saugus Formation*	*Recycled Water*	**Total**
1980	1,126	-	9,467	0	**10,593**	0	-	-	**0**	0	-	1,170	2,363	**3,533**	0	5,995	1,644	-	**7,639**	1,126	-	16,632	4,007	-	**21,765**
1981	4,603	-	7,106	0	**11,709**	0	-	-	**0**	0	-	1,350	2,621	**3,971**	1,214	5,597	1,808	-	**8,619**	5,817	-	14,053	4,429	-	**24,299**
1982	6,454	-	4,091	0	**10,545**	145	-	-	**145**	0	-	1,178	2,672	**3,850**	3,060	3,415	897	-	**7,372**	9,659	-	8,684	3,569	-	**21,912**
1983	5,214	-	4,269	0	**9,483**	207	-	-	**207**	0	-	1,147	2,787	**3,934**	3,764	3,387	611	-	**7,762**	9,185	-	8,803	3,398	-	**21,386**
1984	6,616	-	6,057	0	**12,673**	240	-	-	**240**	0	-	1,549	2,955	**4,504**	4,140	4,975	854	-	**9,969**	10,996	-	12,581	3,809	-	**27,386**
1985	6,910	-	6,242	0	**13,152**	272	-	-	**272**	0	-	1,644	3,255	**4,899**	4,641	4,633	885	-	**10,159**	11,823	-	12,519	4,140	-	**28,482**
1986	8,366	-	5,409	0	**13,775**	342	-	-	**342**	0	-	1,842	3,548	**5,390**	5,051	5,167	1,427	-	**11,645**	13,759	-	12,418	4,975	-	**31,152**
1987	9,712	-	5,582	0	**15,294**	361	-	-	**361**	22	-	2,127	3,657	**5,806**	6,190	4,921	1,305	-	**12,416**	16,285	-	12,630	4,962	-	**33,877**
1988	11,430	-	5,079	63	**16,572**	434	-	-	**434**	142	-	2,283	4,041	**6,466**	7,027	4,835	2,300	-	**14,162**	19,033	-	12,197	6,404	-	**37,634**
1989	12,790	-	5,785	0	**18,575**	457	-	-	**457**	428	-	2,367	4,688	**7,483**	7,943	5,826	2,529	-	**16,298**	21,618	-	13,978	7,217	-	**42,813**
1990	12,480	-	5,983	40	**18,503**	513	-	-	**513**	796	-	1,936	4,746	**7,478**	7,824	5,232	3,516	-	**16,572**	21,613	-	13,151	8,302	-	**43,066**
1991	6,158	-	5,593	4,781	**16,532**	435	-	-	**435**	675	-	1,864	4,994	**7,533**	700	9,951	4,642	-	**15,293**	7,968	-	17,408	14,417	-	**39,793**
1992	6,350	-	8,288	2,913	**17,551**	421	-	-	**421**	802	-	1,994	5,160	**7,956**	6,338	6,615	2,385	-	**15,338**	13,911	-	16,897	10,458	-	**41,266**
1993	3,429	-	12,016	2,901	**18,346**	465	-	-	**465**	1,075	-	1,977	5,068	**8,120**	8,424	5,815	2,182	-	**16,421**	13,393	-	19,808	10,151	-	**43,352**
1994	5,052	-	10,996	3,863	**19,911**	453	-	-	**453**	906	-	2,225	5,103	**8,234**	7,978	6,847	2,565	-	**17,390**	14,389	-	20,068	11,531	-	**45,988**
1995	7,955	-	10,217	1,726	**19,898**	477	-	-	**477**	1,305	-	1,675	4,775	**7,755**	7,259	8,698	1,586	-	**17,543**	16,996	-	20,590	8,087	-	**45,673**
1996	9,385	-	10,445	2,176	**22,006**	533	-	-	**533**	1,213	-	1,803	4,871	**7,887**	6,962	12,433	326	-	**19,721**	18,093	-	24,681	7,373	-	**50,147**
1997	10,120	-	11,268	1,068	**22,456**	785	-	-	**785**	1,324	-	2,309	5,168	**8,801**	9,919	11,696	516	-	**22,131**	22,148	-	25,273	6,752	-	**54,173**
1998	8,893	-	11,426	0	**20,319**	578	-	-	**578**	1,769	-	1,761	4,557	**8,087**	9,014	10,711	149	-	**19,874**	20,254	-	23,898	4,706	-	**48,858**
1999	10,772	-	13,741	0	**24,513**	654	-	-	**654**	5,050	-	1,676	2,622	**9,348**	10,806	11,823	106	-	**22,735**	27,282	-	27,240	2,728	-	**57,250**
2000	13,751	-	11,529	0	**25,280**	800	-	-	**800**	6,024	-	1,508	2,186	**9,718**	12,004	12,179	1,007	-	**25,190**	32,579	-	25,216	3,193	-	**60,988**
2001	15,648	-	9,941	0	**25,589**	907	-	-	**907**	5,452	-	1,641	2,432	**9,525**	13,362	10,518	835	-	**24,715**	35,369	-	22,100	3,267	-	**60,736**
2002	18,916	-	9,513	0	**28,429**	1,069	-	-	**1,069**	5,986	-	981	3,395	**10,362**	15,792	11,603	965	-	**28,360**	41,763	-	22,097	4,360	-	**68,220**
2003	20,665	-	6,424	0	**27,089**	1,175	-	-	**1,175**	6,572	-	1,266	2,513	**10,351**	16,004	11,707	1,068	50	**28,829**	44,416	-	19,397	3,581	50	**67,444**
2004	22,045	-	7,146	0	**29,191**	854	380	-	**1,234**	5,896	-	1,582	3,739	**11,217**	18,410	9,862	1,962	420	**30,654**	47,205	-	18,970	5,701	420	**72,296**
2005	16,476	-	12,408	0	**28,884**	857	343	-	**1,200**	5,932	-	1,389	3,435	**10,756**	14,732	12,228	2,513	418	**29,891**	37,997	-	26,368	5,948	418	**70,731**
2006	16,548	-	13,156	0	**29,704**	1,289	-	-	**1,289**	5,898	-	2,149	3,423	**11,470**	16,313	11,884	2,449	419	**31,065**	40,048	-	27,189	5,872	419	**73,528**
2007	20,488	-	10,686	0	**31,174**	1,406	-	-	**1,406**	6,478	-	1,806	3,691	**11,975**	16,779	13,140	2,367	470	**32,756**	45,151	-	25,632	6,058	470	**77,311**
2008	18,598	-	11,878	0	**30,476**	1,354	-	-	**1,354**	5,428	-	1,717	4,195	**11,340**	16,325	14,324	1,770	311	**32,730**	41,705	-	27,919	5,965	311	**75,900**
2009	17,739	-	10,077	0	**27,816**	1,243	-	-	**1,243**	4,832	-	1,860	3,868	**10,559**	14,732	12,459	2,836	328	**30,355**	38,546	-	24,396	6,704	328	**69,974**
2010	15,188	-	10,607	0	**25,795**	1,141	-	-	**1,141**	3,035	-	2,323	4,173	**9,531**	11,214	13,054	2,995	336	**27,599**	30,578	-	25,984	7,168	336	**64,066**
2011	13,593	2,038	10,195	0	**25,826**	1,172	-	-	**1,172**	1,325	746	3,216	4,389	**9,676**	14,718	12,775	265	373	**28,131**	30,808	2,784	26,186	4,654	373	**64,805**
2012	15,600	2,164	10,192	0	**27,956**	471	-	794	**1,265**	2,965	792	2,631	4,081	**10,469**	16,522	12,770	302	428	**30,022**	35,558	2,956	25,593	5,177	428	**69,712**
2013	20,059	2,275	7,262	0	**29,596**	485	-	811	**1,296**	4,488	833	1,405	3,835	**10,561**	18,249	12,764	594	400	**32,007**	43,281	3,108	21,431	5,240	400	**73,460**
2014	21,478	1,832	4,220	0	**27,530**	4	-	1,238	**1,242**	3,942	671	1,383	3,849	**9,845**	7,668	19,080	2,339	474	**29,561**	33,092	2,503	24,683	7,426	474	**68,178**
2015	15,019	2,167	4,597	0	**21,783**	3	-	973	**976**	2,478	794	1,131	3,697	**8,100**	6,648	13,605	2,929	450	**23,632**	24,148	2,961	19,333	7,599	450	**54,491**



1. Reflects State Water Project through 2006; includes imported water from State Water Project and Buena Vista WSD Agreement beginning in 2007 and continuing through the present year.
2. In January 2011, CLWA began operation of its Saugus groundwater containment project as part of municipal water supply. After treatment for perchlorate removal, that water was blended with treated imported water and delivered to the Purveyors through the CLWA distribution system. The amounts of treated groundwater from Saugus 1 and 2 utilized by each Purveyor reflect the estimated distribution to each Purveyor consistent with the proportions in the December, 2006 MOU that establishes amounts to be delivered and sold by CLWA to SCWD and NCWD at a reduced rate. Although the MOU and the CLWA subsidized rate structure indicates all the treated Saugus 1 and 2 water is delivered to NCWD and SCWD, a minor, unquantifiable amount of the water may have been delivered to the other purveyors as a result of varying distribution system operations.
3.Groundwater purchased from LA County Honor Farm.
4.Groundwater production began at a new LA County Waterworks District 36 Saugus well in December 2011.
5. Recycled water totals for 2012 and 2013 are estimates based on the water treament plant production meter; estimates were necessary due to customer meter failure.

Table 2-2
Individual Water Supply Utilization by Agricultural and Other Users
Santa Clarita Valley Water Report
(Acre-Feet)

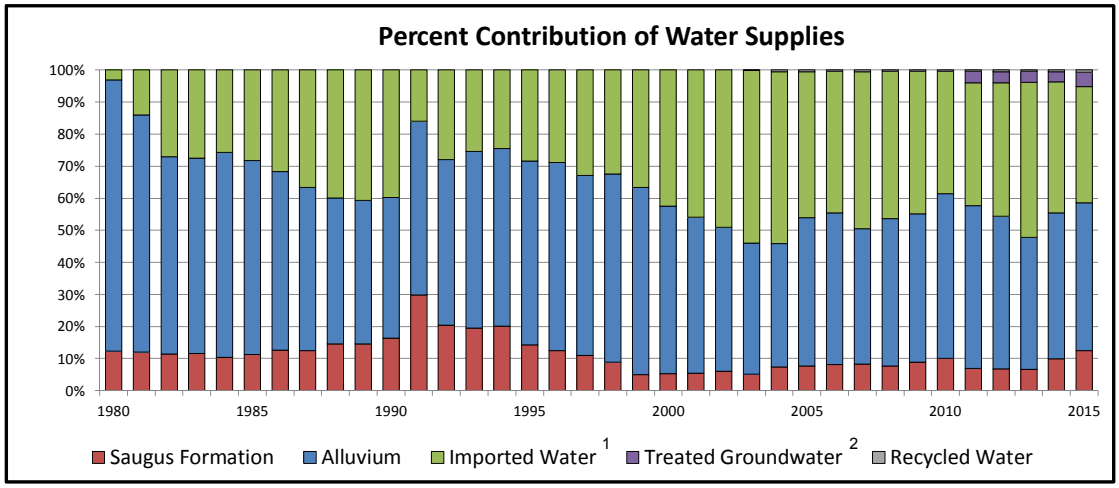
Year	Newhall Land and Farming			Los Angeles County Honor Farm			Small Private Domestic, Irrigation, and Golf Course Uses			All Agricultural and Other Users			
	Local Production		Total	Purchased from CLWA	Local Production	Total	Local Production		Total	Purchased from CLWA	Local Production		Total
	Alluvium	*Saugus Formation*		*Imported Water*[1]	*Alluvium*		*Alluvium*[2]	*Saugus Formation*[3]		*Imported Water*[1]	*Alluvium*	*Saugus Formation*	
1980	11,331	20	**11,351**	0	3,000	**3,000**	500	562	**1,062**	0	14,831	582	**15,413**
1981	13,237	20	**13,257**	0	3,000	**3,000**	500	521	**1,021**	0	16,737	541	**17,278**
1982	9,684	20	**9,704**	0	3,000	**3,000**	500	501	**1,001**	0	13,184	521	**13,705**
1983	7,983	20	**8,003**	0	3,000	**3,000**	500	434	**934**	0	11,483	454	**11,937**
1984	11,237	20	**11,257**	0	3,000	**3,000**	500	620	**1,120**	0	14,737	640	**15,377**
1985	9,328	20	**9,348**	0	3,000	**3,000**	500	555	**1,055**	0	12,828	575	**13,403**
1986	8,287	20	**8,307**	0	3,000	**3,000**	500	490	**990**	0	11,787	510	**12,297**
1987	6,512	20	**6,532**	0	3,000	**3,000**	500	579	**1,079**	0	10,012	599	**10,611**
1988	5,951	20	**5,971**	0	3,000	**3,000**	500	504	**1,004**	0	9,451	524	**9,975**
1989	6,243	20	**6,263**	0	3,000	**3,000**	500	522	**1,022**	0	9,743	542	**10,285**
1990	8,225	20	**8,245**	0	2,000	**2,000**	500	539	**1,039**	0	10,725	559	**11,284**
1991	7,039	20	**7,059**	0	2,240	**2,240**	500	480	**980**	0	9,779	500	**10,279**
1992	8,938	20	**8,958**	987	1,256	**2,243**	500	446	**946**	987	10,694	466	**12,147**
1993	8,020	20	**8,040**	443	1,798	**2,241**	500	439	**939**	443	10,318	459	**11,220**
1994	10,606	20	**10,626**	311	1,959	**2,270**	500	474	**974**	311	13,065	494	**13,870**
1995	11,174	20	**11,194**	6	2,200	**2,206**	500	453	**953**	6	13,874	473	**14,353**
1996	12,020	266	**12,286**	780	1,237	**2,017**	500	547	**1,047**	780	13,757	813	**15,350**
1997	12,826	445	**13,271**	1,067	1,000	**2,067**	500	548	**1,048**	1,067	14,326	993	**16,386**
1998	10,250	426	**10,676**	12	2,000	**2,012**	500	423	**923**	12	12,750	849	**13,611**
1999	13,824	479	**14,303**	20	1,842	**1,862**	500	509	**1,009**	20	16,166	988	**17,174**
2000	11,857	374	**12,231**	3	1,644	**1,647**	1,220	513	**1,733**	3	14,721	887	**15,611**
2001	12,661	300	**12,961**	0	1,604	**1,604**	1,224	573	**1,797**	0	15,489	873	**16,362**
2002	13,514	211	**13,725**	0	1,602	**1,602**	1,063	589	**1,652**	0	16,179	800	**16,979**
2003	10,999	122	**11,121**	0	2,273	**2,273**	931	504	**1,435**	0	14,203	626	**14,829**
2004	10,991	268	**11,259**	0	2,725	**2,725**	1,071	535	**1,606**	0	14,787	803	**15,590**
2005	8,648	6	**8,654**	0	2,499	**2,499**	1,133	499	**1,632**	0	12,280	505	**12,785**
2006	11,477	934	**12,411**	0	3,026	**3,026**	1,369	506	**1,875**	0	15,872	1,440	**17,312**
2007	9,968	971	**10,939**	0	2,085	**2,085**	1,088	656	**1,744**	0	13,141	1,627	**14,768**
2008	9,191	330	**9,521**	0	3,506	**3,506**	1,100	623	**1,723**	0	13,797	953	**14,750**
2009	11,061	379	**11,440**	0	3,432	**3,432**	1,097	595	**1,692**	0	15,590	974	**16,564**
2010	10,772	366	**11,138**	0	3,446	**3,446**	957	558	**1,515**	0	15,175	924	**16,099**
2011	10,323	344	**10,667**	0	3,226	**3,226**	1,013	533	**1,546**	0	14,562	877	**15,439**
2012	11,296	0	**11,296**	0	2,722	**2,722**	1,090	586	**1,676**	0	15,108	586	**15,694**
2013	12,091	0	**12,091**	0	2,309	**2,309**	1,061	690	**1,751**	0	15,461	690	**16,151**
2014	9,262	0	**9,262**	0	2,082	**2,082**	869	672	**1,541**	0	12,213	672	**12,885**
2015	8,868	0	**8,868**	0	1,768	**1,768**	723	720	**1,443**	0	11,359	720	**12,079**



1. *Reflects State Water Project through 2006; includes imported water from State Water Project and Buena Vista WSD Agreement beginning in 2007.*
2. *Robinson Ranch Golf Course irrigation and estimated private pumping.*
3. *Valencia Country Club and Vista Valencia Golf Course irrigation.*

Table 2-3
Total Water Supply Utilization for Municipal, Agricultural and Other Uses
Santa Clarita Valley Water Report
(Acre-Feet)

Year	Purchased from CLWA		Local Production		Other	Total
	Imported Water [1]	*Treated Groundwater* [2]	*Alluvium*	*Saugus Formation*	*Recycled Water*	**Total**
1980	1,126	-	31,463	4,589	-	**37,178**
1981	5,817	-	30,790	4,970	-	**41,577**
1982	9,659	-	21,868	4,090	-	**35,617**
1983	9,185	-	20,286	3,852	-	**33,323**
1984	10,996	-	27,318	4,449	-	**42,763**
1985	11,823	-	25,347	4,715	-	**41,885**
1986	13,759	-	24,205	5,485	-	**43,449**
1987	16,285	-	22,642	5,561	-	**44,488**
1988	19,033	-	21,648	6,928	-	**47,609**
1989	21,618	-	23,721	7,759	-	**53,098**
1990	21,613	-	23,876	8,861	-	**54,350**
1991	7,968	-	27,187	14,917	-	**50,072**
1992	14,898	-	27,591	10,924	-	**53,413**
1993	13,836	-	30,126	10,610	-	**54,572**
1994	14,700	-	33,133	12,025	-	**59,858**
1995	17,002	-	34,464	8,560	-	**60,026**
1996	18,873	-	38,438	8,186	-	**65,497**
1997	23,215	-	39,599	7,745	-	**70,559**
1998	20,266	-	36,648	5,555	-	**62,469**
1999	27,302	-	43,406	3,716	-	**74,424**
2000	32,582	-	39,937	4,080	-	**76,599**
2001	35,369	-	37,589	4,140	-	**77,098**
2002	41,763	-	38,276	5,160	-	**85,199**
2003	44,416	-	33,599	4,207	50	**82,273**
2004	47,205	-	33,757	6,503	420	**87,885**
2005	37,997	-	38,648	6,453	418	**83,516**
2006	40,048	-	43,061	7,312	419	**90,840**
2007	45,151	-	38,773	7,685	470	**92,079**
2008	41,705	-	41,716	6,918	311	**90,650**
2009	38,546	-	39,986	7,678	328	**86,538**
2010	30,578	-	41,159	8,092	336	**80,165**
2011	30,808	2,784	40,748	5,531	373	**80,244**
2012	35,558	2,956	40,701	5,763	428	**85,406**
2013	43,281	3,108	36,892	5,930	400	**89,611**
2014	33,092	2,503	36,896	8,098	474	**81,063**
2015	24,148	2,961	30,692	8,319	450	**66,570**



1. Reflects State Water Project through 2006; includes imported water from State Water Project and Buena Vista WSD Agreement beginning in 2007.
2. In January 2011, CLWA began operation of its Saugus Formation groundwater containment project. After treatment for perchlorate removal, that water was blended with treated imported water and delivered to the Purveyors through the CLWA distribution system.

has since declined to below 70,000 in 2015. The relatively stable 13-year trend (2002-2014) had been mostly attributed to the expansion of water conservation efforts having a greater effect on demand than the continued growth in service connections (**Table 2-3** and **Figure 2-1**). In addition, more stringent conservation efforts were implemented in 2014 and 2015 to both increase conservation efforts and also to comply with state-mandated reductions in water usage of 25% from 2013 levels. These efforts have been successful in dramatically reducing demand to levels not seen since the 1990s.

As can also be seen by inspection of **Table 2-3** and **Figure 2-1**, most of the historical increase in water demand from 1980 through 2007 has been met with generally greater proportions of imported SWP water, complemented by other imported water sources. Recent variations in water demand (from 2007 through 2012) have been met with a corresponding increase or decrease in the use of imported water while total groundwater use has generally remained unchanged, ranging from about 46,000 to 49,000 acre-feet per year. In 2015, the more than 25 percent decrease in water demand over 2013 was primarily met with a 44 percent decrease in imported water and an almost 9 percent decrease in groundwater use (from 46,000 af to 42,000 af).

2.3 Municipal Water Use

The retail water Purveyors use of local groundwater, augmented by water supplies purchased from CLWA (imported SWP and non-SWP water supplies and treated Saugus Formation groundwater), and also slightly augmented by the use of recycled water, are summarized in **Table 2-1**. Municipal water requirements in 2015 (54,500 af) were below the projections in the 2010 UWMP without conservation by about 25,600 af, and about 17,900 af below the projections with conservation.

The decrease in water use in 2015 occurred despite a one percent increase in service connections in 2015 (about 73,100 connections) as compared to 2014 (about 72,400 connections). The largest number of additional service connections occurred in the SCWD (about 450 new connections) and VWC (almost 250 new connections) service areas. There were about 700 new service connections in 2015 compared to about 200 to 500 new annual connections in the 2009 through 2012 period. The number of new annual service connections in 2015 is still less than the number and rate of new annual connections in the late 1990s through 2008 period. Municipal water demand has fluctuated between about 55,000 to

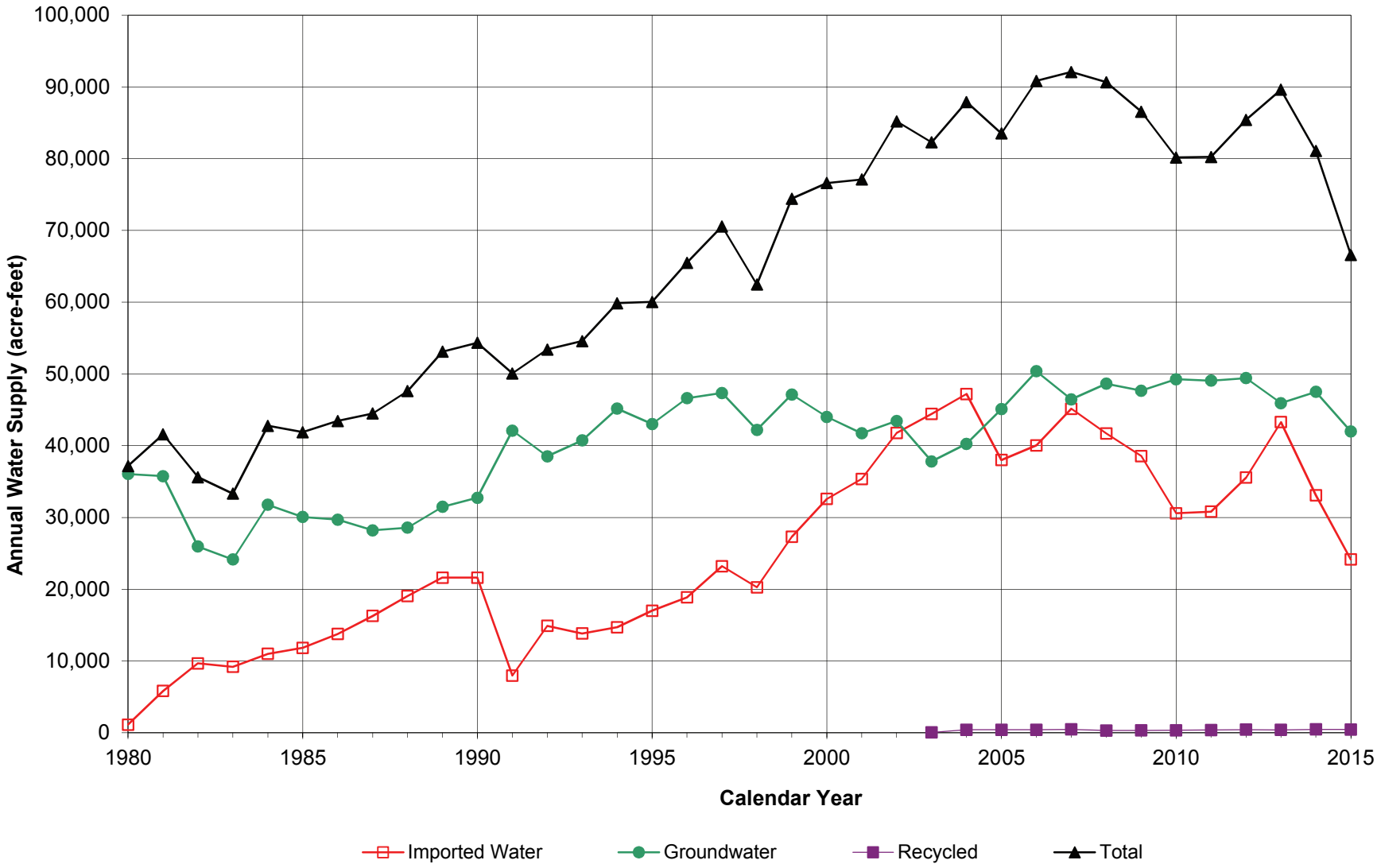
77,000 afy since 2001 (**Table 2-1**) even though there are currently about 21,000 more service connections in 2015 as compared to 2001 (**Table 2-4**) and **Figure 2-2**.

Table 2-4
Service Connections by Purveyor

Year	SCWD	VWC	NCWD	LACWD 36	TOTAL
2001	22,000	22,000	7,200	1,111	52,311
2002	24,175	25,286	7,700	1,187	58,348
2003	25,175	26,810	8,650	1,301	61,936
2004	26,161	28,296	9,010	1,319	64,786
2005	27,000	28,800	9,200	1,321	66,321
2006	27,582	29,111	9,346	1,338	67,377
2007	27,911	29,445	9,525	1,343	68,224
2008	28,547	29,924	9,540	1,357	69,368
2009	28,687	29,948	9,580	1,350	69,565
2010	28,904	30,080	9,637	1,332	69,953
2011	29,089	30,217	9,670	1,337	70,313
2012	29,352	30,411	9,693	1,343	70,799
2013	29,713	30,796	9,702	1,350	71,561
2014	30,229	31,101	9,710	1,345	72,385
2015	30,681	31,353	9,736	1,345	73,115

2.4 Agricultural and Other Water Uses

Water supply utilization for agricultural and other non-municipal uses is summarized in **Table 2-2**. The category of Small Private Domestic, Irrigation and Golf Course Uses in **Table 2-2** includes an estimated 500 afy of small individual private pumping from the Alluvium. Annual water supply utilization for all agricultural and other non-municipal uses has generally remained stable and has averaged about 15,300 af since the mid-1990s and was about 12,100 af in 2015.



LUHDORFF & SCALMANINI CONSULTING ENGINEERS

Figure 2-1
Total Water Supply Utilization
Santa Clarita Valley Water Report

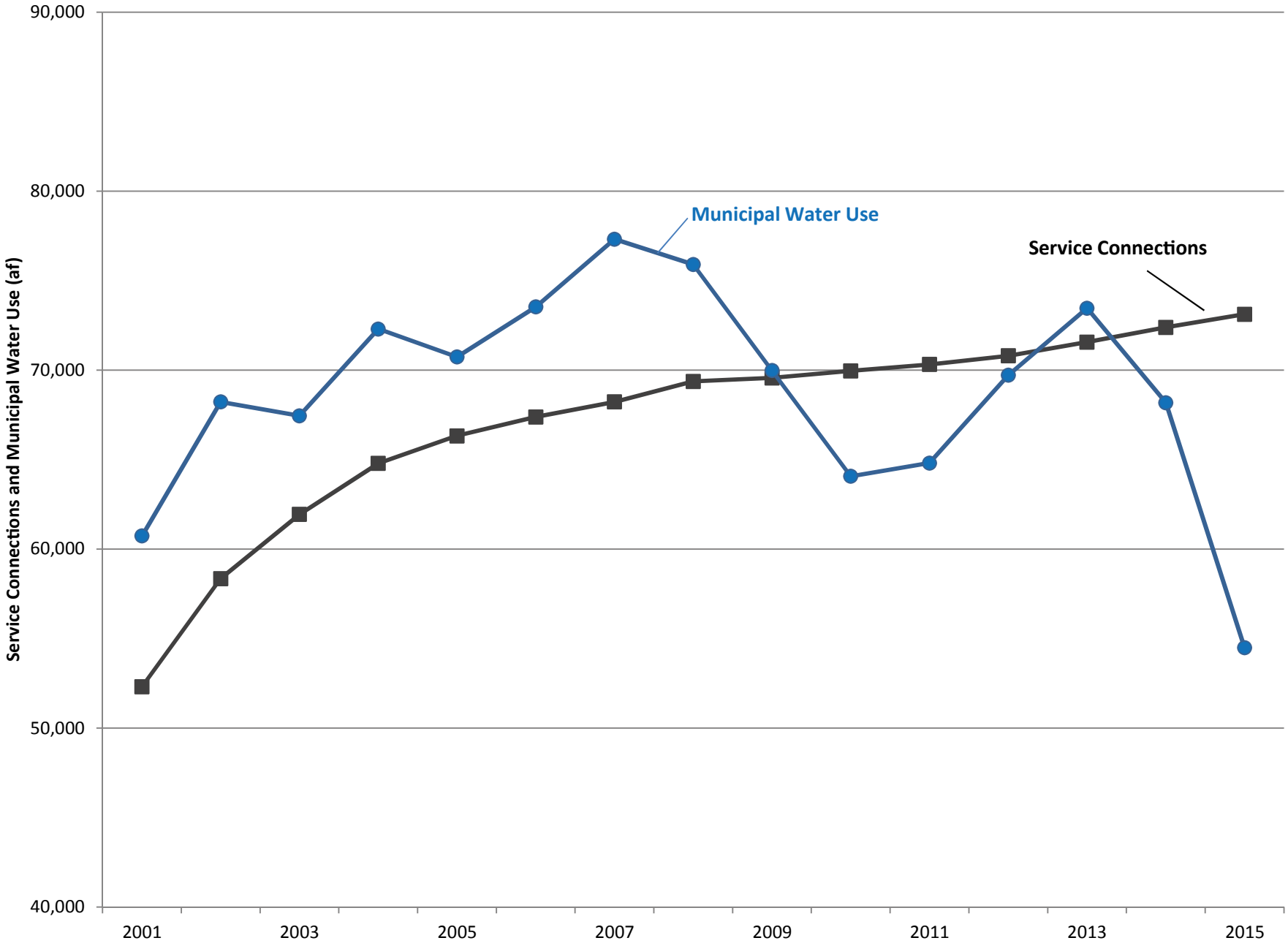


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Figure 2-2
Service Connections and Total Water Use
Santa Clarita Valley Water Report

3 WATER SUPPLIES

Prior to 1980, local groundwater extracted from the Alluvium and the Saugus Formation was the sole source of water supply in the Santa Clarita Valley. Since 1980, local groundwater supplies have been supplemented with imported SWP water supplies, augmented in 2007 by acquisition of additional supplemental water imported from the Buena Vista/Rosedale-Rio Bravo Water Storage District acquisition, and Yuba Accord water in 2008. Those water supplies have also been slightly augmented by deliveries from CLWA's recycled water program since 2003. This section describes the groundwater resources of the Santa Clarita Valley, SWP and other imported water supplies, and the recycled water program in the Valley.

3.1 Groundwater Basin Yield

The groundwater basin beneath the Santa Clarita Valley, identified in the State Department of Water Resources' Bulletin 118 (DWR, 2003) as the Santa Clara River Valley Groundwater Basin, East Subbasin (Basin No. 4-4.07), comprises two aquifer systems, the Alluvium and Saugus Formation. The Alluvium generally underlies the Santa Clara River and its several tributaries, and the Saugus Formation underlies practically the entire Upper Santa Clara River area. The mapped extent of the Santa Clara River Valley East Groundwater Subbasin in DWR Bulletin 118 and its relationship to the extent of the CLWA service area are illustrated in **Figure 3-1**. The mapped subbasin boundary approximately coincides with the outer extent of the Alluvium and Saugus Formation.

3.1.1 Historical Investigations

Since 1986, there have been several efforts which have evaluated and reported on the Alluvium and Saugus Formations, interpreted hydrologic conditions, and estimated sustainable yields from both formations (Slade, 1986; Slade, 1988; Slade, 2002; CLWA, 2003; CH2M Hill, 2004; CH2M HILL, 2005; CH2M HILL and LSCE, 2005; CLWA, 2005; and LSCE and GSI, 2009). Generally, these investigations have concluded similarly about the basin conditions and yield:

- Analysis of groundwater levels and production indicates that there have been no conditions that would be illustrative of groundwater overdraft.
- The utilization of operational yield (as opposed to perennial yield) as a basis for managing groundwater production would be more applicable in this basin to reflect the fluctuating utilization of groundwater in conjunction with imported SWP water.

- The operational yield of the Alluvium would typically be 30,000 to 40,000 acre feet per year (afy) for wet and normal rainfall years, with an expected reduction into the range of 30,000 to 35,000 afy in dry years.
- The operational yield of the Saugus Formation would typically be in the range of 7,500 to 15,000 afy on a long-term basis, with possible short-term increases during dry periods into a range of 15,000 to 25,000 afy, and to 35,000 afy if dry conditions continue.

These points became the foundation of the initial Groundwater Operating Plan (initial Plan) first developed in 2004 after the adoption of a formal Groundwater Management Plan in 2003 (CLWA, 2003). The groundwater component of overall water supply in the Valley was derived from this initial Plan to meet water requirements (municipal, agricultural and other non-municipal, and small individual domestic) while maintaining the basin in a sustainable condition (i.e., no long-term depletion of groundwater or interrelated surface water). This initial Plan also addressed groundwater contamination issues in the basin, all consistent with the Groundwater Management Plan. The initial Plan was based on the concept that pumping can vary from year to year to generally rely on increased groundwater use in dry periods and increased recharge during locally wet periods, and to collectively assure that the groundwater basin is adequately replenished through various wet/dry cycles.

The initial Plan was as follows:

Alluvium – Pumping from the Alluvial Aquifer in a given year is related to local hydrologic conditions in the eastern Santa Clara River watershed. Pumping is expected to typically range between 30,000 and 40,000 afy following normal and above-normal rainfall years. Due to hydrogeologic constraints in the eastern part of the basin, pumping is expected to be typically reduced to between 30,000 and 35,000 afy following multiple locally dry years.

Saugus Formation – Pumping from the Saugus Formation in a given year is related to the availability of imported water supplies, particularly from the SWP. During average-year conditions within the SWP system, Saugus pumping is expected to typically range between 7,500 and 15,000 afy. Planned dry-year pumping from the Saugus Formation is expected to range 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. For three or more consecutive years of reduced SWP deliveries, pumping from the Saugus Formation can

range between 21,000 and 35,000 afy. Such high pumping is expected to typically be followed by periods of reduced (average-year) pumping, at rates between 7,500 and 15,000 afy, to enhance the effectiveness of natural recharge processes that would cause groundwater levels and storage volumes to recover after the higher pumping during dry years.

3.1.2 Current Operating Plan

The initial Plan was updated in 2008 to evaluate the yield of the basin and present a sustainable operating plan for utilizing groundwater resources from the Alluvium and the Saugus Formation under wet, normal, and dry conditions (LSCE and GSI, 2009), summarized in **Table 3-1**. This effort was conducted partly in preparation for UWMP beginning with the 2010 UWMP and continued in the 2015 UWMP, and in part because of events that can be expected to impact the future reliability of the supplemental water supply from the SWP. The Purveyors initiated this updated analysis (Current Operating Plan) to further assess groundwater development potential and possible augmentation of the initial Plan. A further consideration in conducting the updated analysis of the basin was that global climate change could alter local rainfall and associated recharge patterns, thus affecting local groundwater supplies, i.e. the yield of the basin. Finally, the Los Angeles County Flood Control District (LACFCD) was planning a number of small flood control projects in the Santa Clarita Valley; estimated amounts of conservation/groundwater recharge potential were being included for each of the individual projects in the overall LACFCD planning, and the Purveyors had interest in whether that potential could appreciably augment the yield of the basin.

Table 3-1
Groundwater Operating Plan for the Santa Clarita Valley

Aquifer	Groundwater Production (af)			
	Normal Years	Dry Year 1	Dry Year 2	Dry Year 3
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
Total	37,500 to 55,000	45,000 to 60,000	51,000 to 60,000	51,000 to 70,000

The updated basin yield analysis (LSCE and GSI, 2009), completed in August 2009, had the following conclusions:

- The Current Operating Plan, with currently envisioned pumping rates and distribution and comparable to the initial Plan described above, will not cause detrimental short- or long-term effects to the groundwater and surface water resources in the Valley and is, therefore, sustainable (**Table 3-1**). Further, local conditions in the Alluvium in the eastern end of the basin can be expected to repeat historical groundwater level declines during dry periods, necessitating a reduction in desired Alluvial aquifer pumping due to decreased well yield and associated actual pumping capacity during those periods. However, those reductions in pumping from the Alluvial aquifer can be made up by an equivalent amount of increased pumping in other parts of the basin without disrupting basin-wide sustainability or local pumping capacity in those other areas. For the Saugus Formation, the modeling analysis indicated that it can sustain the pumping that is embedded in the Current Operating Plan.
- A Potential Operating Plan (Alluvial pumping between 41,500 and 47,500 afy) would result in lower Alluvial groundwater levels, failure of the basin to fully recover (during wet hydrologic cycles) from depressed storage that would occur during dry periods, and generally declining trends in groundwater levels and storage. Long-term lowering of groundwater levels would also occur in the Saugus Formation (pumping between about 16,000 and nearly 40,000 afy) with only partial water level recovery occurring in the Saugus. Thus, the Potential Operating Plan would not be sustainable over a long-term period.
- Several climate change models were examined to estimate the potential impacts on local hydrology in the Santa Clarita Valley. The range of potential climate change impacts extends from a possible wet trend to a possible dry trend over the long term (from 2010 through 2095). The trends that range from an approximate continuation of historical average precipitation, to something wetter than that, would appear to result in continued sustainability of the Current Operating Plan, again with intermittent constraints on full pumping in the eastern part of the basin. The potential long-term dry trend arising out of climate change would be expected to decrease local recharge to the point that lower and declining groundwater levels would render the Current Operating Plan unsustainable. Ultimately it was recognized that a wide range of potential global climate change produces a range of non-unique results with respect to local hydrologic conditions and associated sustainable groundwater supply. Notable in the wide range of possibilities, however, was the output that, over the planning horizon of the 2010 and 2015 UWMP (through 2050), the range of relatively wet to relatively dry hydrologic

conditions would be expected to produce sustainable groundwater conditions under the Current Groundwater Operating Plan.

Based on the preceding conclusions, groundwater utilization generally has continued in accordance with the Current Operating Plan; and the Potential Operating Plan is not being considered for implementation.

In 2014 and 2015, a temporary redistribution of Alluvial pumping under the Current Operating Plan was implemented in response to a severe curtailment of SWP deliveries, a temporary decrease in Saugus Formation well capacity due to perchlorate concentrations in the vicinity of some Saugus Formation production wells, and drought impacts on groundwater levels in the eastern portion of the subbasin. This redistribution involved a reduction of Alluvial pumping from the eastern areas of the Valley, where groundwater levels have shown the most decline during the drought, to the central and western areas of the Valley. This redistribution involved a temporary increase in Alluvial groundwater pumping in 2014 above the Current Operating Plan range for the Alluvium and Alluvial pumping in the lower end of the dry year range in 2015. However, the combined Alluvial pumping in 2014 and 2015 was within the dry year ranges of pumping for the Alluvium. The temporary redistribution was identified in the 2009 Basin Yield Report as a possible management action to address short-term drought impacts on groundwater levels in the eastern portions of the Valley and is consistent with the overall water supply strategy to conjunctively use groundwater and imported water to area residents to ensure consistent quality and reliability of service. The actual blend of imported water and groundwater in any given year and location in the Valley is an operational decision and varies over time due to source availability and operational capacity of individual Purveyor and CLWA facilities. As noted above, groundwater pumping from Alluvium in 2015 was substantially below the 2014 level of (about 31,000 af in 2015 compared to almost 37,000 af in 2014). This was primarily due to a reduction in demand through conservation efforts.

3.2 Alluvium – General

The spatial extent of the aquifers used for groundwater supply in the Valley, the Alluvium and the Saugus Formation, are illustrated in **Figure 3-1**. Geologic descriptions and hydrogeologic details related to both aquifers are included in several technical reports including Slade (1986, 1988, and 2002), CH2M Hill (2005) and LSCE (2005), the 2005 UWMP (CLWA, 2005) and the 2010 UWMP (CLWA, 2011), and the draft 2015 UWMP.

Consistent with the 2001 Update Report (Slade, 2002), the 2005 Basin Yield Report (CH2M Hill and LSCE, 2005), the 2009 Updated Basin Yield Report (LSCE and GSI, 2009), and the UWMPs (2005, 2010, and draft 2015), the management practice of the Purveyors continues to be reliance on groundwater from the Alluvium for part of the overall municipal water supply, whereby total pumping from the Alluvium (by municipal, agricultural, and private pumpers) is in accordance with the Current Operating Plan, 30,000 to 40,000 afy in wet and normal years, with possible reduction to 30,000 to 35,000 afy during multiple dry years. Such operation will maximize use of the Alluvium because of the aquifer's ability to store and produce good quality water on a sustainable basis, and because the Alluvium is capable of rapid recovery of groundwater storage in wet periods. As with many groundwater basins, it is possible to intermittently exceed a long-term average yield for one or more years without long-term adverse effects. Higher pumping for short periods may temporarily lower groundwater storage and related water levels, as has been the case in the Alluvium several times since the 1930's. However, subsequent decreases in pumping limit the amount of water level decline. Normal to wet-period recharge results in a rapid return of groundwater levels to historic highs. Historical groundwater level data collected from the Alluvium over numerous hydrologic cycles continue to provide assurance that groundwater elevations, if locally lowered during dry periods, recover in subsequent average or wet years. Such water level response to rainfall is a significant characteristic of permeable, porous, alluvial aquifer systems that occur within large watersheds. In light of these historical observations, complemented by the long-term sustainability analysis using the numerical groundwater flow model in 2008, there is ongoing confidence that groundwater will continue to be a sustainable source of water supply at the rates of pumping as described in the 2009 Updated Basin Yield Report, and incorporated in the Valley's recent UWMPs.

Long-term adverse impacts to the Alluvium could occur if the amount of water extracted from the aquifer were to exceed the amount of water that recharges the aquifer over an extended period. However, the quantity and quality of water in the Alluvium and all significant pumping from the Alluvium are routinely monitored, and no long-term adverse impacts have ever been evident. Ultimately, the Purveyors have identified cooperative measures to be taken, if needed, to ensure sustained use of the aquifer. Such measures include but are not limited to the continuation of conjunctive use of SWP and other imported supplemental water with local groundwater, artificial recharge of the aquifer with local runoff or other surface water supplies,

expanded use of other water supplies such as recycled water, and expanded implementation of demand-side management, including conservation.

3.2.1 Alluvium – Current Conditions

Total pumping from the Alluvium in 2015 was about 30,700 af, about 6,200 af less than was pumped in 2014. Total Alluvial pumping was at the lower end of the groundwater Operating Plan range for a dry year while following the temporary redistribution in Alluvial pumping as described previously. Of the total Alluvial pumping in 2015, about 19,300 af (63 percent) was for municipal water supply, and the balance, about 11,400 af (37 percent), was for agriculture and other private uses, including individual domestic uses.

Groundwater level response in 2015 to the lowered overall amount and redistribution of pumping toward central and western parts of the Valley in 2015 varied depending on the location in the Valley. In the Mint Canyon and Above Saugus WRP areas, groundwater levels showed little to no decline in most wells and a 5 to 10 foot decline in a small subset of wells compared to 2014 levels (**Figure 3-4**). In the Bouquet Canyon area, groundwater levels declined 10 to 20 feet compared to 2014. These declines were larger than experienced in 2014 (**Figure 3-4**). In the San Francisquito Canyon area, groundwater levels declined 5 to 15 feet compared to 2014 (**Figure 3-5**). Groundwater levels in the Castaic Valley declined almost 10 feet in wells at lower elevations and otherwise were unchanged during 2015 as compared to 2014. Groundwater levels showed little to no declines in the Below Saugus WRP and Below Valencia WRP areas in 2015, similar to 2014 patterns (**Figure 3-5**).

3.2.2 Alluvium – Historical Conditions

Interpretation of longer term, historical groundwater levels and pumping indicate that the amount of groundwater pumping in 2015 has remained consistent with historically observed conditions, with no negative changes in groundwater levels that might indicate pumping in excess of a sustainable amount. Overall, the combination of pumping and groundwater level response in 2015 suggests that the Operating Plan range does not reflect absolute groundwater pumping limits. In a longer-term context, there has been a change in municipal/agricultural pumping distribution since SWP deliveries began in 1980, toward a higher fraction for municipal water supply (from about 50 percent to more than 65 percent of Alluvial pumpage), which reflects the general land use changes in the area. Ultimately, on a long-term average annual basis since the initiation of SWP deliveries, total Alluvial pumping has been about 33,200 afy,

which is at the lower end of the range of operational yield of the Alluvium during normal years and in the middle of the range for dry years. That annual average has been higher over the last ten years, about 39,100 afy, which remains within the range of operational yield of the Alluvium on a long term annual average basis representing normal hydrologic conditions. The overall historic record of Alluvial pumping is shown in **Table 2-3** and illustrated in **Figure 3-2**.

Groundwater levels in various parts of the basin have historically exhibited different responses to both pumpage and climatic fluctuations. During the last 20 to 30 years, depending on location, Alluvial groundwater levels have remained nearly constant (generally toward the western end of the subbasin), or have fluctuated from near the ground surface when the subbasin is full, to as much as 100 feet lower during intermittent dry periods of reduced recharge (generally toward the eastern end of the subbasin). For illustration of the various groundwater level conditions in the subbasin, the Alluvial wells have been grouped into areas with similar groundwater level patterns, as shown in **Figure 3-3**. The groundwater level records have been organized into hydrograph form showing groundwater elevation on a time series basis as illustrated in **Figures 3-4 and 3-5**. Also shown on these plots is a marker indicating whether any year had a below-average amount of rainfall. The wells shown on these plots are representative of the respective areas, showing the range of values (highest to lowest groundwater elevation) through each area, and containing a sufficiently long-term record to illustrate trends over time.

Situated along the upstream end of the Santa Clara River Channel, the Mint Canyon area, located at the far eastern end of the groundwater subbasin, and the nearby Above Saugus WRP area generally exhibit similar groundwater level responses (**Figure 3-4**) to hydrologic and pumping conditions. The wells located in the Mint Canyon area generally show a more pronounced rebound in groundwater elevations during wet periods compared to wells located in the Above Saugus WRP area. These eastern parts of the Valley have historically experienced a number of alternating wet and dry hydrologic conditions during which groundwater level declines have been followed by returns to high or mid-range historic levels. When water levels are low, well yields and pumping capacities in this and other eastern areas can be impacted. The affected Purveyors typically respond by decreasing pumping in the Alluvium and increasing use of Saugus Formation and imported (SWP and other) supplies, as shown in **Table 2-3**. The Purveyors also shift a fraction of the Alluvial pumping that would normally be supplied by the eastern areas to areas further west, where well yields and pumping capacities remain fairly

constant because of smaller groundwater level fluctuations in response to wet and dry hydrologic periods. Long-term pumping in the Mint Canyon area has averaged about 7,400 afy. However, since a high of over 12,000 afy in 2006, pumping in the Mint Canyon area has since generally declined and in 2015 pumping was about 2,100 af or less than a third the long-term average. Recent wet and dry periods illustrate the groundwater level response to managed Alluvial pumping. The five-year period of 2006 through 2010 saw water level declines on the order of 50 to 60 feet; pumping was gradually reduced by about 40 percent over that period (from 12,000 af in 2006 to 6,900 in 2010) and water levels stopped declining (**Figure 3-6).** Subsequent wet conditions in late 2010, continuing into 2011, resulted in a nearly full recovery of groundwater levels and aquifer storage. With such high groundwater levels, pumping increased by about 1,500 afy over 2010 levels in 2011 (8,400 af) and 2012 (8,600 af). Dry conditions in 2012 through 2015 prompted pumping reductions in each subsequent year as groundwater levels declined through 2013 and began to stabilize in 2014 and 2015. Groundwater levels in the Mint Canyon area are generally at or near historic lows.

Just west of the Mint Canyon area, the Above Saugus WRP area has shown similar hydrologic trends. Pumping trends are historically similar to the Mint Canyon area, with the pumping fluctuating in response to wet/dry periods. However, long-term average annual pumping in the Above Saugus WRP area has been less than half the pumping rate in Mint Canyon, as shown in **Figure 3-6**, at about 3,600 afy. Groundwater level response is similar to the Mint Canyon area in that groundwater levels are sensitive to variations in rainfall and pumping. Groundwater levels have exhibited a decline since 2005 and 2006 with a slight increase in levels in 2010 and 2011 in response to the above normal rainfall in that period. Currently, groundwater levels in the Above Saugus WRP area are at the lower end of the range of long-term levels that are representative of historical dry periods.

In the Bouquet Canyon area, groundwater levels, as represented by the Guida and Clark wells in **Figure 3-4**, are influenced by a number of factors, including groundwater pumping and recharge from rainfall, natural streamflow in Bouquet Creek and releases from Bouquet Reservoir into Bouquet Creek. Groundwater pumping has ranged from 500 to 2,500 afy since 1985 and has declined slightly since 2007 from about 2,200 af to about 1,100 af in 2015, similar to the early 1990s. Since 2005, groundwater elevations had increased in response to a wet rainfall year in 2005 and to resumed 'normal' releases of water from Bouquet Reservoir to Bouquet Creek that

occurred in 2009 through 2011[1]. However, over the past four years, the dry conditions and a continued reduction in Bouquet Reservoir releases (related to streambed issues – not drought related) have resulted in groundwater elevations declining 10 to 20 feet in 2015 to levels that remain within the historical range of levels for each well.

In the western parts and lower elevations of the subbasin, groundwater levels in the Alluvium respond to pumping and precipitation in a similar manner, but to an attenuated or limited extent compared to those situated in the eastern, higher elevation areas. As shown in the group of hydrographs in **Figure 3-5** that represent Alluvial groundwater conditions in the western portion of the subbasin, specifically the San Francisquito Canyon and Below Saugus WRP areas, the magnitude of groundwater level fluctuations are less than those observed in the eastern area of the Valley.

Wells located in the San Francisquito Canyon area and presented in **Figure 3-5** (W5, W9 and W11 wells) generally exhibit similar long-term groundwater level trends that respond to variations in rainfall and pumpage with seasonal declines and partial recovery in dry years or full recovery to historical highs in wet years, similar in nature to other eastern areas of the Valley. In this area, groundwater levels have declined 50 feet from historic highs in 2011, however they are still higher than historical low groundwater levels in the 1950s and 60s.

Groundwater levels in this area notably recovered, possibly as a result of a decline in pumping through the 1960s and 1970s. They have subsequently sustained generally high levels for much of the last 30 years, with four dry-period exceptions: mid-1970s, late 1980s to early 1990s, late 1990s to early 2000s and late 2000s. Recoveries to previous high groundwater levels have followed all of the recent dry-period declines.

[1] Flow in Bouquet Creek is regulated by releases from Bouquet Reservoir, which is operated by Los Angeles Department of Water and Power. Per an agreement with United Water Conservation District, minimum releases from Bouquet Reservoir are specified. These releases had been maintained until a series of storms in 2005 created substantial runoff and altered the streambed so that even small amounts of flow spills out of the creek and onto Bouquet Canyon Road. Efforts to prevent flow onto the road while maintaining specified releases have not been completely successful, and therefore releases from Bouquet Reservoir have continued to be reduced March through October since 2006 (except for 2009-2011).

Wells located in the Below Saugus WRP area in **Figure 3-5** (VWC's I and Q2 wells), along the Santa Clara River immediately downstream of the Saugus Water Reclamation Plant generally show steadily declining groundwater levels from 2006 through 2014 (without the short-term rise in levels in 2010-11 as seen in other areas), and are currently 20 to 50 feet below historic high levels. In 2015, there were some wells with small groundwater level declines compared to 2014 levels, but most had stable water level trends through the year. Although the groundwater levels in the Below Saugus WRP area are relatively low, the water levels are still at or substantially above well screen intake sections and they remain higher than historic lows observed in the 1960s. Pumping has been generally constant at about 6,000 afy from the mid-1990s to the early 2000s, followed by more variable pumping that ranged from 4,000 af in 2005 and 2006 to 10,500 af in 2014 and back down to 8,000 in 2015 in the Below Saugus WRP area.

Groundwater levels in the Castaic Valley area, located along Castaic Creek below Castaic Lake, continue to remain fairly stable since the 1950s. Historically, there have been some fluctuations in groundwater levels from 20 to 40 feet in response to climatic variability and other factors (**Figure 3-5**). Pumping has remained relatively constant for nearly 30 years at about 5,100 afy (**Figure 3-6**); although 2015 pumping was below that long-term average at 2,300 af. Groundwater levels have declined approximately 20 to 35 feet since 2011; however, they are still higher than levels observed in the 1960s. Wells in the lower elevations saw a decline of up to 10 feet in 2015, while water levels in higher elevations were basically unchanged. These recent declines in groundwater levels are consistent with other short-term historical fluctuations around the Valley.

In the Below Valencia WRP area, downstream of the Valencia Water Reclamation Plan which discharges treated effluent to the Santa Clara River, groundwater pumping notably increased through the 1990s but has since increased at a much lower rate since the early 2000s, and was about 10,100 af in 2015 (**Figure 3-6**). Long-term groundwater levels in this area have generally been stable and have exhibited slight response to pumping and climatic fluctuations, although in the last ten years there has been a slight decline of about 10 feet observed in the C and E designated wells in this area through 2015. These slight declines may be attributed to generally dry conditions present since 2005 (**Figure 3-5**).

In summary, the Alluvium shows the same general picture: groundwater levels over the last 30 years have exhibited historic highs as recent as 2011. In some locations, there are intermittent,

short-term dry-period declines (resulting from use of some groundwater from storage) followed by shorter wet-period recoveries (and associated refilling of storage space). On a long-term basis, whether over the last 30 years since importation of supplemental SWP water, or over the last 40 to 50 years (since the 1950s - 60s), the Alluvium shows no chronic trend toward decreasing water levels and storage, and thus shows no symptoms of water level-related overdraft. Consequently, pumping from the Alluvium has been and continues to be sustainable, well within the operational yield of that aquifer on a long-term annual average basis.

3.3 Saugus Formation – General

Saugus Formation wells are operated by the Purveyors and CLWA in a manner consistent with the Current Operating Plan and historical investigations that include the 2001 Update Report (Slade, 2002), the 2005 Basin Yield Report (CH2M Hill and LSCE, 2005), and the 2009 Updated Basin Yield Report (LSCE and GSI, 2009). These wells are primarily located in the southern and western portions of the basin (**Figure 3-7**). The Current Operating Plan targets pumping the Saugus in the range of 7,500 to 15,000 afy in average/normal years, with planned dry-year pumping of 15,000 to 35,000 afy for one to three consecutive dry years, when shortages to CLWA's SWP water supplies could occur. Such high pumping would be followed by periods of lower pumping in order to allow recharge to recover water levels and storage in the Saugus Formation. Maintaining the substantial volume of water in the Saugus Formation remains an important strategy to help maintain water supplies in the Santa Clarita Valley during drought periods. The ability of the Purveyors to pump the Saugus Formation at dry-year levels has been historically impaired due to perchlorate contamination issues and resultant reduced production capacity. Both of these issues are expected to be resolved over the next few years.

3.3.1 Saugus Formation – Current Conditions

Total pumping from the Saugus in 2015 was about 11,300 af, or about 700 af more than in the preceding year. This included about 3,000 af that were pumped from CLWA's Saugus 1 and Saugus 2 wells as part of the perchlorate pump and treat program as described herein. Of the total Saugus Formation pumping in 2015, most (about 10,600 af) was for municipal water supply, and the balance (700 af) was for agricultural and other uses.

3.3.2 Saugus Formation – Historical Conditions

Since the importation of SWP water beginning in 1980, total pumping from the Saugus Formation has ranged between a low of about 3,700 afy (in 1999) and a high of nearly 15,000 afy (in 1991); average pumping from 1980 to present has been about 7,200 afy. These pumping rates remain well within, and generally at the lower end of the range of Operating Yield of the Saugus Formation. The overall historic record of Saugus pumping is illustrated in **Figure 3-8**.

Since the early 1990s, when groundwater pumping from the Saugus Formation peaked, there has been a steady decline in pumping through the remainder of that decade. Since then, Saugus pumping has been trending upward from about 4,000 in the early 2000s to almost 11,300 afy last year, with the recent 5-year average at about 9,600 af per year.

Unlike the Alluvium, which has an abundance of wells with extensive water level records, the water level data for the Saugus Formation are limited by both the geographic distribution of the wells in that Formation and the period of record. The wells that do have a historical water level record that exists prior to the initiation of SWP deliveries in 1980 indicate that groundwater levels in the Saugus Formation were relatively low in the 1960s and experienced a gradual increase to the mid-1980s, followed by a decline that ended in the early 1990s. Since then, groundwater levels increased over the next 10 to 15 years and over the past 8 or 9 years have experienced a decline that has not reached the low levels experienced in the 1960s (**Figure 3-9**). The most recent downward trend that has been experienced since 2006, has resulted in groundwater level declines that have ranged from 30 to 100 feet over that time. However, there is no evidence the recent decline in groundwater levels are representative of a permanent water level or storage decline. There continues to be fluctuations in groundwater levels attributed to seasonal and climatic fluctuations along with pumpage, but the prevalent long-term trend is one of general stability.

Consistent with the 2001 Update Report (Slade, 2002), the 2005 Basin Yield Report (CH2M Hill and LSCE, 2005), the 2005 UWMP, the 2009 Updated Basin Yield Report (LSCE and GSI, 2009), the 2010 UWMP, and the draft 2015 UWMP the Purveyors continue to maintain groundwater storage and associated water levels in the Saugus Formation so that supply is available during drought periods, when supplies from Alluvial pumping, the SWP, and/or other supplemental supplies may be reduced. The period of increased pumping during the early 1990s is a good example of this management strategy. Most notably, in 1991, when SWP deliveries were

substantially reduced, increased pumping from the Saugus made up almost half of the decrease in SWP deliveries. The increased Saugus pumping over several consecutive dry years (1991-1994) resulted in short-term groundwater level declines, reflecting the use of water from storage. However, groundwater levels subsequently recovered when pumping declined in the late 1990s to early 2000s to around 4,000 afy, reflecting recovery of groundwater storage in the Saugus Formation.

3.4 Imported Water

CLWA obtains the majority of its imported water supplies from the SWP, which is owned and operated by the DWR. CLWA is one of 29 contractors holding long-term SWP contracts with DWR. SWP water originates as rainfall and snowmelt in the Feather River watershed in northern California. Runoff from the watershed is stored in Lake Oroville, which is the SWP's largest storage facility. The water is then released from Lake Oroville down the Feather River to the Sacramento River and through the Sacramento-San Joaquin Delta. Water is diverted from the Delta into the Clifton Court Forebay, and then pumped into the 444-mile long California Aqueduct. SWP water delivered to southern California is temporarily stored in San Luis Reservoir, which is jointly operated by DWR and the U.S. Bureau of Reclamation. Prior to delivery to CLWA, SWP supplies are stored in Castaic Lake, a terminal reservoir located at the end of the West Branch of the California Aqueduct.

CLWA's service area covers approximately 195 square miles (124,800 acres), including the City of Santa Clarita and surrounding unincorporated communities. Water from the SWP and other sources located outside the Valley is treated, filtered and disinfected at CLWA's Earl Schmidt Filtration Plant and Rio Vista Water Treatment Plant, which have a combined treatment capacity of 122 million gallons per day. Treated water is delivered from the treatment plants to each of the four retail Purveyors through a distribution network of pipelines and turnouts. At present, CLWA delivers water to the four Purveyors through 26 potable turnouts as schematically illustrated in **Figure 3-10**.

In 2015, CLWA fulfilled the following major accomplishments in order to enhance, preserve, and strengthen the quality and reliability of existing and future supplies:

- reduction in per capita water demand,
- continued participation in long-term water banking programs with Rosedale-Rio Bravo Water Storage District and the Semitropic Water Storage District,

- continued to participate in two-for-one exchange programs with Rosedale-Rio Bravo Water Storage District and West Kern Water District,
- received grant funding to provide for additional recovery capacity from both the Rosedale-Rio Bravo Water Storage District and the Semitropic Water Storage District banking programs,
- continued implementation of the AB 3030 Groundwater Management Plan,
- initiated process to update the 2010 Urban Water Management Plan in the form of the 2015 Urban Water Management Plan,
- continued implementation of the water conservation Best Management Practices, including measures in the Santa Clarita Valley Water Use Efficiency Plan,
- continued participation in the Santa Clarita Valley Water Committee,
- completed rehabilitation of Saugus 2 well,
- pumped and treated about 3,000 af from the Saugus 1 and 2 wells in 2015 as part of the remediation of the Saugus Formation groundwater perchlorate contamination,
- continued cooperative effort with the U.S. Army Corps of Engineers for characterization studies of the former Whittaker-Bermite site and in a task force effort with the City of Santa Clarita, local legislators, and state agencies to effect the cleanup and remediation of all aspects of the former Whittaker-Bermite site, including perchlorate contamination of local groundwater,
- involved in the expansion of existing perchlorate containment and treatment program with the design of treatment facilities to remove perchlorate from VWC Well 201,
- and initiated planning and design of three recycled water projects, updating the Recycled Water Master Plan and associated environmental impact report, and development of the Recycled Water Rules and Regulations.

3.4.1 Disposition of State Water Project Table A and Imported Water Supplies

Each SWP contractor has a specified water supply amount shown in Table A of its contract that currently totals approximately 4.1 million af. The term of the CLWA contract is through 2038 and is renewable after that year. Although the SWP has not been fully completed, the SWP can deliver nearly all 4.1 million af of Table A Amounts during certain wet years.

CLWA has a contractual Table A Amount of 95,200 af per year of water from SWP. On December 1, 2014, the initial allocation for 2015 was announced as 10 percent. The allocation

was increased to 15 percent on January 15, 2015, and subsequently increased to 20 percent on March 2, 2015. CLWA's final allocation of Table A Amount for 2015 was thus 20 percent, or 19,040 af, of which, CLWA used 11,075 af and carried the remainder (7,965 af) over to 2016. CLWA also used 4,121 af of the carryover (18,048 af) from 2014, leaving 13,927 af to carry over to 2016, for a total carryover to 2016 of 21,892 af.

In addition to its Table A Amount, CLWA has access to 4,684 af of "flexible storage" in Castaic Lake. In 2015, CLWA negotiated a 10-year extension of an agreement with the Ventura County SWP contractors (County) to allow CLWA to utilize the County's flexible storage account of 1,376 af. CLWA may withdraw water from the County's flexible storage on an as-needed basis; however any water withdrawn from this storage account must be replaced within five years. The combined flexible storage from CLWA's and the County's accounts provides total flexible storage of 6,060 af, which is maintained in Castaic Lake for use in a future dry period or an emergency. Flexible storage was utilized in 2014, and 4,424 af had been withdrawn by the end of the year. In 2015, 4,339 af were backfilled to the flexible storage account, leaving 85 af remaining to be refilled.

Also in 2005, CLWA completed an agreement to participate in a long-term water banking program with Rosedale-Rio Bravo Water Storage District (RRBWSD) in Kern County. This long-term program allows storage of up to 100,000 af at any one time. CLWA delivered 20,000 af of its excess Table A water into storage in both 2005 and 2006. In 2007, pursuant to the Water Acquisition Agreement with Buena Vista Water Storage District (BVWSD) and RRBWSD as described below, CLWA was also back-credited a total of 22,000 af for 2005 and 2006 (11,000 af in each year). CLWA delivered 8,200 af and another 33,668 af of SWP and BVWSD/RRBWSD water to the bank in 2007 and 2010, respectively. In 2011, CLWA delivered 1,006 af into storage and in 2012, delivered another 6,031 af into storage. At the beginning of 2014, the recoverable storage in the program after groundwater and other losses was 100,000 af. In 2014, 2,824 af of water was withdrawn from the bank, and in 2015, another 2,998 af were withdrawn. At the end of 2015, more than 94,000 af remains in storage. CLWA's current existing withdrawal capacity is 3,000 afy, but additional facilities are under development to increase that capacity.

In 2011, CLWA executed a water Two-for-One Exchange Program with RRBWSD whereby CLWA can recover one acre-foot of water for each two acre-feet delivered (less losses). In 2011,

CLWA delivered 15,602 af to the program, delivered another 3,969 af in 2012 and, after program losses, has 9,441 af of recoverable water. No water was withdrawn from or contributed to the RRBWSD Two-for-One Exchange Program in 2014 or 2015, and this program remains at/near capacity. CLWA also has a Two-for-One Exchange Program with the West Kern Water District in Kern County and delivered 5,000 af in 2011, resulting in a recoverable total of 2,500 af. In 2014, 2,000 af of water was withdrawn from the West Kern Water District Two-for-One exchange program leaving a balance of 500 af. No water was withdrawn from or contributed to this program in 2015.

The other banking component of CLWA's imported water supply reliability program comprises two agreements with Semitropic Water Storage District whereby CLWA banked surplus Table A water supply in 2002 and 2003 (24,000 af and 32,522 af, respectively). Notable in 2009 was the first recovery of water from the 2002 account; of 4,950 af withdrawn in 2009, 1,650 af was delivered for water supply in the Valley in 2009, and the 3,300 af balance was delivered in 2010. An additional 4,950 af of water was withdrawn from the Semitropic Water Banking Program in 2014 (with another 5,000 given to Newhall Land in consideration for CLWA's use of their first priority extraction capacity). No transactions occurred in this program in 2015.

Semitropic has recently expanded its groundwater banking program to incorporate its Stored Water Recovery Unit (SWRU). In 2015 CLWA entered into an agreement with Semitropic to participate in the SWRU (as an additional source of dry-year supply). Under this agreement, the two short-term accounts containing 35,970 AF were transferred into this new program. Under the SWRU agreement, CLWA can store and recover additional water within a 15,000 AF storage account. The term of the Semitropic Banking Program extends through 2035 with the option of a 10 year renewal. CLWA may withdraw up to 5,000 AFY from its account.

As delineated in **Table 3-2**, with the 20 percent Table A allocation and other imported water supplies (further described in the next section), including 18,048 af of carryover from 2014, CLWA's available supply, including water extracted from banking programs was 51,081 af in 2015. This available supply was subdivided with the largest portion delivered to the Purveyors (24,148 af), and a portion (4,339 af) was used to backfill the Castaic Flexible Storage, while the remainder (21,892 af) was carried over in SWP storage for use in 2016 and subsequent years. None of the 51,081 af was banked or sold in 2015.

Table 3-2
2015 CLWA Imported Water Supply and Disposition
(acre-feet)

Supply		
SWP Carryover to 2015 [1]		18,048
Buena Vista/Rosedale Rio-Bravo		10,995
2015 Final SWP Table A Allocation[2]		19,040
Rosedale-Rio Bravo Water Banking Program		2,998
Total 2015 Imported Water Supply		**51,081**
Disposition		
Purveyor Deliveries		24,148
CLWA Santa Clarita Water Division	*15,019*	
Valencia Water Company	*6,648*	
Newhall County Water District	*2,478*	
Los Angeles County WD 36	*3*	
CLWA/DWR/Purveyor Metering[3]		702
Castaic Flexible Storage Backfill[4]		4,339
Carryover to 2016[5]		21,892
Total 2015 Imported Water Disposition		**51,081**

1. Carryover from 2014 available in 2015 was 18,048; of that amount 4,121 af was used by CLWA, based on final DWR delivery accounting, and the difference (13,927 af) plus unused 2015 Table A (7,965 af) remains available for future use (21,892 af).

2. Final 2015 allocation was 20% of contractual Table A amount of 95,200 af, which progressed as follows:

Initial allocation, December 1, 2014	10%	9,520 af
Allocation increase, January 15, 2015	15%	14,280 af
Allocation increase, March 2, 2015	20%	19,040 af
Final allocation (no change)	20%	19,040 af

3. Reflects meter reading differences.

4. In 2015, 4,339 af was backfilled from 2014 use of 4,424 af; 85 af remains to be refilled.

5. Total 2015 Table A and previous years' carryover to 2016.

3.4.2 Other Imported Water Supplies

In early 2007, CLWA finalized a Water Acquisition Agreement with the BVWSD and the RRBWSD in Kern County. Under this Program, Buena Vista's high flow Kern River entitlements (and other acquired waters that may become available) are captured and recharged within Rosedale-Rio Bravo's service area on an ongoing basis. CLWA receives 11,000 af of these supplies annually through either exchange of Buena Vista's and Rosedale-Rio Bravo's SWP supplies or through direct delivery of water to the California Aqueduct via the Cross Valley Canal. In 2015, CLWA received 10,995 af of water from this Program.

In 2008, CLWA entered into the Yuba Accord Agreement, which allows for the purchase of water from the Yuba County Water Agency through the Department of Water Resources to 21 State Water Project contractors (including CLWA) and the San Luis and Delta-Mendota Water Authority. Up to 850 af of non-SWP supply is available to CLWA in critically dry years. Under certain hydrologic conditions, additional water may be available to CLWA from this program. CLWA did not purchase water from this source in 2015.

3.4.3 Imported Water Supply Capability

The current SWP Final Delivery Capability Report 2015, issued in July 2015, maintains the restrictions on SWP operations according to the Biological Opinions of the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fishery Service (NMFS) issued on December 15, 2008 and June 4, 2009, respectively. In December 2010, a federal judge overruled most of the 2008 federal biological opinion and invalidated several of the criteria that reduced SWP's water supply. These matters were appealed to the U.S. Court of Appeals for the Ninth Circuit. The Ninth Circuit rulings (in March 2014 and December 2014 for the USFWS BO and the NMFS BO, respectively) upheld the Biological Opinions of the federal agencies. Therefore, the operational rules defined in these BOs continue to be legally required and were used by DWR in the analyses supporting its 2015 Delivery Capability Report. The SWP Final Delivery Capability Report 2015 also considers the impacts on SWP delivery capability due to climate change, sea level rise, and multiple Delta-specific concerns: the variability of Delta inflows seasonally and annually, the vulnerability of the Delta's conveyance system and structure due to floods and earthquakes, and water quality objectives that address Delta ecosystem health. Consideration is also given to the major Delta policy planning efforts currently underway: the Delta Plan and

the Bay Delta Conservation Plan[2] . With these factors, the Capability Report projects that under existing conditions (2015), the average annual delivery of Table A water is estimated at 61% (less than 0.1% less than the 2013 estimation). CLWA staff has assessed the impact of the current Capability Report on the CLWA water supply and concluded that the current UWMP's statement that current and future supplies are available to meet anticipated water supply needs through the year 2050 remains correct.

Groundwater banking and conjunctive use offer significant opportunities to improve water supply reliability for CLWA. Groundwater banking is the process of storing available supplies of water in groundwater basins during wet years or when supplemental water is otherwise available. During dry periods, or when imported water supply availability is reduced, banked water can be recovered from groundwater storage to replace, or firm up, the imported water supply deliveries.

As described herein, CLWA has entered into four groundwater banking and water exchange programs and has, in aggregate, more than 140,000 af of recoverable water outside the local groundwater basin at the end of 2015. The first component of CLWA's overall groundwater banking program is between CLWA and Semitropic Water Storage District, whereby CLWA can withdraw up to 35,970 af water that it stored in Semitropic to meet Valley demands when needed in dry years. The second component of the program, the long-term RRBWSD Water Banking Program in Kern County, has a recoverable total of more than 94,000 acre-feet in storage. The third and fourth components are the Two-For-One Exchange Programs that CLWA initiated with RRBWSD and West Kern Water District in 2011 that now have a total of 9,941 af of recoverable water.

Conjunctive use is the purposeful integrated use of surface water and groundwater supplies to maximize water supply from the two sources. CLWA and the Purveyors have been conjunctively utilizing local groundwater and imported surface water since the initial importation of SWP water in 1980. The groundwater banking programs described above allow CLWA to firm up the imported water component of conjunctive use in the Valley by storing

[2] In April 2015, after completion of the SWP Final Delivery Capability Report 2015, the Bay Delta Conservation Plan was reorganized into two separate measures: California WaterFix (for the conveyance facility) and California EcoStore (for habitat restoration). This report will retain the former single Plan name to be consistent with the issued Capability Report .

surplus SWP and other water, in wet years, in groundwater basins outside the Valley. This allows recovery and importation of that water as needed in dry years to maintain a greater overall amount of imported surface water to be used conjunctively with local groundwater, further supporting the sustainable use of local groundwater at the rates in the groundwater operating plan.

3.5 Water Quality

Water delivered by the Purveyors consistently meets drinking water standards set by the United States Environmental Protection Agency (USEPA) and the State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW). An annual Water Quality Report is provided prior to July 1st to all Santa Clarita Valley residents who receive water from one of the four water retailers. There is detailed information in that report about the results of quality testing of the groundwater and treated SWP water supplied to the residents of the Santa Clarita Valley.

3.5.1 Water Quality – General

3.5.1.1 Total Trihalomethanes

In December 2005, the USEPA implemented the Stage 2 Disinfectants and Disinfection Byproducts Rule. In part, this rule did not change the existing Maximum Contaminant Level (MCL) of 80 micrograms per liter (µg/l) for Total Trihalomethanes (TTHM), however, it requires water systems to apply that MCL at each compliance monitoring location (instead of as a system-wide average as in previous rules). TTHMs are byproducts created when chlorine is used as a means for disinfection. CLWA and NCWD implemented an alternative method of disinfection, chloramination, in 2005 to maintain compliance with the new rule and future regulations relating to disinfection byproducts. TTHM concentrations have remained significantly below the MCL since implementation of alternative disinfection. VWC and SCWD continue to use chlorination (using free chlorine) to disinfect groundwater and have been in compliance with the USEPA's Disinfection Byproducts Rule.

3.5.1.2 Perchlorate

Perchlorate is a regulated chemical in drinking water. In October 2007, the California Department of Public Health, which currently is the State Water Resources Control Board Division of Drinking Water (DDW), established an MCL for perchlorate of 6 µg/l. Perchlorate has been a water quality concern in the Valley since 1997 when it was originally detected in four wells operated by the Purveyors in the eastern part of the Saugus Formation, near the former Whittaker-Bermite facility. In late 2002, perchlorate was detected in a fifth municipal

well, in this case an Alluvial well (SCWD's Stadium Well), also located near the former Whittaker-Bermite site. Currently, two of those wells (VWC's Well 157 and SCWD's Stadium Well) have been sealed and replaced by new wells, and two wells (CLWA's Saugus 1 and 2 Wells) were returned to service in January 2011 as described below. NCWD's Well NC-11 has remained out of service with a portion of its capacity replaced by a combination of imported water from CLWA and treated water from CLWA's Saugus Perchlorate Treatment Facility (described further below) through a SWP turnout. In early 2005, perchlorate was detected in a second Alluvial well (VWC's Well Q2) near the former Whittaker-Bermite site. Following the installation of wellhead treatment for the removal of perchlorate in the same year, the well was returned to regular water supply service. After two years of subsequent operation with no detections of perchlorate, the wellhead treatment was removed and the well has since remained in active water supply service.

In 2006, perchlorate was detected in low concentrations below the Detection Limit for Reporting (<4.0 µg/l) in another Saugus well (NCWD's Well NC-13), near one of the originally impacted wells. Saugus Well NC-13 has remained in service with regular sampling per the DDW requirements and no subsequent detections of perchlorate. In August 2010, perchlorate was detected further down gradient in an eighth well, VWC's Well 201 that is completed in the Saugus Formation. While the initial detection was below the MCL, the well was immediately taken out of active supply service. VWC is currently pursuing restoration alternatives at Saugus Well 201 that are expected to involve methodologies already employed at other previously impacted wells. Pending regulatory approval by the DDW, it is planned that the approved DDW restoration alternative will be implemented in 2016, resulting in the return of VWC's Well 201 to service in 2017. Following the detection of perchlorate in Well 201 in 2010, VWC elected to minimize pumping from Well 205 through 2011. Since 2011 the well was voluntarily taken out of service entirely when perchlorate was detected in low concentrations below the Detection Limit for Reporting (<4.0 µg/l) in April 2012. This well is planned to resume service as part of the implementation of the restoration and containment program at Well 201. As described in the draft 2015 UWMP, the replacement and reactivation of the impacted wells, augmented by planned and funded replacement wells, adds to the overall ability to meet the groundwater component of total water supply in the Valley.

In February 2003, DTSC and the impacted Purveyors entered into a voluntary cleanup agreement entitled *Environmental Oversight Agreement* (amended in 2012). Under the

Agreement, DTSC is providing review and oversight of the response activities being undertaken by the Purveyors related to the detection of perchlorate in the impacted wells. Under the Agreement's Scope of Work, the impacted Purveyors prepared a Work Plan for sampling the production wells, a report on the results and findings of the production well sampling, a draft Human Health Risk Assessment, and a draft Remedial Action Workplan. In addition, CLWA and the Purveyors conducted an evaluation of treatment technologies and an analysis showing the integrated effectiveness of a project to restore impacted pumping capacity, extract perchlorate-impacted groundwater from two Saugus wells for treatment, and control the migration of perchlorate in the Saugus Formation. Environmental review of that project was completed in 2005 with adoption of a mitigated Negative Declaration. The Final Interim Remedial Action Plan for containment and extraction of perchlorate was completed and approved by DTSC in January 2006. Design and construction of the treatment facilities and pipelines to implement the pump and treat program and to also restore inactivated municipal well capacity was completed in May 2010. Water from Saugus 1 and Saugus 2 was initially treated and discharged into the Santa Clara River. DDW issued an amendment to CLWA's Operating Permit in December 2010, and the wells were placed back in water supply service on January 25, 2011.

As part of the operation of CLWA's Saugus Perchlorate Treatment Facility (SPTF), numerous monitoring tests are performed on a continuous basis in order to ensure the safety of the treated water leaving the SPTF. Groundwater samples are collected semi-weekly at several locations, including at the Saugus 1 and Saugus 2 wells, both at the influent and effluent water points, at the lead and lag vessels, and at several distribution locations. The samples are analyzed at different frequencies for numerous constituents, including chlorate, perchlorate, chloride, nitrate, nitrite and sulfate. In addition, samples are analyzed for microbiological growth, radiological and volatile organic compounds. In 2015, 2,961 af of groundwater were pumped from Saugus 1 and Saugus 2. After treatment for perchlorate removal, the groundwater was blended with treated imported water and delivered to the Purveyors through the CLWA distribution system. In October 2011, Saugus 2 experienced a failure in its casing/screen assembly and associated damage to its pump, causing the well to be taken out of service for mechanical rehabilitation and pump replacement. An inner liner assembly was installed in the well, followed by installation of a new pump. The well was returned to service in April 2012. To avoid the failure that Saugus 2 experienced, Saugus 1 was taken out of service in May 2014 for rehabilitation similar to that performed on Saugus 2. A new liner was installed and Saugus 1 was returned to service in November 2014.

Since 2007, the impacted Purveyors (SCWD, NCWD, and VWC) and CLWA continued working toward the now-implemented plan that combines pumping from two of the impacted wells (Saugus 1 and 2) and a water treatment process (the SPTF) to restore the impacted pumping capacity and control the migration of contamination in the aquifer. The development and implementation of a cleanup plan for the Whittaker-Bermite site and the impacted groundwater is being coordinated among CLWA, the impacted Purveyors, Whittaker Corporation, the State DTSC, and U.S. Army Corps of Engineers. DTSC is the lead agency responsible for regulatory oversight of the Whittaker-Bermite site.

Under the direction of DTSC, Whittaker has submitted a comprehensive site-wide remediation plan for the contaminants of concern in soil and groundwater detected on the property. A Draft Remedial Action Plan (RAP) for Operating Units (OU) 2 through 6 that focused on soil cleanup was submitted to DTSC in 2009, and the final plan was approved in December 2010. The site-wide Remedial Design (RD) was approved by DTSC in January 2013 for OU units 2 through 6, and remediation of soils through the OUs is in various stages of initiation and completion. In addition to soil remediation, soil vapor extraction (SVE) operations have occurred since May 2012 to remove volatile organic compounds from selected areas of OUs 2 through 6 with plans currently in development to expand to full scale SVE operations in all areas identified in the RAP and RD.

The RAP for groundwater (OU7) and associated CEQA document were approved by DTSC in December 2014. The RAP focuses on three areas where groundwater at the site is impacted. The three areas are the Northern Alluvium, the Saugus Formation, and perched groundwater. The RAP includes an evaluation of remedial alternatives to contain and clean up impacted groundwater in these three areas. Pilot studies and interim measures have been initiated in the Saugus Formation and the Northern Alluvium and are at different stages of progress. Operation of an on-site remediation system to treat perchlorate contamination in the Saugus Formation is planned for 2017. It is expected that up to 800 acre feet per year of groundwater will be pumped and treated once the system is fully operational on the Whittaker Bermite site.

3.5.1.3 Volatile Organic Compounds

Organic chemical contaminants, including synthetic and volatile organic chemicals, are byproducts of industrial processes and petroleum production, and can also come from gas

stations, urban storm water runoff and septic systems. Organic compounds also include pesticides and herbicides, which may come from a variety of sources such as agriculture, urban storm water runoff and residential uses. Local wells are tested at least annually for VOCs (Saugus 1 and Saugus 2 are tested weekly) and periodically for SOCs, and Castaic Lake water is checked annually for VOCs and SOCs. The most frequently detected VOCs, Trichloroethylene (TCE) and Tetrachloroethylene (PCE), and the less frequently detected compounds, Chloroform and 1,1-dichloroethene, have been detected in trace levels below the MCL in groundwater in the Santa Clarita Valley.

Because CLWA's Water Supply Permit sets an operational goal of no VOCs above the detection limit for reporting in its distribution system and because CLWA is concerned about any detection of VOCs, CLWA performed a VOC source identification study (CH2mHill, 2015). The October 2015 study concluded that the likely source was either the Whittaker-Bermite site or the Saugus Industrial Center and additional monitoring would be necessary to identify the specific source. CLWA and the purveyors are currently working with DTSC to develop additional monitoring requirements for both sites.

3.5.1.4 Hardness

In 2008, VWC began a demonstration project delivering pre-softened groundwater from one of its wells to approximately 420 residents located in the Copperhill Community of Valencia. Hard water is the primary complaint from VWC customers, and it is estimated that more than 50 percent have installed individual water softening units at their homes. In addition to having high operating costs, many of these units are designed to discharge a brine (salt) solution to the sanitary sewer system that is eventually discharged to the Santa Clara River, or is part of the recycled water supply. The environmental impact of such discharges was the subject of a major Chloride Total Maximum Daily Load investigation which concluded with a commitment by the Purveyors to achieve surface water quality goals for in-stream discharge from the basin. VWC's project is aimed at improving the quality of water for its customers to eliminate the need for home softening devices and to achieve the environmental benefits of reduced chloride discharge to the river.

The demonstration project utilizes softening technology that removes calcium and produces small calcium carbonate pellets which can be reused in a variety of industries. Since the inception of the demonstration project, VWC has collected customer feedback and technical/financial information that is being used to assess potential future expansion of

treatment to other well sites. For much of 2011 and 2012, the project was offline while upgrades and modifications to equipment were conducted. The project resumed operation in December 2012 and was operated periodically in 2013 with additional upgrades to various components. The plant operated intermittently in 2014, and did not operate in 2015. Additional upgrades are being considered in 2016 to enable the plant to resume normal operation.

3.5.2 Groundwater Quality – Alluvium

Groundwater quality is, of course, a key factor in assessing the Alluvial aquifer as a municipal and agricultural water supply. Groundwater quality details and long-term conditions, examined by integration of individual records from several wells completed in the same aquifer materials and in close proximity to each other, have been discussed in previous annual Water Reports and in the 2010 UWMP and draft 2015 UWMP. Historical groundwater quality, including available 2015 data, is illustrated in **Figures 3-11 and 3-12**. These graphs show historical specific conductance (which is a measure of the salinity or amount of dissolved minerals with micromhos per centimeter (µmhos/cm) as the unit of measure) values for representative wells in the Valley with the DDW Secondary Maximum Levels ("Recommended Level" and "Upper Level") included for reference. Over the last 10 years, specific conductance values generally respond to wet periods by exhibiting a downward trend, followed by an increasing trend during a dry period.

In the Mint Canyon and Above Saugus WRP areas (**Figure 3-11**), specific conductance values increased in the early 2000s, followed by a downward trend in the mid-2000s, a result of the 2004 and 2005 wet period. This downward trend was followed by an upward trend in the late 2000s, a downward trend in 2010 through 2011 (Wells T7 and Pinetree 3) and an upward trend through 2013/2014 (Well U4, and Pinetree 3). In 2015, specific conductance ranged from 870 to 1,900 µmhos/cm.

In Bouquet Canyon, historical variations and trends of salinity levels are more gradual than those in Mint Canyon and may be closely timed with periods of flow in Bouquet Creek (**Figure 3-11**). Specific conductance data for wells located in Bouquet Canyon have ranged from about 700 to almost 1,400 µmhos/cm historically. Specific conductance levels in 2014 were within the historical range at around 1,400 µmhos/cm as represented by SCWD's Guida Well. No wells in Bouquet Canyon were sampled for analysis in 2015.

Specific conductance values in the western areas of the Valley exhibited similar patterns and responses of specific conductance values to wet and dry periods as those observed in the eastern portions of the Valley (**Figure 3-12**). Specific conductance values in San Francisquito Canyon and Below Saugus WRP areas historically have ranged from about 650 to 1,600 µmhos/cm. In 2015, specific conductance values were within historical ranges and ranged from about 1,000 to 1,500 µmhos,cm.

In Castaic Valley and Below Valencia WRP areas, specific conductance has historically ranged between 700 to 2,000 µmhos/com. At times the specific conductance appears to vary during wet and dry periods along with discharge from Castaic Lake. In 2015, specific conductance ranged from about 900 to 1,400 µmhos/cm, which is within the historic range.

In summary, water quality in the Alluvium exhibits no long-term overall trends and, most notably, 2015 specific conductance in Alluvial groundwater is within historical ranges with the exception of a slightly higher result from Valencia Well U4. There have been periodic fluctuations in some parts of the basin, where groundwater quality has generally inversely varied with precipitation and streamflow. The fluctuations often occur during dry and wet periods when low streamflow and recharge during dry periods result in increased salinity and high streamflow and recharge during wet periods results in decreased salinity levels. In 2015, of the 27 sampled alluvial wells throughout the Valley, two were found to be in exceedance of the Upper Limit DDW Secondary Maximum Level for Specific Conductance. Testing by the purveyors in accordance with DDW requirements demonstrates that groundwater meets acceptable drinking water standards.

The presence of long-term consistent water quality patterns, although intermittently affected by wet and dry cycles, supports the conclusion that the Alluvial aquifer remains a viable ongoing water supply source in terms of groundwater quality.

3.5.3 Groundwater Quality – Saugus Formation

As discussed above for the Alluvium, groundwater quality is a key factor in also assessing the Saugus Formation as a source for municipal and agricultural water supply. As with groundwater level data, long-term Saugus groundwater quality data are not sufficiently extensive to permit any sort of basin-wide analysis or assessment of pumping-related impacts on quality. However,

integration of individual records from several wells has been used to examine general water quality trends. Based on those records, water quality in the Saugus Formation has not historically exhibited the precipitation-related fluctuations seen in the Alluvium. Based on available data over the last 50 years, groundwater quality in the Saugus has exhibited a slight overall increase in dissolved mineral content as illustrated in **Figure 3-13**. Since 2000, several wells within the Saugus Formation have exhibited an increase in dissolved mineral content, similar to short-term changes in the Alluvium, possibly as a result of recharge to the Saugus Formation from the Alluvium. Since 2005, however, these levels had been steadily dropping through 2013, but have since increased in 2014/2015. Dissolved mineral concentrations in the Saugus Formation remain within the range of historic concentrations and below the Secondary (aesthetic) Upper Long-Term Maximum Contaminant Level. Groundwater quality within the Saugus will continue to be monitored to ensure that degradation to the long-term viability of the Saugus as a component of overall water supply does not occur.

3.5.4 Imported Water Quality

CLWA operates two surface water treatment plants, the Earl Schmidt Filtration Plant located near Castaic Lake and the Rio Vista Water Treatment Plant located in Saugus. CLWA produces water that meets drinking water standards set by the U.S. EPA and DDW. SWP water has different aesthetic characteristics than groundwater with lower dissolved mineral concentrations (total dissolved solids) of approximately 250 to 300 mg/l, and lower hardness (as calcium carbonate) of about 105 to 135 mg/l.

Historically, the SWP delivered only surface water from the Sacramento-San Joaquin River Delta. However, CLWA and other SWP users, in anticipation of drought, many years ago began "water banking" programs where SWP water could be stored or exchanged during wet years and withdrawn in dry years. During the dry-year periods, a greater portion of water in the SWP has been banked water. The banked water has met all water quality standards established by DWR under its anti-degradation policy for the SWP.

3.6 Recycled Water

Recycled water is an important and reliable source of additional water; it enhances reliability in that it provides an additional source of supply and allows for more efficient utilization of groundwater and imported water supplies. Recycled water is currently available from two water reclamation plants operated by the Santa Clarita Valley Sanitation District.

Draft Recycled Water Master Plans for the CLWA service area were completed in 1993 and 2002. These master plans considered various factors affecting recycled water sources, supplies, users and demands so that CLWA could develop a cost-effective recycled water system within its service area. Deliveries of recycled water began in 2003 for irrigation water supply at a golf course and in roadway median strips. In 2007, CLWA completed CEQA analysis of the 2002 Recycled Water Master Plan (RWMP). This analysis consisted of a Programmatic EIR covering the various phases for a recycled water system as outlined in the RWMP. The Programmatic EIR was certified by the CLWA Board in March 2007. More recently, planning and permitting to allow for the use of recycled water for irrigation and grading operations via water trucks was largely completed in 2014, and is ready for implementation at the appropriate time. Also during 2014, the Purveyors conducted a Water Resources Reconnaissance Study to evaluate alternatives for expanding local water supplies (Carollo, 2014). A number of opportunities were identified for further evaluation that included the use of recycled water. In 2015, recycled water deliveries were about 450 af, generally consistent with recycled water deliveries that have ranged between about 310 and nearly 500 afy over the past ten years.

CLWA and the retail water purveyors are currently in the process of updating the RWMP that will contain revised estimates of projected recycled water use. A draft of the updated RWMP is anticipated in summer of 2016, and is scheduled to be finalized by October 2016, with a new Programmatic EIR completed by December 2016.

3.7 Santa Clara River

The Memorandum of Understanding (MOU) between the Santa Clarita Valley Purveyors and the United Water Conservation District, which manages surface and groundwater resources in seven groundwater subbasins in the Lower Santa Clara River Valley Area, was a significant accomplishment when it was prepared and executed in 2001. The MOU initiated a collaborative and integrated approach to data collection; database management; groundwater flow modeling; assessment of groundwater basin conditions, including determination of basin yield amounts; and preparation and presentation of reports. The preparation and presentation of reports included continued annual reports such as this one for current planning and consideration of development proposals, and also more technically detailed reports on geologic and hydrologic aspects of the overall stream-aquifer system. Meetings of the MOU participants have continued, and coordination of the Upper (Santa Clarita Valley) and Lower (United WCD)

Santa Clara River databases has been accomplished. As discussed above, a numerical groundwater flow model of the entire Santa Clarita groundwater basin was initially developed and calibrated in 2002-2004. Subsequent to its initial use in 2004 for assessing the effectiveness of various operating scenarios to restore pumping capacity impacted by perchlorate contamination (by pumping and treating groundwater for water supply while simultaneously controlling the migration of contaminated groundwater), the model was used in 2005 for evaluation of basin yield under varying management actions and hydrologic conditions. The results completed the determination of sustainable operating yield values for both the Alluvium and the Saugus Formation, which were incorporated in the 2005 UWMP. The updated analysis of basin yield, completed in 2009, indicates that the Current Operating Plan will maintain river flows at higher levels than occurred prior to urbanization of the Valley; the resultant operating yield values for both the Alluvium and the Saugus Formation are incorporated in the draft 2015 UWMP.

On occasion, issues have been raised about whether use and management of groundwater in the Santa Clarita Valley have adversely impacted surface water flows into Ventura County. Part of the groundwater modeling work has addressed the surface water flow question as well as groundwater levels and storage. While the sustainability of groundwater has logically derived primarily from projected long-term stability of groundwater levels and storage, it has also derived in part from modeled simulations of surface water flows and the lack of streamflow depletion by groundwater pumping in the central and western portions of the Valley. In addition, the long-term history of groundwater levels in the western and central part of the basin, as illustrated in **Figures 3-4** and **3-5**, supports the modeled analysis and suggests that groundwater has not been lowered in such a way as to induce infiltration from the river and thus impact surface water flows.

Historical annual streamflow in the Santa Clara River, into and out of the Santa Clarita Valley has been monitored at an upstream gage at Santa Clara River above Lang Railroad Station at Lang gage and Capra Road Railroad Crossing and two downstream gages (County Line and SCR at Piru) (**Figure 3-14**). The Lang gage (F93B-R) shows a wide range of average annual streamflow into the basin; however the data from the gage has not always been very accurate. In 2010, Los Angeles County Department of Public Works (LADPW) removed the transducer that previously collected streamflow data due to operational problems with the transducer and the location of the gage not being adequate to allow for accurate streamflow measurements.

Between 2010 and 2012, LADPW have conducted manual measurements of streamflow, however, the measurements were not frequent enough to account for the range of streamflows that likely occurred. In 2013, CLWA had discussions with LADPW regarding the reinstallation or relocation of the Lang gage to a more suitable location and by June 2013, the gage was moved and operational 150 feet upstream on the Santa Clara River and renamed Capra Road Railroad Crossing (F93C-R). The downstream gage, County Line gage (11108500), was moved in 1996 to its present location near Piru and renamed SCR at Piru (11109000), about two miles downriver. The combined record (1953-2015) of these two downstream gages indicates an annual stream discharge of about 46,000 afy (**Figure 3-15**). These data gaged near the County line show notably higher flows from the Santa Clarita Valley into the uppermost downstream subbasin, the Piru subbasin, over the last 35 to 40 years.

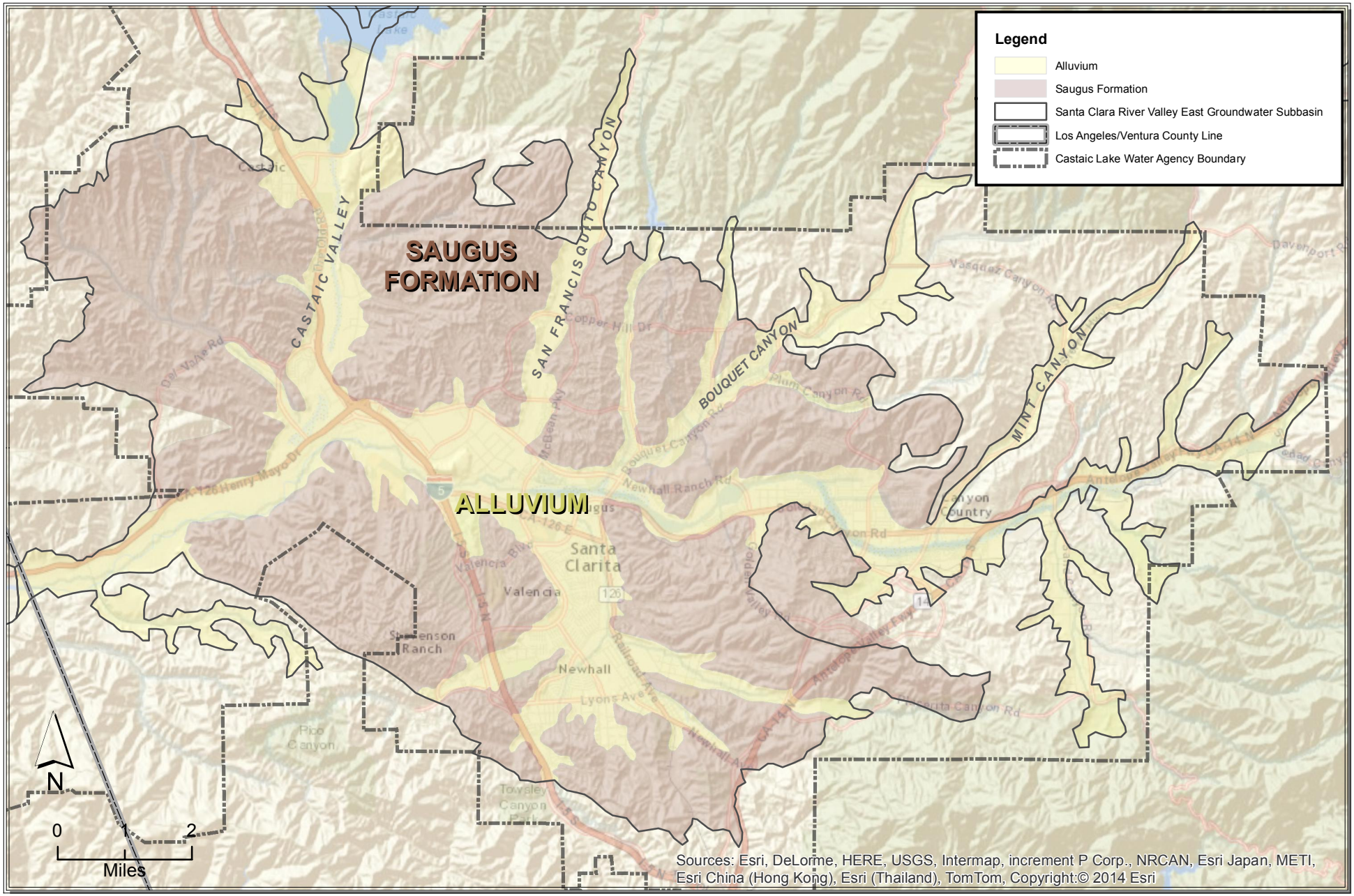

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Figure 3-1
Alluvium and Saugus Formation
Santa Clarita Valley Water Report

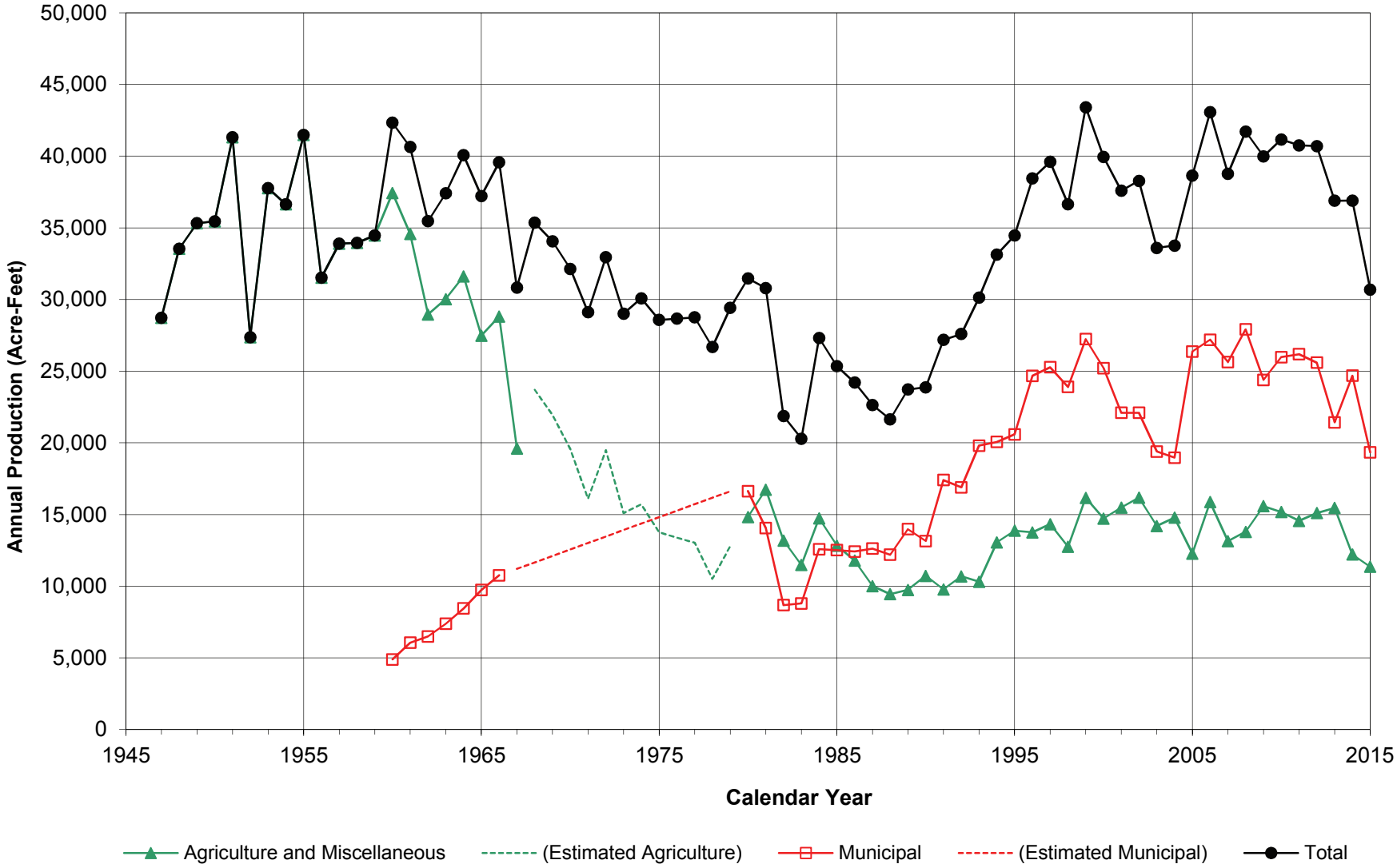

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Figure 3-2
Groundwater Production - Alluvium
Santa Clarita Valley Water Report

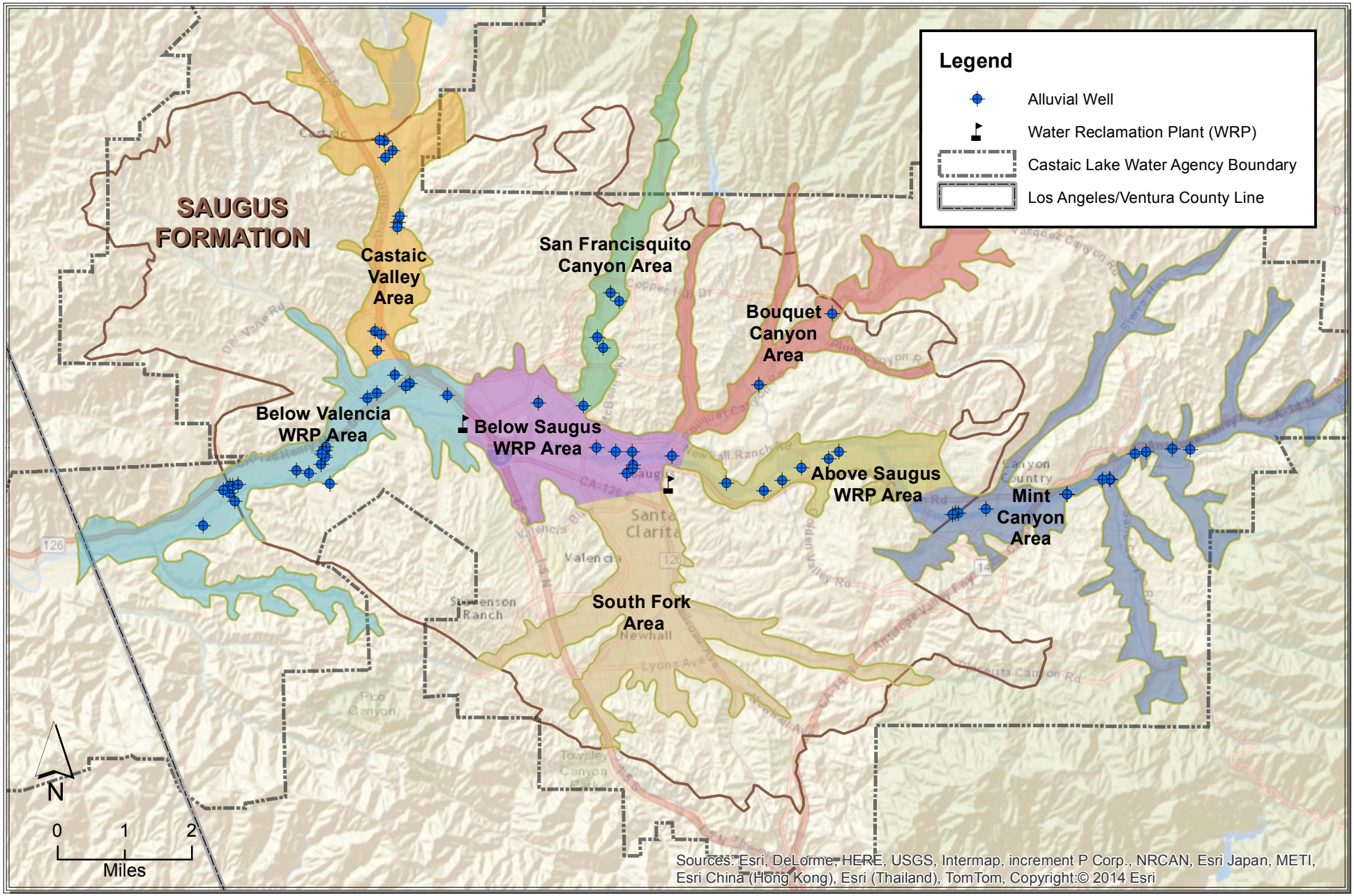

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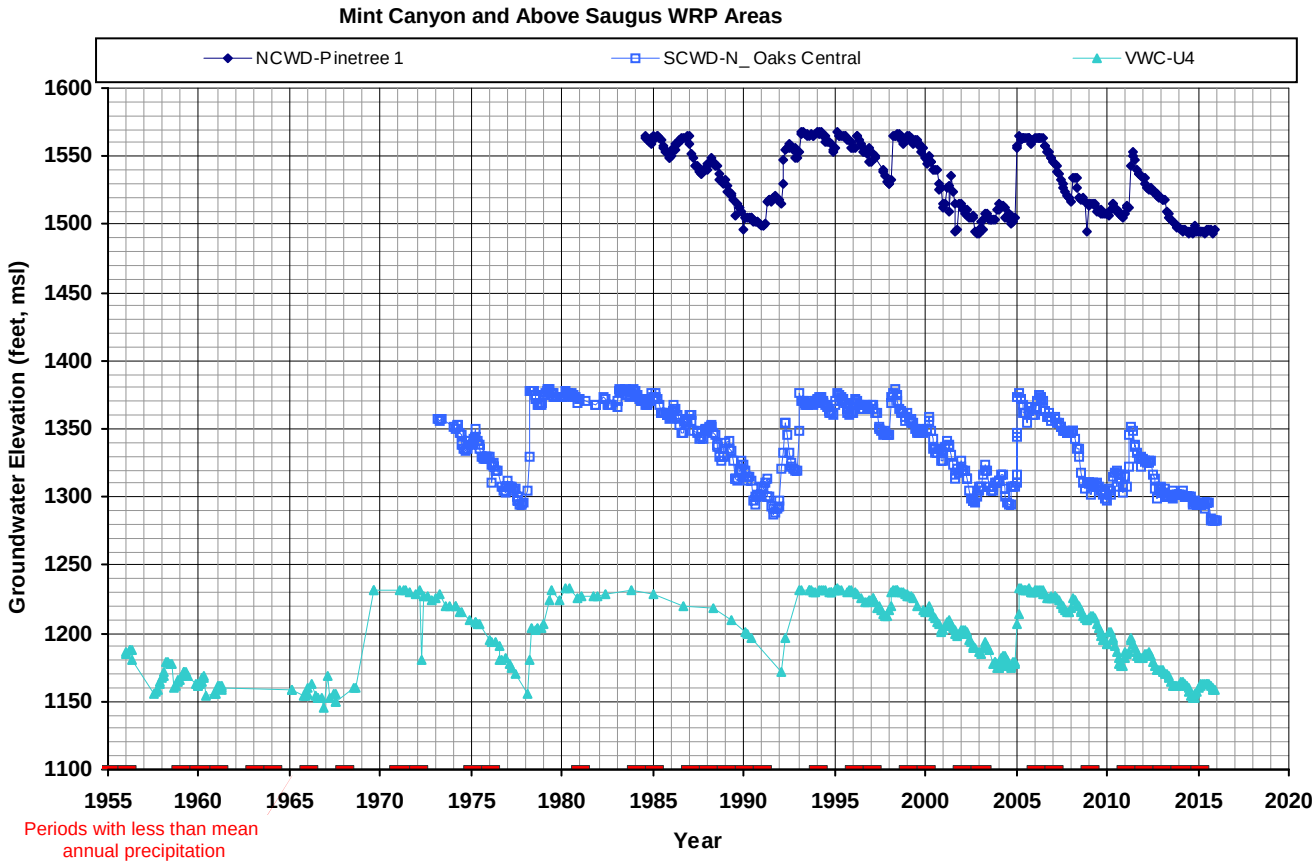
Figure 3-3
Alluvial Well Locations By Area
Santa Clarita Valley Water Report



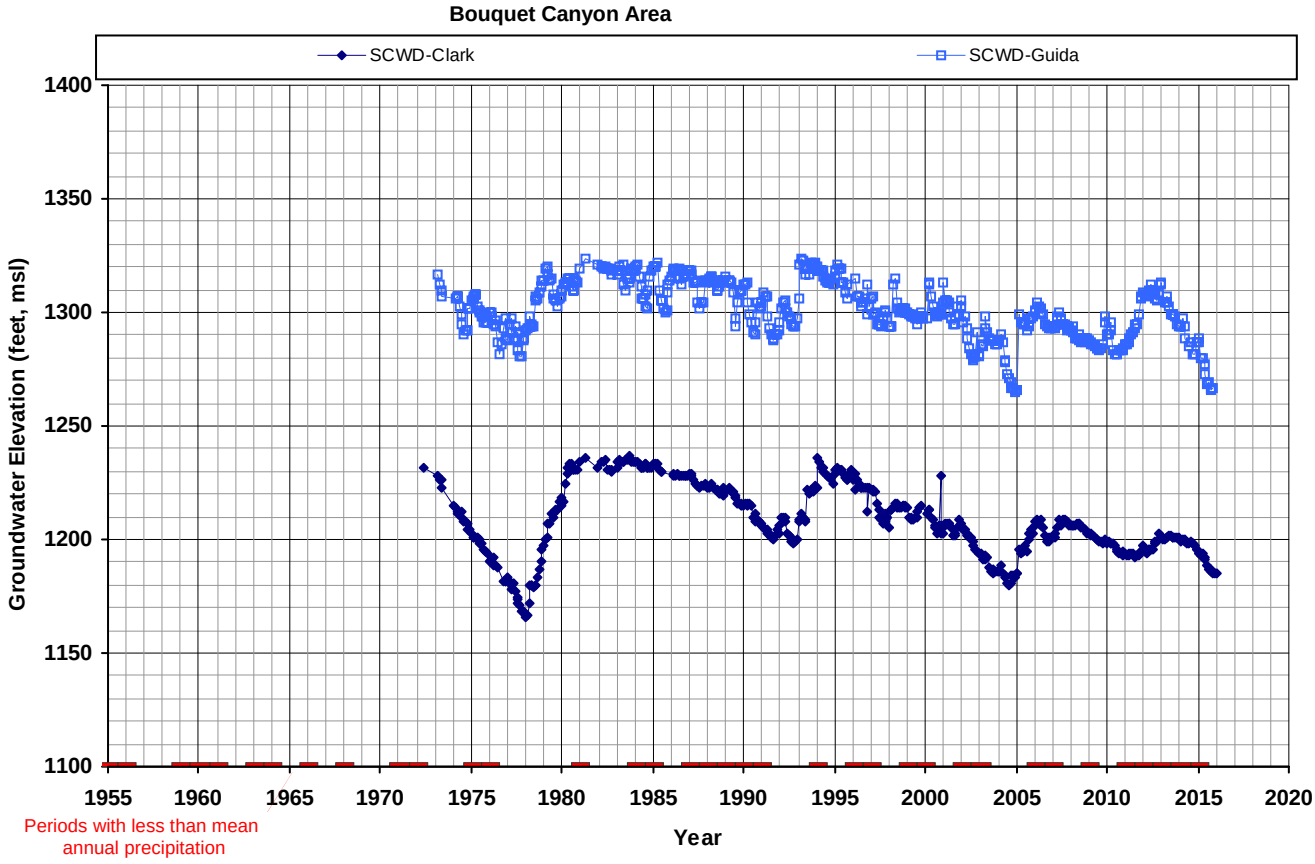


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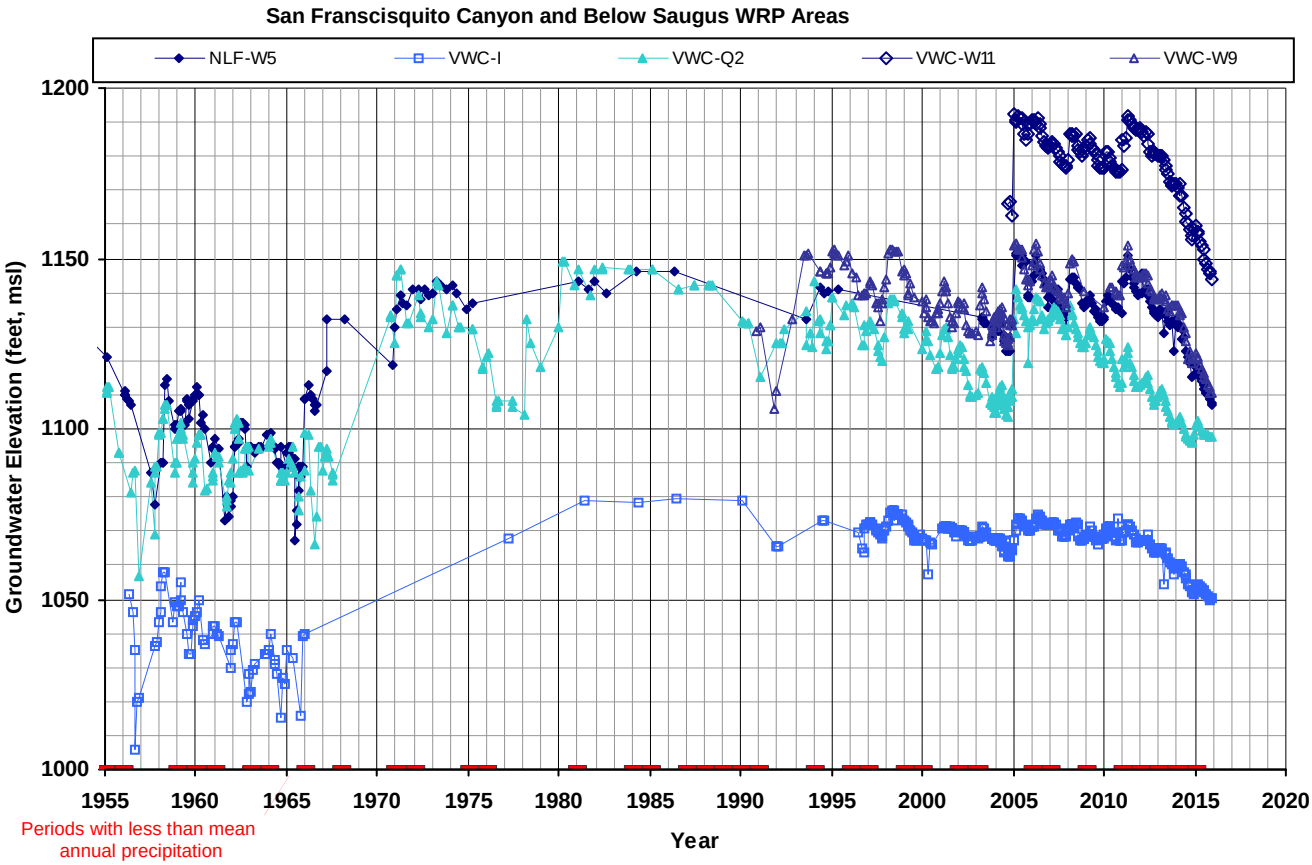
Figure 3-4
Groundwater Elevations in Eastern Santa Clarita Valley Alluvial Wells
Santa Clarita Valley Water Report



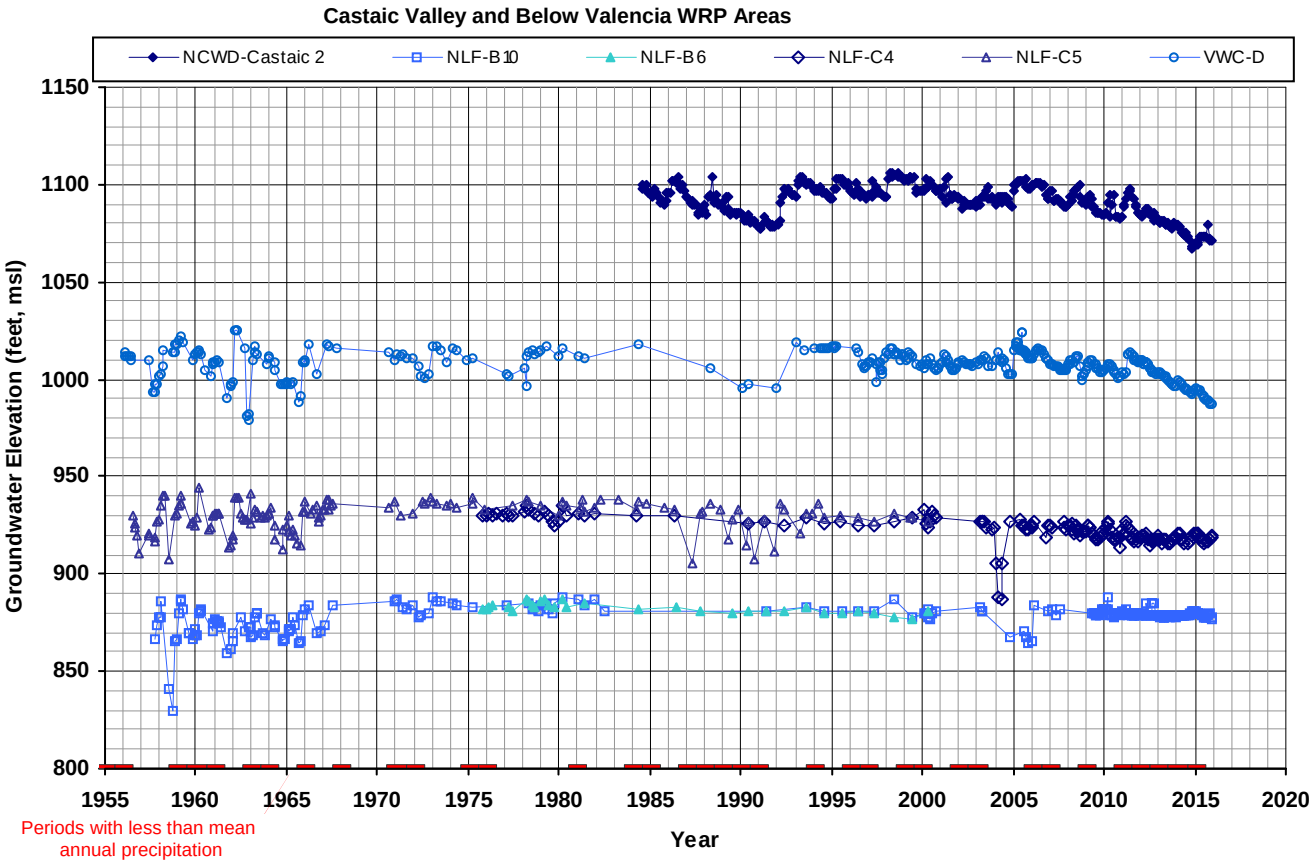


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Figure 3-5
Groundwater Elevations in Western Santa Clarita Valley Alluvial Wells
Santa Clarita Valley Water Report

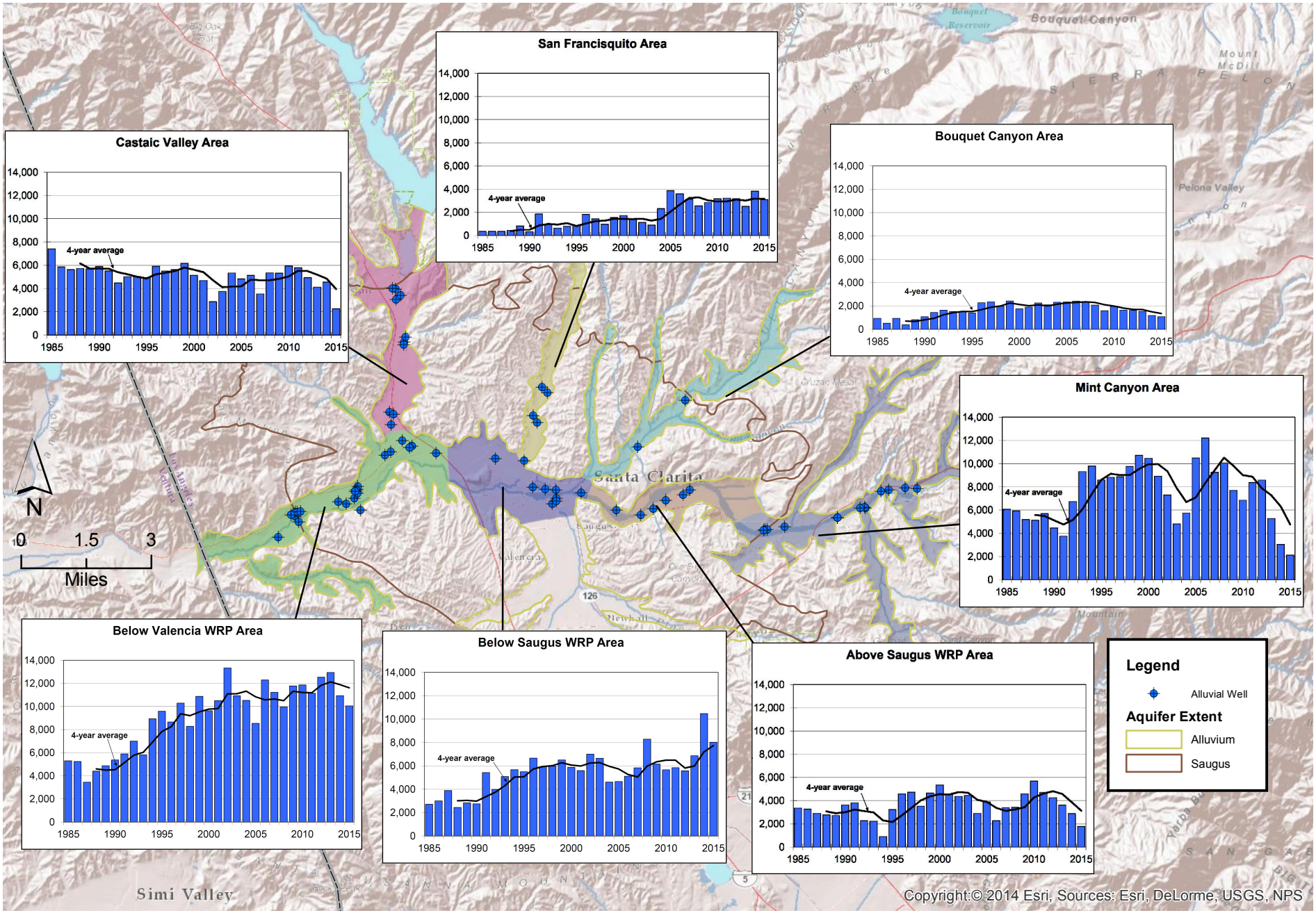

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Figure 3-6

Annual Groundwater Production from Alluvium by Area (Acre-feet)

Santa Clarita Valley Water Report

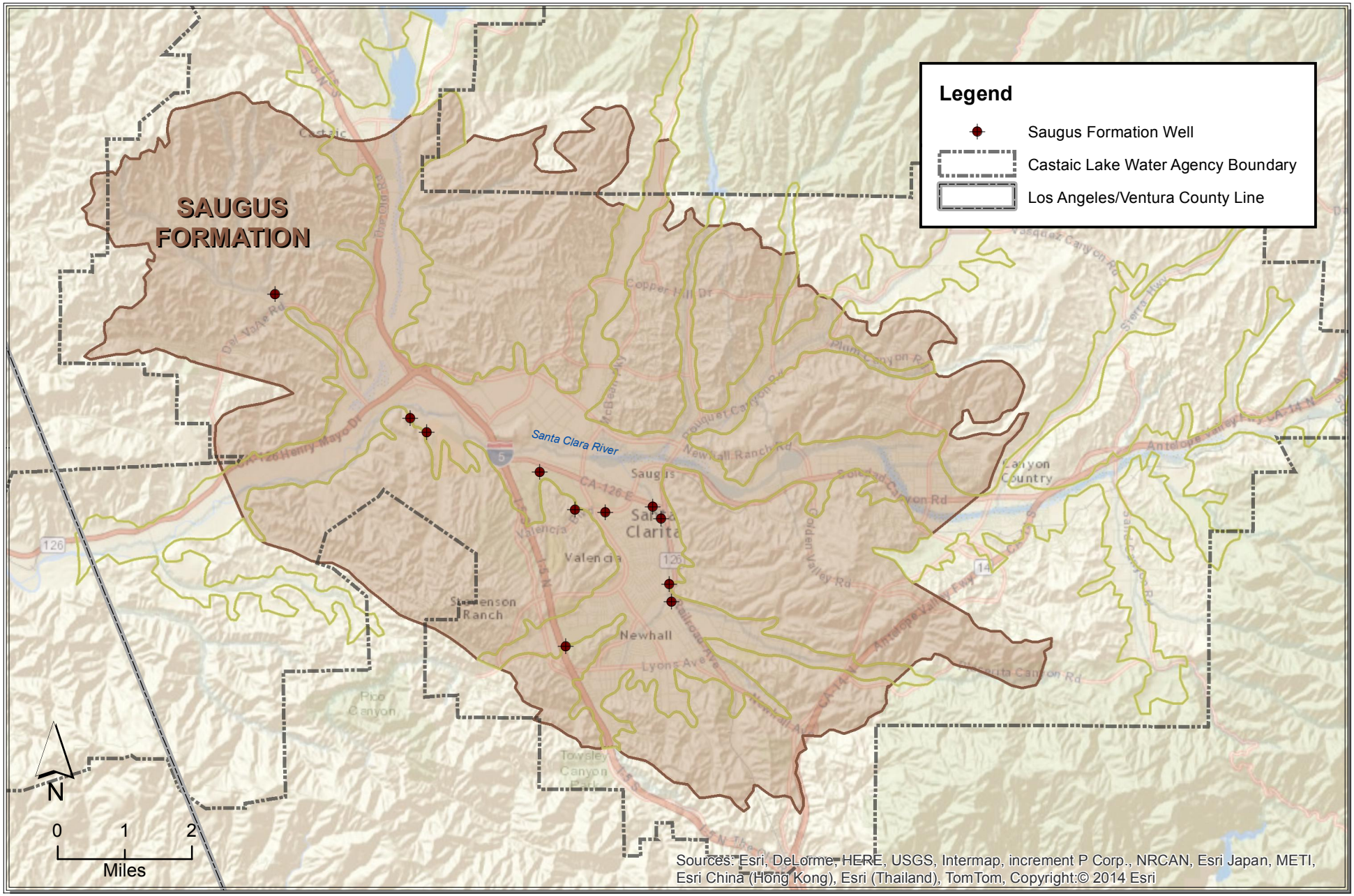

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Figure 3-7
Saugus Formation Well Locations
Santa Clarita Valley Water Report

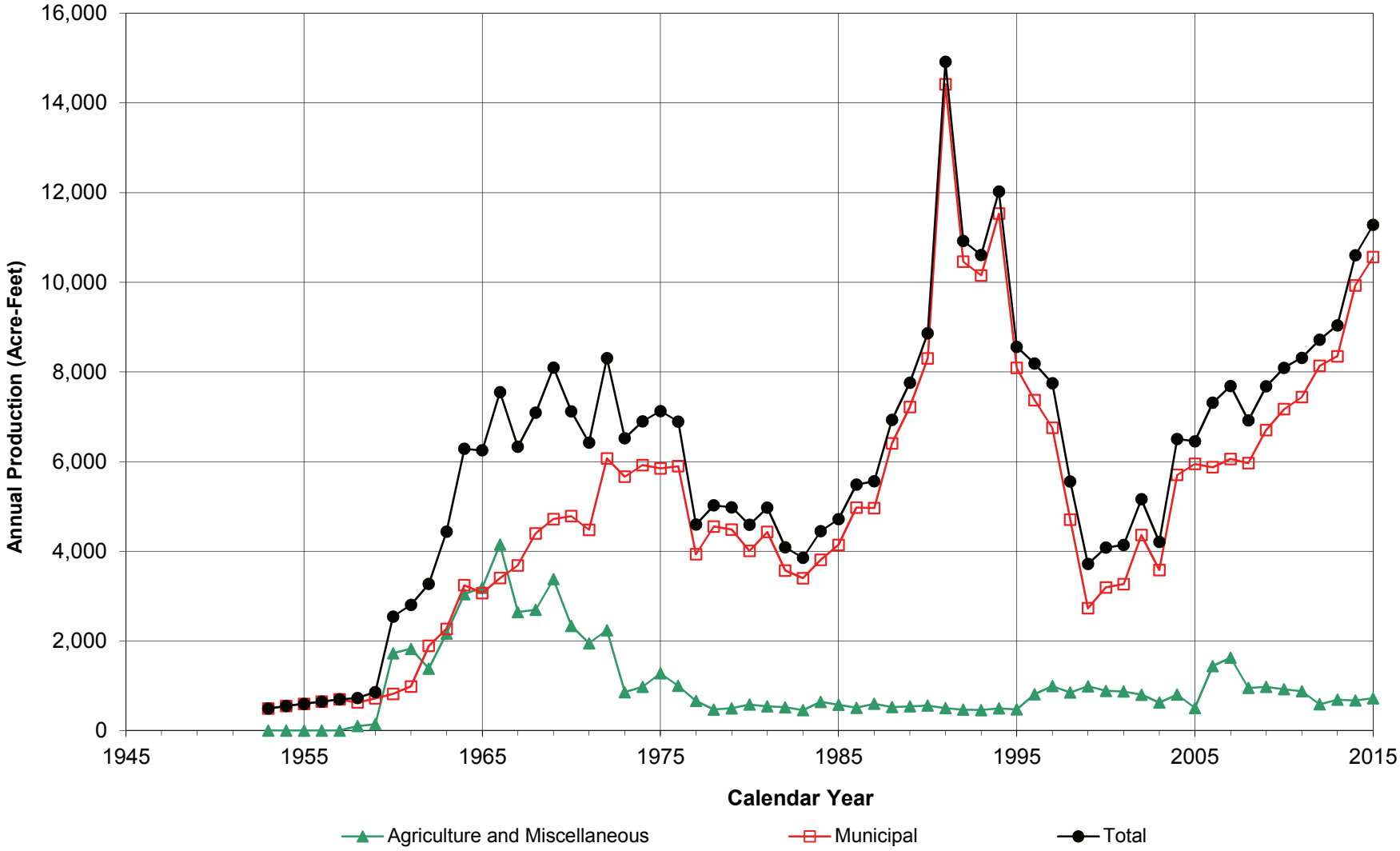

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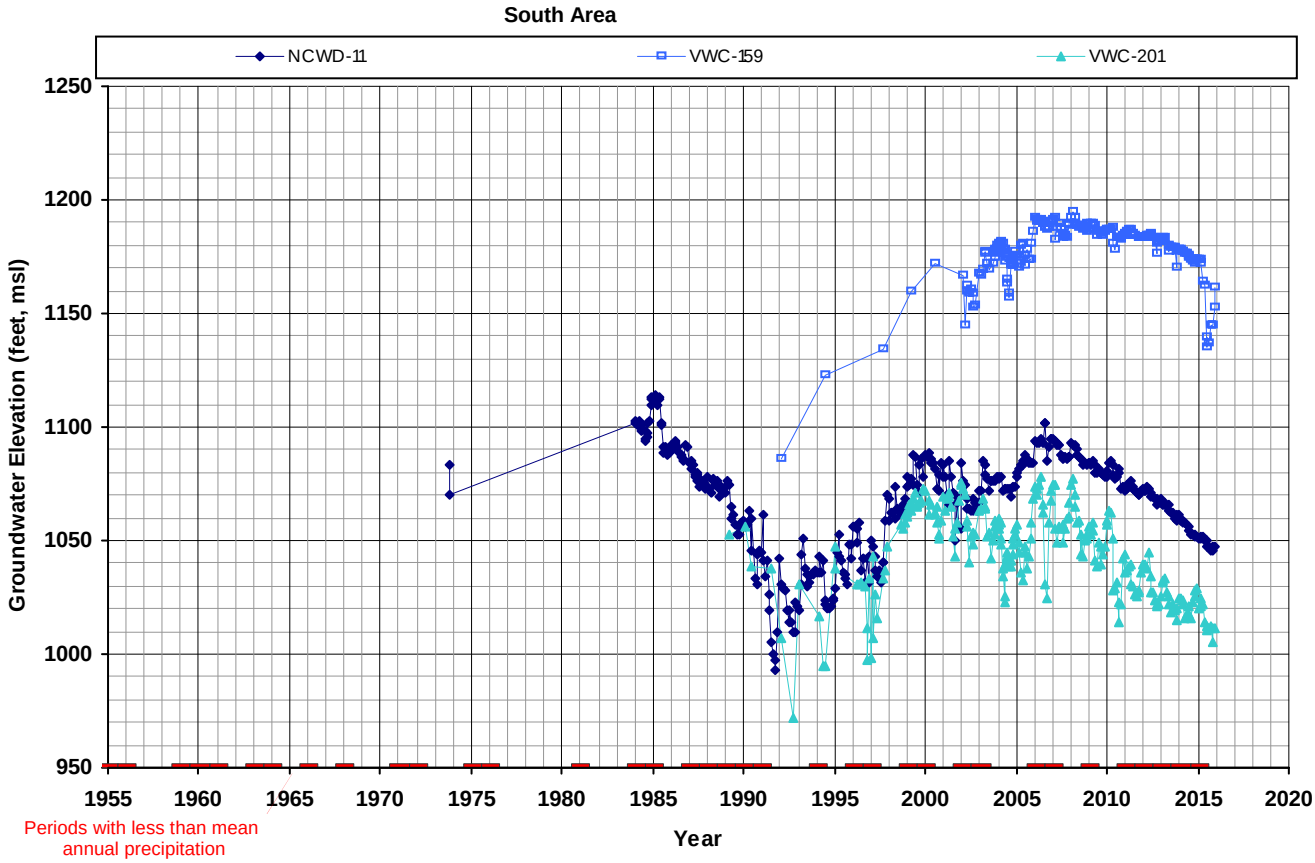
Figure 3-8
Groundwater Production - Saugus Formation
Santa Clarita Valley Water Report



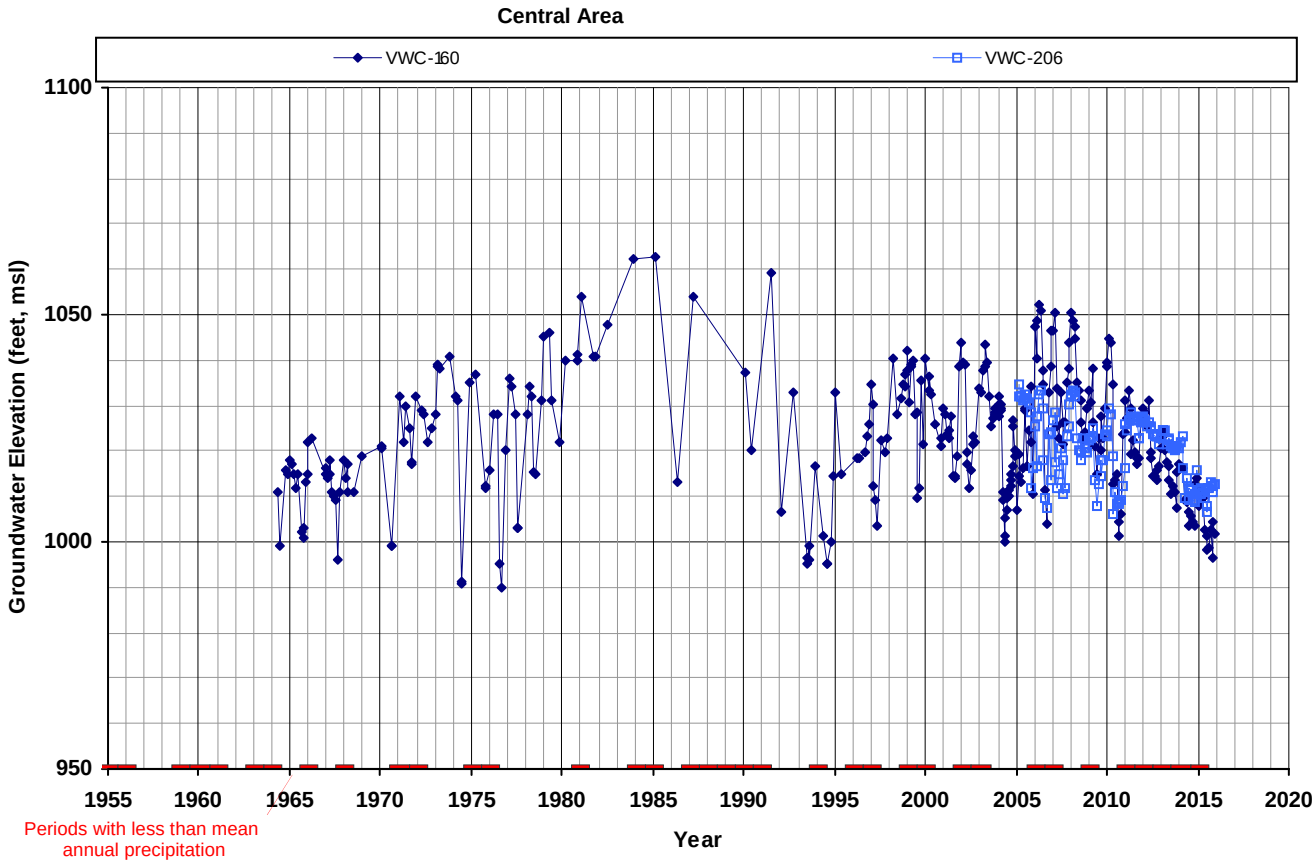


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Figure 3-9
Groundwater Elevations in Saugus Wells

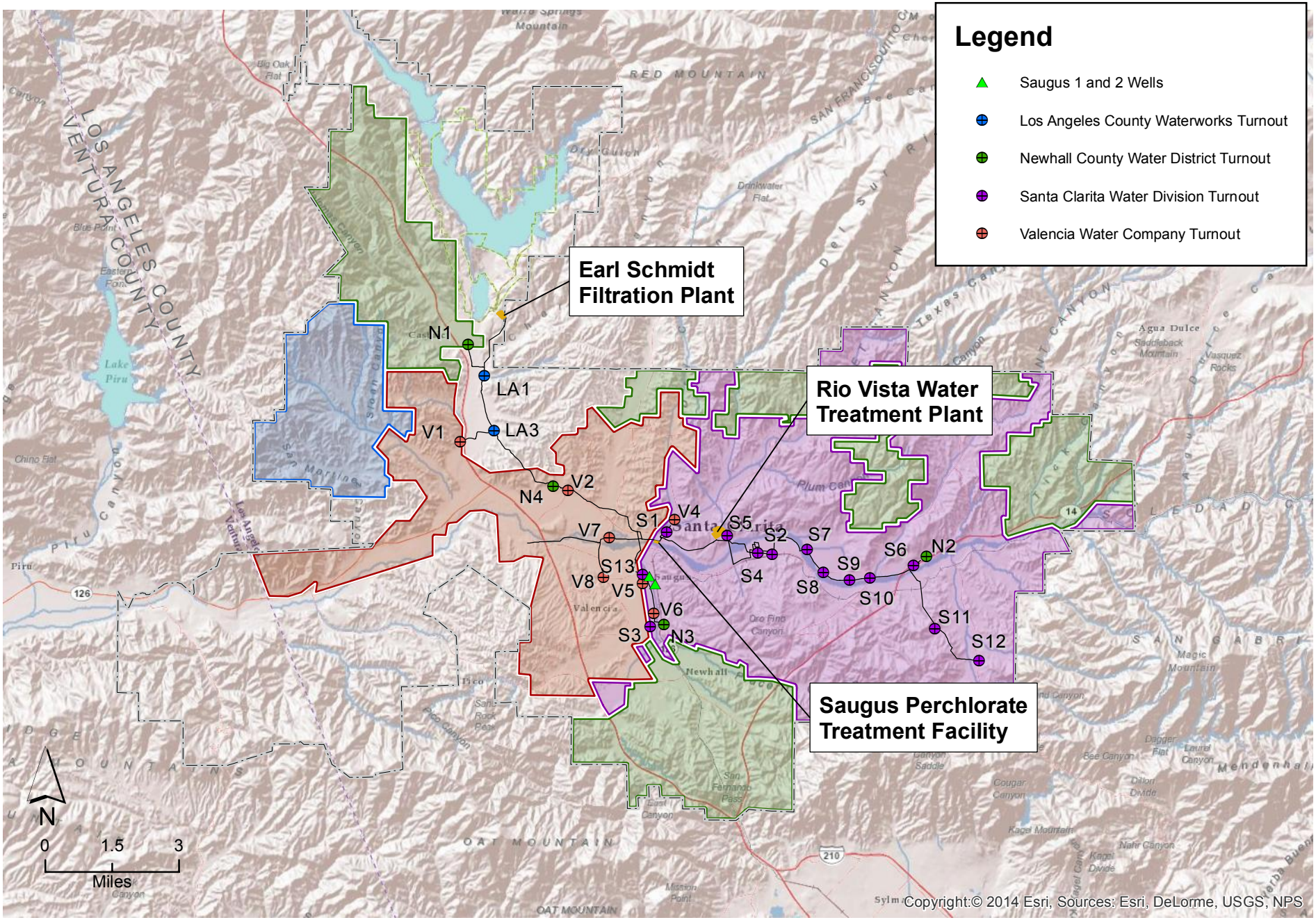

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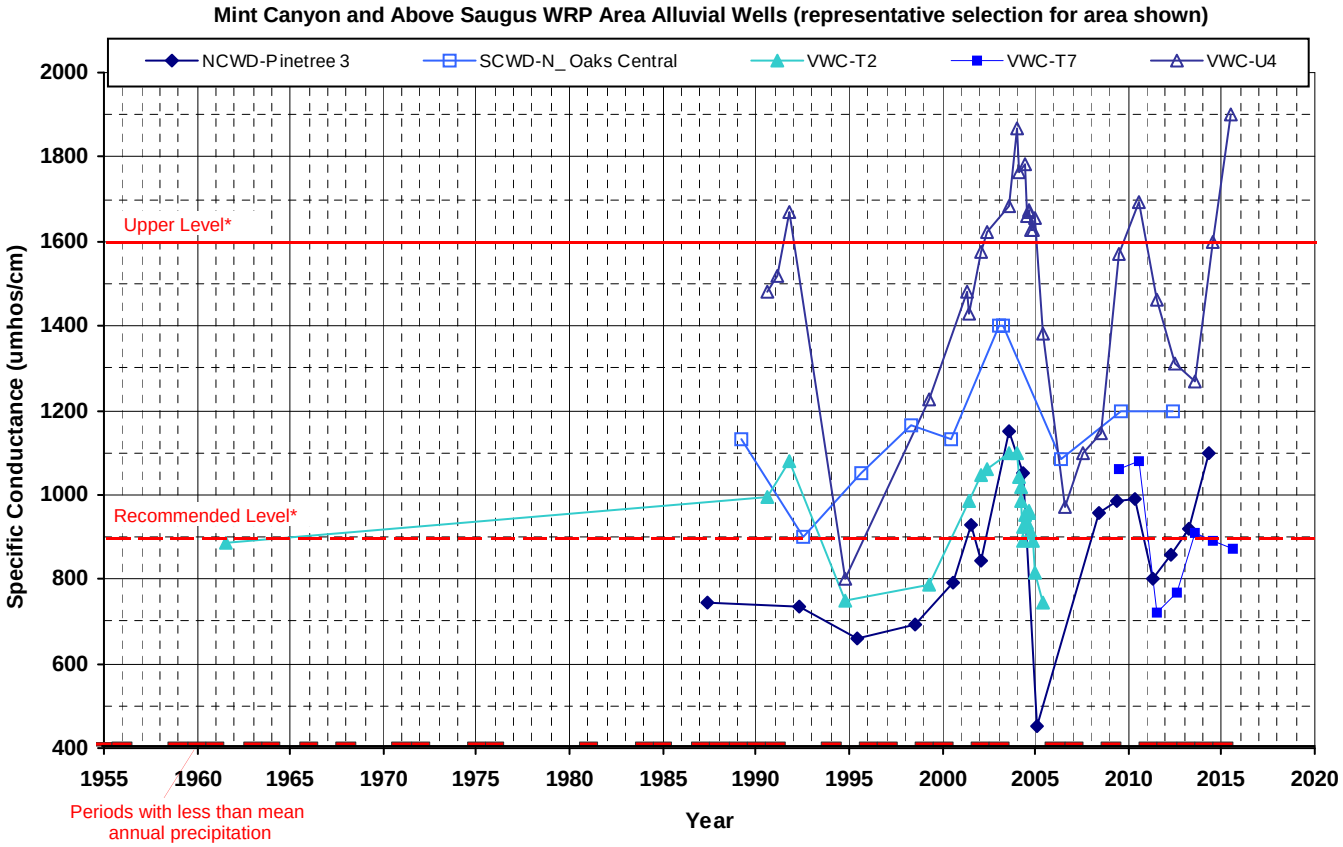
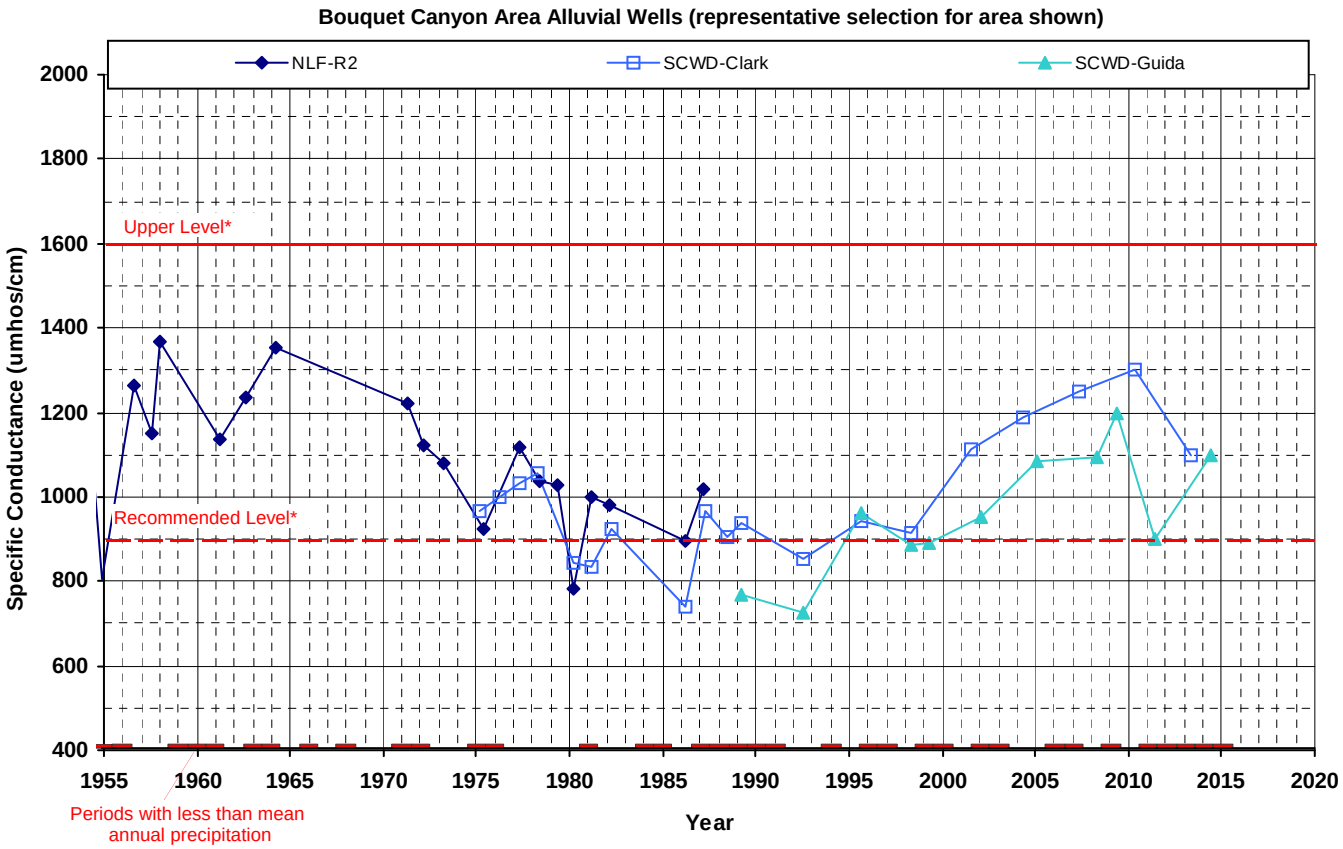
Figure 3-10
Treated Water Distribution System
Castaic Lake Water Agency
Santa Clarita Valley Water Report





*California Department of Public Health Secondary Maximum Contaminant Level

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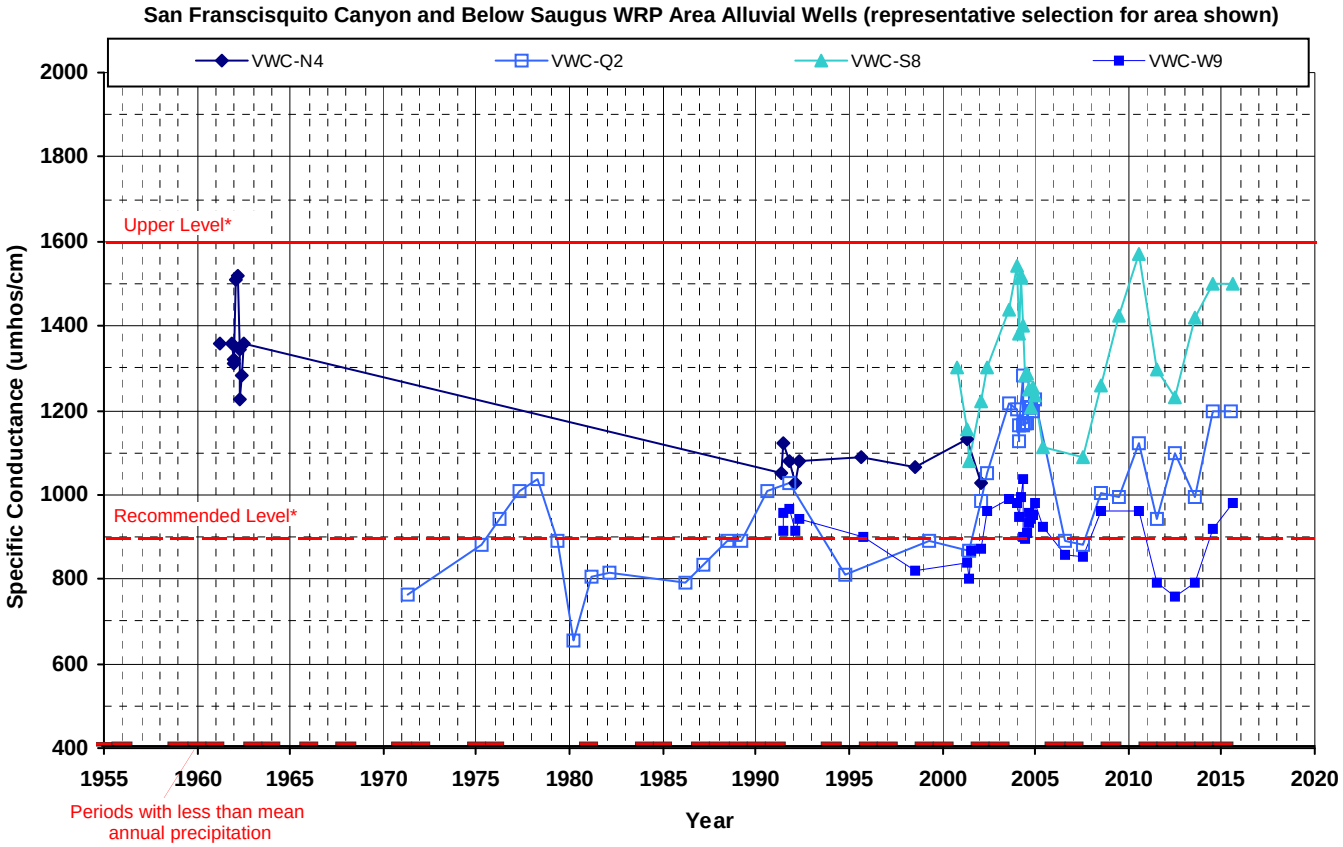
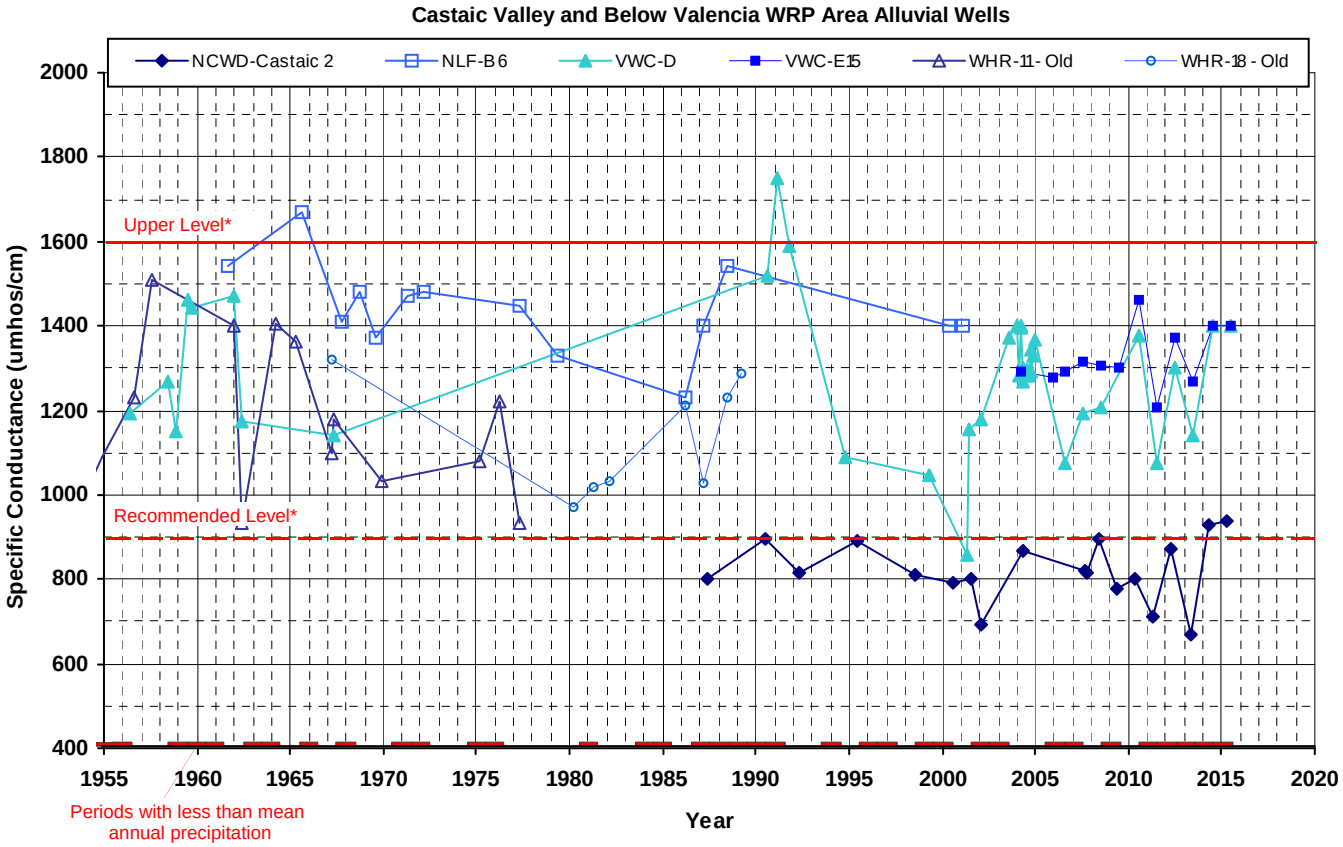
Figure 3-11
Groundwater Quality in Eastern Santa Clarita Valley Alluvial Wells





*California Department of Public Health Secondary Maximum Contaminant Level

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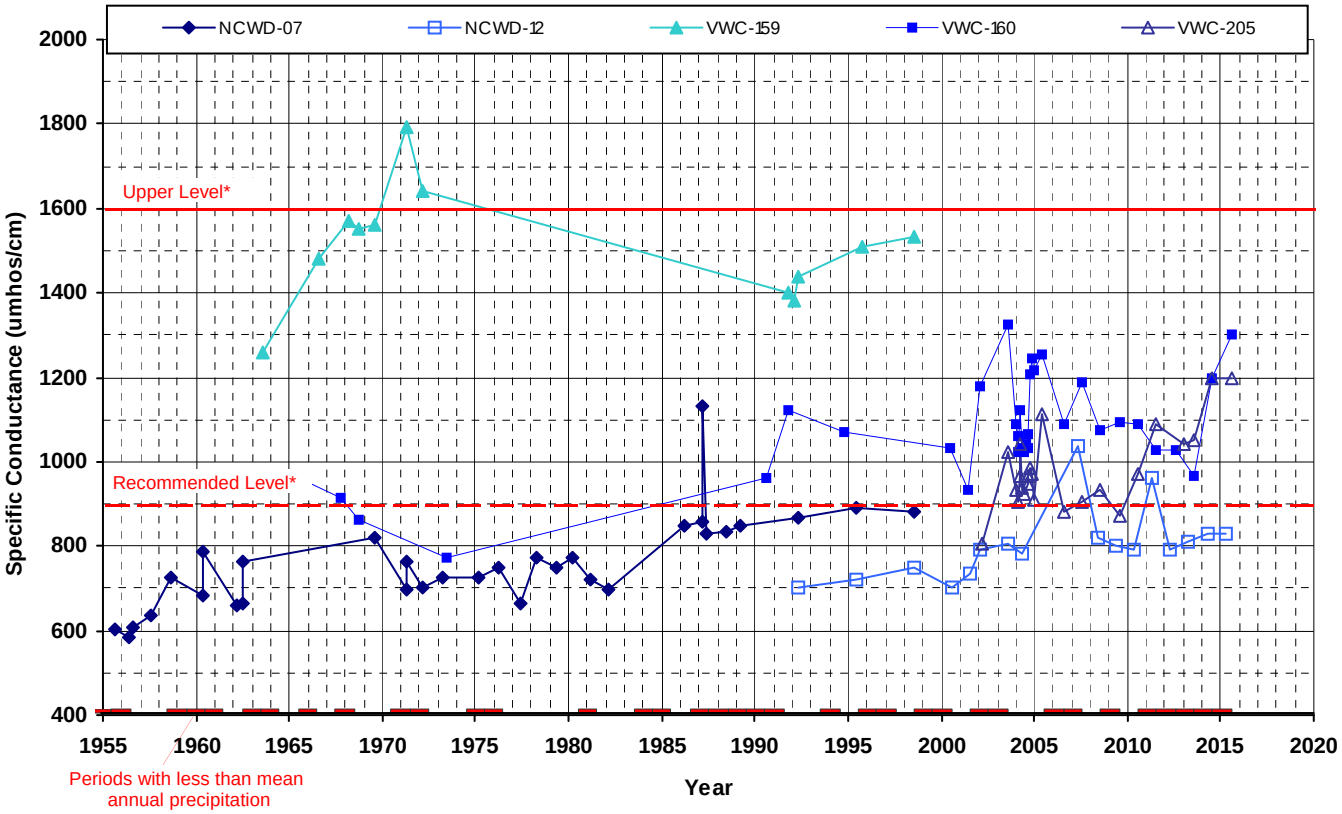
Figure 3-12
Groundwater Quality in Western Santa Clarita Valley Alluvial Wells



*California Department of Public Health Secondary Maximum Contaminant Level

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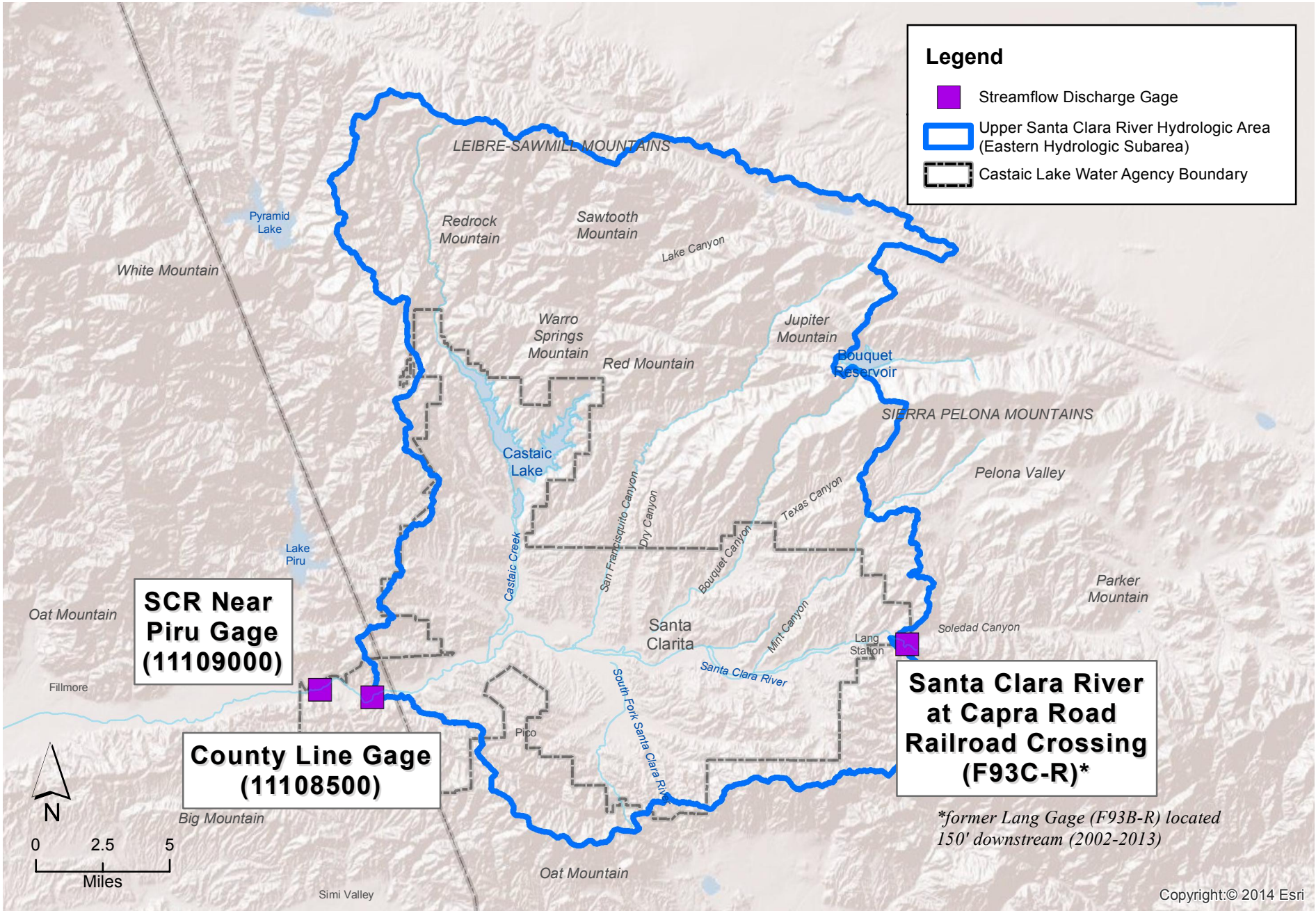
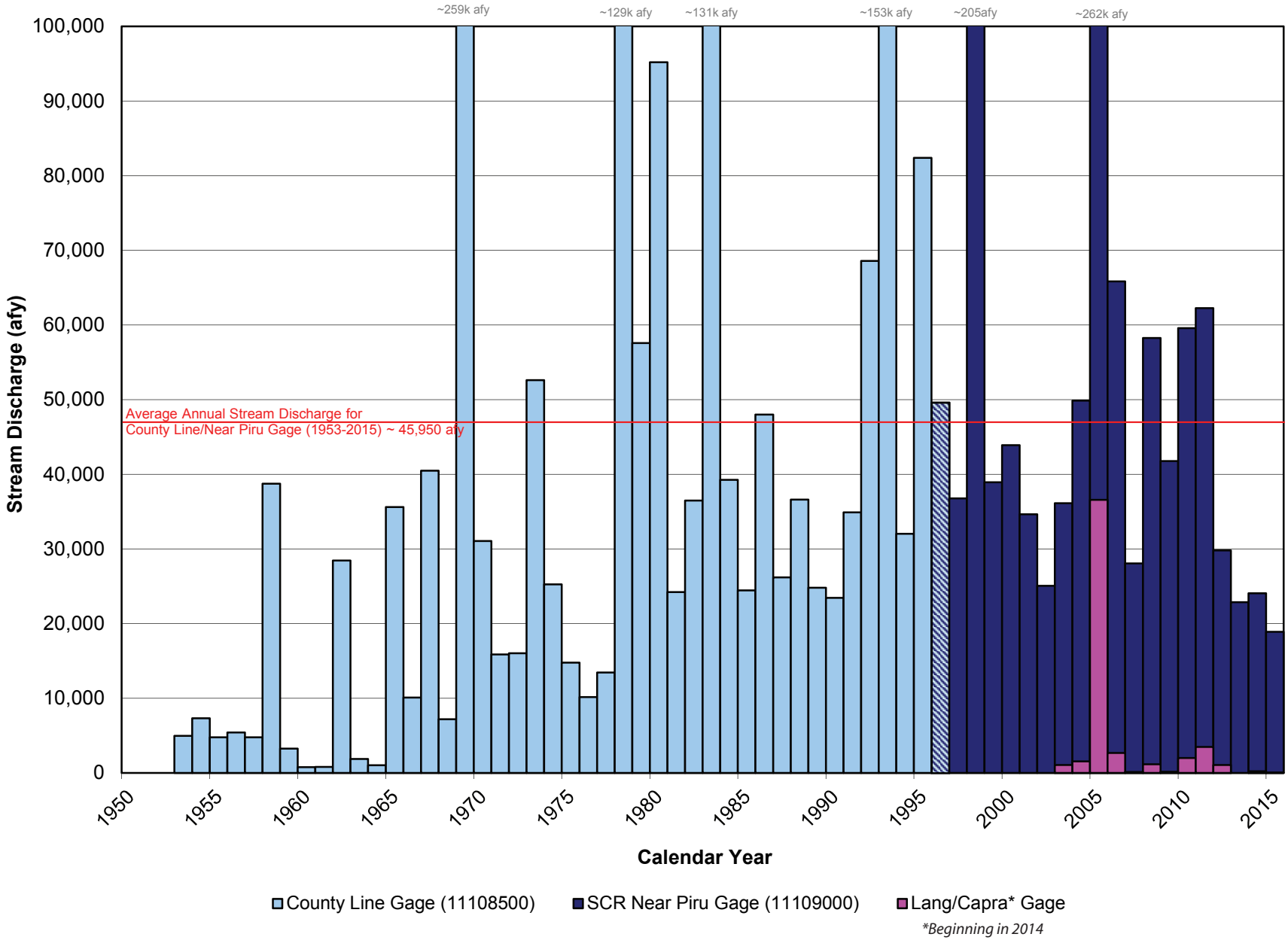
Figure 3-13
Groundwater Quality in Saugus Wells



LUHDORFF & SCALMANINI CONSULTING ENGINEERS

Figure 3-14
Streamflow Discharge Gage Locations
Santa Clarita Valley Water Report



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CONSULTING ENGINEERS

Figure 3-15
Annual Stream Discharge
Santa Clarita Valley Water Report

4 SUMMARY OF 2015 WATER SUPPLY AND 2016 OUTLOOK

As discussed in the preceding chapters, total water demands in the Santa Clarita Valley were 66,600 af in 2015, or eighteen percent lower than in 2014. Of the total demand in 2015, nearly 54,500 af were for municipal water supply (a decrease of 13,700 af), and the balance (12,100 af, a decrease of about 800 af) was for agricultural and other uses, including estimated individual domestic uses. As detailed in Chapter 2, the total demand in 2015 was met by a combination of local groundwater, SWP and other imported water, and a small amount of recycled water.

4.1 2015 Water Demand

The water demand in 2015 was below the average projection in the 2010 UWMP, (95,500 af), and also below the short-term projected demand that was estimated in the 2014 Water Report (79,000 af). For a long-term illustration of demand, historical water use from 1980 through 2015 is plotted in **Figure 4-1** along with the currently projected municipal and agricultural water demands in the 2010 UWMP through 2050. These projections will be updated in next year's Annual Report to represent the adopted 2015 UWMP. Historically, the primary factor causing year-to-year fluctuations in water demands has been weather. In the short term, wetter years have typically resulted in decreased water demand, and drier years have typically resulted in higher water demand. Extended dry periods, however, have resulted in decreases in demand due to conservation and water shortage awareness related to outreach by the water suppliers. The decline in water demand toward the end of the 1989 to 1992 drought is a good example. Similarly, over the recent multi-year dry period beginning in 2006, total water demands progressively declined from a historical high in 2007 to the lowest in nearly two decades in 2015 (except for a couple of interim wet years that saw a corresponding increase). These low demand levels were influenced in part from a slowing in the rate of growth in service connections that started in 2008, but they were primarily the result of intense conservation efforts following state mandated conservation measures.

Adding to these types of demand fluctuations are signs of improving broad economic conditions after a prolonged period of slow growth in new service connections. As reflected by the numbers of service connections in each Purveyor service area, growth in 2015 continued to increase, with the addition of about 730 new service connections. In addition, the Purveyors and the local community continue to be aware of current drought conditions. However, despite the continued growth in service connections, water use in 2015 decreased by eighteen percent from 2014 after an almost ten percent decrease in 2014 as compared to 2013. The

2015 total water demand is now similar to demand last seen in the late 1990s even though the number of service connections is 40% greater; this is due in part to the SWRCB mandatory conservation requirements..

The major factor in the current declining water use in the Valley is the State's ongoing drought and related water conservation measures. Beginning with the 2010 UWMP, conservation goals were adopted to achieve a 20% reduction in water usage by the year 2020. As California began to experience its third consecutive year of drought conditions, on January 17, 2014, Governor Brown declared a drought state of emergency. In Spring 2014, with minimal reductions in water use observed statewide, the Governor signed an Executive Order on April 25, 2014, calling on the State to redouble its drought conservation efforts. On July 28, 2014, Resolution 2014-0038 mandating emergency water conservation measures became effective. Additionally, on April 1, 2015, with ongoing drought conditions throughout the state, and shortfalls in statewide interim conservation goals, the Governor mandated a statewide 25% reduction in usage from 2013 levels and directed the SWRCB to develop emergency regulations to implement these reductions by June 1, 2015.

4.2 Projected 2016 Water Demand and Supplies

Despite the drier-than-average conditions in early 2016, total municipal water requirements in the first quarter of 2016 were lower than the first quarter of 2015 by almost 15 percent. Recognizing those early-year conditions, the potential impact of additional conservation, and continued growth in the Valley, total water demand in 2016 is estimated to be about 65,000 af.

It is expected that both municipal and agricultural water demands in 2016 will continue to be met with a mix of water supplies as in previous years, notably local groundwater, SWP and other supplemental imported water supplies, complemented by recycled water that will continue to supply a small fraction of total water demand.

On December 1, 2015, the initial allocation of water from the SWP for 2016 was 10 percent. On January 26, 2016, it was increased to 15 percent. On February 24, 2016 the allocation was increased to 30 percent. On March 17, 2016 it was increased to 45 percent, and on April 21, 2016 it was increased to 60 percent. A 60 percent allocation for CLWA equates to 57,120 af of its total Table A Amount of 95,200 af. Combined with local groundwater from the two aquifer systems (about 40,000 af), total carryover SWP water from 2015 (21,892 af), annual acquisition

from Buena Vista Water/Rosedale-Rio Bravo Water Storage Districts (11,000 af), and recycled water (450 af), the total available water supplies for 2016 are about 130,500 af. CLWA does not anticipate withdrawing from any water banks in 2016 and is planning to bank about 5,000 af in Rosedale-Rio Bravo. Due to continuing water conservation efforts and diversified sources of water supply, CLWA and the Purveyors anticipate having more than adequate supplies to meet all water demands in 2016. Projected 2016 water supplies and demand are summarized in **Table 4-1**.

4.3 SWP Delivery Capability

In August, 2007, a federal court ruled that certain operational changes were required of the SWP in order to protect the endangered Delta smelt. With the objective of protecting endangered fish such as the Delta smelt and spring-run salmon, the court order resulted in the preparation of new Biological Opinions (BO) requiring DWR to implement mitigation requirements with resultant impacts on SWP water supply reliability. The current SWP Delivery Capability Report 2015 (DWR, 2015), maintains the restrictions on SWP operations according to the Biological Opinions of the U.S. Fish and Wildlife Service and the National Marine Fishery Service issued on December 15, 2008 and June 4, 2009, respectively. In December 2010, a federal judge overruled most of the 2008 federal biological opinion and invalidated several of the criteria that reduced SWP's water supply. These matters were appealed to the U.S. Court of Appeals for the Ninth Circuit. The Ninth Circuit ruling upheld the Biological Opinions of the federal agencies. Therefore, the operational rules defined in these BOs continue to be legally required and were used by DWR in the analyses supporting its 2015 Delivery Capability Report. The SWP Delivery Capability Report 2015 also considers the impacts on SWP delivery reliability due to climate change, sea level rise, and multiple Delta-specific concerns. Further consideration is also given to the major Delta policy planning efforts currently underway: the Delta Plan and the Bay Delta Conservation Plan (currently called CA Water Fix). With these factors, the Capability Report projects that the average annual delivery of Table A water is estimated at 61% (less than 0.1% less than the 2013 estimate). CLWA staff has assessed the impact of the current SWP Delivery Capability Report on the CLWA reliability analysis contained in the Agency's upcoming 2015 UWMP that current and anticipated supplies are available to meet projected water supply needs through the year 2050. The preceding discussion of SWP supply should be considered by noting that, while the SWP Capability Report represents a reasonable scenario with respect to long term reliability, recent reductions in supply reduce the difference between available supply and demand in the future, thereby making the CLWA

Table 4-1
2016 Water Supply and Demand
(acre-feet)

Projected 2016 Demand [1]		**65,000**
Available 2016 Water Supplies		
Local Groundwater		40,000
Alluvium [2]	*30,000*	
Saugus Formation [3]	*10,000*	
Imported Water		90,012
Table A Amount [4]	*57,120*	
Total Carryover from 2015 [5]	*21,892*	
Buena Vista/Rosedale-Rio Bravo[6]	*11,000*	
Flexible Storage Account (CLWA/Ventura County) [7]	*0*	
Yuba Accord[8]	*0*	
Rosedale-Rio Bravo Water Banking Program Withdrawal	*0*	
Recycled Water		450
Total Available 2016 Supplies		**130,462**
Additional Dry Year Supplies [9]		
Semitropic Groundwater Banking Program[10]		35,970
Rosedale-Rio Bravo Water Banking Program		94,178
2005/2006 Buena Vista/Rosedale-Rio Bravo Water Acquisition Agreement[11]	*22,000*	
2005/2006 Banking of Table A[12]	*35,006*	
2007/2010-2012 Rosedale Rio-Bravo Banking[13]	*37,172*	
Two-for-One Exchange Programs		9,941
2011/2012 Rosedale-Rio Bravo Water Storage District[14]	9,441	
2011 West Kern Water District[15]	500	
Total Additional Dry Year Supplies		**140,089**

1. Based on: Year-to-date demand through May 2016 and actual demand from 2015 with adjustment for conservation and anticipated demand.

2. The Alluvium represents 30,000 to 40,000 afy of available supply under local wet-normal conditions, and 30,000 to 35,000 afy under local dry conditions. Available supply in 2016 is shown to be reflective of dry year production under the Current Operating Plan described in the Updated Basin Yield Analysis, August 2009. This available supply will be achieved through a temporary redistribution of pumping to the central and western portions of the subbasin and a decrease in pumping from the easternmost areas of the subbasin.

3. The Saugus Formation represents 7,500 – 15,000 afy of available water supply under non-drought conditions, and up to 35,000 afy under dry conditions. Estimated supply for 2016 takes into consideration current available capacity.

4. CLWA's SWP Table A amount is 95,200 af. The initial 2015 allocation on December 1, 2015 was 10 percent (9,520 af). On January 26, 2016 the allocation was increased to 15 percent (14,280 af). On February 24, 2016 the allocation was increased to 30 percent (28,560 af). On March 17, 2016 the allocation was increased to 45 percent (42,840 af), and on April 21, 2016 it was increased to 60 percent (57,120 af).

5. Of the 21,892 af of total available carryover, some may be returned to the SWP if the system reservoirs were to go into a 'spill' mode due to the carryover water in storage needing to be reassigned. As of the drafting of this report, no water has spilled in 2016. As the likelihood of significant increases in SWP reservoir storage for the year has diminished, it is assumed that the total amount of carryover would be available for 2016 supply.

6. 2016 annual supply from Buena Vista/Rosedale-Rio Bravo Water Acquisition Agreement.

7. CLWA can directly utilize up to 4,684 af of flexible storage capacity in Castaic Lake. By agreement in 2005, that was extended by 10 years in 2015, CLWA can also utilize 1,376 af of Ventura County SWP contractors' flexible storage capacity in Castaic Lake for a total of 6,060 af of flexible storage. In 2014, 4,424 af was recovered and 4,339 af was backfilled in 2015; 85 af remains to be refilled. No utilization of this flexible storage is anticipated in 2016.

8. Yuba Accord Water is subject to availability and cost. Up to 850 af of non-SWP water supply may be available to CLWA in critically dry years as a result of agreements among DWR, Yuba County Water Agency, and the U.S. Bureau of Reclamation regarding settlement of water rights issues on the Lower Yuba River (Yuba Accord). CLWA opted to take 445 af of Yuba water in 2014 and did not take any in 2015. CLWA will not take any Yuba water in 2016.

9. Does not include other reliability measures available to CLWA and the retail water Purveyors. These measures include short-term exchanges, participation in DWR's dry-year water purchase programs, local dry-year supply programs and other future groundwater storage programs.

10. CLWA initially banked 24,000 af and 32,522 af in 2002 and 2003, respectively. This is the current balance after accounting for program losses, recovering 4,950 af in 2009/2010, and withdrawing 4,950 af in 2014 through Newhall Land's first priority extraction capacity (and giving Newhall Land 5,000 af of water in consideration for this use). No water will be withdrawn in 2016. In 2015, CLWA entered into an agreement with Semitropic to participate in the Stored Water Recovery Unit (SWRU). Under this agreement, the two short-term accounts containing 35,970 AF were transferred into this new program, and CLWA can store and recover additional water within a 15,000 AF storage account. The term of the Semitropic Banking Program extends through 2035 with the option of a 10 year renewal. CLWA may withdraw up to 5,000 AFY from its account.

11. Water stored in Rosedale-Rio Bravo Water Banking Program back-credited for 2005 and 2006 pursuant to the Buena Vista/Rosedale-Rio Bravo Water Acquisition Agreement executed in 2007, not subject to losses.

12. Net recoverable water balance is 35,006 af comprising the following transactions:
    17,146 af after banking 20,000 af in 2005;
    17,860 af after banking 20,000 af in 2006.

13. Net recoverable water balance is 37,172 af comprising the following transactions:
    7,323 af after banking 8,200 af in 2007;
    29,132 af after banking of 33,668 af in 2010;
    810 af after banking of 1,006 af in 2011;
    5,729 af after banking of 6,031 af in 2012;
    recovery of 2,824 af in 2014;
    recovery of 2,998 af in 2015.

14. Net recoverable water balance is 9,441 af comprising the following transactions:
    7,555 af after exchanging 15,602 af in 2011;
    1,954 af after exchanging 3,969 af in 2012;
    recalculation of program losses and reduction by 68 af in 2015.

15. Net recoverable water balance is 500 af comprising the following transactions:
    2,500 af after exchanging 5,000 af in 2011;
    recovery of 2,000 af in 2014.

service area more subject to shortages in certain dry years. Accordingly, the reduction in SWP supply reinforces the need to continue diligent efforts to conserve potable water and increase the use of recycled water to maximize utilization of potable water supplies.

As discussed in Chapter 5, CLWA and the retail water purveyors have worked with Los Angeles County and the City of Santa Clarita to aggressively implement water conservation in the CLWA service area. In terms of short-term water supply availability, however, CLWA and the retail water purveyors have determined that even with operational changes of the SWP in effect, there are sufficient supplemental water supplies, including SWP water, to augment local groundwater and other water supplies such that overall water supplies will be sufficient to meet projected water requirements. CLWA, the retail water Purveyors, Los Angeles County, and the City of Santa Clarita have formed the Santa Clarita Valley Water Committee (formerly convened as the Santa Clarita Drought Committee). The specific purpose of the committee is to work collaboratively to manage the conjunctive use of the Valley's water supplies, respond to drought conditions and ensure the progressive implementation of water use efficiency programs in the Santa Clarita Valley.

4.4 Supplemental Water Supply Sources

In addition to the water supplies described above, and as described in Chapter 3, CLWA has dry-year supplemental water supply of more than 140,000 af of recoverable water outside the groundwater basin at the end of 2015. Through four long-term groundwater banking and exchange programs, as itemized in the lower half of **Table 4-1**, these additional dry-year supplies include: nearly 36,000 af of recoverable water stored in the Semitropic Groundwater Storage Bank in Kern County, more than 94,000 af in the Rosedale Rio-Bravo Water Storage District (RRBWSD), a separate two-for-one exchange with RRBWSD with more than 9,400 af of total recoverable water, and another two-for-one exchange program with the West Kern Water District in Kern County that has 500 af of recoverable water at the end of 2015. These components of overall water supply are separately reflected in **Table 4-1** because they are intended as a future dry-year supply. No water was delivered into any of the banking programs in 2015. There will be no extractions from the Rosedale-Rio Bravo, Semitropic or West Kern exchange programs in 2016, and CLWA is planning to bank about 5,000 af into Rosedale-Rio Bravo in 2016.

4.5 Water Supply Strategy

CLWA and the Purveyors have implemented a number of projects that are part of an overall program to provide facilities needed to firm up imported water supplies during times of drought. These involve water conservation, surface and groundwater storage, water transfers and exchanges, water recycling, additional short-term pumping from the Saugus Formation, and increasing the reliability of CLWA's imported supply. This overall strategy is designed to meet increasing water demands while assuring a reasonable degree of supply reliability.

Part of the overall water supply strategy is to conjunctively use groundwater and imported water to area residents to ensure consistent quality and reliability of service. The actual blend of imported water and groundwater in any given year and location in the Valley is an operational decision and varies over time due to source availability and operational capacity of an individual Purveyor and the CLWA facilities. The goal is to conjunctively use the available water resources so that the overall reliability of water supply is maximized while utilizing local groundwater at a sustainable rate. Such is the case in 2016. Due to the larger amount of available SWP supplies, the temporary decrease in Saugus Formation well capacity due to perchlorate concentrations in the vicinity of some Saugus Formation production wells, and drought impacts on groundwater levels in the eastern portion of the subbasin, groundwater pumping from the Alluvium will be more representative of dry year levels (about 30,000 afy). As done in 2014 and 2015, the pumping of approximately 30,000 af from the Alluvium will be accomplished by redistribution of pumping to the central and western portions of the subbasin. This redistribution of pumping is planned to be a short term measure to help meet projected demands in 2016.

For long-term planning purposes, water supplies and facilities are added on an incremental basis and ahead of need. It would be economically unsound to immediately, or in the short term, implement all the facilities and water supplies needed for the next twenty to thirty years. This would unfairly burden existing customers with costs that should be borne by future customers. There are numerous ongoing efforts to produce an adequate and reliable supply of good quality water for Valley residents, including increased recovery capacity at both the Semitropic Water Storage District and Rosedale-Rio Bravo Water Storage District Banking Programs and new and replacement wells in the Saugus Formation to increase groundwater recovery. Water consumers expect their needs will continue to be met with a high degree of reliability and quality of service. To that end, CLWA's and the water suppliers stated reliability

goal is to deliver a reliable and high quality water supply for their customers, even during dry periods. Based on conservative water supply and demand assumptions contained in the 2010 and upcoming 2015 UWMP for a planning horizon to 2050, in combination with conservation of non-essential demand during certain dry years, CLWA and the water suppliers believe implementing their water plan will successfully achieve this goal.

5 WATER CONSERVATION

5.1 Historical Conservation Efforts

The California Urban Water Conservation Council (CUWCC) was formed in 1991 through the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). The urban water conservation Best Management Practices (BMPs) included in the MOU are intended to reduce California's long-term urban water demands. In 2001, the CLWA Board approved signing the CUWCC's MOU on behalf of both the wholesale and retail service areas (CLWA and SCWD), thus meeting one of the recommendations of the 2000 UWMP. Los Angeles County signed the MOU prior to the 2000 UWMP on behalf of all its Waterworks Districts; NCWD signed the MOU on its own behalf in September 2002 and VWC signed in 2006. In 2009, the CUWCC changed its policy to specify that each signatory had to join individually and that a wholesaler could no longer be a signatory on behalf of its retailers. SCWD therefore signed the MOU independently in 2011. CLWA and the retail water purveyors are subject to the Urban Water Management Planning Act, AB1420 and SBX7-7 requirements, in addition to the commitment of compliance with the BMPs as signatories to the MOU. In the CLWA service area, demand management is addressed at both the local (retail agency) and regional (Santa Clarita Valley-wide) levels.

The MOU and BMPs were revised by the CUWCC in 2008. The revised BMPs now contain a category of "Foundational BMPs" that signatories are expected to implement as a matter of their regular course of business. These include Utility Operations (metering, water loss control, pricing, conservation coordinator, wholesale agency assistance programs and water waste ordinances) and Public Education (public outreach and school education programs). The remaining "Programmatic" BMPs have been placed into three categories: Residential, Large Landscape, and Commercial, Industrial, Institutional (CII) Programs and are similar to the original quantifiable BMPs.

A key intent of the MOU revision was to provide retail water agencies with more flexibility in meeting requirements and allow them to choose program options most suitable to their specific needs. Therefore, as alternatives to the traditional Programmatic BMP requirements, agencies may also implement the MOU Flex Track or gallons per capita per day (GPCD) options. Under the Flex Track option, an agency is responsible for achieving water savings greater than or equal to those it would have achieved using only the BMP list items. The CUWCC has

developed three Flex Track Menus – Residential, CII, and Landscape – and each provides a list of program options that may be implemented in part or any combination to meet the water savings goal of that BMP. Custom measures can also be developed and require documentation on how savings were realized and the method and calculations for estimating savings.

The GPCD option sets a water use reduction goal of 18 percent reduction by 2018. The MOU defines the variables involved in setting the baseline and determining final and interim targets. The GPCD option and requirements track well with the requirements of SB X7-7. All three retail suppliers – SCWD, VWC and NCWD – have chosen to implement the GPCD compliance option.

As the water wholesaler for the region, CLWA is responsible for the implementation of a subset of the BMPs. However, CLWA in partnership with the Water Purveyors has taken a leadership role in the implementation and support of a number of the BMPs that extend beyond a wholesaler's responsibilities in the MOU. Additional detail on the water suppliers' conservation programs and compliance with the BMPs are presented below.

In 2007, VWC coordinated the development and execution of a MOU with CLWA and the other retail water purveyors that led to the preparation of the Santa Clarita Valley Water Use Efficiency Strategic Plan (2008 SCVWUESP). The purpose of the effort was to prepare a comprehensive long-term conservation plan for the Santa Clarita Valley by adopting objectives, policies and programs designed to promote proven and cost-effective conservation practices. The preparation of the 2008 SCVWUESP included input from stakeholders and the community at large and was completed in 2008. The 2008 SCVWUESP provided a detailed study of residential and commercial water use, and recommended programs designed to reduce overall Valley-wide water demand by ten percent by 2030. Following the completion of the 2008 SCVWUESP, Senate Bill SBX7-7 was passed in November 2009. SBX7-7 included requirements for reductions in per capita water use by 2020 of 20 percent which exceeded the targets outlined in the 2008 SCVWUESP.

5.2 Recent Conservation Efforts

In 2015, an updated SCVWUESP was finalized that incorporated the SBX7-7 targeted reductions. The updated SCVWUESP was supported by a thorough economic analysis that will guide water conservation efforts planned and implemented by CLWA and the retail water purveyors in the coming years. The economic analysis concluded that water conservation measures are more

economically feasible as compared to the economic benefit of adding recycled water infrastructure in meeting a portion of future water demands. The SCVWUESP is consistent with CLWA's and the retail water purveyors Strategic Plan Objectives including:

- Ensure long-term average water supply meets current and future demand.
- Meet local water demands.
- Achieve the water conservation target of 20 percent per capita by 2020.

CLWA and the retail water purveyors are committed to a water conservation program that is composed of several conservation measures that will lower projected demand by 2020, similar to what has already been implemented over the past two decades. The conservation measures incorporate education, incentives, and conservation mandates among all the various customers present in the Valley. Some of these measures are summarized below by retail water purveyor.

2015 was the fourth consecutive calendar year of exceptional and extreme drought conditions for most of California, including the Santa Clarita Valley. On January 17, 2014, as a response to these continued conditions, the Governor of the State of California declared a drought emergency and asked that all California's take voluntary action to reduce their 2013 water use by 20%. In February 2014, the Santa Clarita Valley Family of Water Suppliers approved the Water Conservation Action Plan that provided a series of water conservation guidelines customers could implement to reduce their water use by 20%. In July 2014, the SWRCB adopted temporary emergency water conservation regulations that required water agencies to implement the actions of their water shortage contingency plans that imposed mandatory restrictions on outdoor irrigation of ornamental landscapes or turf with potable water and prohibited the following actions:

- the application of potable water outdoor landscapes in a manner that causes runoff,
- the use of a hose that dispenses potable water to wash a motor vehicle, except where the hose is fitted with a shut-off nozzle,
- the application of potable water to driveways, sidewalks, and other hardscape,
- failure to repair a leak within 24 hours of detection or notification,
- irrigating lawns, turf, or vegetated areas during and within 48 hours following measurable rainfall and between the hours of 9:00 am to 5:00 pm,
- the use of potable water in a fountain or other decorative water feature except where the water is part of a recirculating system.

In August 2014, the Santa Clarita Valley Water Committee declared a second phase of the Water Conservation Action Plan that formally recommended that local water retail agencies adopt the SWRCB Prohibitive Measures and Mandatory Outdoor Watering Restrictions, which provided restricted watering days for outdoor landscaping. Additionally, and as a result of the water conservation measures described in the Water Conservation Action Plan, the SCV Family of Water Suppliers put forth a valley wide communication plan that included outreach efforts by both CLWA and the retail water purveyors.

As described in the draft 2015 UWMP, each retail purveyor must demonstrate SBX7-7 compliance by an interim 2015 Daily Per Capita Water Use Target. As summarized in **Table 5-1**, NCWD, SCWD and VWC met their 2015 Interim Water Use Target in addition to their 2020 Target.

Table 5-1
20x2020 Compliance GPCD Targets and Current Purveyor Levels

Daily Per Capital Water Use (GPCD)	NCWD	SCWD	VWC
2015 Interim Target	214	226	301
2020 Target	190	201	267
2015 Actual	156	158	211

5.3 Purveyor Specific Efforts

5.3.1 Valencia Water Company

CLWA and the retail water suppliers have implemented a number of conservation activities to meet the requirements of the SCVWUESP MOU and SBX7-7 goals along with other measures to comply with the emergency water conservation regulations. These activities include VWC's internal Water Conservation Plan drafted in 2013. The Water Conservation Plan provides a broad framework defining VWC's conservation policies as well as detailed conservation programs. The Water Conservation Plan is reviewed annually and updated every three years. Notable VWC programs include:

- **Water SMART Allocation and Tiered Rates Program** –provides customized monthly water allocations based on each customer's specific indoor and outdoor water needs. Additionally, the Water SMART Allocation and Tiered Rates Program couples the water allocation with tiered rates by establishing pricing signals that encourage the efficient uses of water and incentives to reduce the inefficient, excessive and wasteful uses of water.
- **Residential Water Tune-Up Program** – offers residential customers a home water survey at no additional cost. A water use efficiency specialist will visit a customer's home and check for leaks, install water saving devices, and perform an irrigation system inspection. The specialist will also provide information pertaining to the Water SMART Allocation and Tiered Rates Program and additional conservation program opportunities.
- **Residential Water Efficiency Kit** – offers residential customers a free water efficiency kit that includes water efficient shower heads, bathroom faucet aerators, a hose nozzle, a replacement toilet flapper, leak detector dye tablet packs, and a flow rate bag with instructions.
- **HELIUM Rebates (High Efficiency Landscape Irrigation Upgrade Measures)** – provides customers with rebates and incentives for High Efficiency ("HE") irrigation improvements. Currently, VWC offers free nozzles rebates for converting spray irrigation to drip irrigation systems, via the www.freesprinklernozzles.com program and 50% rebates for the eligible HE nozzles, pressure regulated bodies, or master pressure regulation devices.
- **Pool Cover Rebates** – offering residential customers rebates for new pool covers.
- **Water SMART Irrigation and Garden Care Workshops** – provides customers with a $20 credit for attending the workshop. The Workshop provides information on easy-to-implement, no cost, solutions for improved irrigation efficiency. Topics include watering to the weather, cycle and soak irrigation scheduling, and when, where, and how to use Drip Irrigation.
- **High Consumption Notification Program** – provides courtesy letters to customers with water consumption significantly greater than their monthly Water SMART Allocation. The letter informs customers that there are solutions available to assist them with their water conservation goals. Customers receiving the High Consumption Notification letter are encouraged to participate in the Residential Tune-Up Program.

- **Turf Replacement Program** – VWC participates with the other Valley water purveyors in offering rebates for turf conversion.
- **Water Conservation Works Program** – for commercial customers, VWC offers free facility surveys, rebates for HE plumbing and landscape irrigation retrofits.
- **VWC Customized Drought Reports** – VWC developed customized drought reports that provided customers with actual 2013 water use figures, their 20% drought reduction targets, weekly water savings estimates and tools and tips to achieve their goals. Additionally, VWC developed an online tracking tool that enabled customers to track their performance throughout the year.

5.3.2 Santa Clarita Water Division

SCWD developed a specific Santa Clarita Water Division Water Use Efficiency Strategic Plan in 2012. In this plan and the recent SCVWUESP, SCWD recognized the need to implement additional conservation measures that could accelerate savings in the SCWD service area. Both plans identified the elements and processes to promote conservation and further complement the SCVWUESP. Furthermore, SCWD uses multiple communication tools including social media sites, bill messages, monthly newsletters, robocalls, and bill inserts to update customers on water conservation. SCWD participates in multiple public outreach events every year to promote water conservation and has implemented the following programs to encourage customers to reduce water usage:

- **Free Sprinkler Nozzle Program** - both residential and commercial customers can apply to receive free high efficiency sprinkler nozzles.
- **Turf Replacement Program** - SCWD participates with other Valley water purveyors in a $2/sf turf replacement rebate program.
- **Drip Program** - SCWD offers both residential and commercial customers a $0.25/sf rebate for installing drip irrigation systems.
- **Conservation Products** - SCWD distributes free efficient water use products like drip kits, faucet aerators, showerheads, and spray nozzles.
- **Free SMART Controller** - SCWD participates in a program that distributes free weather-based controllers to residential customers and provides a $25/station rebate to commercial customers.
- **Indoor Rebates** - SCWD promoted programs offering rebates for water efficient washers and toilets.

- **Water Audits and Budgets** - SCWD completed water audits and updated landscape water budgets for twenty large users.

5.3.3 Newhall County Water District

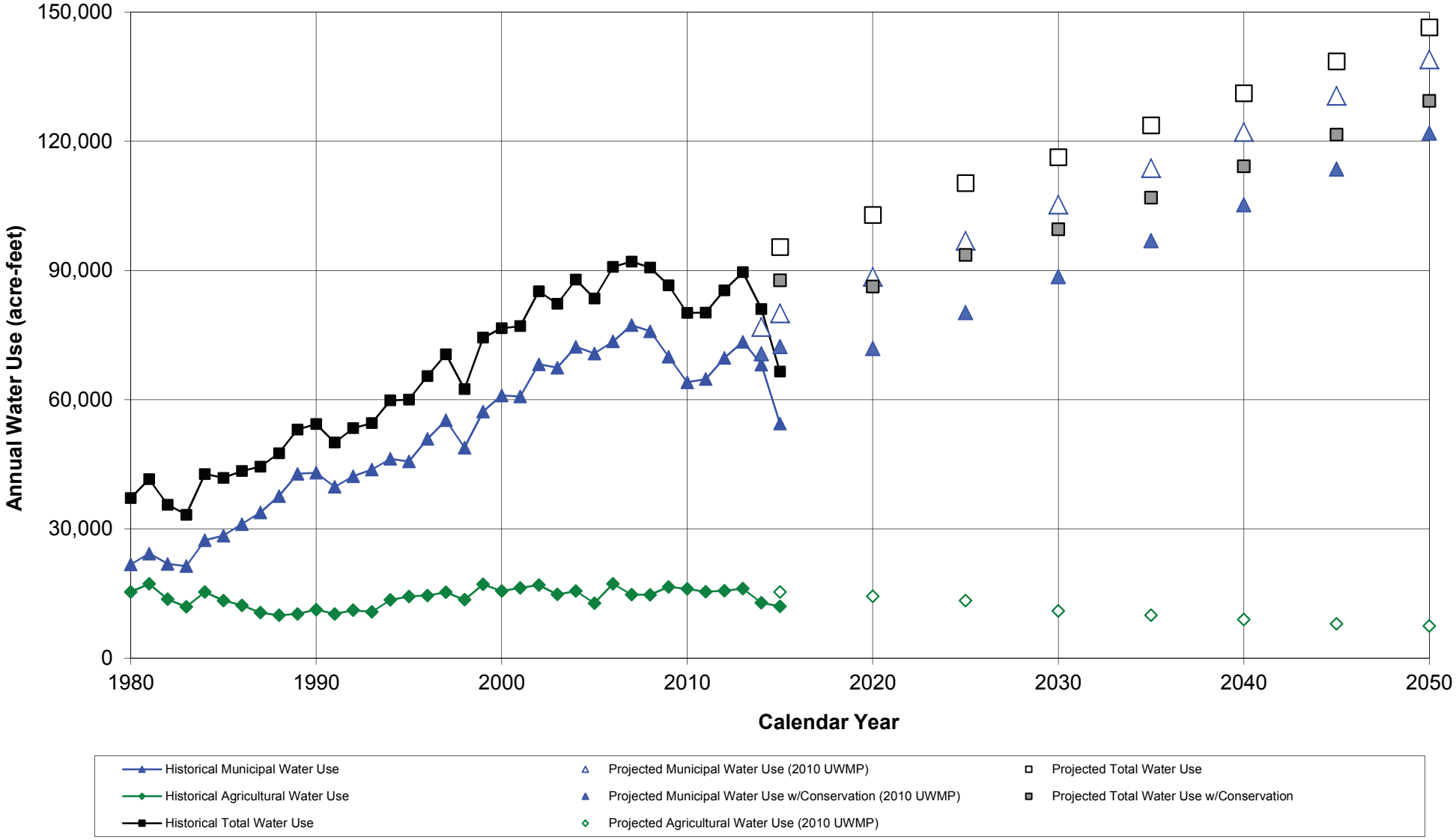
NCWD has taken a number of steps to comply with SBX7-7 and help NCWD customers efficiently use water which meets the requirements of the SCVWUESP. NCWD participates in multiple public outreach events every year promoting water use efficiency within the community and has implemented a variety of programs similar to those described above for Valencia Water Company. These programs include the following:

- **Residential Sprinkler Nozzle Program** - provides rebates to customers who replace standard irrigation spray nozzles with high efficiency nozzles.
- **Customized Water Efficiency Program** – provides rebates to customers who demonstrate a process or product that conserves water.
- **Turf Replacement Program** – NCWD participates with other Valley water purveyors in a turf replacement rebate program.
- **Water Efficiency Target (W.E.T.) Program** – provides customers a customized water usage "target" each month through their water bill to measure against their actual usage. If their usage is over their W.E.T., there will be various programs and opportunities for the customer to identify ways to reduce their usage and meet their target.

5.4 2015 Water Reductions

The residents, businesses, and city and county government agencies have responded to the calls for conservation by significantly reducing their 2015 water use by 18,969 ac-ft (6.2 billion gallons) compared to 2013 (about a 26 percent reduction). Water savings by water purveyor included:

- **VWC – 8,375 ac-ft (2,729 million gallons)**
- **SCWD – 7,813 ac-ft (2,545 million gallons)**
- **NCWD – 2,461 ac-ft (802 million gallons)**
- **LAC36 – 320 ac-ft (104 million gallons)**



LUHDORFF & SCALMANINI CONSULTING ENGINEERS

Figure 4-1
Historical and Projected Water Use
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