Executive Summary

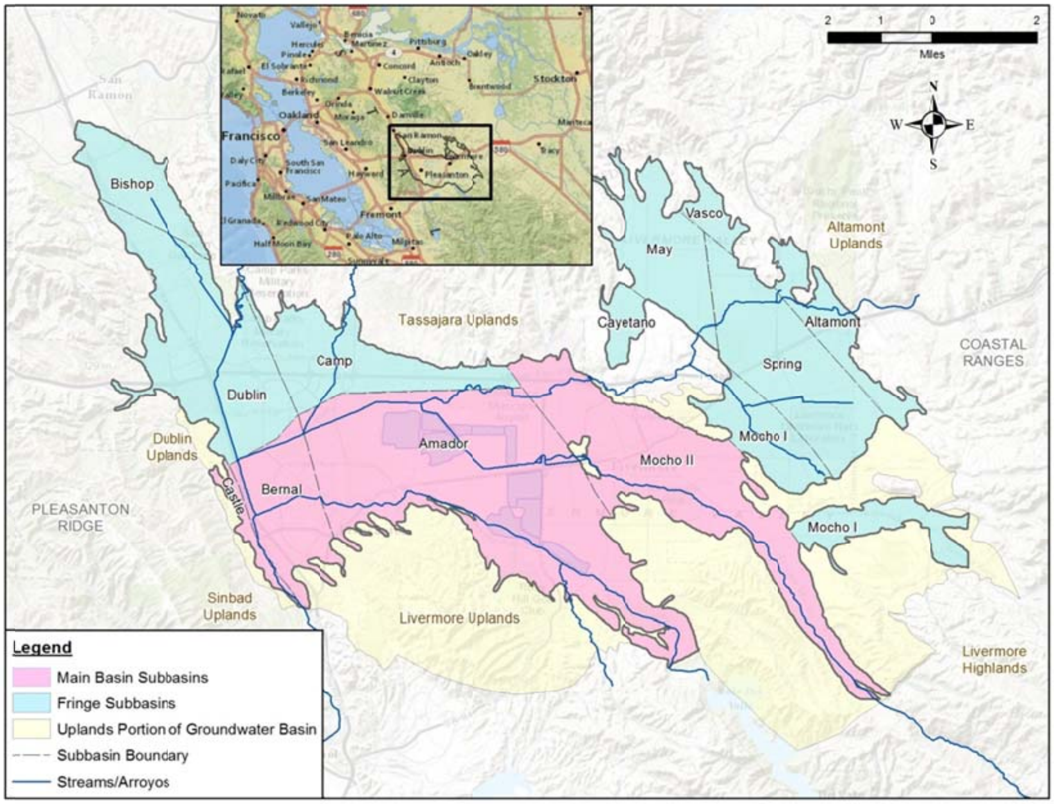
Introduction

The Annual Report for the Groundwater Management Program for the 2013 Water Year (October 2012 through September 2013), the format of which has changed significantly from previous years, summarizes this year's groundwater monitoring, evaluation, and management efforts in the Livermore Valley Groundwater Basin. Important results for each of the monitoring, evaluation, and management programs are summarized in this Executive Summary, while the details are provided in the following sections:

- Section 1.2: Hydrogeologic Setting
- Section 2.1: Climatological Monitoring
- Section 2.2: Surface Water Monitoring
- Section 2.3: Chain of Lakes Monitoring
- Section 2.4: Groundwater Monitoring
- Section 2.5: Subsidence Monitoring Program
- Section 2.6: Wastewater and Recycled Water
- Section 2.7: Land Use Monitoring Program
- Section 3.1: Groundwater Storage
- Section 3.2: Sustainable Water Supply
- Section 3.3: Sustainable Water Quality Management
- Section 3.4: Groundwater Model
- Section 3.5: Capital Projects

The programs presented in Chapter 2 and most of Chapter 3 are reported based on the Water Year (WY, October through September); however, due to other reporting obligations, the programs outlined in Section 3.2, Sustainable Water Supply, and Section 3.3.3, Groundwater Resource Protection Programs, are compiled and reported on a Calendar Year basis (CY, January through December).

Figure ES-1: Livermore Valley Groundwater Basin



Climatological Monitoring (Section 2.1)

For the 2013 Water Year (October 2012 to September 2013), rainfall in the Livermore-Amador Valley was about 78% of average, the second water year in a row with below-average rainfall. Rainfall was especially low for the 2013 Calendar Year (January to December 2013) at only 31% of the calculated average calendar year, a record low. Rainfall throughout the rest of Northern California for the Calendar Year was also at a record low at 27% of average.

Figure ES-2: Rainfall (Water Year Totals)

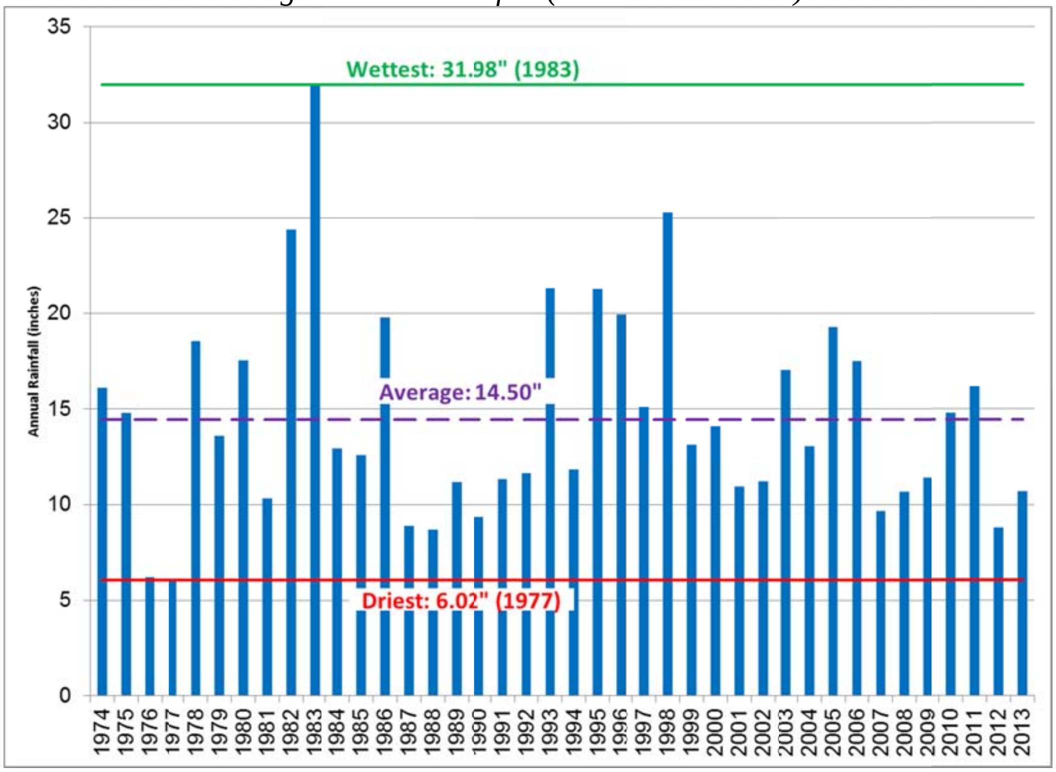
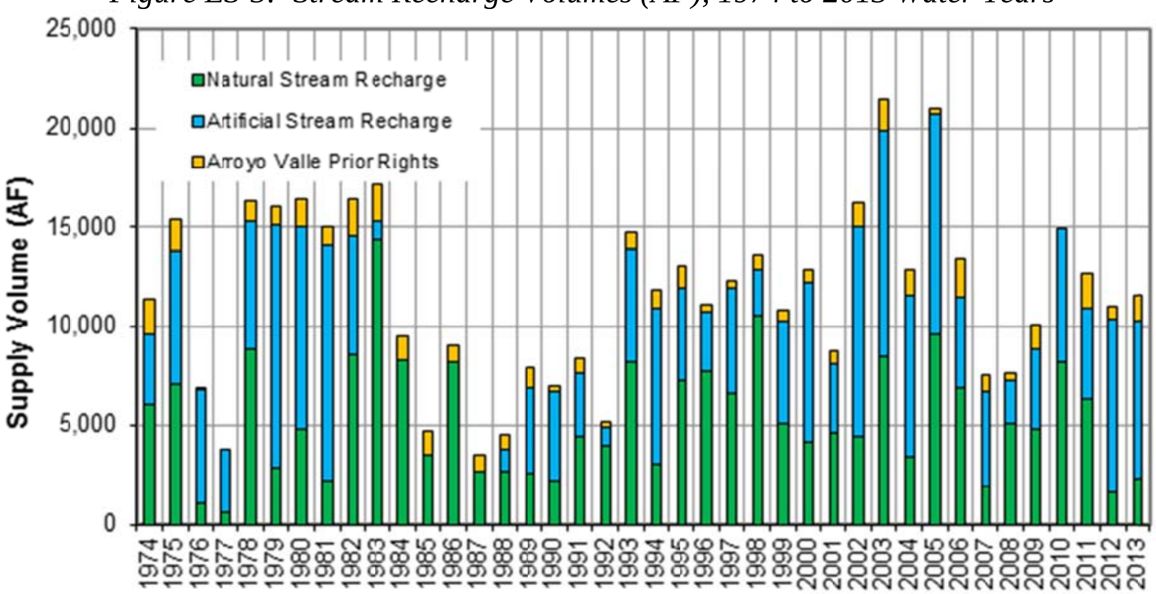


Figure ES-3: Stream Recharge Volumes (AF), 1974 to 2013 Water Years

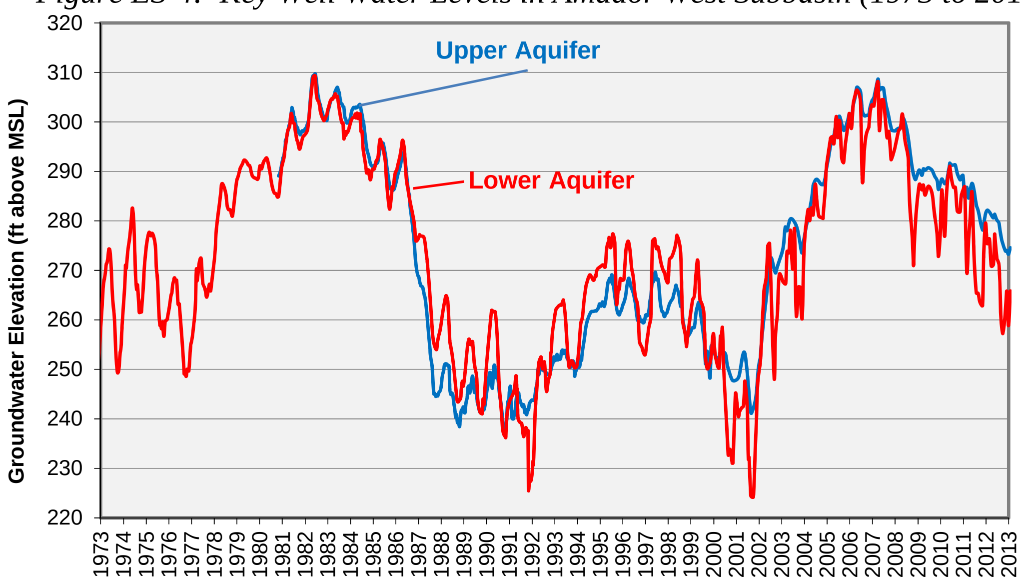


Note: Water Years are tracked October of the previous year through September of the water year.

Surface Water (Section 2.2)
As a result of the low rainfall throughout Northern California, natural stream recharge into the groundwater basin was about 40% of average. To mitigate the lack of natural water supplies into the groundwater basin, Zone 7 increased artificial stream recharge; however, Zone 7's ability to maximize the recharge was limited by planned outages of the State Water Project's delivery system and stream channel restoration construction along the recharge streams. In addition much of the recharge was offset by gravel mining dewatering operations that pumped groundwater to various ponds and arroyos where much was lost to evaporation and basin outflow.

Groundwater Elevations (Section 2.4.2)
As is usually the case, 2013 Water Year (October 2012 through September 2013) groundwater levels varied with seasonal recharge and extraction; generally the highest water levels are found in spring, at the end of the rainy season, and lowest at the end of the high demand summer/fall seasons. In general, for the first quarter of the 2013 Water Year (October 2012 to December 2012), groundwater elevations rose due to rainfall, artificial recharge, and reduced pumping. However, during the second to fourth quarters of the 2013 Water Year (January 2013 through September 2013), groundwater elevations leveled off and then dropped as rainfall recharge decreased and water demand increased, especially during the summer and fall seasons. As a net result, water levels at the end of the water year generally dropped (up to 9 feet) in both the upper and lower aquifers. The exception was the wells in the Mocho II Subbasin, where groundwater levels rose up to 25 feet.

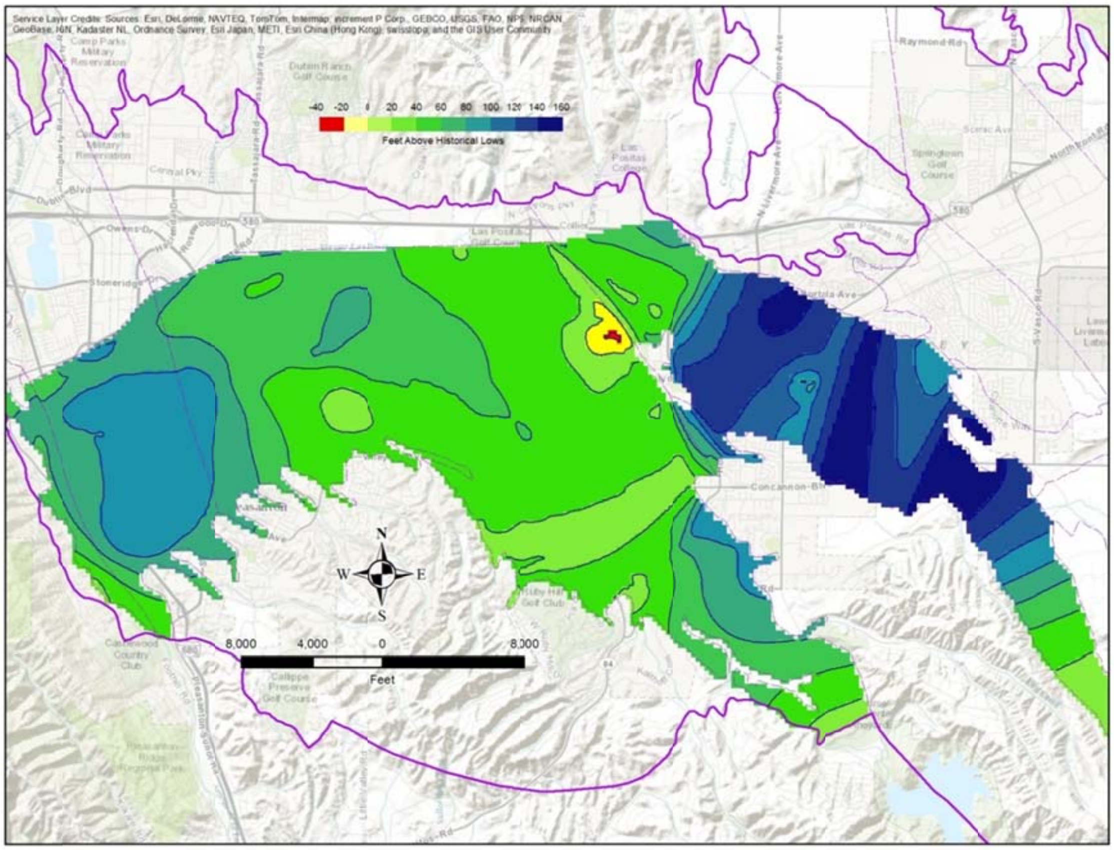
Figure ES-4: Key Well Water Levels in Amador West Subbasin (1973 to 2013)



Note: Water Years are tracked October of the previous year through September of the titled year.

In the lower aquifer, water levels in the vicinity of Zone 7's municipal wells were 38 to 82 ft above historical lows at the end of the water year. In the eastern part of the Amador Subbasin the groundwater elevation in one municipal well was about 20 ft below historical lows; however, it is possible that the water level in this well was not representative of a stabilized groundwater elevation. In the south-central portion of the Main Basin water levels ranged from 8 to 40 feet above historical lows.

Figure ES-5: Water Levels above Historical Lows (Fall 2013 Water Year [October 2012 through September 2013])



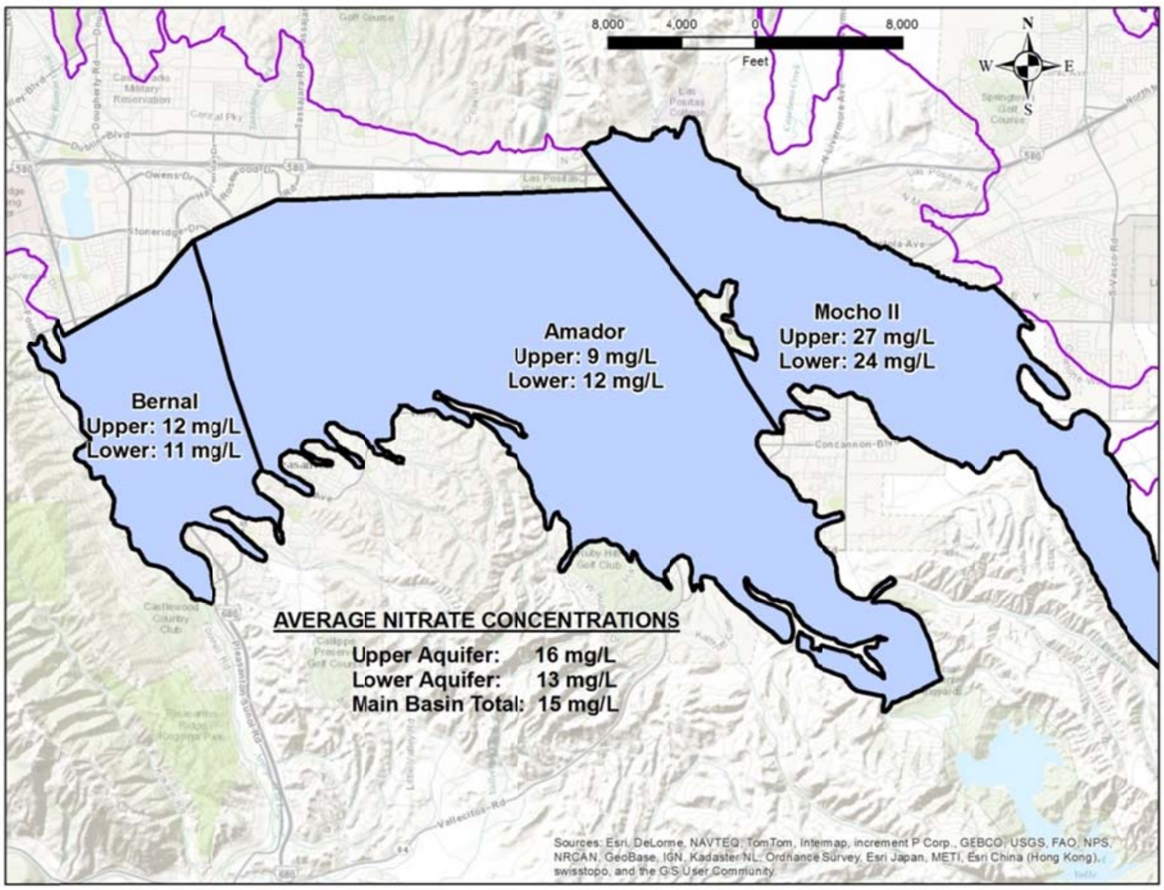
Groundwater Quality (Section 2.4.3)

Groundwater quality is generally good in the Main Basin. The main constituents of concern involved with meeting the Regional Water Quality Control Board's (RWQCB's) Basin Plan Objectives are salts (total dissolved solids [TDS]) and nitrate.

The calculated basin-wide average TDS concentration at the end of the 2013 Water Year (October 2012 through September 2013) was approximately 585 mg/L, with the upper aquifer averaging 647 mg/L and the lower aquifer averaging 509 mg/L. The Basin Plan objective is 500 mg/L for the Main Basin.

There are plume-like nitrate "hot spots" distributed across the Main and fringe basins, however the aquifer weighted basin-wide average nitrate concentration is 15 mg/L (as NO_3), well below the Basin Plan objective of 45 mg/L (*Figure ES-6*). The average nitrate concentration in the upper aquifer is approximately 16 mg/L, whereas the lower aquifer's nitrate concentration is 13 mg/L.

Figure ES-6: Average Nitrate Concentration by Subbasin (2013 Water Year [October 2012 through September 2013])

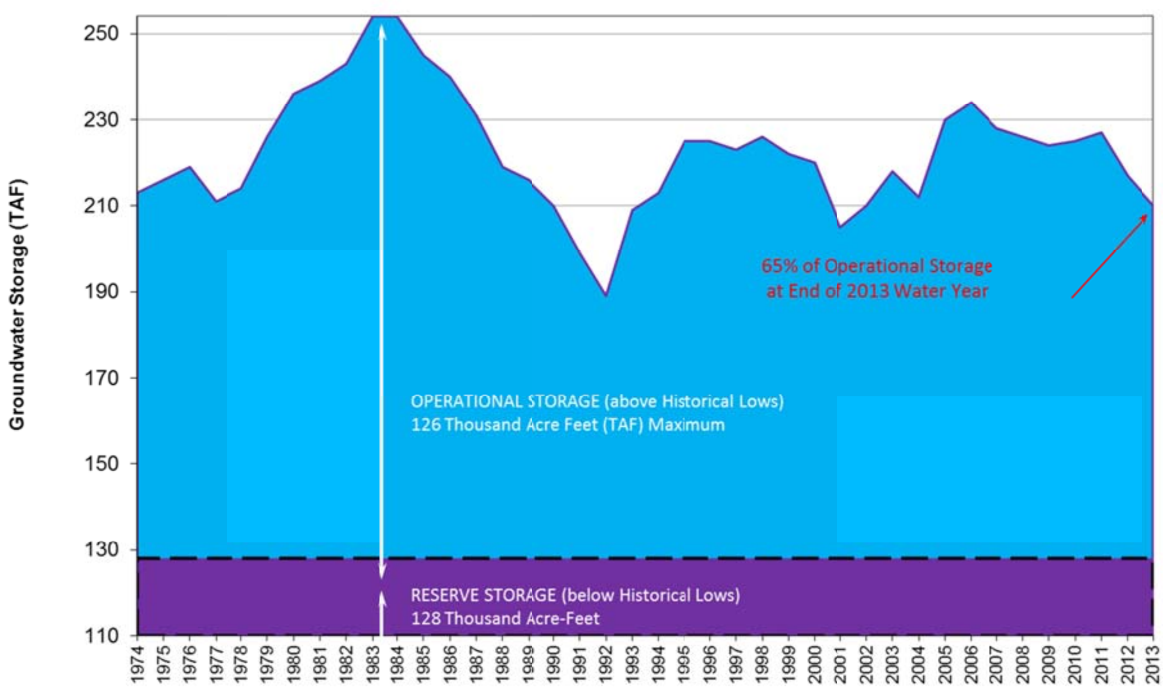


While there is no MCL for boron, it can become a problem for irrigated crops when it exceeds 1 or 2 mg/L, depending on the crop so the California Department of Health Services has a Notification Level of 1 milligram per liter (mg/L) for boron. Boron concentrations in the Livermore Valley are generally below 2 mg/L throughout the lower aquifers, but boron exists at elevated concentrations (up to 25.1 mg/L) in the upper aquifers in two main areas of the groundwater basin; in the eastern fringe basin area and along the boundary between the Main Basin and the Dublin and Camp fringe basins.

Groundwater Storage (Section 3.1)

During the 2013 Water Year (October 2012 through September 2013), groundwater supplies stored locally in the Main Basin decreased by approximately 7,000 acre-feet (AF). As a result 2013 Water Year ended with an estimated 200,000 AF of groundwater in total storage and 82,000 in operational (available above historical lows) storage. This represents about 65% of the Main Basin's operational storage capacity.

Figure ES-7: Groundwater Storage (1974 to 2013 Water Years)

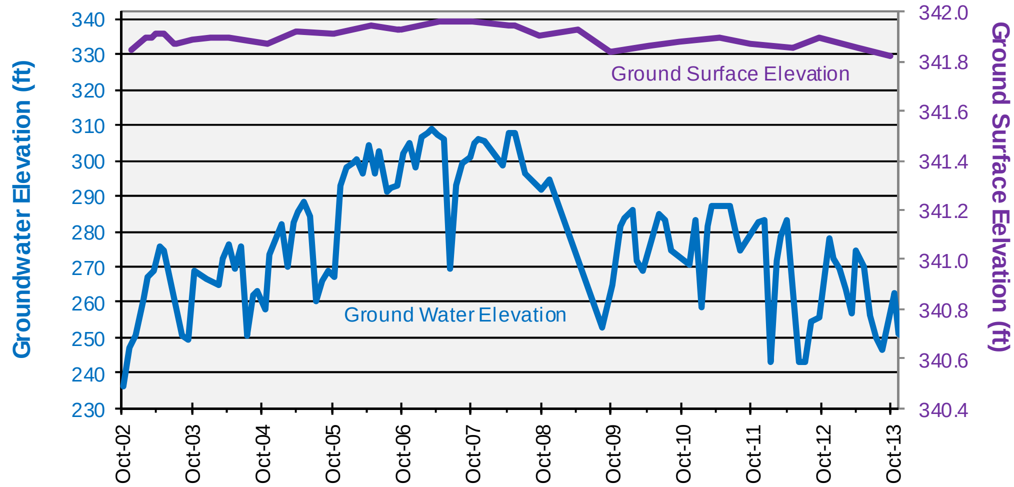


Note: Water Years are tracked October of the previous year through September of the water year.

Subsidence (Section 2.5)

As shown in *Figure ES-8*, land surface elevations showed localized decrease with a drop in the associated groundwater levels. However, there was no indication that inelastic subsidence occurred anywhere in the valley during the water year due to groundwater pumping.

Figure ES-8: Surface Elevation and Groundwater Levels at Mocho Wellfield



Wastewater and Recycled Water (Section 2.6)

In 2013 Water Year (October 2012 through September 2013), approximately 5,000 acre feet (AF) of the 20,000 AF of the wastewater produced in the Valley (about 25%) was recycled for irrigation projects: about 2,000 AF by the City of Livermore and about 3,000 AF by the Dublin San Ramon Services District (DSRSD). About 66% (about 1,300 AF) of the recycled water produced by the City of Livermore's Water Reclamation Plant (LWRP) was applied over the Main Basin; whereas the remainder of LWRP's and all of DSRSD's recycled water was applied on areas outside of the Main Basin, primarily on Fringe Basin areas.

Recycled water accounted for only 1.4% of the Main Basin's groundwater inflow component (i.e., recharging waters) in the 2013 Water Year but more importantly its use conserved up to 4,993 AF of groundwater storage, assuming that otherwise the irrigation demand would have been met with groundwater supplies. The recycled water from both wastewater plants met the State Department of Public Health "Title 22" water quality standards for irrigation uses during the 2013 Water Year.

Land Use Monitoring (Section 2.7)

For the 2013 Water Year (October 2012 through September 2013), the only major change in land use was the commercial and residential development of the El Charro Road area at Fallon Road just south of Interstate 580. Otherwise land use remained relatively unchanged from the 2012 Water Year (October 2011 through September 2012) and, in fact, remains very similar to the land use of the mid-2000s.

Chain of Lakes (Sections 2.3 and 3.2.5)

Mining activities continued for Vulcan Materials (formerly Calmat) and Cemex (formerly RMC and Lonestar). Vulcan Materials continued their mining in pit R24 (future Lake E). Cemex continued mining in pit P42, located just north of Arroyo Valle (in the future Lake B area). As a result of these mining operations, about 4,796 AF of groundwater were discharged to the Arroyo Mocho and subsequently flowed out of the Valley and approximately 700 AF of groundwater were lost during gravel processing. Evaporation from the mining ponds accounted for another 2,895 AF of groundwater loss. TDS concentrations in the mining area pits ranged from about 340 mg/L to over 1,400 mg/L, with the better water quality (lower TDS concentrations) found in the ponds that are intercepting groundwater and artificially recharged surface water. The higher TDS concentrations are found, for the most part, in the clay-lined ponds, where evaporation is concentrating the minerals in the water. In 2013, Zone 7 entered into an agreement with Vulcan Materials to extend the Vulcan discharge pipeline into Cope Lake to recapture groundwater pumped as part of Vulcan's mining operations. Under the new project, Vulcan will decant and convey surplus groundwater pumped from their active pits to Cope Lake, rather than discharging the water to the Arroyo Mocho where the majority would be lost as surface outflow to the Bay (as it was previously). A pipeline between Cope Lake and Lake I was also installed in May 2014 that will allow the discharged water to percolate into the groundwater basin.

Water Supply and Water Quality Management (Sections 3.2 and 3.3)

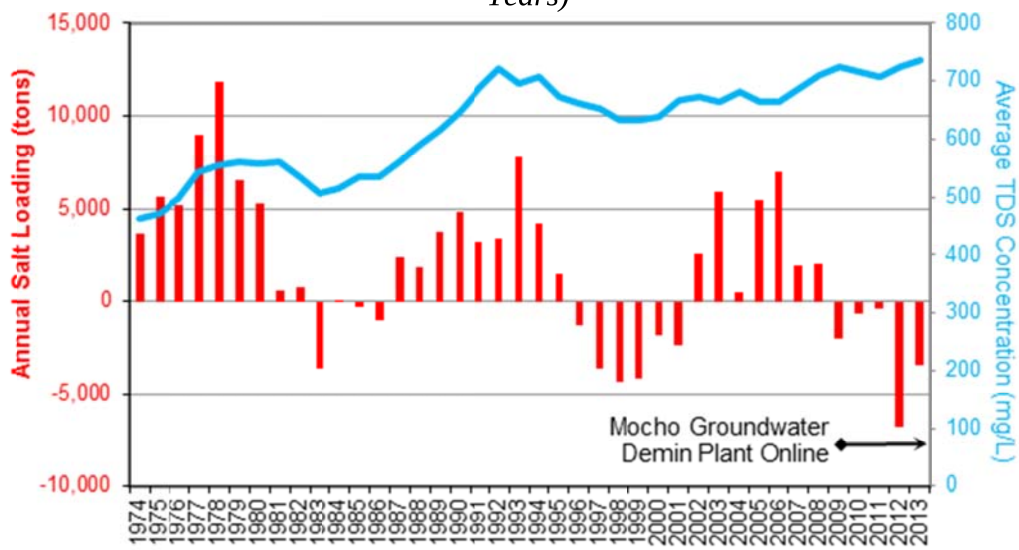
For the 2013 Calendar Year (January 2013 through December 2013) Zone 7 pumped 10,432 AF of groundwater; of which 575 AF was exported from the Valley to improve the salt balance as Mocho Groundwater Demineralization Plant (MGDP) brine and 29 AF was lost to outflow during well start-ups/purging; leaving 9,828 AF that was included in Zone 7's potable water production in 2013. This groundwater production represents 22% of Zone 7's total treated water production for 2013. Groundwater, including groundwater pumped by others, comprised about 39% of the total water used by the Valley in the 2013 Calendar Year.

For the 2013 Calendar Year, Zone 7's State Water Project (SWP) allocations were 65% of the Table A Contract Amount. Consequently, 40,800 AF of SWP water was imported into the Valley. Zone 7 released about 9,000 AF of this imported water to the local arroyos for artificial recharge and to satisfy conditions of its water rights permit.

At the end of the 2013 Calendar Year, Zone 7 carried-over about 200 AF of local water in Lake Del Valle, about 107,200 AF in out-of-basin groundwater banks (Semitropic at 82,000 AF and Cawelo at 25,200 AF), and about 18,000 AF as SWP carryover.

Hydrologic conditions and water operations in the 2013 Water Year (October 2012 through September 2013) resulted in a net calculated decrease of approximately 3,500 tons of salt from the Main Basin, after accounting for the 2,500 tons of salt removed by Zone 7's Mocho Groundwater Demineralization Plant (MGDP). Since 1974 and before Zone 7's MGDP began operating in 2009, approximately 84,275 tons of salt had been added to the Main Basin. This is equivalent to an average increase of about 2,400 tons of salt per year and a total theoretical TDS increase of about 260 mg/L since 1974. Since 2009, there has been a net reduction in Main Basin salts by approximately 13,378 tons of salt. However, during this same period, the theoretical basin-wide TDS increased by about 28 mg/L, due to several years of dry hydrologic conditions (especially in Water Years 2009 [October 2008 through September 2009], 2012 [October 2011 through September 2012], and 2013 [October 2012 through September 2013]).

Figure ES-9: Main Basin Salt Loading and Theoretical TDS Concentration (1974 to 2013 Water Years)



Note: Water Years are tracked October of the previous year through September of the water year.

Zone 7 is scheduled to complete an update to its 2004 Salt Management Plan (SMP) for the Livermore Valley Groundwater Basin in 2014. One purpose of the update is to add nutrient management considerations and constituents-of-emerging-concern (CEC) monitoring requirements to Zone 7's SMP to make it compliant with the State's 2009 Recycled Water Policy requirements for Salt/Nutrient Management Plans (SNMPs) (State Water Board, Resolution No. 2009-0011). The updated SMP will also assess the potential impacts of the water supply "portfolios" outlined in Zone 7's Water Systems Evaluation (Zone 7, 2011c) including salt loading impacts associated with increased recycled water use over the Main Basin, and evaluate the success of the salt management strategies recommended in the 2004 SMP to mitigate the Basin's net salt loading.

In 2013, Zone 7 calculated the current nitrate concentration (measured as NO_3) in each subbasin, aquifer, and the Main Basin as part of the SMP update. The average nitrate concentration for the Main Basin is 15 mg/L. All concentrations are well below the Basin Management Objective (BMO) (45 mg/L), however there are certain hotspots where the nitrate concentration does exceed the BMO. Preliminary nutrient loading calculations indicate that there is an overall net nitrogen loss from the Main Basin of about 28,000 pounds per year.

Groundwater Protection (Section 3.3.3)

Zone 7 issued 158 drilling permits in the 2013 Calendar Year, eight more than were issued in the 2012 Calendar Year. Zone 7 permit compliance staff inspected approximately 40% of all permitted well work in the 2013 Calendar Year. The remainder was self-monitored, but with permit requirements that reports be submitted to Zone 7.

In the 2013 Calendar Year, Zone 7 tracked the progress of 58 active contamination cases where contamination has been detected in groundwater or is threatening groundwater. Fourteen of the sites are designated as “High Priority” because they have impacted or are an immediate threat to potable water supply wells or surface water. Ten of the high priority sites are fuel leak cases; the other four cases involve solvent contamination (tetrachloroethylene [PCE]). Seven contamination cases were closed during the 2013 Calendar Year, after they were determined to no longer pose a threat to drinking water. Alameda County Environmental Health (ACEH) is the lead agency overseeing the cleanup of all of the fuel leak sites. Generally, the RWQCB oversees solvent contamination cases; however, two of the solvent cases identified by Zone 7 have not been incorporated into the RWQCB’s case load because the responsible parties have not yet been identified. For these two cases, Zone 7 staff continues to work with the RWQCB to identify potentially responsible parties so that they can begin pursuing investigation and cleanup.

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